ADDENDUM NO. 4

October 09, 2024

TO THE PLANS AND PROJECT MANUAL FOR

Canyons School District -
Corner Canyon High School - Fieldhouse

Prepared by:

CORE ARCHITECTURE

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CURTIS LELAND LIVINGSTON
No. 10606440
STATE OF UTAH

09 OCT '24

This addendum is hereby made a part of the contract documents. It shall be the responsibility of each Contractor to notify his subcontractors of the contents of this addendum. In case of conflict between drawings, specifications and the Addendum, this Addendum shall govern. All changes, corrections, deletions and/or additions to the initial bidding documents shall be included in the bid.

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Specification Items:

1. **New Specification section**

    a. **Section 10 8315** – Building Wrap Film

2. **Approved Manufacture List** –

    a. **DFB Pre-Engineered Metal Buildings**
        i. DFB Pre-Engineered Metal Buildings Qualifications Packet.

    b. **CO Building Systems Inc.**

    c. **All Weather Insulated Panels**
        i. All Weather Insulated Panels Substituion Request Form
        ii. All Weather Insulated Panels Product Data

Architectural Items:

1. **Fire Marshal Review Comments**–
    a. See attached Fire Marshal Response **(GFLS) 24-692 CCHS Fieldhouse RESPONSE 10.09.24**
2. **Peer Review Comments -**.
    a. See attached **Plan Review - RESPONSE 10.09.24**

Sheet A001 – See the attached revised sheet for items noted by revision cloud Mark 2
Sheet A102 – See the attached revised sheet for items noted by revision cloud Mark 2
Sheet A550 – See the attached revised sheet for items noted by revision cloud Mark 2
Sheet A900 – See the attached revised sheet for items noted by revision cloud Mark 2
Sheet A911 – See the attached revised sheet for items noted by revision cloud Mark 2
Sheet A940 – See the attached revised sheet for items noted by revision cloud Mark 2
Sheet A941 – See the attached revised sheet for items noted by revision cloud Mark 2
Sheet A942 – See the attached revised sheet for items noted by revision cloud Mark 2
Sheet A960 – See the attached revised sheet for items noted by revision cloud Mark 2

3. **Prebid Questions –**
    a. See attached - **CCHS Fieldhouse Pre-Bid Questions as of 10.4.24 - RESPONSE**

Sheet A110C – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A540 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A601 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A801 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A802 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A810 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A811 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A812 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A813 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A814 – See the attached revised sheet for items noted by revision cloud Mark 3

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Sheet A815 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A816 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A817 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A960 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A960 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A980 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A981 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A882 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A883 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A884 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A885 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A886 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A887 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A888 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A889 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A890 – See the attached revised sheet for items noted by revision cloud Mark 3
Sheet A891 – See the attached revised sheet for items noted by revision cloud Mark 3

Civil Items:

1. **Fire Marshal Review Comments**–
   a. See attached Fire Marshal Response **(GFLS) 24-692 CCHS Fieldhouse RESPONSE 10.09.24**
2. **Prebid Questions –**
   a. See attached - **CCHS Fieldhouse Pre-Bid Questions as of 10.4.24 - RESPONSE**

Structural Items:

1. **Peer Review Comments -**.
   a. See attached **Plan Review - RESPONSE 10.09.24**
   b. **Structural Addendum –**
      i. See attached - **2024-10-09 - CCHS Fieldhouse - Addendum 4**
      ii. See attached - **CCHS Field House - structural calculations**
      iii. See attached - See attached - **CCHS Field House - structural calculations**
2. **Prebid Questions –**
   a. See attached - **CCHS Fieldhouse Pre-Bid Questions as of 10.4.24 – RESPONSE**

Electrical Items:

1. **Fire Marshal Review Comments**–
   a. See attached Fire Marshal Response **(GFLS) 24-0692 CCHS Fieldhouse RESPONSE**
2. **Peer Review Comments -**.
   a. See attached **Plan Review - RESPONSE 10.09.24**
      i. See attached COMcheck
3. **Prebid Questions –**
   a. See attached - **CCHS Fieldhouse Pre-Bid Questions as of 10.4.24 – RESPONSE**

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4. **Electrical Addendum –**
    a. See attached - **20240920 CYD Corner Canyon HS Field House - Electrical Addendum #4**
    b. See attached - **20241002 - Addendum #4 Drawings**

Mechanical & Plumbing Items:

1. **Peer Review Comments -**.
    a. See attached **Plan Review - RESPONSE 10.09.24**
2. **Prebid Questions –**
    a. See attached - **CCHS Fieldhouse Pre-Bid Questions as of 10.4.24 - RESPONSE**
3. **Mechanical Addendum –**
    a. See attached - **CCHS Fieldhouse - Mechanical Addendum 04 - 10-09-2024 - opc**

END OF ADDENDUM

SECTION 10 8315 – BUILDING WRAP FILM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Digital print building wrap film for building exterior installation.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for building wrap.

B. Shop Drawings: For each type of product.

1. Include elevations, materials, fabrication, dimensions, mounting heights, clearances, and installation details.
2. Detail colors and graphic layout and content. Show graphics, text message, font, and spacing.

C. Samples for Initial Selection: For each type of product.

1. Include color and finish selection.

D. Samples for Verification: For each type of the following products, prepared on Samples of size indicated below:

1. Wrap Film: 12-inch- square section of film.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For banners to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store print wrap film rolled over 6 inch or larger rigid tubes; do not fold print wrap film.

PART 2 - PRODUCTS

2.1 BUILDING WRAP FILM

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Envision Print Wrap Film LX480mC as manufactured by 3M.
2. Envision Wrap Overlaminates 8549L as manufactured by 3M.

B. Print Wrap Material: As follows:

1. 3M Product: LX480mC
2. Material Type: Non-Vinyl Composite.
3. Film Thickness: 50 micron.
4. Height and Width: As indicated on Drawings.
5. Color: As selected by Architect from full range of industry colors and color densities.
6. Applied Treatment: Clear lamination.

C. Wrap Overlaminates: As follows:

1. 3M Product: 8549L Luster Wrap Overlaminate.
2. Material Type: Non-PVC.
3. Thickness: 2 mils.
4. Height and Width: As indicated on Drawings.
5. Color: As selected by Architect from full range of industry colors and color densities.
6. Applied Treatment: Clear lamination.

D. Graphics Application: Latex Inkjet printing.

1. Outdoor Durability: Not less than seven years.
2. Image/Message: As indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install building wrap film at locations and in position indicated and according to fabricator's written instructions.

END OF SECTION 10 8315

CCHS Fieldhouse Pre-Bid Questions

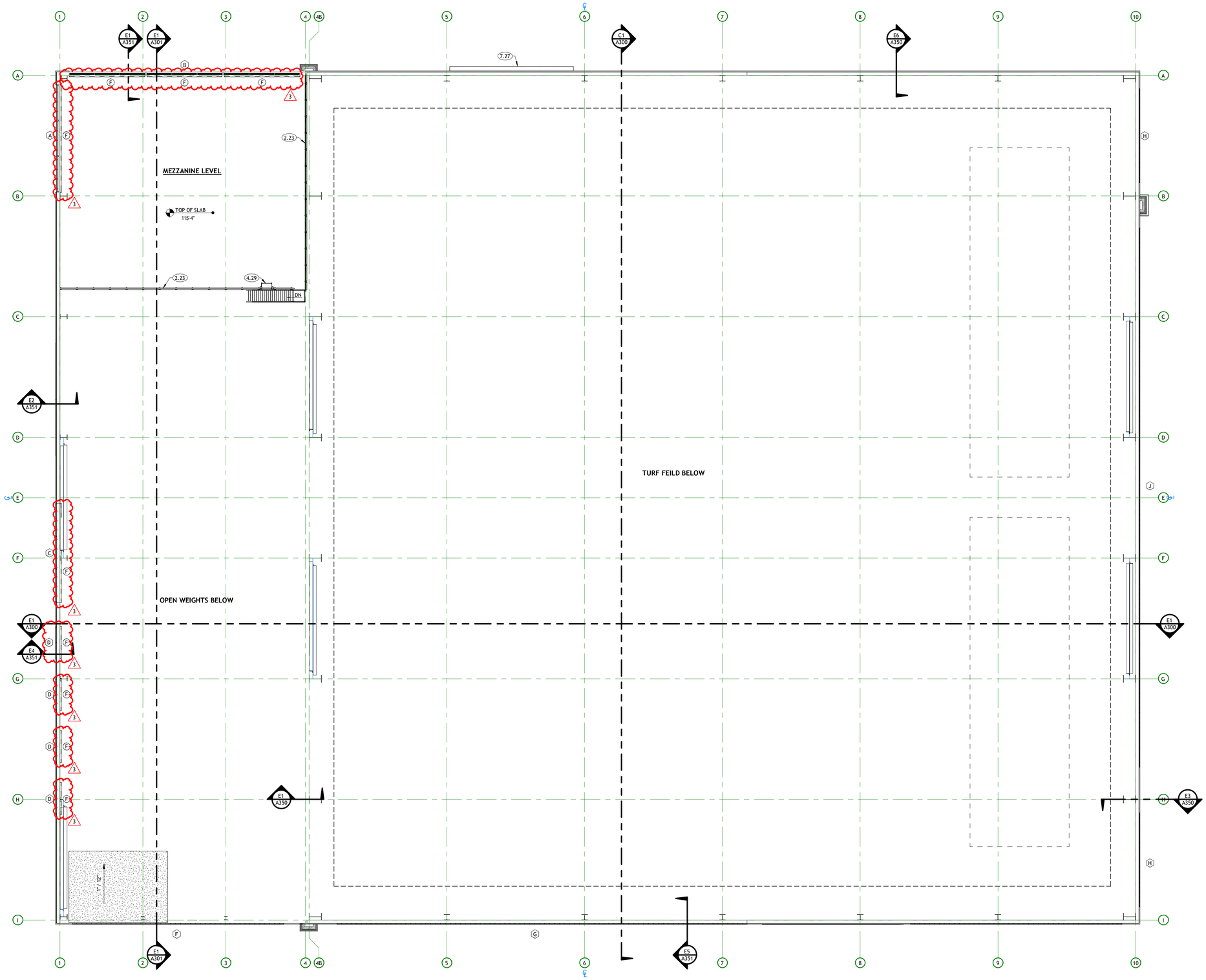
#	Date	A/E TEAM	QUESTION	RESPONSE
1	10/1/24	ARCHITECTURAL	Question: I have been reviewing section 10 1200 for the display cases and I am getting some conflicting information and questions. Spec says 3/16" Rolling Glass Doors, The print page A985 says 5/8" Pivot Doors. We propose to use ¼" tempered glass rolling doors. Spec says ¼" Glass shelves, The print page A985 says ½' Glass shelves. We propose to use 3/8" tempered glass s they do not warp over time. The glass shelves are about 20" deep, which is deeper than our shelf brackets can handle. We propose to use steel cables instead of wall mounted brackets. I know the spec says in 101200 Section 2.1 "or comparable" . Would these changes qualify as comparable? Do we need to get the architect to adjust the spec or drawing so that they are more clear on what they want?	The specification is accurate, please follow spec. If a product is comparable it will be reviewed in the submittal process.
2	10/1/24	ARCHITECTURAL	Question: The finish schedule needs to be updated from 3' tile to rolls for the Mondo Sport Impact, F2. Can we have that change made?	F2 has been updated to reflect this change. See Revised Sheets A802, A980
3	10/1/24	MECHANICAL	Question: We noticed that there is no Specification for Automated Temperature Controls, will this be needed?	See provided spec.
4	10/1/24	ARCHITECTURAL	Question: We cannot find the locations for roller shades in the drawings, can you let us know where they are to be located.	Roller shades will be provided on all exterior window systems, see updated drawings indicating locations.
5	10/1/24	ARCHITECTURAL	Question: Will there be a signage schedule providing locations besides sheet A004 ADA signage?	Yes, See Revised sheet A601, A801, A960, A980
6	10/2/24	ARCHITECTURAL	Question: Specifications are calling for 2" thick insulated panels, but details such as those found on A540 seem to indicate a 2 ½" thick insulated panel. Please clarify Insulated Panel thickness requirements for project.	2" Spec drives this requirement.
7	10/2/24	ARCHITECTURAL	Question: Specifications are calling for 36" wide insulated panels which is a standard size for the Metal-Span panels being specified. However, the elevations on A201 & A202 are calling for an 18" vertical joint for the SF Striated panels and an 8" lap for the CF Mesa panels. The smallest width the Striated panels are manufactured in is 24" and the smallest width the Mesa panels are manufactured in is 30" neither of which are standard widths and although available, would be more expensive than the standard 36" wide panels. I'm not familiar with any IMP panels that are 18" or 8" in width. Please advise.	The 36" standard panels per spec are the correct panel.
8	10/2/24	ARCHITECTURAL	Question: The "EM-2" panels on A201 & A202 have the notation "horizontal lap siding" for the CF Mesa. Is the intent to have these panels installed horizontally so the mesa lines are horizontal? It appears that these panels are only installed in three 'popout' locations on the building, but I can't see any details on the 'popout' framing. Is this framing to be steel stud? Or provided by the PEMB manufacturer? Could a detail be provided on these 'popouts' with included dimensions?	Yes, install in a horizontal pattern.

CCHS Fieldhouse Pre-Bid Questions

9	**10/2/24**	ARCHITECTURAL	Question: Could the weight be provided for the owner furnished scoreboard so the PEMB can be designed to support that loading?	Yes, See attached Cut Sheets for owner provided scoreboard.
10	**10/2/24**	ARCHITECTURAL	Question: It appears that logos and signage called out as keynote 4.51 will be something such as a vinyl wrap that will not impose additional significant weight upon the structure. If this assumption is incorrect, could the weights of that signage be provided so the PEMB can be designed to support it?	These are applied graphics, see attached specification.
11	**10/2/24**	STRUCTURAL	Question: The structural design criteria indicates the structure is to be designed with a 10 PSF collateral load. The turf field includes underhung netting /batting cage netting suspended from the structure. Is the 10 PSF collateral load sufficient for the underhung netting? Or does the structure need to be designed to support the weight of the netting in addition to the 10 PSF collateral load? If so, could the weight of the netting be provided so the PEMB can be designed to support those additional loads	The netting and other items listed under plan notes E and F on sheet S103 are not included in the 10 psf collateral load. The PEMB designer may, after award, coordinate all applicable elements with general contractor and, if applicable, request a reduction in weight if it is determined the 10 psf is excessively high.
12	**10/2/24**	STRUCTURAL / ARCHITECTURAL	Question: The drawings indicate that the parapets are framed with structural C-channel with steel stud infill. Detail C5 & C6 on A540 has callouts to see the structural drawings for more information, however I don't see anything in the structural drawings relating to the parapets. Is there any reason these parapets are not being framed by the PEMB manufacturer with PEMB stub columns and girts in lieu of the steel channel and steel stud framing? Putting the parapet framing in the scope of the PEMB I imagine would be the most economical way to frame these parapets. Is it acceptable to have the PEMB manufacture design and provide the framing for the building's parapets?	The PEMB is responsible for the parapet framing.
13	**10/2/24**	ARCHITECTURAL	Question: Plan keynote 9.36 states "Aluminum Z Girt Framing". I'm not sure any manufacturer makes their girts from aluminum. These are typically either primed steel Z girts, or for an additional cost galvanized steel Z girts. Please clarify the desired girt type.	Z Girt Framing is to be steel. Primed or galvanized is acceptable.
14	**10/2/24**	STRUCTURAL	Question: The PEMB specifications include verbiage about FM global and wind uplift requirements for roof panel assemblies, however no roof panels are being provided. I would assume that these parts of the specifications are not applicable to this project.	This should apply to all metal roof panels, decking, or other component materials as noted in the specifications.
15	**10/2/24**	STRUCTURAL	Question: All steel deck info in structural drawings appears to be only applicable to the floor decking. What are the project requirements for the PEMB provided roof decking such as gage, finish, etc.?	The minimum deck gage and profile will be determined based on design load criteria. CRCE defers to CORE for finish and other criteria.
16	**10/3/24**	ARCHITECTURAL	Question: Will a specification for the exterior bleachers be provided or are they OPOI as well?	Bleachers are NIC.
17	**10/3/24**	ELECTRICAL	Question: On sheet E602 the panel schedules are missing for CT/MS, MDPH, and MDPL. Will this be updated or provided?	After Reviewing the Construction Documents, it is confirmed that panel schedules for CT/MS, MDPH, and MDPL are present. It is unclear what is needed.
18	**10/3/24**	ELECTRICAL	Question: looking at panel 1L4, (going off of the one-line) I think it needs to be a two section, 225A panel, not a one section 150A. Please advise?	Panel 1L4 has a total connected load of less than 40A (see panel schedule on E602) A 150A panel is sufficient. There is plenty of capacity for additional circuits – a second section is not needed. Keynote X7 on Sheet E501 notes that the wire size has been upsized due to voltage drop for the length of the conduit to the panel.

CCHS Fieldhouse Pre-Bid Questions

19	**10/4/24**	CIVIL	Question: Are drainage plans available to show under artificial turf system. These are not shown in any of the current civil drawings.	Not a this time.
20	**10/8/24**	ARCHITECTURAL	Question: Article 2.3.A.1.a calls for 48”H frames. Article 2.3.A.1.b calls for 72”H frames with a manufacturer’s base. The typical base height for welded frames is 4”. That puts the top of the double-tier frames at nominally 76”H not including the sloped tops. Detail E3 on plan sheet A550 looks to show the locker base height at 14”. That puts the top of the single-tier frames at nominally 62”H. The difference in frame heights will not allow a continuous run of sloped tops but will instead have 2 runs at different heights. Is this acceptable? Additionally, the frame depth in Detail E3 looks to be shown as 18”. Detail A4 on plan sheet A812 looks to show 60”H double-tier frames. Can you please confirm the required heights and depths of the frames?	Locker tops do not need to be aligned.
21	**10/8/24**	ELECTRICAL	Question: ON SCHEET E201 AND E202 THERE IS A LIGHT FIXTURE TYPE “OWS1” THAT IS SHOWN ON THE PLANS BUT IT IS OMITED ON THE LIGHT FIXTURE SCHEDULE. NEED CLARIFICATION AND MANUFACTURE SPECS FOR THAT FIXTURE.	Looks like there is a typo on the Schedule on E002. OW1 was meant to be OWS1, please have them use the information provided for OW1 on the schedule.
22	**10/8/24**	ELECTRICAL	Question: This project lists numerous 1G down-link/1G up-link Netgear switches under the A/V section. Are these A/V switches tied into the district network via fiber optics? If so, we will also need to include optics, and the structured wiring sub-contractor will need to run fiber during the build-out instead of copper.	No, the AV switches are not tied to the district network.
23	**10/9/24**	ARCHITECTURAL	Question: Page A201 shows what appears to be 3 pairs of store front doors. Page A202 shows what appears to be 2 more pairs of store front doors. The door schedule lists 1 pair of store front doors. Please provide some clarification.	See floor plans, elevations and door schedule for locations, quantities and types. See door types for type of style of door as called out.
24				
25				
26				
27				
28				
29				
30				



KEYNOTES

2.23	PAINTED STEEL GUARDRAIL, 42" ABOVE FINISHED FLOOR OR NOSE OF STAIRS. SEE TYPICAL DETAILS.
4.29	ROOF ACCESS LADDER AND HATCH
7.27	SCOREBOARD. OWNER FURNISHED, OWNER INSTALLED.

WALL FURNISHINGS LEGEND

A1	6'-0" x 4'-0"	MARKER BOARD
A2	12'-0" x 4'-0"	MARKER BOARD
B1	24" X 36"	MIRROR
B2	48" X 72"	MIRROR
C1	24" X 72"	WALL PADDING
C2	18" X 72"	I-BEAM WALL PADDING
C3	10" X 132"	CROSS BEAM WALL PADDING
D	8" X 8"	SIGNAGE, SEE SHEET A004
E	SEE WINDOW TYPES	MANUAL WINDOW SHADES - SEE SPECS
F	SEE WINODW TYPES	MOTORIZED WINDOW SHADES - SEE SPECS

NOTE: COORDINATE FINAL LOCATION WITH OWNER AND ARCHITECT PRIOR TO INSTALLATION
* ALL SHADES IN MAIN AND AUXILIARY GYMS TO BE 1% TRANSMISSION, ALL OTHERS TO BE 5%

GENERAL NOTES

A. GENERAL CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR CONSTRUCTION. REPORT ANY SIGNIFICANT DISCREPANCIES TO THE ARCHITECT.
B. COORDINATE INSTALLATIONS OF ALL "AFTER CONTRACT" ASSEMBLIES WITH OWNER PRIOR TO CONSTRUCTION OF ADJOINING OR RELATED STRUCTURES.
C. PROVIDE 18" MINIMUM CLEAR FLOOR SPACE AT PULL SIDE OF ALL DOORS. PROVIDE 12" MINIMUM CLEAR FLOOR SPACE AT PUSH SIDE OF ALL DOORS.
D. UNLESS OTHERWISE NOTED OR DIMENSIONED, LOCATE DOORS AS FOLLOWS:
   - MASONRY WALLS- OUTSIDE OF FRAME 8" FROM FACE OF WALL (ON BLOCK MODULE),
   - FRAMED WALLS-INSIDE OF JAMB 4" FROM FINISHED WALL (ADJUST FOR TILE WHERE SHOWN).
E. CONCRETE FOUNDATION WALLS RETAINING EARTH TO RECEIVE TWO COATS OF BITUMINOUS DAMP PROOFING MATERIAL.
F. AN AUTOMATIC FIRE SPRINKLER SYSTEM IS TO BE INSTALLED THROUGHOUT THE ENTIRE BUILDING PER NFPA 13.
G. SEE STRUCTURAL, MECHANICAL, AND ELECTRICAL SHEETS FOR ADDITIONAL INFORMATION
H. SEE INTERIOR ELEVATIONS ON A850 SHEETS AND MILLWORK DETAILS ON A550 SHEETS FOR FINISHES OF MILLWORK BASES, AND COUNTERTOPS. SEE A120 SHEETS FOR REFLECTED CEILING PLAN INFORMATION.
I. SEE A800 SHEETS, FOR FINISH INFORMATION. CONFIRM FINISHES WITH OWNER PRIOR TO ORDERING.
J. SEE A600 SHEETS FOR DOOR AND WINDOW INFORMATION.
K. GENERAL CONTRACTOR SHALL REVIEW AND APPROVE ALL APPLIANCES WITH OWNER PRIOR TO PURCHASING EQUIPMENT AND FABRICATING MILLWORK.
L. SEE THE SPECIFICATION FOR ADDITIONAL INFORMATION.
M. SEE G000 FOR LEGENDS, SYMBOLS, ABBREVIATIONS AND OTHER ARCHITECTURAL GENERAL INFORMATION.
N. SEE A110 FOR WALL TYPES.
O. PROVIDE BACKING/BLOCKING FOR WALL MOUNTED ITEMS-INCLUDING GRAB BARS, HANDRAILS, SIGNAGE AND EQUIPMENT AS REQUIRED.
P. TILE IS TO BE SET OVER CEMENTITIOUS BACKER BOARD UNDERLAYMENT. RECESS SLAB AS/IF REQUIRED. VERIFY WITH OWNER.
Q. SEE STRUCTURAL DRAWINGS FOR LOCATION OF DEPRESSED SLABS
R. PROVIDE 1" RADIUS BULLNOSE AT ALL MASONRY WALL CORNERS. BASE COURSE OF MASONRY TO REMAIN SQUARE FOR WALL BASE INSTALLATION.
S. ALL DIMENSIONS ARE TO FACE OF MASONRY, WOOD, AND METAL STUD FACES UNLESS NOTED OTHERWISE.
T. EXTEND ALL WALLS TO UNDERSIDE OF DECK ABOVE UNLESS OTHERWISE NOTED. CONTRACTORS OPTION TO FILL METAL DECK VOIDS WITH MINERAL WOOL INSULATION OR FIELD CUT GYP. BOARD INTO FLUTES. INCLUDING MASONRY WALLS. REFER TO STRUCTURAL SHEETS FOR EXACT LOCATIONS OF BEARING WALLS.
U. FILL VOIDS BETWEEN SEPARATION WALLS AND ROOF DECK WITH FIREDAM SPRAY INSULATION. SEE SPECS.
V. **FOR ALL METAL STUD WALLS THAT EXTEND TO BOTTOM OF ROOF DECK & WHERE METAL STUD WALLS CUT PERPENDICULAR THROUGH ROOF TRUSSES, SEE DETAILS.**
W. DO NOT SCALE DRAWINGS.

FLOOR PLAN - OVERALL MAIN FLOOR CLERESTORY PLAN

A110C | SCALE: 1/8" = 1'-0"

CORE ARCHITECTURE
233 SOUTH PLEASANT GROVE BLVD.
SUITE #105
PLEASANT GROVE, UTAH 84062
PHONE: (801) 769-3000
core@corearch.com

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PROFESSIONAL STAMP

LICENSED ARCHITECT
CURTIS LEONARD LIVINGSTON
NO. 10021445
STATE OF UTAH

09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

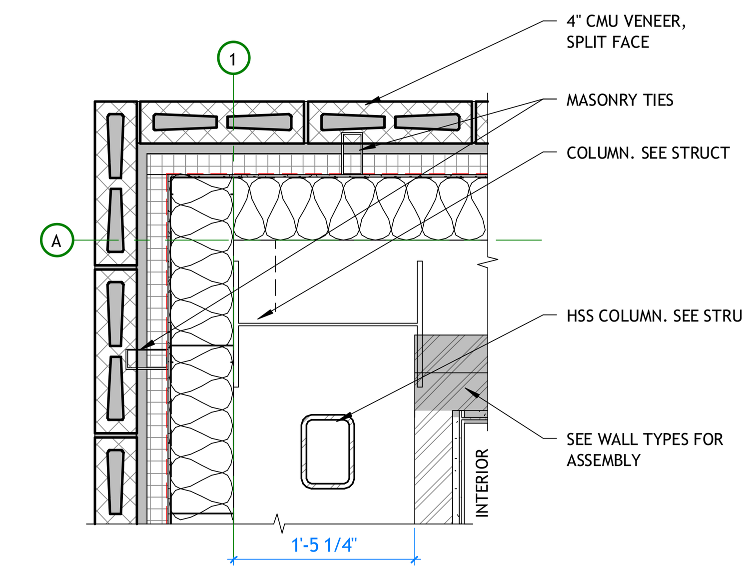
SHEET TITLE

MAIN FLOOR CLERESTORY

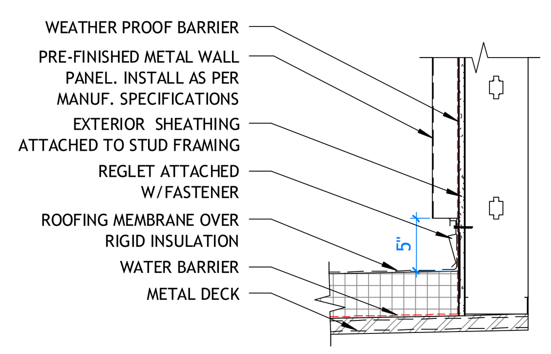
SHEET NUMBER

A110C

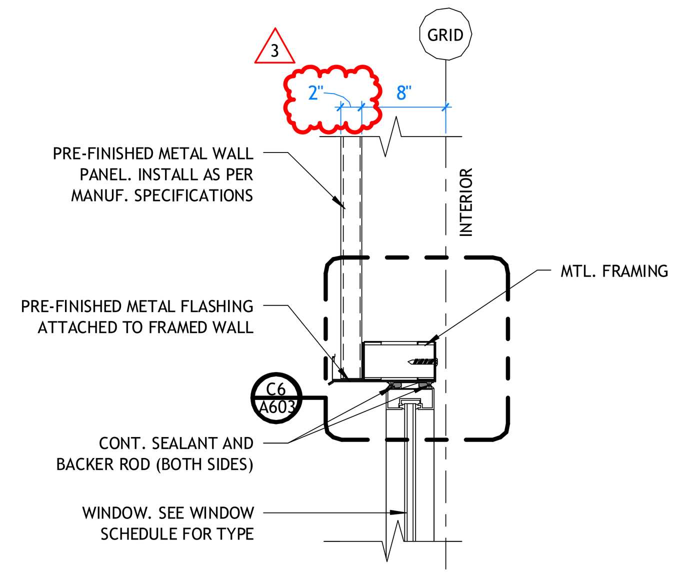
1 2 3 4 5 6 7



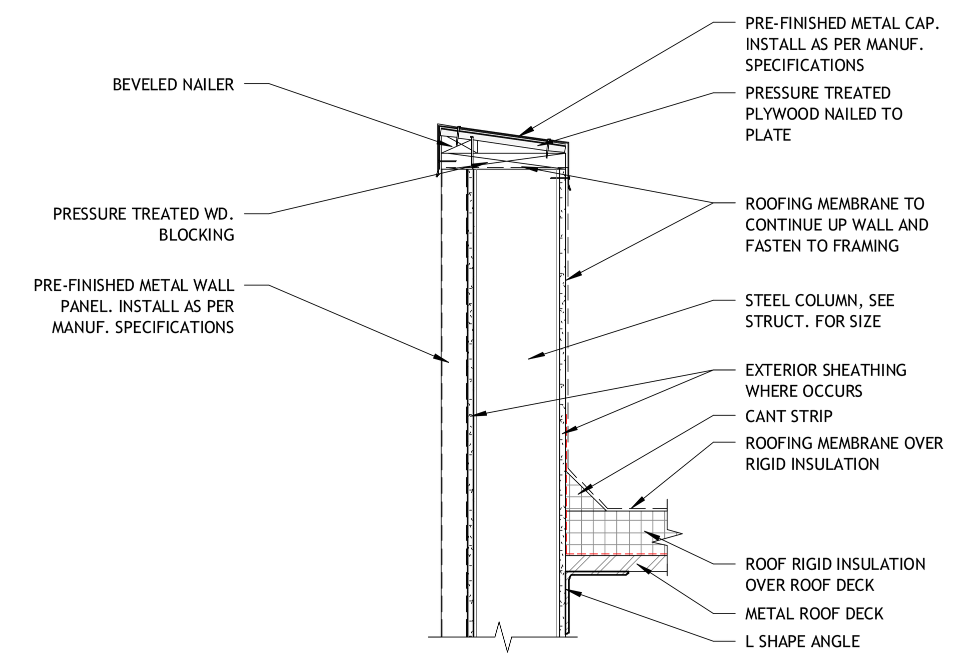
B6 COLUMN/STRUT CONNECTION DETAIL
A540 | SCALE: 1" = 1'-0"



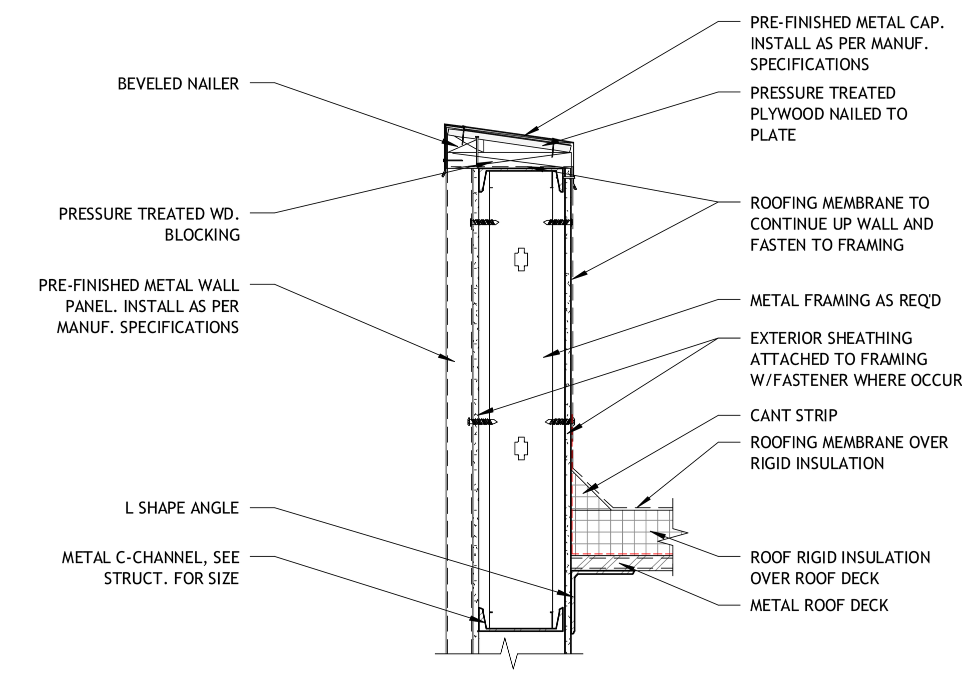
C2 ROOF/WALL TRANSITION DETAIL
A540 | SCALE: 1" = 1'-0"



