

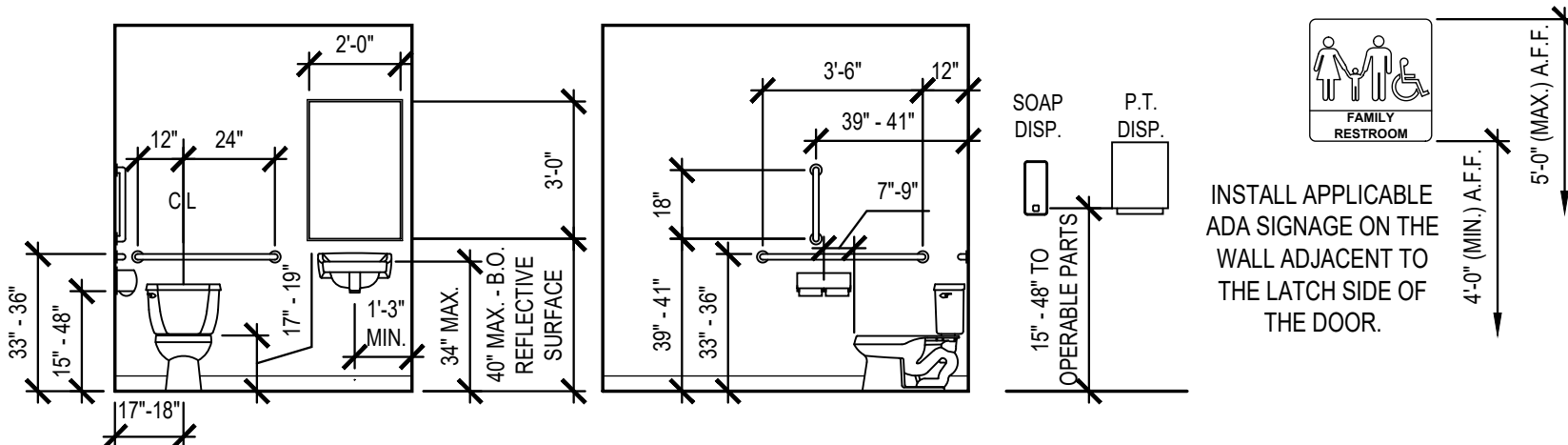
BUTLER SUPPLY

PERMIT SUBMITTAL

APRIL 29, 2025

ACCESSIBILITY NOTES:

- ACCESS TO THESE FACILITIES SHALL BE PROVIDED AT PRIMARY ENTRANCES, AS REQUIRED BY ADA.
- WALKS & SIDEWALKS SHALL HAVE A CONTINUOUS COMMON SURFACE NOT INTERRUPTED BY STEPS OR BY ABRUPT CHANGES IN LEVEL EXCEEDING 1/2" AND SHALL BE A MIN. OF 36" IN WIDTH.
- SURFACES WITH A SLOPE OF LESS THAN 6% GRADIENT SHALL BE AT LEAST AS SLIP RESISTANT AS THAT DESCRIBED AS A MEDIUM SALTED FINISH.
- SURFACES WITH A SLOPE OF 6% GRADIENT OR GREATER SHALL BE SLIP RESISTANT.
- SURFACE CROSS SLOPES SHALL NOT EXCEED 1/4" PER FOOT.
- WALKS, SIDEWALKS & PEDESTRIAN WAYS SHALL BE FREE OF GRATING WHENEVER POSSIBLE. FOR GRATINGS LOCATED IN THE SURFACE OF ANY OF THESE AREAS, GRID OPENINGS IN THE GRATINGS SHALL BE LIMITED TO 1/2" IN THE DIRECTION OF TRAFFIC FLOW.
- WHEN THE SLOPE IN THE DIRECTION OF TRAVEL OF ANY WALK EXCEEDS 1 VERTICAL TO 20 HORIZONTAL, IT SHALL COMPLY WITH THE PROVISIONS OF A PEDESTRIAN RAMP.
- ABRUPT CHANGES IN LEVEL ALONG ANY ACCESSIBLE ROUTE SHALL NOT EXCEED 1/2". WHEN CHANGES IN LEVEL DO OCCUR, THEY SHALL BE BEVELED WITH A SLOPE NO GREATER THAN 1:2, EXCEPT THAT LEVEL CHANGES NOT EXCEEDING 1/4" MAY BE VERTICAL. WHEN CHANGES IN LEVELS GREATER THAN 1/2" ARE NECESSARY, THEY SHALL COMPLY WITH THE REQUIREMENTS FOR CURB OR PEDESTRIAN RAMPS.
- EVERY REQUIRED EXIT DOORWAY SHALL BE SIZED FOR A DOOR NOT LESS THAN 3 FT. WIDE BY NOT LESS THAN 6'-8" HIGH CAPABLE OF OPENING 90° AND MOUNTED SO THAT THE CLEAR WIDTH OF THE EXIT WAY IS 32" MIN.
- THRESHOLDS MAY BE A MAX. 1/2" ABOVE ADJACENT FINISH FLOOR.
- MAXIMUM EFFORT TO OPERATE DOORS SHALL NOT EXCEED 8 1/2 LBS. FOR EXTERIOR DOORS AND 5 LBS. FOR INTERIOR DOORS, SUCH PULL OR PUSH EFFORT BEING APPLIED AT RIGHT ANGLES TO HINGED DOORS AND AT THE CENTER PLANE OF SLIDING OR FOLDING DOORS. COMPENSATING DEVICES OR AUTOMATIC DOOR OPERATORS MAY BE UTILIZED TO MEET THE ABOVE STANDARDS. WHEN FIRE DOORS ARE REQUIRED, THE MAXIMUM EFFORT TO OPERATE THE DOOR MAY BE INCREASED TO THE MAXIMUM ALLOWABLE BY THE APPROPRIATE ADMINISTRATIVE AUTHORITY, NOT TO EXCEED 15 LBS.
- THE BOTTOM 10" OF ALL DOORS, EXCEPT AUTOMATIC AND SLIDING, SHALL HAVE A SMOOTH UNINTERRUPTED SURFACE.
- PROVIDE LEVER-TYPE HARDWARE, PANIC BARS, PUSH - PULL ACTIVATING BARS OR OTHER HARDWARE DESIGNED TO PROVIDE PASSAGE WITHOUT REQUIRING TIGHT GRASPING, TIGHT PINCHING, OR TWISTING OF THE WRIST TO OPERATE THE HARDWARE. (34" TO 48" A.F.F.)
- PROVIDE 17" (MIN.) OR 18" (MAX.) FROM ADJACENT WALL TO CENTERLINE OF WATER CLOSET.
- PROVIDE A 30"x48" CLEAR SPACE WITHIN THE TOILET ROOM THAT DOES NOT ENCROACH INTO THE DOOR SWING.
- GRAB BARS LOCATED ON EACH SIDE, OR ONE SIDE AND THE BACK OF PHYSICALLY DISABLED TOILET COMPARTMENTS SHALL BE SECURELY ATTACHED 33" MIN. AND 36" MAX. FROM THE FINISHED FLOOR TO THE TOP OF THE GRAB BAR AND PARALLEL TO THE FLOOR. THE SPACE BETWEEN WALL-MOUNTED GRAB BARS AND THE WALL SHALL BE 1 1/2". GRAB BARS AT THE SIDE SHALL BE 42" LONG, AND THE BACK END SHALL BE LOCATED 12" FROM THE BACK WALL. GRAB BARS AT THE BACK SHALL BE NOT LESS THAN 36" LONG WITH THE END CLOSEST TO THE SIDE WALL MOUNTED 12" FROM THE CENTER OF THE WATER CLOSET. THE DIAMETER OR WIDTH OF THE GRIPPING SURFACES OF A GRAB BAR SHALL BE 1 1/4" TO 1 1/2" OR THE SHAPE SHALL PROVIDE AN EQUIVALENT GRIPPING SURFACE.
- WATER CLOSET HEIGHT SHALL BE 17" (MIN.) OR 19" (MAX.) MEASURED TO THE TOP OF THE TOILET SEAT TO THE FINISHED FLOOR. CONTROLS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST. CONTROLS FOR FLUSH VALVES SHALL BE MOUNTED ON THE WIDE SIDE OF TOILET AREAS, NO MORE THAN 44" A.F.F. THE FORCE REQUIRED TO ACTIVATE CONTROLS SHALL BE NO GREATER THAN 5 LBS. OF FORCE.
- URINALS SHALL BE 17" (MAX.) ABOVE THE FLOOR AND PROJECT 13 1/2" FROM THE WALL. URINALS SHALL HAVE A CLEAR SPACE OF 30"x48" IN FRONT. FLUSH VALVES SHALL BE AUTOMATIC OR MOUNTED NO MORE THAN 44" A.F.F. IF HAND-OPERATED.
- IN FRONT OF LAVATORIES, PROVIDE A 30"x48" CLEAR SPACE LOCATED 25" (MAX.) FROM THE LEADING EDGE OF THE LAVATORY TOWARD THE MOUNTING WALL. KNEE CLEARANCE SHALL BE 11" DEEP (MIN.) AT 9" A.F.F. AND 8" DEEP (MIN.) AT 27" A.F.F. BETWEEN 9" AND 27" A.F.F., THE KNEE CLEARANCE SHALL BE PERMITTED TO REDUCE AT A RATE OF 1" IN DEPTH FOR EACH 6" IN HEIGHT.
- ALL ACCESSIBLE LAVATORIES SHALL BE MOUNTED WITH THE RIM OR COUNTER SURFACE NO HIGHER THAN 34" A.F.F.
- HOT WATER AND DRAIN PIPES UNDER LAVATORIES SHALL BE INSULATED OR OTHERWISE COVERED. THERE SHALL BE NO SHARP OR ABRASIVE SURFACES UNDER LAVATORIES.



H2 TYP. ADA TOILET DIMENSIONS

SCALE: =

CONSTRUCTION NOTES:

- PERFORM ALL WORK IN ACCORDANCE WITH ACCEPTABLE TRADE PRACTICE TO ENSURE THE HIGHEST QUALITY FINISHED PRODUCT - EXPRESSED OR IMPLIED. PERFORM ALL WORK BY SKILLED MECHANICS IN ACCORDANCE WITH ESTABLISHED STANDARDS OF WORKMANSHIP IN EACH OF THE VARIOUS TRADES.
- WHEN THE PROJECT REQUIREMENTS REQUIRE THAT THE INSTALLATION OF WORK SHALL COMPLY WITH MANUFACTURER'S INSTRUCTIONS, PERFORM THE WORK IN STRICT ACCORDANCE WITH THE MOST CURRENT WRITTEN MANUFACTURER'S INSTRUCTIONS.
- ALL PRODUCTS AND EQUIPMENT SHALL BE DELIVERED IN UNDAMAGED CONDITION AND STORED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO AVOID DISRUPTION OF THE WORK OR DAMAGE TO THE ITEMS. REPLACE DAMAGED OR UNFIT MATERIALS, AT NO COST TO THE OWNER.
- COORDINATE BLOCKING REQUIREMENTS WITH ADJACENT OR RELATED TRADES, ACCESSORIES, EQUIPMENT AND FIXTURES. INSTALL REQUIRED BLOCKING AT NO ADDITIONAL COST TO THE CONTRACT.
- ALL WEATHER-EXPOSED SURFACES SHALL HAVE A WEATHER-RESISTIVE BARRIER. EXTERIOR OPENINGS SHALL BE FLASHED IN SUCH A MANNER AS TO MAKE THEM WATERPROOF.
- REPAIR PROPERTY DAMAGE BY THE INSTALLERS TO A LIKE NEW CONDITION, OR REPLACE DAMAGED SURFACES AND MATERIALS OF THE PREVIOUSLY INSTALLED WORK BY OTHER TRADES, INSTALLERS, AND SUBCONTRACTORS.
- ALLOWABLE TOLERANCES - UNLESS OTHERWISE NOTED OR INDICATED, THE FOLLOWING TOLERANCES SHALL APPLY TO ALL WORK:
 - ALL VERTICAL SURFACES SHALL BE PLUMB OR CONSTRUCTED TO THE EXACT SLOPES OR ANGLES INDICATED.
 - ALL HORIZONTAL SURFACES SHALL BE LEVEL OR CONSTRUCTED TO THE EXACT ANGLE INDICATED OR INTENDED.
 - WALL AND SOFFIT INTERSECTIONS SHALL BE 90° OR THE EXACT ANGLE INDICATED OR INTENDED.
 - ALL CORNERS AND EDGES SHALL BE STRAIGHT AND TRUE WITHOUT DENTS, WAVES, BULGES OR OTHER BLEMISHES.
 - ALL JOINTS SHALL BE TIGHT, STRAIGHT, EVEN, AND SMOOTH.
 - ALL OPERABLE ITEMS SHALL OPERATE SMOOTHLY WITHOUT STICKING OR BINDING AND WITHOUT EXCESSIVE
- THE CONTRACTOR SHALL NOTIFY THE OWNER WHEN THE WORK IS SUBSTANTIALLY COMPLETE AND READY FOR INSPECTION. UPON INSPECTION, PROVIDE WRITTEN OPERATION AND MAINTENANCE INSTRUCTIONS AND WARRANTIES FOR ALL EQUIPMENT AND MATERIALS INSTALLED. PROVIDE WRITTEN GUARANTEES FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THE WORK.
- FAUCET CONTROLS AND OPERATING MECHANISMS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST. THE FORCE REQUIRED TO ACTIVATE CONTROLS SHALL BE NO GREATER THAN 5 LBS. LEVER-OPERATED, PUSH-TYPE, AND ELECTRONIC CONTROLLED MECHANISMS ARE EXAMPLES OF ACCEPTABLE DESIGNS. SELF-CLOSING VALVES ARE ALLOWED IF THE FAUCET IS OPEN FOR AT LEAST 10 SECONDS.
- LOCATE PAPER TOWEL DISPENSERS, SOAP DISPENSERS, SANITARY NAPKIN DISPENSERS, AND WASTE RECEPTACLES WITH ALL OPERABLE PARTS BETWEEN 15" AND 48" A.F.F.
- LOCATE TISSUE DISPENSERS ON THE WALL 7" (MIN.) AND 9" (MAX.) FROM THE FRONT EDGE OF THE TOILET SEAT TO THE CENTERLINE OF DISPENSER WITH THE OUTLET BETWEEN 15" AND 48" A.F.F.
- ACCESSIBLE RESTROOMS SHALL BE PROVIDED WITH SIGNAGE DESIGNED AND LOCATED PER SECTION 703 OF THE ADA DESIGN GUIDELINES.
- DOORS IN ACCESSIBLE ROUTES SHALL BE DESIGNED TO MEET CLEARANCE REQUIREMENTS PER SECTION 404 OF THE ADA DESIGN GUIDELINES.
- WALKS, HALLS, CORRIDORS, PASSAGEWAYS, AISLES OR OTHER CIRCULATION SPACES SHALL HAVE 80" MINIMUM CLEAR HEADROOM.
- OBJECTS PROJECTING FROM WALLS WITH THEIR LEADING EDGES BETWEEN 27" AND 80" ABOVE THE FINISH FLOOR SHALL PROTRUDE NO MORE THAN 4" INTO WALKS, HALLS, CORRIDORS, PASSAGEWAYS OR AISLES. OBJECTS MOUNTED AT OR BELOW 27" ABOVE FINISH FLOOR MAY PROTRUDE ANY AMOUNT.
- OBJECTS THAT ARE BETWEEN 27" AND 80" A.F.F. AND MOUNTED ON POSTS MAY EXTEND BEYOND THE POSTS A MAXIMUM OF 12". OBJECTS MOUNTED BETWEEN POSTS, WHERE THE SPACE BETWEEN THE POSTS IS GREATER THAN 12", THE LOWEST EDGE OF THE OBJECT SHALL BE LOCATED 27" MAX. AND 80" MIN. A.F.F.
- IF CARPET OR CARPET TILE IS USED ON A GROUND OR FLOOR SURFACE IN A COMMON USE AREA, IT SHALL HAVE FIRM BACKING OR NO BACKING. THE MAXIMUM PILE HEIGHT SHALL BE 1/2" EXPOSED EDGES OF CARPET SHALL BE FASTENED TO FLOOR SURFACES AND HAVE TRIM ALONG THE EXPOSED EDGE, AND TRIM SHALL COMPLY WITH THE REQUIREMENTS FOR CHANGES IN LEVEL.

GENERAL NOTES:

- THE CONTRACTOR SHALL SECURE AND PAY FOR GOVERNMENT LICENSES, INSPECTIONS, TESTING, TEMPORARY UTILITIES AND PERMITS AS REQUIRED BY THE CONSTRUCTION DOCUMENTS AND/OR REGULATORY BODY HAVING AUTHORITY.
- CONTRACTORS SHALL VISIT THE SITE WHILE BIDDING AND SHALL FAMILIARIZE THEMSELVES WITH EXISTING CONDITIONS AND THE REQUIREMENTS OF THE PROJECT AND CONSTRUCTION DOCUMENTS PRIOR TO DEVELOPING THEIR BID, FABRICATION / CONSTRUCTION, AND PURCHASING. MATERIAL QUANTITIES SHALL BE BASED ON ACTUAL FIELD CONDITIONS AND MEASUREMENTS. DO NOT RELY ON SCALING DRAWINGS FOR ACCURATE DIMENSIONS. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT OR OWNER'S REPRESENTATIVE OF ANY DISCREPANCIES, CONFLICTS OR OMISSIONS DISCOVERED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECTIONS AND/OR REPAIRS REQUIRED FOR FAILING TO DO SO.
- THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ALL CONSTRUCTION DOCUMENTS TO THEIR SUBCONTRACTORS AS REQUIRED FOR THEM TO DEVELOP A COMPLETE BID FOR THEIR WORK AND TO HAVE A COMPLETE UNDERSTANDING OF COORDINATION NEEDED WITH OTHER SUBCONTRACTORS FOR RELATED HIDDEN OR EXPOSED WORK TO ENSURE EFFICIENT AND ORDERLY INSTALLATION.
- THE ARCHITECT ASSUMES NO LIABILITY FOR THE SERVICES AND/OR CONSTRUCTION DOCUMENTS OF DESIGN SUB-CONSULTANTS COMPILED INTO THE SET OF DOCUMENTS ISSUED BY THE ARCHITECT. THESE DESIGN SERVICES MAY INCLUDE, BUT ARE NOT LIMITED TO, CIVIL, LANDSCAPE, STRUCTURAL, MECHANICAL, PLUMBING, ELECTRICAL, PRE-ENGINEERED METAL BUILDING DESIGN, TILT-UP DESIGN, TRUSS SYSTEM DESIGN, AUTOMATIC FIRE SPRINKLER AND/OR ALARM SYSTEMS, LOW-VOLTAGE ELECTRICAL, TELECOMMUNICATION AND SECURITY SYSTEMS AND GUTTER / DOWNSPOUT DESIGN.
- UNLESS SPECIFICALLY NOTED OTHERWISE, THE CONTRACTOR SHALL PROVIDE AND PAY FOR LABOR, MATERIALS, EQUIPMENT, MACHINERY, SCAFFOLDING, SHORING, TOOLS, LAYOUT, ON-SITE DIMENSIONING, TRANSPORTATION, UTILITIES, AND OTHER FACILITIES AND SERVICES NECESSARY FOR PROPER EXECUTION AND COMPLETION OF THE WORK AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS. THIS SHALL ALSO INCLUDE NECESSARY CUTTING, PATCHING AND REPAIRING OF EXISTING CONSTRUCTION MATERIALS IN PLACE. ALL WORK AND MATERIAL SHALL COMPLY WITH THE APPLICABLE GOVERNING CODES LISTED.
- WHERE DETAILS AND DESIGN INTENT ARE NOT CLEAR, THE CONTRACTOR SHALL CONSULT THE ARCHITECT FOR CLARIFICATION PRIOR TO PROCEEDING WITH THE WORK.
- THE CONTRACTOR SHALL DESIGN AND INSTALL ADEQUATE SHORING AND BRACING FOR STRUCTURAL MODIFICATIONS, INSTALLATIONS AND ERECTION.
- CONTRACTORS SHALL TAKE CARE TO PROTECT ADJACENT AREAS FROM DUST AND DAMAGE DURING THE CONSTRUCTION PROCESS AND SHALL CLEAN UP AFTER THEMSELVES AT THE END OF EACH WORKING DAY. ANY DAMAGE DONE TO ADJACENT AREAS MUST BE REPAIRED TO MATCH ORIGINAL CONDITIONS OR TO THE OWNER'S SATISFACTION. REPAIRS ARE TO BE PAID FOR BY THE CONTRACTOR RESPONSIBLE.
- THE CONTRACTOR SHALL NOTIFY THE ARCHITECT OF ANY ADDITIONAL WORK OR REVISIONS REQUIRED DUE TO SITE CONDITIONS OR ADDITIONAL REQUIREMENTS OF ANY REGULATORY BODIES HAVING AUTHORITY.
- FOR THE DURATION OF THE PROJECT AND AT ALL TIMES OF EACH DAY, THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOB SITE CONDITIONS, SECURITY AND SAFETY FOR WORKERS AND THE GENERAL PUBLIC, AS REQUIRED BY THE REGULATORY BODY HAVING AUTHORITY.
- THE GENERAL CONTRACTOR SHALL PURCHASE AND MAINTAIN INSURANCE COVERAGE IN ACCORDANCE WITH THE REQUIREMENTS OF THE OWNER. VERIFY AND COORDINATE WITH THE OWNER'S REPRESENTATIVE FOR ANY ADDITIONAL REQUIREMENTS.
- THE OWNER OR THE OWNER'S SUBCONTRACTORS MAY OCCUPY PORTIONS OF THE PROJECT DURING THE FINAL STAGE OF CONSTRUCTION. COORDINATE AND COOPERATE WITH THE OWNER TO MINIMIZE CONFLICT AND FACILITATE THE OWNER'S OPERATION.
- THE CONTRACTOR SHALL PROVIDE SECURITY OF THE WORK, INCLUDING TOOLS AND UNINSTALLED MATERIALS. PROTECT THE WORK, STORED PRODUCTS, CONSTRUCTION EQUIPMENT, AND OWNERS' PROPERTY FROM THEFT AND VANDALISM, AND PROTECT THE PREMISES FROM ENTRY BY UNAUTHORIZED PERSONNEL UNTIL FINAL ACCEPTANCE BY THE OWNER.
- CONTRACTOR SHALL COORDINATE STAGING AREAS AS REQUIRED BY THE LANDLORD / OWNER.
- THE CONTRACTOR SHALL VERIFY THE SIZE AND LOCATION OF ALL EXISTING UTILITIES.
- THE STRUCTURAL ENGINEER AND ARCHITECT MUST BE NOTIFIED AND MUST GIVE APPROVAL PRIOR TO ANY STRUCTURAL MEMBER(S) BEING CUT OR MODIFIED TO ACCOMMODATE THE INSTALLATION OF ANY PIPES, DUCTS OR OTHER CONSTRUCTION.
- THE STRUCTURAL ENGINEER AND ARCHITECT MUST BE NOTIFIED AND MUST GIVE APPROVAL PRIOR TO ANY MODIFICATION TO THE ROOF SYSTEM OR ADDING ANY ADDITIONAL ROOF-MOUNTED EQUIPMENT.

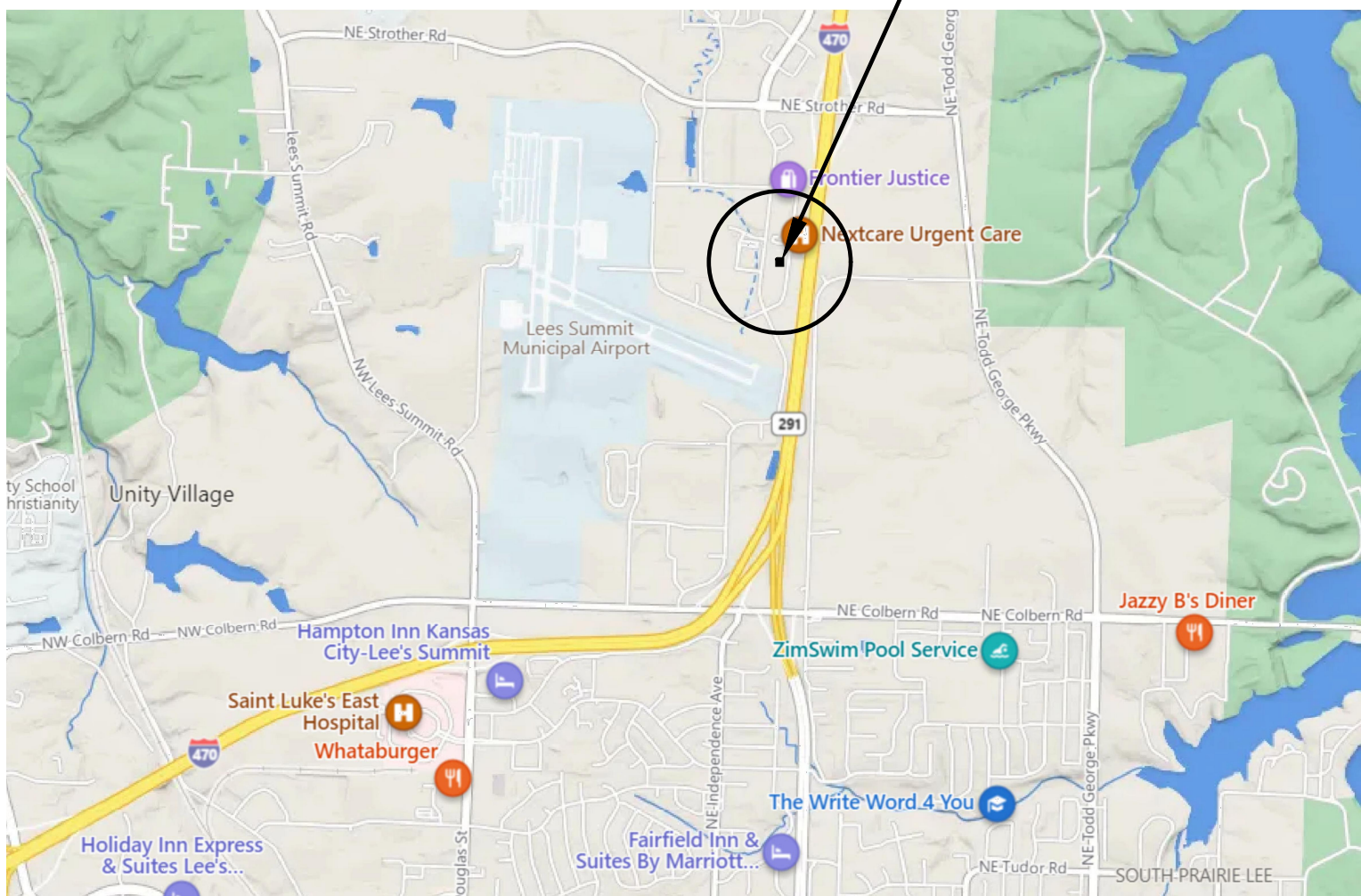
DISCLAIMER:

THESE DRAWINGS ARE CONSIDERED A "BUILDER'S SET" AND BY BEGINNING CONSTRUCTION, THE CONTRACTOR GUARANTEES TO THE ARCHITECT, THAT THE CONTRACTOR HAS THE COMPETENCE AND SKILL IN CONSTRUCTION NECESSARY TO BUILD THE PROJECT WITH THESE DRAWINGS. THE CONTRACTOR WILL BE REQUIRED TO ADAPT THE DRAWINGS TO ACTUAL FIELD CONDITIONS AND MAKE LOGICAL ADJUSTMENTS IN FIT, FORM, DIMENSION AND QUANTITY. IN THE EVENT ADDITIONAL DETAIL OR GUIDANCE IS NEEDED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT. FAILURE TO GIVE NOTICE SHALL RELIEVE THE ARCHITECT OF RESPONSIBILITY FOR ANY RESULTANT EXPENSES, REPAIRS OR ADDITIONAL WORK. IT IS UNDERSTOOD AND AGREED THAT IF THE ARCHITECT IS NOT HIRED TO DO CONSTRUCTION OBSERVATION OR ANY OTHER CONSTRUCTION PHASE SERVICES, THAT THE ENTITY HIRED TO PERFORM SUCH SERVICES ASSUMES ALL RESPONSIBILITY FOR THESE SERVICES, AND THE CLIENT WAIVES ANY CLAIMS AGAINST THE ARCHITECT THAT MAY BE IN ANY WAY CONNECTED THERETO.

ABBREVIATIONS:*

*NOTE: THE CONTRACTOR SHALL NOTIFY THE ARCHITECT OF ANY ABBREVIATIONS NOT NOTED AND REQUEST CLARIFICATIONS.

@	AT	JT	JOINT
ACT	ACOUSTIC CEILING TILE		
ADJ	ADJUSTABLE	KS	KNEE SPACE
AFF	ABOVE FINISHED FLOOR		
ALUM	ALUMINUM	L	LONG
ANOD	ANODIZED	LB (#)	POUND
ATT	ATTENUATION	LVL	LAMINATED VENEER LUMBER
BD	BOARD	MAX	MAXIMUM
BET	BETWEEN	MDO	MEDIUM DENSITY OVERLAY
BF	BARRIER FREE	MECH	MECHANICAL
BIT	BITUMINOUS	MFR	MANUFACTURER
BLDG	BUILDING	MICRO	MICROWAVE
BO	BOTTOM OF	MIN	MINIMUM
BTM	BOTTOM	MO	MASONRY OPENING
		MR	MOISTURE RESISTANT
		MTD	MOUNTED
		MTL	METAL
		NIC	NOT IN CONTRACT
		NO	NUMBER
		NOM	NOMINAL
		O.C.	ON CENTER
		O.D.	OUTSIDE DIAMETER
		O.H.	OVERHEAD OR OPPOSITE HAND
		OSB	ORIENTED STRAND BOARD
		OZ	OUNCE
		PREFAB	PREFABRICATED
		PLAM	PLASTIC LAMINATE
		PLYWD	PLYWOOD
		PR	PAIR
		PT	PRESSURE TREATED
		PNT	PAINT
		PEMB	PRE-ENGINEERED MTL BLDG
		DISHWASHER	QUANTITY
EA	EACH	R	RISER
EJ	EXPANSION JOINT	RCP	REFLECTED CEILING PLAN
EQ	EQUAL	REF	REFRIGERATOR, REFERENCE
ETR	EXISTING TO REMAIN	REINF	REINFORCED
EXG	EXISTING	REQD	REQUIRED
EXP	EXPOSED TO STRUCTURE	RM	ROOM
		RO	ROUGH OPENING
FD	FLOOR DRAIN	RCB	RUBBER COVE BASE
FE	FIRE EXTINGUISHER, FINISHED		
END	FINISHED FLOOR	SC	SEALED CONCRETE
F&I	FURNISH AND INSTALL	SF	SQUARE FEET
FLR	FLOOR	SIM	SIMILAR
FR	FIRE RETARDANT	SQ	SQUARE
FRP	FIBER-REINFORCED PLASTIC	SS	STAINLESS STEEL
FV	FIELD VERIFY	ST	STAIN
GA	GAUGE	T	TREAD
GALV	GALVANIZED	TBD	TO BE DETERMINED
GC	GENERAL CONTRACTOR	TO	TOP OF
GFI	GROUND FAULT CIRCUIT INTERRUPTER	TYP	TYPICAL
GL	GLASS	UNO	UNLESS NOTED OTHERWISE
GYP	GYPSPUM BOARD	VCT	VINYL COMPOSITION TILE
		VERT	VERTICAL
H	HIGH		
HB	HOSE BIB		
HT	HEIGHT	W	WASHER, WIDE
HDW	HARDWARE	W	WITH
HRWD	HARDWOOD	WD	WOOD
HM	HOLLOW METAL	WH	WATER HEATER
HR	HOUR	WC	WALK-IN CLOSET
		WWF	WELDED WIRE FABRIC
IN	INCH		
INSUL	INSULATION		



F1 VICINITY MAP

SCALE: =

Architect:
MICHAEL MOORES, RA
t: (816) 819-4601

Client:
Butler Supply
t: (573) 819-4400

Consultants:

MEP Engineering:
EBS
ENGINEERED BUILDING SYSTEMS
t: (913) 735-5654

Revisions to technical submissions which are not made or approved by the licensee are prohibited.

Seal:



MICHAEL MOORES, MO Architect #2009032812

Project Number: 2503

Project Type: TENANT FINISH

Project Name and Address:

BUTLER SUPPLY

2736 NE McBaine Drive
Lee's Summit, Missouri 64064

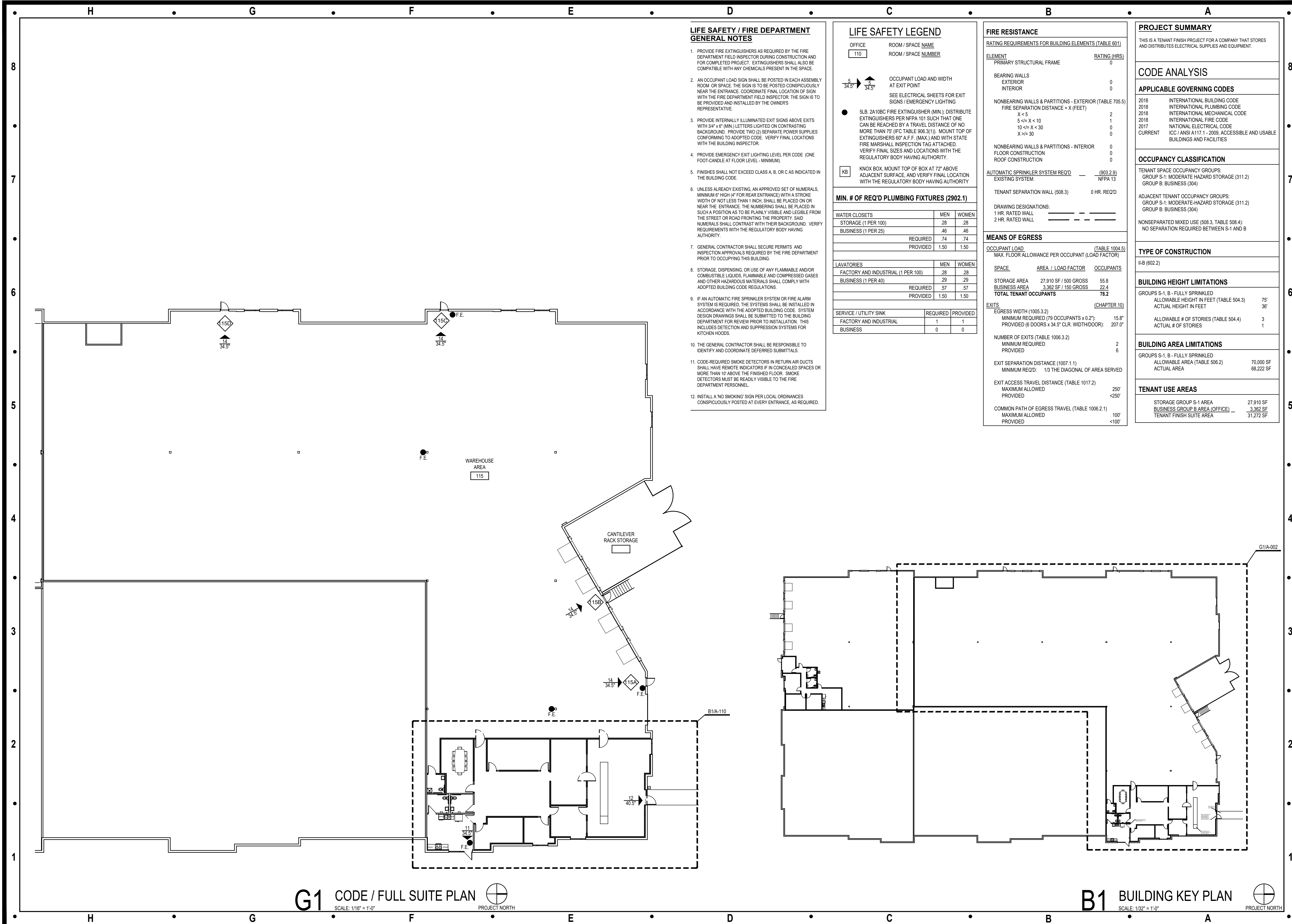
Issue: Date:

Permit Submittal 04.29.25

Sheet Title:

COVER / MAP
GENERAL NOTES
ADA NOTES

A-001



LIFE SAFETY / FIRE DEPARTMENT GENERAL NOTES

1. PROVIDE FIRE EXTINGUISHERS AS REQUIRED BY THE FIRE DEPARTMENT FIELD INSPECTOR DURING CONSTRUCTION AND FOR COMPLETED PROJECT. EXTINGUISHERS SHALL ALSO BE COMPATIBLE WITH ANY CHEMICALS PRESENT IN THE SPACE.
2. AN OCCUPANT LOAD SIGN SHALL BE POSTED IN EACH ASSEMBLY ROOM OR SPACE. THE SIGN IS TO BE POSTED CONSPICUOUSLY NEAR THE ENTRANCE. COORDINATE FINAL LOCATION OF SIGN WITH THE FIRE DEPARTMENT FIELD INSPECTOR. THE SIGN IS TO BE PROVIDED AND INSTALLED BY THE OWNER'S REPRESENTATIVE.
3. PROVIDE INTERNALLY ILLUMINATED EXIT SIGNS ABOVE EXITS WITH 3/4" x 8" (MIN.) LETTERS LIGHTED ON CONTRASTING BACKGROUND. PROVIDE TWO (2) SEPARATE POWER SUPPLIES CONFORMING TO ADOPTED CODE. VERIFY FINAL LOCATIONS WITH THE BUILDING INSPECTOR.
4. PROVIDE EMERGENCY EXIT LIGHTING LEVEL PER CODE (ONE FOOT-CANDLE AT FLOOR LEVEL - MINIMUM).
5. FINISHES SHALL NOT EXCEED CLASS A, B, OR C AS INDICATED IN THE BUILDING CODE.
6. UNLESS ALREADY EXISTING, AN APPROVED SET OF NUMERALS, MINIMUM 6" HIGH (4" FOR REAR ENTRANCE) WITH A STROKE WIDTH OF NOT LESS THAN 1 INCH, SHALL BE PLACED ON OR NEAR THE ENTRANCE. THE NUMBERING SHALL BE PLACED IN SUCH A POSITION AS TO BE PLAINLY VISIBLE AND LEGIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY. SAID NUMERALS SHALL CONTRAST WITH THEIR BACKGROUND. VERIFY REQUIREMENTS WITH THE REGULATORY BODY HAVING AUTHORITY.
7. GENERAL CONTRACTOR SHALL SECURE PERMITS AND INSPECTION APPROVALS REQUIRED BY THE FIRE DEPARTMENT PRIOR TO OCCUPANCY THIS BUILDING.
8. STORAGE, DISPENSING, OR USE OF ANY FLAMMABLE AND/OR COMBUSTIBLE LIQUIDS, FLAMMABLE AND COMPRESSED GASES AND OTHER HAZARDOUS MATERIALS SHALL COMPLY WITH ADOPTED BUILDING CODE REGULATIONS.
9. IF AN AUTOMATIC FIRE SPRINKLER SYSTEM OR FIRE ALARM SYSTEM IS REQUIRED, THE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE ADOPTED BUILDING CODE. SYSTEM DESIGN DRAWINGS SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT FOR REVIEW PRIOR TO INSTALLATION. THIS INCLUDES DETECTION AND SUPPRESSION SYSTEMS FOR KITCHEN HOODS.
10. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO IDENTIFY AND COORDINATE DEFERRED SUBMITTALS.
11. CODE-REQUIRED SMOKE DETECTORS IN RETURN AIR DUCTS SHALL HAVE REMOTE INDICATORS IF IN CONCEALED SPACES OR MORE THAN 10' ABOVE THE FINISHED FLOOR. SMOKE DETECTORS MUST BE READILY VISIBLE TO THE FIRE DEPARTMENT PERSONNEL.
12. INSTALL A "NO SMOKING" SIGN PER LOCAL ORDINANCES CONSPICUOUSLY POSTED AT EVERY ENTRANCE, AS REQUIRED.

LIFE SAFETY LEGEND

OFFICE
ROOM / SPACE NAME
ROOM / SPACE NUMBER

6
34.5"

● S.L.B. 2A10BC FIRE EXTINGUISHER (MIN.); DISTRIBUTE EXTINGUISHERS PER NFPA 101 SUCH THAT ONE CAN BE REACHED BY A TRAVEL DISTANCE OF NO MORE THAN 75' (IFC TABLE 906.3(1)). MOUNT TOP OF EXTINGUISHERS 60" A.F.F. (MAX.) AND WITH STATE FIRE MARSHALL INSPECTION TAG ATTACHED. VERIFY FINAL SIZES AND LOCATIONS WITH THE REGULATORY BODY HAVING AUTHORITY.

KB KNOX BOX, MOUNT TOP OF BOX AT 72" ABOVE ADJACENT SURFACE, AND VERIFY FINAL LOCATION WITH THE REGULATORY BODY HAVING AUTHORITY.

MIN. # OF REQ'D PLUMBING FIXTURES (2902.1)

	MEN	WOMEN
WATER CLOSETS		
STORAGE (1 PER 100)	.28	.28
BUSINESS (1 PER 25)	.46	.46
REQUIRED	.74	.74
PROVIDED	1.50	1.50

	MEN	WOMEN
LAVATORIES		
FACTORY AND INDUSTRIAL (1 PER 100)	.28	.28
BUSINESS (1 PER 40)	.29	.29
REQUIRED	.57	.57
PROVIDED	1.50	1.50

	REQUIRED	PROVIDED
SERVICE / UTILITY SINK		
FACTORY AND INDUSTRIAL	1	1
BUSINESS	0	0

FIRE RESISTANCE

RATING REQUIREMENTS FOR BUILDING ELEMENTS (TABLE 601)

ELEMENT	RATING (HRS)
---------	--------------

PRIMARY STRUCTURAL FRAME 0

BEARING WALLS
EXTERIOR 0
INTERIOR 0

NONBEARING WALLS & PARTITIONS - EXTERIOR (TABLE 705.5)

FIRE SEPARATION DISTANCE = X (FEET)
X < 5 2
5 <= X < 10 1
10 <= X < 30 0
X >= 30 0

NONBEARING WALLS & PARTITIONS - INTERIOR
FLOOR CONSTRUCTION 0
ROOF CONSTRUCTION 0

AUTOMATIC SPRINKLER SYSTEM REQ'D (903.2.9)
EXISTING SYSTEM: NFPA 13

TENANT SEPARATION WALL (508.3) 0 HR. REQ'D

DRAWING DESIGNATIONS:
1 HR. RATED WALL
2 HR. RATED WALL

MEANS OF EGRESS

OCCUPANT LOAD (TABLE 1004.5)
MAX. FLOOR ALLOWANCE PER OCCUPANT (LOAD FACTOR)

SPACE	AREA / LOAD FACTOR	OCCUPANTS
-------	--------------------	-----------

STORAGE AREA 27,910 SF / 500 GROSS 55.8
BUSINESS AREA 3,362 SF / 150 GROSS 22.4
TOTAL TENANT OCCUPANTS 78.2

EXITS (CHAPTER 10)

EGRESS WIDTH (1005.3.2)
MINIMUM REQUIRED (79 OCCUPANTS x 0.2') 15.8"
PROVIDED (6 DOORS x 34.5' CLR. WIDTH/DOOR) 207.0"

NUMBER OF EXITS (TABLE 1006.3.2)
MINIMUM REQUIRED 2
PROVIDED 6

EXIT SEPARATION DISTANCE (1007.1.1)
MINIMUM REQ'D: 1/3 THE DIAGONAL OF AREA SERVED

EXIT ACCESS TRAVEL DISTANCE (TABLE 1017.2)
MAXIMUM ALLOWED 250'
PROVIDED <250'

COMMON PATH OF EGRESS TRAVEL (TABLE 1006.2.1)
MAXIMUM ALLOWED 100'
PROVIDED <100'

PROJECT SUMMARY

THIS IS A TENANT FINISH PROJECT FOR A COMPANY THAT STORES AND DISTRIBUTES ELECTRICAL SUPPLIES AND EQUIPMENT.

CODE ANALYSIS

APPLICABLE GOVERNING CODES

2018 INTERNATIONAL BUILDING CODE
2018 INTERNATIONAL PLUMBING CODE
2018 INTERNATIONAL MECHANICAL CODE
2018 INTERNATIONAL FIRE CODE
2017 NATIONAL ELECTRICAL CODE
CURRENT ICC / ANSI A117.1 - 2009, ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES

OCCUPANCY CLASSIFICATION

TENANT SPACE OCCUPANCY GROUPS:
GROUP S-1: MODERATE HAZARD STORAGE (311.2)
GROUP B: BUSINESS (304)

ADJACENT TENANT OCCUPANCY GROUPS:
GROUP S-1: MODERATE HAZARD STORAGE (311.2)
GROUP B: BUSINESS (304)

NONSEPARATED MIXED USE (508.3, TABLE 508.4):
NO SEPARATION REQUIRED BETWEEN S-1 AND B

TYPE OF CONSTRUCTION

II-B (602.2)

BUILDING HEIGHT LIMITATIONS

GROUPS S-1, B - FULLY SPRINKLED
ALLOWABLE HEIGHT IN FEET (TABLE 504.3) 75'
ACTUAL HEIGHT IN FEET 36'

ALLOWABLE # OF STORIES (TABLE 504.4) 3
ACTUAL # OF STORIES 1

BUILDING AREA LIMITATIONS

GROUPS S-1, B - FULLY SPRINKLED
ALLOWABLE AREA (TABLE 506.2) 70,000 SF
ACTUAL AREA 68,222 SF

TENANT USE AREAS

STORAGE GROUP S-1 AREA 27,910 SF
BUSINESS GROUP B AREA (OFFICE) 3,362 SF
TENANT FINISH SUITE AREA 31,272 SF

Architect:
MICHAEL MOORES, RA
t: (816) 516-4861

Client:
Butler Supply
t: (573) 819-4400

Consultants:

MEP Engineering:
EBS
ENGINEERED BUILDING SYSTEMS
t: (913) 735-5654

Revisions to technical submissions which are not made or approved by the licensee are prohibited.

Seal:



MICHAEL MOORES, MO Architect #2009032812

Project Number: 2503
Project Type: TENANT FINISH
Project Name and Address:

BUTLER SUPPLY
2736 NE McBaine Drive
Lee's Summit, Missouri 64064

Issue: Date:
Permit Submittal 04.29.25

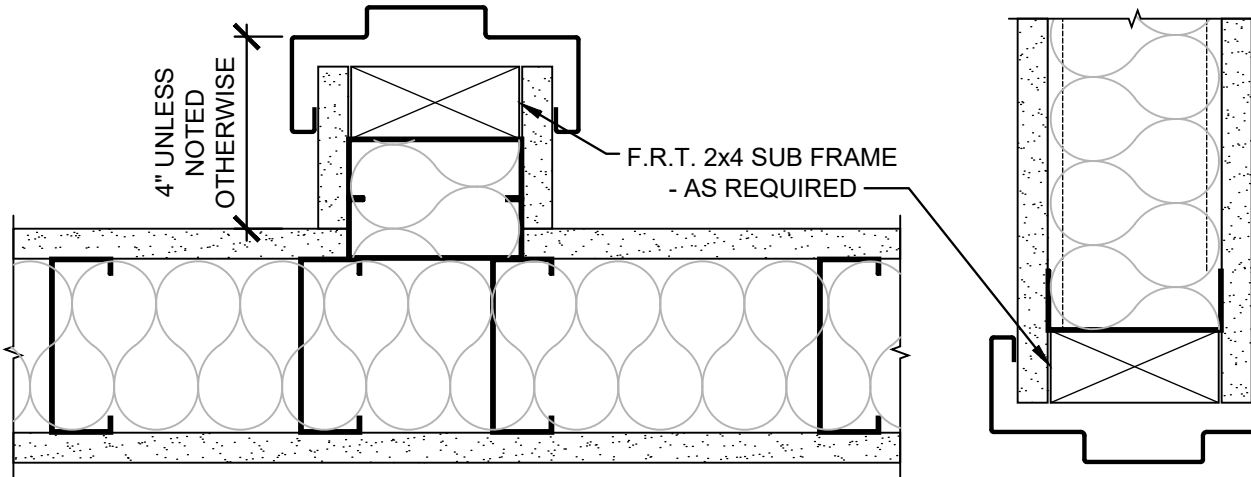
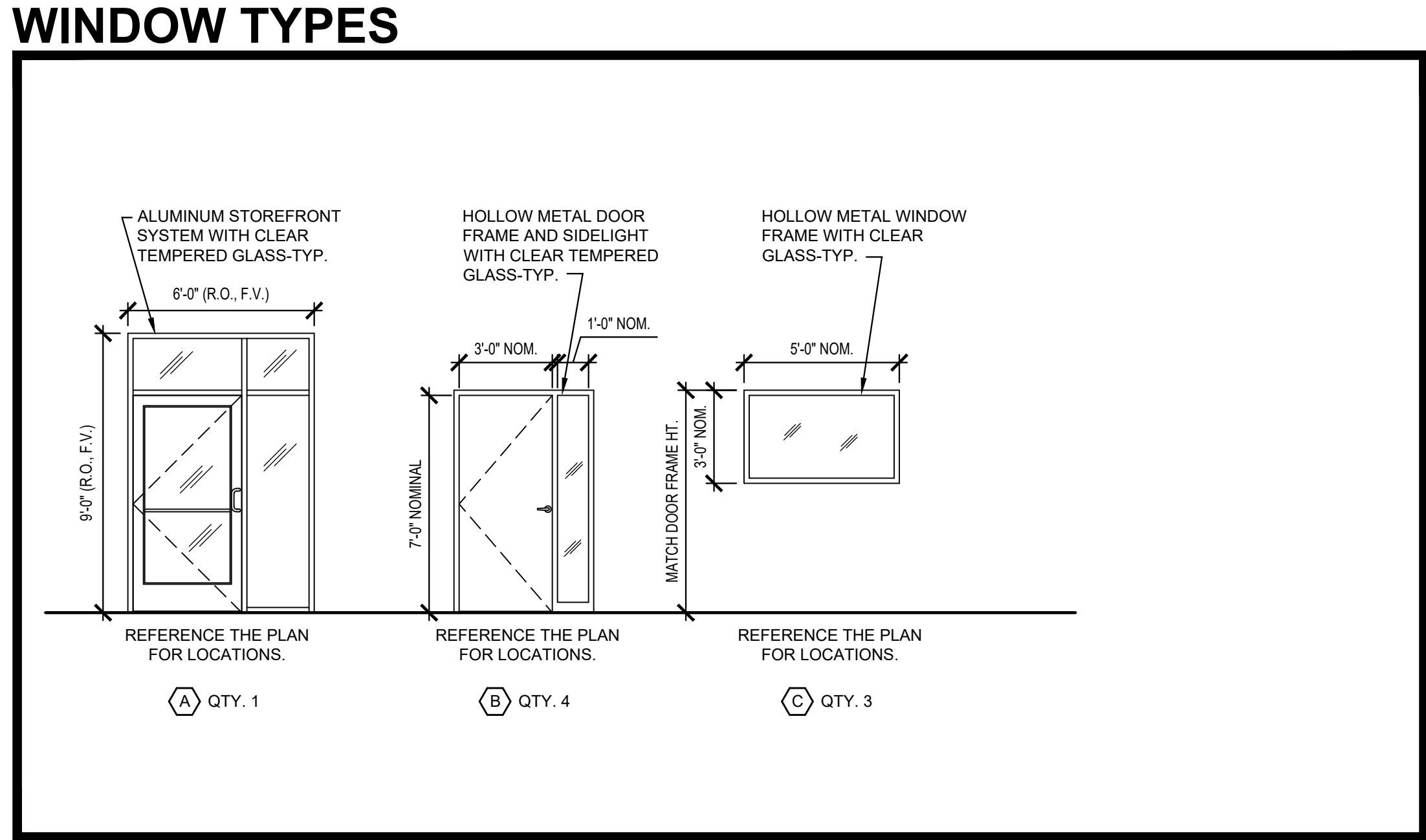
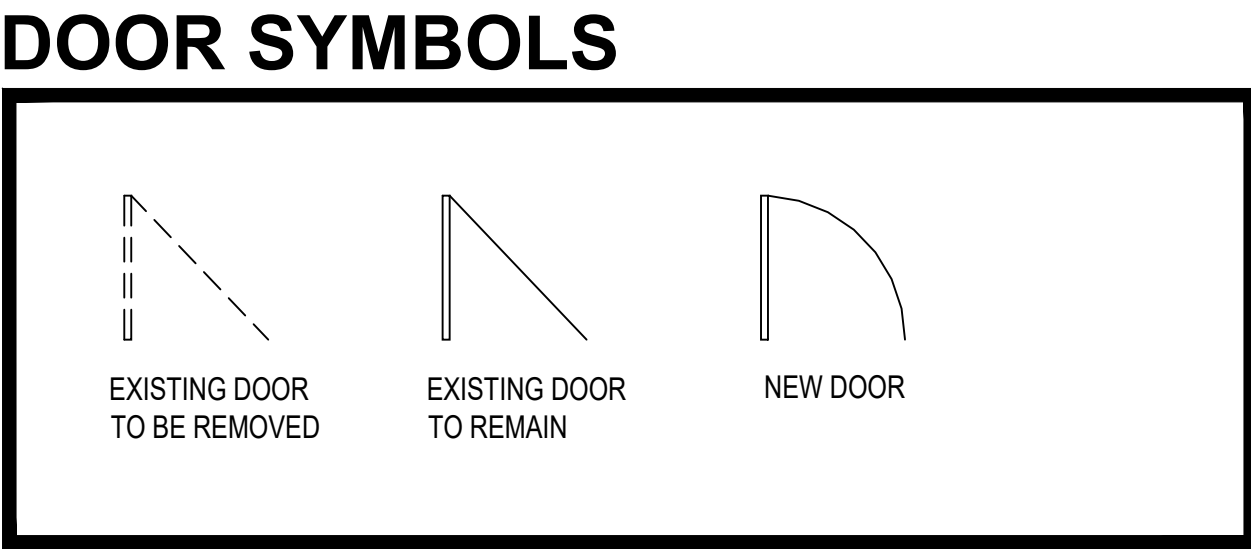
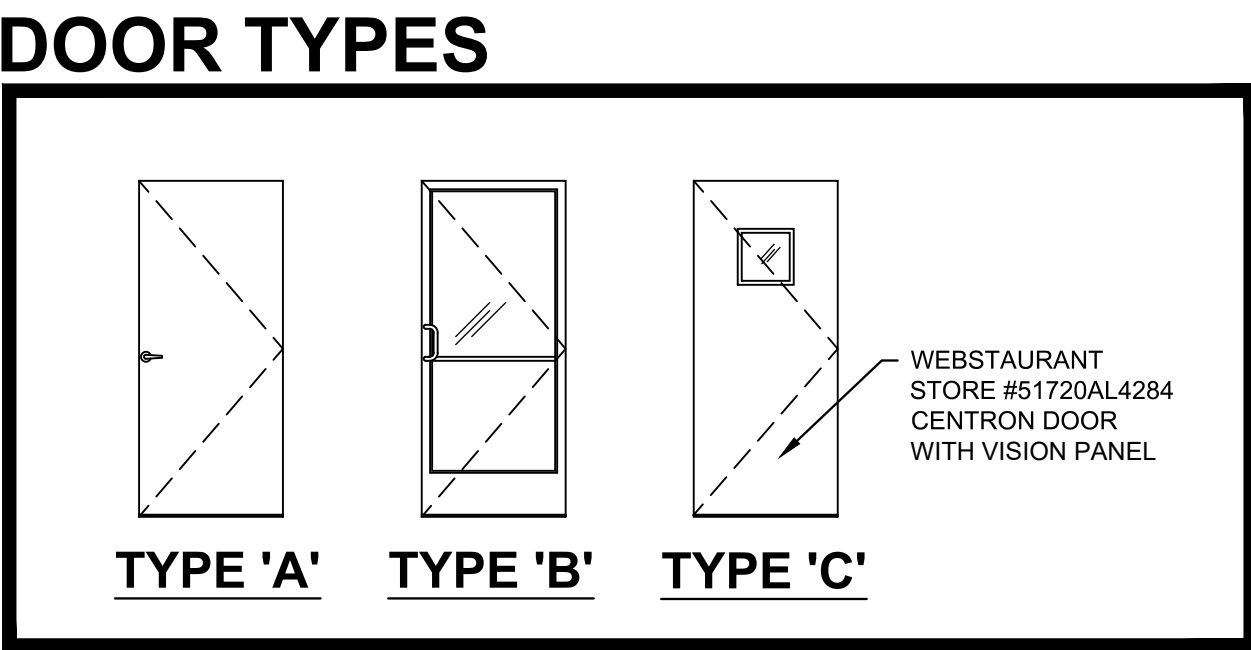
Sheet Title:

BUILDING KEY PLAN
FULL SUITE PLAN
CODE INFORMATION

A-002

DOOR AND FRAME LEGEND

DOOR	MATERIAL	DESCRIPTION
	WD	STAIN-GRADE FLUSH / SLAB SOLID CORE WOOD DOOR.
	HM	HOLLOW METAL - 18 GAUGE COLD ROLLED STEEL / POLYSTYRENE FOAM CORE (CLASSIFICATION SD1 - LEVEL 2 - MODEL 1) 1 3/4"
	AL	ALUMINUM
	ETR	EXISTING TO REMAIN
FRAME	MATERIAL	DESCRIPTION
	WD	WOOD
	HM	HOLLOW METAL - 16 GAUGE COLD ROLLED STEEL
	AL	ALUMINUM
	ETR	EXISTING TO REMAIN



H2 HOLLOW METAL FRAME DETAILS
SCALE: 3" = 1'-0"

HARDWARE SETS

①	1 1/2 PAIR BUTT HINGES, 1" PUSH / PULL SET, KEYED (INTERIOR AND EXTERIOR) CYLINDER LOCK WITH LOCKED INDICATOR, SURFACE-MOUNTED CLOSER, ALUMINUM THRESHOLD, SWEEP AND PILE WEATHERSEAL SET
②	DOUBLE-ACTING SPRING-LOADED HINGES PER DOOR MANUFACTURER
③	3-HINGES 1-LEVER-HANDLE OFFICE FUNCTION LOCKSET 1-WALL STOP
④	EXISTING TO REMAIN
⑤	3-HINGES 1-LEVER-HANDLE PRIVACY FUNCTION LOCKSET 1-WALL STOP

MATERIAL LEGEND

ITEM	DESCRIPTION
ETR	EXISTING TO REMAIN
WD	WOOD (STAIN GRADE, SOLID CORE SLAB DOOR)
HM	HOLLOW METAL
ST	STAIN
STL	STEEL
RCB	4" RUBBER COVE BASE
PNT	PAINT
EXP	EXPOSED TO STRUCTURE
AL	ALUMINUM
ANOD	ANODIZED - MATCH EXISTING, AS APPLICABLE
SC	SEALED CONCRETE
GYP	GYPSUM BOARD
ACT	ACOUSTIC CEILING TILE
LVT	LUXURY VINYL TILE
CONC	CONCRETE

DOOR SCHEDULE

DOOR						FRAME			DETAILS - (SEE SHEET A-003)			HARDWARE	KEY NOTES / COMMENTS
NO.	TYPE	SIZE	MATERIAL	PUSH FINISH	PULL FINISH	MATERIAL	PUSH FINISH	PULL FINISH	HEAD	JAMB	THRESHOLD		
101A	B	1 3/4" X 3'-6" X 7'-0"	AL	ANOD	ANOD	AL	ANOD	ANOD	-	-	-	①	B.
101B	C	3'-6" X 7'-0"	AL	ANOD	ANOD	HM	PNT	PNT	-	H2/A-003 (SIMILAR)	-	②	C.
102A	A	1 3/4" X 3'-0" X 7'-0"	WD	ST	ST	HM	PNT	PNT	-	H2/A-003	-	③	
102B	A	1 3/4" X 3'-0" X 7'-0"	WD	ST	ST	HM	PNT	PNT	-	H2/A-003	-	③	
103	C	3'-6" X 7'-0"	AL	ANOD	ANOD	HM	PNT	PNT	-	H2/A-003 (SIMILAR)	-	②	C.
104	A	1 3/4" X 3'-0" X 7'-0"	WD	ST	ST	HM	PNT	PNT	-	H2/A-003	-	③	D.
106A	A	1 3/4" X 3'-0" X 7'-0"	WD	ST	ST	HM	PNT	PNT	-	H2/A-003	-	③	D.
106B	A	1 3/4" X 3'-0" X 7'-0"	WD	ST	ST	HM	PNT	PNT	-	H2/A-003	-	③	D.
107	A	1 3/4" X 3'-0" X 7'-0"	WD	ST	ST	HM	PNT	PNT	-	H2/A-003	-	③	
108	C	3'-6" X 7'-0"	AL	ANOD	ANOD	HM	PNT	PNT	-	H2/A-003 (SIMILAR)	-	②	C.
109	B	1 3/4" X 3'-0" X 7'-0" (ETR)	AL	ANOD	ANOD	AL	ANOD	ANOD	-	-	-	④	A., B.
110	A	1 3/4" X 3'-0" X 7'-0" (ETR)	WD	-	-	WD	-	-	-	-	-	④	A.
111	A	1 3/4" X 3'-0" X 7'-0"	WD	ST	ST	HM	PNT	PNT	-	H2/A-003	-	③	D.
112	A	1 3/4" X 3'-0" X 7'-0" (ETR)	WD	-	-	WD	-	-	-	-	-	④	A.
113	A	1 3/4" X 3'-0" X 7'-0"	WD	ST	ST	HM	PNT	PNT	-	H2/A-003	-	⑤	
115A	A	1 3/4" X 3'-0" X 7'-0" (ETR)	HM	-	-	HM	-	-	-	-	-	④	A.
115B	A	1 3/4" X 3'-0" X 7'-0" (ETR)	HM	-	-	HM	-	-	-	-	-	④	A.
115C	A	1 3/4" X 3'-0" X 7'-0" (ETR)	HM	-	-	HM	-	-	-	-	-	④	A.
115D	A	1 3/4" X 3'-0" X 7'-0" (ETR)	HM	-	-	HM	-	-	-	-	-	④	A.

KEY NOTES:
A. EXISTING FRAME AND DOOR TO REMAIN
B. INSTALL A SIGN ABOVE THIS DOOR THAT READS, "THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED"
C. DOOR FRAME DOES NOT HAVE STOPS SO THAT IT CAN SWING IN BOTH DIRECTIONS
D. THESE HOLLOW METAL FRAMES INCLUDE AN INTEGRAL 1" (NOM.) FULL-HEIGHT SIDELIGHT. SEE PLAN AND WINDOW TYPE B.

INTERIOR FINISH SCHEDULE

ROOM NUMBER	ROOM NAME	FLOOR MATERIAL	BASE MATERIAL	WALL FINISH (NORTH)	WALL FINISH (EAST)	WALL FINISH (SOUTH)	WALL FINISH (WEST)	CEILING		COMMENT KEY NOTES
								MATERIAL	FINISH	
101	SALES COUNTER	SC	RCB	PNT	PNT	PNT	PNT	ACT	-	
102	MANAGER OFFICE	SC	RCB	PNT	PNT	PNT	PNT	ACT	-	
103	INSIDE SALES	SC	RCB	PNT	PNT	PNT	PNT	ACT	-	
104	OFFICE 1	SC	RCB	PNT	PNT	PNT	PNT	ACT	-	
105	OUTSIDE SALES	SC	RCB	PNT	PNT	PNT	PNT	ACT	-	
106	PROJECT OFFICE	SC	RCB	PNT	PNT	PNT	PNT	ACT	-	
107	OFFICE 2	SC	RCB	PNT	PNT	PNT	PNT	ACT	-	
108	HALL	SC	RCB	PNT	PNT	PNT	PNT	ACT	-	
109	BREAK ROOM	LVT	RCB	PNT	PNT	PNT	PNT	ETR	-	
110	EXIST. MEN	ETR	ETR	PNT	PNT	PNT	PNT	ETR	-	1.
111	CONFERENCE ROOM	SC	RCB	PNT	PNT	PNT	PNT	ACT	-	
112	EXIST. WOMEN	ETR	ETR	PNT	PNT	PNT	PNT	ACT	-	1.
113	UNISEX TOILET	LVT	RCB	PNT	PNT	PNT	PNT	ETR	-	1.
114	HALL	SC	RCB	PNT	PNT	PNT	PNT	ACT	-	
115	WAREHOUSE AREA	-	RCB	-	PNT	-	-	EXP		1, 2.
COMMENTS: 1. WALLS WITHIN 2' OF SERVICE SINKS, URINALS, AND WATER CLOSETS MUST BE PAINTED WITH EPOXY-BASED PAINT UP TO A MINIMUM OF 4' A.F.F. 2. PAINT AND INSTALL RCB AT THE OUTSIDE WALLS OF THE OFFICE.										

DOOR NOTES

DOORS SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS:

- ALL DOOR HANDLES TO BE LEVER TYPE.
- EGRESS DOORS SHALL BE READILY OPENABLE FROM THE EGRESS SIDE WITHOUT THE USE OF A KEY OR ANY SPECIAL KNOWLEDGE OR EFFORT.
- PROVIDE DOOR STOPS OF APPROPRIATE TYPE FOR ALL INTERIOR DOORS, MATCH ADJACENT HARDWARE FINISH.
- DOOR CLOSERS SHALL BE ADJUSTED SO THAT FROM AN OPEN POSITION OF 90 DEGREES, THE TIME REQUIRED TO MOVE THE DOOR TO AN OPEN POSITION OF 12 DEGREES WILL BE 5 SECONDS MINIMUM.
- MAXIMUM EFFORT TO OPERATE DOORS SHALL NOT EXCEED 8 1/2 POUNDS FOR EXTERIOR DOORS AND 5 POUNDS FOR INTERIOR DOORS. SUCH PULL OR PUSH EFFORT BEING APPLIED AT RIGHT ANGLES TO HINGED DOORS AND AT THE CENTER PLANE OF SLIDING OR FOLDING DOORS. COMPENSATING DEVICES OR AUTOMATIC DOOR OPERATORS MAY BE UTILIZED TO MEET THE ABOVE STANDARDS. WHEN FIRE DOORS ARE REQUIRED, THE MAXIMUM EFFORT TO OPERATE THE DOOR MAY BE INCREASED TO THE MAXIMUM ALLOWABLE BY THE APPROPRIATE ADMINISTRATIVE AUTHORITY, NOT TO EXCEED 15 POUNDS.
- THE BOTTOM 10" OF ALL DOORS EXCEPT AUTOMATIC DOORS, POWER ASSISTED DOORS, AND SLIDING DOORS SHALL HAVE A SMOOTH, UNINTERRUPTED SURFACE TO ALLOW THE DOOR TO BE OPENED BY A WHEELCHAIR FOOTREST WITHOUT CREATING A TRAP OR HAZARDOUS CONDITION.
- EXIT DOORS IN ASSEMBLY AND EDUCATION OCCUPANCIES SERVING AN OCCUPANT LOAD OF 50 OR MORE SHALL BE EQUIPPED WITH PANIC HARDWARE, WITH THE EXCEPTION BELOW (NOTE 8).
- MAIN EXIT DOORS HAVING KEY-OPERATED LOCKING DEVICES ON THE EGRESS SIDE IN GROUP A OCCUPANCIES (SERVING 300 OCCUPANTS OR LESS), GROUPS B, F, M, S, AND PLACES OF RELIGIOUS WORSHIP SHALL HAVE DURABLE SIGNAGE ABOVE THE DOOR IN 1" HIGH LETTERS ON CONTRASTING BACKGROUND STATING: "THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED". LOCKING DEVICES SHALL BE READILY DISTINGUISHABLE AS LOCKED.
- LATCHING AND LOCKING DOORS THAT ARE HAND ACTIVATED AND WHICH ARE IN THE PATH OF TRAVEL SHALL BE OPERABLE WITH A SINGLE EFFORT BY LEVER TYPE HARDWARE, PANIC BARS, PUSH-PULL ACTIVATING BARS OR OTHER HARDWARE DESIGNED TO PROVIDE PASSAGE WITHOUT REQUIRING THE ABILITY TO GRASP THE OPENING HARDWARE. LOCKABLE EXIT DOORS SHALL OPERATE AS ABOVE IN EGRESS DIRECTION.
- HAND-ACTIVATED DOOR OPENING HARDWARE TO BE CENTERED BETWEEN 34" AND 44" ABOVE THE FLOOR.
- EVERY DOORWAY WHICH IS LOCATED WITHIN AN ACCESSIBLE PATH OF TRAVEL SHALL BE OF A SIZE AS TO PERMIT THE INSTALLATION OF A DOOR NOT LESS THAN 3'-0" IN WIDTH AND NOT LESS THAN 6'-8" IN HEIGHT. WHEN INSTALLED, EXIT DOORS SHALL BE CAPABLE OF OPENING SO THAT THE CLEAR WIDTH OF THE EXIT IS NOT LESS THAN 32". MEASURED BETWEEN THE FACE OF THE OPENED DOOR AND THE OPPOSITE STOP.
- MINIMUM MANEUVERING CLEARANCES AT DOORS SHALL BE AS REQUIRED BY THE ICC/ANSI A117.1 ACCESSIBILITY CODE. THE FLOOR OR GROUND AREA WITHIN THE REQUIRED CLEARANCES SHALL BE LEVEL AND CLEAR. THE FLOOR OR LANDING SHALL BE NOT MORE THAN 1/2" LOWER THAN THE THRESHOLD OF THE DOORWAY.
- DOORS SHALL NOT PROJECT MORE THAN 7" INTO THE REQUIRED CORRIDOR WIDTH WHEN FULLY OPENED OR MORE THAN ONE HALF INTO THE REQUIRED WIDTH WHEN IN ANY POSITION.
- WHERE A PAIR OF DOORS IS UTILIZED, AT LEAST ONE OF THE DOORS SHALL PROVIDE A CLEAR, UNOBSTRUCTED OPENING WIDTH OF 32" WITH THE LEAF POSITIONED AT AN ANGLE OF 90° FROM ITS CLOSED POSITION.
- EXIT DOORS SHALL SWING IN THE DIRECTION OF EXIT TRAVEL WHEN SERVING 50 OR MORE OCCUPANTS.
- COORDINATE ALL DOOR HARDWARE WITH THE OWNER TO ENSURE THE MANUFACTURER, FUNCTIONS, MODELS, AND KEYING SYSTEMS MEET THE OWNER'S STANDARD REQUIREMENTS.

Architect:
MICHAEL MOORES, RA
t: (816) 816-4861

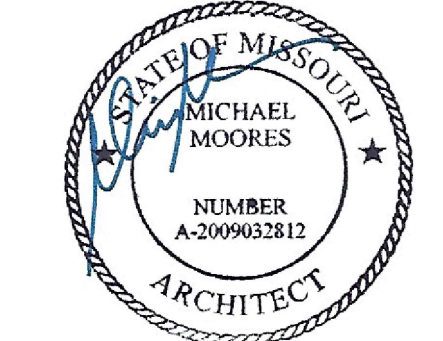
Client:
Butler Supply
t: (573) 819-4400

Consultants:

MEP Engineering:
EBS
ENGINEERED BUILDING SYSTEMS
t: (913) 735-5654

Revisions to technical submissions which are not made or approved by the licensee are prohibited.

Seal:



MICHAEL MOORES, MO Architect #2009032812

Project Number: 2503

Project Type: TENANT FINISH

Project Name and Address:

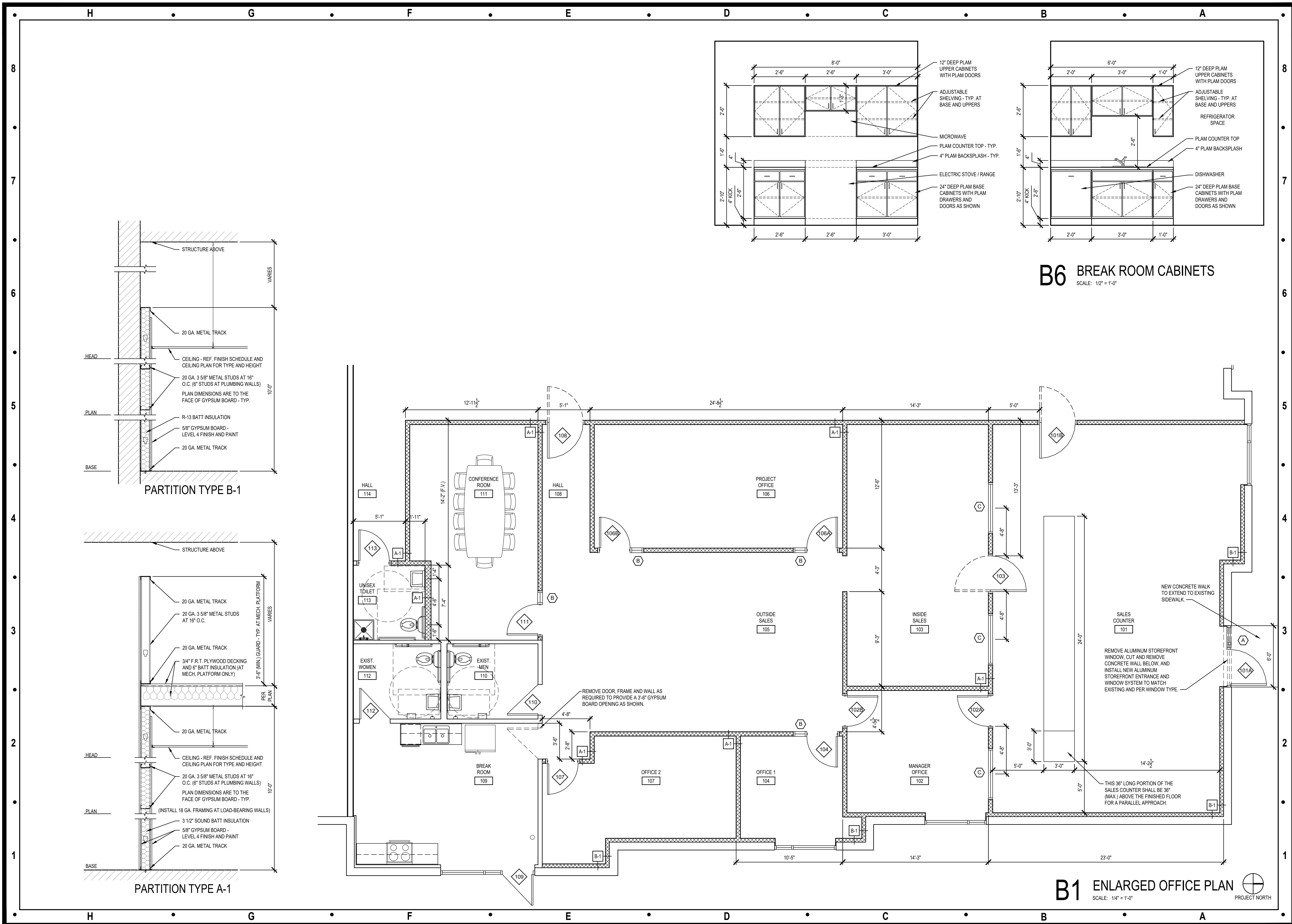
BUTLER SUPPLY
2736 NE McBaine Drive
Lee's Summit, Missouri 64064

Issue: Permit Submittal
Date: 04.29.25

Sheet Title:

DOOR / WINDOW /
FINISH SCHEDULES
AND NOTES

A-003



Architect:
MICHAEL MOORES, RA
t: (816) 516-4861

Client:
Butler Supply
t: (573) 819-4400

Consultants:
MEP Engineering:
EBS
ENGINEERED BUILDING SYSTEMS
t: (913) 735-5654

Revisions to technical submissions which are not made or approved by the licensee are prohibited.