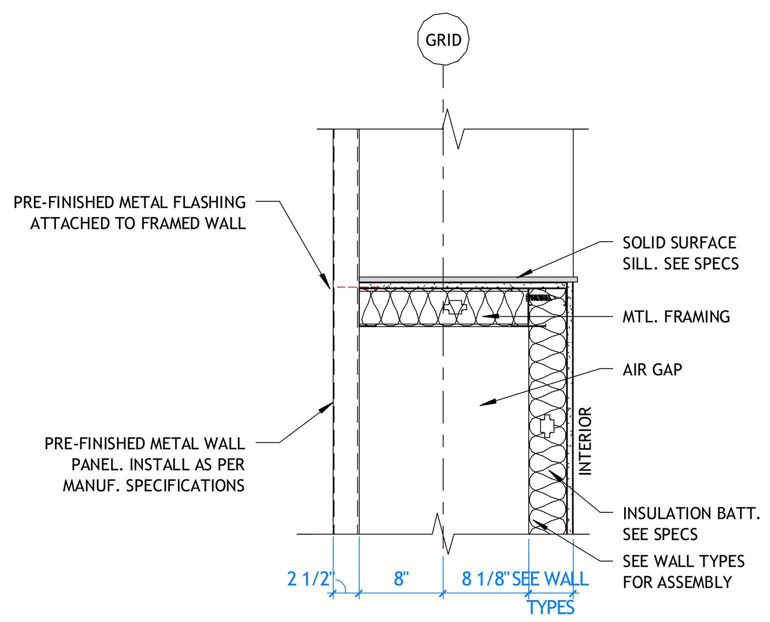
C3 WINDOW HEAD DETAIL
A540 | SCALE: 1" = 1'-0"



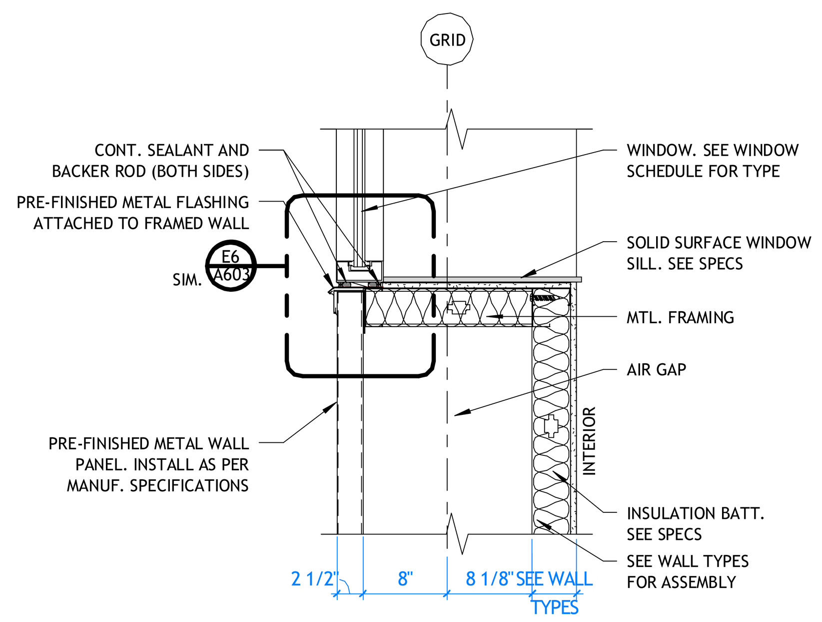
C5 PARAPET DETAIL W/I-BEAM
A540 | SCALE: 1" = 1'-0"



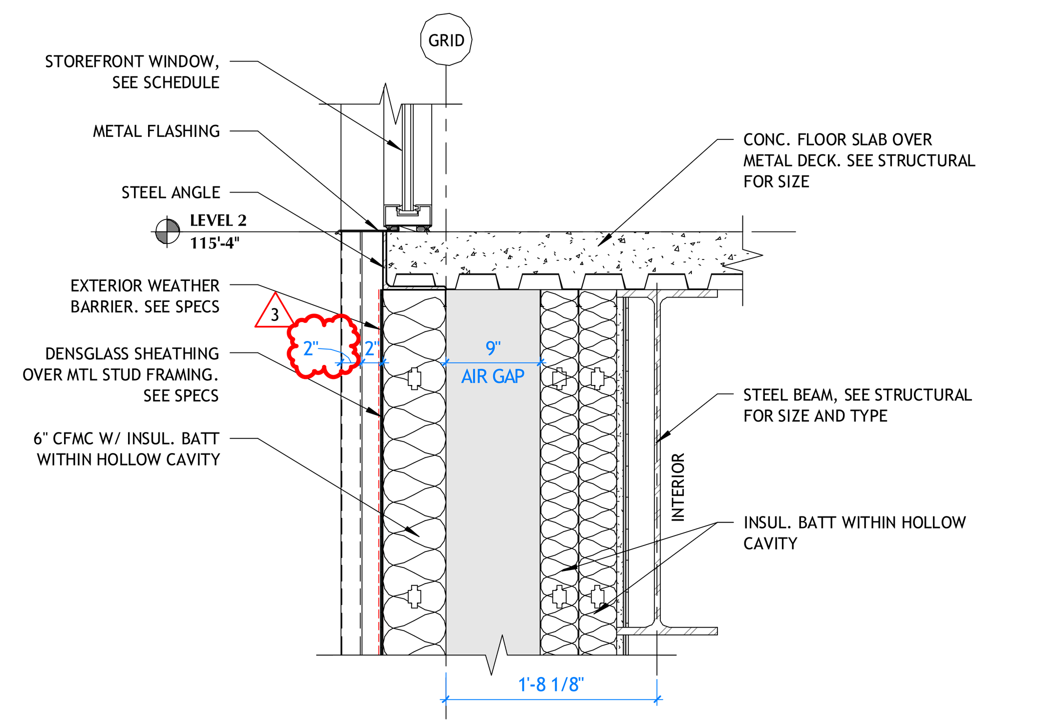
C6 PARAPET DETAIL W/C-CHANNEL
A540 | SCALE: 1" = 1'-0"



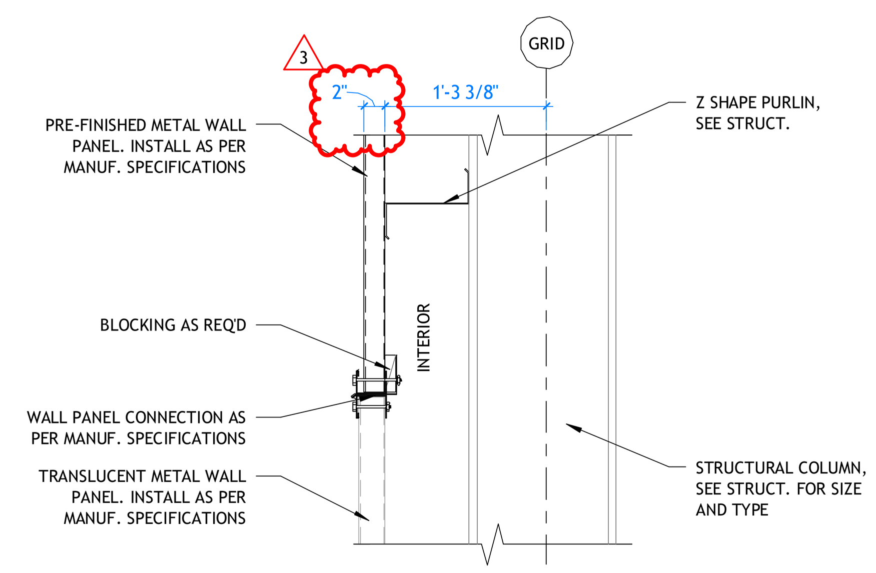
D1 SILL DETAIL @UPPER FLOOR (ALT.)
A540 | SCALE: 1" = 1'-0"



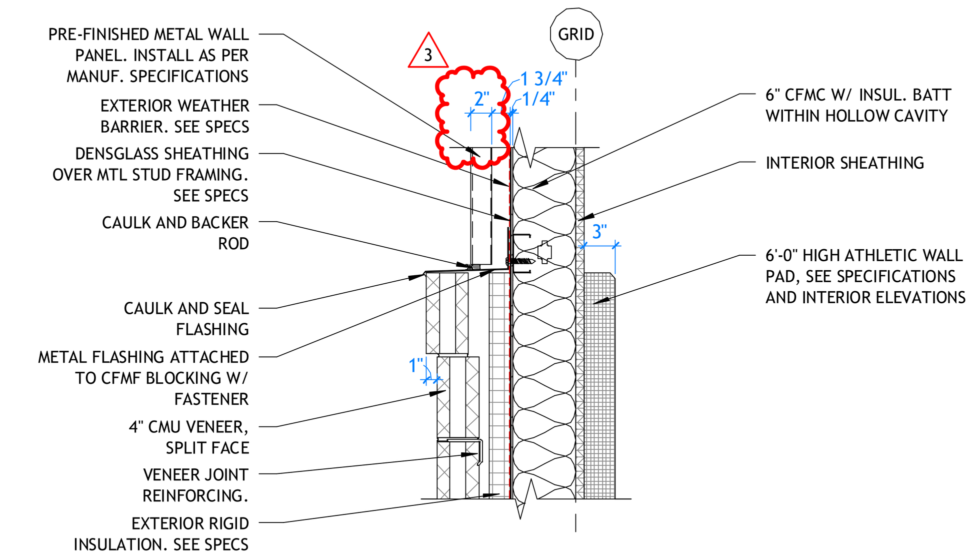
D2 WINDOW SILL DETAIL @UPPER FLOOR (ALT.)
A540 | SCALE: 1" = 1'-0"



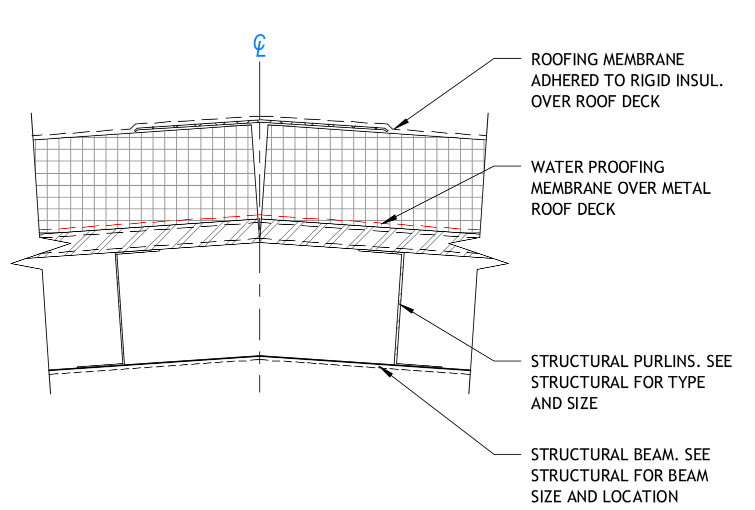
D3 FLOOR CONNECTION DETAIL
A540 | SCALE: 1" = 1'-0"



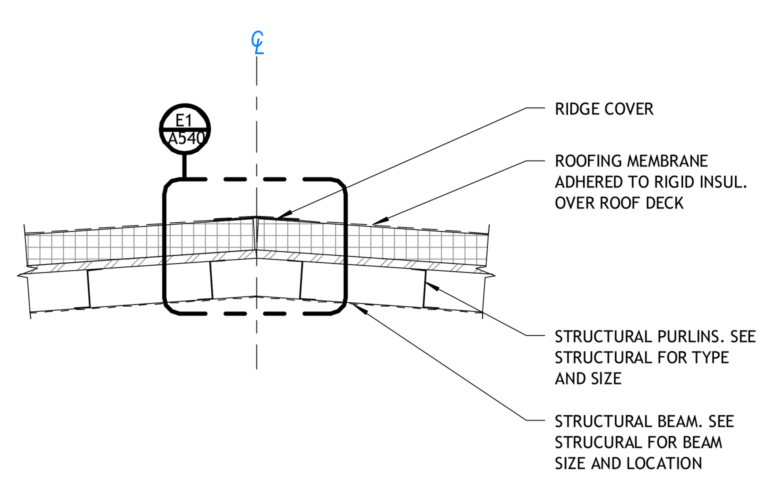
D5 HEAD DETAIL @TRANSLUCENT WALL PANEL (SILL SIM.)
A540 | SCALE: 1" = 1'-0"



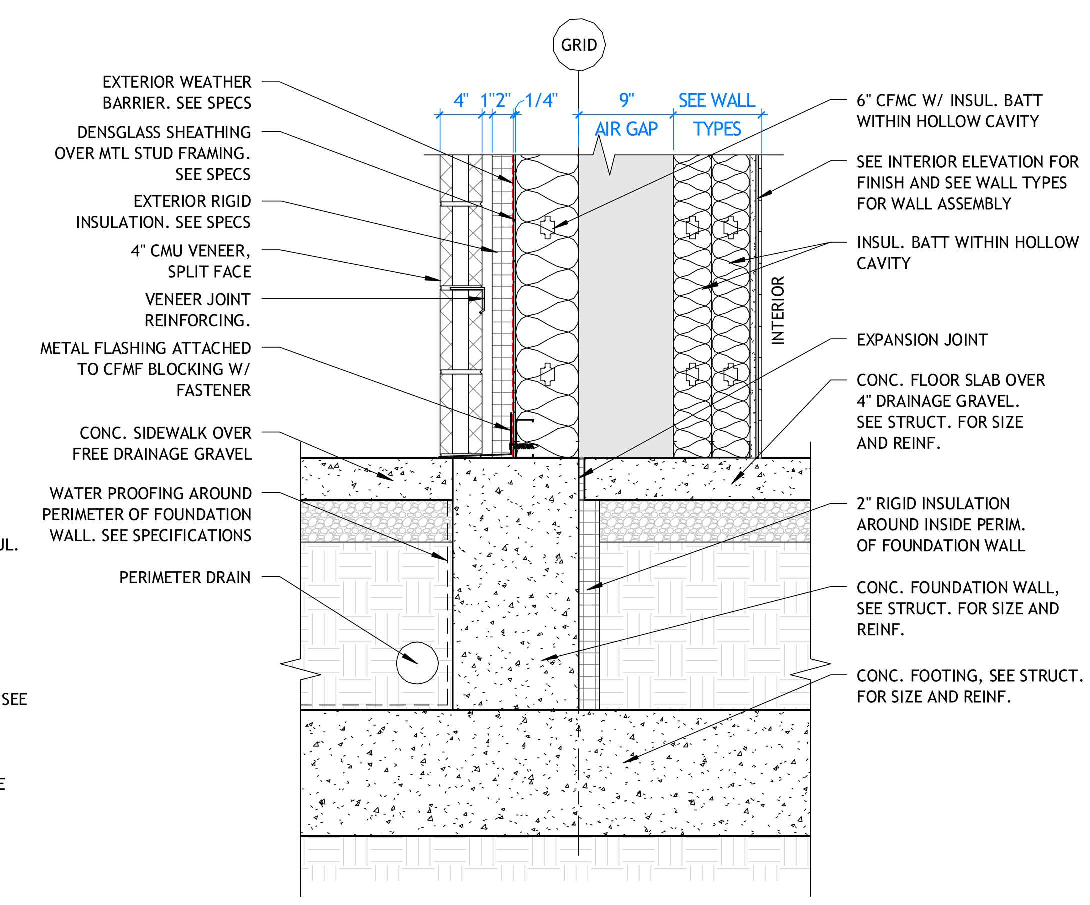
D6 CMU/METAL WALL TRANSITION
A540 | SCALE: 1" = 1'-0"



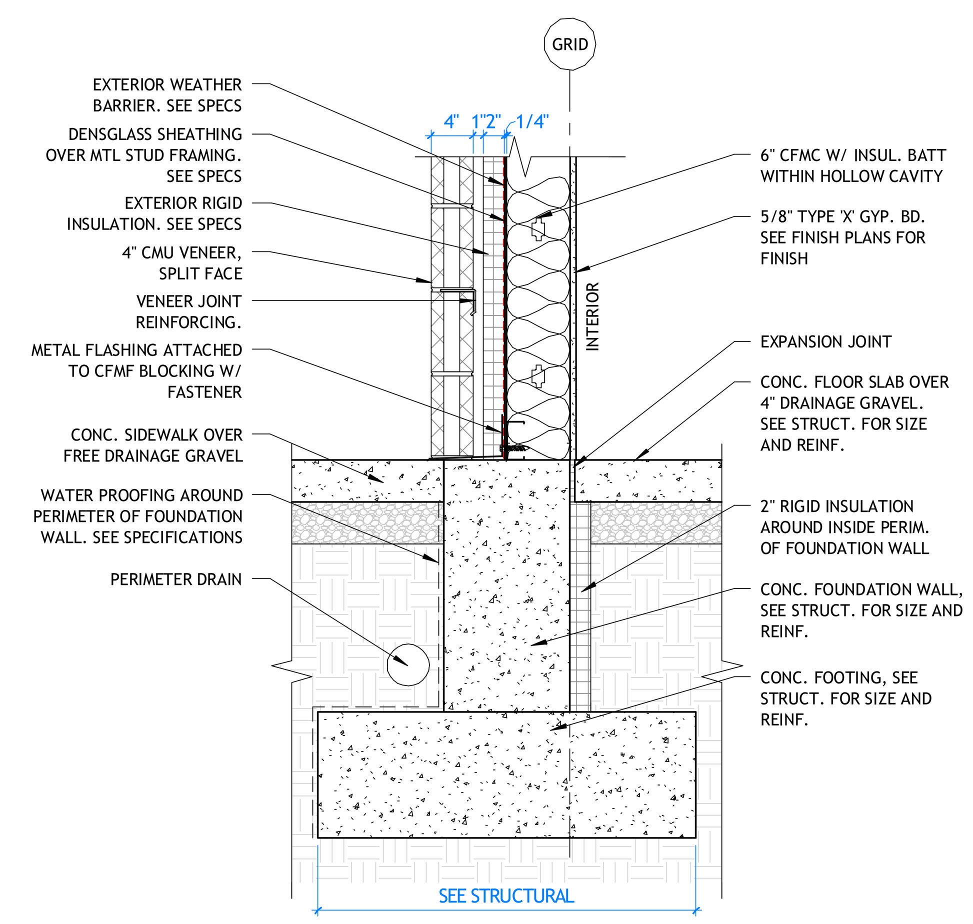
E1 ROOF RIDGE DETAIL
A540 | SCALE: 3" = 1'-0"



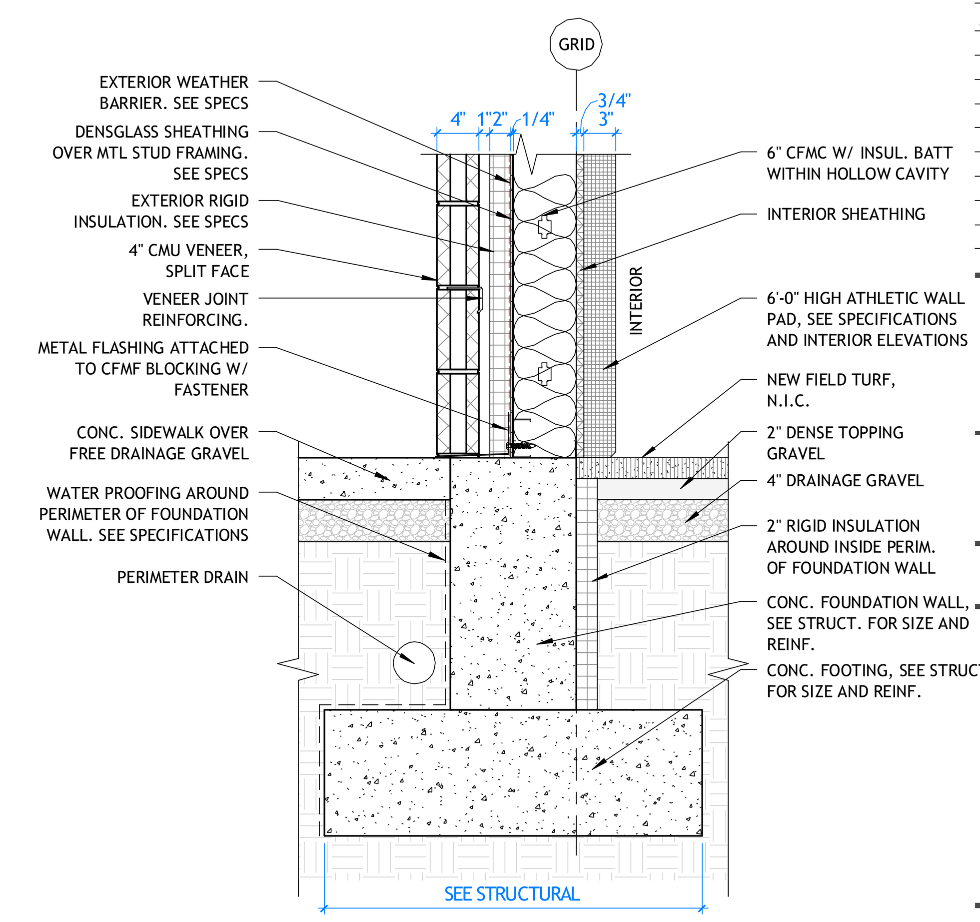
E2 ROOF RIDGE
A540 | SCALE: 1" = 1'-0"



E3 FOUNDATION WALL @PLUMBING WALL
A540 | SCALE: 1" = 1'-0"



E5 FOUNDATION DETAIL - TYP.
A540 | SCALE: 1" = 1'-0"



E6 FOUNDATION DETAIL @TURF AREA
A540 | SCALE: 1" = 1'-0"

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PROFESSIONAL STAMP

LICENSED ARCHITECT
CURTIS LELAND LIVINGSTON
No. 10606440
STATE OF UTAH
09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

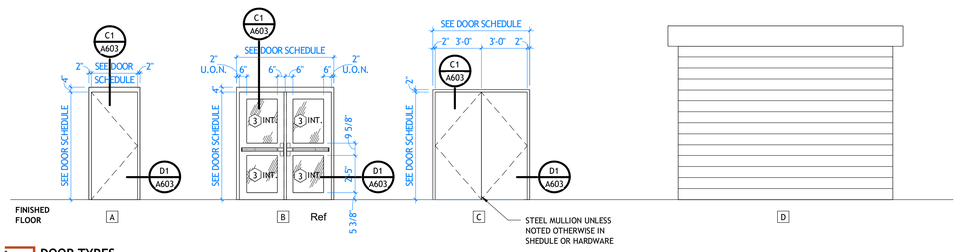
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

SECTION DETAILS

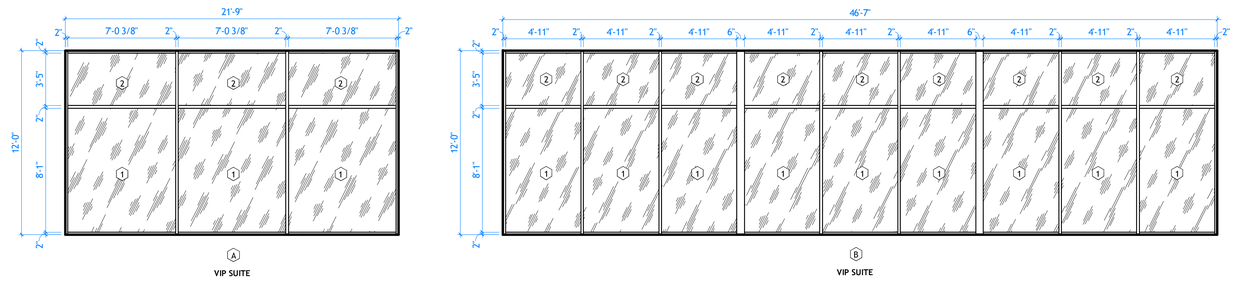
SHEET NUMBER

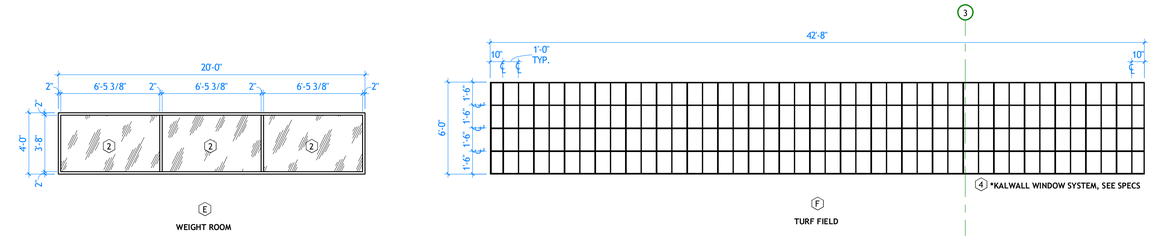
A540

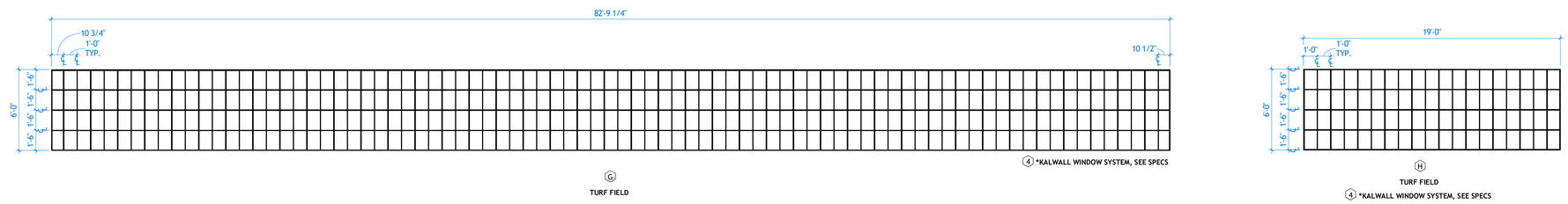


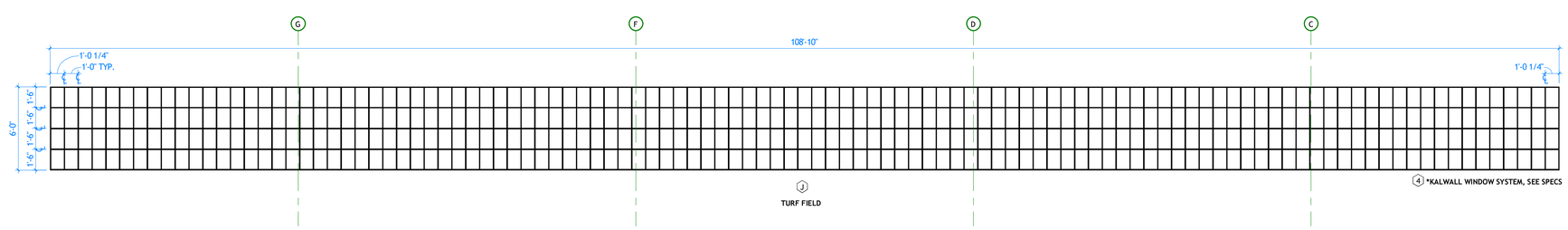
B1 DOOR TYPES

A601 | SCALE: 1/4" = 1'-0"









E1 WINDOW TYPES

A601 | SCALE: 1/4" = 1'-0"

DOOR SCHEDULE - FH BASE BID

MARK	TYPE	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	MATERIAL DOOR	MATERIAL FRAME	HARDWARE	RATING	DOOR SIGNAGE	COMMENTS
FH. LEVEL 1									
100A	B	6'-0"	7'-0"	HM	HM	01		No	
100B	D	14'-0"	10'-0"	STL	STL	R1		No	
100C	B	6'-0"	7'-0"	HM	HM	01		No	
100D	B	6'-0"	7'-0"	HM	HM	01		No	
100E	D	14'-0"	10'-0"	STL	STL	R1		No	
100F	B	6'-0"	7'-0"	HM	HM	01		No	
100G	A	3'-0"	7'-0"	HM	HM	02		No	
100H	A	3'-0"	7'-0"	HM	HM	04		No	
100J	B	6'-0"	7'-0"	HM	HM	06		Yes	
100K	A	3'-0"	7'-0"	HM	HM	14		Yes	
101B	C	6'-0"	7'-0"	HM	HM	06		Yes	
101F	B	6'-0"	7'-0"	AL	AL	A1		No	
102	A	3'-0"	7'-0"	HM	HM	16		Yes	
103	A	3'-0"	7'-0"	HM	HM	16		Yes	
104	A	3'-0"	7'-0"	HM	HM	15		Yes	
106	A	3'-0"	7'-0"	HM	HM	17		Yes	
107	A	3'-0"	7'-0"	HM	HM	12		Yes	
108	A	3'-0"	7'-0"	HM	HM	17		Yes	
109A	A	3'-0"	7'-0"	HM	HM	14		Yes	
109B	A	3'-0"	7'-0"	HM	HM	16		Yes	
110	A	3'-0"	7'-0"	HM	HM	05		No	
112A	D	14'-0"	10'-0"	STL	STL	R1		No	
112B	A	3'-0"	7'-0"	HM	HM	02		No	
112C	B	6'-0"	7'-0"	HM	HM	06		Yes	
113	A	3'-0"	7'-0"	HM	HM	10		Yes	
114	A	3'-0"	7'-0"	HM	HM	03		No	

3

KEYNOTES

GLAZING SCHEDULE

1. 1" INSULATED TEMPERED LOW-E GLASS
2. 1" INSULATED ANNEALED CLEAR LOW-E GLASS
3. 1/4" TEMPERED CLEAR GLASS
3. KALWALL WINDOW SYSTEM - SEE SPECS

NOTE:
- EXTERIOR DOORS & WINDOWS TO BE GLAZING TYPES 1 & 2
- INTERIOR DOORS & WINDOWS TO BE GLAZING TYPE 3
-TEMPERED GLASS WITHIN 4'-0" OF ANY DOOR/OPENING

GENERAL NOTES

A. THE CONTRACTOR IS TO VERIFY THE DIMENSIONS OF ALL OPENINGS PRIOR TO THE FABRICATION OF ALL DOORS AND FRAMES.
B. DUE TO MULTIPLE USE, SOME OF THE DETAILS REFERRED TO ON THE DOOR SCHEDULE ARE REVERSED OR TURNED FROM THE DIRECTION SHOWN ON THE FLOOR PLANS. THE INTENT OF THE DETAILS IS TO BE FOLLOWED. CONSULT THE ARCHITECT WHEN QUESTIONS ARISE.
C. ALL EXIT ACCESS DOORS AND EXIT DOORS SHALL BE OPENABLE FROM THE INSIDE WITHOUT THE USE OF A KEY, SPECIAL KNOWLEDGE, OR EFFORT. USE OF MANUAL FLUSH BOLTS, EDGE BOLTS, TOP OR BOTTOM BOLTS, ETC., IS PROHIBITED.
D. 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.
E. FIRE DOORS SHALL HAVE THE MINIMUM OPENING FORCE ALLOWABLE BY THE APPROPRIATE ADMINISTRATIVE AUTHORITY. THE REQUIRED FORCE FOR PUSHING OPEN OR PULLING OPEN DOORS OTHER THAN FIRE DOORS SHALL BE 5 POUNDS. THESE FORCES DO NOT APPLY TO THE FORCE REQUIRED TO RETRACT LATCH BOLTS OR DISENGAGE OTHER DEVICES THAT HOLD THE DOOR IN A CLOSED POSITION.
F. 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. WHEN NARROW STILE AND RAIL DOORS ARE USED, A 10" MINIMUM, SMOOTH PANEL, EXTENDING THE FULL WIDTH OF THE DOOR, SHALL BE INSTALLED ON THE PUSH SIDE(S) OF THE DOOR WHICH ALLOW THE DOOR TO BE OPENED BY A WHEELCHAIR FOOTREST WITHOUT CREATING A TRAP OR HAZARDOUS CONDITION. CAVITIES CREATED BY KICK PLATES SHALL BE CAPPED.
G. ALL DOOR LOCKSETS AND PANIC DEVICES SHALL BE ADA COMPLIANT LEVER TYPE.
H. CAULK HEAD, JAMBS, AND SILLS OF ALL DOORS AND WINDOWS WITH SEALANT CONTINUOUSLY APPLIED TO BOTH SIDES OF THE FRAMES.
I. COORDINATE KEYING TYPE AND SCHEDULE WITH OWNER.
J. ALL DOOR CLOSURES TO BE SET IN ACCORDANCE WITH THE ADA REDUCED OPENING FORCE REQUIREMENTS.
K. SEE SPECIFICATIONS FOR DOOR HARDWARE, GLAZING OF CURTAIN WALL AND SUPPORT AS PER MANUFACTURER RECOMMENDATIONS. COORDINATE LOADS WITH STRUCTURAL PRIOR TO STEEL FABRICATION.