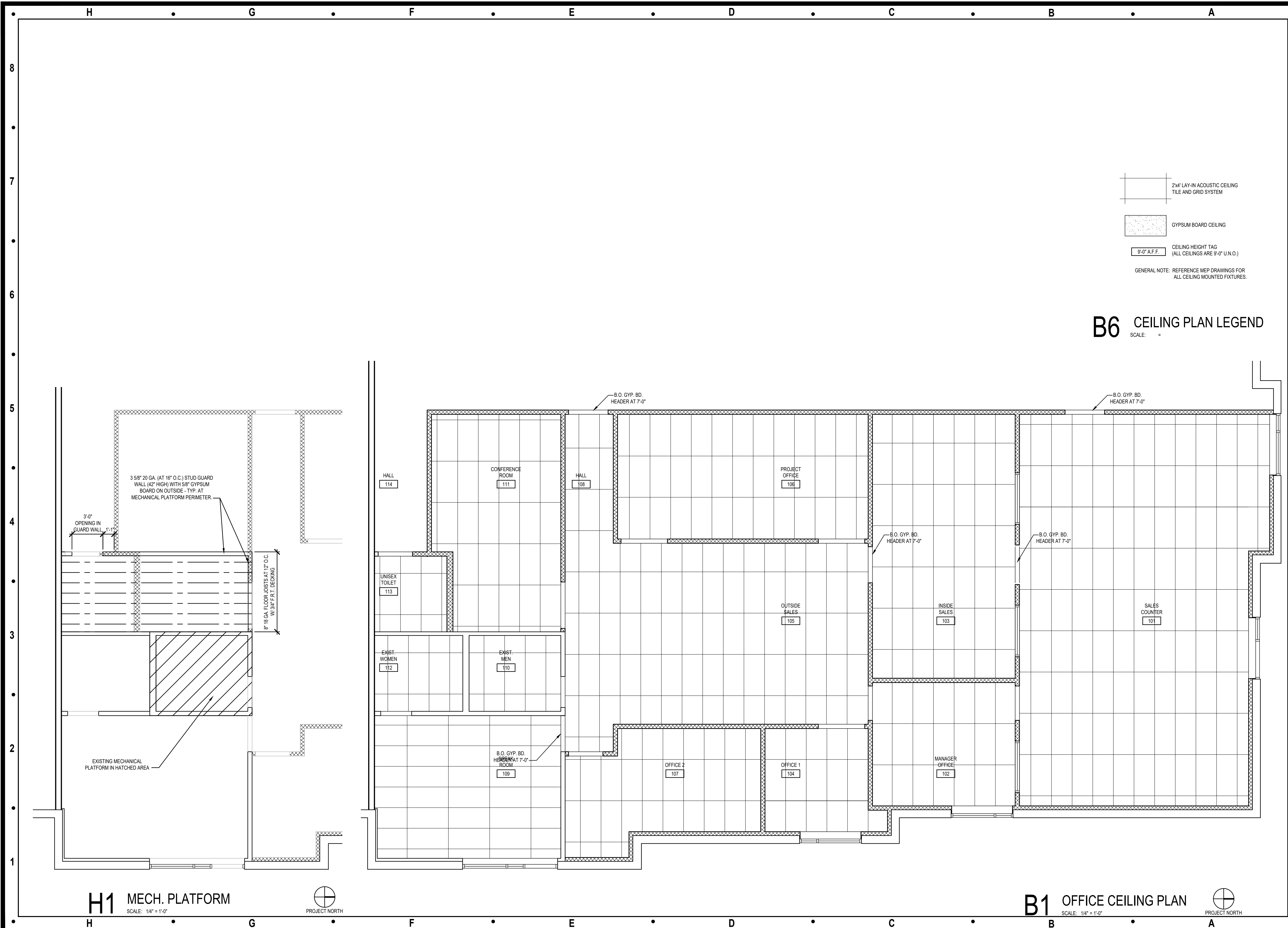
Seal:

MICHAEL MOORES, MO Architect #2009032812

Project Number: 2503
Project Type: TENANT FINISH
Project Name and Address:
BUTLER SUPPLY
2736 NE McBaine Drive
Lee's Summit, Missouri 64064

Issue: Permit Submittal Date: 04.29.25

Sheet Title:
**ENLARGED PLAN
PARTITION TYPES
BREAK RM. CABINETS
A-110**



Architect:
MICHAEL MOORES, RA
t: (816) 516-4861

Client:
Butler Supply
t: (573) 819-4400

Consultants:
MEP Engineering:
EBS
ENGINEERED BUILDING SYSTEMS
t: (913) 735-5654

Revisions to technical submissions which are not made or approved by the licensee are prohibited.

Seal:

MICHAEL MOORES
NUMBER
A-2009032812
ARCHITECT
04.29.25

MICHAEL MOORES, MO Architect #2009032812

Project Number: 2503

Project Type: TENANT FINISH

Project Name and Address:

BUTLER SUPPLY

2736 NE McBaine Drive
Lee's Summit, Missouri 64064

Issue: Permit Submittal

Date: 04.29.25

Sheet Title:

CEILING PLAN
MECH PLATFORM

A-410

MECHANICAL ABBREVIATIONS	
(ALPHABETICAL BY ABBREVIATION)	
ABBREVIATION	LONG FORM
ABV	ABOVE
AC OR ACU	AIR-CONDITIONING UNIT
AHAP	AS HIGH AS POSSIBLE
AHU	AIR-HANDLING UNIT
AUTO	AUTOMATIC
BLW	BELOW
C	CHILLER
CD	CONDENSATE
CF	CABINET FAN
CFM	CUBIC FEET PER MINUTE
CH	CABINET HEATER
CHP	CHILLED WATER PUMP
CLNG OR CLG	CEILING
CONC	CONCRETE
CP OR CWP	CONDENSER WATER PUMP
CS	CONDENSER WATER SUPPLY
CR	CONDENSER WATER RETURN
CRAC OR CACU	COMPUTER ROOM AIR-CONDITIONING UNIT
CREF	CHILLER ROOM EXHAUST FAN
CRU	CONDENSATE (STEAM) RETURN UNIT
CT	COOLING TOWER CELL
CTU	CONDENSATE (STEAM) TRANSFER UNIT
CU	CONDENSING UNIT
DV	CONSTANT VOLUME TERMINAL BOX
	DEPTH
DEF	DISHWASER EXHAUST FAN
DMPR	DAMPER
DN	DOWN
EA	EACH
EBH	ELECTRIC BASEBOARD HEATER
EDH	ELECTRIC DUCT-MOUNTED HEATER
EF	EXHAUST FAN
EG	EXHAUST GRILLE
ER	EXHAUST REGISTER
EUH	ELECTRIC UNIT HEATER
EXH	EXHAUST
	FILTER
FD	FIRE DAMPER
FCU	FAN-COIL UNIT
FF	FINAL FILTER
FFCH	FORCED-FLOW CABINET HEATER
FFU	FAN FILTER UNIT
FP	FAN POWERED TERMINAL BOX
GPM	GALLONS PER MINUTE
HC	HEATING COIL
HUM	HUMIDIFIER
HWP OR HP	HEATING WATER PUMP
HX	HEAT EXCHANGER
KEF	KITCHEN (GREASE HOOD) EXHAUST FAN
KW	KILOWATTS
LD	LINEAR SUPPLY DIFFUSER
MOT	MOTORIZED
MTD	MOUNTED
MUAF	MAKE-UP AIR FAN
MUAHU	MAKE-UP AIR-HANDLING UNIT
OA	OUTSIDE AIR
OAF	OUTSIDE AIR FAN
OPG OR OPNG	OPENING
PF	PRE-FILTER
PLNM	PLENUM
RA	RETURN AIR
RAF	RETURN AIR FAN
RAG OR RG	RETURN AIR GRILLE
RAR OR RR	RETURN AIR REGISTER
RAS	RETURN AIR SILENCER
RE	IN REFERENCE TO
RTU	ROOFTOP UNIT
SA	SUPPLY AIR
SAF OR SF	SUPPLY AIR FAN
SAG OR SG	SUPPLY AIR GRILLE
SAR OR SR	SUPPLY AIR REGISTER
SAS	SUPPLY AIR SILENCER
SD	SMOKE DAMPER OR DETECTOR
TA	THROW AWAY (FILTER TYPE)
TEF	TOILET EXHAUST FAN
TYP	TYPICAL
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
VF	VENTILATION FAN
VFD	VARIABLE FREQUENCY DRIVE
NOT ALL ABBREVIATIONS ON THIS LIST ARE NECESSARILY USED ON THIS PROJECT	

DUCTWORK LEGEND		
(REFER TO SPECIFICATIONS SECTIONS 15815 AND 15820 FOR ADDITIONAL INFORMATION)		
SINGLE LINE	DESCRIPTION	DOUBLE LINE
	ROUND ELBOW DOWN	
	ROUND ELBOW UP	
	OFFSET TO CHANGE ELEVATION (AT 30° WHEN POSSIBLE, ARROW SLOPES DN, U.N.O.)	
	ROUND RADIUS ELBOW	
	90° STRAIGHT TEE	
	90° CONICAL TEE	
	45° LATERAL TAP	
	45° LATERAL CONICAL TEE	
	SIZE OR SHAPE TRANSITION	
	ROUND FLEXIBLE DUCT	
	RECTANGULAR ELBOW DOWN	
	RECTANGULAR ELBOW UP	
	OFFSET TO CHANGE ELEVATION (AT 30° WHERE POSSIBLE, ARROW SLOPES DN, U.N.O.)	
	RECTANGULAR RADIUS ELBOW	
	RECTANGULAR ELBOW WITH TURNING VANES	
	SPLIT BRANCH TAKE-OFF WITH SQUARE ELBOW & SPLITTER DAMPER	
	SPLIT BRANCH TAKE-OFF WITH RADIUS ELBOW & SPLITTER DAMPER	
	SPLIT BRANCH TAKE-OFF TEE WITH STATIONARY SPLITTER DAMPER	
	BRANCH TAKE-OFF WITH 45° LEAD IN TAP	
	INSULATED LINED DUCTWORK (U.N.O.)	
	SQUARE FACED CEILING DIFFUSER 4-WAY DIRECTIONAL THROW (U.N.O.)	
	ROUND FACED CEILING DIFFUSER	
	CEILING RETURN OR EXHAUST AIR GRILLE OR REGISTER	
	SIDEALL SUPPLY GRILLE OR REGISTER	
	SUPPLY DUCT RISER	
	RETURN, EXHAUST OR OUTSIDE AIR DUCT RISER	
	MANUAL BALANCING DAMPER	
	AUTOMATIC (MOTOR-OPERATED) DAMPER	
	FIRE DAMPER	
	GRAVITY BACKDRAFT DAMPER	
	COMBINATION FIRE AND SMOKE DAMPER WITH SMOKE DETECTOR	
	SMOKE DAMPER (AUTOMATIC) WITH SMOKE DETECTOR	
	DUCT MOUNTED SMOKE DETECTOR	
NOT ALL SYMBOLS ON THIS LIST ARE NECESSARILY USED ON THIS PROJECT		

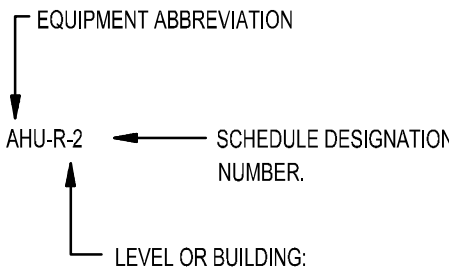
STANDARD MECHANICAL SYMBOLS	
SYMBOL	DESCRIPTION
	GATE VALVE
	BALL VALVE
	GLOBE VALVE
	BUTTERFLY VALVE
	PLUG VALVE
	ANGLE VALVE
	CHECK VALVE
	AUTOMATIC CONTROL VALVE (STRAIGHT THROUGH)
	AUTOMATIC CONTROL VALVE (3-WAY)
	AUTOMATIC CONTROL VALVE (ANGLE)
	AUTOMATIC CONTROL VALVE (STRAIGHT THROUGH)
	SOLENOID VALVE
	PRESSURE REDUCING VALVE
	PRESSURE RELIEF VALVE
	GAUGE COCK
	PRESSURE GAUGE WITH GAUGE COCK
	THERMOMETER
	THERMOMETER WELL
	TEST PLUG
	FLOW METER
	TEMPERATURE SENSOR
	PRESSURE SENSOR
	DIFFERENTIAL PRESSURE SWITCH
	IMMERSION THERMOSTAT
	MANUAL AIR VENT
	AUTOMATIC AIR VENT
	FLOW SWITCH
	ORIFICE
	PIPE SLEEVE THRU WALL OR FLOOR
	EXPANSION JOINT
	FLEXIBLE PIPE JOINT
	PIPE GUIDE
	ANCHOR
	STRAINER (Y-TYPE)
	STRAINER (BASKET TYPE)
	UNION
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
	DIRECTION OF FLOW
	DIRECTION OF SLOPE
	THERMOSTAT
	HUMIDISTAT
	FAN SPEED CONTROLLER
	CONDENSER WATER SUPPLY
	CONDENSER WATER RETURN
	CONDENSATE DRAIN
NOT ALL SYMBOLS ON THIS LIST ARE NECESSARILY USED ON THIS PROJECT	

VALVES, FITTINGS, & DEVICES

PIPING

OTHER SYMBOLS	
SYMBOL	DESCRIPTION
	INDICATES CONNECTION TO EXISTING DUCT OR PIPE

GENERAL EQUIPMENT DESIGNATION KEY:



GENERAL MECHANICAL NOTES:

- REFER TO ARCHITECTURAL PLANS FOR RATED WALLS AND PARTITIONS.VERIFY FIRE AND/OR SMOKE DAMPER LOCATIONS AT DUCTS OR OPENINGS PENETRATING THESE WALLS.
- REFER TO ARCHITECTURAL PLANS FOR ROOM NAMES AND NUMBERS.
- REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF CEILING DIFFUSERS, REGISTERS, AND GRILLES.
- VERIFY LOCATIONS OF THERMOSTATS WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION.
- VERIFY LOCATIONS OF EXPOSED DUCTS WITH ARCHITECT PRIOR TO INSTALLATION. DUCT DIMENSIONS INDICATED ON PLANS ARE FREE AREA DIMENSIONS.
- SUPPLY AND RETURN AIR DUCT SHALL BE INTERNALLY LINED WHERE SPECIFIED.
- ALL LOUVER SIZES ON MECHANICAL PLANS ARE GIVEN IN FREE AREA REQUIRED. REFER TO ARCHITECTURAL PLANS FOR DIMENSIONS AND LOCATIONS.
- COORDINATE TERMINAL BOX AND BALANCING DAMPER LOCATIONS CAREFULLY TO ENSURE PROPER AND ADEQUATE ACCESS TO FILTERS, MOTORS, CONTROL VALVES, CONTROL PANELS, ETC. PROVIDE ACCESS PANELS AS SPECIFIED WHERE REQUIRED TO ASSURE THIS ACCESS.
- CEILING PLENUM SPACE IS VERY TIGHT. WHERE REQUIRED, DUCTS OR PIPES SHALL BE ROUTED BETWEEN LIGHT FIXTURES AND UP AND OVER OTHER DUCTS OR PIPES USING THE SPACES BETWEEN STRUCTURAL JOISTS OR BEAMS WHERE APPLICABLE. CONTRACTOR SHALL BE RESPONSIBLE FOR CAREFULLY COORDINATING ALL TRADES. EXISTING UNKNOWN CONDITIONS MAY AFFECT EXACT DUCT OR PIPE ROUTING. OR EXISTING CONDITIONS MAY NEED TO BE MODIFIED TO ACCOMMODATE DUCTS AND PIPES.
- ALL BRANCH DUCT CONNECTIONS AND TAKE-OFFS TO INDIVIDUAL DIFFUSERS, REGISTERS, AND GRILLES SHALL HAVE A PREFABRICATED 45 DEGREE, HIGH EFFICIENCY, RECTANGULAR/ROUND BRANCH DUCT TAKEOFF FITTING WITH MANUAL BALANCING DAMPER AND LOCKING QUADRANT.
- BRANCH DUCTWORK TO AIR OUTLETS SHALL BE SAME SIZE AS OUTLET NECK SIZE UNLESS OTHERWISE NOTED.
- RIGID DUCTWORK INSULATION: PROVIDE R-6 MINIMUM INSULATION WRAP ON ALL CONCEALED DUCTWORK. PROVIDE R-8 MINIMUM INTERNAL DUCT LINER ON ALL EXPOSED DUCTWORK. DUCT SIZES ON MECHANICAL PLANS INDICATE CLEAR INSIDE DIMENSIONS. SHEET METAL SIZES SHALL INCREASE ACCORDINGLY. PROVIDE R-12 MINIMUM INSULATION ON ALL DUCTWORK INSTALLED IN UNCONDITIONED SPACES.REFER TO SPECIFICATIONS FOR MORE INFORMATION.
- FLEXIBLE DUCT WORK SHALL BE THERMAFLEX TYPE MKE, FLEXMASTER TYPE 9M, OR APPROVED EQUAL. SHALL BE LISTED UNDER 191 AS CLASS 1 AIR DUCT AND SHALL BE PROVIDED WITH INTEGRAL R-6 MINIMUM FIBERGLASS INSULATION. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5'-0" IN LENGTH AND SHALL BE INSTALLED AND SUPPORT TO AVOID SHARP BENDS AND SAGGING.
- WALL MOUNTED DIFFUSERS AND GRILLES SHALL BE PROVIDED WITH SUITABLE MOUNTING FRAME TO MATCH WALL CONSTRUCTION. COORDINATE WITH ARCHITECTURAL DRAWINGS.

Architect:
MICHAEL MOORES, RA
t: (816) 516-4861

Client:
Butler Supply
t: (573) 819-4400

Consultants:

MEP Engineering:
EBS
ENGINEERED BUILDING SOLUTIONS, LLC
P.O. BOX 11101
OVERLAND PARK, MO 66207
913.735.0034
MO Certificate of Authority #C-221100022

Revisions to technical submissions which are not made or approved by the licensee are prohibited.

Seal:

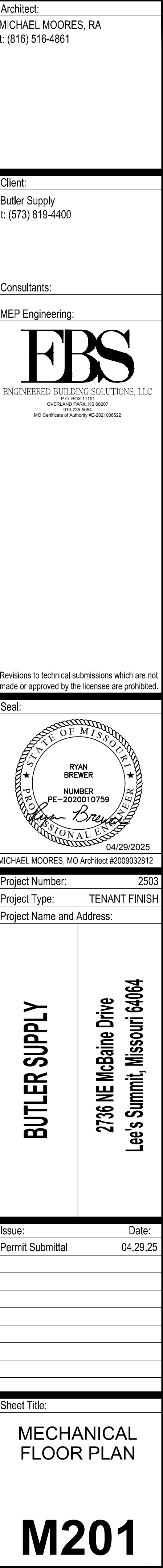
MICHAEL MOORES, MO Architect #2009032812

Project Number: 2503
Project Type: TENANT FINISH
Project Name and Address:

BUTLER SUPPLY
2736 NE McBaine Drive
Lee's Summit, Missouri 64064

Issue: Date:
Permit Submittal 04.29.25

Sheet Title:
MECHANICAL NOTES, SYMBOLS & ABBREVIATIONS
M101

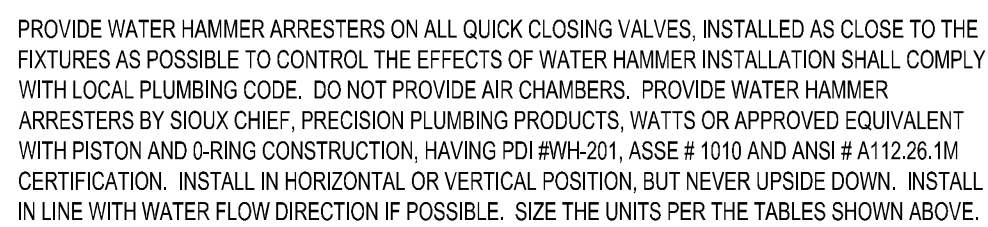


[illegible]

SYSTEM TYPE	MATERIAL
GAS	
ABOVE GROUND	SCHEDULE 40 BLACK STEEL WITH MALLEABLE IRON THREADED FITTINGS OR WELDED JOINTS WITH BUTT WELD FITTINGS. PROVIDE CORROSION RESISTANT MATERIAL ON PIPING EXPOSED TO ATMOSPHERE OR IN CONTACT WITH MATERIAL EXERTING A CORROSIVE ACTION
UNDER GROUND	APPROVED PLASTIC WITH COMPATIBLE FITTINGS CONFORMING WITH ASTM D 2513 AND SHALL BE INSTALLED IN ACCORDANCE WITH GAS CODE OR WITH SCH. 40 STEEL WITH MALLEABLE IRON FITTINGS OR WELDED JOINTS WITH BUTT WELD FITTINGS. MILL COAT PIPE WITH HIGH DENSITY POLYETHYLENE OVER ADHESIVE UNDERCOATING WRAP FIELD JOINTS AND FITTINGS WITH REPUBLIC "X-TRU-TAPE" OR EQUAL.
SEWER, VENT, AND STORM	
ABOVE GROUND	PVC OR ABS SOLID WALL SCHEDULE 40 PIPE AND FITTINGS EXCEPT IN PLENUM RETURN AREAS. IN RETURN AIR PLENUM AREAS USE ONE OF THE FOLLOWING: CAST IRON, HUB AND SPIGOT WITH RUBBER GASKETS FOLLOWING ASTM C564 AND ASTM 74. CAST IRON, NO-HUB. NEOPRENE GASKET AND CORRUGATED 304 STAINLESS STEEL. SHIELD IN CONJUNCTION WITH 4 STAINLESS STEEL CLAMPS FOR 4" AND SMALLER, 6 CLAMPS FOR 5" AND LARGER
UNDER GROUND	PVC OR ABS SOLID WALL SCHEDULE 40 PIPE AND FITTINGS
WATER	
DISTRIBUTION PIPE	WATER DISTRIBUTION PIPE SHALL CONFORM TO NSF 61 AND SHALL BE COPPER, TYPE "A" PEX, OR TYPE "B" PEX AND CONFORM TO THE STANDARDS LISTED IN TABLE 605.4 OF THE I.P.C.
SERVICE PIPE	WATER SERVICE PIPE SHALL CONFORM TO NSF 61 AND SHALL BE COPPER, TYPE "A" PEX, OR TYPE "B" PEX AND CONFORM TO THE STANDARDS LISTED IN TABLE 605.3 OF THE I.P.C.



1. ALL WORK SHALL BE IN CONFORMANCE WITH ALL APPLICABLE NATIONAL, STATE AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION.
2. PROVIDE THE OWNER A COPY OF ALL REPORTS AND APPROVAL CERTIFICATES FROM LOCAL AND STATE INSPECTIONS AND ALL PLUMBING SYSTEMS EQUIPMENT MANUFACTURERS INCLUDING WARRANTIES.
3. COORDINATE THE COMPLETE INSTALLATION OF SYSTEMS TO AVOID CONFLICT WITH OTHER TRADES.
4. COORDINATE ALL ABOVE SLAB AND UNDER SLAB SANITARY, AND WATER PIPING SYSTEMS TO AVOID CONFLICT WITH ALL OTHER TRADES SYSTEMS, AND COLUMN FOOTINGS. ALL SOIL AND WASTE PIPING SHALL BE GRADED TO A UNIFORM SLOPE OF NOT LESS THAN 1/8" PER FOOT FOR PIPING 4" OR LARGER, AND NOT LESS THAN 1/4" PER FOOT FOR PIPING 3" OR SMALLER. ALL GREASE WASTE PIPING SHALL BE ROUTED AT 1/4" PER FOOT SLOPE.
5. COORDINATE ALL FLOOR DRAIN CLEANS OUTS, AND FLOOR MOUNTED VENTINGS WITH FINISHED FLOOR SLAB ELEVATION TO ENSURE THEY ARE INSTALLED PLUMB AND FLUSH WITHOUT CRACKS, RISE IN THE SLAB, OR VOIDS ABOVE GRATES OR TOPS. ALL CLEANOUTS SHALL BE INSTALLED ALONG MAINS AT 50'-0" DISTANCE MAXIMUM. ALL FLOOR AND WALL CLEANOUTS SHALL BE ACCESSIBLE FOR MAINTENANCE AND NOT INSTALLED BENEATH EQUIPMENT. ANY DRAIN GRATES THAT ARE DAMAGED AS A RESULT OF OTHER CONSTRUCTION PRIOR TO RELEASE OF THE BUILDING TO THE OWNER SHALL BE REPLACED WITH LIKE GRATE AT NO EXPENSE OF THE OWNER.
6. EXPOSED PIPES PENETRATING FINISHED WALLS SHALL BE EQUIPPED WITH WALL ESCUTCHEONS.
7. PROVIDE TRAP AND SEAL PRIMERS ON ALL FLOOR DRAINS IF REQUIRED BY CODE OR OWNER.
8. PLUMBING VENTS THROUGH THE ROOF ARE LOCATED AT A MINIMUM OF 5'-0" FROM BUILDING PARAPETS AND 10'-0" FROM FRESH AIR INTAKES AND AS REQUIRED TO MEET LOCAL CODES.
9. ALL SHUT-OFF OR BALANCING VALVES TO PLUMBING ROUTED IN PIPE CHASES SHALL BE ACCESSIBLE FROM CEILING AREA OR ACCESS DOORS PROVIDED IN WALL.
10. PROVIDE FINAL CONNECTIONS FOR ALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS. PROVIDE ALL REQUIRED SHUT-OFFS, BACKFLOW PREVENTERS, PRESSURE REGULATORS, AND CONDENSATE DRAINS AS REQUIRED BY THE EQUIPMENT MANUFACTURER. EQUIPMENT INSTALLATION, CONSULT EQUIPMENT SUPPLIER OR OWNER FOR ADDITIONAL FINAL CONNECTION REQUIREMENTS NOT SHOWN ON THESE DRAWINGS.
11. CONTRACTOR TO FULLY INVESTIGATE ALL EXISTING PIPING TO REMAIN TO INSURE EXISTING PIPING IS IN GOOD REPAIR. IF ANY EXISTING PIPING IS FOUND TO BE DAMAGED REPLACE WITH LIKE.
12. ALL PLUMBING PENETRATIONS THROUGH FIRE RATED ASSEMBLIES SHALL BE INSTALLED AND SEALED TO MAINTAIN FIRE RATING OF ASSEMBLY. PROVIDE FIRE CAULKING, FIRESTOP COLLAR, OR OTHER APPROVED METHOD TO MAINTAIN FIRE RATINGS AND DRAIN RATING.



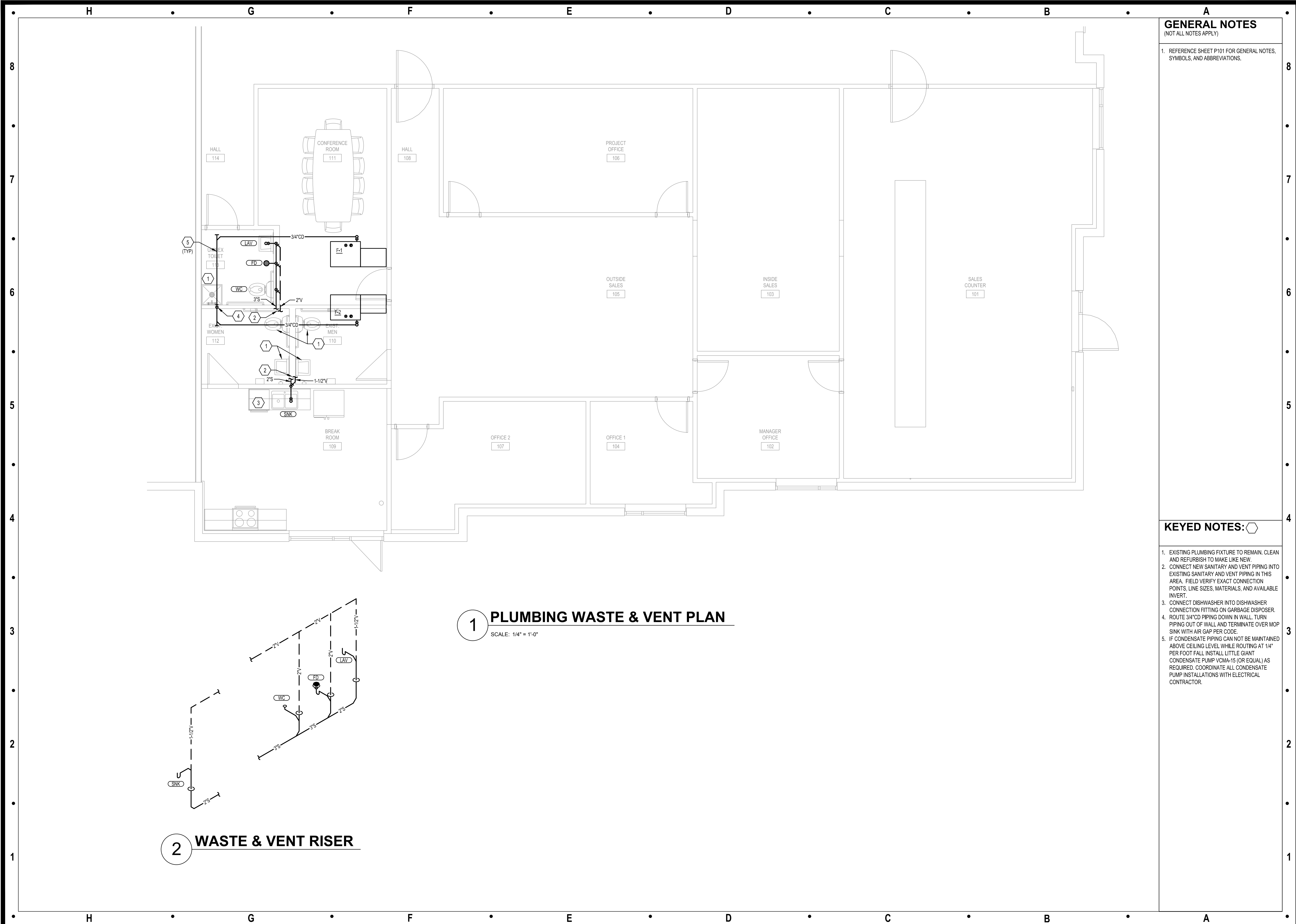
3 VENT THROUGH ROOF DETAIL (VTR)

AD	AREA DRAIN, ACCESS DOOR	IE	INVERT ELEVATION
AFC	ABOVE FINISH CEILING	LP	LIQUEFIED PETROLEUM
AFG	ABOVE FINISH GRADE	MBH	1000 BTU PER HOUR
AHU	AIR HANDLING UNIT	N/A	NOT APPLICABLE
BFP	BACKFLOW PREVENTER	ORD	OVERFLOW ROOF DRAIN
BOP	BOTTOM OF PIPE	OST	STORM OVERFLOW
BOS	BOTTOM OF STRUCTURE	PD	PUMP DISCHARGE
CD	CONDENSATE	PIV	POST INDICATOR VALVE
CO	CLEANOUT	PRV	PRESSURE REDUCING VALVE
CW	DOMESTIC COLD WATER	REV	REVISION
DD	DECK DRAIN	RPM	REVOLUTIONS PER MINUTE
DN	DOWN	RTU	ROOF TOP UNIT
ETR	EXISTING TO REMAIN	SAN	SANITARY
EWG	ELECTRIC WATER COOLER	SCW	SOFT DOMESTIC COLD WATER
FCO	FLOOR CLEANOUT	SHW	SOFT DOMESTIC HOT WATER
FFA	FROM FLOOR ABOVE	SDHWR	SOFT RECIDR. HOT WATER
FP	FIRE PROTECTION	ST	STORM
FS	FLOOR SINK	TFA	TO FLOOR ABOVE
G	GAS (NATURAL)	TFB	TO FLOOR BELOW
GCO	GRADE CLEANOUT	TP	TEMPERED WATER
GPM	GALLONS PER MINUTE	UH	UNIT HEATER
HB	HOSE BIBB	V	VENT PIPE
HW	DOMESTIC HOT WATER	VTR	VENT THROUGH ROOF
HWR	HOT WATER RETURN	WCO	WALL CLEANOUT
HWS	HOT WATER SUPPLY	WH	WALL HYDRANT

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	GATE VALVE		FLOOR DRAIN / AREA DRAIN
	CHECK VALVE		FLOOR SINK
	PRESSURE		HOT WATER RECIRCULATION PUMP
	SOLENOID VALVE		PLUMBING VEVT THRU ROOF
	GLOBE VALVE (STRAIGHT PATTERN)		POINT OF CONNECTION (CONNECT NEW TO EXISTING)
	BUTTERFLY VALVE		PLUMBING EQUIPMENT DESIGNATION
	BALL VALVE		KITCHEN EQUIPMENT DESIGNATION
	GAS COCK		PLUMBING RISER OR DETAIL DESIGNATION
	PLUG VALVE		SANITARY SEWER PIPING
	FLOOR CLEAN OUT		STORM SEWER PIPING
	WALL CLEAN OUT		VENT PIPING
	CLEAN OUT		VENT PIPING (BELOW SLAB)
	HOSE BIBB		COLD WATER PIPING
	FREEZE PROOF WALL HYDRANT		HOT WATER PIPING
	SHOWER HEAD		COLD WATER PIPING (BELOW SLAB)
	ELBOW DOWN		HOT WATER PIPING (BELOW SLAB)
	ELBOW UP		HOT WATER RECIRCULATING PIPING
	TEE UP		FILTERED WATER PIPING
	TEE DOWN		FILTERED WATER PIPING BELOW GRADE
	STRAINER		GAS PIPING
	UNION		CONDENSATE PIPING
	REDUCER		
	CAP		
	FLEX PIPE		

[illegible]

P101



GENERAL NOTES
(NOT ALL NOTES APPLY)

1. REFERENCE SHEET P101 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.

KEYED NOTES:

1. EXISTING PLUMBING FIXTURE TO REMAIN. CLEAN AND REFURBISH TO MAKE LIKE NEW.
2. CONNECT NEW SANITARY AND VENT PIPING INTO EXISTING SANITARY AND VENT PIPING IN THIS AREA. FIELD VERIFY EXACT CONNECTION POINTS, LINE SIZES, MATERIALS, AND AVAILABLE INVERT.
3. CONNECT DISHWASHER INTO DISHWASHER CONNECTION FITTING ON GARBAGE DISPOSER.
4. ROUTE 3/4"CD PIPING DOWN IN WALL. TURN PIPING OUT OF WALL AND TERMINATE OVER MOP SINK WITH AIR GAP PER CODE.
5. IF CONDENSATE PIPING CAN NOT BE MAINTAINED ABOVE CEILING LEVEL WHILE ROUTING AT 1/4" PER FOOT FALL. INSTALL LITTLE GIANT CONDENSATE PUMP VDMA-15 (OR EQUAL) AS REQUIRED. COORDINATE ALL CONDENSATE PUMP INSTALLATIONS WITH ELECTRICAL CONTRACTOR.

Architect:
MICHAEL MOORES, RA
t: (816) 516-4861

Client:
Butler Supply
t: (573) 819-4400

Consultants:
MEP Engineering:



Revisions to technical submissions which are not made or approved by the licensee are prohibited.