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PROFESSIONAL STAMP

LICENSED ARCHITECT CURTIS HOWELL LIVINGSTON NO. 10021449 UTAH

09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

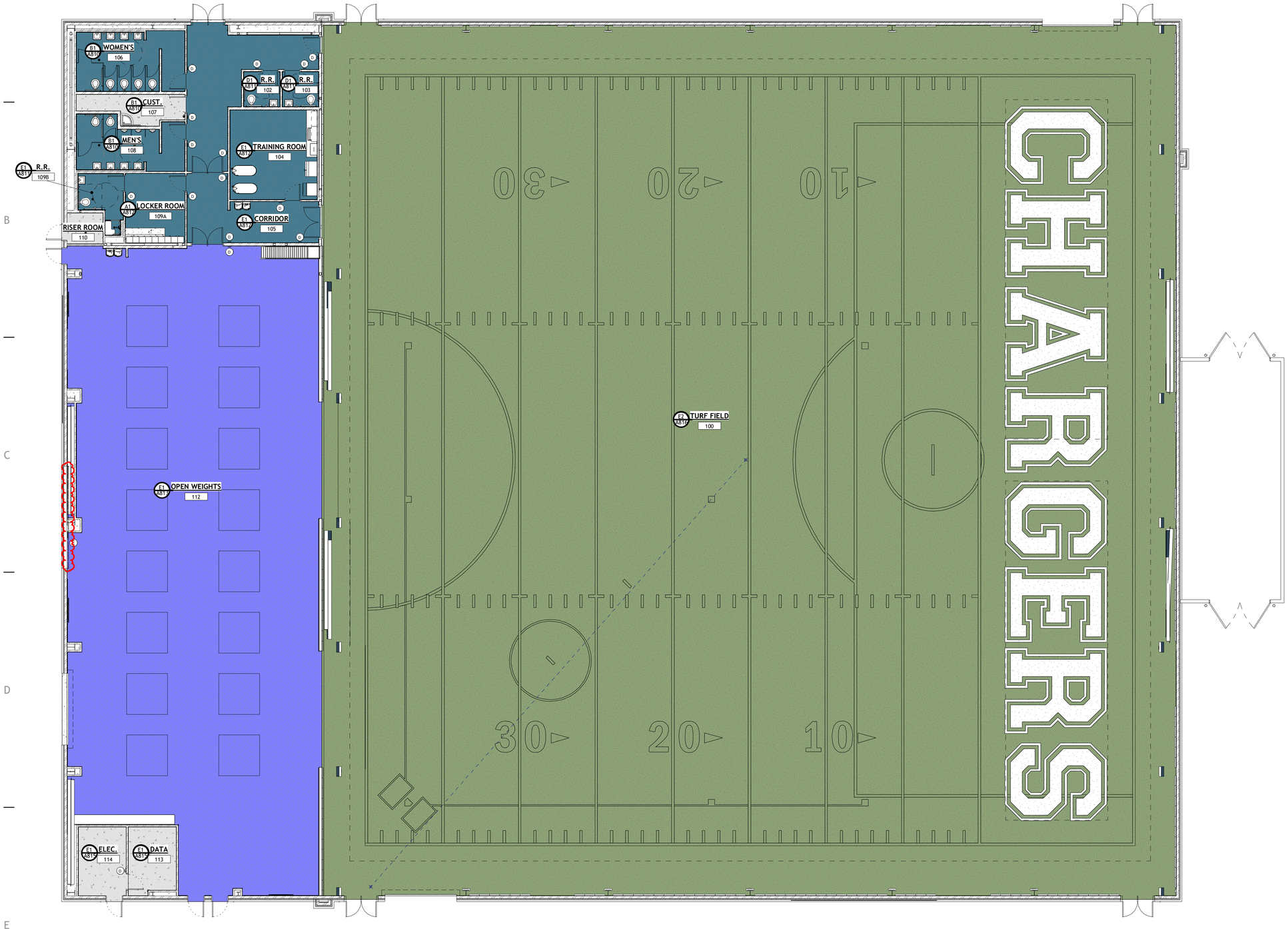
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

DOOR AND WINDOWS

SHEET NUMBER

A601



E1 FINISH PLAN - FIELDHOUSE
A801 | SCALE: 1/8" = 1'-0"

KEYNOTES

WALL FURNISHINGS LEGEND

A1	6'-0" x 4'-0"	MARKER BOARD
A2	12'-0" x 4'-0"	MARKER BOARD
B1	24" X 36"	MIRROR
B2	48" X 72"	MIRROR
C1	24" X 72"	WALL PADDING
C2	18" X 72"	I-BEAM WALL PADDING
C3	10" X 132"	CROSS BEAM WALL PADDING
D	8" X 8"	SIGNAGE, SEE SHEET A004
E	SEE WINDOW TYPES	MANUAL WINDOW SHADES - SEE SPECS
F	SEE WINDOW TYPES	MOTORIZED WINDOW SHADES - SEE SPECS

3

NOTE: COORDINATE FINAL LOCATION WITH OWNER AND ARCHITECT PRIOR TO INSTALLATION
* ALL SHADES IN MAIN AND AUXILIARY GYMS TO BE 1% TRANSMISSION, ALL OTHERS TO BE 5%

FLOOR FINISHES

F1	RUBBER FLOORING TYPE 1
F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
F3	EPOXY PAINTED CONCRETE
F4	TURF TYPE 1
F5	TURF TYPE 2
F6	TURF TYPE 3
F7	TURF TYPE 4
F8	EXISTING RUBBER FLOORING TO REMAIN, PATCH AND REPAIR WHERE NEEDED
F9	LUXURY VINYL TILE
F10	ACCENT LUXURY VINYL TILE
F11	CARPET TILE
F12	ACCENT CARPET TILE
F13	PORCELAIN FLOOR TILE

SEE A802 FOR FINISHES

FINISH LEGEND

CODE	MATERIAL
2- BASE FINISHES	
B1	6" RUBBER BASE
B2	CORRESPONDING TILE BASE
3- WALL FINISH	
W1	GENERAL PAINT
W2	ACCENT PAINT
W3	PORCELAIN WALL TILE
W4	CERAMIC WALL TILE
W5	EPOXY PAINTED CONCRETE
W6	PORCELAIN WALL TILE
W7	WALL PADDING
W8	ACCENT PAINT 2
W9	ACCENT PAINT 3
W10	PAINTED METAL STRUCTURE
W11	FIELD METAL PAINT
W12	DIAMOND PLATE
W13	PLASTIC LAMINATE WALL PANELS
W14	TEXTILE WALLCOVERING
4- MILLWORK FINISHES	
M1	PLASTIC LAMINATE MILLWORK
M2	PLASTIC LAMINATE COUNTERTOP
M3	SOLID SURFACE
M4	PLASTIC LAMINATE MILLWORK
5-CEILING FINISH	
CL1	PAINTED GYPSUM BOARD
CL2	ACOUSTIC CEILING TILE
CL3	PAINTED STRUCTURE
6-DOOR FINISHES	
D1	PAINTED METAL DOOR & TRIM
D2	WOOD DOOR & PAINTED METAL TRIM

GENERAL NOTES

A. GENERAL CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION. REPORT ANY SIGNIFICANT DISCREPANCIES TO THE ARCHITECT.
B. PROVIDE 18" MINIMUM CLEAR FLOOR SPACE AT PULL SIDE OF ALL DOORS. PROVIDE
C. MILLWORK SHOWN FOR CLARITY. PROVIDE FLOORING UNDER EQUIPMENT, MILLWORK AND COUNTERTOPS.
D. SEE INTERIOR ELEVATIONS ON A850 SHEETS AND MILLWORK DETAILS ON A550 SHEETS
E. FINAL FINISH SELECTION TO BE COORDINATED WITH ARCHITECT, OWNER AND INTERIOR DESIGNER.
F. CONTRACTOR TO VERIFY TRANSITION STRIP DIMENSIONS WITH MATERIAL THICKNESS.
G. SEE ELECTRICAL SHEETS FOR LOCATIONS OF OUTLETS, SWITCHES, DATA, TELEPHONE, TELEVISON, INTERCOMES, CLOCKS, SPEAKERS, HORNS, STROBES, ETC.
H. PROVIDE 3" DIAMETER HOLE THRU CONTER TOP AT ALL POWER AND DATE OUTLEST BELOW CABINET. PROVIDE 3MM PVC SLEEVE AROUND OPENING. COORDINATE WITH ELECTRICAL SHEETS. DRILL OPENING AFTER MILLWORK AS BEEN INSTALLED FOR ACCURATE LOCATION WITH ELECTRICAL.
I. FINAL LOCATION OF ALL RESTROOM EQUIPMENT TO BE COORDINATED WITH OWNER PRIOR TO INSTALLATION.
J. CHAMFER ALL EXPOSED CORNERS ON COUNTERTOPS.
K. ALL WINDOWS TO RECIEVE SOLID SURFACE SILLS. SEE A802 & SPECIFICATIONS FOR FINISH DETAILS.
L. PROVIDE STAINLESS STEEL CORNER GUARDS AT ALL DRYWALL CORNERS PER DETAIL D4/A560.
M. PROVIDE SCHULTER TRIM PIECE ON ALL EXPOSED TILE EDGES AND EXTERIOR CORNERS. SEE SPECIFICATIONS
N. ALL ROOMS TO RECIEVE ROOM SIGNS AT EACH ENTRY INTO SPACE. PLAN FOR APPROPRIATE AMOUNT PER ROOM.
O. A PREINSTALLTION MEETING IS TO BE SCHEDULED WITH THE OWNER, ARCHITECT, GENERAL CONTRACTOR, GYMNASIUM EQUIPMENT SUBCONTRACTOR, AND THE MULTI-PURPOSE ROOM FLOORING SUBCONTRACTOR TO COORDINATE THE LAYOUT AND INSTALLTION OF THE GYMNASIUM EQUIPMENT AND THE FLOOR GAME LINES.
P. PROVIDE FLOOR TRANSITION STRIPS AT ALL FLOOR MATERIAL TRANSITIONS PER DETAILS. SHEETS A550.

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PROFESSIONAL STAMP

LICENSED ARCHITECT CURTIS LEONARD LIVINGSTON NO. 10067840 UTAH

09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
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PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

FURNISHINGS PLAN - LEVEL 1

SHEET NUMBER

A801

FINISH ROOM SCHEDULE MAIN

Name	Number	Floor Finish	Base Finish	Wall Finish	Millwork Finishes	Ceiling Finish	Door Finish
TURF FIELD	100	F4, F5, F6, F7	B1	W7, W10, W11	-	CL3	D1
VESTIBULE	101	F2	B1	W1, W6	-	CL2	D1
R.R.	102	F1	B2	W3	-	CL1	D1
R.R.	103	F1	B2	W3	-	CL1	D1
TRAINING ROOM	104	F1	B1	W1, W3	M1, M2	CL2	D1
CORRIDOR	105	F2	B2	W1, W6	-	CL2	D1
WOMEN'S	106	F1	B2	W3	-	CL1	D1
CUST.	107	F3	B1	W1, W4	-	-	D1
MEN'S	108	F1	B2	W3	-	CL1	D1
LOCKER ROOM	109A	F1	B1	W1, W5		CL1	D1
R.R.	109B	F1	B2	W3	-	CL1	D1
RISER ROOM	110	F3	B1	W1	-	-	D1
OPEN WEIGHTS	112	F2	B1	W1, W2, W10, W11, W12	M1. M2	CL3	D1
DATA	113	F3	B1	W1	-	-	D1
ELEC.	114	F3	B1	W1	-	-	D1
MEN'S	115	F1	B1	W1	-	-	D1
BALCONY	200	F9	B1	W1	-		D2

INTERIOR FINISH SCHEDULE

CODE	MATERIAL	MANUFACTURER	PRODUCT NAME / NUMBER	COLOR / FINISH	SIZE	COMMENTS
1-FLOOR FINISHES						
F1	RUBBER TYPE 1	MONDO FLOORING	RAMFLEX	MARINE BLUE G986	3 ROLLS	CHEMICALLY WELDED
F2	RUBBER TYPE 2	MONDO FLOORING	SPORT IMPACT	DARK GREY S018	ROLLS	NO INTERLOCKING
F3	EPOXY PAINTED CONCRETE	SHERWIN WILLIAMS	-	KNITTING NEEDLES SW7672		
F4	TURF TYPE 1	-	-	-	-	NIC - OWNER PROVIDED
F5	TURF TYPE 2	-	-	-	-	NIC - OWNER PROVIDED
F6	TURF TYPE 3	-	-	-	-	NIC - OWNER PROVIDED
F7	TURF TYPE 4	-	-	-	-	NIC - OWNER PROVIDED
F8	EXISTING RUBBER	-	-	-	-	-
F9	LUXURY VINYL TILE	JJ FLOORING	STEP BY STEP 5MM	ALL PURPOSE	18" X 36"	INSTALLATION: ASHLAR
F10	LUXURY VINYL TILE ACCENT	JJ FLOORING	STEP BY STEP 5MM	DENIM 1134	18" X 36"	INSTALLATION: ASHLAR
F11	CARPET TILE	PATCRAFT	ORGANIC INTERRUPTION. STYLE: LINEAR TENSION	CONCRETE 00570	18" X 36"	INSTALLATION: STAGGARED
F12	CARPET TILE	PATCRAFT	ORGANIC INTERRUPTION. STYLE: LINEAR TENSION	HARBOR 00460	18" X 36"	INSTALLATION: STAGGARED
F13	PORCELAIN FLOOR TILE	DALTILE	-	-	-	-
2- BASE FINISHES						
B1	6" RUBBER BASE	JOHNSONITE BY TARKETT	MANDALAY	BURNT UMBER 63	6"	
B2	CORRESPONDING TILE BASE	-	-	-	-	
3- WALL FINISH						
W1	GENERAL PAINT	SHERWIN WILLIAMS	-	PURE WHITE SW7005	-	SHEEN: EGGSHELL
W2	ACCENT PAINT	SHERWIN WILLIAMS	-	DRESS BLUES SW9167	-	SHEEN: EGGSHELL
W3	PORCELAIN WALL TILE	DALTILE	SYNCHRONIC	WHITE SY30 MATTE	12X24	GROUT: CBP, "ASH" #642 / INSTALLATION: VERTICAL STRAIGHT STACK
W4	CERAMIC WALL TILE	DALTILE	COLOR WHEEL L INEAR	MATTE SUEDE GRAY 0782	4X16	GROUT: CBP, "PEWTER" #19 / INSTALLATION: HORIZONTAL STRAIGHT STACK
W5	EPOXY PAINTED CONCRETE	SHERWIN WILLIAMS	-	KNITTING NEEDLES SW7672	-	-
W6	PORCELAIN WALL TILE	DALTILE	VOLUME 1.0	SONIC WHITE VL75	12x24	GROUT: CBP, "ASH" #642 / INSTALLATION: HORIZONTAL STRAIGHT STACK
W7	WALL PADDING	-		-	2'X6' TYPICAL	COLOR TO BE SELECTED BY INTERIOR DESIGNER
W8	ACCENT PAINT 2	SHERWIN WILLIAMS	-	KNITTING NEEDLES SW7672	-	FINISH: EGGSHELL
W9	ACCENT PAINT 3	SHERWIN WILLIAMS	-	DOMINO SW6989	-	FINISH: EGGSHELL
W10	PAINTED METAL STRUCTURE	SHERWIN WILLIAMS	-	DRESS BLUES SW9167	-	FINISH: SEMI-GLOSS
W11	FIELD METAL PAINT	SHERWIN WILLIAMS	-	PURE WHITE SW7005	-	FINISH: SEMI-GLOSS
W12	DIAMOND PLATE	INPRO	-	STAINLESS STEEL DIAMOND PLATE	-	FINISH WITH CORNER GUARDS IN SAME DIAMOND PLATE PATTERN
W13	PLASTIC LAMINATE WALL PANELS	FORMICA	-	WALNUT RIF TWOOD 9283-NG	-	USE FRY REGLET 1/2" MILLWORK REVEAL INBETWEEN MDF WRAPPED PANELS.
W14	TEXTILE WALLCOVERING	SBR TECHNOLOGIES	-	-	-	CUSTOM WALLCOVERING. BRANDING PROVIDED BY OWNER.
4- MILLWORK FINISHES						
M1	PLASTIC LAMINATE MILLWORK	FORMICA	-	STORM 912-58	-	-
M2	PLASTIC LAMINATE COUNTERTOP	WILSONART	-	GREY PAMPAS 4168-60	-	EASED EDGE
M3	SOLID SURFACE	FORMICA	EVERFORM	GAMMA GRAY 417	3CM	EASED EDGE USED AS WINDOW SILLS AS WELL
M4	PLASTIC LAMINATE MILLWORK	FORMICA	-	WALNUT RIF TWOOD 9283-NG	-	-
5-CEILING FINISH						
CL1	PAINTED GYPSUM BOARD	SHERWIN WILLIAMS	-	PURE WHITE SW7005	-	FINISH: FLAT
CL2	ACOUSTIC CEILING TILE	-	-	-	-	-
CL3	PAINTED STRUCTURE	SHERWIN WILLIAMS	-	DRESS BLUES SW9167	-	FINISH: SEMI-GLOSS
6-DOOR FINISHES						
D1	PAINTED METAL DOOR & TRIM	SHERWIN WILLIAMS	-	DOMINO SW6989	-	TRIM OF DOOR MATCH EXISTING, SHEEN - SEMI-GLOSS
D2	WOOD DOOR & PAINTED METAL TRIM	SHERWIN WILLIAMS	-	-	-	SHEEN: SEMI-GLOSS

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PROFESSIONAL STAMP

LICENSED ARCHITECT
CURTIS LEONARD LITWINOVICH
NO. 10021445
STATE OF UTAH
09 OCT. 24

CONSULTANT INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

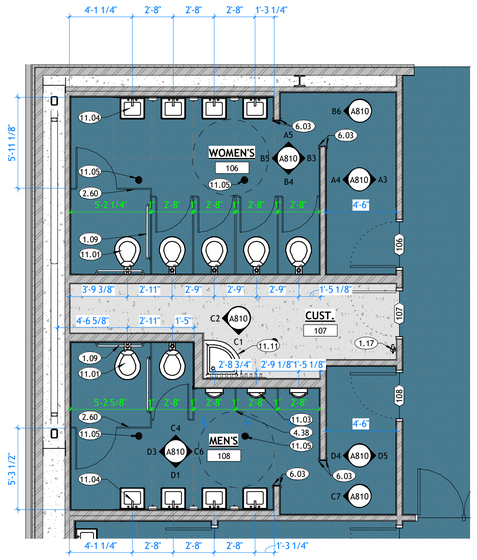
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

FINISH LEGEND

SHEET NUMBER

A802



ENLARGED RESTROOM 106 & 108
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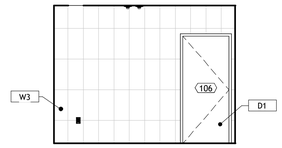

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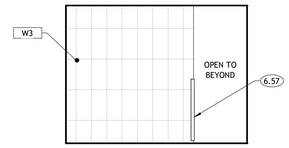

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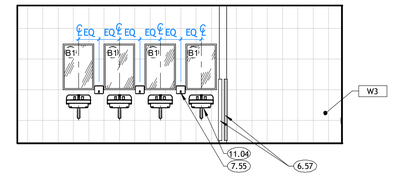

A5 WOMENS RESTROOM 106
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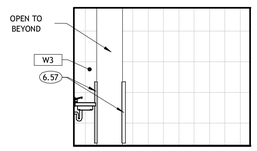

B3 WOMENS RESTROOM 106
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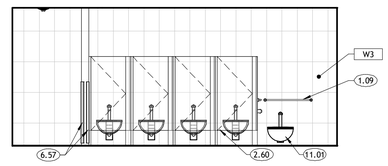

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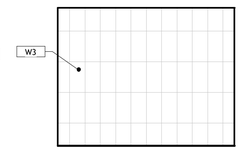

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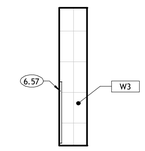

B6 WOMENS RESTROOM 106
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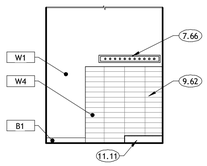
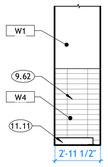
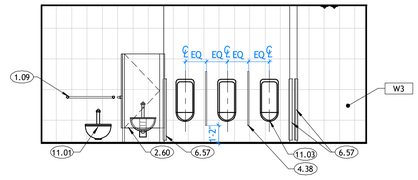


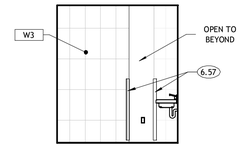
C1 CUSTODIAL 107
A810 | SCALE: 1/4" = 1'-0"



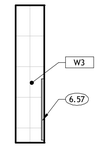
C2 CUSTODIAL 107
A810 | SCALE: 1/4" = 1'-0"



C4 MENS RESTROOM 108
A810 | SCALE: 1/4" = 1'-0"



C6 MENS RESTROOM 108
A810 | SCALE: 1/4" = 1'-0"



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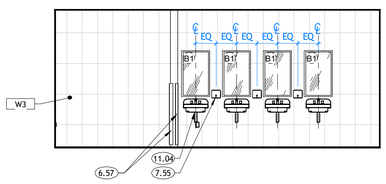
A810 | SCALE: 1/4" = 1'-0"



D1 MENS RESTROOM 108
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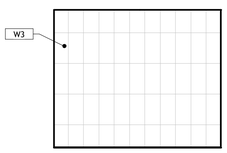

D3 MENS RESTROOM 108
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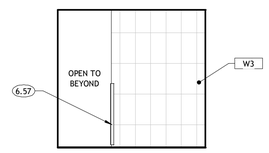

D4 MENS RESTROOM 108
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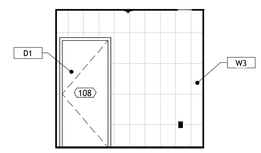

D5 MENS RESTROOM 108
A810 | SCALE: 1/4" = 1'-0"

KEYNOTES

1.09	ADA COMPLIANT GRAB BAR. SEE DETAILS AND SPECIFICATIONS.
1.17	BRACKET MOUNTED FIRE EXTINGUISHER. SEE SPECIFICATIONS..
2.60	PHENOLIC-CORE TOILET PARTITIONS, SEE SPECIFICATIONS.
4.38	PHENOLIC-CORE URINAL SCREEN. SEE INTERIOR ELEVATIONS AND SPECIFICATIONS.
6.03	4' TALL STAINLESS STEEL CORNER GUARD
6.57	4' TALL STAINLESS STEEL CORNER GUARD. APPLY ON TOP OF SCHLUTER TILE EDGE PROTECTION
7.55	SOAP DISPENSER. OWNER PROVIDED, CONTRACTOR INSTALLED.
7.66	HANGING MOP RACK 63" A.F.F.
9.62	SEE D1/A560 FOR DETAILS AND TILE DIMENSIONS.
11.01	TOILET. SEE PLUMBING.
11.03	URINAL. SEE PLUMBING.
11.04	SINK. SEE PLUMBING.
11.05	FLOOR DRAIN. SEE PLUMBING SCHEDULE. VERIFY LOCATION WITH PLUMBING. SLOPE FLOOR 1/4" PER 1'-0" TOWARD DRAIN.
11.11	MOP SINK OVER TYPICAL MOP SINK WALL TILE. LONG MOP AND BROOM HOLDER ABOVE. SEE PLUMBING AND ELEVATIONS.

FLOOR FINISHES

F1	RUBBER FLOORING TYPE 1
F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
F3	EPOXY PAINTED CONCRETE
F4	TURF TYPE 1
F5	TURF TYPE 2
F6	TURF TYPE 3
F7	TURF TYPE 4
F8	EXISTING RUBBER FLOORING TO REMAIN, PATCH AND REPAIR WHERE NEEDED
F9	LUXURY VINYL TILE
F10	ACCENT LUXURY VINYL TILE
F11	CARPET TILE
F12	ACCENT CARPET TILE
F13	PORCELAIN FLOOR TILE

SEE A802 FOR FINISHES

FINISH LEGEND

CODE	MATERIAL
2- BASE FINISHES	
B1	6" RUBBER BASE
B2	CORRESPONDING TILE BASE
3- WALL FINISH	
W1	GENERAL PAINT
W2	ACCENT PAINT
W3	PORCELAIN WALL TILE
W4	CERAMIC WALL TILE
W5	EPOXY PAINTED CONCRETE
W6	PORCELAIN WALL TILE
W7	WALL PADDING
W8	ACCENT PAINT 2
W9	ACCENT PAINT 3
W10	PAINTED METAL STRUCTURE
W11	FIELD METAL PAINT
W12	DIAMOND PLATE
W13	PLASTIC LAMINATE WALL PANELS
W14	TEXTILE WALLCOVERING
4- MILLWORK FINISHES	
M1	PLASTIC LAMINATE MILLWORK
M2	PLASTIC LAMINATE COUNTERTOP
M3	SOLID SURFACE
M4	PLASTIC LAMINATE MILLWORK
5-CEILNG FINISH	
CL1	PAINTED GYPSUM BOARD
CL2	ACOUSTIC CEILNG TILE
CL3	PAINTED STRUCTURE
6-DOOR FINISHES	
D1	PAINTED METAL DOOR & TRIM
D2	WOOD DOOR & PAINTED METAL TRIM

WALL FURNISHINGS LEGEND

A1	6'-0" x 4'-0"	MARKER BOARD
A2	12'-0" x 4'-0"	MARKER BOARD
B1	24" X 36"	MIRROR
B2	48" X 72"	MIRROR
C1	24" X 72"	WALL PADDING
C2	18" X 72"	I-BEAM WALL PADDING
C3	10" X 132"	CROSS BEAM WALL PADDING
D	8" X 8"	SIGNAGE, SEE SHEET A004
E	SEE WINDOW TYPES	MANUAL WINDOW SHADES - SEE SPECS
F	SEE WINODW TYPES	MOTORIZED WINDOW SHADES - SEE SPECS

3

NOTE: COORDINATE FINAL LOCATION WITH OWNER AND ARCHITECT PRIOR TO INSTALLATION
* ALL SHADES IN MAIN AND AUXILIARY GYMS TO BE 1% TRANSMISSION, ALL OTHERS TO BE 5%

GENERAL NOTES

A. GENERAL CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION. REPORT ANY SIGNIFICANT DISCREPANCIES TO THE ARCHITECT.
B. COORDINATE INSTALLATIONS OF ALL "AFTER CONTRACT" ASSEMBLIES WITH OWNER PRIOR TO CONSTRUCTION OF ADJOINING OR RELATED STRUCTURES.
C. INTERIOR DRYWALL CORNERS TO BE SQUARE.
D. WALL TYPES SHOWN DO NOT ADDRESS CERAMIC TILE INSTALLATION ON WALL SURFACES AS SHOWN ON THE FLOOR PLANS. REFER TO THE CURRENT EDITION OF THE HANDBOOK FOR CERAMIC TILE INSTALLATION PUBLISHED BY THE TILE COUNCIL OF AMERICA, INC., FOR PROPER INSTALLATION MATERIALS AND METHODS. TILE TO BE INSTALLED OVER TILE BACKER BOARD.
E. SEE DETAILS ON SHEET A003 FOR TYPICAL FIXTURE MOUNTING HEIGHTS. BLOCK WALLS AS REQUIRED FOR HANGING FIXTURES AND FURNISHINGS.
F. PROVIDE BLOCKING IN WALLS AT ALL TOILETS AND SHOWERS FOR GRAB BARS. SEE DETAIL C3/A003 & D6/A003.
G. ALL MILLWORK NUMBERS NOTED ARE TMI SYSTEMS. COORDINATE BETWEEN ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR MISCELLANEOUS ITEMS THAT MAY ONLY BE SHOWN ON ONE OR THE OTHER.
H. FINISH ALL EXTERIOR TILE CORNERS WITH SCHLUTER ECK - K.
I. IN ADDITION TO TMI SYSTEMS SELECT MILLWORK NUMBERS NOTED ARE KEWAUNEE. COORDINATE BETWEEN ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR LOCATIONS OF KEWAUNEE MILLWORK AND OTHER MISCHELANOUS ITEMS THAT MAY ONLY BE SHOWN ON ONE OR THE OTHER.
J. PROVIDE SCHLUTER-RONDEC CORNER PIECE WHERE TILE MEETS DOOR JAMBS

CORE ARCHITECTURE
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PROFESSIONAL STAMP

LICENSED ARCHITECT CURTIS LEONARD LIVINGSTON NO. 10021445 UTAH

09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

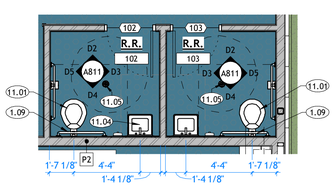
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

ENLARGED RESTROOMS

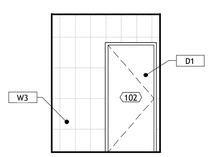
SHEET NUMBER

A810



ENLARGED RESTROOM 102 & 103

A811 | SCALE: 1/4" = 1'-0"



D2 RESTROOM 102 & 103

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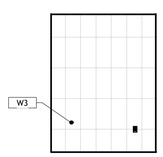

D3 RESTROOM 102 & 103

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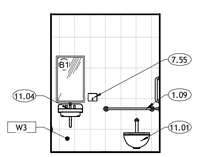

D4 RESTROOM 102 & 103

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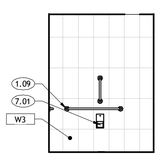
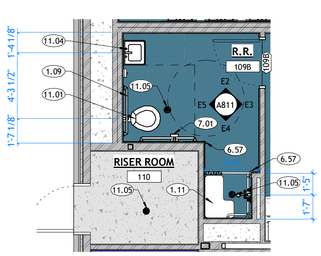


D5 RESTROOM 102 & 103

A811 | SCALE: 1/4" = 1'-0"



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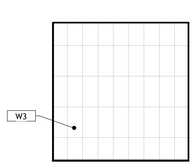

E2 RESTROOM 109B

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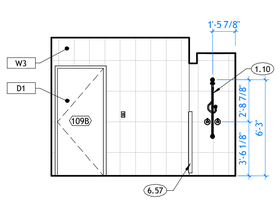

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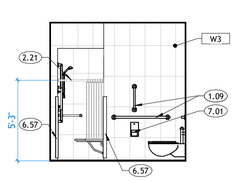

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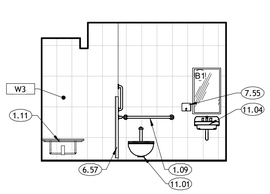

E5 RESTROOM 109B

A811 | SCALE: 1/4" = 1'-0"

KEYNOTES

1.09	ADA COMPLIANT GRAB BAR. SEE DETAILS AND SPECIFICATIONS.
1.10	ADA COMPLIANT SHOWER HEAD AND CONTROLS. SEE DETAILS AND SPECIFICATIONS.
1.11	ADA COMPLIANT FOLD-UP SHOWER SEAT AND SHOWER GRAB BARS. SEE DETAILS AND SPECIFICATIONS.
2.21	SHOWER CURTAIN AND ROD. SEE SPECIFICATIONS.
6.57	4' TALL STAINLESS STEEL CORNER GUARD. APPLY ON TOP OF SCHLUTER TILE EDGE PROTECTION
7.01	TOILET PAPER DISPENSER. PORVIDED BY OWNER, INSTALLED BY CONTRACTOR. SEE A003 FOR MOUNTING HEIGHTS
7.55	SOAP DISPENSER. OWNER PROVIDED, CONTRACTOR INSTALLED.
11.01	TOILET. SEE PLUMBING.
11.04	SINK. SEE PLUMBING.
11.05	FLOOR DRAIN. SEE PLUMBING SCHEDULE. VERIFY LOCATION WITH PLUMBING. SLOPE FLOOR 1/4" PER 1'-0" TOWARD DRAIN.

FLOOR FINISHES

F1	RUBBER FLOORING TYPE 1
F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
F3	EPOXY PAINTED CONCRETE
F4	TURF TYPE 1
F5	TURF TYPE 2
F6	TURF TYPE 3
F7	TURF TYPE 4
F8	EXISTING RUBBER FLOORING TO REMAIN, PATCH AND REPAIR WHERE NEEDED
F9	LUXURY VINYL TILE
F10	ACCENT LUXURY VINYL TILE
F11	CARPET TILE
F12	ACCENT CARPET TILE
F13	PORCELAIN FLOOR TILE

SEE A802 FOR FINISHES

FINISH LEGEND

CODE	MATERIAL
2- BASE FINISHES	
B1	6" RUBBER BASE
B2	CORRESPONDING TILE BASE
3- WALL FINISH	
W1	GENERAL PAINT
W2	ACCENT PAINT
W3	PORCELAIN WALL TILE
W4	CERAMIC WALL TILE
W5	EPOXY PAINTED CONCRETE
W6	PORCELAIN WALL TILE
W7	WALL PADDING
W8	ACCENT PAINT 2
W9	ACCENT PAINT 3
W10	PAINTED METAL STRUCTURE
W11	FIELD METAL PAINT
W12	DIAMOND PLATE
W13	PLASTIC LAMINATE WALL PANELS
W14	TEXTILE WALL COVERING
4- MILLWORK FINISHES	
M1	PLASTIC LAMINATE MILLWORK
M2	PLASTIC LAMINATE COUNTERTOP
M3	SOLID SURFACE
M4	PLASTIC LAMINATE MILLWORK
5-CEILING FINISH	
CL1	PAINTED GYPSUM BOARD
CL2	ACOUSTIC CEILING TILE
CL3	PAINTED STRUCTURE
6-DOOR FINISHES	
D1	PAINTED METAL DOOR & TRIM
D2	WOOD DOOR & PAINTED METAL TRIM

WALL FURNISHINGS LEGEND

A1	6'-0" x 4'-0"	MARKER BOARD
A2	12'-0" x 4'-0"	MARKER BOARD
B1	24" X 36"	MIRROR
B2	48" X 72"	MIRROR
C1	24" X 72"	WALL PADDING
C2	18" X 72"	I-BEAM WALL PADDING
C3	10" X 132"	CROSS BEAM WALL PADDING
D	8" X 8"	SIGNAGE, SEE SHEET A004
E	SEE WINDOW TYPES	MANUAL WINDOW SHADES - SEE SPECS
F	SEE WINODW TYPES	MOTORIZED WINDOW SHADES - SEE SPECS

NOTE: COORDINATE FINAL LOCATION WITH OWNER AND ARCHITECT PRIOR TO INSTALLATION
* ALL SHADES IN MAIN AND AUXILIARY GYMS TO BE 1% TRANSMISSION, ALL OTHERS TO BE 5%

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G. ALL MILLWORK NUMBERS NOTED ARE TMI SYSTEMS. COORDINATE BETWEEN ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR MISCELLANEOUS ITEMS THAT MAY ONLY BE SHOWN ON ONE OR THE OTHER.
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I. IN ADDITION TO TMI SYSTEMS SELECT MILLWORK NUMBERS NOTED ARE KEWAUNEE. COORDINATE BETWEEN ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR LOCATIONS OF KEWAUNEE MILLWORK AND OTHER MISCHELANOUS ITEMS THAT MAY ONLY BE SHOWN ON ONE OR THE OTHER.
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CORE ARCHITECTURE
233 SOUTH PLEASANT GROVE BLVD.
SUITE #105
PLEASANT GROVE, UTAH 84062
PHONE: (801) 769-3000
core@corearch.com

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PROFESSIONAL STAMP

LICENSED ARCHITECT
CURTIS LEONARD LYTHGOE
NO. 10021240
STATE OF UTAH

09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

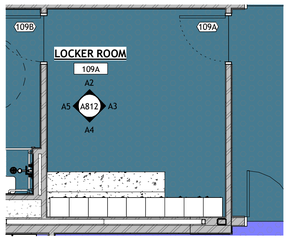
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

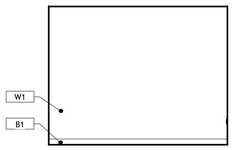
ENLARGED RESTROOMS

SHEET NUMBER

A811



ENLARGED LOCKER ROOM 109A
A812 | SCALE: 1/4" = 1'-0"



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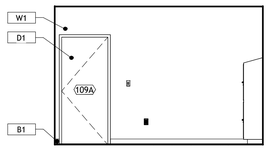

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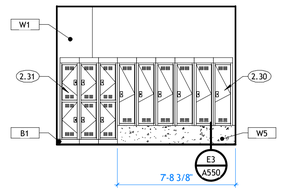

A4 LOCKER ROOM 109A
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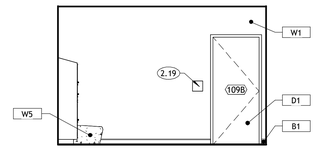

A5 LOCKER ROOM 109A
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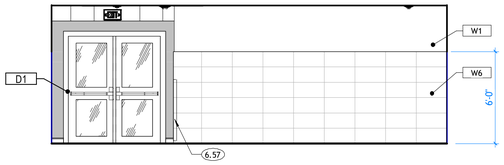
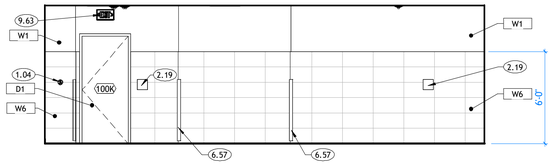


B1 VESTIBULE 101
A812 | SCALE: 1/4" = 1'-0"



B3 VESTIBULE 101
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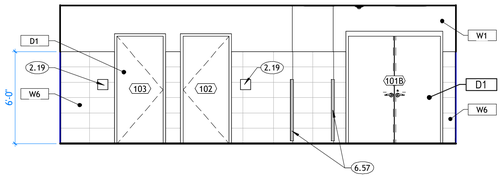

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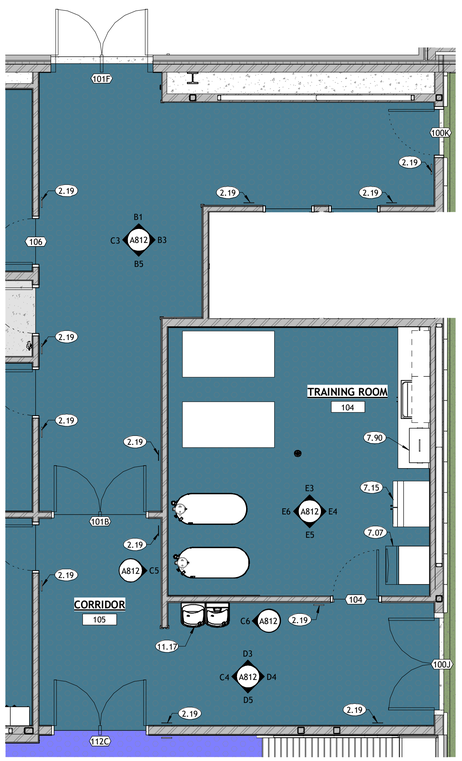
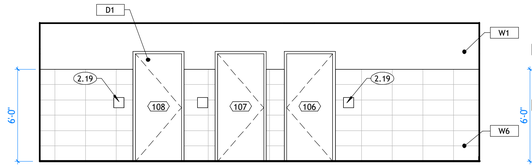


ENLARGED TRAINING ROOM
A812 | SCALE: 1/4" = 1'-0"



C3 VESTIBULE 101
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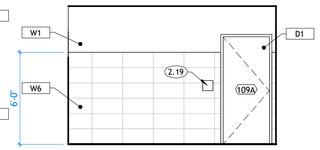

C4 CORRIDOR 105
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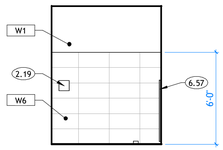

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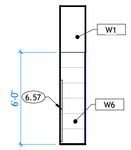

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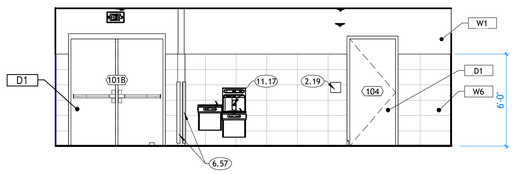

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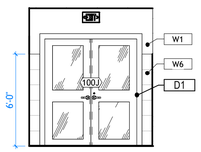

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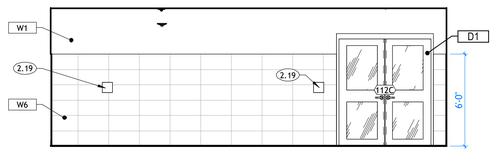
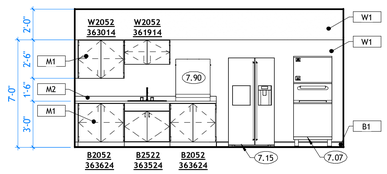
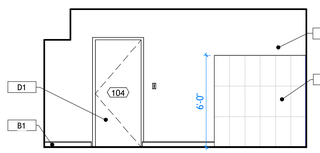


D5 CORRIDOR 105
A812 | SCALE: 1/4" = 1'-0"

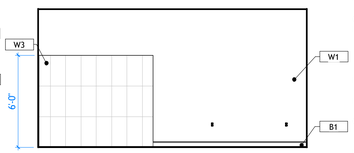
E3 TRAINING ROOM 104
A812 | SCALE: 1/4" = 1'-0"



E4 TRAINING ROOM 104
A812 | SCALE: 1/4" = 1'-0"



E5 TRAINING ROOM 104
A812 | SCALE: 1/4" = 1'-0"



E6 TRAINING ROOM 104
A812 | SCALE: 1/4" = 1'-0"

KEYNOTES

1.04	ADA ACTUATOR. SEE SPECIFICATIONS. COORDINATE FINAL LOCATION WITH ARCHITECT, OWNER ,ELECTRICAL, AND HARDWARE.
2.19	ROOM SIGNAGE. EACH ROOM DOOR/OPENING TO RECEIVE SIGNAGE. SOME ROOMS MAY RECEIVE MORE THAN ONE SIGN. SEE FLOOR PLANS AND DETAILS.
2.30	LOCKER ROOM 1-TIER LOCKERS WITH SLOPED TOP. SEE SPECIFICATIONS. COLORS BY ARCHITECT.
2.31	LOCKER ROOM 2-TIER LOCKERS WITH SLOPED TOP. SEE SPECIFICATIONS. COLORS BY ARCHITECT.
6.57	4' TALL STAINLESS STEEL CORNER GUARD. APPLY ON TOP OF SCHLUTER TILE EDGE PROTECTION
7.07	ICE MAKER (NIC).
7.15	REFRIGERATOR WITH FREEZER (N.I.C.)
7.90	HYDROCOLLATOR (N.I.C.)
9.63	EXIT SIGN.
11.17	ELECTRIC WATER COOLER & BOTTLE FILLER, OVER TYPICAL DRINKING FOUNTAIN WALL TILE. SEE PLUMBING, ELEVATIONS AND MECHANICAL.

FLOOR FINISHES

F1	RUBBER FLOORING TYPE 1
F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
F3	EPOXY PAINTED CONCRETE
F4	TURF TYPE 1
F5	TURF TYPE 2
F6	TURF TYPE 3
F7	TURF TYPE 4
F8	EXISTING RUBBER FLOORING TO REMAIN, PATCH AND REPAIR WHERE NEEDED
F9	LUXURY VINYL TILE
F10	ACCENT LUXURY VINYL TILE
F11	CARPET TILE
F12	ACCENT CARPET TILE
F13	PORCELAIN FLOOR TILE

SEE A802 FOR FINISHES

FINISH LEGEND

CODE	MATERIAL
2- BASE FINISHES	
B1	6" RUBBER BASE
B2	CORRESPONDING TILE BASE
3- WALL FINISH	
W1	GENERAL PAINT
W2	ACCENT PAINT
W3	PORCELAIN WALL TILE
W4	CERAMIC WALL TILE
W5	EPOXY PAINTED CONCRETE
W6	PORCELAIN WALL TILE
W7	WALL PADDING
W8	ACCENT PAINT 2
W9	ACCENT PAINT 3
W10	PAINTED METAL STRUCTURE
W11	FIELD METAL PAINT
W12	DIAMOND PLATE
W13	PLASTIC LAMINATE WALL PANELS
W14	TEXTILE WALLCOVERING
4- MILLWORK FINISHES	
M1	PLASTIC LAMINATE MILLWORK
M2	PLASTIC LAMINATE COUNTERTOP
M3	SOLID SURFACE
M4	PLASTIC LAMINATE MILLWORK
5-CEILING FINISH	
CL1	PAINTED GYPSUM BOARD
CL2	ACOUSTIC CEILING TILE
CL3	PAINTED STRUCTURE
6-DOOR FINISHES	
D1	PAINTED METAL DOOR & TRIM
D2	WOOD DOOR & PAINTED METAL TRIM

WALL FURNISHINGS LEGEND

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CORE ARCHITECTURE
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PLEASANT GROVE, UTAH 84062
PHONE: (801) 769-3000
core@corearch.com

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PROFESSIONAL STAMP

LICENSED ARCHITECT CURTIS LEONARD LIVINGSTON NO. 10024497 UTAH

09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE: SEPTEMBER 12, 2024
PROJECT #: 24-013
PM / PA: KJM
PIC: CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

ENLARGED TRAINING ROOM

SHEET NUMBER

A812

KEYNOTES

6.03	4' TALL STAINLESS STEEL CORNER GUARD
11.17	ELECTRIC WATER COOLER & BOTTLE FILLER, OVER TYPICAL DRINKING FOUNTAIN WALL TILE. SEE PLUMBING, ELEVATIONS AND MECHANICAL.

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PROFESSIONAL STAMP

LICENSED ARCHITECT
CURTIS LEONARD LIVINGSTON
NO. 10021445
STATE OF UTAH

09 OCT. 24

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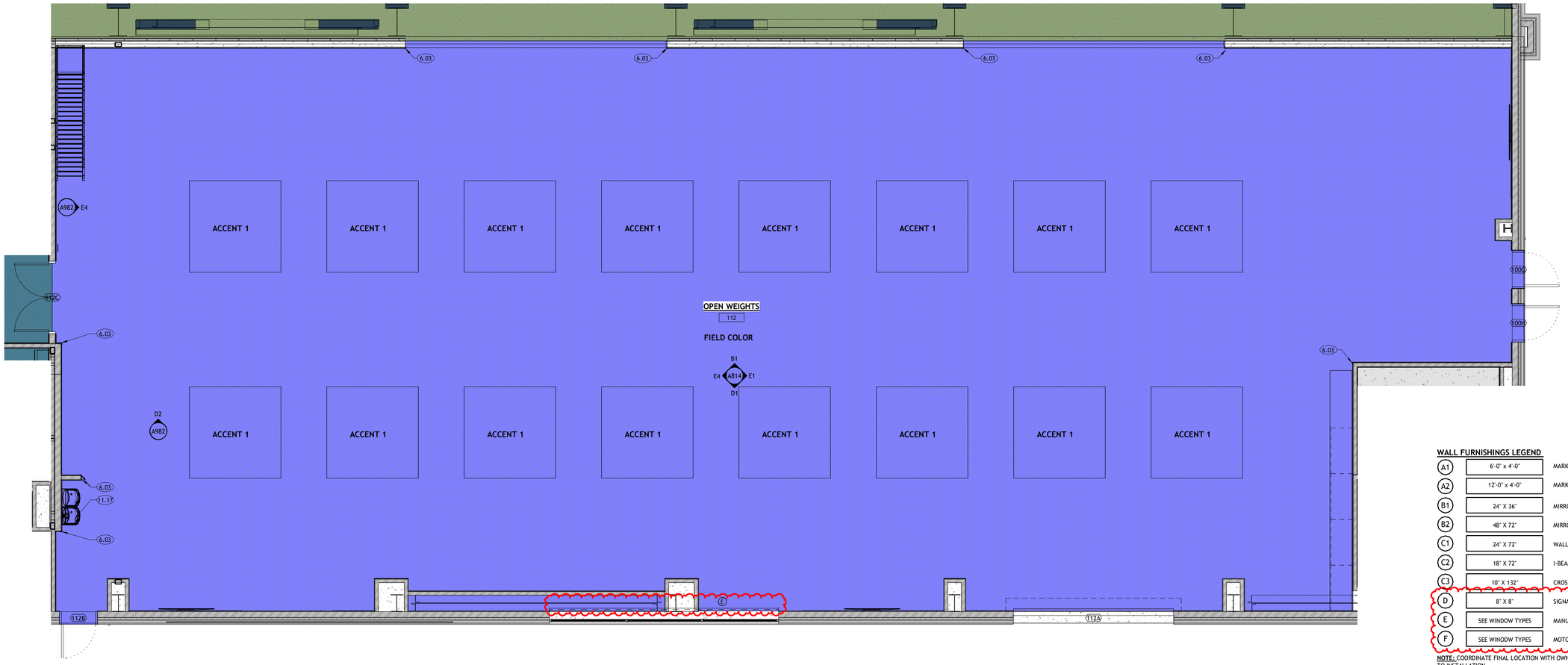
F12	ACCENT CARPET TILE
F13	PORCELAIN FLOOR TILE

SEE A802 FOR FINISHES

OWNER INFORMATION

CANYONS SCHOOL DISTRICT



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CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

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PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

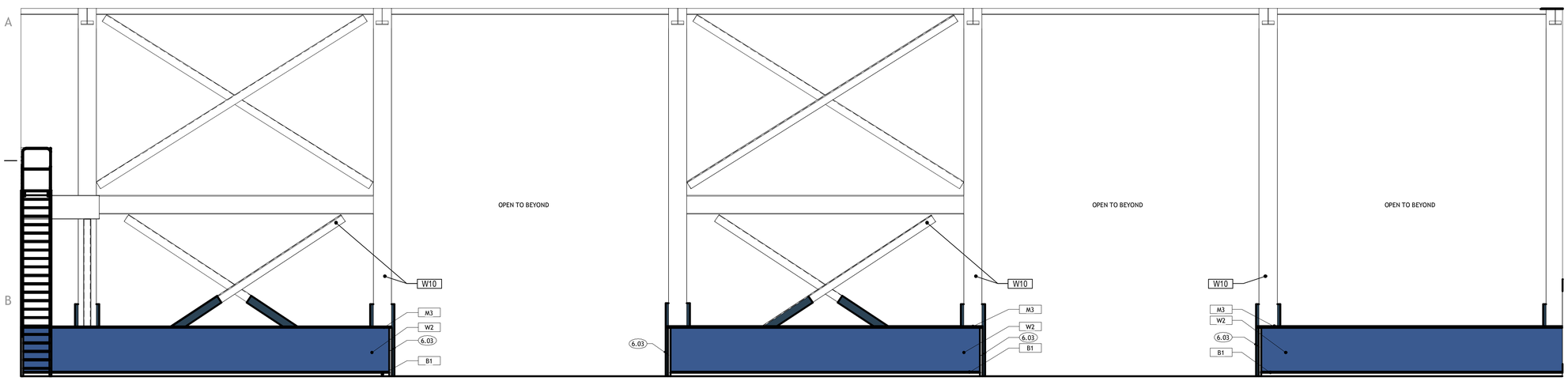
SHEET TITLE

ENLARGED OPEN WEIGHTS

SHEET NUMBER

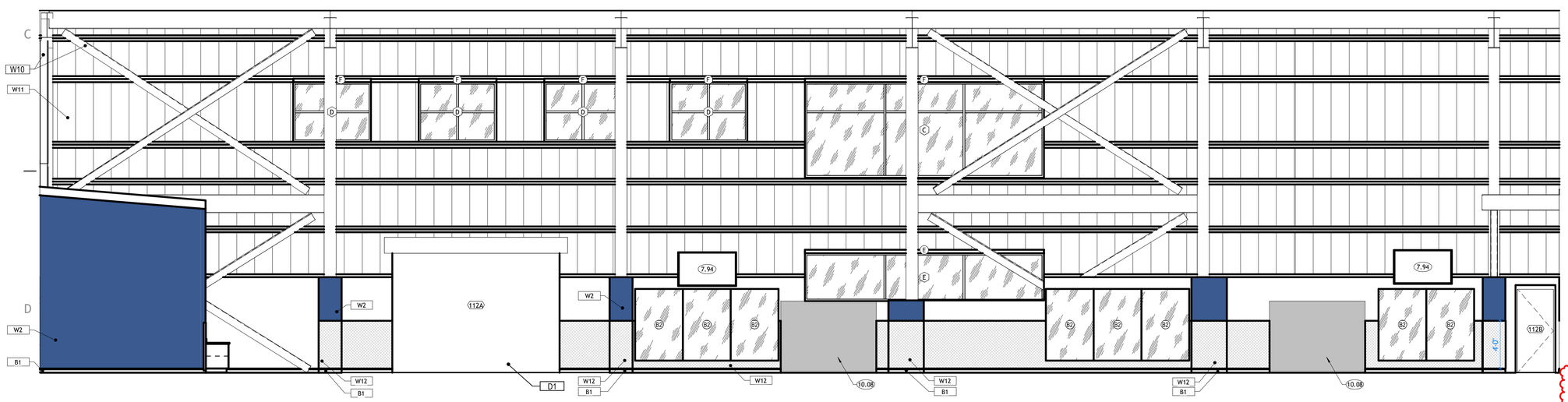
A813

ENLARGED OPEN WIEGHTS ROOM
A813 | SCALE: 1/4" = 1'-0"



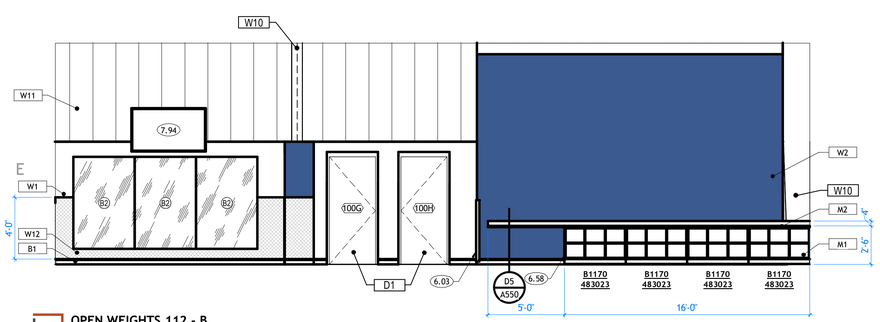
B1 OPEN WEIGHTS 112 - A

A814 | SCALE: 1/4" = 1'-0"



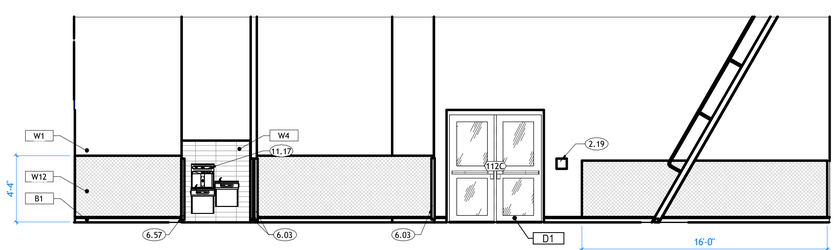
D1 OPEN WEIGHTS 112 - C

A814 | SCALE: 1/4" = 1'-0"



E1 OPEN WEIGHTS 112 - B

A814 | SCALE: 1/4" = 1'-0"



E4 OPEN WEIGHTS 112 - D

A814 | SCALE: 1/4" = 1'-0"

KEYNOTES

2.19	ROOM SIGNAGE. EACH ROOM DOOR/OPENING TO RECEIVE SIGNAGE. SOME ROOMS MAY RECEIVE MORE THAN ONE SIGN. SEE FLOOR PLANS AND DETAILS.
6.03	4' TALL STAINLESS STEEL CORNER GUARD
6.57	4' TALL STAINLESS STEEL CORNER GUARD. APPLY ON TOP OF SCHLUTER TILE EDGE PROTECTION
6.58	PROVIDE 3/4" END PANEL. TO MATCH SCHEDULED MILLWORK FINISH
7.94	65" TV. COORDINATE WITH ELECTRICAL
10.08	MECHANICAL EQUIPMENT. SEE MECHANICAL.
11.17	ELECTRIC WATER COOLER & BOTTLE FILLER, OVER TYPICAL DRINKING FOUNTAIN WALL TILE. SEE PLUMBING, ELEVATIONS AND MECHANICAL.

FLOOR FINISHES

F1	RUBBER FLOORING TYPE 1
F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
F3	EPOXY PAINTED CONCRETE
F4	TURF TYPE 1
F5	TURF TYPE 2
F6	TURF TYPE 3
F7	TURF TYPE 4
F8	EXISTING RUBBER FLOORING TO REMAIN, PATCH AND REPAIR WHERE NEEDED
F9	LUXURY VINYL TILE
F10	ACCENT LUXURY VINYL TILE
F11	CARPET TILE
F12	ACCENT CARPET TILE
F13	PORCELAIN FLOOR TILE

SEE A802 FOR FINISHES

FINISH LEGEND

CODE	MATERIAL
2- BASE FINISHES	
B1	6" RUBBER BASE
B2	CORRESPONDING TILE BASE
3- WALL FINISH	
W1	GENERAL PAINT
W2	ACCENT PAINT
W3	PORCELAIN WALL TILE
W4	CERAMIC WALL TILE
W5	EPOXY PAINTED CONCRETE
W6	PORCELAIN WALL TILE
W7	WALL PADDING
W8	ACCENT PAINT 2
W9	ACCENT PAINT 3
W10	PAINTED METAL STRUCTURE
W11	FIELD METAL PAINT
W12	DIAMOND PLATE
W13	PLASTIC LAMINATE WALL PANELS
W14	TEXTILE WALL COVERING
4- MILLWORK FINISHES	
M1	PLASTIC LAMINATE MILLWORK
M2	PLASTIC LAMINATE COUNTERTOP
M3	SOLID SURFACE
M4	PLASTIC LAMINATE MILLWORK
5-CEILING FINISH	
CL1	PAINTED GYPSUM BOARD
CL2	ACOUSTIC CEILING TILE
CL3	PAINTED STRUCTURE
6-DOOR FINISHES	
D1	PAINTED METAL DOOR & TRIM
D2	WOOD DOOR & PAINTED METAL TRIM

WALL FURNISHINGS LEGEND

A1	6'-0" x 4'-0"	MARKER BOARD
A2	12'-0" x 4'-0"	MARKER BOARD
B1	24" X 36"	MIRROR
B2	48" X 72"	MIRROR
C1	24" X 72"	WALL PADDING
C2	18" X 72"	I-BEAM WALL PADDING
C3	10" X 132"	CROSS BEAM WALL PADDING
D	8" X 8"	SIGNAGE, SEE SHEET A004
E	SEE WINDOW TYPES	MANUAL WINDOW SHADES - SEE SPECS
F	SEE WINODW TYPES	MOTORIZED WINDOW SHADES - SEE SPECS

NOTE: COORDINATE FINAL LOCATION WITH OWNER AND ARCHITECT PRIOR TO INSTALLATION
* ALL SHADES IN MAIN AND AUXILIARY GYMS TO BE 1% TRANSMISSION, ALL OTHERS TO BE 5%

3

GENERAL NOTES

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C. INTERIOR DRYWALL CORNERS TO BE SQUARE.
D. WALL TYPES SHOWN DO NOT ADDRESS CERAMIC TILE INSTALLATION ON WALL SURFACES AS SHOWN ON THE FLOOR PLANS. REFER TO THE CURRENT EDITION OF THE HANDBOOK FOR CERAMIC TILE INSTALLATION PUBLISHED BY THE TILE COUNCIL OF AMERICA, INC., FOR PROPER INSTALLATION MATERIALS AND METHODS. TILE TO BE INSTALLED OVER TILE BACKER BOARD.
E. SEE DETAILS ON SHEET **A003** FOR TYPICAL FIXTURE MOUNTING HEIGHTS. BLOCK WALLS AS REQUIRED FOR HANGING FIXTURES AND FURNISHINGS.
F. PROVIDE BLOCKING IN WALLS AT ALL TOILETS AND SHOWERS FOR GRAB BARS. SEE DETAIL **C3/A003 & D6/A003**.
G. ALL MILLWORK NUMBERS NOTED ARE TMI SYSTEMS. COORDINATE BETWEEN ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR MISCELLANEOUS ITEMS THAT MAY ONLY BE SHOWN ON ONE OR THE OTHER.
H. FINISH ALL EXTERIOR TILE CORNERS WITH SCHLUTER ECK - K.
I. IN ADDITION TO TMI SYSTEMS SELECT MILLWORK NUMBERS NOTED ARE KEWAUNEE. COORDINATE BETWEEN ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR LOCATIONS OF KEWAUNEE MILLWORK AND OTHER MISCHELANOUS ITEMS THAT MAY ONLY BE SHOWN ON ONE OR THE OTHER.
J. PROVIDE SCHLUTER-RONDEC CORNER PIECE WHERE TILE MEETS DOOR JAMBS

CORE ARCHITECTURE
233 SOUTH PLEASANT GROVE BLVD. SUITE #105
PLEASANT GROVE, UTAH 84062
PHONE: (801) 769-3000
core@corearch.com

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PROFESSIONAL STAMP

LICENSED ARCHITECT CURTIS LEONARD LIVINGSTON NO. 10021449 STATE OF UTAH

09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

ENLARGED OPEN WEIGHTS

SHEET NUMBER

A814

KEYNOTES

6.03 4' TALL STAINLESS STEEL CORNER GUARD

CORE ARCHITECTURE

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09 OCT. 24

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F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
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F10	ACCENT LUXURY VINYL TILE
F11	CARPET TILE
F12	ACCENT CARPET TILE
F13	PORCELAIN FLOOR TILE

SEE A802 FOR FINISHES

FINISH LEGEND

CODE	MATERIAL
2- BASE FINISHES	
B1	6" RUBBER BASE
B2	CORRESPONDING TILE BASE
3- WALL FINISH	
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W3	PORCELAIN WALL TILE
W4	CERAMIC WALL TILE
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W9	ACCENT PAINT 3
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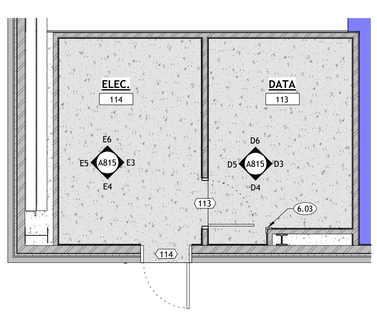
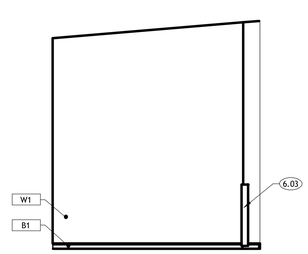
CL2	ACOUSTIC CEILING TILE
CL3	PAINTED STRUCTURE
6-DOOR FINISHES	
D1	PAINTED METAL DOOR & TRIM
D2	WOOD DOOR & PAINTED METAL TRIM