Seal:



MICHAEL MOORES, MO Architect #2009032812

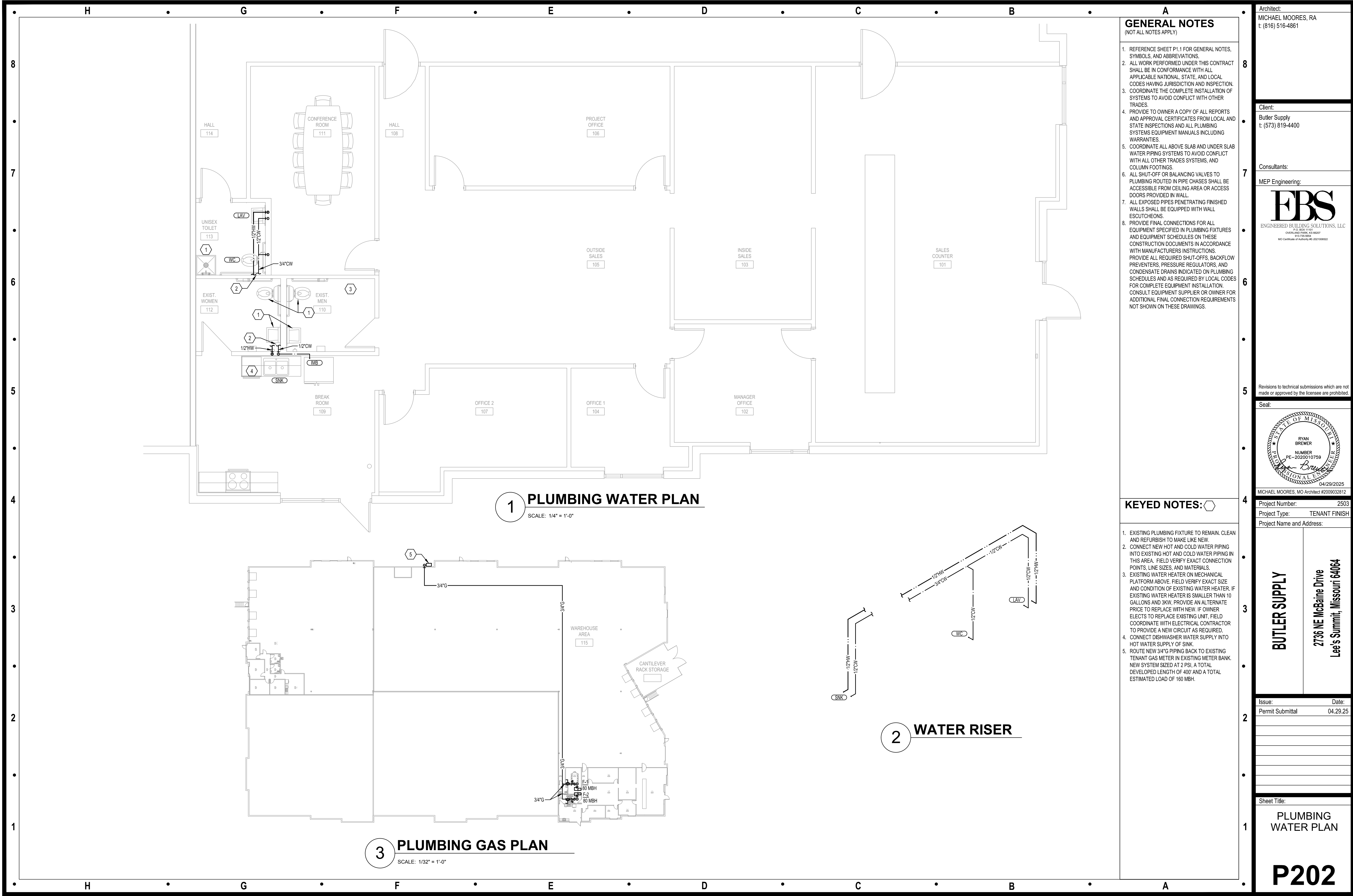
Project Number: 2503
Project Type: TENANT FINISH
Project Name and Address:

BUTLER SUPPLY
2736 NE McBaine Drive
Lee's Summit, Missouri 64064

Issue: Date:
Permit Submittal 04.29.25

Sheet Title:
PLUMBING
WASTE AND
VENT PLAN

P201



Architect:
MICHAEL MOORES, RA
t: (816) 516-4861

Client:
Butler Supply
t: (573) 819-4400

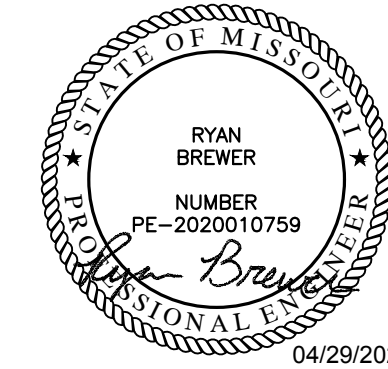
Consultants:

MEP Engineering:



Revisions to technical submissions which are not made or approved by the licensee are prohibited.

Seal:



MICHAEL MOORES, MO Architect #2009032812

Project Number: 2503

Project Type: TENANT FINISH

Project Name and Address:

BUTLER SUPPLY

2736 NE McBaine Drive
Lee's Summit, Missouri 64064

Issue: Date:
Permit Submittal 04.29.25

Sheet Title:

PLUMBING
WATER PLAN

P202

</

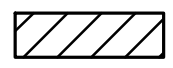
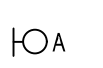
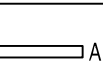
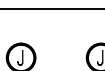
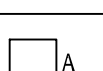
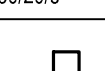
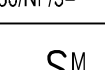
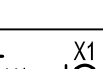
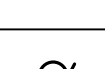
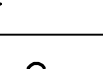
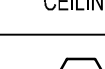
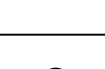
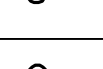
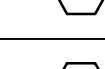
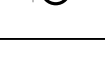
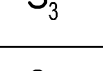
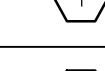
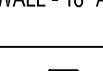
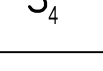
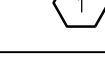
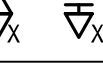
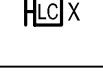
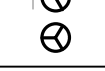
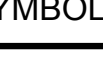
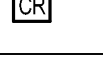
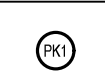
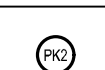
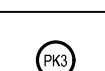
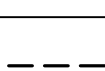
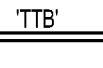
ELECTRICAL ABBREVIATIONS

AC	ALTERNATING CURRENT
AHU	AIR HANDLING UNIT
A. OR AMPS.	AMPERES
AFC	ABOVE FINISH COUNTER
AFCI	ARC FAULT CIRCUIT INTERRUPTER
AFF	ABOVE FINISHED FLOOR
AIC	AMPERES INTERRUPTING CAPACITY
ATS	AUTOMATIC TRANSFER SWITCH
BTC	BRANCH TO CONNECTION POINT AND CONNECT EQUIPMENT
C	CONDUIT ("E.C." IS EMPTY CONDUIT)
CF	CEILING FAN
CM	COFFEE MAKER
CT	COOKTOP
D	DEDICATED CIRCUIT
DCO	DUPLEX CONVENIENCE OUTLET
DP	DISPOSAL
DW	DISHWASHER
DY	DRYER
EMT	ELETRICAL METALLIC TUBING
EF	EXHAUST FAN
EWC	ELECTRIC WATER COOLER (WATER-COOLED DRINKING FOUNTAIN)
EX	EXISTING
FOU	FAN COIL UNIT
GFI/GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI/P	GROUND FAULT INTERRUPTER PROTECTED
GRD	GROUND
H	HORIZONTAL MOUNT (RECEPTACLE)
HD	VENTILATION HOOD
HP	HORSEPOWER
HT	HEAT TRACE POWER (PROVIDE W/ 20A/1P GFI BREAKER)
HVAC	HEATING, VENTILATING, & AIR CONDITIONING
HZ	HERTZ
IG	ISOLATED GROUND (DUPLEX RECEPTS. - NEMA 5-20RIG)
KCM	THOUSAND CIRCULAR MILLS
KVA	KILOVOLT-AMPERES (1000 VOLT-AMPERES)
KW	KILOWATTS (1000 WATTS)
MLO	MAIN LUGS ONLY
MCB	MAIN CIRCUIT BREAKER
MW	MICROWAVE (COORD MTG HT W/ ARCHITECT)
NIC	NOT IN CONTRACT
NEC	NATIONAL ELECTRICAL CODE
NF	NOT FUSED
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
PNL	PANEL
PH OR Ø	PHASE
P	POLE
PVC	POLYVINYL CHLORIDE
RF	REFRIGERATOR
RG	RANGE
SPD	SURGE PROTECTIVE DEVICE
T	TAMPERPROOF RECEPTACLE
TTB	TELEPHONE TERMINAL BOARD
TV	TELEVISION RECEPTACLE
UC	UNDERCOUNTER REFRIGERATOR (OR ICE MACHINE)
UL	UNDERWRITERS LABORATORIES
U.N.O.	UNLESS NOTED OTHERWISE
V	VOLTS
VA	VOLT-AMPERES
VD	VENDING MACHINE (24" AFF)
VFD	VARIABLE FREQUENCY DRIVE
W	WATTS
WA	WASHER
WD	WARMING DRAWER
WO	WALL OVEN
WP	WEATHERPROOF
WP/WR	WEATHERPROOF/WEATHER RESISTANT
WI/UNIT	DISCONNECT IS SUPPLIED WITH THE UNIT

GENERAL ELECTRICAL NOTES

1. COMPLETE INSTALLATION SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, REQUIREMENTS OF THE AHJ AND ALL LOCAL & STATE CODES.
2. DO NOT SCALE FROM THESE DRAWINGS.
3. REFER TO ARCHITECTURAL DRAWINGS AND REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF ALL LIGHTING FIXTURES AND ELECTRICAL DEVICES.
4. ALL EMPTY CONDUITS SHALL BE PROVIDED WITH PULL STRINGS AND BUSHINGS.
5. ALL JUNCTION BOXES SHALL HAVE A COVER.
6. COORDINATE EACH LIGHT FIXTURE INSTALLATION(S) W/ ACTUAL CEILING TO BE FURNISHED.
7. ALL BRANCH CIRCUITS WITHOUT A CONDUCTOR & CONDUIT INDICATED SHALL BE ROUTED TO A 20A-1P BREAKER W/ 2412, 1412EG 34"C.
8. ALL BRANCH CIRCUIT CONDUCTORS SHALL NOT BE SMALLER THAN #12 AWG AND ALL CONDUIT SHALL NOT BE SMALLER THAN 3/4"C. UNLESS SPECIFICALLY NOTED OTHERWISE.
9. ALL CIRCUITS (LIGHTING AND POWER) SHALL BE PROVIDED WITH DEDICATED NEUTRALS UNLESS NOTED OTHERWISE. WHERE NEUTRALS ARE INDICATED TO BE SHARED, MULTIWIRE BRANCH CIRCUITS SHALL BE PROVIDED WITH 2P OR 3P BREAKERS AS REQUIRED PER NEC210.4.
10. ALL CIRCUITS (LIGHTING AND POWER) SHALL BE PROVIDED WITH AN INSULATED EQUIPMENT GROUND CONDUCTOR SIZED IN ACCORDANCE WITH THE NEC. THE RACEWAY SHALL NOT BE USED AN EQUIPMENT GROUND.
11. ALL FIXTURES SHALL BE SUPPORTED FROM EACH CORNER (INDEPENDENT OF THE SUSPENDED CEILING) WITH 12 GAUGE WIRE CONNECTED TO STRUCTURAL SYSTEM OF BUILDING. THE INSTALLATION SHALL MEET OR EXCEED THE SEISMIC REQUIREMENTS OF LOCAL AND NATIONAL CODES.
12. ELECTRICAL DEVICE MOUNTING HEIGHTS, UNO:
PANELBOARDS 78" AFF TO TOP OF PANEL
SWITCHES 48" AFF TO TOP OF JUNCTION BOX
RECEPTACLES 18" AFF TO CENTER OF RECEPTACLE
TELE/DATE OUTLETS 18" AFF TO CENTER OF RECEPTACLE
APARTMENT LOADCENTERS PER ANSI A117.1 REQUIREMENTS (VERIFY WITH LOCAL INSPECTOR)
13. ELECTRICAL EQUIPMENT (PANELBOARDS, TRANSFORMERS, DISTRIBUTION EQUIPMENT, ETC.) IS SHOWN TO SCALE ON THE FLOOR PLANS.
14. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING EQUIPMENT THAT WILL FIT WITHIN THE SPACES SHOWN ON THE PLANS AND COMPLYING WITH ALL CODE REQUIRED CLEARANCES.
15. ELECTRICAL CONTRACTOR TO LABEL ALL DEVICES (RECEPTACLES, SWITCHES, PANELBOARDS, DISCONNECTS, ETC.) WITH CIRCUIT NUMBER AND PANELBOARD DESIGNATION. RECEPTACLES, SWITCHES, AND SIMILAR DEVICES TO HAVE PRE-PRINTED, SELF ADHESIVE LABEL.
16. PANELBOARDS, DISCONNECT SWITCHES, AND SIMILAR DEVICES TO HAVE ENGRAVED, SELF-ADHESIVE, LAMINATED ACRYLIC LABEL (BLACK W/ WHITE LETTERING).
17. PROVIDE TYPE-WRITTEN PANELBOARD SCHEDULES FOR ALL ELECTRICAL PANELBOARDS.

ELECTRICAL SYMBOLS

LIGHTING FIXTURES/DEVICES			POWER EQUIPMENT/DEVICES		
SYMBOL	DESCRIPTION	MOUNTING	SYMBOL	DESCRIPTION	MOUNTING
	DOWNLIGHT (LETTER INDICATES FIXTURE TYPE) REFER TO LIGHT FIXTURE SCHEDULE	CEILING		SWITCHBOARD OR DISTRIBUTION PANEL REFER TO PANEL SCHEDULES	
	DIRECTIONAL DOWNLIGHT (LETTER INDICATES FIXTURE TYPE) REFER TO LIGHT FIXTURE SCHEDULE	CEILING		DRY-TYPE TRANSFORMER REFER TO PLANS FOR KVA RATING	
	WALL MOUNTED LIGHT FIXTURE (LETTER INDICATES FIXTURE TYPE) REFER TO LIGHT FIXTURE SCHEDULE	WALL		120/208V, 3Ø, 4W PANELBOARD REFER TO PANEL SCHEDULES	
	LINEAR LIGHT FIXTURE (LETTER INDICATES FIXTURE TYPE) REFER TO LIGHT FIXTURE SCHEDULE	CEILING OR SUSPENDED		277/480V, 3Ø, 4W PANELBOARD REFER TO PANEL SCHEDULES	
	2X4 LIGHT FIXTURE (LETTER INDICATES FIXTURE TYPE) REFER TO LIGHT FIXTURE SCHEDULE	CEILING		JUNCTION BOX	WALL OR CEILING
	2X2 LIGHT FIXTURE (LETTER INDICATES FIXTURE TYPE) REFER TO LIGHT FIXTURE SCHEDULE	CEILING		FUSED SAFETY SWITCH (E.G. 3Ø/2013 INDICATES A 3ØA, 3-POLE SWITCH WITH 20A FUSES)	
	HATCHING ON FIXTURE INDICATES FIXTURE TO HAVE EMERGENCY BACK-UP			NON-FUSED SAFETY SWITCH (E.G. 3ØNF/3 INDICATES A 3ØA, 3-POLE SWITCH WITHOUT FUSES)	
	TWO HEAD EMERGENCY LIGHT FIXTURE (LETTER INDICATES FIXTURE TYPE) REFER TO LIGHT FIXTURE SCHEDULE	WALL OR CEILING		MOTOR RATED SWITCH	
	EMERGENCY EXIT SIGN. PROVIDE ARROW(S) AS INDICATED. SHADING INDICATES FACE (LETTER INDICATES FIXTURE TYPE) REFER TO LIGHT FIXTURE SCHEDULE	WALL OR CEILING		MOTOR	
	SINGLE POLE SWITCH 20A (120/277V)			NEMA 5-20R SIMPLEX RECEPTACLE	WALL - 18" AFF
	THREE WAY SWITCH 20A (120/277V)			NEMA 5-20R DUPLEX RECEPTACLE	WALL - 18" AFF
	FOUR WAY SWITCH 20A (120/277V)			NEMA 5-20R DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER	
	WALL BOX DIMMER SWITCH			NEMA 5-20R QUAD-PLEX RECEPTACLE	WALL - 18" AFF
	CEILING OR WALL MOUNTED OCCUPANCY SENSOR (LETTER INDICATES SENSOR TYPE) REFER TO LIGHTING CONTROLS SCHEDULE	WALL OR CEILING		NEMA 5-20R SPLIT RECEPTACLE. TOP OUTLET WIRED HOT. BOTTOM OUTLET SWITCHED.	WALL - 18" AFF
	LOW-VOLTAGE CONTROL STATION (LETTER INDICATES CONTROL STATION TYPE) REFER TO LIGHTING CONTROLS SCHEDULE	WALL - 48" AFF TO TOP OF JUNCTION BOX		SPECIAL PURPOSE RECEPTACLE REFER TO PLANS FOR NEMA CONFIGURATION	WALL - 18" AFF OR CEILING
	PHOTOCELL SENSOR (LETTER INDICATES SENSOR TYPE) REFER TO LIGHTING CONTROLS SCHEDULE	FIELD VERIFY		NEMA 5-20R - DUPLEX RECEPTACLE WITH USB PORTS SIMILAR TO HUBBELL #USB20ACSW	WALL - 18" AFF
	POWERPACK (LETTER INDICATES POWERPACK TYPE) REFER TO LIGHTING CONTROLS SCHEDULE	ACCESSIBLE CEILING		NEMA 5-20R DUPLEX RECEPTACLE MOUNTED ON CEILING	CEILING - FLUSH
COMMUNICATION/LOW-VOLTAGE DEVICES				HUBBELL CF84 SERIES FLOOR BOX (OR EQUAL) WITH (2) DUPLEX RECEPTACLES AND DATA/COMMUNICATION CONNECTION CAPABILITY	FLOOR - FLUSH
SYMBOL	DESCRIPTION	MOUNTING		HUBBELL 524 SERIES FLOOR BOX (OR EQUAL) WITH (1) DUPLEX RECEPTACLE AND DATA/COMMUNICATION CONNECTION CAPABILITY	FLOOR - FLUSH
	CARD READER (VERIFY EXACT REQUIREMENTS)			HUBBELL B24 SERIES FLOOR BOX (OR EQUAL) FOR POWER AND DATA CONNECTIONS TO PRE-WIRED FURNITURE. VERIFY EXACT CONNECTION WITH FURNITURE VENDOR	FLOOR - FLUSH
	DATA, TELEPHONE, OR COMBO TELEDATA OUTLET PROVIDE PULLSTRING IN CONDUIT TO ACCESSIBLE CEILING	WALL - 18" AFF		HUBBELL S1PT SERIES 4" POKE-THRU (OR EQUAL) WITH (2) DUPLEX RECEPTACLES AND DATA/COMMUNICATION CONNECTION CAPABILITY	FLOOR - FLUSH
	DATA, TELEPHONE, OR COMBO TELEDATA OUTLET PROVIDE PULLSTRING IN CONDUIT TO ACCESSIBLE CEILING	FLOOR OR CEILING		HUBBELL S1PTFF SERIES 4" POKE-THRU (OR EQUAL) FOR POWER AND DATA CONNECTIONS TO PRE-WIRED FURNITURE. VERIFY EXACT CONNECTION WITH FURNITURE VENDOR	FLOOR - FLUSH
	TELEVISION OUTLET	WALL OR CEILING		HUBBELL S1RS SERIES 6" POKE-THRU (OR EQUAL) WITH (2) DUPLEX RECEPTACLES AND DATA/COMMUNICATION AND AVY CONNECTION CAPABILITY	FLOOR - FLUSH
	SPEAKER OUTLET	FIELD VERIFY		CONDUIT IN OR UNDER FLOOR/GRADE	
	TELEPHONE TERMINAL BOARD	WALL		CONDUCTOR HOME RUN - (H) HOT, (N) NEUTRAL, (E) EQUIPMENT GROUND, & (I) ISOLATED GROUND	
	SECURITY CAMERA OUTLET	FIELD VERIFY		EQUIPMENT CONNECTION	
	PUSH BUTTON			CONDUIT IN CEILING OR WALL	

NOTE: NOT ALL SYMBOLS MAY BE USED.

-  IF MOUNTED ABOVE A COUNTER, DEVICE TO BE WALL MOUNTED 6" ABOVE FINISHED COUNTER OR 44" TO TOP OF JUNCTION BOX (WHICHEVER IS LOWER). IF NOT MOUNTED ABOVE A COUNTER, DEVICE TO BE WALL MOUNTED AT 48" AFF TO TOP OF JUNCTION BOX AS REQUIRED TO MEET ADA REQUIREMENTS. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS/ELEVATIONS.

Architect:
MICHAEL MOORES, RA
t: (816) 516-4861

Client:
Butler Supply
t: (573) 819-4400

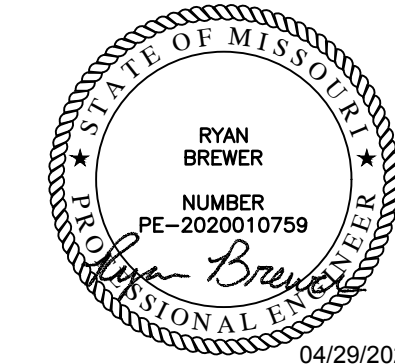
Consultants:

MEP Engineering:



Revisions to technical submissions which are not made or approved by the licensee are prohibited.

Seal:



MICHAEL MOORES, MO Architect #2009032812

Project Number: 2503

Project Type: TENANT FINISH

Project Name and Address:

BUTLER SUPPLY

2736 NE McBaine Drive
Lee's Summit, Missouri 64064

Issue: Date:
Permit Submittal 04.29.25

Sheet Title:

ELECTRICAL
NOTES,
SYMBOLS &
ABBREVIATIONS

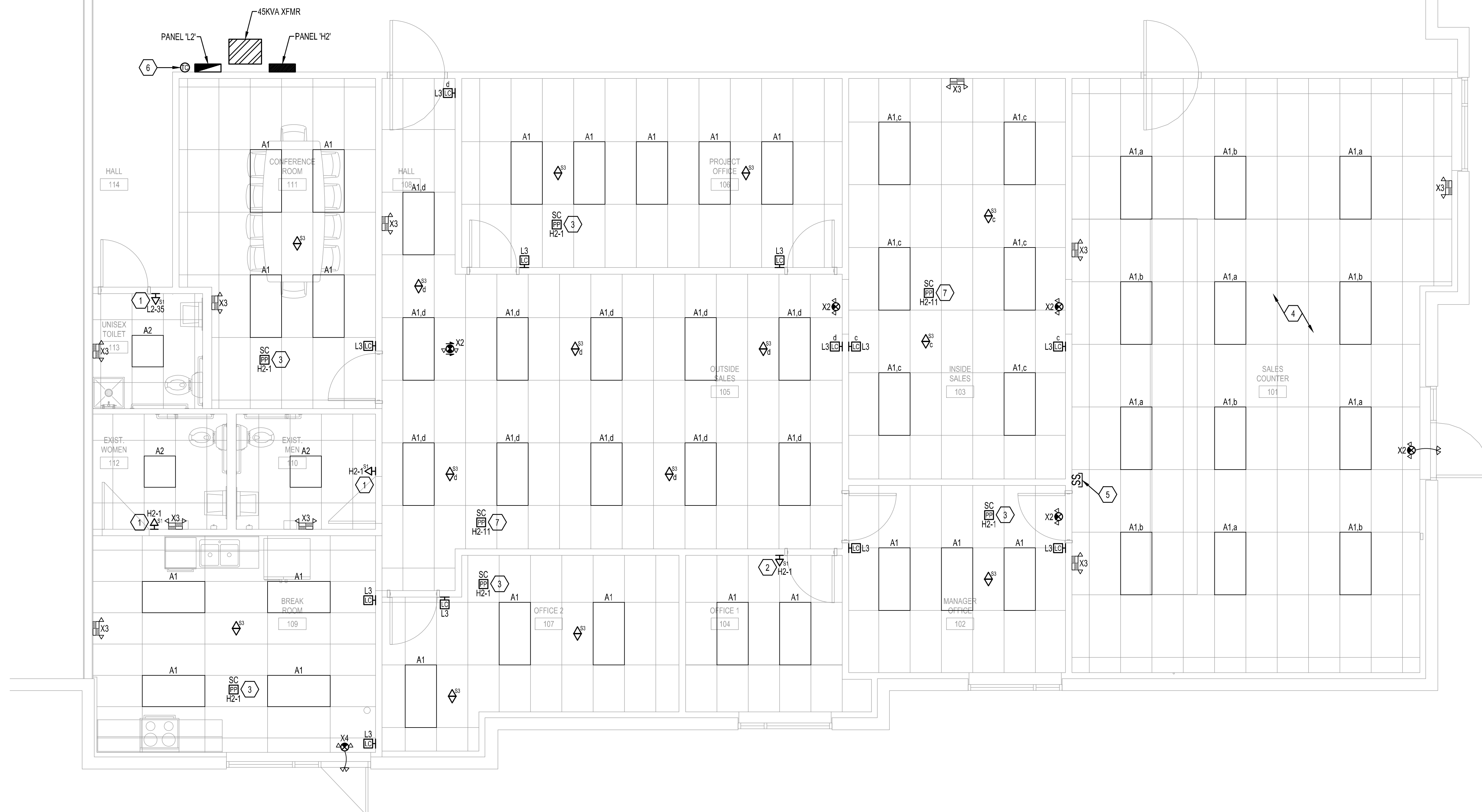
E101



- KEYED NOTES:**

3. POWER FOR RANGE, FIELD VERIFY EXACT CONNECTION REQUIREMENTS OF ALL BREAKROOM APPLIANCES WITH OWNER/EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN.
4. EXISTING RESTROOM AREA TO REMAIN. IF NEW EXHAUST FAN IS PROVIDED, CONNECT FAN TO EXISTING LIGHTING SWITCH/LEG. CONTROL INTENT IS FOR FAN TO ENERGIZE "ON/OFF" WITH THE LIGHTS IN THIS AREA. FIELD VERIFY VOLTAGE TO EXISTING LIGHTING SWITCH PRIOR TO ROUGH-IN. IF EXISTING SWITCH IS NOT 120V, PROVIDE A RIB RAY AND ANY ADDITIONAL ACCESSORIES FOR A COMPLETE AND OPERATIONAL SYSTEM.
5. RECEPTACLE TO BE MOUNTED ON EQUIPMENT PLATFORM IN AN ACCESSIBLE LOCATION. FIELD VERIFY EXACT LOCATION PRIOR TO ROUGH-IN.
6. PROVIDE (1) 3/4" CONDUIT FOR POWER AND (1) 1-1/4" CONDUIT FOR DATA FROM FLOOR BOX TO NEAREST WALL AND UP INTO ACCESSIBLE CEILING. FIELD VERIFY EXACT LOCATION PRIOR TO ROUGH-IN. PATCH AND REPAIR CONCRETE AS REQUIRED.
7. PROVIDE (1) 3/4" CONDUIT FOR POWER AND (1) 1-1/4" CONDUIT FOR DATA FROM SALES COUNTER TO NEAREST WALL AND UP INTO ACCESSIBLE CEILING FOR CONNECTION TO SALES COUNTER DEVICES. FIELD VERIFY EXACT CONNECTION REQUIREMENTS WITH OWNER/MILLWORK SUPPLIER PRIOR TO ROUGH-IN. PATCH AND REPAIR CONCRETE AS REQUIRED.
8. CONNECT EXHAUST FAN TO LIGHTING SWITCH/LEG FOR THIS AREA. CONTROL INTENT IS FOR FAN TO ENERGIZE "ON/OFF" WITH LIGHTS IN RESTROOM.
9. FIELD COORDINATE ANY ADDITIONAL POWER REQUIREMENTS IN THIS AREA WITH OWNER PRIOR TO START OF PROJECT.
10. IF SUBMITTAL FOR PHYSICAL DAMAGE FROM FORK LIFT OPERATION IN THIS AREA, PROVIDE AN ALTERNATE PRICE TO INSTALL REMOVEABLE BOLLARDS IN FRONT OF THE EQUIPMENT AS REQUIRED TO PROTECT THE EQUIPMENT PER NEC 110.27.
11. RECEPTACLE FOR MICROWAVE AND RE-CIRC FAN. FIELD VERIFY EXACT LOCATION PRIOR TO ROUGH-IN.

E201



GENERAL NOTES

(NOT ALL NOTES APPLY)

1. REFERENCE SHEET E101 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS.
2. COORDINATE MOUNTING HEIGHTS AND LOCATIONS FOR ALL DEVICES WITH ARCHITECT AND/OR OWNER PRIOR TO ROUGH-IN.
3. CIRCUIT ALL EXIT SIGNS TO NEAREST EMERGENCY LIGHTING CIRCUIT (OR NEAREST LIGHTING CIRCUIT IF NO GENERATOR).
4. VERIFY ALL EXISTING BRANCH CIRCUITING. CONTRACTOR SHALL WIRE FIXTURES IN ACCORDANCE WITH SWITCHING INDICATED. CONNECTED LOAD FOR 270V-220A CIRCUITS SHALL NOT EXCEED 4000W. 120V-20A CIRCUITS SHALL NOT EXCEED 1800W.
5. CIRCUIT NUMBERS ARE SHOWN FOR REFERENCE ONLY. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS.
6. EXISTING FIXTURES TO BE RELOCATED, AND EXISTING FIXTURES TO REMAIN SHALL BE REFURBISHED AND CLEANED. REPLACE BALLASTS/DRIVERS AS WELL AS DIM, OR BURNED OUT LAMPS. LAMP COLOR AND WATTAGE TO MATCH EXISTING.
7. FIXTURES LABELED 'EXR' ARE EXISTING FIXTURES TO BE RELOCATED.
8. FIXTURES LABELED 'EX' ARE EXISTING FIXTURES TO REMAIN.
9. EXISTING CONDITIONS INDICATED IN THESE DOCUMENTS ARE BASED ON A CURSORY SITE REVIEW AND DO NOT REPRESENT A COMPLETE "AS-BUILT" SET OF DOCUMENTS. IT IS THE CONTRACTORS RESPONSIBILITY TO FULLY INVESTIGATE ALL EXISTING CONDITIONS AND NOTIFY THE ARCHITECT/ENGINEER OF ANY DISCREPANCIES TO THESE DOCUMENTS OR THE DESIGN INTENT.

KEYED NOTES:

1. CONTROL INTENT FOR THIS AREA IS FOR LIGHTS TO BE AUTO 'ON', AUTO 'OFF' VIA OCCUPANCY SENSOR SWITCH.
2. CONTROL INTENT FOR THIS AREA IS FOR LIGHTS TO BE MANUAL 'ON', AUTO 'OFF' VIA OCCUPANCY SENSOR SWITCH.
3. CONTROL INTENT FOR THIS AREA IS FOR LIGHTS TO BE MANUAL 'ON', AUTO 'OFF' VIA OCCUPANCY SENSOR WITH MANUAL OVERRIDE AVAILABLE VIA THE LOW-VOLTAGE CONTROL STATION.
4. CONTROL INTENT FOR THIS AREA IS FOR LIGHTS TO BE AUTO 'ON', AUTO 'OFF' VIA TIMECLOCK CONTROL. VERIFY TIME/ SCHEDULE SETTINGS WITH OWNER.
5. MAIN SWITCH-BANK. COORDINATE EXACT LOCATION WITH OWNER PRIOR TO ROUGH-IN. SEE DETAIL 3, THIS SHEET, FOR MORE INFORMATION.
6. TIMECLOCK AND CONTACTORS. PROVIDE IN ACCESSIBLE LOCATION.
7. CONTROL INTENT FOR THIS AREA IS FOR LIGHTS TO BE AUTO 'ON', AUTO 'OFF' VIA OCCUPANCY SENSOR WITH MANUAL OVERRIDE AVAILABLE VIA THE LOW-VOLTAGE CONTROL STATION.

LIGHTING CONTROL
KEYED NOTES: ○

1. PROVIDE TORK DIGITAL SERIES, MODEL DGLC200A-NC (2-CHANNEL) TIMECLOCK (OR EQUIVALENT).
2. PROVIDE SQUARE D MODEL 8903 ELECTRICALLY HELD LIGHTING CONTACTORS (LC1 & LC2) WITH POLE QUANTITY AS REQUIRED.
3. PROVIDE PARAGON 5WSPZH 2-HOUR SPRING WOUND OVERRIDE SWITCH (OR EQUIVALENT).
4. PROVIDE NEMA 1 ENCLOSURE TO HOUSE ALL CONTACTORS INDICATED.
5. REMOTE MANUAL SWITCH: REFER TO SWITCHING DETAIL (THIS SHEET) FOR ADDITIONAL INFORMATION.
6. PROVIDE INTERMATIC #K4236C PHOTOCCELL MOUNTED ON A WEATHERPROOF BOX. CONTROL INTENT OF EXTERIOR LIGHT FIXTURES IS FOR LIGHTS TO BE ON A TIME-OF-DAY SCHEDULE WITH PHOTOCCELL OVERRIDE.

Architect:

MICHAEL MOORES, RA
t: (816) 516-4861

Client:

Butler Supply
t: (573) 819-4400

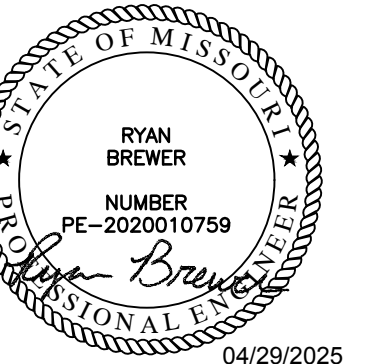
Consultants:

MEP Engineering:

EBS
ENGINEERED BUILDING SOLUTIONS, LLC
P.O. BOX 11101
OVERLAND PARK, KS 66207
913-735-5654
MO Certificate of Authority #E-2021060522

Revisions to technical submissions which are not made or approved by the licensee are prohibited.

Seal:



MICHAEL MOORES, MO Architect #2009032812

Project Number: 2503

Project Type: TENANT FINISH

Project Name and Address:

BUTLER SUPPLY

2/36 NE McBaine Drive
Lee's Summit, Missouri 64064

Issue: _____ Date: _____

Permit Submittal	04.29.25
------------------	----------

Sheet Title:

ELECTRICAL
LIGHTING PLAN

E301



LIGHTING CONTROLS SCHEDULE					
FIXTURE TAG	MANUFACTURER	MODEL #	SETTINGS	DESCRIPTION	NOTES
SC	ACUITY BRANDS: nLIGHT	nPP16 SERIES	REFER TO PLANS FOR CONTROL INTENT	ON/OFF ROOM SWITCH CONTROLLER LINE VOLTAGE - SINGLE RELAY	1,2,4
L3	ACUITY BRANDS: nLIGHT	nPODM	-	ON/OFF LOW VOLTAGE SWITCH WITH 1-CHANNEL CONTROL	1,6
S1	SENSOR SWITCH	WSX SERIES	REFER TO PLANS FOR CONTROL INTENT	WALL MOUNT OCCUPANCY SENSOR LINE VOLTAGE - SINGLE RELAY	1
S3	ACUITY BRANDS: nLIGHT	nCM-9 SERIES	-	CEILING MOUNT OCCUPANCY SENSOR - SMALL MOTION LOW VOLTAGE	3
S4	ACUITY BRANDS: nLIGHT	nCM-10 SERIES	-	CEILING MOUNT OCCUPANCY SENSOR - LARGE MOTION LOW VOLTAGE	3
WIRE	-	-	-	CAT5, CAT5e, OR CAT 6. STANDARD OR SOLID. TERMINATED AS RJ45 TIA/EIA-568B	

[illegible]

VOLTAGE PHASE: 208/120/3P, 4W
BUS: MAIN BUS, 225A
MAIN TYPE: 15A-BK

APC, VALUE: VERNY
AC RATING: VERNY
MOUNTING: SURFACE (MNTA 1)

GROUNDING: BS (PWR 225.66)
INSULATED CABLE BUS NO
SERVICE ENTRANCE RATIO: MO
USER: STANFORD

PANEL L2																																				
L1S COLORED VARY																																				
LTS	ROPT	MOTOR	HEAT	COOL	MISC	EXTENSD	ELEV	DISCRIPTION	AMP	F1	WIRE	Q1	PHASE	Q2	Q3	AMP	DISCRIPTION	LTS	ROPT	MOTOR	HEAT	COOL	MISC	EXTENSD	ELEV											
720								OFFICE ROPTS	12	1	2	1	A	2	12	20	DEGRAL																			
720								OFFICE ROPTS	12	1	2	1	B	2	12	20	DEGRAL	180																		
720								MANAGE OFFICE ROPTS	12	1	2	1	C	2	12	20	DEGRAL																			
720								INER SALES ROPTS	12	1	2	7	A	8			SPACE ONLY																			
720								INER SALES ROPTS	12	1	2	7	B	10	12	20	SPACE ONLY																			
720								SALES COASTER	10	1	12	11	C	12			SPACE ONLY																			
720								SALES AREA WALL ROPTS	12	1	13	A	13	A	13		SPACE ONLY																			
720								SALES AREA WALL ROPTS	12	1	13	B	16	B	16	12	20	PURNAME F-2																		
720								SALES AREA WALL ROPTS	12	1	13	C	17	C			SPACE ONLY	1380																		
540								PROJECT OFFICE ROPTS	10	1	12	19	A	20		8	2	50	COND UNIT TOL-1																	
540								PROJECT OFFICE ROPTS	10	1	12	19	B	21	B			COND UNIT TOL-1																		
540								OFFICE SALES WALL ROPTS	10	1	12	23	C	24		8	2	50	COND UNIT TOL-1																	
540								OFFICE SALES WALL ROPTS	10	1	12	23	A	26		8	2	50	COND UNIT TOL-1																	
540								OFFICE SALES WALL ROPTS	10	1	12	23	B	28		8	2	50	RANGE																	
540								SPACE	10	1	12	29	C	30		12	1	20	WIPORF WANTS	720																
1080								COOR REWALL ROPTS	10	1	12	31	A	32	12	1	20	WIPORF WANTS																		
360								COOR REWALL ROPTS	10	1	12	31	B	34	12	1	20	PURNAME F-1	1380																	
360								RECEIVABLE WALL ROPT	10	1	12	33	A	35	12	1	20	SPACE ONLY																		
360								E BREAK ENTR ROPTS	10	1	12	37	A	38			SPACE ONLY																			
1080								RECEIVABLE ROPT	10	1	12	39	B	40			SPACE ONLY																			
1080								DEGRALNER	10	1	12	41	C	42			SPACE ONLY																			
40	11100	0	0	0	0	0	2500	0	TOTALS										TOTALS										0	690	250	0	11020	200	4920	0

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR + 100% SLACK OF DISCONNECTORS
100% OF L2 FOR COORD. PHASE BASED ON L2 TEST 14

100% OF LST KVA, 50% OF RERATING
100% OF LARGEST MOTOR +

VOLTAGE DROP CHART BRANCH CIRCUIT VOLTAGE DROP WIRING SCHEDULE FOR 1Ø CIRCUITS						
BRANCH CIRCUIT RATING (AMPS)	WIRE SIZE (AWG)	MAXIMUM LENGTH OF BRANCH CIRCUIT (FEET)				
		120V	208V	240V	277V	480V
20A	#12	50	90	110	125	200
	#10	80	150	175	200	350
	#8	140	230	280	320	550
	#6	215	375	430	500	870
30A	#10	50	100	110	130	225
	#8	80	160	180	210	360
	#6	135	250	280	325	560
	#4	220	400	450	525	910

NOTES:

1. PROVIDE BRANCH CIRCUIT CONDUCTORS AS INDICATED IN THE TABLE ABOVE FOR ALL LIGHTING AND RECEPTACLE BRANCH CIRCUITS. WHEREAS BRANCH CIRCUITS SERVE DEDICATED EQUIPMENT, THE CONTRACTOR MAY PERFORM VOLTAGE DROP CALCULATIONS BASED ON ACTUAL EQUIPMENT CONNECTED LOAD AND PROVIDE CONDUCTORS APPROPRIATELY SIZED TO LIMIT VOLTAGE DROP TO A MAXIMUM OF 3%.
2. CONDUCTOR SIZES ARE BASED ON SOLID COPPER CONDUCTORS FOR WIRES SMALLER THAN #6 AND STRANDED COPPER CONDUCTORS FOR WIRES #6 AND LARGER, IN A SINGLE METAL CONDUIT.
3. LIMITS FOR CONDUCTOR LENGTH SHOWN ARE BASED ON A MAXIMUM OF 3% VOLTAGE DROP TO COMPLY WITH THE NEC FOR CIRCUITS LOADED UP TO 80% OF THE BRANCH BREAKER RATING. FIELD VERIFY EXACT BRANCH CIRCUIT LENGTHS AND PROVIDE CONDUCTORS APPROPRIATELY SIZED TO LIMIT VOLTAGE DROP TO 3%.