ENLARGED DATA AND ELEC. ROOMS
A815 | SCALE: 1/4" = 1'-0"



D3 DATA 113 - A
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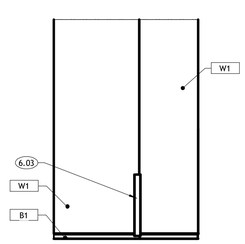

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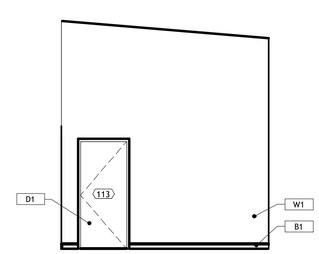

D5 DATA 113 - C
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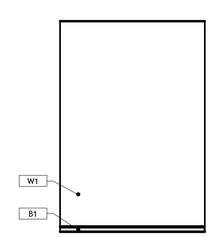
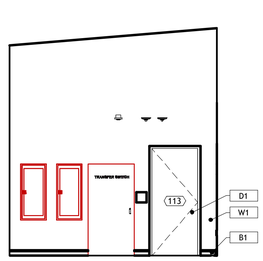
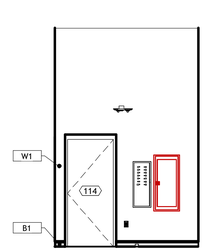


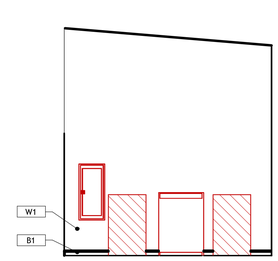
D6 DATA 113 - D
A815 | SCALE: 1/4" = 1'-0"



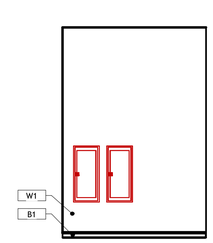
E3 ELEC. 114 - A
A815 | SCALE: 1/4" = 1'-0"



E4 ELEC. 114 - B
A815 | SCALE: 1/4" = 1'-0"



E5 ELEC. 114 - C
A815 | SCALE: 1/4" = 1'-0"



E6 ELEC. 114 - D
A815 | SCALE: 1/4" = 1'-0"

WALL FURNISHINGS LEGEND

A1	6'-0" x 4'-0"	MARKER BOARD
A2	12'-0" x 4'-0"	MARKER BOARD
B1	24" X 36"	MIRROR
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C1	24" X 72"	WALL PADDING
C2	18" X 72"	I-BEAM WALL PADDING
C3	10" X 132"	CROSS BEAM WALL PADDING
D	8" X 8"	SIGNAGE, SEE SHEET A004
E	SEE WINDOW TYPES	MANUAL WINDOW SHADES - SEE SPECS
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3

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PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

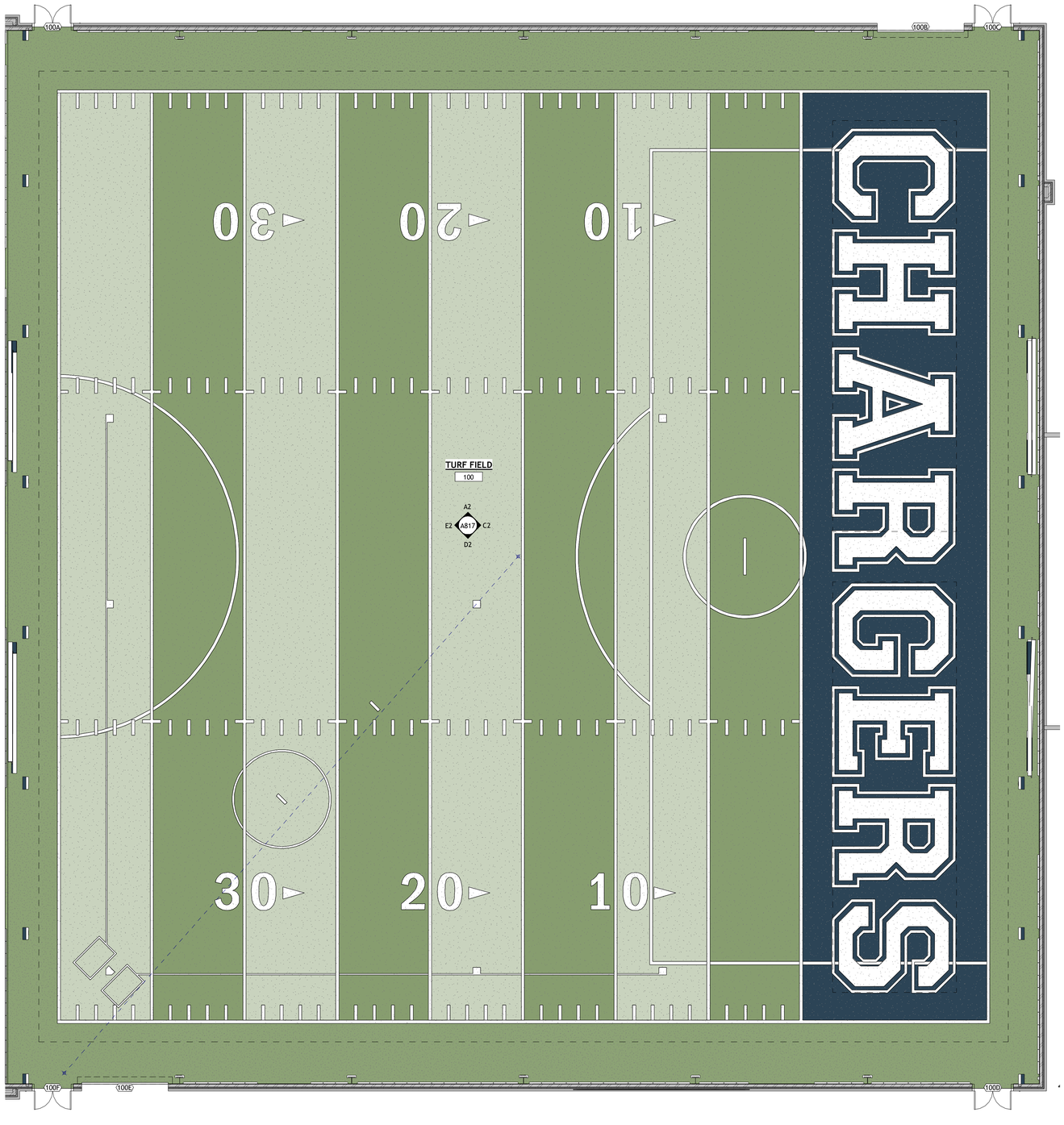
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

ENLARGED DATA & ELEC. ROOMS

SHEET NUMBER

A815



ENLARGED TURF FIELD

A816 | SCALE: 1/8" = 1'-0"

KEYNOTES

CORE ARCHITECTURE

233 SOUTH PLEASANT GROVE BLVD.
SUITE #105
PLEASANT GROVE, UTAH 84062
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PROFESSIONAL STAMP

LICENSED ARCHITECT
CURTIS LEONARD LIVINGSTON
NO. 10081240
STATE OF UTAH

09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

FLOOR FINISHES

F1	RUBBER FLOORING TYPE 1
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SEE A802 FOR FINISHES

FINISH LEGEND

CODE	MATERIAL
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REVISIONS

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BID SET

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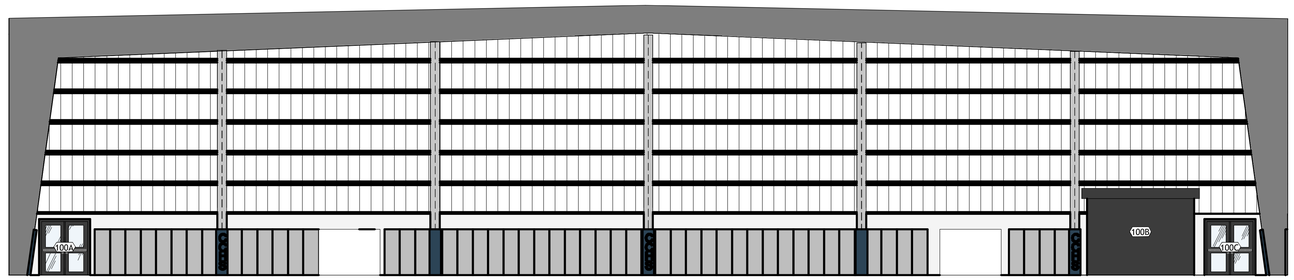
SHEET TITLE

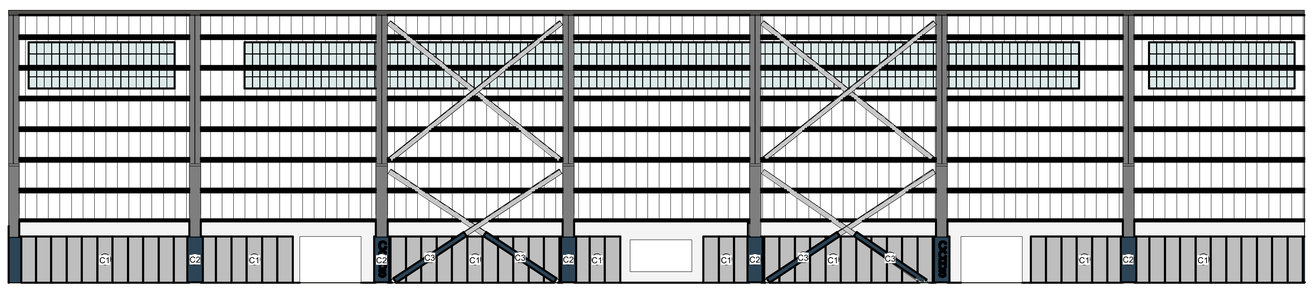
ENLARGED TURF FIELD

SHEET NUMBER

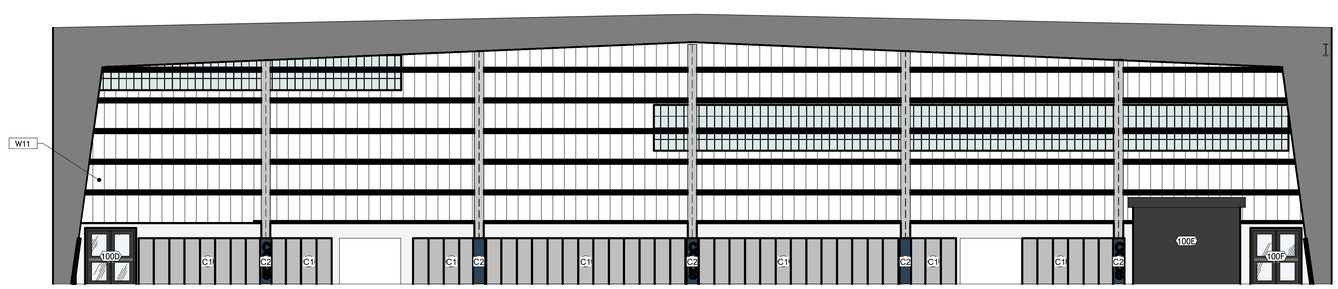
A816



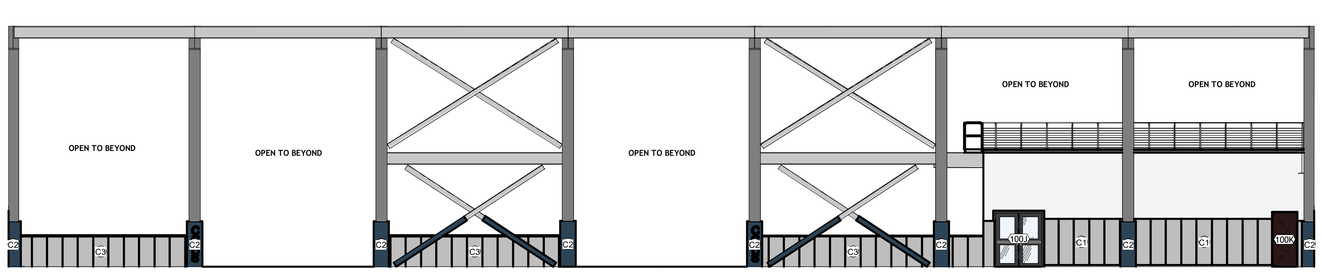
A2 TURF FIELD 100 - A
A817 | SCALE: 1/8" = 1'-0"



C2 TURF FIELD 100 - B
A817 | SCALE: 1/8" = 1'-0"



D2 TURF FIELD 100 - C
A817 | SCALE: 1/8" = 1'-0"



E2 TURF FIELD 100 - D
A817 | SCALE: 1/8" = 1'-0"

KEYNOTES

FLOOR FINISHES

F1	RUBBER FLOORING TYPE 1
F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
F3	EPOXY PAINTED CONCRETE
F4	TURF TYPE 1
F5	TURF TYPE 2
F6	TURF TYPE 3
F7	TURF TYPE 4
F8	EXISTING RUBBER FLOORING TO REMAIN, PATCH AND REPAIR WHERE NEEDED
F9	LUXURY VINYL TILE
F10	ACCENT LUXURY VINYL TILE
F11	CARPET TILE
F12	ACCENT CARPET TILE
F13	PORCELAIN FLOOR TILE

SEE A802 FOR FINISHES

FINISH LEGEND

CODE	MATERIAL
2- BASE FINISHES	
B1	6" RUBBER BASE
B2	CORRESPONDING TILE BASE
3- WALL FINISH	
W1	GENERAL PAINT
W2	ACCENT PAINT
W3	PORCELAIN WALL TILE
W4	CERAMIC WALL TILE
W5	EPOXY PAINTED CONCRETE
W6	PORCELAIN WALL TILE
W7	WALL PADDING
W8	ACCENT PAINT 2
W9	ACCENT PAINT 3
W10	PAINTED METAL STRUCTURE
W11	FIELD METAL PAINT
W12	DIAMOND PLATE
W13	PLASTIC LAMINATE WALL PANELS
W14	TEXTILE WALL COVERING
4- MILLWORK FINISHES	
M1	PLASTIC LAMINATE MILLWORK
M2	PLASTIC LAMINATE COUNTERTOP
M3	SOLID SURFACE
M4	PLASTIC LAMINATE MILLWORK
5-CEILING FINISH	
CL1	PAINTED GYPSUM BOARD
CL2	ACOUSTIC CEILING TILE
CL3	PAINTED STRUCTURE
6-DOOR FINISHES	
D1	PAINTED METAL DOOR & TRIM
D2	WOOD DOOR & PAINTED METAL TRIM

WALL FURNISHINGS LEGEND

A1	6'-0" x 4'-0"	MARKER BOARD
A2	12'-0" x 4'-0"	MARKER BOARD
B1	24" X 36"	MIRROR
B2	48" X 72"	MIRROR
C1	24" X 72"	WALL PADDING
C2	18" X 72"	I-BEAM WALL PADDING
C3	10" X 132"	CROSS BEAM WALL PADDING
D	8" X 8"	SIGNAGE, SEE SHEET A004
E	SEE WINDOW TYPES	MANUAL WINDOW SHADES - SEE SPECS
F	SEE WINODW TYPES	MOTORIZED WINDOW SHADES - SEE SPECS

NOTE: COORDINATE FINAL LOCATION WITH OWNER AND ARCHITECT PRIOR TO INSTALLATION
* ALL SHADES IN MAIN AND AUXILIARY GYMS TO BE 1% TRANSMISSION, ALL OTHERS TO BE 5%

3

GENERAL NOTES

A. GENERAL CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION. REPORT ANY SIGNIFICANT DISCREPANCIES TO THE ARCHITECT.
B. COORDINATE INSTALLATIONS OF ALL "AFTER CONTRACT" ASSEMBLIES WITH OWNER PRIOR TO CONSTRUCTION OF ADJOINING OR RELATED STRUCTURES.
C. INTERIOR DRYWALL CORNERS TO BE SQUARE.
D. WALL TYPES SHOWN DO NOT ADDRESS CERAMIC TILE INSTALLATION ON WALL SURFACES AS SHOWN ON THE FLOOR PLANS. REFER TO THE CURRENT EDITION OF THE HANDBOOK FOR CERAMIC TILE INSTALLATION PUBLISHED BY THE TILE COUNCIL OF AMERICA, INC., FOR PROPER INSTALLATION MATERIALS AND METHODS. TILE TO BE INSTALLED OVER TILE BACKER BOARD.
E. SEE DETAILS ON SHEET **A003** FOR TYPICAL FIXTURE MOUNTING HEIGHTS. BLOCK WALLS AS REQUIRED FOR HANGING FIXTURES AND FURNISHINGS.
F. PROVIDE BLOCKING IN WALLS AT ALL TOILETS AND SHOWERS FOR GRAB BARS. SEE DETAIL **C3/A003 & D6/A003**.
G. ALL MILLWORK NUMBERS NOTED ARE TMI SYSTEMS. COORDINATE BETWEEN ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR MISCELLANEOUS ITEMS THAT MAY ONLY BE SHOWN ON ONE OR THE OTHER.
H. FINISH ALL EXTERIOR TILE CORNERS WITH SCHLUTER ECK - K.
I. IN ADDITION TO TMI SYSTEMS SELECT MILLWORK NUMBERS NOTED ARE KEWAUNEE. COORDINATE BETWEEN ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR LOCATIONS OF KEWAUNEE MILLWORK AND OTHER MISCHELANOUS ITEMS THAT MAY ONLY BE SHOWN ON ONE OR THE OTHER.
J. PROVIDE SCHLUTER-RONDEC CORNER PIECE WHERE TILE MEETS DOOR JAMBS

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PROFESSIONAL STAMP

LICENSED ARCHITECT
CURTIS LEONARD LIVINGSTON
NO. 10021449
STATE OF UTAH
09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

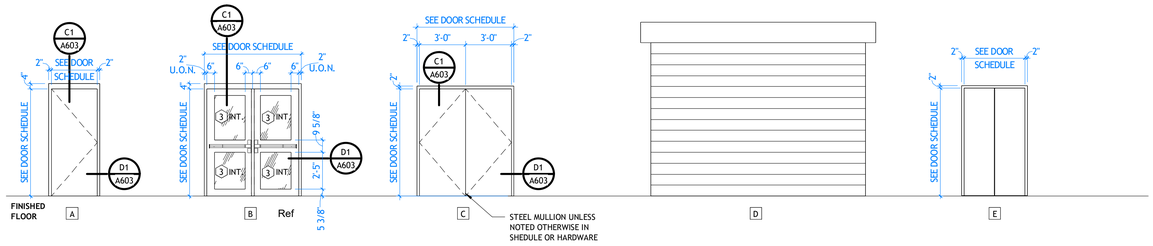
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

ENLARGED TURF FIELD

SHEET NUMBER

A817



A1 DOOR TYPES

A601 | SCALE: 1/4" = 1'-0"

KEYNOTES

DOOR SCHEDULE - FH ALTERNATE 1

MARK	TYPE	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	MATERIAL DOOR	MATERIAL FRAME	HARDWARE	RATING	DOOR SIGNAGE	COMMENTS
FH. LEVEL 1									
101E1	E					E1		Yes	ELEVATOR DOOR PER MANUFACTURER
101E2	H	3'-0"	7'-0"	HM	HM	11	1 HR	Yes	
112D	B	6'-0"	7'-0"	HM	HM	06		Yes	
112E	D	12'-0"	10'-0"	STL	STL	R1		No	
112F	B	6'-0"	7'-0"	HM	HM	18		Yes	
112G	D	12'-0"	10'-0"	STL	STL	R1		No	
112H	B	6'-0"	7'-0"	HM	HM	18		Yes	
115	A	3'-0"	7'-0"	HM	HM	11		Yes	
FH. LEVEL 2									
200B	E					E1		Yes	ELEVATOR DOOR PER MANUFACTURER
201A	A	3'-0"	7'-0"	WD	HM	09		Yes	
201B	B	6'-0"	7'-0"	WD	HM	08		Yes	
203A	C	6'-0"	7'-0"	WD	HM	07		Yes	
203B	A	3'-0"	7'-0"	WD	HM	12		Yes	
204	A	3'-0"	7'-0"	WD	HM	16		Yes	
205	A	3'-0"	7'-0"	WD	HM	16		Yes	
206	B	6'-0"	7'-0"	WD	HM	07		Yes	
207A	A	3'-0"	7'-0"	WD	HM	13		Yes	
207B	A	3'-0"	7'-0"	WD	HM	13		Yes	
207C	A	3'-0"	7'-0"	WD	HM	13		Yes	
207D	A	3'-0"	7'-0"	WD	HM	13		Yes	
207E	A	3'-0"	7'-0"	WD	HM	14		Yes	
207F	A	3'-0"	7'-0"	WD	HM	16		Yes	
207G	A	3'-0"	7'-0"	WD	HM	11		Yes	
207H	A	3'-0"	7'-0"	WD	HM	14		Yes	
208	A	3'-0"	7'-0"	WD	HM	11		Yes	

GLAZING SCHEDULE

1. 1" INSULATED TEMPERED LOW-E GLASS
2. 1" INSULATED ANNEALED CLEAR LOW-E GLASS
3. 1/4" TEMPERED CLEAR GLASS
3. KALWALL WINDOW SYSTEM - SEE SPECS

NOTE:
- EXTERIOR DOORS & WINDOWS TO BE GLAZING TYPES 1 & 2
- INTERIOR DOORS & WINDOWS TO BE GLAZING TYPE 3
-TEMPERED GLASS WITHIN 4'-0" OF ANY DOOR/OPENING

GENERAL NOTES

A. THE CONTRACTOR IS TO VERIFY THE DIMENSIONS OF ALL OPENINGS PRIOR TO THE FABRICATION OF ALL DOORS AND FRAMES.
B. DUE TO MULTIPLE USE, SOME OF THE DETAILS REFERRED TO ON THE DOOR SCHEDULE ARE REVERSED OR TURNED FROM THE DIRECTION SHOWN ON THE FLOOR PLANS. THE INTENT OF THE DETAILS IS TO BE FOLLOWED. CONSULT THE ARCHITECT WHEN QUESTIONS ARISE.
C. ALL EXIT ACCESS DOORS AND EXIT DOORS SHALL BE OPENABLE FROM THE INSIDE WITHOUT THE USE OF A KEY, SPECIAL KNOWLEDGE, OR EFFORT. USE OF MANUAL FLUSH BOLTS, EDGE BOLTS, TOP OR BOTTOM BOLTS, ETC., IS PROHIBITED.
D. 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.
E. FIRE DOORS SHALL HAVE THE MINIMUM OPENING FORCE ALLOWABLE BY THE APPROPRIATE ADMINISTRATIVE AUTHORITY. THE REQUIRED FORCE FOR PUSHING OPEN OR PULLING OPEN DOORS OTHER THAN FIRE DOORS SHALL BE 5 POUNDS. THESE FORCES DO NOT APPLY TO THE FORCE REQUIRED TO RETRACT LATCH BOLTS OR DISENGAGE OTHER DEVICES THAT HOLD THE DOOR IN A CLOSED POSITION.
F. 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. WHEN NARROW STILE AND RAIL DOORS ARE USED, A 10" MINIMUM, SMOOTH PANEL, EXTENDING THE FULL WIDTH OF THE DOOR, SHALL BE INSTALLED ON THE PUSH SIDE(S) OF THE DOOR WHICH ALLOW THE DOOR TO BE OPENED BY A WHEELCHAIR FOOTREST WITHOUT CREATING A TRAP OR HAZARDOUS CONDITION. CAVITIES CREATED BY KICK PLATES SHALL BE CAPPED.
G. ALL DOOR LOCKSETS AND PANIC DEVICES SHALL BE ADA COMPLIANT LEVER TYPE.
H. CAULK HEAD, JAMBS, AND SILLS OF ALL DOORS AND WINDOWS WITH SEALANT CONTINUOUSLY APPLIED TO BOTH SIDES OF THE FRAMES.
I. COORDINATE KEYING TYPE AND SCHEDULE WITH OWNER.
J. ALL DOOR CLOSURES TO BE SET IN ACCORDANCE WITH THE ADA REDUCED OPENING FORCE REQUIREMENTS.
K. SEE SPECIFICATIONS FOR DOOR HARDWARE. GLAZING OF CURTAIN WALL AND SUPPORT AS PER MANUFACTURER RECOMMENDATIONS. COORDINATE LOADS WITH STRUCTURAL PRIOR TO STEEL FABRICATION.

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CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

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PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

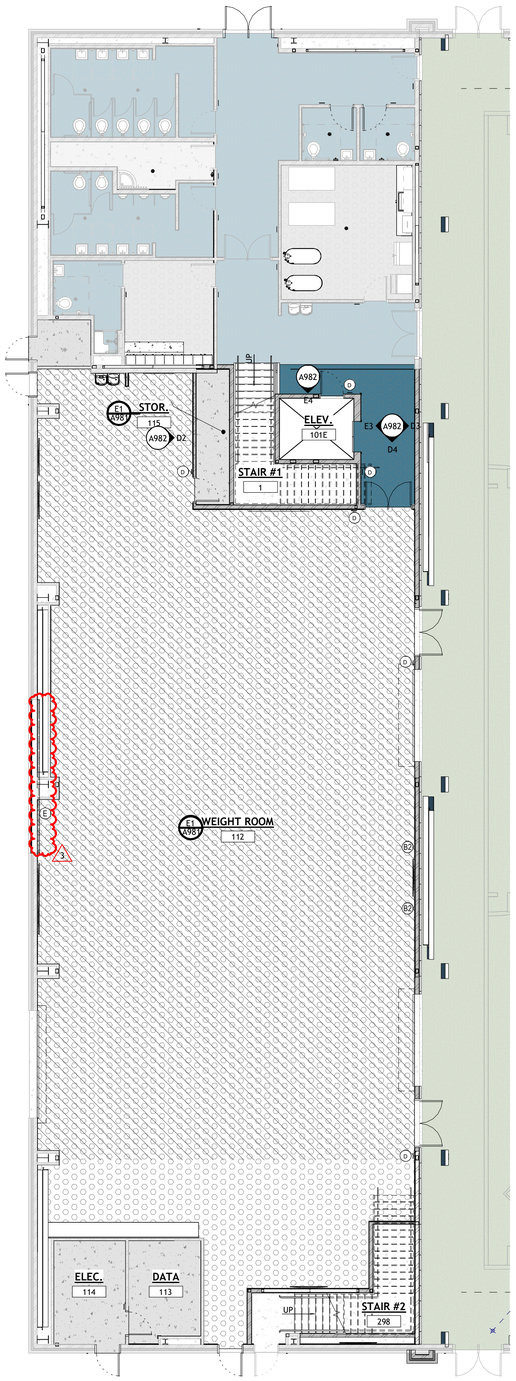
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

DOOR AND WINDOWS

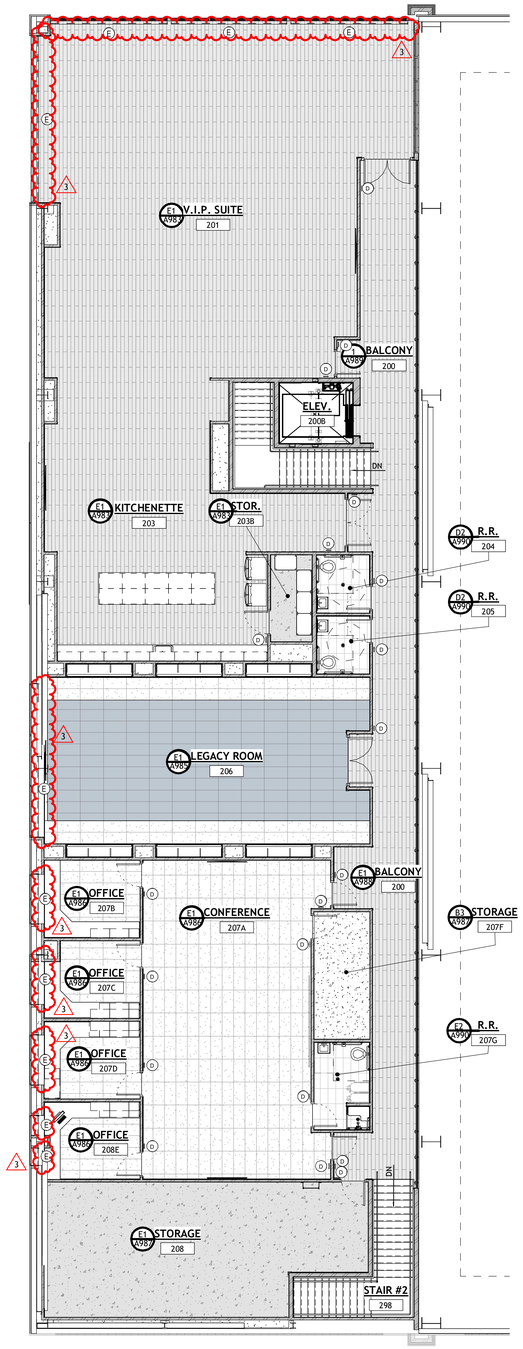
SHEET NUMBER

A960



MAIN FLOOR FURNISHINGS PLAN - ALTERNATIVE

A980 | SCALE: 1/8" = 1'-0"



UPPER FLOOR FURNISHINGS PLAN - ALTERNATIVE

A980 | SCALE: 1/8" = 1'-0"

KEYNOTES

FINISH ROOM SCHEDULE ALTERNATE

Name	Number	Floor Finish	Base Finish	Wall Finish	Millwork Finishes	Ceiling Finish	Door Finish
TURF FIELD	100	F4, F5, F6, F7	B1	W7, W10, W11	-	CL3	D1
VESTIBULE	101	F2	B1	W1, W6	-	CL2	D1
R.R.	102	F1	B2	W3	-	CL1	D1
R.R.	103	F1	B2	W3	-	CL1	D1
TRAINING ROOM	104	F1	B1	W1, W3	M1, M2	CL2	D1
CORRIDOR	105	F2	B2	W1, W6	-	CL2	D1
WOMENS	106	F1	B2	W3	-	CL1	D1
CUST.	107	F3	B1	W1, W4	-	-	D1
MENS	108	F1	B2	W3	-	CL1	D1
LOCKER ROOM	109A	F1	B1	W1, W5		CL1	D1
R.R.	109B	F1	B2	W3	-	CL1	D1
RISER ROOM	110	F3	B1	W1	-	-	D1
OPEN WEIGHTS	112	F2	B1	W1, W2, W10, W11, W12	M1. M2	CL3	D1
DATA	113	F3	B1	W1	-	-	D1
ELEC.	114	F3	B1	W1	-	-	D1
MENS	115	F1	B1	W1	-	-	D1
BALCONY	200	F9	B1	W1	-		D2

INTERIOR FINISH SCHEDULE

CODE	MATERIAL	MANUFACTURER	PRODUCT NAME / NUMBER	COLOR / FINISH	SIZE	COMMENTS
1-FLOOR FINISHES						
F1	RUBBER TYPE 1	MONDO FLOORING	RAMFLEX	MARINE BLUE G986	ROLLS	CHEMICALLY WELDED
F2	RUBBER TYPE 2	MONDO FLOORING	SPORT IMPACT	DARK GREY S018	ROLLS	NO INTERLOCKING
F3	EPOXY PAINTED CONCRETE	SHERWIN WILLIAMS	-	KNITTING NEEDLES SW7672	-	-
F4	TURF TYPE 1	-	-	-	-	NIC - OWNER PROVIDED
F5	TURF TYPE 2	-	-	-	-	NIC - OWNER PROVIDED
F6	TURF TYPE 3	-	-	-	-	NIC - OWNER PROVIDED
F7	TURF TYPE 4	-	-	-	-	NIC - OWNER PROVIDED
F8	EXISTING RUBBER	-	-	-	-	-
F9	LUXURY VINYL TILE	JJ FLOORING	STEP BY STEP 5MM	ALL PURPOSE	18" X 36"	INSTALLATION: ASHLAR
F10	LUXURY VINYL TILE ACCENT	JJ FLOORING	STEP BY STEP 5MM	DENIM 1134	18" X 36"	INSTALLATION: ASHLAR
F11	CARPET TILE	PATCRAFT	ORGANIC INTERRUPTION. STYLE: LINEAR TENSION	CONCRETE 00570	18" X 36"	INSTALLATION: STAGGARED
F12	CARPET TILE	PATCRAFT	ORGANIC INTERRUPTION. STYLE: LINEAR TENSION	HARBOR 00460	18" X 36"	INSTALLATION: STAGGARED
F13	PORCELAIN FLOOR TILE	DALTILE	-	-	-	-
2- BASE FINISHES						
B1	6" RUBBER BASE	JOHNSONITE BY TARKETT	MANDALAY	BURNT UMBER 63	6"	
B2	CORRESPONDING TILE BASE	-	-	-	-	
3- WALL FINISH						
W1	GENERAL PAINT	SHERWIN WILLIAMS	-	PURE WHITE SW7005	-	SHEEN: EGGSHELL
W2	ACCENT PAINT	SHERWIN WILLIAMS	-	DRESS BLUES SW9167	-	SHEEN: EGGSHELL
W3	PORCELAIN WALL TILE	DALTILE	SYNCHRONIC	WHITE SY30 MATTE	12X24	GROUT: CBP, "ASH" #642 / INSTALLATION: VERTICAL STRAIGHT STACK
W4	CERAMIC WALL TILE	DALTILE	COLOR WHEEL LINEAR	MATTE SUEDE GRAY 0782	4X16	GROUT: CBP, "PEWTER" #19 / INSTALLATION: HORZONTAL STRAIGHT STACK
W5	EPOXY PAINTED CONCRETE	SHERWIN WILLIAMS	-	KNITTING NEEDLES SW7672	-	-
W6	PORCELAIN WALL TILE	DALTILE	VOLUME 1.0	SONIC WHITE VL75	12x24	GROUT: CBP, "ASH" #642 / INSTALLATION: HORIZONTAL STRAIGHT STACK
W7	WALL PADDING	-	-	-	2'X6' TYPICAL	COLOR TO BE SELECTED BY INTERIOR DESIGNER
W8	ACCENT PAINT 2	SHERWIN WILLIAMS	-	KNITTING NEEDLES SW7672	-	FINISH: EGGSHELL
W9	ACCENT PAINT 3	SHERWIN WILLIAMS	-	DOMINO SW6989	-	FINISH: EGGSHELL
W10	PAINTED METAL STRUCTURE	SHERWIN WILLIAMS	-	DRESS BLUES SW9167	-	FINISH: SEMI-GLOSS
W11	FIELD METAL PAINT	SHERWIN WILLIAMS	-	PURE WHITE SW7005	-	FINISH: SEMI-GLOSS
W12	DIAMOND PLATE	INPRO	-	STAINLESS STEEL DIAMOND PLATE	-	FINISH WITH CORNER GUARDS IN SAME DIAMOND PLATE PATTERN
W13	PLASTIC LAMINATE WALL PANELS	FORMICA	-	WALNUT RIFTWOOD 9283-NG	-	USE FRY REGLET 1/2" MILLWORK REVEAL INBETWEEN MDF WRAPPED PANELS.
W14	TEXTILE WALLCOVERING	SBR TECHNOLOGIES	-	-	-	CUSTOM WALLCOVERING. BRANDING PROVIDED BY OWNER.
4- MILLWORK FINISHES						
M1	PLASTIC LAMINATE MILLWORK	FORMICA	-	STORM 912-58	-	-
M2	PLASTIC LAMINATE COUNTERTOP	WILSONART	-	GREY PAMPAS 4168-60	-	EASED EDGE
M3	SOLID SURFACE	FORMICA	EVERFORM	GAMMA GRAY 417	3CM	EASED EDGE USED AS WINDOW SILLS AS WELL
M4	PLASTIC LAMINATE MILLWORK	FORMICA	-	WALNUT RIFTWOOD 9283-NG	-	-
5-CEILING FINISH						
CL1	PAINTED GYPSUM BOARD	SHERWIN WILLIAMS	-	PURE WHITE SW7005	-	FINISH: FLAT
CL2	ACOUSTIC CEILING TILE	-	-	-	-	-
CL3	PAINTED STRUCTURE	SHERWIN WILLIAMS	-	DRESS BLUES SW9167	-	FINISH: SEMI-GLOSS
6-DOOR FINISHES						
D1	PAINTED METAL DOOR & TRIM	SHERWIN WILLIAMS	-	DOMINO SW6989	-	TRIM OF DOOR MATCH EXISTING, SHEEN - SEMI-GLOSS
D2	WOOD DOOR & PAINTED METAL TRIM	SHERWIN WILLIAMS	-	-	-	SHEEN: SEMI-GLOSS

WALL FURNISHINGS LEGEND

A1	6'-0" x 4'-0"	MARKER BOARD
A2	12'-0" x 4'-0"	MARKER BOARD
B1	24" X 36"	MIRROR
B2	48" X 72"	MIRROR
C1	24" X 72"	WALL PADDING
C2	18" X 72"	I-BEAM WALL PADDING
C3	10" X 132"	CROSS BEAM WALL PADDING
D	8" X 8"	SIGNAGE, SEE SHEET A004
E	SEE WINDOW TYPES	MANUAL WINDOW SHADES - SEE SPECS
F	SEE WINDOW TYPES	MOTORIZED WINDOW SHADES - SEE SPECS

NOTE: COORDINATE FINAL LOCATION WITH OWNER AND ARCHITECT PRIOR TO INSTALLATION
* ALL SHADES IN MAIN AND AUXILIARY GYMS TO BE 1% TRANSMISSION, ALL OTHERS TO BE 5%

GENERAL NOTES

A. GENERAL CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION. REPORT ANY SIGNIFICANT DISCREPANCIES TO THE ARCHITECT.
B. PROVIDE 18" MINIMUM CLEAR FLOOR SPACE AT PULL SIDE OF ALL DOORS. PROVIDE
C. MILLWORK SHOWN FOR CLARITY. PROVIDE FLOORING UNDER EQUIPMENT, MILLWORK AND COUNTERTOPS.
D. SEE INTERIOR ELEVATIONS ON A850 SHEETS AND MILLWORK DETAILS ON A550 SHEETS
E. FINAL FINISH SELECTION TO BE COORDINATED WITH ARCHITECT, OWNER AND INTERIOR DESIGNER.
F. CONTRACTOR TO VERIFY TRANSITION STRIP DIMENSIONS WITH MATERIAL THICKNESS.
G. SEE ELECTRICAL SHEETS FOR LOCATIONS OF OUTLETS, SWITCHES, DATA, TELEPHONE, TELEVISON, INTERCOMES, CLOCKS, SPEAKERS, HORNS, STROBES, ETC.
H. PROVIDE 3" DIAMETER HOLE THRU CONTER TOP AT ALL POWER AND DATE OUTLEST BELOW CABINET. PROVIDE 3MM PVC SLEEVE AROUND OPENING. COORDINATE WITH ELECTRICAL SHEETS. DRILL OPENING AFTER MILLWORK AS BEEN INSTALLED FOR ACCURATE LOCATION WITH ELECTRICAL.
I. FINAL LOCATION OF ALL RESTROOM EQUIPMENT TO BE COORDINATED WITH OWNER PRIOR TO INSTALLATION.
J. CHAMFER ALL EXPOSED CORNERS ON COUNTERTOPS.
K. ALL WINDOWS TO RECIEVE SOLID SURFACE SILLS. SEE A802 & SPECIFICATIONS FOR FINISH DETAILS.
L. PROVIDE STAINLESS STEEL CORNER GUARDS AT ALL DRYWALL CORNERS PER DETAIL D4/A560.
M. PROVIDE SCHULTER TRIM PIECE ON ALL EXPOSED TILE EDGES AND EXTERIOR CORNERS. SEE SPECIFICATIONS
N. ALL ROOMS TO RECIEVE ROOM SIGNS AT EACH ENTRY INTO SPACE. PLAN FOR APPROPRIATE AMOUNT PER ROOM.
O. A PREINSTALLTION MEETING IS TO BE SCHEDULED WITH THE OWNER, ARCHITECT, GENERAL CONTRACTOR, GYMNASIUM EQUIPMENT SUBCONTRACTOR, AND THE MULTI-PURPOSE ROOM FLOORING SUBCONTRACTOR TO COORDINATE THE LAYOUT AND INSTALLTION OF THE GYMNASIUM EQUIPMENT AND THE FLOOR GAME LINES.
P. PROVIDE FLOOR TRANSITION STRIPS AT ALL FLOOR MATERIAL TRANSITIONS PER DETAILS. SHEETS A550.

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PROFESSIONAL STAMP

LICENSED ARCHITECT CURTIS LEONARD LIVINGSTON NO. 10021840 STATE OF UTAH
09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

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DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

ALTERNATE - FINISHINGS PLANS

SHEET NUMBER

A980

KEYNOTES

2.19	ROOM SIGNAGE. EACH ROOM DOOR/OPENING TO RECEIVE SIGNAGE. SOME ROOMS MAY RECEIVE MORE THAN ONE SIGN. SEE FLOOR PLANS AND DETAILS.
6.53	6' TALL 4' WIDE MIRROR. COORDINATE FINAL LOCATION WITH OWNER.
11.17	ELECTRIC WATER COOLER & BOTTLE FILLER, OVER TYPICAL DRINKING FOUNTAIN WALL TILE. SEE PLUMBING, ELEVATIONS AND MECHANICAL.

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PROFESSIONAL STAMP

LICENSED ARCHITECT
CURTIS LEONARD LYTWINSKI OBA
NO. 10021445
STATE OF UTAH

09 OCT. 24

CONSULTANT INFORMATION

WALL FURNISHINGS LEGEND

A1	6'-0" x 4'-0"	MARKER BOARD
A2	12'-0" x 4'-0"	MARKER BOARD
B1	24" X 36"	MIRROR
B2	48" X 72"	MIRROR
C1	24" X 72"	WALL PADDING
C2	18" X 72"	I-BEAM WALL PADDING
C3	10" X 132"	CROSS BEAM WALL PADDING
D	8" X 8"	SIGNAGE, SEE SHEET A004
E	SEE WINDOW TYPES	MANUAL WINDOW SHADES - SEE SPECS
F	SEE WINDOW TYPES	MOTORIZED WINDOW SHADES - SEE SPECS

3

NOTE: COORDINATE FINAL LOCATION WITH OWNER AND ARCHITECT PRIOR TO INSTALLATION
* ALL SHADES IN MAIN AND AUXILIARY GYMS TO BE 1% TRANSMISSION, ALL OTHERS TO BE 5%

FINISH LEGEND

CODE	MATERIAL
2- BASE FINISHES	
B1	6" RUBBER BASE
B2	CORRESPONDING TILE BASE
3- WALL FINISH	
W1	GENERAL PAINT
W2	ACCENT PAINT
W3	PORCELAIN WALL TILE
W4	CERAMIC WALL TILE
W5	EPOXY PAINTED CONCRETE
W6	PORCELAIN WALL TILE
W7	WALL PADDING
W8	ACCENT PAINT 2
W9	ACCENT PAINT 3
W10	PAINTED METAL STRUCTURE
W11	FIELD METAL PAINT
W12	DIAMOND PLATE
W13	PLASTIC LAMINATE WALL PANELS
W14	TEXTILE WALLCOVERING
4- MILLWORK FINISHES	
M1	PLASTIC LAMINATE MILLWORK
M2	PLASTIC LAMINATE COUNTERTOP
M3	SOLID SURFACE
M4	PLASTIC LAMINATE MILLWORK
5-CEILING FINISH	
CL1	PAINTED GYPSUM BOARD
CL2	ACOUSTIC CEILING TILE
CL3	PAINTED STRUCTURE
6-DOOR FINISHES	
D1	PAINTED METAL DOOR & TRIM
D2	WOOD DOOR & PAINTED METAL TRIM

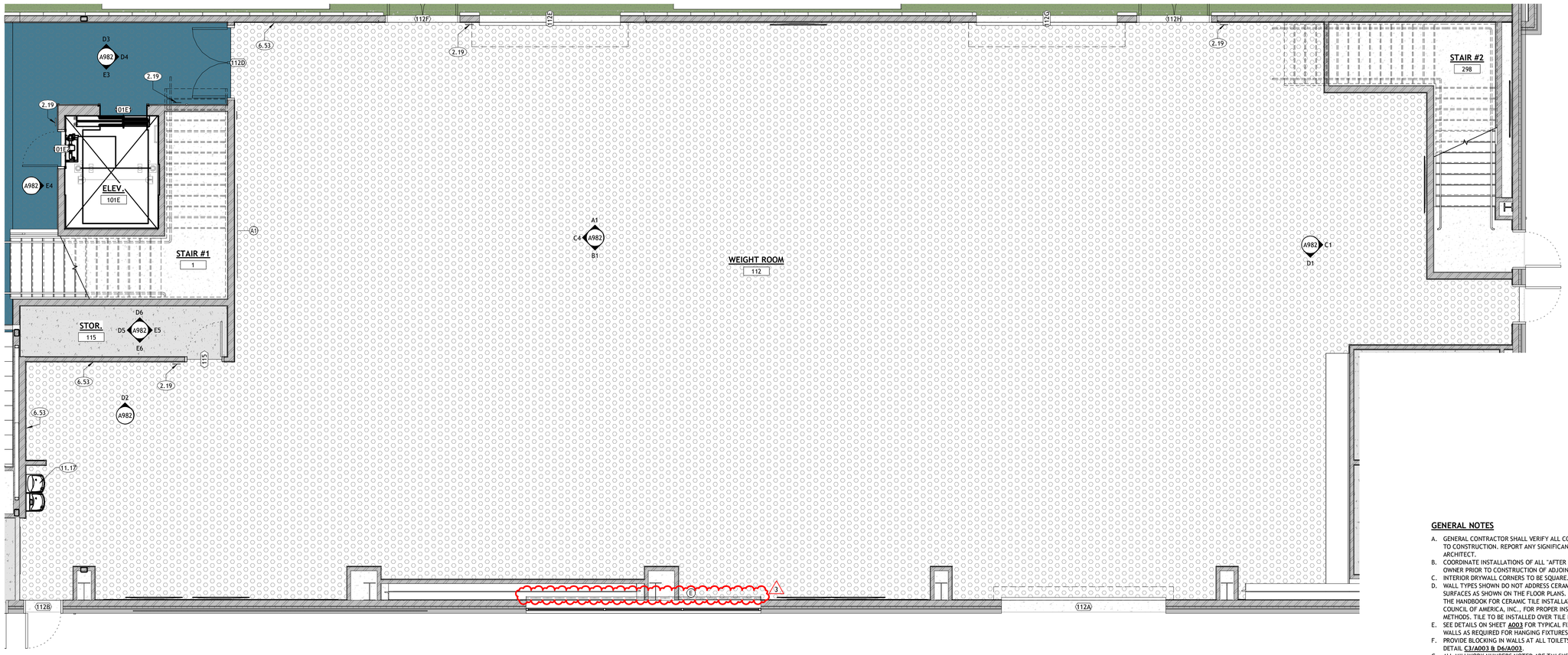
FLOOR FINISHES

F1	RUBBER FLOORING TYPE 1
F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
F3	EPOXY PAINTED CONCRETE
F4	TURF TYPE 1
F5	TURF TYPE 2
F6	TURF TYPE 3
F7	TURF TYPE 4
F8	EXISTING RUBBER FLOORING TO REMAIN, PATCH AND REPAIR WHERE NEEDED
F9	LUXURY VINYL TILE
F10	ACCENT LUXURY VINYL TILE
F11	CARPET TILE
F12	ACCENT CARPET TILE
F13	PORCELAIN FLOOR TILE

SEE A802 FOR FINISHES

OWNER INFORMATION

CANYONS SCHOOL DISTRICT



GENERAL NOTES

A. GENERAL CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION. REPORT ANY SIGNIFICANT DISCREPANCIES TO THE ARCHITECT.
B. COORDINATE INSTALLATIONS OF ALL "AFTER CONTRACT" ASSEMBLIES WITH OWNER PRIOR TO CONSTRUCTION OF ADJOINING OR RELATED STRUCTURES.
C. INTERIOR DRYWALL CORNERS TO BE SQUARE.
D. WALL TYPES SHOWN DO NOT ADDRESS CERAMIC TILE INSTALLATION ON WALL SURFACES AS SHOWN ON THE FLOOR PLANS. REFER TO THE CURRENT EDITION OF THE HANDBOOK FOR CERAMIC TILE INSTALLATION PUBLISHED BY THE TILE COUNCIL OF AMERICA, INC., FOR PROPER INSTALLATION MATERIALS AND METHODS. TILE TO BE INSTALLED OVER TILE BACKER BOARD.
E. SEE DETAILS ON SHEET **A003** FOR TYPICAL FIXTURE MOUNTING HEIGHTS. BLOCK WALLS AS REQUIRED FOR HANGING FIXTURES AND FURNISHINGS.
F. PROVIDE BLOCKING IN WALLS AT ALL TOILETS AND SHOWERS FOR GRAB BARS. SEE DETAIL **C3/A003 & D6/A003**.
G. ALL MILLWORK NUMBERS NOTED ARE TMI SYSTEMS. COORDINATE BETWEEN ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR MISCELLANEOUS ITEMS THAT MAY ONLY BE SHOWN ON ONE OR THE OTHER.
H. FINISH ALL EXTERIOR TILE CORNERS WITH SCHLUTER ECK - K.
I. IN ADDITION TO TMI SYSTEMS SELECT MILLWORK NUMBERS NOTED ARE KEWAUNEE. COORDINATE BETWEEN ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR LOCATIONS OF KEWAUNEE MILLWORK AND OTHER MISCHELANOUS ITEMS THAT MAY ONLY BE SHOWN ON ONE OR THE OTHER.
J. PROVIDE SCHLUTER-RONDEC CORNER PIECE WHERE TILE MEETS DOOR JAMBS

ENLARGED WEIGHT ROOM

A981 | SCALE: 1/4" = 1'-0"

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

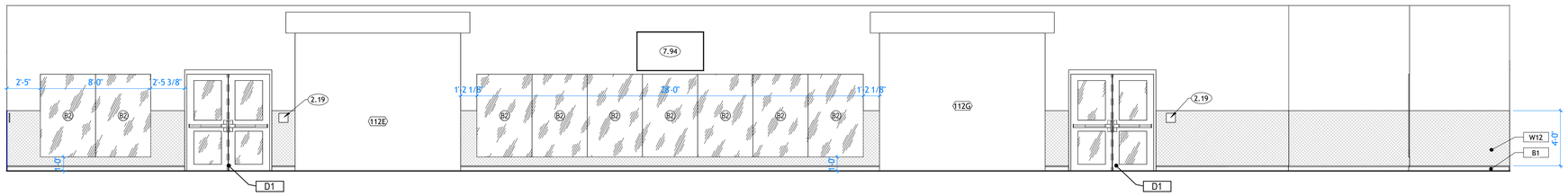
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

ALTERNATE - ENLARGED WIEGHT ROOM

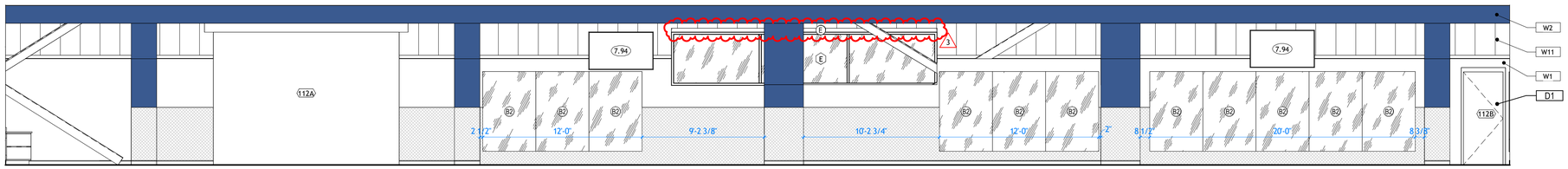
SHEET NUMBER

A981



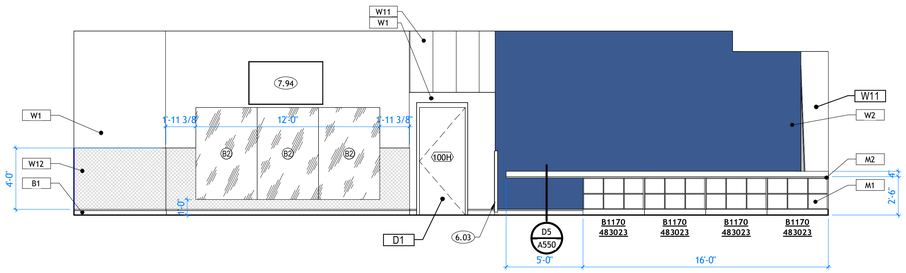
A1 WEIGHT ROOM 109 - B

A982 | SCALE: 1/4" = 1'-0"



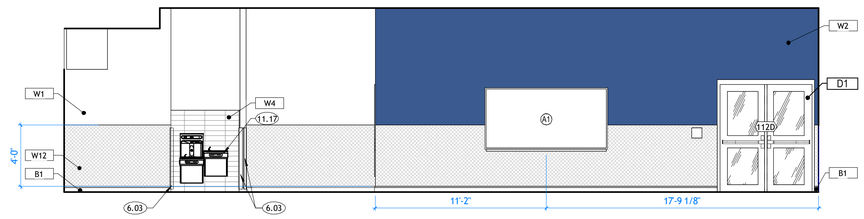
B1 WEIGHT ROOM 109 - D

A982 | SCALE: 1/4" = 1'-0"



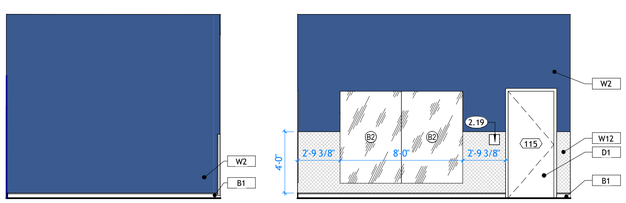
C1 WEIGHT ROOM 112 - C

A982 | SCALE: 1/4" = 1'-0"



C4 WEIGHT ROOM 109 - A

A982 | SCALE: 1/4" = 1'-0"

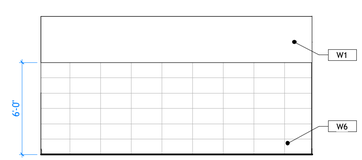


D1 WEIGHT ROOM 112 - B

A982 | SCALE: 1/4" = 1'-0"

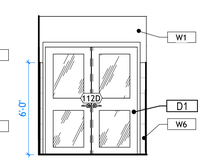
D2 WEIGHT ROOM 112

A982 | SCALE: 1/4" = 1'-0"



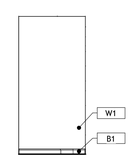
D3 CORRIDOR 113 ALT.

A982 | SCALE: 1/4" = 1'-0"



D4 CORRIDOR 113 ALT.

A982 | SCALE: 1/4" = 1'-0"

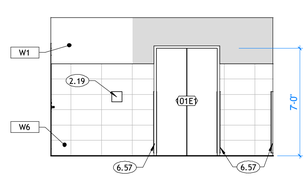


D5 STORAGE 109B - A

A982 | SCALE: 1/4" = 1'-0"

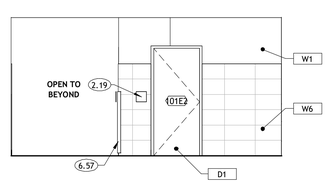
D6 STORAGE 109B - B

A982 | SCALE: 1/4" = 1'-0"



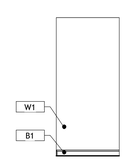
E3 CORRIDOR 113 ALT.

A982 | SCALE: 1/4" = 1'-0"



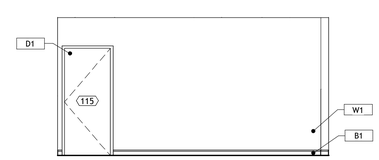
E4 CORRIDOR 113 ALT.

A982 | SCALE: 1/4" = 1'-0"



E5 STORAGE 109B - C

A982 | SCALE: 1/4" = 1'-0"



E6 STORAGE 109B - D

A982 | SCALE: 1/4" = 1'-0"

KEYNOTES

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6.03	4' TALL STAINLESS STEEL CORNER GUARD
6.57	4' TALL STAINLESS STEEL CORNER GUARD. APPLY ON TOP OF SCHLUTER TILE EDGE PROTECTION
7.94	65" TV. COORDINATE WITH ELECTRICAL
11.17	ELECTRIC WATER COOLER & BOTTLE FILLER. OVER TYPICAL DRINKING FOUNTAIN WALL TILE. SEE PLUMBING, ELEVATIONS AND MECHANICAL.

FLOOR FINISHES

F1	RUBBER FLOORING TYPE 1
F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
F3	EPOXY PAINTED CONCRETE
F4	TURF TYPE 1
F5	TURF TYPE 2
F6	TURF TYPE 3
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F8	EXISTING RUBBER FLOORING TO REMAIN, PATCH AND REPAIR WHERE NEEDED
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F10	ACCENT LUXURY VINYL TILE
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F12	ACCENT CARPET TILE
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SEE A802 FOR FINISHES

FINISH LEGEND

CODE	MATERIAL
2- BASE FINISHES	
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B2	CORRESPONDING TILE BASE
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W4	CERAMIC WALL TILE
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CORE ARCHITECTURE
233 SOUTH PLEASANT GROVE BLVD. SUITE #105
PLEASANT GROVE, UTAH 84062
PHONE: (801) 769-3000
core@corearch.com

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LICENSED ARCHITECT CURTIS LEONARD LIVINGSTON NO. 10021445 UTAH

09 OCT. 24

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CCHS FIELDHOUSE & SOCCER FIELD

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DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

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BID SET

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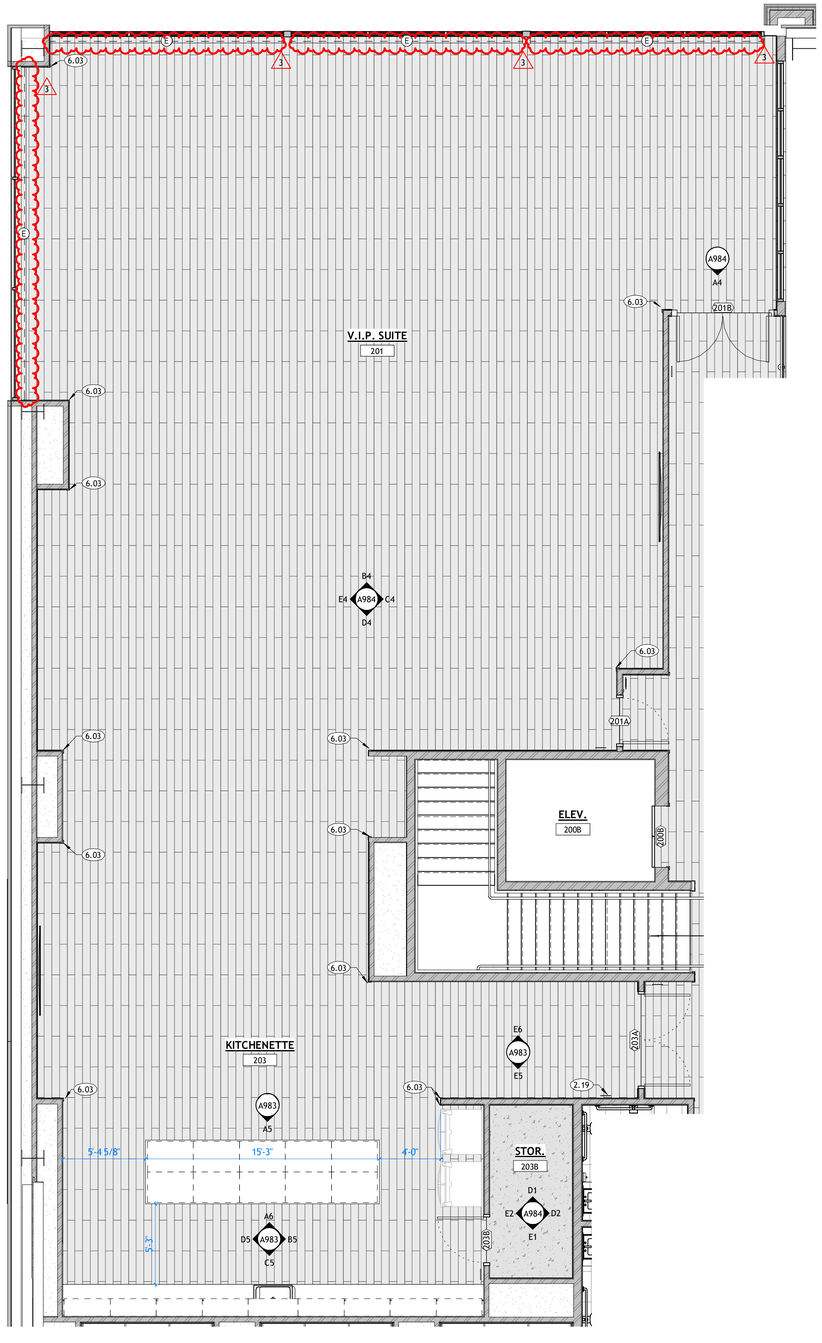
SHEET TITLE

ALTERNATE - ENLARGED WIEGHT ROOM

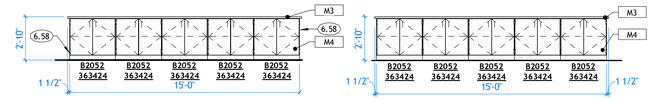
SHEET NUMBER

A982



ENLARGED V.I.P. SUITE - ALTERNATIVE

A983 | SCALE: 1/4" = 1'-0"

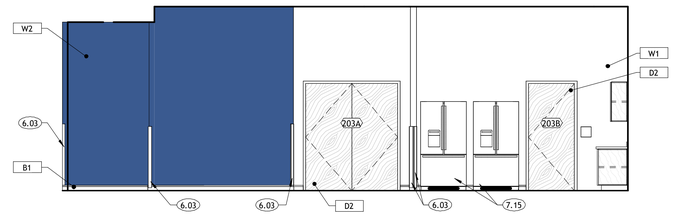


A5 KITCHENETTE 203 -

A983 | SCALE: 1/4" = 1'-0"

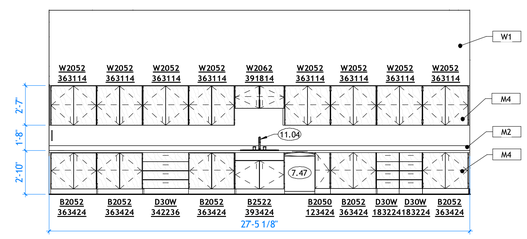
A6 KITCHENETTE 203 - A

A983 | SCALE: 1/4" = 1'-0"



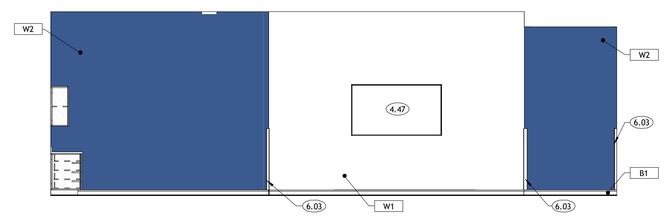
B5 KITCHENETTE 203 - B

A983 | SCALE: 1/4" = 1'-0"



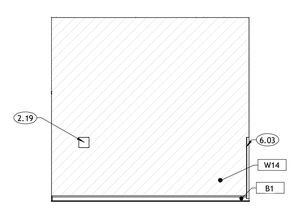
C5 KITCHENETTE 203 - C

A983 | SCALE: 1/4" = 1'-0"



D5 KITCHENETTE 203 - D

A983 | SCALE: 1/4" = 1'-0"



E5 KITCHENETTE 203 - E

A983 | SCALE: 1/4" = 1'-0"

E6 KITCHENETTE 203 - F

A983 | SCALE: 1/4" = 1'-0"

KEYNOTES

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4.47	TELEVISION (CPCI). CONTRACTOR TO PROVIDE BACKING NEEDED FOR MOUNTING AND TO ROUGH IN POWER AND DATA FOR TELEVISION. SEE ELECTRICAL FOR POWER AND DATA LOCATIONS.
6.03	4' TALL STAINLESS STEEL CORNER GUARD
6.58	PROVIDE 3/4" END PANEL. TO MATCH SCHEDULED MILLWORK FINISH
7.15	REFRIGERATOR WITH FREEZER (N.I.C.)
7.47	ADA HEIGHT DISHWASHER (OFCI).
11.04	SINK. SEE PLUMBING.