ENSURE ALL PANELS ARE PROPERLY LABELED. PROVIDE NEW LABELS WHERE ONE IS NOT CURRENTLY PRESENT. UPDATE PANEL DIRECTORIES AS NECESSARY.

1. PROVIDE 3P-100A BREAKER IN EXISTING PANEL 'H1' TO SERVE NEW PANEL 'H2' NEAR OFFICE AREA.
2. EXISTING DISCONNECTS AND METER TO REMAIN.
3. EXISTING METER, CT CABINET AND DISCONNECT TO REMAIN.

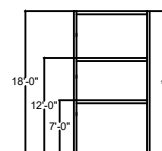
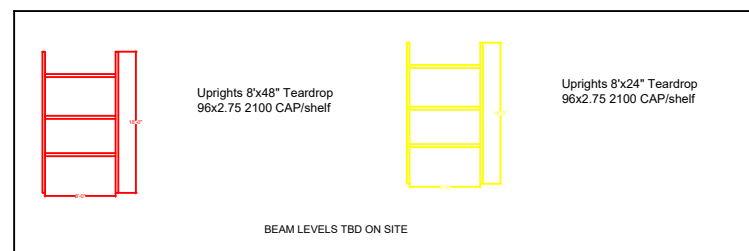
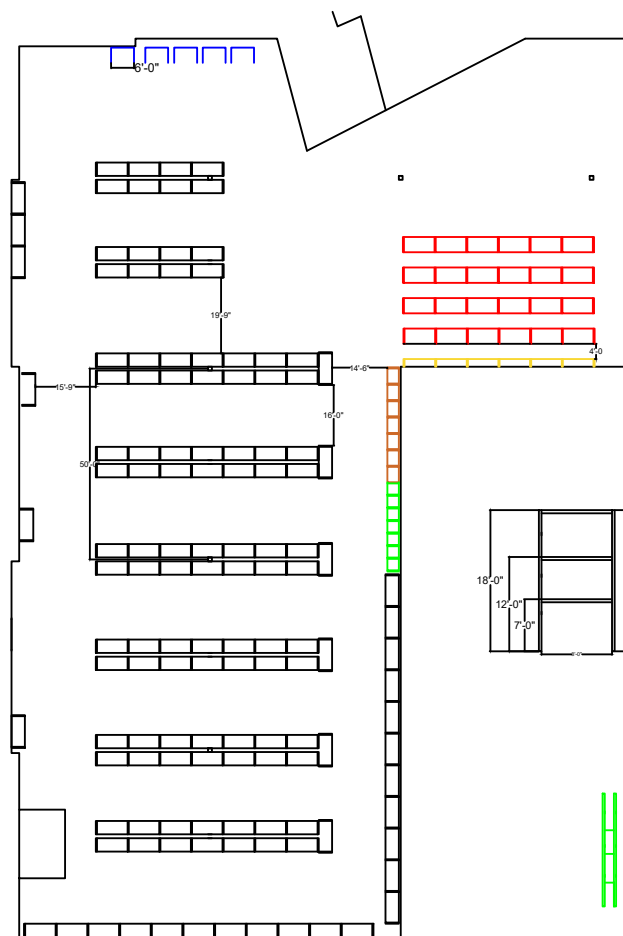
E401

[illegible]

[illegible]



THE P.E. CERTIFICATION PROVIDED HEREIN PERTAINS
TO THE SIGNATURE OF THE INDIVIDUAL NAMED
STRUCTURAL COMPONENTS ONLY. ALL
OTHER AREAS ARE WITHIN THE SCOPE OF
WORK OF THIS CERTIFICATION.



Uprights 18'x42" Teardrop
NEW ERA PRODUCTS
96x4" beams MECALUX
BEAMS CAP/shelf
42x46 Wire decking
(2500 lbs cap w/material
handling)



Single Sided Cantilever
(MECALUX)
12'tall with COL.H23 C W
8"x18 U 12
BASE H23 W 8"x18 U 4'
48" Straight Arm H23
S5"x10 U 4'



Uprights 8'x36" Teardrop
Reel Rack 3' wide

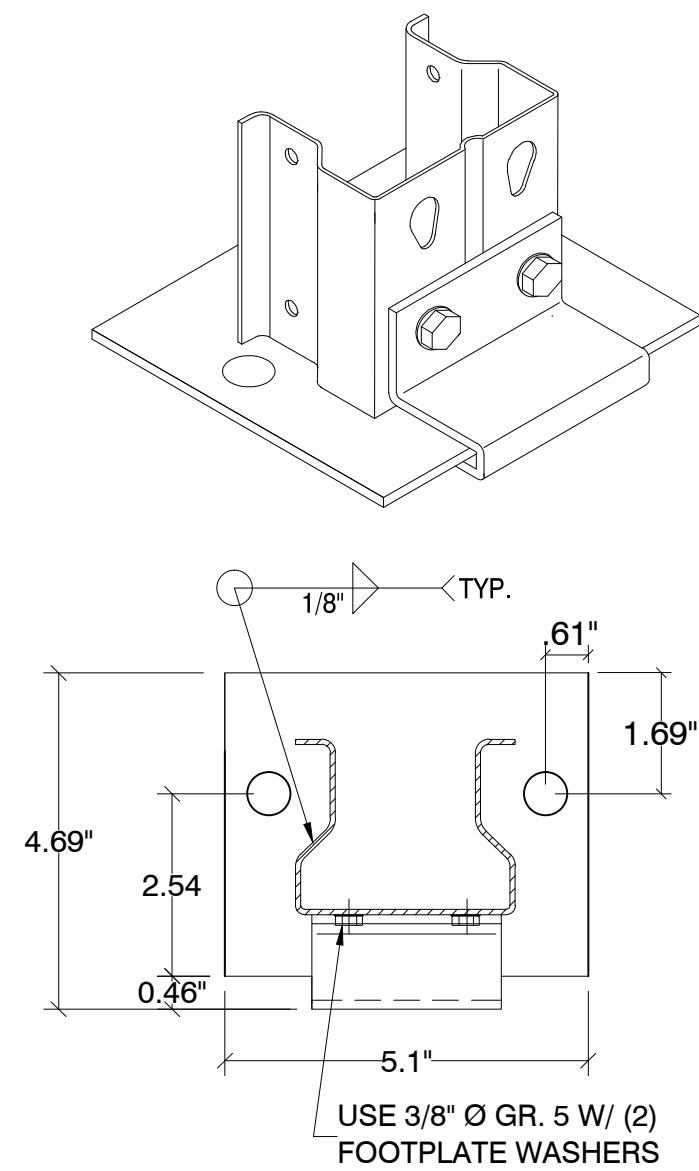


Uprights 8'x36" Teardrop
Reel Rack 4' wide

JOB NAME: BUTLER SUPPLY
LOCATION: 2736 NE MCBAIN
DR
Lees Summit MO 64064



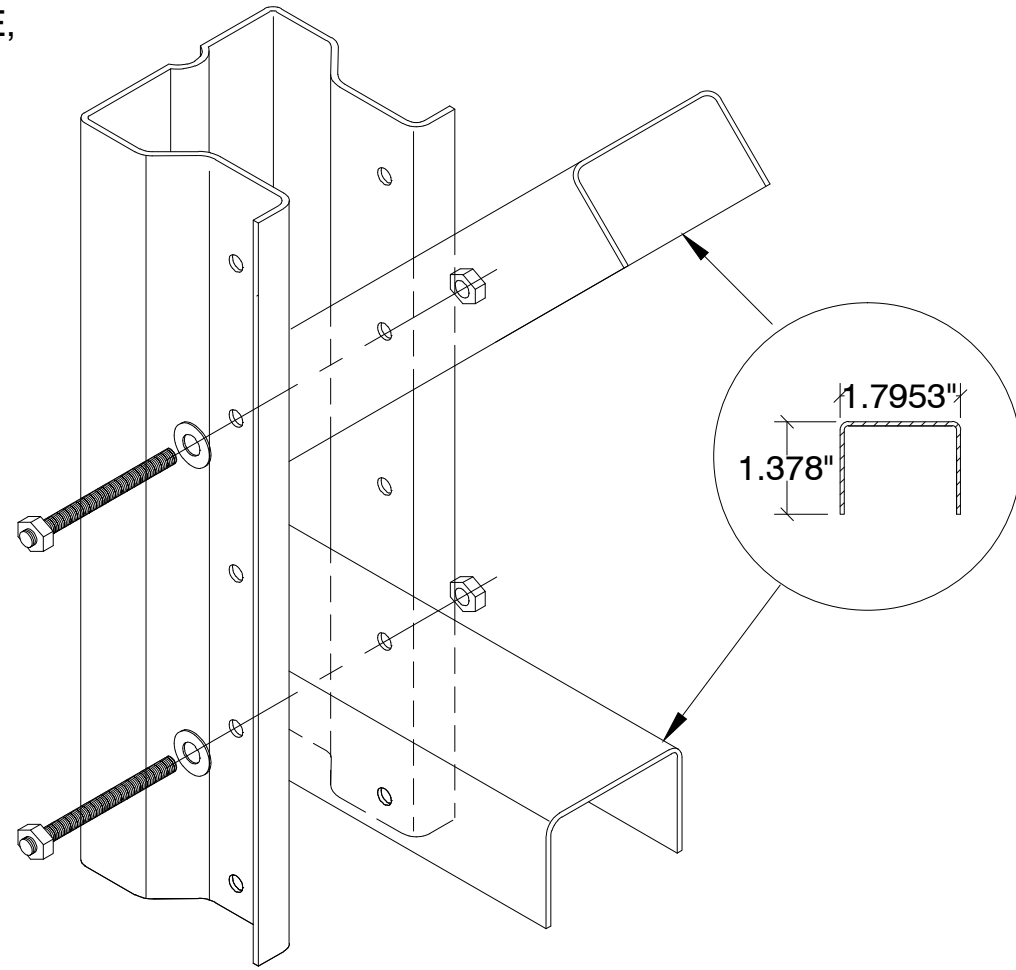
COLUMN



NOTES:
USE @ ALL
COLUMN/BASE LOCATIONS TYP.

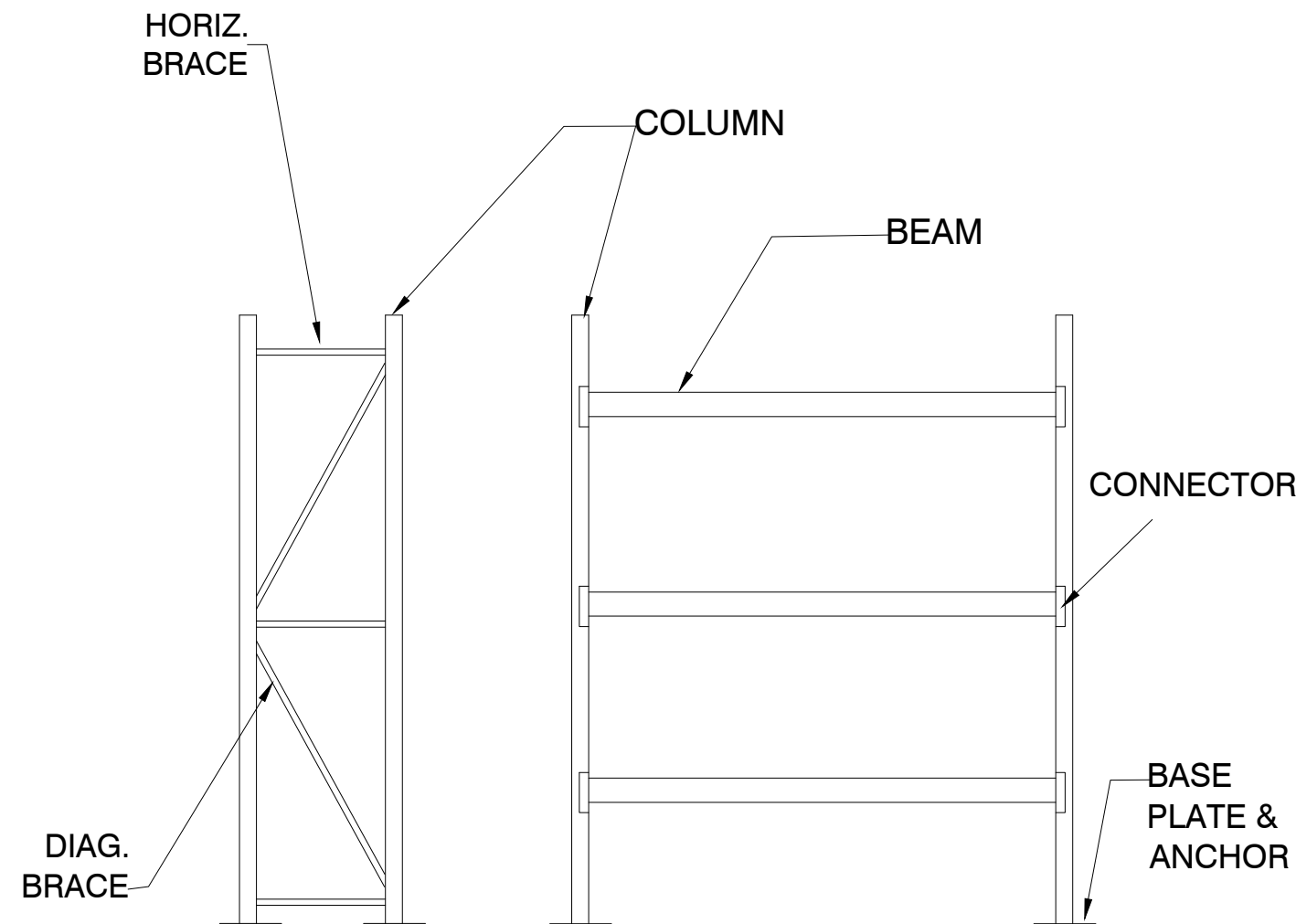
1

ATTACHMENT:
ATTACH W/ (4)
5/16"Ø X 3/4" GR. 5
BOLTS PER BRACE,
(2) @ EA. END



2

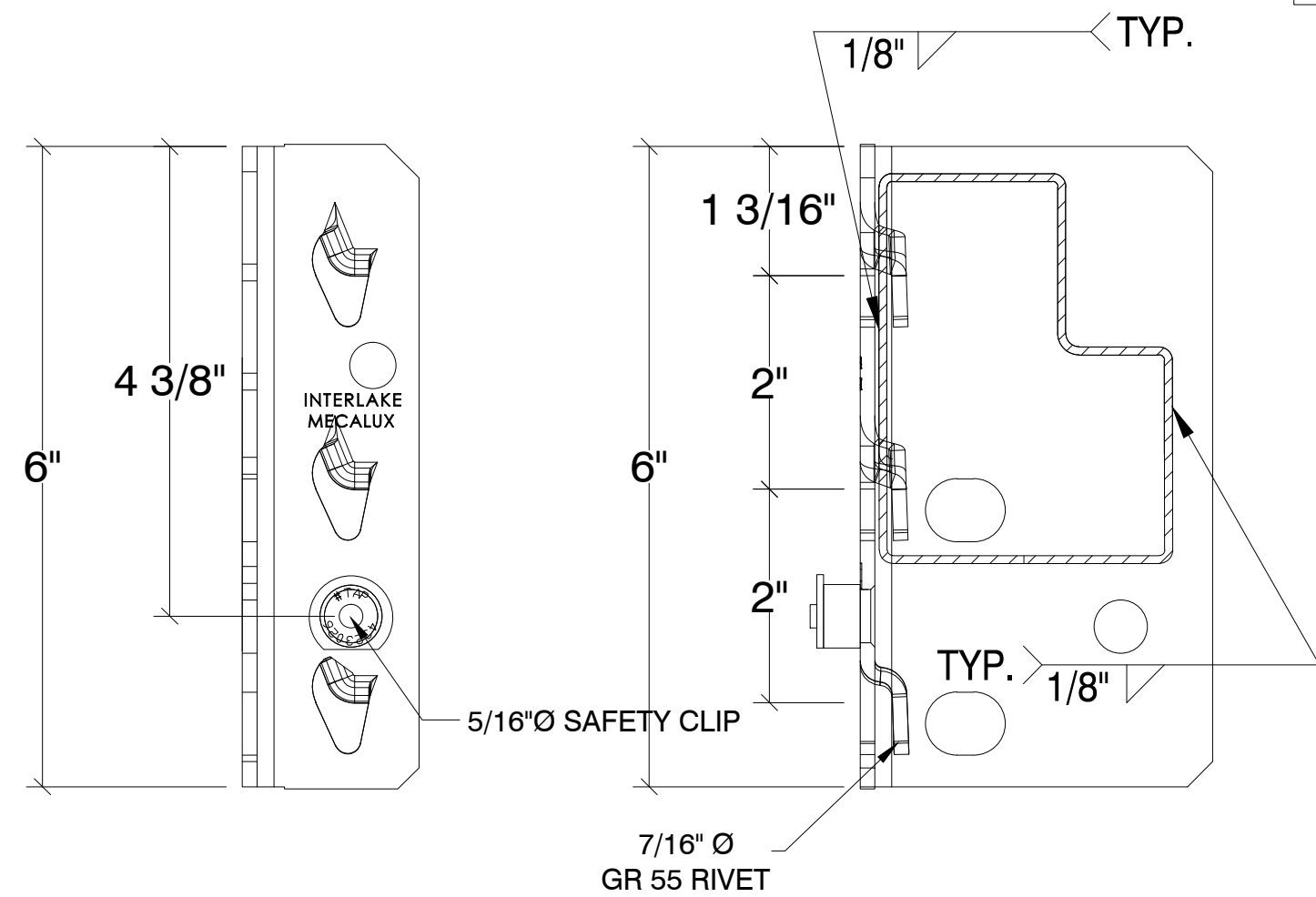
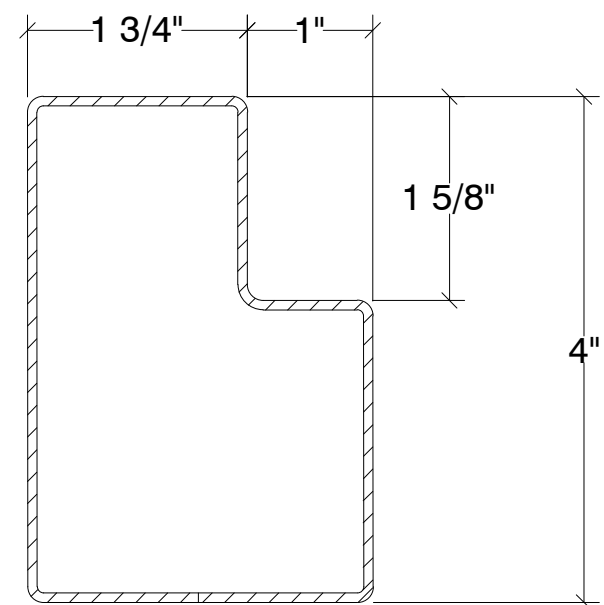
GENERAL RACK CONFIGURATION



NOT A DEPICTION OF THIS PROJECT

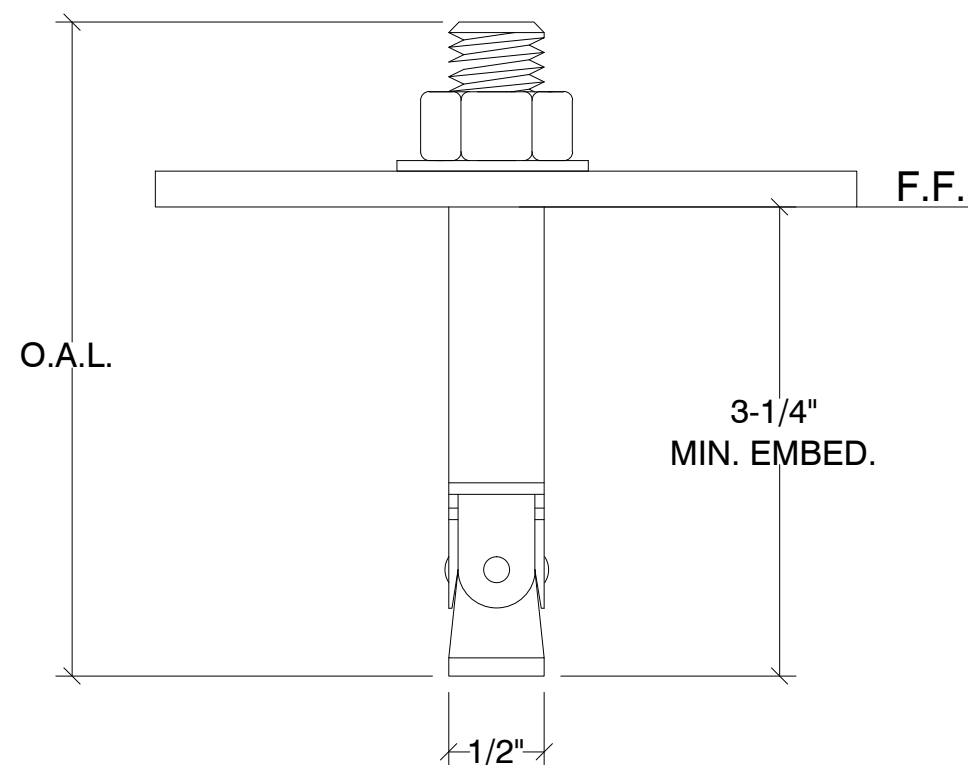
GENERAL PROJECT NOTES

2. DESIGNER PER REQUIREMENTS OF THE 2018 IBC, ASCE 7-16 AND THE 2012 RMI RACK DESIGN MANUAL.
3. SEISMIC CRITERIA $S_s = 0.099$, $S_1 = 0.068$, $F_a = 1.600$, $F_v = 2.400$
 $I_p = 1.0$ (NO PUBLIC ACCESS), $S_d_s = 0.106$, $S_1 = 0.109$, OCC. CATAG. II,
SITE CLASS D-DEFAULT, SEISMIC DESIGN CATEG. B
3. STORAGE CAPACITY:
TYPE 1 SELECTIVE RACK = 3000 LBS PER LEVEL, TYP.
4. ANCHORS : HILTI KWIKBOLT T22 ESR #4266 (50 FT-LBS TORQUE), OR POWERS SD2 ESR#2502 (40 FT-LBS TORQUE)
1/2" O 3 x 1-4" MIN. EMBED.
(1) ANCHOR PER BASE PLATE
5. PERIODIC SPECIAL INSPECTION IS REQUIRED DURING ANCHOR INSTALLATION. ANCHORS SHALL BE INSTALLED PER ICC ESR#4266.
6. EXISTING S.O.G. CONCRETE THICKNESS & COMPRESSIVE STRENGTH, 6" x 4000 PSI
7. SOIL BEARING PRESSURE 750 PSF.
8. ALL RACK INSTALLATIONS AND RACKS MANUFACTURED IN CONFORMITY WITH THIS STANDARD SHALL DISPLAY IN ONE OR MORE CONSPICUOUS LOCATIONS A PERMANENT PLaque EACH NOT LESS THAN 50 SQUARE INCHES IN AREA AND SHOWING THE MAXIMUM PERMISSIBLE UNIT LOAD IN CLEAR, LEGIBLE PRINT.
9. ALL BOLTS GR. 5 OR BETTER, INSTALL TO SNUG TIGHT FIT OR BETTER
10. ALL WELDING PERFORMED IN THE SHOP OF AN APPROVED FABRICATOR BY AWS CERTIFIED WELDERS USING E70XX ELECTRODE OR BETTER. NO FIELD WELDING PERFORMED. SPECIAL INSPECTION IS REQUIRED ONLY FOR ANY FIELD WELDING.
11. THE CLEAR SPACE BELOW SPRINKLERS SHALL BE A MIN. OF 18" BETWEEN TOP OF THE STORAGE AND THE CEILING SPRINKLER DEFLECTOR.
12. THE PRODUCT SHOWN ON THE DETAILS HEREIN IS ASSUMED TO BE IN GOOD, UNDAMAGED CONDITION. THE PRODUCT MUST BE FREE OF ANY DAMAGE AND/OR FABRICATION DEFICIENCIES OR IRREGULARITIES. IT IS THE RESPONSIBILITY OF THE OWNER, USER, PRODUCT PROVIDER AND/OR INSTALLER OF THE COMPONENTS TO NOTIFY SED, INC IN WRITING OF ANY DAMAGE, DEFICIENCIES OR IRREGULARITIES.
13. IT IS THE RESPONSIBILITY OF THE OWNER AND/OR USER OF THE COMPONENTS SHOWN HEREIN TO NOTIFY SED, INC OF ANY DAMAGE OR DEFICIENCIES IN THE SYSTEM DURING USE. THIS INCLUDES SUCH OCCURRENCES SUCH AS IMPACT DAMAGE TO THE COMPONENTS FROM FORKLIFT OR HEAVY MACHINERY, IMPACT FROM DROPPED LOADS ON THE SYSTEM, DAMAGE TO SYSTEMS BY IMPROPER USE OR INSTALLATION, ETC. THE USER OF THE PRODUCT MUST NOTIFY SED, INC IN WRITING SHOULD ANY DAMAGE OR DEFICIENCY OCCUR TO THE PRODUCT SHOWN HEREIN. IT IS THE RESPONSIBILITY OF THE OWNER AND/OR USER TO MAINTAIN THE SAFETY AND PROPER USE OF THE STORAGE PRODUCT SHOWN HEREIN.
14. IT IS THE RESPONSIBILITY OF THE OWNER/USER OF THE STORAGE SYSTEM SHOWN HEREIN TO REPAIR OR REPLACE ANY COMPONENT THAT IS DAMAGED OR OTHERWISE DEFICIENT.
15. THE OWNER SHALL MAINTAIN THE STRUCTURAL INTEGRITY OF THE RACK SYSTEM BY ASSURING PROPER OPERATIONAL, HOUSE KEEPING AND MAINTENANCE PROCEDURES, BUT NOT LIMITED TO THE FOLLOWING:
 - a. PROHIBIT ANY OVER LOADING OF ANY PALLET POSITIONS AND OF OVERALL RACK SYSTEMS.
 - b. REGULARLY INSPECT FOR DAMAGE. IF DAMAGE IS FOUND, IMMEDIATELY UNLOAD THE AFFECTED AREA AND REPLACE OR REPAIR ANY DAMAGED COLUMNS, BEAMS, OR OTHER STRUCTURAL COMPONENTS.
 - c. REQUIRE ALL PALLETS TO BE MAINTAINED IN GOOD, SAFE, OPERATING CONDITION.
 - d. ENSURE THAT PALLETS ARE PROPERLY PLACED ONTO PALLET LOAD SUPPORT MEMBERS IN PROPERLY STACKED AND STABLE POSITION.
 - e. REQUIRE THAT ALL GOODS STORED ON EACH PALLET TO BE PROPERLY STACKED AND STABLE.
 - f. PROHIBIT DOUBLE STACKING OF ANY PALLET POSITION, INCLUDING THE TOP MOST POSITION, UNLESS THE RACK SYSTEM IS SPECIFICALLY DESIGNED FOR SUCH LOADING.
 - g. THE OWNER AND/OR USER OF THE RACK SYSTEM MUST PROVIDE MEASURES TO MITIGATE DAMAGE TO THE STORAGE RACK BY USE OF IMPACT PROTECTIVE DEVICES IN AREAS WHERE FORKLIFT AND/OR HEAVY MACHINERY ARE IN USE.

34

NOTES:
CONFIRM O.A.L. OF ANCHORS WITH INSTALLER TO
ENSURE REQUIRED EMBEDMENT IS OBTAINED.

5

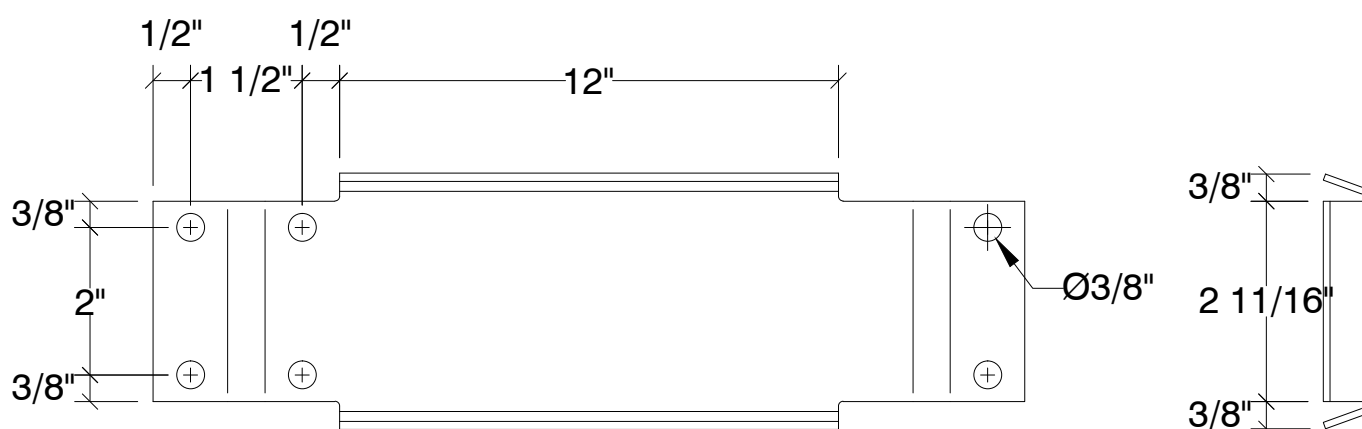


NOTES:
USES (3) ROW SPACERS FOR DOUBLE ROW UNITS

DESCRIPTION	STD ROW SPACER	NOTES: ATTACH WITH (4) 5/16"Ø GR. 5 BOLTS, (2) @ EACH END
MATERIAL	14 GAGE	
STEEL YIELD	ASTM A570, Fy=55,000 PSI	

[illegible]

SEE ATTACHED PALLET RACK KC DWG.
FOR STORAGE RACK ELEVATIONS.



DESCRIPTION	STD ROW SPACER	NOTES:
MATERIAL	14 GAGE	ATTACH WITH (4) 5/16"Ø GR. 5 BOLTS,
STEEL YIELD	ASTM A570, F _y =55,000 PSI	(2) @ EACH END



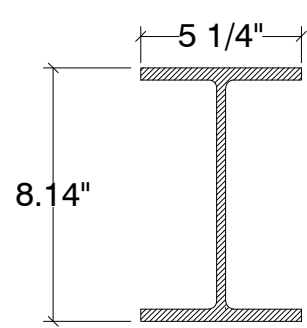
CLIENT	PALLET RACK KC
DATE	06/30/2025
DRAWN BY	DAS
ENG. BY	
MFG.	MECALUX
TYPE	STORAGE RACK

JOB NO.

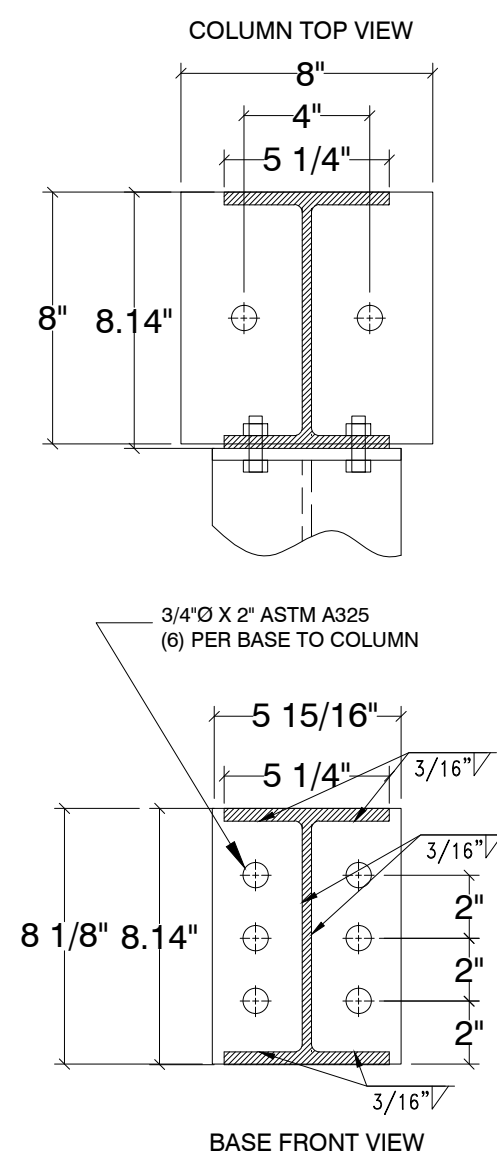
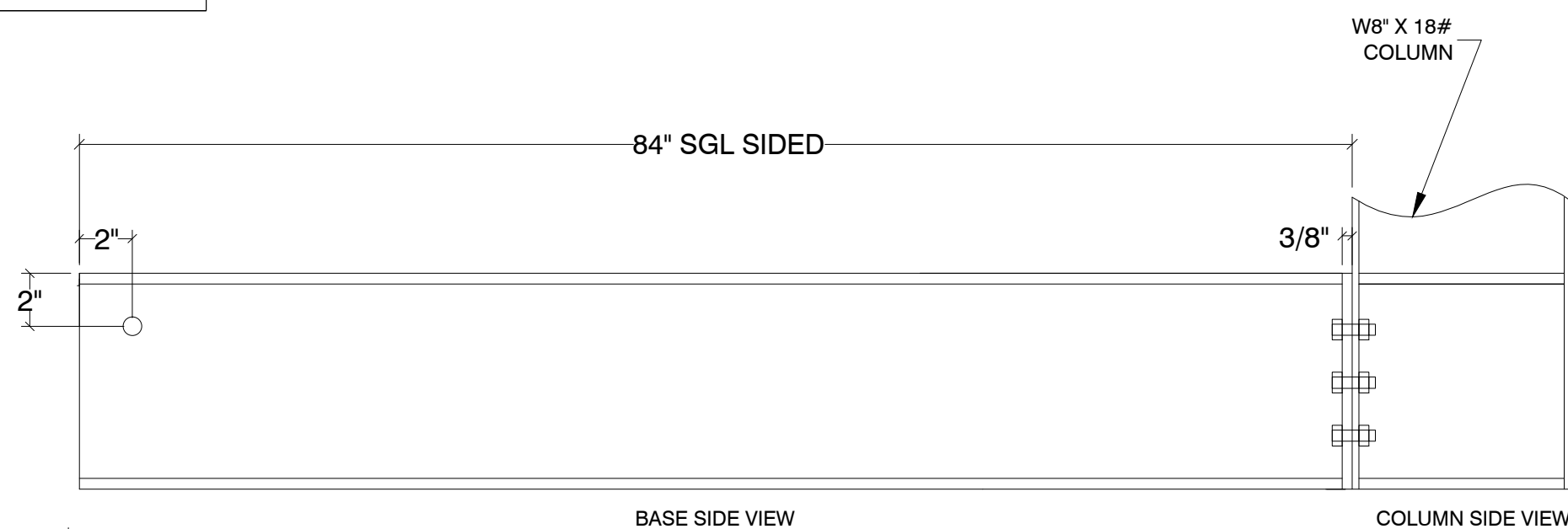
25-0625-3

SHEET NO. _____

SED 1 OF 2

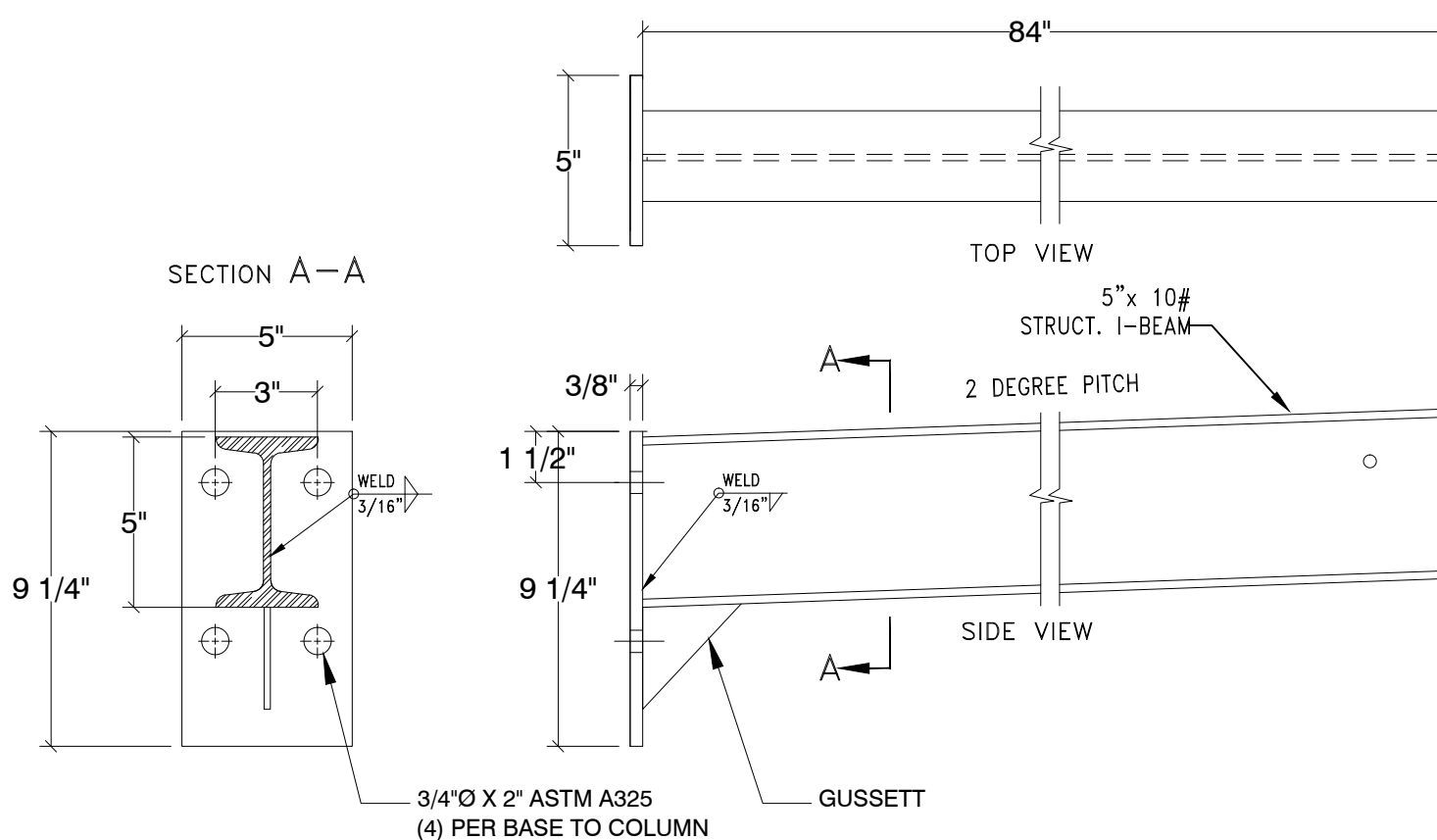


COLUMN W8"X 18#



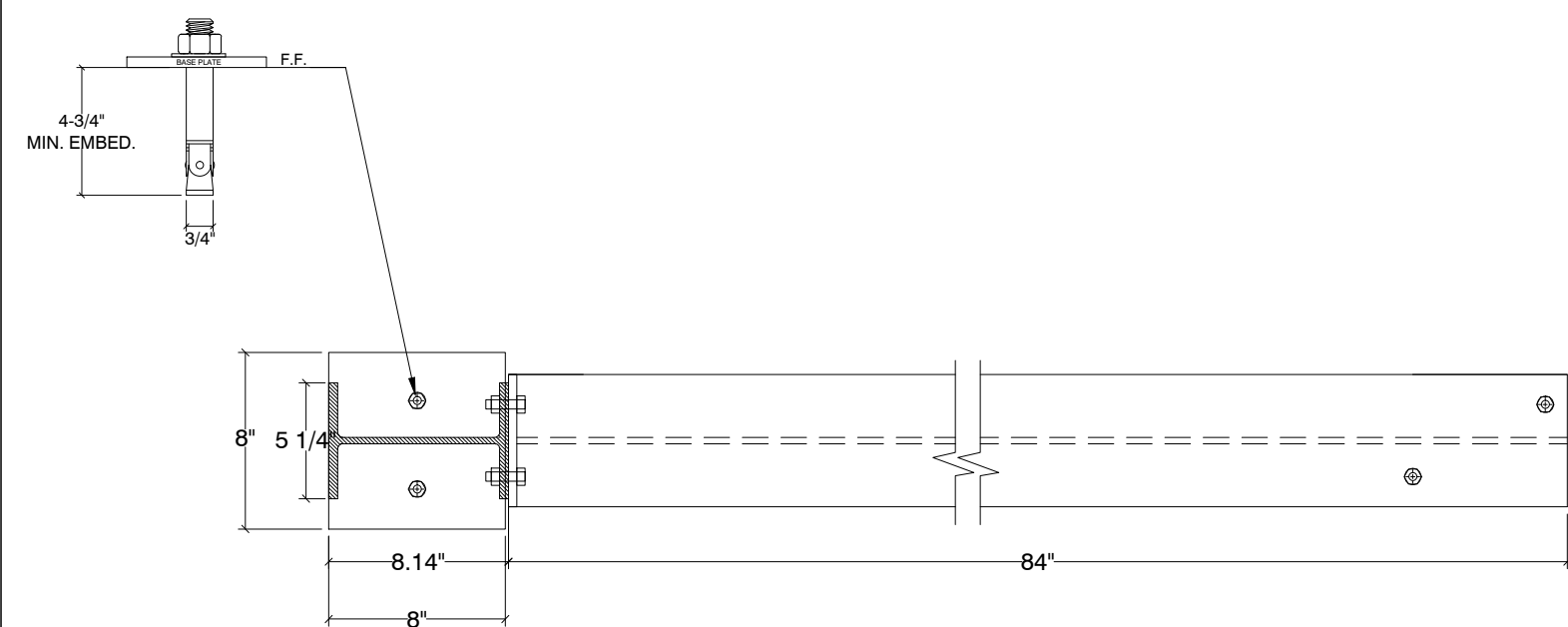
DESCRIPTION	BASE: STRUCTURAL	DESCRIPTION	COLUMN: STRUCTURAL
MATERIAL	W8" X 18#	MATERIAL	W8" X 18#
STEEL YIELD	ASTM A572, Fy=36,000 PSI	STEEL YIELD	ASTM A572, Fy=36,000 PSI

NOTES:
USE @ ALL SGL SIDED STRUCTURAL BASE TO COLUMN LOCATIONS.
ATTACH W/ 3/4"Ø ASTM A325 BOLTS COLUMN TO BASE.

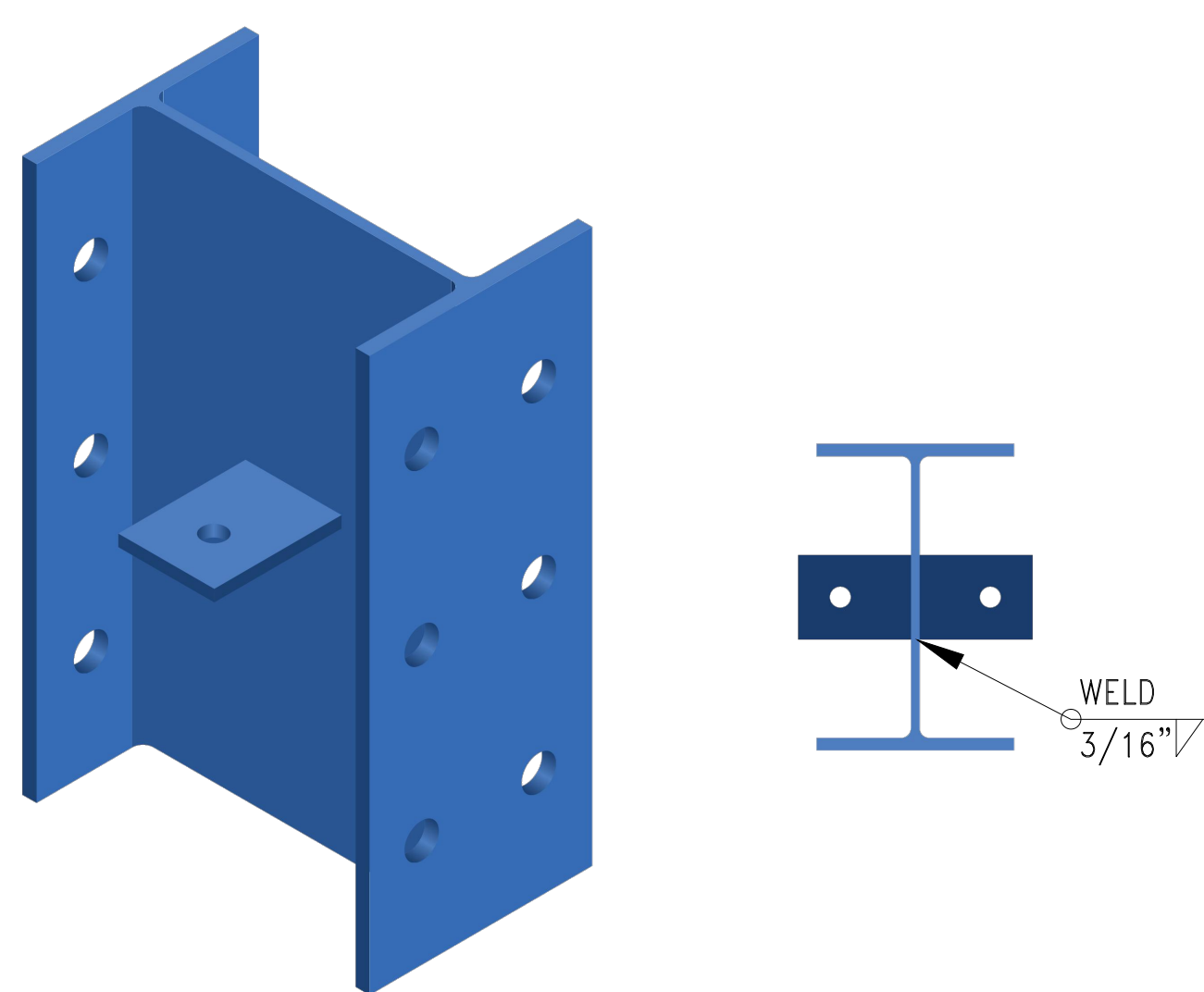


NOTES:
USE @ ALL ARM LOCATIONS TYP.
ALL LOADS TO BE EVENLY DISTRIBUTED OVER ALL ARMS. NO TIP LOADING ALLOWED.

DESCRIPTION	4" STRUCTURAL ARM	NOTES: ATTACH W/ (4) 3/4" DIA. ASTM A325 BOLTS.
MATERIAL	S5" X 10#	
STEEL YIELD	ASTM A572, Fy=50,000 PSI	

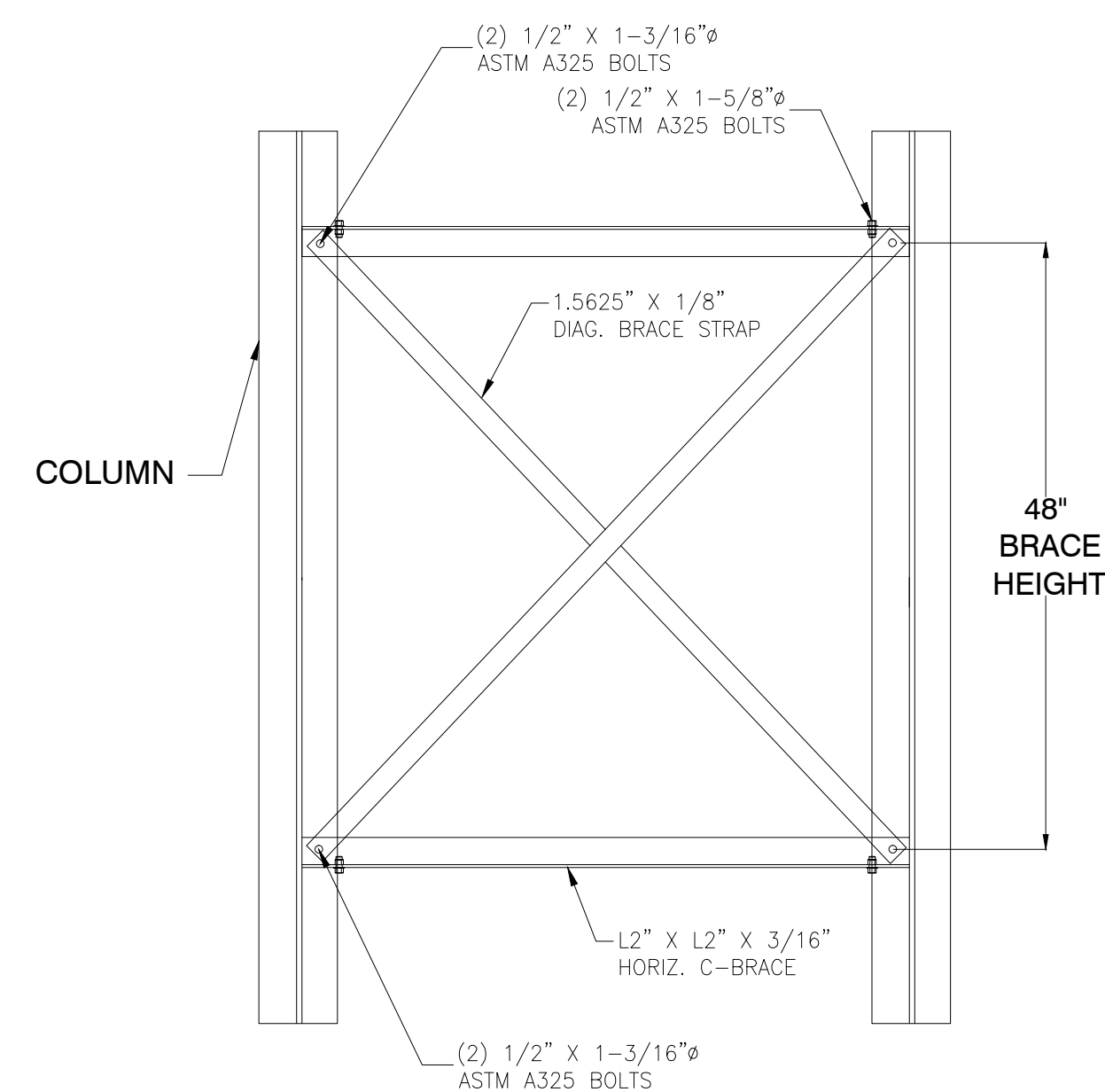


SEE NOTE # 4 ANCHOR DETAILS AND PLACEMENT	
DESCRIPTION	ANCHOR PLAN

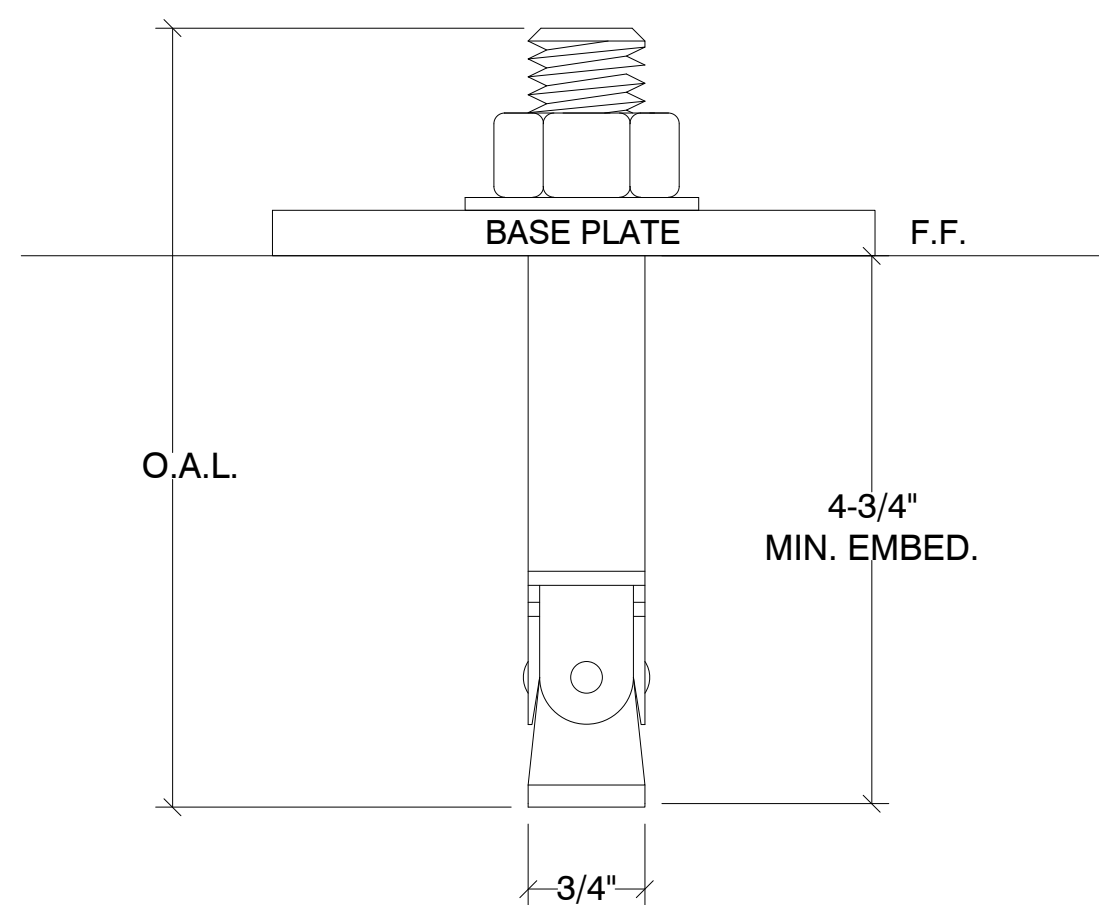


DESCRIPTION	BRACE CLIP	NOTES: USE @ ALL BRACE TO COLUMN CONNECTION LOCATIONS TYP.
MATERIAL	3/16" THK	
STEEL YIELD	ASTM A36, Fy=36,000 PSI	

NOTES:
USE @ ALL BRACE TO COLUMN CONNECTION
LOCATIONS TYP.

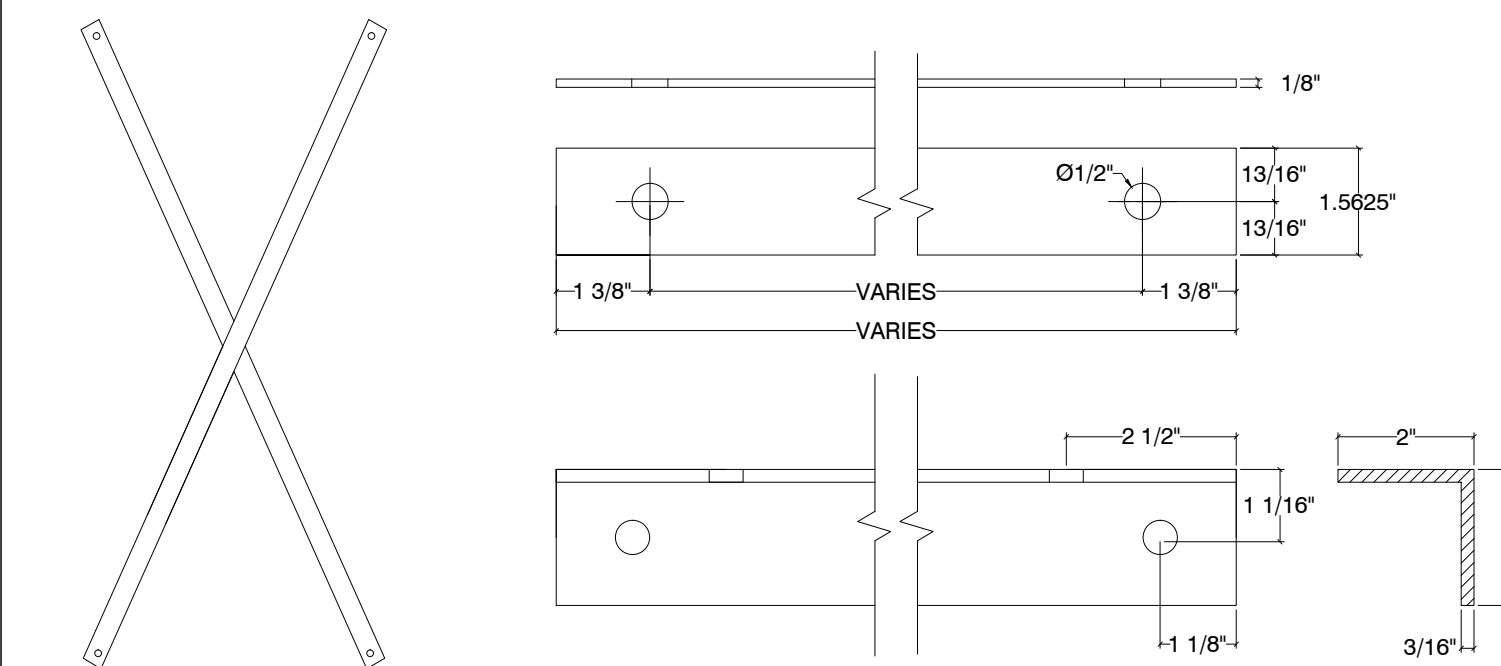


DESCRIPTION	BRACE TO COLUMN CONNECTION
-------------	----------------------------



NOTES:
CONFIRM O.A.L. OF ANCHORS WITH INSTALLER TO
ENSURE REQUIRED EMBEDMENT IS OBTAINED.

DESCRIPTION	HILTI KWIKBOLT TZ2 ANCHOR	
SIZE	3/4"Ø x 4-3/4" MIN. EMBED.	NOTE:
ESR#	4266	SEE NOTE #4 ABOVE FOR ANCHOR SPECS.



NOTES:
USE @ ALL BRACE LOCATIONS TYP.

DESCRIPTION	HORIZ. C-BRACE	DESCRIPTION	DIAG. BRACE
MATERIAL	L2" X L2" X 3/16"	MATERIAL	1.5625" X 1/8" STRAP
STEEL YIELD	ASTM A36, Fy=36,000 PSI	STEEL YIELD	ASTM A36, Fy=36,000 PSI

SEE ATTACHED PALLET RACK KC DWG.
FOR CANTI. RACK ELEVATIONS

NOTE: CANTILEVER RACK ELEVATIONS

- ## GENERAL PROJECT NOTES

- DESIGNED PER REQUIREMENTS OF THE 2018 IBC, ASCE 7-16, SECTION 15.5.3, & 2012 RMI RACK DESIGN MANUAL.
- SEISMIC CRITERIA $S_s = 0.099$, $S_1 = 0.068$, $F_a = 1.600$, $F_v = 2.400$.
- $I_p = 1.0$ (NO PUBLIC ACCESS), $S_{ds} = 0.166$, $S_{d1} = 0.109$, OCCUPANCY CATAG. II
- TYPE CLASS D-DEFAULT, Seismic Design Catag. B
3. STORAGE CAPACITY:
- TYPE 2 SGL-SIDED CANTILEVER = 1000# UNIFORM LOAD PER ARM LEVEL TYP.
4. ANCHORS: HILTI KWIKBOLT T22 ESR#4266 (110 FT-LBS TORQUE), OR POWERS SD2 ESR#2502 (110 FT-LBS TORQUE)
3/4"O X 4-3/4" MIN. EMBED.
- (4) ANCHORS PER BASE PLATE, (2) @ TOE, (2) @ COLUMN.
5. PERIODIC SPECIAL INSPECTION IS REQUIRED DURING ANCHOR INSTALLATION. ANCHORS SHALL BE INSTALLED PER ICC ESR#4266.
6. EXISTING S.O.G. CONCRETE THICKNESS & COMPRESSIVE STRENGTH, 6" x 4000 PSI
7. SOIL BEARING PRESSURE 750 PSF.
8. ALL RACK INSTALLATIONS AND RACKS MANUFACTURED IN CONFORMITY WITH THIS STANDARD SHALL DISPLAY IN ONE OR MORE CONSPICUOUS LOCATIONS A PERMANENT PLaque EACH NOT LESS THAN 150 SQUARE INCHES IN AREA AND SHOWING THE MAXIMUM PERMISSIBLE UNIT LOAD IN CLEAR, LEGIBLE PRINT.
9. ALL BOLTS ASTM A325 OR BETTER, INSTALL TO SNUG TIGHT FIT OR BETTER
10. ALL WELDING PERFORMED IN THE SHOP OF AN APPROVED FABRICATOR BY AWS CERTIFIED WELDERS USING E70XX ELECTRODE OR BETTER. FIELD WELDS, IF ANY, SHALL BE PROVIDED UNDER THE SUPERVISION OF A LICENSED QUALITY INSPECTOR. SPECIAL INSPECTION IS REQUIRED FOR ALL STRUCTURAL WELDS EXCEPT FOR WELDING DONE IN AN APPROVED FABRICATOR'S SHOP.
11. THE CLEAR SPACE BELOW SPRINKLERS SHALL BE A MIN. OF 18" BETWEEN TOP OF THE STORAGE AND THE CEILING SPRINKLER DEFLECTOR.
12. THE PRODUCT SHOWN ON THE DETAILS HEREIN IS ASSUMED TO BE IN GOOD, UNDAMAGED CONDITION. THE PRODUCT MUST BE FREE OF ANY DAMAGE AND/OR FABRICATION DEFICIENCIES OR IRREGULARITIES. IT IS THE RESPONSIBILITY OF THE OWNER, USER, PRODUCT PROVIDER AND/OR INSTALLER OF THE COMPONENTS TO NOTIFY SED, INC IN WRITING, OF ANY DAMAGE, DEFICIENCIES OR IRREGULARITIES.
13. IF IT IS THE RESPONSIBILITY OF THE OWNER AND/OR USER OF THE COMPONENTS SHOWN HEREIN TO NOTIFY SED, INC OF ANY DAMAGE OR DEFICIENCIES IN THE SYSTEM DURING USE THIS INCLUDES SUCH OCCURRENCES SUCH AS IMPACT DAMAGE TO THE COMPONENTS FROM FORKLUFT OR HEAVY MACHINERY, IMPACT FROM DROPPED LOADS ON THE SYSTEM, DAMAGE TO SYSTEMS BY IMPROPER USE OR INSTALLATION, ETC. THE USER OF THE PRODUCT MUST NOTIFY SED, INC IN WRITING SHOULD ANY DAMAGE OR DEFICIENCY OCCUR TO THE PRODUCT SHOWN HEREIN. IT IS THE RESPONSIBILITY OF THE OWNER AND/OR USER TO MAINTAIN THE SAFETY AND PROPER USE OF THE STORAGE PRODUCT SHOWN HEREIN.
14. IF IT IS THE RESPONSIBILITY OF THE OWNER/USER OF THE STORAGE SYSTEM SHOWN HEREIN TO REPAIR OR REPLACE ANY COMPONENT THAT IS DAMAGED OR OTHERWISE DEFICIENT.
15. THE OWNER SHALL MAINTAIN THE STRUCTURAL INTEGRITY OF THE RACK SYSTEM BY ASSURING PROPER OPERATIONAL, HOUSE KEEPING AND MAINTENANCE PROCEDURES, BUT NOT LIMITED TO THE FOLLOWING:
- A. PROHIBIT ANY OVER LOADING OF ANY PALLET POSITIONS AND OF OVERALL RACK SYSTEMS.
- B. REGULARLY INSPECT FOR DAMAGE; IF DAMAGE IS FOUND, IMMEDIATELY UNLOAD THE AFFECTED AREA AND REPLACE OR REPAIR ANY DAMAGED COLUMNS, BEAMS, OR OTHER STRUCTURAL COMPONENTS.
- C. REQUIRE ALL PALLETS TO BE MAINTAINED IN GOOD, SAFE, OPERATING CONDITION.
- D. ENSURE THAT PALLETS ARE PROPERLY PLACED ONTO PALLET LOAD SUPPORT MEMBERS IN PROPERLY STACKED AND STABLE POSITION.
- E. REQUIRE THAT ALL GOODS STORED ON EACH PALLET TO BE PROPERLY STACKED AND STABLE.
- F. PROHIBIT DOUBLE STACKING OF ANY PALLET POSITION, INCLUDING THE TOP MOST POSITION
- G. THE OWNER AND/OR USER OF THE RACK SYSTEM MUST PROVIDE MEASURES TO MITIGATE DAMAGE TO THE STORAGE RACK BY USE OF IMPACT PROTECTIVE DEVICES IN AREAS WHERE FORKLUFT AND/OR HEAVY MACHINERY ARE IN USE.
- H. ENSURE THAT THE RACKS ARE NOT MODIFIED OR REARRANGED IN A MANNER NOT WITHIN THE ORIGINAL DESIGN CONFIGURATION.

Structural Engineering & Design, Inc.

1815 Wright Ave
La Verne, CA 91750
Phone: 909.596.1351 Fax: 909.596.7186

Project Name : BUTLER SUPPLY

Project Number : 25-0625-3

Date : 07/01/25

Street Address: 2736 NE MCBAINE DR
City/State : LEES SUMMIT, MO 64064

Scope of Work : STORAGE RACK



Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

Project #: 25-0625-3

TABLE OF CONTENTS

Title Page	1
Table of Contents.....	2
Design Data and Definition of Components	3
Critical Configuration	4
Seismic Loads	5 to 6
Column	7
Beam and Connector	8 to 9
Bracing	10
Anchors	11
Base Plate	12
Slab on Grade	13
Other Configurations	14 to 24

Structural Engineering & Design Inc.

1815 Wright Ave. La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

Project #: 25-0625-3

Design Data

1) The analyses herein conforms to the requirements of the:
2021 IBC Section 2209

ANSI MH 16.1-2012 Specifications for the Design of Industrial Steel Storage Racks "2012 RMI Rack Design Manual"
ASCE 7-16, section 15.5.3

2) Transverse braced frame steel conforms to ASTM A570, Gr.55, with minimum strength, $F_y=55$ ksi
Longitudinal frame beam and connector steel conforms to ASTM A570, Gr.55, with minimum yield, $F_y=55$ ksi
All other steel conforms to ASTM A36, Gr. 36 with minimum yield, $F_y= 36$ ksi

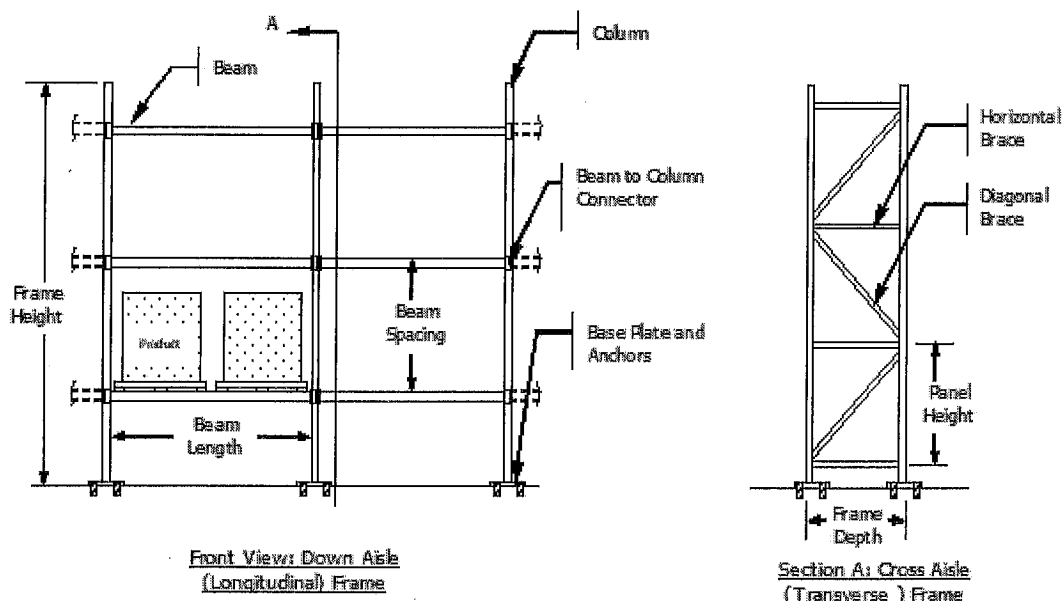
3) Anchor bolts shall be provided by installer per ICC reference on plans and calculations herein.

4) All welds shall conform to AWS procedures, utilizing E70xx electrodes or similar. All such welds shall be performed in shop, with no field welding allowed other than those supervised by a licensed deputy inspector.

5) The existing slab on grade is 6" thick with minimum 4000 psi compressive strength. Allowable Soil bearing capacity is 750 psf. The design of the existing slab is by others.

6) Load combinations for rack components correspond to 2012 RMI Section 2.1 for ASD level load criteria

Definition of Components



Structural Engineering & Design Inc.