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D. WALL TYPES SHOWN DO NOT ADDRESS CERAMIC TILE INSTALLATION ON WALL SURFACES AS SHOWN ON THE FLOOR PLANS. REFER TO THE CURRENT EDITION OF THE HANDBOOK FOR CERAMIC TILE INSTALLATION PUBLISHED BY THE TILE COUNCIL OF AMERICA, INC., FOR PROPER INSTALLATION MATERIALS AND METHODS. TILE TO BE INSTALLED OVER TILE BACKER BOARD.
E. SEE DETAILS ON SHEET **A003** FOR TYPICAL FIXTURE MOUNTING HEIGHTS. BLOCK WALLS AS REQUIRED FOR HANGING FIXTURES AND FURNISHINGS.
F. PROVIDE BLOCKING IN WALLS AT ALL TOILETS AND SHOWERS FOR GRAB BARS. SEE DETAIL **C1/A003 & D6/A003.**
G. ALL MILLWORK NUMBERS NOTED ARE TMI SYSTEMS. COORDINATE BETWEEN ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR MISCELLANEOUS ITEMS THAT MAY ONLY BE SHOWN ON ONE OR THE OTHER.
H. FINISH ALL EXTERIOR TILE CORNERS WITH SCHLUTER ECK - K.
I. IN ADDITION TO TMI SYSTEMS SELECT MILLWORK NUMBERS NOTED ARE KEWAUNEE. COORDINATE BETWEEN ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR LOCATIONS OF KEWAUNEE MILLWORK AND OTHER MISCHELANOUS ITEMS THAT MAY ONLY BE SHOWN ON ONE OR THE OTHER.
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CORE ARCHITECTURE
233 SOUTH PLEASANT GROVE BLVD. SUITE #105
PLEASANT GROVE, UTAH 84062
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PROFESSIONAL STAMP

LICENSED ARCHITECT CURTIS LEONARD LIVINGSTON NO. 10021840 UTAH

09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

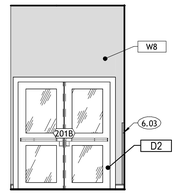
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

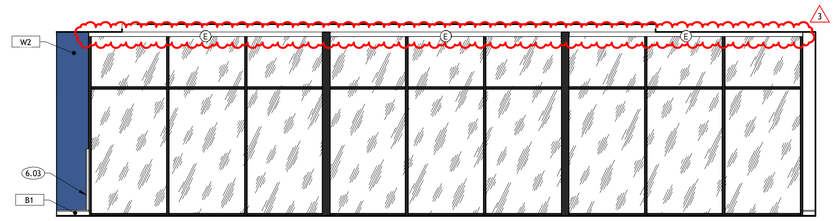
ALTERNATE - ENLARGED V.I.P. SUITE

SHEET NUMBER

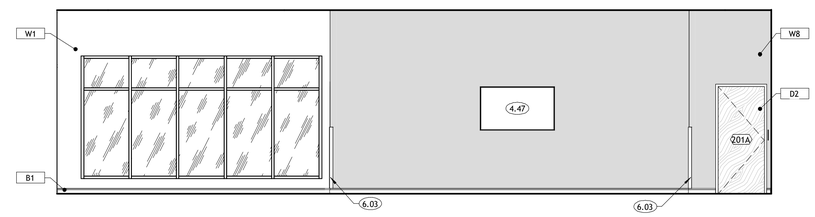
A983



A4 2 - c
A984 | SCALE: 1/4" = 1'-0"



B4 V.I.P. SUITE 201 - A
A984 | SCALE: 1/4" = 1'-0"



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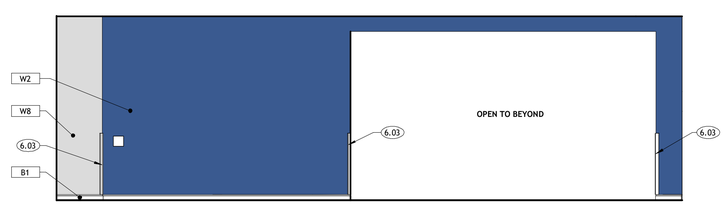

D4 V.I.P. SUITE 201 - C
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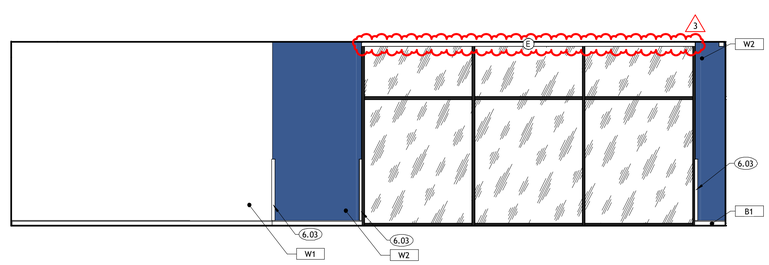

E4 V.I.P. SUITE 201 - D
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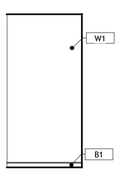

D1 STORAGE 203B - A
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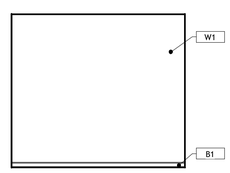

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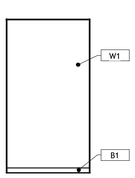

E1 STORAGE 203B - C
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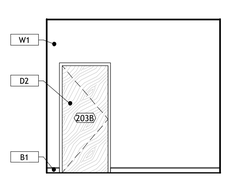

E2 STORAGE 203B - D
A984 | SCALE: 1/4" = 1'-0"

KEYNOTES

4.47	TELEVISION (CPCI). CONTRACTOR TO PROVIDE BACKING NEEDED FOR MOUNTING AND TO ROUGH IN POWER AND DATA FOR TELEVISION. SEE ELECTRICAL FOR POWER AND DATA LOCATIONS.
6.03	4' TALL STAINLESS STEEL CORNER GUARD

FLOOR FINISHES

F1	RUBBER FLOORING TYPE 1
F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
F3	EPOXY PAINTED CONCRETE
F4	TURF TYPE 1
F5	TURF TYPE 2
F6	TURF TYPE 3
F7	TURF TYPE 4
F8	EXISTING RUBBER FLOORING TO REMAIN, PATCH AND REPAIR WHERE NEEDED
F9	LUXURY VINYL TILE
F10	ACCENT LUXURY VINYL TILE
F11	CARPET TILE
F12	ACCENT CARPET TILE
F13	PORCELAIN FLOOR TILE

SEE A802 FOR FINISHES

FINISH LEGEND

CODE	MATERIAL
2- BASE FINISHES	
B1	6" RUBBER BASE
B2	CORRESPONDING TILE BASE
3- WALL FINISH	
W1	GENERAL PAINT
W2	ACCENT PAINT
W3	PORCELAIN WALL TILE
W4	CERAMIC WALL TILE
W5	EPOXY PAINTED CONCRETE
W6	PORCELAIN WALL TILE
W7	WALL PADDING
W8	ACCENT PAINT 2
W9	ACCENT PAINT 3
W10	PAINTED METAL STRUCTURE
W11	FIELD METAL PAINT
W12	DIAMOND PLATE
W13	PLASTIC LAMINATE WALL PANELS
W14	TEXTILE WALLCOVERING
4- MILLWORK FINISHES	
M1	PLASTIC LAMINATE MILLWORK
M2	PLASTIC LAMINATE COUNTERTOP
M3	SOLID SURFACE
M4	PLASTIC LAMINATE MILLWORK
5-CEILING FINISH	
CL1	PAINTED GYPSUM BOARD
CL2	ACOUSTIC CEILING TILE
CL3	PAINTED STRUCTURE
6-DOOR FINISHES	
D1	PAINTED METAL DOOR & TRIM
D2	WOOD DOOR & PAINTED METAL TRIM

WALL FURNISHINGS LEGEND

A1	6'-0" x 4'-0"	MARKER BOARD
A2	12'-0" x 4'-0"	MARKER BOARD
B1	24" X 36"	MIRROR
B2	48" X 72"	MIRROR
C1	24" X 72"	WALL PADDING
C2	18" X 72"	I-BEAM WALL PADDING
C3	10" X 132"	CROSS BEAM WALL PADDING
D	8" X 8"	SIGNAGE, SEE SHEET A004
E	SEE WINDOW TYPES	MANUAL WINDOW SHADES - SEE SPECS
F	SEE WINODW TYPES	MOTORIZED WINDOW SHADES - SEE SPECS

NOTE: COORDINATE FINAL LOCATION WITH OWNER AND ARCHITECT PRIOR TO INSTALLATION
* ALL SHADES IN MAIN AND AUXILIARY GYMS TO BE 1% TRANSMISSION, ALL OTHERS TO BE 5%

3

GENERAL NOTES

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PROFESSIONAL STAMP

LICENSED ARCHITECT
CURTIS LEONARD LIVINGSTON
NO. 10081445
STATE OF UTAH
09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

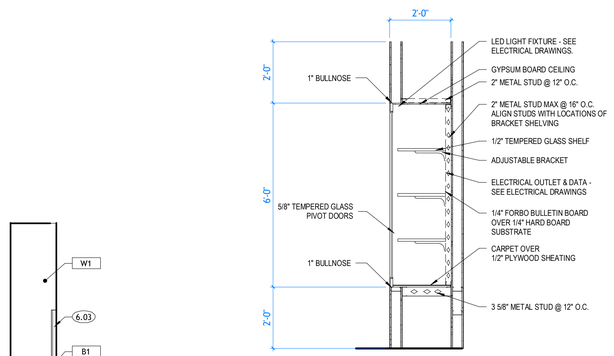
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

ALTERNATE - ENLARGED V.I.P. SUITE

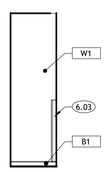
SHEET NUMBER

A984

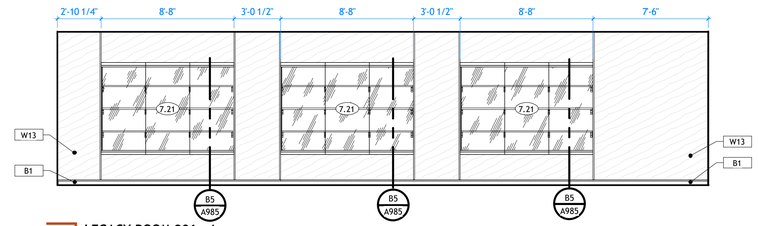


NOTE:
SEE SPECIFICATIONS - DISPLAY CASES

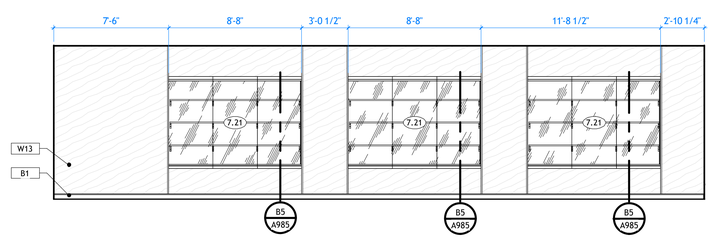
B5 LEGACY ROOM DISPLAY CASES
A985 | SCALE: 1/2" = 1'-0"



B4 LEGACY ROOM 206
A985 | SCALE: 1/4" = 1'-0"



C4 LEGACY ROOM 206 - A
A985 | SCALE: 1/4" = 1'-0"



D4 LEGACY ROOM 206 - D
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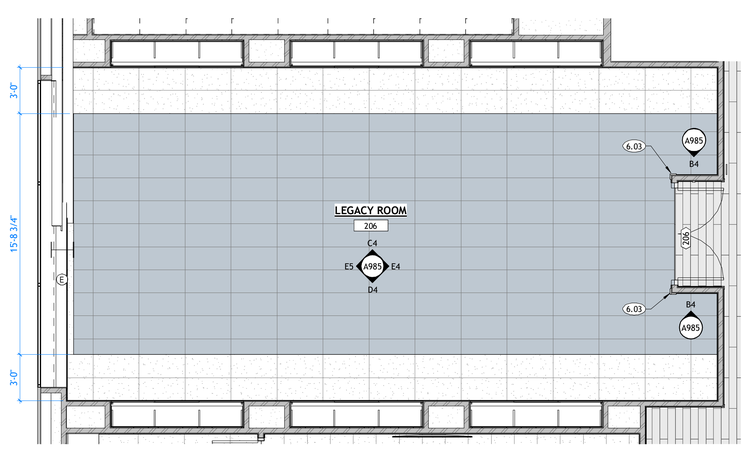

ENLARGED LEGACY ROOM - ALTERNATIVE
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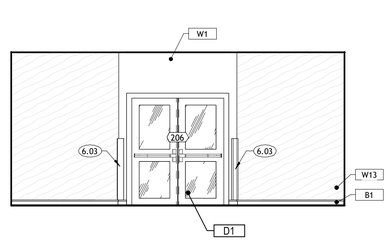
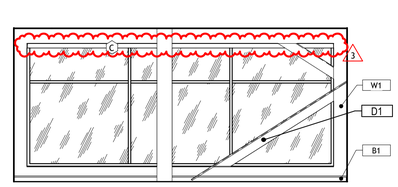


E4 LEGACY ROOM 206 - C
A985 | SCALE: 1/4" = 1'-0"



E5 LEGACY ROOM 206 - E
A985 | SCALE: 1/4" = 1'-0"

KEYNOTES

6.03	4' TALL STAINLESS STEEL CORNER GUARD
7.21	DISPLAY CASE. SEE SPECIFICATIONS.

FLOOR FINISHES

F1	RUBBER FLOORING TYPE 1
F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
F3	EPOXY PAINTED CONCRETE
F4	TURF TYPE 1
F5	TURF TYPE 2
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F7	TURF TYPE 4
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SEE A802 FOR FINISHES

FINISH LEGEND

CODE	MATERIAL
2- BASE FINISHES	
B1	6" RUBBER BASE
B2	CORRESPONDING TILE BASE
3- WALL FINISH	
W1	GENERAL PAINT
W2	ACCENT PAINT
W3	PORCELAIN WALL TILE
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W6	PORCELAIN WALL TILE
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W9	ACCENT PAINT 3
W10	PAINTED METAL STRUCTURE
W11	FIELD METAL PAINT
W12	DIAMOND PLATE
W13	PLASTIC LAMINATE WALL PANELS
W14	TEXTILE WALL COVERING
4- MILLWORK FINISHES	
M1	PLASTIC LAMINATE MILLWORK
M2	PLASTIC LAMINATE COUNTERTOP
M3	SOLID SURFACE
M4	PLASTIC LAMINATE MILLWORK
5-CEILING FINISH	
CL1	PAINTED GYPSUM BOARD
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CL3	PAINTED STRUCTURE
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WALL FURNISHINGS LEGEND

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LICENSED ARCHITECT
CURTIS LEONARD LIVINGSTON
NO. 10071445
STATE OF UTAH
09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

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DATE:	SEPTEMBER 12, 2024
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PM / PA:	KJM
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DRAWING SET STATUS

BID SET

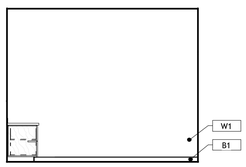
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

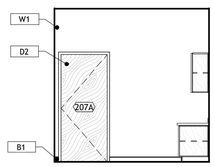
ALTERNATE - ENLARGED LEGACY ROOM

SHEET NUMBER

A985



A1 TYPICAL OFFICE - A
A986 | SCALE: 1/4" = 1'-0"



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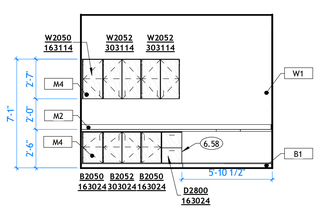
A986 | SCALE: 1/4" = 1'-0"



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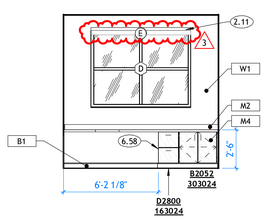

B2 TYPICAL OFFICE - D
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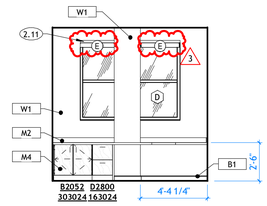

A4 OFFICE 208E - A
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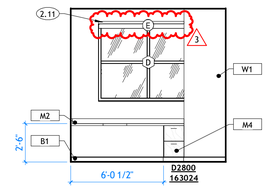
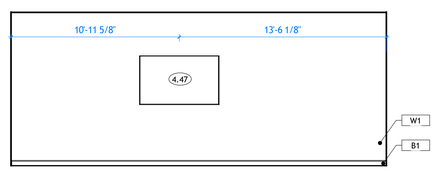
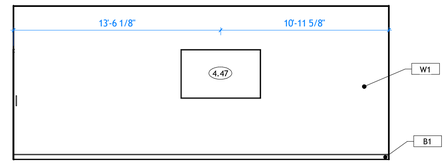


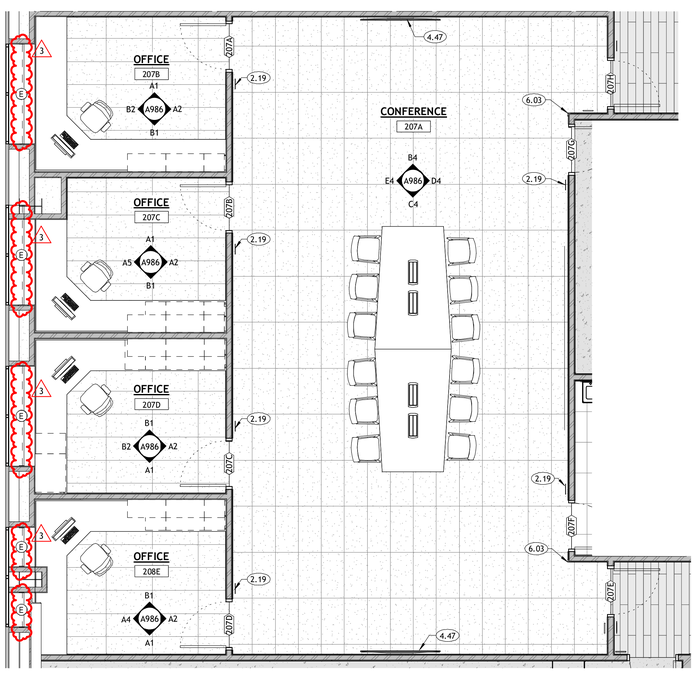
A5 OFFICE 207C - B
A986 | SCALE: 1/4" = 1'-0"



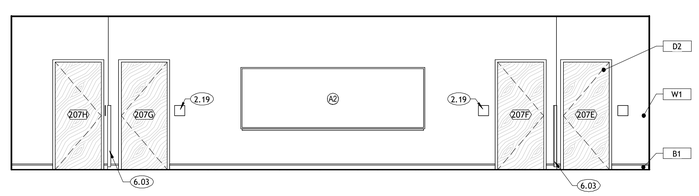
B4 CONFERENCE 207A - B
A986 | SCALE: 1/4" = 1'-0"



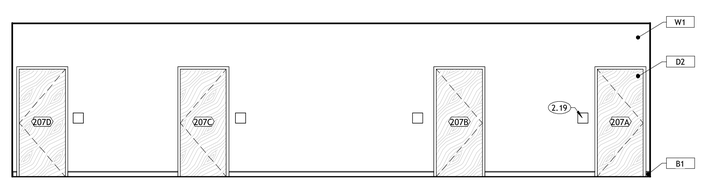
C4 CONFERENCE 207A - C
A986 | SCALE: 1/4" = 1'-0"



ENLARGED V.I.P. SUITE - CONFERENCE ROOM
A986 | SCALE: 1/4" = 1'-0"



D4 CONFERENCE 207A - D
A986 | SCALE: 1/4" = 1'-0"



E4 CONFERENCE 207A - E
A986 | SCALE: 1/4" = 1'-0"

KEYNOTES

2.11	SUSPENDED CEILING SYSTEM. SEE REFLECTED CEILING PLAN FOR TYPE.
2.19	ROOM SIGNAGE. EACH ROOM DOOR/OPENING TO RECEIVE SIGNAGE. SOME ROOMS MAY RECEIVE MORE THAN ONE SIGN. SEE FLOOR PLANS AND DETAILS.
4.47	TELEVISION (CPCI). CONTRACTOR TO PROVIDE BACKING NEEDED FOR MOUNTING AND TO ROUGH IN POWER AND DATA FOR TELEVISION. SEE ELECTRICAL FOR POWER AND DATA LOCATIONS.
6.03	4' TALL STAINLESS STEEL CORNER GUARD
6.58	PROVIDE 3/4" END PANEL. TO MATCH SCHEDULED MILLWORK FINISH

FLOOR FINISHES

F1	RUBBER FLOORING TYPE 1
F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
F3	EPOXY PAINTED CONCRETE
F4	TURF TYPE 1
F5	TURF TYPE 2
F6	TURF TYPE 3
F7	TURF TYPE 4
F8	EXISTING RUBBER FLOORING TO REMAIN, PATCH AND REPAIR WHERE NEEDED
F9	LUXURY VINYL TILE
F10	ACCENT LUXURY VINYL TILE
F11	CARPET TILE
F12	ACCENT CARPET TILE
F13	PORCELAIN FLOOR TILE

SEE A802 FOR FINISHES

FINISH LEGEND

CODE	MATERIAL
2- BASE FINISHES	
B1	6" RUBBER BASE
B2	CORRESPONDING TILE BASE
3- WALL FINISH	
W1	GENERAL PAINT
W2	ACCENT PAINT
W3	PORCELAIN WALL TILE
W4	CERAMIC WALL TILE
W5	EPOXY PAINTED CONCRETE
W6	PORCELAIN WALL TILE
W7	WALL PADDING
W8	ACCENT PAINT 2
W9	ACCENT PAINT 3
W10	PAINTED METAL STRUCTURE
W11	FIELD METAL PAINT
W12	DIAMOND PLATE
W13	PLASTIC LAMINATE WALL PANELS
W14	TEXTILE WALL COVERING
4- MILLWORK FINISHES	
M1	PLASTIC LAMINATE MILLWORK
M2	PLASTIC LAMINATE COUNTERTOP
M3	SOLID SURFACE
M4	PLASTIC LAMINATE MILLWORK
5-CEILING FINISH	
CL1	PAINTED GYPSUM BOARD
CL2	ACOUSTIC CEILING TILE
CL3	PAINTED STRUCTURE
6-DOOR FINISHES	
D1	PAINTED METAL DOOR & TRIM
D2	WOOD DOOR & PAINTED METAL TRIM

WALL FURNISHINGS LEGEND

A1	6'-0" x 4'-0"	MARKER BOARD
A2	12'-0" x 4'-0"	MARKER BOARD
B1	24" X 36"	MIRROR
B2	48" X 72"	MIRROR
C1	24" X 72"	WALL PADDING
C2	18" X 72"	I-BEAM WALL PADDING
C3	10" X 132"	CROSS BEAM WALL PADDING
D	8" X 8"	SIGNAGE, SEE SHEET A004
E	SEE WINDOW TYPES	MANUAL WINDOW SHADES - SEE SPECS
F	SEE WINDOW TYPES	MOTORIZED WINDOW SHADES - SEE SPECS

NOTE: COORDINATE FINAL LOCATION WITH OWNER AND ARCHITECT PRIOR TO INSTALLATION
* ALL SHADES IN MAIN AND AUXILIARY GYMS TO BE 1% TRANSMISSION, ALL OTHERS TO BE 5%

GENERAL NOTES

A. GENERAL CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION. REPORT ANY SIGNIFICANT DISCREPANCIES TO THE ARCHITECT.
B. COORDINATE INSTALLATIONS OF ALL "AFTER CONTRACT" ASSEMBLIES WITH OWNER PRIOR TO CONSTRUCTION OF ADJOINING OR RELATED STRUCTURES.
C. INTERIOR DRYWALL CORNERS TO BE SQUARE.
D. WALL TYPES SHOWN DO NOT ADDRESS CERAMIC TILE INSTALLATION ON WALL SURFACES AS SHOWN ON THE FLOOR PLANS. REFER TO THE CURRENT EDITION OF THE HANDBOOK FOR CERAMIC TILE INSTALLATION PUBLISHED BY THE TILE COUNCIL OF AMERICA, INC., FOR PROPER INSTALLATION MATERIALS AND METHODS. TILE TO BE INSTALLED OVER TILE BACKER BOARD.
E. SEE DETAILS ON SHEET **A003** FOR TYPICAL FIXTURE MOUNTING HEIGHTS. BLOCK WALLS AS REQUIRED FOR HANGING FIXTURES AND FURNISHINGS.
F. PROVIDE BLOCKING IN WALLS AT ALL TOILETS AND SHOWERS FOR GRAB BARS. SEE DETAIL **C3/A003 & D6/A003.**
G. ALL MILLWORK NUMBERS NOTED ARE TMI SYSTEMS. COORDINATE BETWEEN ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR MISCELLANEOUS ITEMS THAT MAY ONLY BE SHOWN ON ONE OR THE OTHER.
H. FINISH ALL EXTERIOR TILE CORNERS WITH SCHLUTER ECK - K.
I. IN ADDITION TO TMI SYSTEMS SELECT MILLWORK NUMBERS NOTED ARE KEWAUNEE. COORDINATE BETWEEN ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR LOCATIONS OF KEWAUNEE MILLWORK AND OTHER MISCHELANOUS ITEMS THAT MAY ONLY BE SHOWN ON ONE OR THE OTHER.
J. PROVIDE SCHLUTER-RONDEC CORNER PIECE WHERE TILE MEETS DOOR JAMBS

CORE ARCHITECTURE
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PROFESSIONAL STAMP

LICENSED ARCHITECT CURTIS LEONARD LIVINGSTON NO. 10067440 STATE OF UTAH

09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

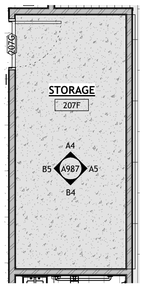
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

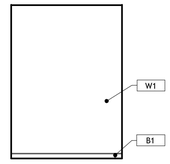
ALTERNATE - ENLARGED CONFERENCE ROOM

SHEET NUMBER

A986

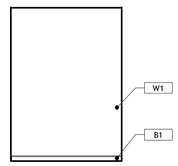


ENLARGED STORAGE 207F
A987 | SCALE: 1/4" = 1'-0"



A4 STORAGE 207F - A
A987 | SCALE: 1/4" = 1'-0"

A5 STORAGE 207F - A5
A987 | SCALE: 1/4" = 1'-0"



B4 STORAGE 207F - B4
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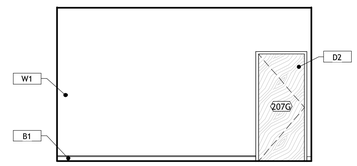

B5 STORAGE 207F - B
A987 | SCALE: 1/4" = 1'-0"

C2 STORAGE 208 - C
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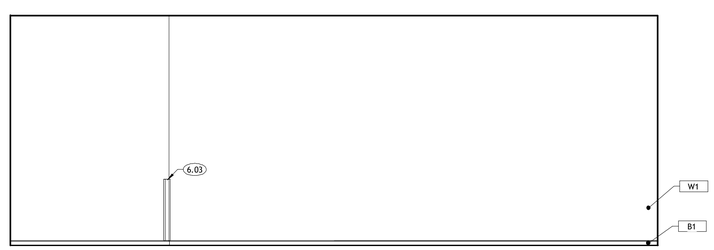
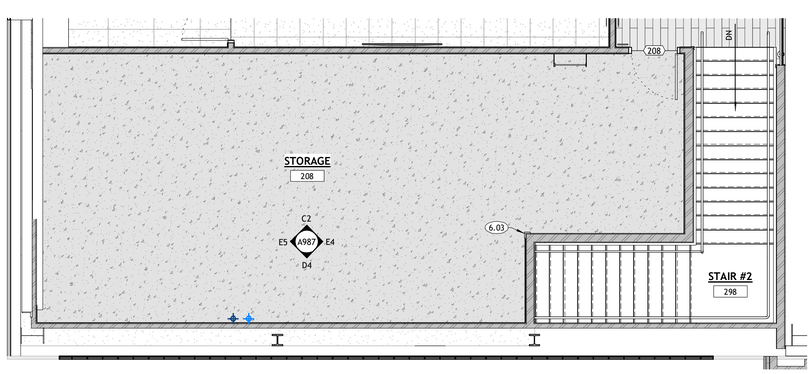


D4 STORAGE 208 - D
A987 | SCALE: 1/4" = 1'-0"



ENLARGED STORAGE 208
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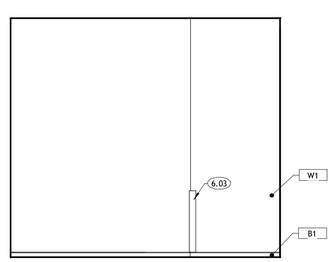
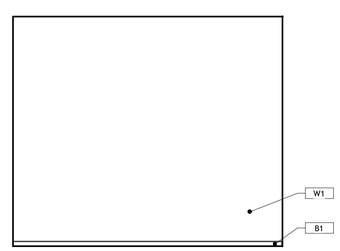


E4 STORAGE 208 - E
A987 | SCALE: 1/4" = 1'-0"



E5 STORAGE 208 - E
A987 | SCALE: 1/4" = 1'-0"

KEYNOTES

4.29	ROOF ACCESS LADDER AND HATCH
6.03	4' TALL STAINLESS STEEL CORNER GUARD

FLOOR FINISHES

F1	RUBBER FLOORING TYPE 1
F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
F3	EPOXY PAINTED CONCRETE
F4	TURF TYPE 1
F5	TURF TYPE 2
F6	TURF TYPE 3
F7	TURF TYPE 4
F8	EXISTING RUBBER FLOORING TO REMAIN, PATCH AND REPAIR WHERE NEEDED
F9	LUXURY VINYL TILE
F10	ACCENT LUXURY VINYL TILE
F11	CARPET TILE
F12	ACCENT CARPET TILE
F13	PORCELAIN FLOOR TILE

SEE A802 FOR FINISHES

FINISH LEGEND

CODE	MATERIAL
2- BASE FINISHES	
B1	6" RUBBER BASE
B2	CORRESPONDING TILE BASE
3- WALL FINISH	
W1	GENERAL PAINT
W2	ACCENT PAINT
W3	PORCELAIN WALL TILE
W4	CERAMIC WALL TILE
W5	EPOXY PAINTED CONCRETE
W6	PORCELAIN WALL TILE
W7	WALL PADDING
W8	ACCENT PAINT 2
W9	ACCENT PAINT 3
W10	PAINTED METAL STRUCTURE
W11	FIELD METAL PAINT
W12	DIAMOND PLATE
W13	PLASTIC LAMINATE WALL PANELS
W14	TEXTILE WALLCOVERING
4- MILLWORK FINISHES	
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M2	PLASTIC LAMINATE COUNTERTOP
M3	SOLID SURFACE
M4	PLASTIC LAMINATE MILLWORK
5-CEILING FINISH	
CL1	PAINTED GYPSUM BOARD
CL2	ACOUSTIC CEILING TILE
CL3	PAINTED STRUCTURE
6-DOOR FINISHES	
D1	PAINTED METAL DOOR & TRIM
D2	WOOD DOOR & PAINTED METAL TRIM

WALL FURNISHINGS LEGEND

A1	6'-0" x 4'-0"	MARKER BOARD
A2	12'-0" x 4'-0"	MARKER BOARD
B1	24" X 36"	MIRROR
B2	48" X 72"	MIRROR
C1	24" X 72"	WALL PADDING
C2	18" X 72"	I-BEAM WALL PADDING
C3	10" X 132"	CROSS BEAM WALL PADDING
D	8" X 8"	SIGNAGE, SEE SHEET A004
E	SEE WINDOW TYPES	MANUAL WINDOW SHADES - SEE SPECS
F	SEE WINODW TYPES	MOTORIZED WINDOW SHADES - SEE SPECS