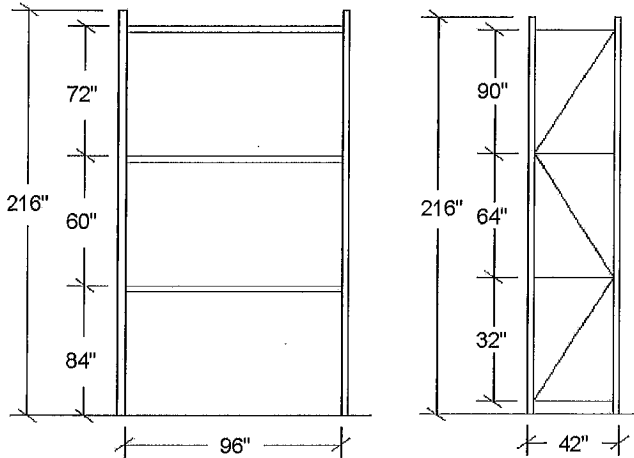
1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

Project #: 25-0625-3

Configuration & Summary: TYPE 1 SELECTIVE RACK



****RACK COLUMN REACTIONS**
UNFACTORED LOAD
 AXIAL D= 75 lb
 AXIAL P= 4,500 lb
 AXIAL S= lb
SEISMIC AXIAL Ps= +/- 441 lb
BASE MOMENT= 0 in-lb

Seismic Criteria	# Bm Lvl	Frame Depth	Frame Height	# Diagonals	Beam Length	Frame Type
Ss=0.099, Fa=1.6	3	42 in	216.0 in	3	96 in	Single Row

Component		Description							STRESS
Column	Fy=55 ksi	Mecalux 314 3.0"x2.69"x0.070"			P=4575 lb, M=4415 in-lb			0.85-OK	
Column & Backer	None	None			None			N/A	
Beam	Fy=55 ksi	Intlk 40E 4Hx2.75Wx0.059"Thk			Lu=96 in	Capacity: 5164 lb/pr		0.58-OK	
Beam Connector	Fy=55 ksi	Lvl 1: 3 Tab OK	Mconn=3521 in-lb			Mcap=8828 in-lb		0.4-OK	
Brace-Horizontal	Fy=50 ksi	Mclx C456 Sgl 1.7953x1.378x16ga(U31x)							0.04-OK
Brace-Diagonal	Fy=50 ksi	Mclx C456 Sgl 1.7953x1.378x16ga(U31x)							0.39-OK
Base Plate	Fy=36 ksi	5.09x4.66x0.194				Fixity= 0 in-lb		0.52-OK	
Anchor	1 per Base	0.5" x 3.25" Embed HILTI TZ2 ESR 4266 Inspection Req'd (Net Seismic Uplift=0 lb)							0.025-OK
Slab & Soil		6" thk x 4000 psi slab on grade. 750 psf Soil Bearing Pressure							0.27-OK
Level	Load** Per Level	Beam Spcg	Brace	Story Force Transv	Story Force Longit.	Column Axial	Column Moment	Conn. Moment	Beam Connector
1	3,000 lb	84.0 in	32.0 in	31 lb	21 lb	4,575 lb	4,415 "#	3,521 "#	3 Tab OK
2	3,000 lb	60.0 in	64.0 in	53 lb	35 lb	3,050 lb	1,326 "#	2,310 "#	3 Tab OK
3	3,000 lb	72.0 in	90.0 in	79 lb	53 lb	1,525 lb	954 "#	1,846 "#	3 Tab OK

** Load defined as product weight per pair of beams Total: 163 lb 109 lb

Notes

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

Project #: 25-0625-3

Seismic Forces Configuration: TYPE 1 SELECTIVE RACK

Lateral analysis is performed with regard to the requirements of the 2012 RMI ANSI MH 16.1-2012 Sec 2.6 & ASCE 7-16 sec 15.5.3

Transverse (Cross Aisle) Seismic Load

$$V = Cs * Ip * Ws = Cs * Ip * (0.67 * P * Rf + D + 0.2S)$$

$$Cs1 = Sds / R$$

$$= 0.0264$$

$$Cs2 = 0.044 * Sds$$

$$= 0.0046$$

$$Cs3 = 0.5 * S1 / R$$

$$= 0.0085$$

$$Cs-max = 0.0264$$

$$\text{Base Shear Coeff} = Cs = 0.0264$$

$$Cs-max * Ip = 0.0264$$

$$V_{min} = 0.015$$

$$\text{Eff Base Shear} = Cs = 0.0264$$

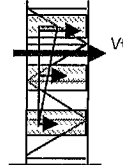
$$Ws = (0.67 * PL_{RF1} * PL) + DL + 0.2S$$

$$= 6,180 \text{ lb}$$

$$V_{transv} = Vt = 0.0264 * (150 \text{ lb} + 6030 \text{ lb} + 0.2)$$

$$E_{transverse} = 163 \text{ lb}$$

Limit States Level Transverse seismic shear per upright



Transverse Elevation

(Transverse, Braced Frame Dir.) R= 4.0

$$Ss = 0.099$$

$$S1 = 0.068$$

$$Fa = 1.600$$

$$Fv = 2.400$$

$$Sds = 2/3 * Ss * Fa = 0.106$$

$$Sd1 = 2/3 * S1 * Fv = 0.109$$

$$Ip = 1.0$$

$$P_{RF1} = 1.0$$

$$\text{Pallet Height} = hp = 0.0 \text{ in}$$

$$DL \text{ per Beam Lvl} = 50 \text{ lb}$$

Level	PRODUCT LOAD P	P*0.67*P _{RF1}	DL	hi	wi*hi	Fi	Fi*(hi+hp/2)
1	3,000 lb	2,010 lb	50 lb	84 in	173,040	30.8 lb	2,587-#
2	3,000 lb	2,010 lb	50 lb	144 in	296,640	52.9 lb	7,618-#
3	3,000 lb	2,010 lb	50 lb	216 in	444,960	79.3 lb	17,129-#
			0 lb		0		
			0 lb		0		
			0 lb		0		
			0 lb		0		
			0 lb		0		
			0 lb		0		
			0 lb		0		
			0 lb		0		
			0 lb		0		
			0 lb		0		
			0 lb		0		
			0 lb		0		
sum:	P=9000 lb	6,030 lb	150 lb	W=6180 lb	914,640	163 lb	Σ=27,334

Longitudinal (Downaisle) Seismic Load

Similarly for longitudinal seismic loads, using R=6.0

$$Ws = (0.67 * PL_{RF2} * P) + DL + 0.2S$$

$$= 6,180 \text{ lb}$$

$$P_{RF2} = 1.0$$

(Longitudinal, Unbraced Dir.) R= 6.0

$$Cs1 = 0.0176$$

$$Cs2 = 0.0046$$

$$Cs3 = 0.0057$$

$$Cs-max = 0.0176$$

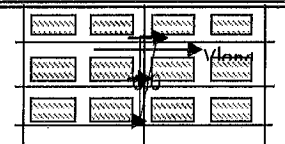
$$Cs = Cs-max * Ip = 0.0176$$

$$T = 0.75 \text{ sec}$$

$$V_{long} = 0.0176 * (150 \text{ lb} + 6030 \text{ lb} + 0.2 * 0)$$

$$E_{longitudinal} = 109 \text{ lb}$$

Limit States Level Longit. seismic shear per upright



Front View

Level	PRODUC LOAD P	P*0.67*P _{RF2}	DL	hi	wi*hi	Fi
1	3,000 lb	2,010 lb	50 lb	84 in	173,040	20.6 lb
2	3,000 lb	2,010 lb	50 lb	144 in	296,640	35.4 lb
3	3,000 lb	2,010 lb	50 lb	216 in	444,960	53.0 lb
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
sum:		6,030 lb	150 lb	W=6180 lb	914,640	109 lb

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

Project #: 25-0625-3

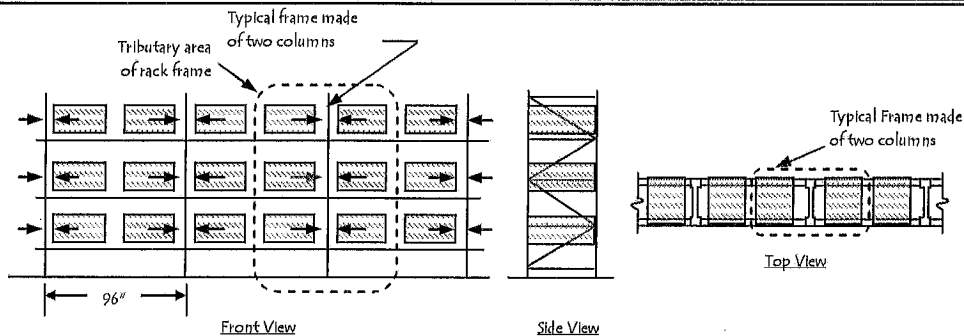
Downaisle Seismic Loads

Configuration: TYPE 1 SELECTIVE RACK

Determine the story moments by applying portal analysis. The base plate is assumed to provide no fixity.

Seismic Story Forces

$$\begin{aligned} V_{long} &= 109 \text{ lb} \\ V_{col} &= V_{long}/2 = 55 \text{ lb} \\ F1 &= 21 \text{ lb} \\ F2 &= 35 \text{ lb} \\ F3 &= 53 \text{ lb} \end{aligned}$$



Seismic Story Moments

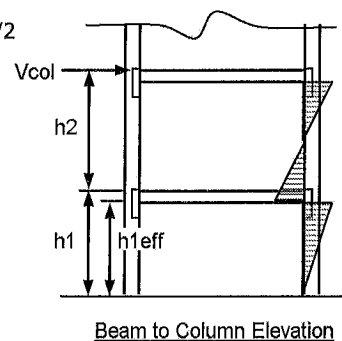
Conceptual System

COI

$$\begin{aligned} M_{base-max} &= 0 \text{ in-lb} &<=== \text{Default capacity} \\ M_{base-v} &= (V_{col} * h1_{eff})/2 \\ &= 2,207 \text{ in-lb} &<=== \text{Moment going to base} \\ M_{base-eff} &= \text{Minimum of } M_{base-max} \text{ and } M_{base-v} \\ &= 0 \text{ in-lb} &PINNED \text{ BASE ASSUMED} \\ M1-1 &= [V_{col} * h1_{eff}] - M_{base-eff} \\ &= (55 \text{ lb} * 81 \text{ in}) - 0 \text{ in-lb} \\ &= 4,415 \text{ in-lb} \end{aligned}$$

$$\begin{aligned} h1_{eff} &= h1 - \text{beam clip height}/2 \\ &= 81 \text{ in} \end{aligned}$$

$$\begin{aligned} M2-2 &= [V_{col} - (F1)/2] * h2 \\ &= [55 \text{ lb} - 17.7 \text{ lb}] * 60 \text{ in}/2 \\ &= 1,326 \text{ in-lb} \end{aligned}$$



Beam to Column Elevation

$$M_{seis} = (M_{upper} + M_{lower})/2$$

$$\begin{aligned} M_{seis(1-1)} &= (4415 \text{ in-lb} + 1326 \text{ in-lb})/2 \\ &= 2,870 \text{ in-lb} \end{aligned}$$

$$\begin{aligned} M_{seis(2-2)} &= (1326 \text{ in-lb} + 954 \text{ in-lb})/2 \\ &= 1,140 \text{ in-lb} \end{aligned}$$

$$\rho = 1.0000$$

Summary of Forces

LEVEL	hi	Axial Load	Column Moment**	Mseismic**	Mend-fixity	Mconn**	Beam Connector
1	84 in	4,575 lb	4,415 in-lb	2,870 in-lb	2,160 in-lb	3,521 in-lb	3 Tab OK
2	60 in	3,050 lb	1,326 in-lb	1,140 in-lb	2,160 in-lb	2,310 in-lb	3 Tab OK
3	72 in	1,525 lb	954 in-lb	477 in-lb	2,160 in-lb	1,846 in-lb	3 Tab OK

$$M_{conn} = (M_{seismic} + M_{end-fixity}) * 0.70 * \rho$$

$$M_{conn-allow(3 \text{ Pin})} = 8,828 \text{ in-lb}$$

**all moments based on limit states level loading

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

Project #: 25-0625-3

Column (Longitudinal Loads)

Configuration: TYPE 1 SELECTIVE RACK

Section Properties

Section: Mecalux 314 3.0"x2.69"x0.070"

Aeff = 0.538 in²

Ix = 0.765 in⁴

Sx = 0.510 in³

rx = 1.190 in

Ωf = 1.67

E = 29,500 ksi

Iy = 0.464 in⁴

Sy = 0.307 in³

ry = 0.928 in

Fy = 55 ksi

Cmx = 0.85

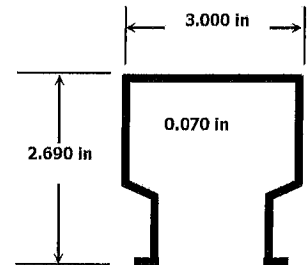
Kx = 1.7

Lx = 82.0 in

Ky = 1.0

Ly = 32.0 in

Cb = 1.0



Loads

Considers loads at level 1

COLUMN DL = 75 lb

COLUMN PL = 4,500 lb

Mcol = 4,414 in-lb

Sds = 0.1056

1+0.105*Sds = 1.0111

1.4+0.14Sds = 1.4148

1+0.14Sds = 1.0148

0.85+0.14*Sds = 0.8648

B = 0.7000

rho = 1.0000

Critical load cases are: RMI Sec 2.1

Load Case 5: : $(1+0.105*Sds)D + 0.75*(1.4+0.14Sds)*B*P + 0.75*(0.7*\rho*E) \leq 1.0$, ASD Method

axial load coeff: 0.7427616 * P

seismic moment coeff: 0.5625 * Mcol

Load Case 6: : $(1+0.104*Sds)D + (0.85+0.14Sds)*B*P + (0.7*\rho*E) \leq 1.0$, ASD Method

axial load coeff: 0.60535

seismic moment coeff: 0.7 * Mcol

By analysis, Load case 5 governs utilizing loads as such

Axial Load=Pax= $1.011088*75 \text{ lb} + 0.75 * 1.414784 * 0.7 * 4500 \text{ lb}$

= 3,418 lb

Moment=Mx= $0.75*0.7*\rho*Mcol$

= 0.525*4414 in-lb

= 2,317 in-lb

Axial Analysis

KxLx/rx = $1.7*82/1.19$

= 117.1

KyLy/ry = $1*32/0.9284$

= 34.5

Fe < Fy/2

Fn = Fe

= $\pi^2 E / (KL/r)_{\max}^2$

= 21.2 ksi

Pa = Pn/Ωc

= 11413 lb/1.92

= 5,944 lb

Fe = $\pi^2 E / (KL/r)_{\max}^2$

= 21.2ksi

Pn = Aeff*Fn

= 11,413 lb

P/Pa = 0.58

> 0.15

Fy/2 = 27.5 ksi

Ωc = 1.92

Bending Analysis

Check: $Pax/Pa + (Cmx*Mx)/(Max*\mu_x) \leq 1.0$

$P/Pao + Mx/Max \leq 1.0$

Pno = Ae*Fy

= $0.538 \text{ in}^2 * 55000 \text{ psi}$

= 29,585 lb

Pao = Pno/Ωc

= $29585 \text{ lb} / 1.92$

= 15,409 lb

Myield = My = Sx*Fy

= $0.51 \text{ in}^3 * 55000 \text{ psi}$

= 28,050 in-lb

Max = My/Ωf

= $28050 \text{ in-lb} / 1.67$

= 16,796 in-lb

$\mu_x = \{1/[1-(\Omega_c*P/Pcr)]\}^{-1}$

= $\{1/[1-(1.92*3418 \text{ lb}/11462 \text{ lb})]\}^{-1}$

= 0.43

Pcr = $\pi^2 EI / (KL)_{\max}^2$

= $\pi^2 * 29500 \text{ ksi} / (1.7*82 \text{ in})^2$

= 11,462 lb

Combined Stresses

$(3418 \text{ lb} / 5944 \text{ lb}) + (0.85*2317 \text{ in-lb}) / (16796 \text{ in-lb}*0.43) =$

0.85

< 1.0, OK

(EQ C5-1)

$(3418 \text{ lb} / 15409 \text{ lb}) + (2317 \text{ in-lb} / 16796 \text{ in-lb}) =$

0.36

< 1.0, OK

(EQ C5-2)

** For comparison, total column stress computed for load case 6 is: 77.0%

izing loads 2800.1784 lb Axial and M= 3089 in-lb

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: **Bob S**

Project: **Butler Supply**

Project #: **25-0625-3**

BEAM

Configuration: TYPE 1 SELECTIVE RACK

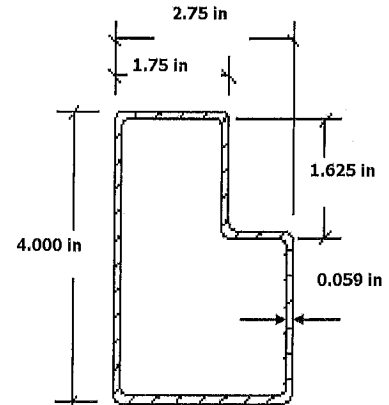
DETERMINE ALLOWABLE MOMENT CAPACITY

A) Check compression flange for local buckling (B2.1)

$$\begin{aligned} w &= c - 2*t - 2*r \\ &= 1.75 \text{ in} - 2*0.059 \text{ in} - 2*0.059 \text{ in} \\ &= 1.514 \text{ in} \\ w/t &= 25.66 \\ l=\lambda &= [1.052/(k)^{0.5}] * (w/t) * (F_y/E)^{0.5} \\ &= [1.052/(4)^{0.5}] * 25.66 * (55/29500)^{0.5} \\ &= 0.583 < 0.673, \text{ Flange is fully effective} \end{aligned}$$

Eq. B2.1-4

Eq. B2.1-1



B) check web for local buckling per section b2.3

$$\begin{aligned} f_1(\text{comp}) &= F_y * (y_3/y_2) = 50.23 \text{ ksi} \\ f_2(\text{tension}) &= F_y * (y_1/y_2) = 101.99 \text{ ksi} \\ Y &= f_2/f_1 \\ &= -2.03 \\ k &= 4 + 2*(1-Y)^3 + 2*(1-Y) \\ &= 65.70 \\ \text{flat depth} &= w = y_1 + y_3 \\ &= 3.764 \text{ in} \quad w/t = 63.79661017 \quad \text{OK} \\ l=\lambda &= [1.052/(k)^{0.5}] * (w/t) * (f_1/E)^{0.5} \\ &= [1.052/(65.7)^{0.5}] * 3.764 * (50.23/29500)^{0.5} \\ &= 0.342 < 0.673 \\ b_e &= w = 3.764 \text{ in} \quad b_2 = b_e/2 \\ &= 1.88 \text{ in} \\ b_1 &= b_e(3-Y) \\ &= 0.748 \\ b_1 + b_2 &= 2.628 \text{ in} > 1.242 \text{ in, Web is fully effective} \end{aligned}$$

Eq. B2.3-5

Eq. B2.3-4

OK

Eq B2.3-2

Beam= **Intlik 40E 4Hx2.75Wx0.059"Thk**

I_x	1.667 in^4
S_x	0.783 in^3
Y_{cg}	2.640 in
t	0.059 in
Bend Radius= r	0.059 in
$F_y = F_{yv}$	55.00 ksi
$F_u = F_{uv}$	65.00 ksi
E	29500 ksi
top flange= b	1.750 in
bottom flange= b	2.750 in
Web depth= d	4.000 in

Determine effect of cold working on steel yield point (F_{ya}) per section A7.2

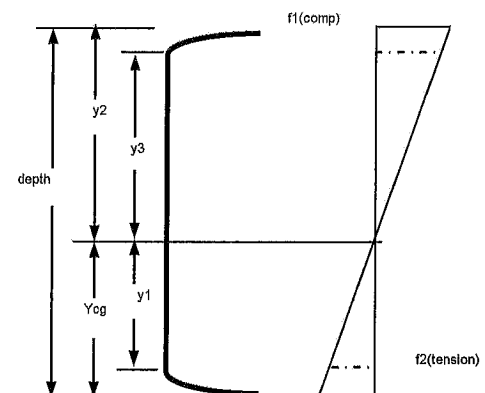
$$\begin{aligned} F_{ya} &= C * F_{yc} + (1-C) * F_y \quad (\text{EQ A7.2-1}) \\ L_{\text{corner}} &= L_c = (p/2) * (r + t/2) \\ &= 0.139 \text{ in} \quad C = 2 * L_c / (L_f + 2 * L_c) \\ L_{\text{flange-top}} &= L_f = 1.514 \text{ in} \quad = 0.155 \text{ in} \\ m &= 0.192 * (F_u/F_y) - 0.068 \quad (\text{EQ A7.2-4}) \\ &= 0.1590 \\ B_c &= 3.69 * (F_u/F_y) - 0.819 * (F_u/F_y)^2 - 1.79 \\ &= 1.427 \\ \text{since } f_u/F_v &= 1.18 < 1.2 \\ \text{and } r/t &= 1 < 7 \text{ OK} \\ \text{then } F_{yc} &= B_c * F_y / (R/t)^m \quad (\text{EQ A7.2-2}) \\ &= 78.485 \text{ ksi} \end{aligned}$$

$$\begin{aligned} \text{Thus, } F_{ya-\text{top}} &= 58.64 \text{ ksi} \quad (\text{tension stress at top}) \\ F_{ya-\text{bottom}} &= F_{ya} * Y_{cg} / (\text{depth} - Y_{cg}) \\ &= 113.84 \text{ ksi} \quad (\text{tension stress at bottom}) \end{aligned}$$

Check allowable tension stress for bottom flange

$$\begin{aligned} L_{\text{flange-bot}} &= L_{fb} = L_{\text{bottom}} - 2 * r - 2 * t \\ &= 2.514 \text{ in} \\ C_{\text{bottom}} &= C_b = 2 * L_c / (L_{fb} + 2 * L_c) \\ &= 0.100 \\ F_{y-\text{bottom}} &= F_{yb} = C_b * F_{yc} + (1-C_b) * F_{yf} \\ &= 57.34 \text{ ksi} \\ F_{ya} &= (F_{ya-\text{top}}) * (F_{yb} / F_{ya-\text{bottom}}) \\ &= 29.54 \text{ ksi} \\ \text{if } F &= 0.95 \end{aligned}$$

$$\text{Then } F * M_n = F * F_{ya} * S_x = 21.96 \text{ in-k}$$



$$\begin{aligned} y_1 &= Y_{cg} - t - r = 2.522 \text{ in} \\ y_2 &= \text{depth} - Y_{cg} = 1.360 \text{ in} \\ y_3 &= y_2 - t - r = 1.242 \text{ in} \end{aligned}$$

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: **Bob S**

Project: **Butler Supply**

Project #: **25-0625-3**

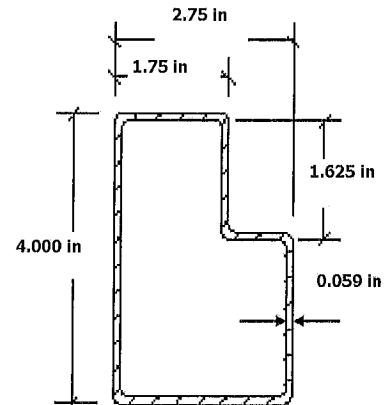
BEAM

Configuration: TYPE 1 SELECTIVE RACK

RMI Section 5.2, PT II

Section

Beam= Intlk 40E 4Hx2.75Wx0.059"Thk
 $I_x = I_y = 1.667 \text{ in}^4$
 $S_x = 0.783 \text{ in}^3$
 $t = 0.059 \text{ in}$
 $E = 29500 \text{ ksi}$
 $F_y = F_{yv} = 55 \text{ ksi}$
 $F_u = F_{uv} = 65 \text{ ksi}$
 $F_{ya} = 58.6 \text{ ksi}$
 $F = 225.0$
 $L = 96 \text{ in}$
 Beam Level= 1
 $P = \text{Product Load} = 3,000 \text{ lb/pair}$
 $D = \text{Dead Load} = 50 \text{ lb/pair}$



1. Check Bending Stress Allowable Loads

$$M_{center} = F \cdot Mn = W \cdot L \cdot W \cdot R_m / 8$$

W = LRFD Load Factor = $1.2 \cdot D + 1.4 \cdot P + 1.4 \cdot (0.125) \cdot P$
FOR DL = 2% of PL,

RMI 2.2, item 8

$$W = 1.599$$

$$R_m = 1 - [(2 \cdot F \cdot L) / (6 \cdot E \cdot I_b + 3 \cdot F \cdot L)]$$

$$= 1 - (2 \cdot 225 \cdot 96) / [(6 \cdot 29500 \text{ ksi} \cdot 1.667 \text{ in}^4) + (3 \cdot 225 \cdot 96)]$$

$$= 0.88$$

$$\text{if } F = 0.95$$

$$\text{Then } F \cdot Mn = F \cdot F_{ya} \cdot S_x = 43.59 \text{ in-k}$$

Thus, allowable load

$$\text{per beam pair} = W = F \cdot Mn \cdot 8 \cdot (\# \text{ of beams}) / (L \cdot R_m \cdot W)$$

$$= 43.59 \text{ in-k} \cdot 8 \cdot 2 / (96 \text{ in} \cdot 0.88 \cdot 1.599)$$

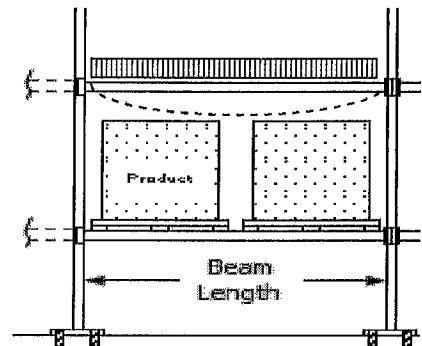
$$= \mathbf{5,164 \text{ lb/pair} \quad \text{allowable load based on bending stress}}$$

$$M_{end} = W \cdot L \cdot (1 - R_m) / 8$$

$$= (5164 \text{ lb/2}) \cdot 96 \text{ in} \cdot (1 - 0.88) / 8$$

$$= 3,718 \text{ in-lb} \quad @ \text{ 5164 lb max allowable load}$$

$$= 2,160 \text{ in-lb} \quad @ \mathbf{3000 \text{ lb imposed product load}}$$



2. Check Deflection Stress Allowable Loads

$$D_{max} = D_{ss} \cdot R_d$$

$$R_d = 1 - (4 \cdot F \cdot L) / (5 \cdot F \cdot L + 10 \cdot E \cdot I_b)$$

$$= 1 - (4 \cdot 225 \cdot 96) / (5 \cdot 225 \cdot 96 + (10 \cdot 29500 \text{ ksi} \cdot 1.667 \text{ in}^4))$$

$$= 0.856 \text{ in}$$

if $D_{max} = L/180$ Based on L/180 Deflection Criteria

$$\text{and } D_{ss} = 5 \cdot W \cdot L^3 / (384 \cdot E \cdot I_b)$$

$$\text{Allowable Deflection} = L/180$$

$$= 0.533 \text{ in}$$

$$\text{Deflection at imposed Load} = 0.310 \text{ in}$$

$$L/180 = 5 \cdot W \cdot L^3 \cdot R_d / (384 \cdot E \cdot I_b \cdot \# \text{ of beams})$$

solving for W yields,

$$W = 384 \cdot E \cdot I_b \cdot 2 / (180 \cdot 5 \cdot L^2 \cdot R_d)$$

$$= 384 \cdot 1.667 \text{ in}^4 \cdot 2 / [180 \cdot 5 \cdot (96 \text{ in})^2 \cdot 0.856]$$

$$= \mathbf{5,319 \text{ lb/pair} \quad \text{allowable load based on deflection limits}}$$

Thus, based on the least capacity of item 1 and 2 above:

Allowable load = **5,164 lb/pair**
 Imposed Product Load = **3,000 lb/pair**

Beam Stress = **0.58**

Beam at Level 1

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: **Bob S**

Project: **Butler Supply**

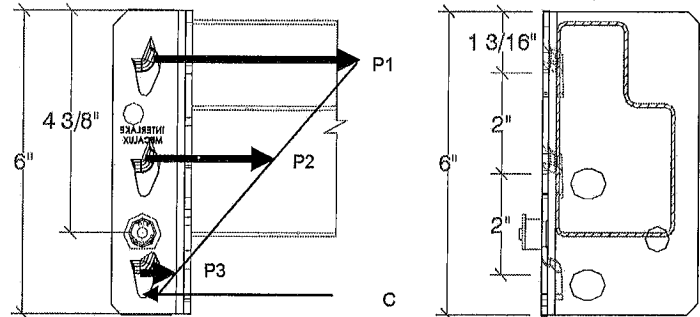
Project #: **25-0625-3**

3 Tab Beam to Column Connection

Configuration: TYPE 1 SELECTIVE RACK

$$\begin{aligned} M_{conn \max} &= (M_{seismic} + M_{end-fixity}) * 0.70 * \rho \\ &= 3,521 \text{ in-lb} \quad \text{Load at level 1} \end{aligned}$$

Connector Type= 3 Tab



Shear Capacity of Tab

Tab Length= 0.50 in

Fy= 55,000 psi

$$\begin{aligned} A_{shear} &= 0.5 \text{ in} * 0.135 \text{ in} \\ &= 0.0675 \text{ in}^2 \end{aligned}$$

$$\begin{aligned} P_{shear} &= 0.4 * F_y * A_{shear} \\ &= 0.4 * 55000 \text{ psi} * 0.0675 \text{ in}^2 \\ &= 1,485 \text{ lb} \end{aligned}$$

Bearing Capacity of Tab

tcol= 0.070 in

Fu= 65,000 psi

Bearing Length= 0.5000 in

Omega= 2.22

a= 2.22

$$\begin{aligned} P_{bearing} &= \alpha * F_u * \text{tab length} * t_{col} / \Omega \\ &= 2.22 * 65000 \text{ psi} * 0.5 \text{ in} * 0.07 \text{ in} / 2.22 \\ &= 2,275 \text{ lb} > 1485 \text{ lb} \end{aligned}$$

Moment Capacity of Bracket

Edge Distance=E= 1.00 in

Tab Spacing= 2.0 in

Fy= 55,000 psi

$$\begin{aligned} C &= P_1 + P_2 + P_3 \\ &= P_1 + P_1 * (2.5" / 4.5") + P_1 * (0.5" / 4.5") \\ &= 1.667 * P_1 \end{aligned}$$

tclip= 0.135 in

Sclip= 0.183 in³

$$\begin{aligned} M_{cap} &= S_{clip} * F_{bending} \\ &= 0.1832 \text{ in}^3 * 0.66 * F_y \\ &= 6,650 \text{ in-lb} \end{aligned}$$

C*d= Mcap = 1.667

$$\begin{aligned} d &= E / 2 \\ &= 0.50 \text{ in} \end{aligned}$$

$$\begin{aligned} P_{clip} &= M_{cap} / (1.667 * d) \\ &= 6650.16 \text{ in-lb} / (1.667 * 0.5 \text{ in}) \\ &= 7,979 \text{ lb} \end{aligned}$$

Thus, P1= 1,485 lb

$$\begin{aligned} M_{conn-allow} &= [P_1 * 4.5" + P_1 * (2.5" / 4.5") * 2.5" + P_1 * (0.5" / 4.5") * 0.5"] \\ &= 1485 \text{ LB} * [4.5" + (2.5" / 4.5") * 2.5" + (0.5" / 4.5") * 0.5"] \\ &= 8,828 \text{ in-lb} > M_{conn \max}, \text{ OK} \end{aligned}$$

Stress= 0.4

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

Project #: 25-0625-3

Transverse Brace

Configuration: TYPE 1 SELECTIVE RACK

Section Properties

Diagonal Member= Mclx C456 Sgl 1.7953x1.378x16ga(U31x)

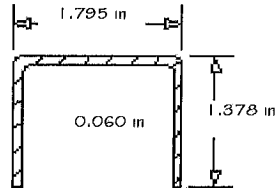
Area= 0.259 in²

r min= 0.449 in

Fy= 50,000 psi

K= 1.0

Ωc= 1.92



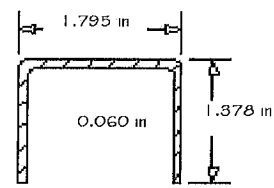
Horizontal Member= Mclx C456 Sgl 1.7953x1.378x16ga(U31x)

Area= 0.259 in²

r min= 0.449 in

Fy= 50,000 psi

K= 1.0



Frame Dimensions

Bottom Panel Height=H= 90.0 in

Clear Depth=D-B*2= 36.6 in

Frame Depth=D= 42.0 in

X Brace= NO

Column Width=B= 2.7 in

rho= 1.30

Diagonal Member

Load Case 6: : $(1+0.104Sds)D + [(0.85+0.14Sds)*B*P + [0.7*rho*E] <= 1.0$, ASD Method

Vtransverse= 163 lb

Vb=Vtransv*0.7*rho= 163 lb * 0.7 * 1.3

= 148 lb

Ldiag= [(D-B*2)^2 + (H-6")^2]^1/2

= 91.6 in

Pmax= V*(Ldiag/D)

= 371 lb

axial load on diagonal brace member

Pn= AREA*Fn

= 0.259 in² * 6996 psi

= 1,810 lb

Pallow= Pn/Ω

= 1810 lb /1.92

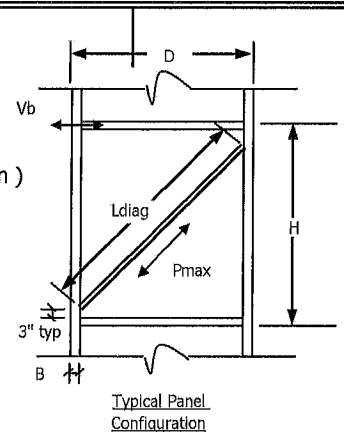
= 943 lb

Pn/Pallow= 0.39 <= 1.0 OK

(kl/r)= (k * Ldiag)/r min
= (1 x 91.6 in /0.449 in)
= 204.0 in
Fe= pi^2*E/(kl/r)^2
= 6,996 psi

Since Fe<Fy/2,

Fn= Fe
= 6,996 psi



Horizontal brace

Vb=Vtransv*0.7*rho= 148 lb

(kl/r)= (k * Lhoriz)/r min
= (1 x 42 in) /0.449 in
= 93.5 in

Since Fe>Fy/2, Fn=Fy*(1-fy/4fe)

= 31,233 psi

Fe= pi^2*E/(kl/r)^2
= 33,304 psi

Pn= AREA*Fn

= 0.259in²*31233 psi

= 8,080 lb

Fy/2= 25,000 psi

Pallow= Pn/Ωc

= 8080 lb /1.92

= 4,208 lb

Pn/Pallow= 0.04 <= 1.0 OK

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

Project #: 25-0625-3

Single Row Frame Overturning

Configuration: TYPE 1 SELECTIVE RACK

Loads

Critical Load case(s):

1) RMI Sec 2.2, Item 7: $(0.9-0.2Sds)D + (0.9-0.20Sds)*B*\rho - E*\rho$

$$V_{trans}=V=E=Q_e= 163 \text{ lb}$$

$$\text{DEAD LOAD PER UPRIGHT}=D= 150 \text{ lb}$$

$$\text{PRODUCT LOAD PER UPRIGHT}=P= 9,000 \text{ lb}$$

$$P_{app}=P*0.67= 6,030 \text{ lb}$$

$$W_{st} \text{ LC1}=W_{st1}=(0.87888*D + 0.87888*P_{app}*1)= 5,431 \text{ lb}$$

$$\text{Product Load Top Level, } P_{top}= 3,000 \text{ lb}$$

$$DL/Lvl= 50 \text{ lb}$$

$$\text{Seismic Ovt based on E, } \Sigma(F_i*h_i)= 18,546 \text{ in-lb}$$

$$\text{height/depth ratio}= 5.1 \text{ in}$$

$$S_{ds}= 0.1056$$

$$(0.9-0.2S_{ds})= 0.8789$$

$$(0.9-0.2S_{ds})= 0.8789$$

$$B= 1.0000$$

$$\rho= 1.0000$$

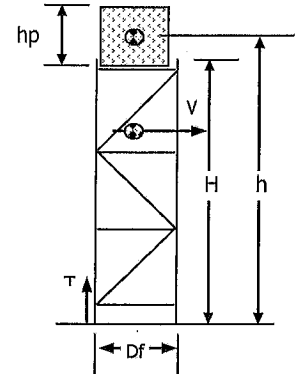
$$\text{Frame Depth}=D_f= 42.0 \text{ in}$$

$$H_{top-lvl}=H= 216.0 \text{ in}$$

$$\# \text{ Levels}= 3$$

$$\# \text{ Anchors/Base}= 1$$

$$h_p= .0 \text{ in}$$



SIDE ELEVATION

A) Fully Loaded Rack

$$h=H+h_p/2= 216.0 \text{ in}$$

Load case 1:

$$\begin{aligned} \text{Movt} &= \Sigma(F_i*h_i)*E*\rho \\ &= 18,546 \text{ in-lb} \end{aligned}$$

$$\begin{aligned} \text{Mst} &= W_{st1} * D_f/2 \\ &= 5431 \text{ lb} * 42 \text{ in}/2 \\ &= 114,051 \text{ in-lb} \end{aligned}$$

$$\begin{aligned} T &= (\text{Movt}-\text{Mst})/D_f \\ &= (18546 \text{ in-lb} - 114051 \text{ in-lb})/42 \text{ in} \\ &= -2,274 \text{ lb} \end{aligned}$$

No Uplift

$$\text{Net Seismic Uplift}= -4,548 \text{ lb}$$

Strength Level

B) Top Level Loaded Only

Load case 1:

$$\begin{aligned} \square V_1 &= V_{top}= C_s * I_p * P_{top} \geq 350 \text{ lb for } H/D > 6.0 \\ &= 0.0264 * 3000 \text{ lb} \\ &= 79 \text{ lb} \end{aligned}$$

$$V_{1eff}= 79 \text{ lb}$$

$$\begin{aligned} V_2 &= V_{dl}= C_s * I_p * D \\ &= 4 \text{ lb} \end{aligned}$$

$$\begin{aligned} \text{Mst} &= (0.87888*D + 0.87888*P_{top}*1) * 42 \text{ in}/2 \\ &= 58,138 \text{ in-lb} \end{aligned}$$

$$\text{Critical Level}= 3$$

$$C_s * I_p= 0.0264$$

$$\begin{aligned} \text{Movt} &= [V_1*h + V_2 * H/2]*\rho \\ &= 17,535 \text{ in-lb} \end{aligned}$$

$$\begin{aligned} T &= (\text{Movt}-\text{Mst})/D_f \\ &= (17535 \text{ in-lb} - 58138 \text{ in-lb})/42 \text{ in} \\ &= -967 \text{ lb} \end{aligned}$$

No Uplift

$$\text{Net Seismic Uplift}= -1,934 \text{ lb}$$

Strength Level

Anchor

Check (1) 0.5" x 3.25" Embed HILTI TZ2 anchor(s) per base plate.

Special inspection is required per ESR 4266.

$$\text{Pullout Capacity}=T_{cap}= 1,961 \text{ lb}$$

$$\text{Shear Capacity}=V_{cap}= 2,517 \text{ lb}$$

$$\text{L.A. City Jurisdiction? NO}$$

$$\Phi= 1$$

$$T_{cap}*\Phi= 1,961 \text{ lb}$$

$$V_{cap}*\Phi= 2,517 \text{ lb}$$

Fully Loaded:

$$(81 \text{ lb}/2517 \text{ lb})^{\wedge}1 = 0.03$$

$$\leq 1.2 \text{ OK}$$

Top Level Loaded:

$$(-1934 \text{ lb}/1961 \text{ lb})^{\wedge}1 + (39 \text{ lb}/2517 \text{ lb})^{\wedge}1 = 0.02$$

$$\leq 1.2 \text{ OK}$$

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

Project #: 25-0625-3

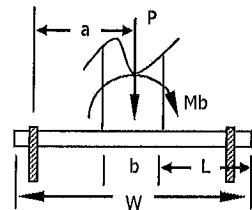
Base Plate

Configuration: TYPE 1 SELECTIVE RACK

Section

Baseplate= 5.09x4.66x0.194
Eff Width=W = 5.09 in
Eff Depth=D = 4.66 in
Column Width=b = 3.00 in
Column Depth=dc = 2.69 in
L = 1.05 in
Plate Thickness=t = 0.194 in

a = 1.55 in
Anchor c.c. = 2*a = d = 3.09 in
N=# Anchor/Base= 1
Fy = 36,000 psi
rho = 1



Downaisle Elevation

Down Aisle Loads Load Case 5: $(1+0.105Sds)D + 0.75*[(1.4+0.14Sds)*B*P + 0.75*[0.7*rho*E]] \leq 1.0$, ASD Method

COLUMN DL= 75 lb
COLUMN PL= 4,500 lb
Base Moment= 0 in-lb

Axial=P= $1.011088 * 75 \text{ lb} + 0.75 * (1.414784 * 0.7 * 4500 \text{ lb})$
= 3,418 lb

$1+0.105Sds = 1.0111$
 $1.4+0.14Sds = 1.4148$
B= 0.7000

Mb= Base Moment*0.75*0.7*rho
= 0 in-lb * 0.75*0.7*rho
= 0 in-lb

Axial Load P = 3,418 lb Mbase=Mb = 0 in-lb

Effr
Effe

Axial stress=fa = P/A = P/(D*W)
= 144 psi

M1= $wL^2/2 = fa*L^2/2$
= 79 in-lb

Moment Stress=fb = M/S = 6*Mb/[(D*B^2)]
= 0.0 psi

Moment Stress=fb2 = $2 * fb * L/W$
= 0.0 psi

Moment Stress=fb1 = fb-fb2
= 0.0 psi

M2= $fb1*L^2/2$
= 0 in-lb

M3 = $(1/2)*fb2*L*(2/3)*L = (1/3)*fb2*L^2$
= 0 in-lb

Mtotal = M1+M2+M3
= 79 in-lb/in

S-plate = $(1)(t^2)/6$
= 0.006 in^3/in

Fb = 0.75*Fy
= 27,000 psi

fb/Fb = Mtotal/[(S-plate)(Fb)]
= 0.46 OK

Fp = 0.7*Fc
= 2,800 psi

Tanchor = $(Mb-(PLapp*0.75*0.46)(a))/[(d)*N/2]$
= -5,431 lb No Tension

Tallow = 1,961 lb OK

Cross Aisle Loads Critical load case RMI Sec 2.1, Item 4: $(1+0.11Sds)DL + (1+0.14Sds)PL*0.75+EL*0.75 \leq 1.0$, ASD Method

Check uplift load on Baseplate

Pstatic= 3,418 lb

Movt*0.75*0.7*rho = 18,655 in-lb
Frame Depth= 42.0 in

Pseismic= Movt/Frame Depth
= 444 lb

P=Pstatic+Pseismic= 3,862 lb

b = Column Depth= 2.69 in

L = Base Plate Depth-Col Depth= 1.05 in

fa = P/A = P/(D*W)
= 163 psi

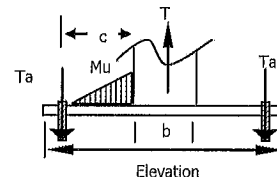
M= $wL^2/2 = fa*L^2/2$
= 89 in-lb/in

Sbase/in = $(1)(t^2)/6$
= 0.006 in^3/in

Fbase = 0.75*Fy
= 27,000 psi

fb/Fb = M/[(S-plate)(Fb)]
= 0.52 OK

Check uplift forces on baseplate with 2 or more anchors per RMI 7.2.2.
"When the base plate configuration consists of two anchor bolts located on either side of the column and a net uplift force exists, the minimum base plate thickness shall be determined based on a design bending moment in the plate equal to the uplift force on one anchor times 1/2 the distance from the centerline of the anchor to the nearest edge of the rack column"



Elevation

Uplift per Column= 0 lb

Qty Anchor per BP= 1

Net Tension per anchor=Ta= 0 lb

c= 1.05 in

Mu=Moment on Baseplate due to uplift= Ta*c/2
= in-lb

Splate= 0.029 in^3

[fb/Fb]*0.75= 0

OK

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

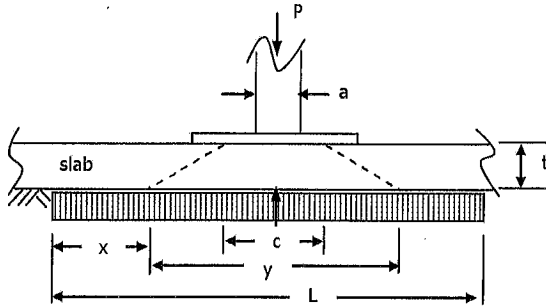
By: Bob S

Project: Butler Supply

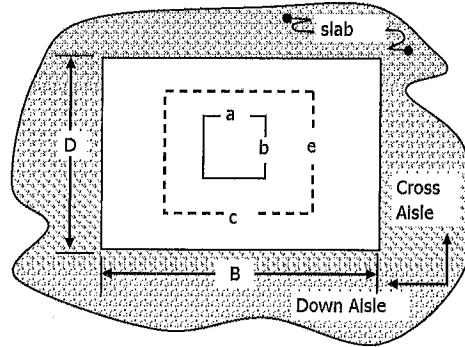
Project #: 25-0625-3

Slab on Grade

Configuration: TYPE 1 SELECTIVE RACK



SLAB ELEVATION



Baseplate Plan View

Concrete

$f'_c = 4,000$ psi

$t_{slab} = t = 6.0$ in

$t_{eff} = 6.0$ in

$\phi = 0.6$

Soil

$f_{soil} = 750$ psf

$Movt = 18,546$ in-lb

Frame depth = 42.0 in

$Sds = 0.106$

$0.2 \cdot Sds = 0.021$

$\lambda = 0.600$

$\beta = B/D = 1.092$

$F'_c^{0.5} = 63.2$

Base Plate

Effec. Baseplate width = $B = 5.09$ in

Effec. Baseplate Depth = $D = 4.66$ in

width = $a = 3.00$ in

depth = $b = 2.69$ in

midway dist face of column to edge of plate = $c = 4.05$ in

midway dist face of column to edge of plate = $e = 3.68$ in

Column Loads

DEAD LOAD = $D = 75$ lb per column

unfactored ASD load

PRODUCT LOAD = $P = 4,500$ lb per column

unfactored ASD load

$P_{app} = 3,015$ lb per column

P-seismic = $E = (Movt / \text{Frame depth})$

= 441 lb per column

unfactored Limit State load

$B = 0.7000$

$\rho = 1.3000$

$Sds = 0.1056$

$1.2 + 0.2 \cdot Sds = 1.2211$

$0.9 - 0.20Sds = 0.8789$

Load Case 1) $(1.2 + 0.2Sds)D + (1.2 + 0.2Sds) \cdot B \cdot P + \rho \cdot E$ RMI SEC 2.2 EQTN 5

= $1.22112 \cdot 75 \text{ lb} + 1.22112 \cdot 0.7 \cdot 4500 \text{ lb} + 1.3 \cdot 441 \text{ lb}$

= 4,511 lb

Load Case 2) $(0.9 - 0.2Sds)D + (0.9 - 0.2Sds) \cdot B \cdot P_{app} + \rho \cdot E$ RMI SEC 2.2 EQTN 7

= $0.87888 \cdot 75 \text{ lb} + 0.87888 \cdot 0.7 \cdot 3015 \text{ lb} + 1.3 \cdot 441 \text{ lb}$

= 2,494 lb

Load Case 3) $1.2 \cdot D + 1.4 \cdot P$ RMI SEC 2.2 EQTN 1,2

= $1.2 \cdot 75 \text{ lb} + 1.4 \cdot 4500 \text{ lb}$

= 6,390 lb

Load Case 4) $1.2 \cdot D + 1.0 \cdot P + 1.0E$ ACI 318-14 Sec 5.3.1

= 5,031 lb

Eqtn 5.3.1e

Effective Column Load = $P_u = 6,390$ lb per column

Puncture

$A_{punct} = [(c+t) + (e+t)] \cdot 2 \cdot t$

= 236.64 in²

$F_{punct1} = [(4/3 + 8/(3 \cdot \beta))] \cdot \lambda \cdot (F'_c)^{0.5}$

= 143.1 psi

$F_{punct2} = 2.66 \cdot \lambda \cdot (F'_c)^{0.5}$

= 100.9 psi

$F_{punct \text{ eff}} = 100.9$ psi

$f_v / F_v = P_u / (A_{punct} \cdot F_{punct})$

= **0.268 < 1 OK**

Slab Bending

$P_{se} = DL + PL + E = 6,390$ lb

$A_{soil} = (P_{se} \cdot 144) / (f_{soil})$

= 1,227 in²

$x = (L - y) / 2$

= 9.6 in

$F_b = 5 \cdot (\phi) \cdot (f'_c)^{0.5}$

= 189.74 psi

$L = (A_{soil})^{0.5}$

= 35.03 in

$M = w \cdot x^2 / 2$

= $(f_{soil} \cdot x^2) / (144 \cdot 2)$

= 239.3 in-lb

$y = (c \cdot e)^{0.5} + 2 \cdot t$

= 15.9 in

$S_{slab} = 1 \cdot t_{eff}^2 / 6$

= 6.0 in³

$f_b / F_b = M / (S_{slab} \cdot F_b)$

= **0.210 < 1, OK**

Structural Engineering & Design Inc.

1815 Wright Ave., La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.593.8561

Cantilever Rack Analysis

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

Project #: 25-0625-3

Design Data

Configuration: TYPE 2 SGL-SIDED CANTILEVER RACK

- 1) The analysis presented herein conforms to the requirements of the 2021 IBC and ASCE 7-16
- 2) W & S Shape steel conforms to ASTM A572, Gr. 50, with minimum yield, $F_y = 50$ ksi
Formed steel conforms to ASTM A570, Gr. 50, with minimum yield, $F_y = 50$ ksi
Other steel conforms to ASTM A36, Gr. 36, with minimum yield, $F_y = 36$ ksi
- 3) Bolts shall conform to ASTM A325-N unless noted otherwise on the plans or calculations.
- 4) Anchor bolts shall be provided by installer per ICC reference on plans and calculations herein. Installer must provide any special inspection as called out on plans or calculations, or as required by the ICC report indicated herein.
- 5) All welds shall conform to AWS procedures, utilizing E70xx electrodes or similar. All such welds shall be performed in shop, with no field welding allowed other than those supervised by a licensed deputy inspector.
- 6) 6 in Thk x 4000 psi slab with 750 psf soil bearing pressure

Seismic Design Coefficient

$S_s = 0.0990$
 $S_1 = 0.0680$
 $F_a = 1.6000$
 $F_v = 2.4000$
 $S_{ds} = 0.1057$
 $S_{d1} = 0.1089$

Structural Engineering & Design Inc.

1815 Wright Ave. La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

Project #: 25-0625-3

Summary of Results

Configuration: TYPE 2 SGL-SIDED CANTILEVER RACK

144 IN H
48 IN ARM AND BASE LENGTH
48 IN BRACE HEIGHT
48 IN COLUMN SPACING

Rack Dimensions & Loads

Arm	Elev	Unif. Arm Load
h1	36 in	2,400 lb
h2	72 in	2,400 lb
h3	108 in	2,400 lb

Seismic Coeff $S_s = 0.099$

Seismic Coeff $F_a = 1.600$

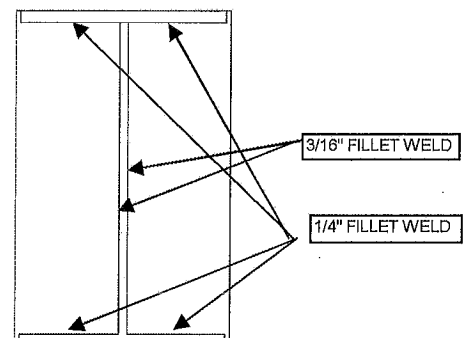
Summary of Components & Results

Column	$F_y = 50$ ksi	W8x18	0.46	OK
Base	$F_y = 50$ ksi	W8x18	0.38	OK
Arm	$F_y = 50$ ksi	S5x10	0.40	OK
Arm Connection		(4) 3/4" Diam Bolts, Grade 5 or better	0.44	OK
Brace	$F_y = 36$ ksi	X Brace: 1.575x0.984x105 Strut L2x2x3/16	0.02	OK
X Brace Connection	Bolted	(1) 0.5 in diam Bolt per end	0.03	OK
Anchors	ESR 4266	0.75 in diam x 4.75 in embed HILTI TZ2 with inspection 4 per base	0.09	OK
Slab & Soil		6 in thick x 4000 psi with 750 psf soil at grade	0.22	OK

Notes

ALL LOADS SHOWN ARE PER ARM, UNIFORM LOAD, NO TIP LOADS, NO DROPPED LOADS, NO IMPACT LOADS

OMEGA = 2.0



Structural

Engineering & Design Inc.

1815 Wright Ave. La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

Project #: 25-0625-3

Seismic Loads

Configuration: TYPE 2 SGL-SIDED CANTILEVER RACK

Seismic Eqtn:	Transverse	Longitudinal
Cs1=	Sds*I/R	
=	0.042	0.033
Cs2=	0.044*Sds*I	
=	0.005	0.005
Cs3=	0.5*S1*I/R	
=	0.014	0.010

Rtrans= 2.5

Ss= 0.099

Rlong= 3.25

S1= 0.068

Sides=n= 1

Fa= 1.600

Arms= 3

Fv= 2.400

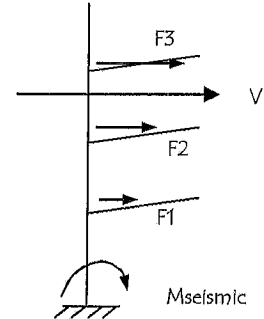
Sds= 0.106

Sd1= 0.109

I= 1.0

phi= 0.67

** DL per arm= 127.0 lb



Side Elevation

** weight of arm plus trib weight of column per level

Vtrans= 0.0423

Vlong= 0.0325

Σ Arm LL= 7,200 lb

Σ Arm LL*phi= 4,824 lb

Σ Arm DL= 381 lb

W1=W_{arm,gravity}= 7,581 lb

W2=W_{arm,seismic}= 5,205 lb

V-transv= 0.0423 * 5205 lb

= 220 lb/frame

transv shear per upright

V-long= 0.0325 * 5205 lb

= 169 lb/frame

longit shear per upright

Lateral Force Distribution

Level	Transverse Force						Longitudinal Force
	W1 (DL+LL)*n	W2 (DL+LL*phi)	hx	wxhx	Fi	Fi * hi	Fi
1	2,527 lb	1,735 lb	36 in	62460	37 lb	1,332 in-lb	28 lb
2	2,527 lb	1,735 lb	72 in	124920	73 lb	5,279 in-lb	56 lb
3	2,527 lb	1,735 lb	108 in	187380	110 lb	11,880 in-lb	85 lb

Σ= 374,760 220 lb 18,491 in-lb

Summary of Frame Loads

Mseismic= 18,491 in-lb

Mwind= 24,019 in-lb

Pcol= 7,581 lb DL+LL

Marm-max= (LL-max+DL) * (Arm Length/2)

= (2400 lb + 31 lb) * (48 in/2)

= 58,344 in-lb

Marm-total= Σ Marm

= 175,032 in-lb

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

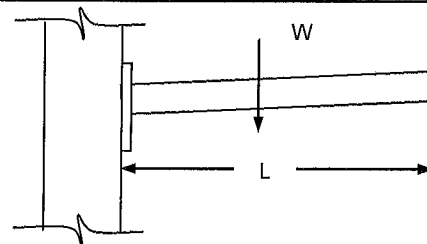
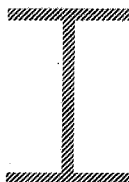
Project #: 25-0625-3

Arm

Configuration: TYPE 2 SGL-SIDED CANTILEVER RACK

Analysis is based on a uniformly loaded arm with no tip or impact loads considered.

Arm Type= S5x10
 $I_x = 12.3000 \text{ in}^4$
 $S_x = 4.920 \text{ in}^3$
 $F_y = 50,000 \text{ psi}$
 $L = 48 \text{ in}$



Check Arm Bending

$$LL\text{-max} = 2,400 \text{ lb}$$

$$DL = 31 \text{ lb}$$

$$M = W * L/2 \\ = 58,344 \text{ in-lb}$$

$$fb = M/S_y \\ = 11,859 \text{ psi}$$

$$Fb = 0.6 * F_y \\ 30,000 \text{ psi}$$

$$fb/Fb = 0.40 \quad \text{OK}$$

Check Arm Deflection

$$E = 29,000,000 \text{ psi}$$

$$D = w * L^4 / (8 * E * I_x) \\ = 0.0973 \text{ in}$$

$$D_{allow} = L/180 \\ = 0.27 \text{ in} \quad \text{OK}$$

Check Bolts For Imposed Arm Loads

$$\text{Spacing} = d = 4.0 \text{ in}$$

$$\text{Bolt diameter} = 0.75 \text{ in}$$

$$F_t = 44,000 \text{ psi}$$

$$F_v = 21,000 \text{ psi}$$

$$t_{min} = 0.188 \text{ in}$$

$$F_u = 58,000 \text{ psi}$$

$$\# \text{ Bolts in shear} = N_s = 4$$

$$\# \text{ Bolts in tension} = N_t = 2$$

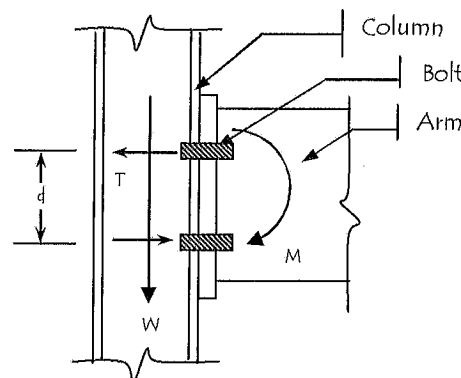
$$M = 58,344 \text{ in-lb}$$

$$T = M/d \\ = 14,586 \text{ lb}$$

$$W = LL + DL \\ = 2,431 \text{ lb}$$

$$W/\text{Bolt} = 608 \text{ lb}$$

$$T/\text{Bolt} = 7,293 \text{ lb}$$



Arm to Column Connection

$$\text{Shear Capacity} = \text{Bolt Area} * F_v \\ = [(0.75 \text{ in})^2 * \pi/4] * 21000 \text{ psi} \\ = 9,278 \text{ lb}$$

$$\text{Bearing Capacity} = \text{Bolt Diam} * t_{min} * F_u * 1.2 \\ = 9,788 \text{ lb}$$

$$\text{Tension Capacity} = \text{Bolt Area} * F_t \\ = 19,439 \text{ lb}$$

$$\text{Combined stresses: } (608 \text{ lb}/9278 \text{ lb}) + (7293 \text{ lb}/19439 \text{ lb}) = 0.44 \quad \text{OK}$$

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

Project #: 25-0625-3

Column Load Case: DL+LL

Configuration: TYPE 2 SGL-SIDED CANTILEVER RACK

Section

Section= W8x18

Area= 5.26 in²

Ix= 61.90 in⁴

Sx= 15.20 in³

rx= 3.43 in

Iy= 7.97 in⁴

Sy= 3.04 in³

ry= 1.23 in

Fy= 50,000 psi

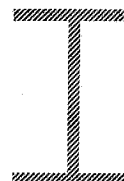
Kx= 2.4

Ky= 1.0

Lx= 108 in

Ly= 48 in

Cm= 1.00



Loads (Single Face Rack-Full Static Arm Loads)

Check Load Case 2 ASCE 2.4.1: ; DL + LL <= 1.0, ASD Method

Pmax= 7,581 lb

Mstatic= 175,032 in-lb

COLUMN DL= 381 lb

COLUMN PL= 7,200 lb

Mstatic= 175,032 in-lb

Combined Stress

$$(kl/r)_x = (2.4 \times 108 \text{ in} / 3.43 \text{ in}) \\ = 75.57$$

$$(kl/r)_y = (1 \times 48 \text{ in} / 1.23 \text{ in}) \\ = 39.02$$

$$(kl/r)_{\max} = 75.57$$

$$C_c = (2\pi^2 E / F_y)^{0.5} \\ = 107.0$$

SINCE $(KL/r)_{\max} < C_c$, USE EQTN E2-1

$$F_a = \frac{[1 - ((kl/r)^2 / 2C_c^2)] F_y}{5/3 + 3(kl/r) / 8C_c - (kl/r)^3 / 8C_c^3} \\ = 19,884 \text{ psi}$$

$$f_a = P / \text{AREA} \\ = 1,441 \text{ psi} \\ f_a / F_a = 0.07 < 0.15$$

$$f_{bx} = M / S \\ = 11,515 \text{ psi}$$

$$F_{bx} = 0.6 F_y \\ = 30,000 \text{ psi}$$

$$F'_{ex} = (12 \pi^2 E) / (23 (KL/r)^2) \\ = 26,150 \text{ psi}$$

$$f_b / F_b = 0.38$$

$$(1 - f_a / F_e) > 0 = 1.00$$

(H1-3):

$$f_a / F_a + f_b / F_b = 0.46 \leq 1 \text{ OK}$$

Check Base Bending

Section= W8x18

Sx= 15.20 in³

Fy= 50,000 psi

Fbx= 0.6 Fy

= 30,000 psi

Mbase-static= 175,032 in-lb

$$f_b / F_b = 0.38$$

OK

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

Project #: 25-0625-3

Column Load Case: DL+LL+ Lateral Load **Configuration: TYPE 2 SGL-SIDED CANTILEVER RACK**

Section

Section= W8x18

Area= 5.26 in²

Ix= 61.90 in⁴

Sx= 15.20 in³

rx= 3.43 in

Iy= 7.97 in⁴

Sy= 3.04 in³

ry= 1.23 in

Stress Increase= 1.00

Fy= 50,000 psi

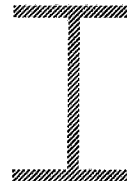
Kx= 2.4

Ky= 1.0

Lx= 108 in

Ly= 48 in

Cm= 1.00



Loads (Single Face Rack-Full Arm Loads plus lateral loads)

Check Load Case 6b ASCE 12.4.2.3: $(1+0.10*Sds)D + 0.75L + 0.525E \leq 1.0$, ASD Method

Pmax= 1.01 * 381 lb + 0.75 * 7200 lb

= 5,785 lb

M= 0.75*175032 in-lb + 18491 in-lb * 0.525

= 140,982 in-lb

(Mstatic + Mwind)

COLUMN DL= 381 lb

COLUMN PL= 7,200 lb

Mstatic= 175,032 in-lb

Mseismic= 18,491 in-lb

Sds= 0.1057

1+0.10*Sds= 1.0100

Combined Stress

$(kl/r)_x = (2.4*108 \text{ in}/3.43 \text{ in})$

= 75.57

$C_c = (2\pi^2 E/F_y)^{0.5}$

= 107.0

$(kl/r)_y = (1*48 \text{ in}/1.23 \text{ in})$

= 39.02

$(kl/r)_{\text{max}} = 75.57$

SINCE $(KL/r)_{\text{max}} < C_c$, USE EQTN E2-1

$F_a = \frac{[1 - ((kl/r)^2 / 2C_c^2)] F_y}{5/3 + 3(kl/r)/8C_c - (kl/r)^3 / 8C_c^3}$

= 19,884 psi

$f_a = P/\text{AREA}$

= 1,100 psi

$f_a/F_a = 0.06 < 0.15$

$f_{bx} = M/S$

= 9,275 psi

$F_{bx} = 0.6 * F_y$

= 30,000 psi

$F'_{ex} = (12 * \pi^2 * E) / (23 * (KL/r)^2)$

= 26,150 psi

$f_b/F_b = 0.31$

$(1 - f_a/F_e) = 1.00$

(H1-3):

$f_a/F_a + f_b/F_b = 0.36 \leq 1$ OK

Check Base Bending

Section= W8x18

Sx= 15.20 in³

Fy= 50,000 psi

$F_{bx} = 0.6 * F_y$

= 30,000 psi

Mbase-lateral= 140,982 in-lb

$f_b/F_b = 0.31$

OK

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

Project: Butler Supply

Project #: 25-0625-3

Anchors

Configuration: TYPE 2 SGL-SIDED CANTILEVER RACK

Check Load Case 7 ASCE 12.4.2.3: : $(0.9-0.20*Sds)DL + (0.9-0.20*Sds)Papp + E$

Overtuning Forces

Seismic Forces

Seismic Ovt Moment=Mseismic= 18,491 in-lb

Rack DL= 381 lb *load per upright*
 LL_{eff}=Total LL*0.67=P_{app}= 4,824 lb *load per upright*

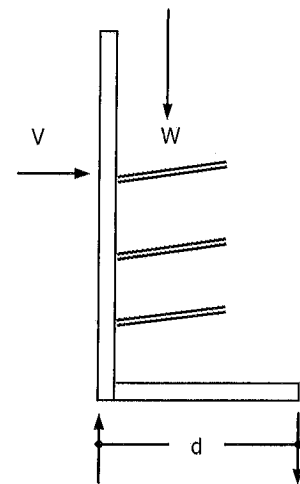
M_{stabilizing}=M_{st}= $[0.879*(381 \text{ lb}+4824 \text{ lb})]*56.14 \text{ in}/2$
 = 128,426 in-lb

T-seismic= $[M_{\text{seismic}} - M_{\text{st}}]/d * \Omega$
 = 0 lb
net seismic uplift

Seismic shear= 220 lb/frame

Seismic Tension per anchor= 0 lb

Seismic Shear per anchor= 55 lb



Side Elevation

Base depth= 48.0 in
 Column depth= 8.1 in
 d= 56.1 in
 $0.9-0.20*Sds= 0.879$

Check Anchors

Anchor Type= 0.75 in diam x 4.75 embed HILTI TZ2 Per ICBO ESR 4266

Anchor Inspection Required? Yes

Anchor/base= 4

T_{allow}= 1,961 lb

Stress Increase= 1

Anchor/end= 2

V_{allow}= 2,517 lb

Eqn Exponent= 1

	Tension/anchr	Shear/anchr	Tallow	Vallow	Interactn Eq.	Status
Seismic	0 lb	55 lb	1,961 lb	2,517 lb	0.022	OK

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

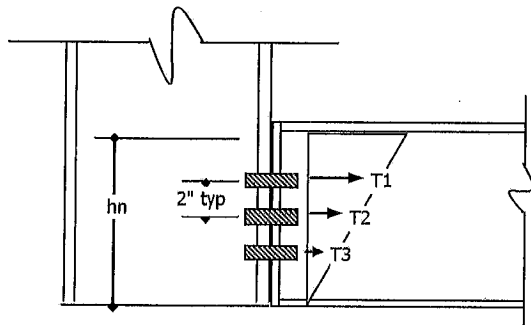
By: Bob S

Project: Butler Supply

Project #: 25-0625-3

Base to Column Connection

Configuration: TYPE 2 SGL-SIDED CANTILEVER RACK



$h1 = 6.0$ in

$h2 = 4.0$ in

$h3 = 2.0$ in

$M_D = 2,232$ in-lb

$M_P = 172,800$ in-lb

$M_E = 18,491$ in-lb

$\beta = 0.7$

$p = 1.3$

$Sds = 0.106$

$\Omega = 2$

Bolt Diam = 0.750 in

$F_t = 19.40$ kip (Grade 5 or better)

Base to Column Elevation

$$T1 = F_t \times 2 \\ = 38.80 \text{ kip}$$

$$T2 = T1 \times h2/h1 \\ = 25.87 \text{ kip}$$

$$T3 = T1 \times h3/h1 \\ = 12.93 \text{ kip}$$

$$\text{Moment Capacity} = M_{cap} = T1 \times h1 + T2 \times h2 + T3 \times h3 + T4 \times h4 + T5 \times h5 + T6 \times h6 \\ = 362 \text{ in-kip}$$

Load Case 1 (ANSI MH16.3-2016 Sec 2.1)

$$D+P = 175,032 \text{ in-lb}$$

$$\text{Load Case 5} \quad (1+0.105 \times Sds) \times D + 0.75 \times [1.4 + 0.14 \times Sds] \times \beta \times P + L + S + 0.7 \times p \times E = 143,227 \text{ in-lb}$$

$$\text{Load Case 6} \quad (1+0.14 \times Sds) \times D + (0.85 + 0.14 \times Sds) \times \beta \times P + 0.7 \times p \times E = 123,697 \text{ in-lb}$$

$$\text{Load Case 7} \quad (0.6 - 0.14 \times Sds) \times D + (0.6 - 0.14 \times Sds) \times P_{app} + 0.7 \times E \times \Omega = -51,167 \text{ in-lb}$$

Check Longitudinal Brace

$$M_{demand} = 175.0 \text{ in-kip}$$

OK

Brace Type = X Brace

Brace = 1.575x0.984x105

Area = $A_n = 0.337$ in²

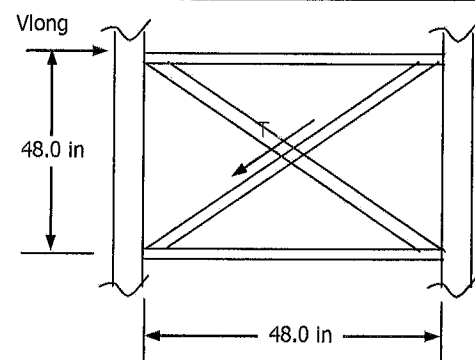
$V_{long} = 169$ lb

$$T = 0.525 \times V_{long} \times L_{diag}/L_h \\ = 126 \text{ lb}$$

$$F_t = 0.6 \times F_y \\ = 21,600 \text{ psi}$$

$$f_t = T/A_n \\ = 374 \text{ psi}$$

$$f_t/F_t = 0.02 < 1.0, \text{ OK}$$



Brace Panel Elevation

Bay Width = $L_h = 48.0$ in

Brace Panel Ht = $L_v = 48.0$ in

$L_{diag} = 68.0$ in

$F_y = 36,000$ psi

Check Brace Connection

Connection = Bolted

$F_v\text{-bolt} = 21,000$ psi

Bolts = 1

Bolt Diam = 0.5

Bolt Capacity = Bolt Area * $F_v\text{-bolt}$

$$= 4,123 \text{ lb}$$

OK

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

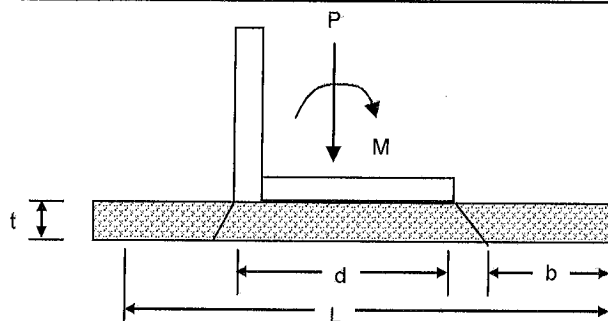
Project: Butler Supply

Project #: 25-0625-3

Footing

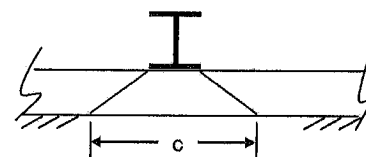
Load case: DL+ LL

Configuration: TYPE 2 SGL-SIDED CANTILEVER RACK



Thickness= $t=$ 6.0 in
 $f'_c=$ 4,000 psi
 $f_{\text{soil}}=$ 750 psf
 base depth= $d=$ 56.14 in

Base width= $W=$ 5.25 in
 $B=$ 3
 Stress Increase= $a=$ 1.00
 $\phi=$ 0.65
 $c=$ 17.3 in



Check Puncture

$P_{\text{gravity}}=$ 7,581 lb

$M_{\text{base}}=$ 175,032 in-lb

$P_{\text{vt}}= M_{\text{base}}/(d \cdot 0.66)$
 $=$ 4,724 lb

$P= 1.4 \cdot (P_{\text{gravity}} + P_{\text{vt}})$
 $=$ 17,227 lb

$F_p= [(4/3) + (8/3)/B] \cdot (f'_c)^{0.5} < 2.66 \cdot (f'_c)^{0.5} \cdot a$
 $=$ 140.5 psi

Punct Area= $A= (d + t) + (W + t) \cdot 2 \cdot t$
 $=$ 880.7 in²

Puncture Stress= $(P/A)/F_p$
 $=$ 0.14

OK

Check Bending

$A_{\text{req}}= P/f_{\text{soil}}$
 $=$ 3308 in²
 $=$ 191.7 in

x

17.3 in

$b= 191.7 \text{ in} - (56.14 \text{ in} + 2 \cdot 6 \text{ in}) \geq 0$
 $=$ 123.56 in

$M_{\text{slab}}= f_{\text{soil}} \cdot c \cdot b^2/(2 \cdot 144)$
 $=$ 4,763 in-lb

$S= c \cdot t^2/6$
 $=$ 103.5 in³

$F_b= 5 \cdot \phi \cdot (f'_c)^{0.5} \cdot a$
 $=$ 205.5 psi

$f_b/F_b= (M_{\text{slab}}/S)/F_b$
 $=$ 0.22

OK

Structural Engineering & Design Inc.

1815 Wright Ave La Verne, CA 91750 Tel: 909.596.1351 Fax: 909.596.7186

By: Bob S

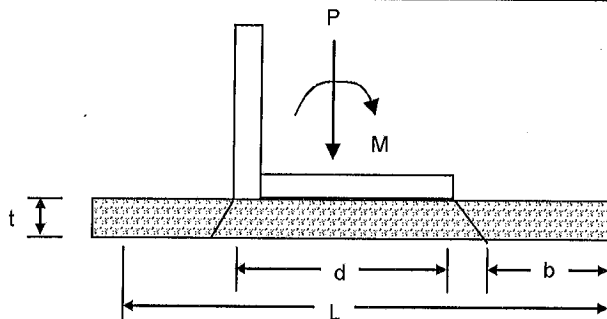
Project: Butler Supply

Project #: 25-0625-3

Footing

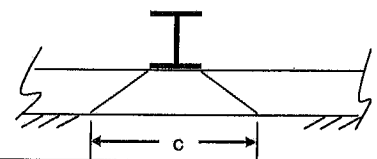
Load case: DL+ LL + Lateral

Configuration: TYPE 2 SGL-SIDED CANTILEVER RACK



Thickness= $t= 6.0$ in
 $f'_c= 4,000$ psi
 $f_{\text{soil}}= 750$ psf
 base depth= $d= 56.14$ in

Base width= $W= 5.25$ in
 $B= 3$
 Stress Increase= $a= 1.00$
 $\phi= 0.65$
 $c= 17.3$ in



Check Puncture

$$P_{\text{gravity}} = 5,785 \text{ lb}$$

$$M_{\text{base}} = 140,982 \text{ in-lb}$$

$$P_{\text{ovt}} = M_{\text{base}} / (d * 0.66) \\ = 3,805 \text{ lb}$$

$$P = 1.2 * P_{\text{gravity}} + P_{\text{ovt}} \\ = 10,351 \text{ lb}$$

$$F_p = [(4/3) + (8/3)/B] * (f'_c)^{0.5} < 2.66 * (f'_c)^{0.5} * a \\ = 140.5 \text{ psi}$$

$$\text{Punct Area} = A = (d + t) + (W + t) * 2 * t \\ = 880.7 \text{ in}^2$$

$$\text{Puncture Stress} = (P/A) / F_p \\ = 0.08$$

OK

Check Bending

$$A_{\text{req}} = P / f_{\text{soil}} \\ = 1987 \text{ in}^2 \\ = 115.2 \text{ in} \quad \times \quad 17.3 \text{ in}$$

$$b = 115.2 \text{ in} - (56.14 \text{ in} + 2 * 6 \text{ in}) \geq 0 \\ = 47.06 \text{ in}$$

$$M_{\text{slab}} = f_{\text{soil}} * c * b^2 / (2 * 144) \\ = 691 \text{ in-lb}$$

$$S = c * t^2 / 6 \\ = 103.5 \text{ in}^3$$

$$F_b = 5 * \phi * (f'_c)^{0.5} * a \\ = 205.5 \text{ psi}$$

$$f_b / F_b = (M_{\text{slab}} / S) / F_b \\ = 0.03$$

OK

MICHAEL MOORES, RA
(816) 516-4861

Development Services
CITY OF LEE'S SUMMIT, Missouri
220 SE Green Street
Lee's Summit, MO 64063

Re: Butler Supply
2736 NE McBaine Drive
Lee's Summit, MO 64064
Permit No.: PRCOM20251795

June 30, 2025

Dear Plans Examiner:

According to the bar joist manufacturer, the existing bar joists are capable of supporting up to 100 lbs. of concentrated load without installing additional web members. The two new condensing units each weigh 182 lbs. The condensers shall be installed on the roof equidistant from the adjacent bar joists, and the two units shall be separated by at least one bay so that each bar joist does not support more than 100 lbs. of concentrated load (see sketch below).

Sincerely,



MICHAEL MOORES, RA