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3

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E. SEE DETAILS ON SHEET **A003** FOR TYPICAL FIXTURE MOUNTING HEIGHTS. BLOCK WALLS AS REQUIRED FOR HANGING FIXTURES AND FURNISHINGS.
F. PROVIDE BLOCKING IN WALLS AT ALL TOILETS AND SHOWERS FOR GRAB BARS. SEE DETAIL **C3/A003 & D6/A003.**
G. ALL MILLWORK NUMBERS NOTED ARE TMI SYSTEMS. COORDINATE BETWEEN ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR MISCELLANEOUS ITEMS THAT MAY ONLY BE SHOWN ON ONE OR THE OTHER.
H. FINISH ALL EXTERIOR TILE CORNERS WITH SCHLUTER ECK - K.
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PROFESSIONAL STAMP

LICENSED ARCHITECT
CURTIS LEONARD LIVINGSTON
NO. 10021449
UTAH
09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

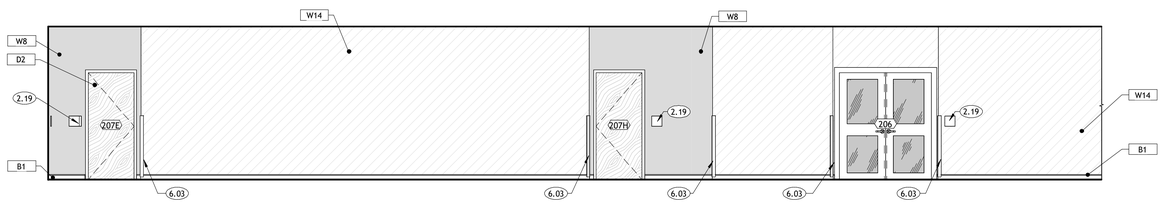
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

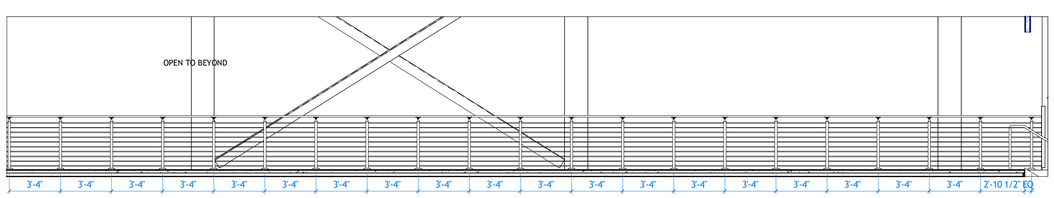
ALTERNATE - ENLARGED STORAGE

SHEET NUMBER

A987



C1 BALCONY 200 - C
A988 | SCALE: 1/4" = 1'-0"



D1 BALCONY 200 - D
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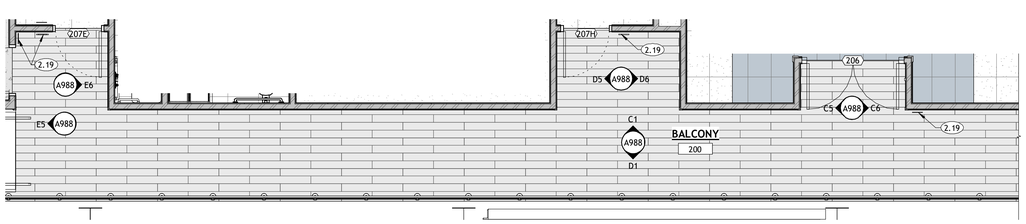

ENLARGED BALCONY - ALTERNATIVE
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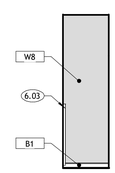

C5 BALCONY
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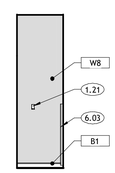
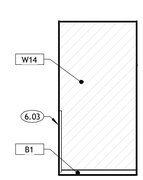
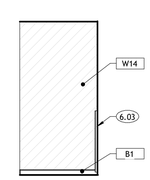


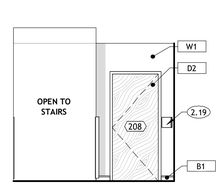
C6 BALCONY
A988 | SCALE: 1/4" = 1'-0"



D5 BALCONY
A988 | SCALE: 1/4" = 1'-0"



D6 BALCONY
A988 | SCALE: 1/4" = 1'-0"



E5 BALCONY 200 - A
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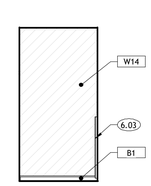

E6 BALCONY
A988 | SCALE: 1/4" = 1'-0"

KEYNOTES

1.21	DIGITAL CARD READER. SEE SPECIFICATIONS.
2.19	ROOM SIGNAGE. EACH ROOM DOOR/OPENING TO RECEIVE SIGNAGE. SOME ROOMS MAY RECEIVE MORE THAN ONE SIGN. SEE FLOOR PLANS AND DETAILS.
6.03	4' TALL STAINLESS STEEL CORNER GUARD

FLOOR FINISHES

F1	RUBBER FLOORING TYPE 1
F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
F3	EPOXY PAINTED CONCRETE
F4	TURF TYPE 1
F5	TURF TYPE 2
F6	TURF TYPE 3
F7	TURF TYPE 4
F8	EXISTING RUBBER FLOORING TO REMAIN, PATCH AND REPAIR WHERE NEEDED
F9	LUXURY VINYL TILE
F10	ACCENT LUXURY VINYL TILE
F11	CARPET TILE
F12	ACCENT CARPET TILE
F13	PORCELAIN FLOOR TILE

SEE A802 FOR FINISHES

FINISH LEGEND

CODE	MATERIAL
2- BASE FINISHES	
B1	6" RUBBER BASE
B2	CORRESPONDING TILE BASE
3- WALL FINISH	
W1	GENERAL PAINT
W2	ACCENT PAINT
W3	PORCELAIN WALL TILE
W4	CERAMIC WALL TILE
W5	EPOXY PAINTED CONCRETE
W6	PORCELAIN WALL TILE
W7	WALL PADDING
W8	ACCENT PAINT 2
W9	ACCENT PAINT 3
W10	PAINTED METAL STRUCTURE
W11	FIELD METAL PAINT
W12	DIAMOND PLATE
W13	PLASTIC LAMINATE WALL PANELS
W14	TEXTILE WALLCOVERING
4- MILLWORK FINISHES	
M1	PLASTIC LAMINATE MILLWORK
M2	PLASTIC LAMINATE COUNTERTOP
M3	SOLID SURFACE
M4	PLASTIC LAMINATE MILLWORK
5-CEILING FINISH	
CL1	PAINTED GYPSUM BOARD
CL2	ACOUSTIC CEILING TILE
CL3	PAINTED STRUCTURE
6-DOOR FINISHES	
D1	PAINTED METAL DOOR & TRIM
D2	WOOD DOOR & PAINTED METAL TRIM

WALL FURNISHINGS LEGEND

A1	6'-0" x 4'-0"	MARKER BOARD
A2	12'-0" x 4'-0"	MARKER BOARD
B1	24" X 36"	MIRROR
B2	48" X 72"	MIRROR
C1	24" X 72"	WALL PADDING
C2	18" X 72"	I-BEAM WALL PADDING
C3	10" X 132"	CROSS BEAM WALL PADDING
D	8" X 8"	SIGNAGE, SEE SHEET A004
E	SEE WINDOW TYPES	MANUAL WINDOW SHADES - SEE SPECS
F	SEE WINDOW TYPES	MOTORIZED WINDOW SHADES - SEE SPECS

NOTE: COORDINATE FINAL LOCATION WITH OWNER AND ARCHITECT PRIOR TO INSTALLATION
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F. PROVIDE BLOCKING IN WALLS AT ALL TOILETS AND SHOWERS FOR GRAB BARS. SEE DETAIL **C3/A003 & D6/A003**.
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H. FINISH ALL EXTERIOR TILE CORNERS WITH SCHLUTER ECK - K.
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PROFESSIONAL STAMP

LICENSED ARCHITECT
CURTIS LEONARD LIVINGSTON
NO. 10021449
STATE OF UTAH

09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

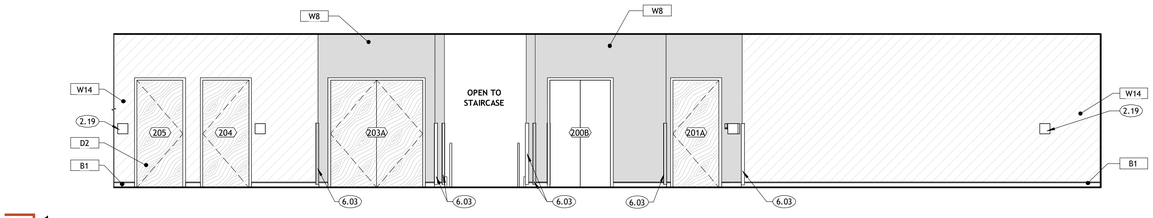
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

ALTERNATE - ENLARGED BALCONY

SHEET NUMBER

A988



C1 1 - a
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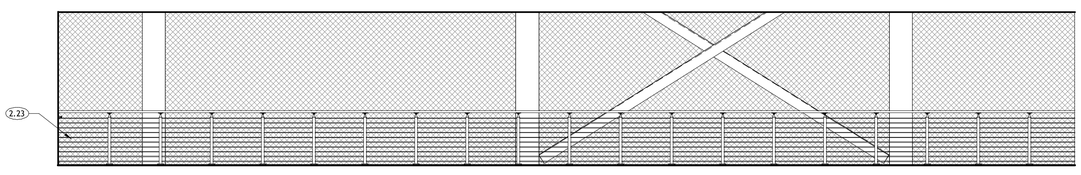

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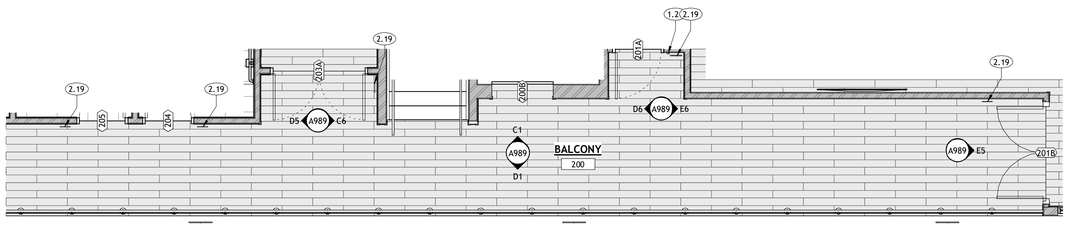

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UPPER FLOOR FURNISHINGS PLAN - ALTERNATIVE - 2
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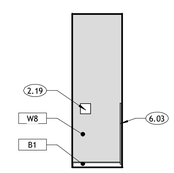

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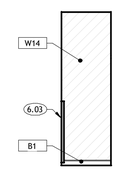
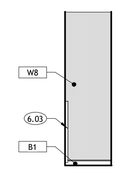


D5 BALCONY
A989 | SCALE: 1/4" = 1'-0"



D6 BALCONY
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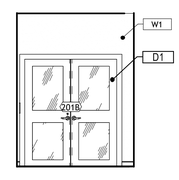
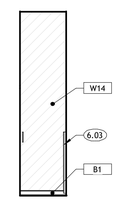


E5 BALCONY 200 - B
A989 | SCALE: 1/4" = 1'-0"



E6 BALCONY
A989 | SCALE: 1/4" = 1'-0"

KEYNOTES

1.21	DIGITAL CARD READER. SEE SPECIFICATIONS.
2.19	ROOM SIGNAGE. EACH ROOM DOOR/OPENING TO RECEIVE SIGNAGE. SOME ROOMS MAY RECEIVE MORE THAN ONE SIGN. SEE FLOOR PLANS AND DETAILS.
2.23	PAINTED STEEL GUARDRAIL. 42" ABOVE FINISHED FLOOR OR NOSE OF STAIRS. SEE TYPICAL DETAILS.
6.03	4' TALL STAINLESS STEEL CORNER GUARD

FLOOR FINISHES

F1	RUBBER FLOORING TYPE 1
F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
F3	EPOXY PAINTED CONCRETE
F4	TURF TYPE 1
F5	TURF TYPE 2
F6	TURF TYPE 3
F7	TURF TYPE 4
F8	EXISTING RUBBER FLOORING TO REMAIN, PATCH AND REPAIR WHERE NEEDED
F9	LUXURY VINYL TILE
F10	ACCENT LUXURY VINYL TILE
F11	CARPET TILE
F12	ACCENT CARPET TILE
F13	PORCELAIN FLOOR TILE

SEE A802 FOR FINISHES

FINISH LEGEND

CODE	MATERIAL
2- BASE FINISHES	
B1	6" RUBBER BASE
B2	CORRESPONDING TILE BASE
3- WALL FINISH	
W1	GENERAL PAINT
W2	ACCENT PAINT
W3	PORCELAIN WALL TILE
W4	CERAMIC WALL TILE
W5	EPOXY PAINTED CONCRETE
W6	PORCELAIN WALL TILE
W7	WALL PADDING
W8	ACCENT PAINT 2
W9	ACCENT PAINT 3
W10	PAINTED METAL STRUCTURE
W11	FIELD METAL PAINT
W12	DIAMOND PLATE
W13	PLASTIC LAMINATE WALL PANELS
W14	TEXTILE WALLCOVERING
4- MILLWORK FINISHES	
M1	PLASTIC LAMINATE MILLWORK
M2	PLASTIC LAMINATE COUNTERTOP
M3	SOLID SURFACE
M4	PLASTIC LAMINATE MILLWORK
5-CEILING FINISH	
CL1	PAINTED GYPSUM BOARD
CL2	ACOUSTIC CEILING TILE
CL3	PAINTED STRUCTURE
6-DOOR FINISHES	
D1	PAINTED METAL DOOR & TRIM
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WALL FURNISHINGS LEGEND

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C3	10" X 132"	CROSS BEAM WALL PADDING
D	8" X 8"	SIGNAGE, SEE SHEET A004
E	SEE WINDOW TYPES	MANUAL WINDOW SHADES - SEE SPECS
F	SEE WINODW TYPES	MOTORIZED WINDOW SHADES - SEE SPECS

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PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

ALTERNATE - ENLARGED BALCONY

SHEET NUMBER

A989

KEYNOTES

1.06	ADA COMPLIANT 36" HORIZONTAL GRAB BAR. SEE DETAILS AND SPECIFICATIONS.
1.09	ADA COMPLIANT GRAB BAR. SEE DETAILS AND SPECIFICATIONS.
1.10	ADA COMPLIANT SHOWER HEAD AND CONTROLS. SEE DETAILS AND SPECIFICATIONS.
1.11	ADA COMPLIANT FOLD-UP SHOWER SEAT AND SHOWER GRAB BARS. SEE DETAILS AND SPECIFICATIONS.
2.21	SHOWER CURTAIN AND ROD. SEE SPECIFICATIONS.
2.50	METAL GRID TEAM LOCKERS. SEE SPECIFICATIONS.
6.57	4' TALL STAINLESS STEEL CORNER GUARD. APPLY ON TOP OF SCHLUTER TILE EDGE PROTECTION
7.01	TOILET PAPER DISPENSER. PORVIDED BY OWNER, INSTALLED BY CONTRACTOR. SEE A803 FOR MOUNTING HEIGHTS
7.55	SOAP DISPENSER. OWNER PROVIDED, CONTRACTOR INSTALLED.
11.01	TOILET. SEE PLUMBING.
11.04	SINK. SEE PLUMBING.
11.05	FLOOR DRAIN. SEE PLUMBING SCHEDULE. VERIFY LOCATION WITH PLUMBING. SLOPE FLOOR 1/4" PER 1'-0" TOWARD DRAIN.

FLOOR FINISHES

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F2	RUBBER FLOORING TYPE 2 FIELD & ACCENT 1
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F4	TURF TYPE 1
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W13	PLASTIC LAMINATE WALL PANELS
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M4	PLASTIC LAMINATE MILLWORK
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CL2	ACOUSTIC CEILING TILE
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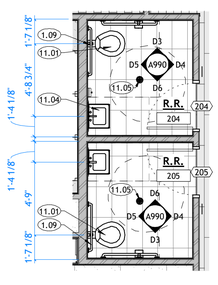
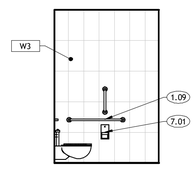


ENLARGED RESTROOM 204 & 205
A990 | SCALE: 1/4" = 1'-0"



D3 RESTROOM 204 & 205 - A
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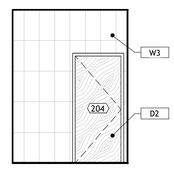

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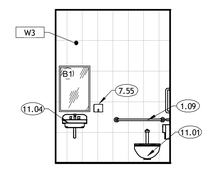

D5 RESTROOM 204 & 205 - C
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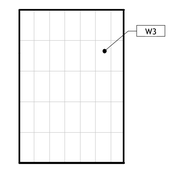

D6 RESTROOM 204 & 205 - D
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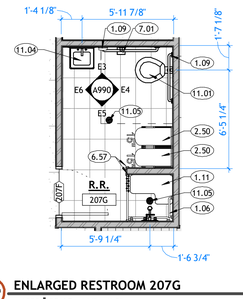
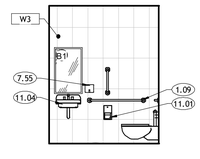
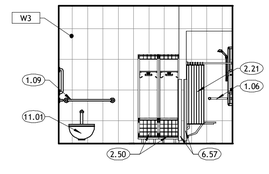


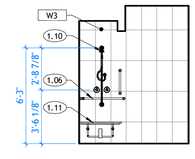
ENLARGED RESTROOM 207G
A990 | SCALE: 1/4" = 1'-0"



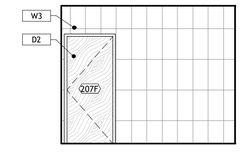
E3 RESTROOM 207G - A
A990 | SCALE: 1/4" = 1'-0"



E4 RESTROOM 207G - B
A990 | SCALE: 1/4" = 1'-0"



E5 RESTROOM 207G - C
A990 | SCALE: 1/4" = 1'-0"



E6 RESTROOM 207G - D
A990 | SCALE: 1/4" = 1'-0"

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LICENSED ARCHITECT
CURTIS LEONARD LITWINOVICH
NO. 10021449
STATE OF UTAH

09 OCT. 24

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PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

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CYD CORNER CANYON HS – FIELD HOUSE

Electrical Addendum #4 **Issue Date: 10/09/2024**

CHANGES TO THE DRAWINGS:

SHEET E001

1. Include new sheet T250 – audiovisual rough in diagrams in index.

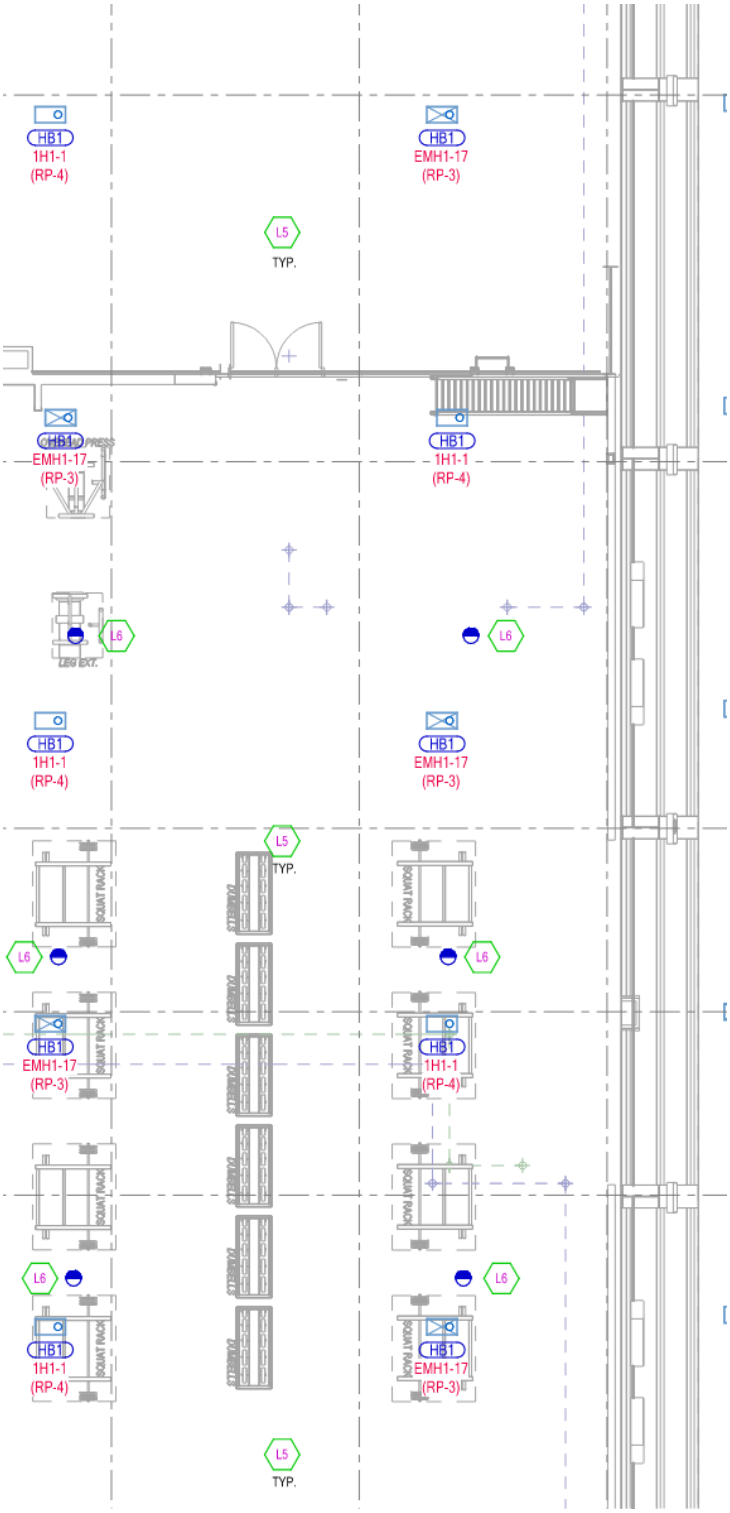
SHEET E002 –

1. Refer to attached sheet for revisions.

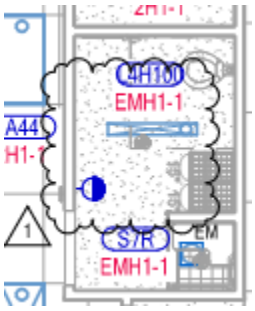
SHEET 201 –

1. Provide 4 type X2 exit signs with wire guards for field side exit doors. Circuit all exit signs on circuit EMH1-31.
2. Clarify language of keynote L4 to say: LOCATE WALLSTATION WITHIN SWITCHING CABINET. SEE DIAGRAM P004 FOR MORE INFORMATION. SEE LIGHTING NARRATIVE FOR CONTROL DESCRIPTIONS.
3. Wallstations in the weight room are type LC4. All switching cabinets on the Turf side of the building contain wallstation types LC1, LC2, and LC3.

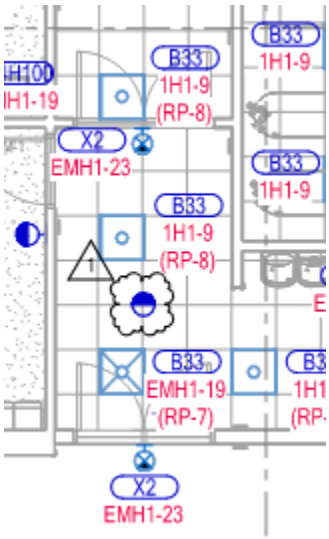
4. Refer to snapshot below for revised normal and emergency fixture circuiting in the weight room.



SHEET E202 –

1. Replace ceiling occ sensor with wall mounted occ sensor in bathroom rr-207g adjacent to conference room.
   a. 

2. Add (1) occ sensor to corridor by the locker room for full coverage of the hallway.



SHEET E301 – CHANGES FOR IT

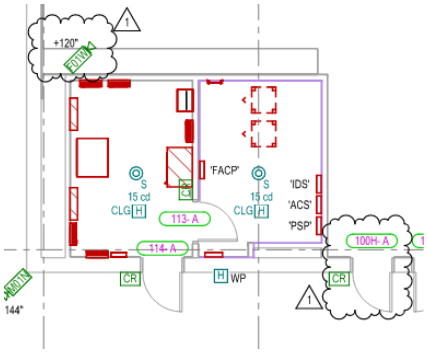
1. Refer to sheet for updates.

SHEET E302

1. Main level - match changes to base bid (e301).
2. Upper level – add ceiling data port and wap in conference room.
3. Upper level – add wap in multi-purpose space.
4. Circuit floorbox in Legacy room to circuit 2L1-39.

SHEET E401

1. Add (1) card reader to weight room door.

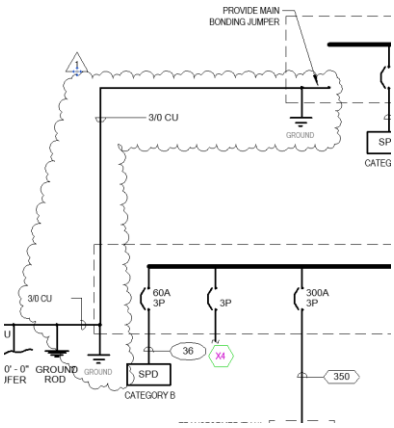
2. Add (1) camera in corner of weight room adjacent to electrical room.
   a. 

3. Add (1) tamper switch for a total of (2) in fire riser room.
4. Add (4) horn strobes with wire guards to north wall in field room.
5. Clarify nearby circuit 1l3-27 to be used for the fire alarm bell.

SHEET E402

1. Add (1) card reader (same as base bid, match e401).

SHEET E501

1. Clarify spd's for emh1 and eml1 are both category c type.
2. Add keynote x8 to panel 1l3 to clarify 1l3-a is simply an alternate version of the panel if the alternate is accepted.
   a. X8 IF THE ALTERNATE IS ACCEPTED THAN THE PANEL SCHEDULE FOR 1L3-A REPLACES 1L3. OTHERWISE, PANEL SCHEDULE 1L3 IS THE DEFAULT SCHEDULE FOR THE BASE BID.
3. Add grounding details per review comments.
   a. 

SHEET E601

1. Update panel schedule 2h1 which was missing wire sizes. See below image of the schedule

PANELBOARD SCHEDULE

PANEL: 2H1 **TYPE:** Type 1 **VOLTS:** 480/277 Y **PHASE:** 3 **WIRES:** 4

LOCATION: TURF FIELD-1 100-1
FED FROM: MDPH
MOUNTING: SURFACE
BUSSING:

MAINS/BUS AMPS: 225
MAIN DISC. TYPE: MLO
MAIN DISC. TRIP: MLO

LUGS: Standard
X DOOR-IN-DOOR
200% NEUTRAL
ISO GROUND
SPD

BRANCH BREAKERS

ITEM	AMPS	POLE	WIRE SIZE	CIR. NO.	A	B	C	A	B	C	CIR. NO.	WIRE SIZE	POLE	AMPS	ITEM
UPPER NORTHWEST...	20 A	1	#12	1	1464 VA			4656 VA			2	#12	3	25 A	RT-5
UPPER NORTHEAST LIGHTING	20 A	1	#12	3		1447 VA			4656 VA		4	–	–	–	–
RT-7	15 A	3	#12	5			2882 VA			4656 VA	6	–	–	–	–
–	–	–	–	7	2882 VA			3547 VA			8	#12	3	20 A	RT-2
–	–	–	–	9		2882 VA			3547 VA		10	–	–	–	–
RT-4	15 A	3	#12	11			2439 VA			3547 VA	12	–	–	–	–
–	–	–	–	13	2439 VA			0 VA			14	–	1	20 A	SPARE
–	–	–	–	15		2439 VA			0 VA		16	–	1	20 A	SPARE
RT-6	25 A	3	#10	17			4656 VA			0 VA	18	–	1	20 A	SPARE
–	–	–	–	19	4656 VA			0 VA			20	–	1	20 A	SPARE
–	–	–	–	21		4656 VA			0 VA		22	–	1	20 A	SPARE
RT-3	15 A	3	#12	23			2882 VA			0 VA	24	–	1	20 A	SPARE
–	–	–	–	25	2882 VA			0 VA			26	–	1	20 A	SPARE
–	–	–	–	27		2882 VA			0 VA		28	–	1	20 A	SPARE
SPARE	20 A	1	–	29			0 VA			0 VA	30	–	1	20 A	SPARE
SPARE	20 A	1	–	31	0 VA			0 VA			32	–	1	20 A	SPARE
SPARE	20 A	1	–	33		0 VA			0 VA		34	–	1	20 A	SPARE
SPARE	20 A	1	–	35			0 VA			0 VA	36	–	1	20 A	SPARE
SPARE	20 A	1	–	37	0 VA			0 VA			38	–	1	20 A	SPARE
SPARE	20 A	1	–	39		0 VA			0 VA		40	–	1	20 A	SPARE
SPARE	20 A	1	–	41			0 VA			0 VA	42	–	1	20 A	SPARE
					22526	22509	21062	**TOTAL (VA)**							**CONNECTED LOAD TOTAL**
					82 A	82 A	76 A	**AMPS/PHASE**							66096 VA

AIC RATING: 15,218 **AMPS RMS SYSM.**

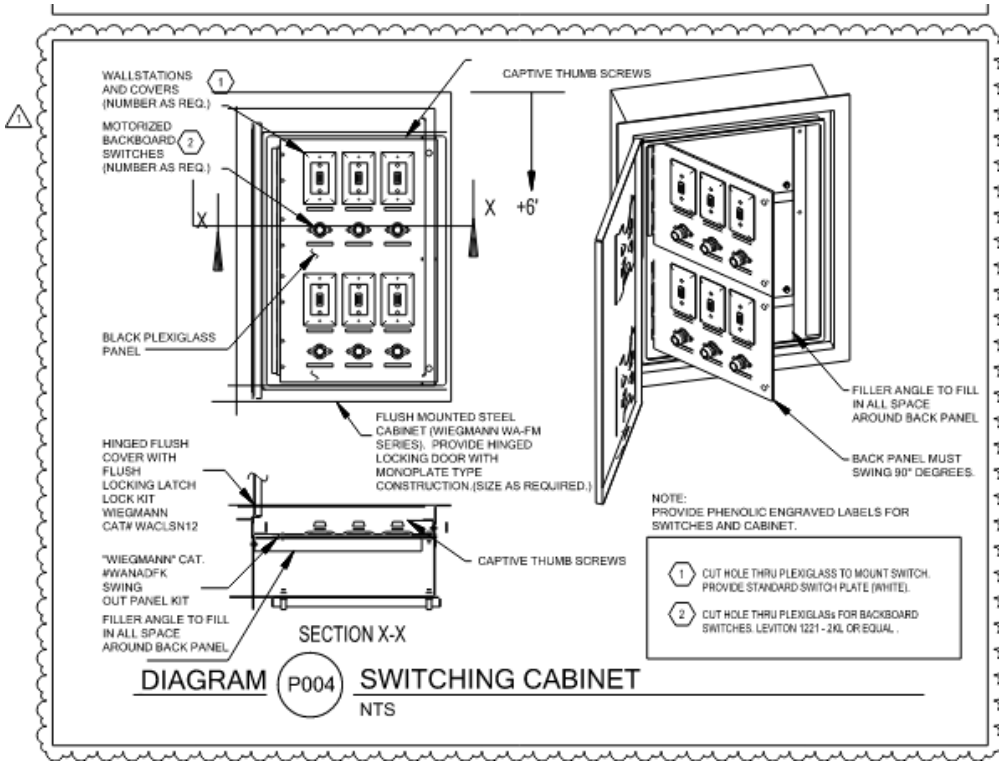
NOTES: * PROVIDE 5mA GFCI CIRCUIT BREAKER ** PROVIDE 30mA CIRCUIT BREAKER

CYD CORNER CANYON HS – FIELD HOUSE

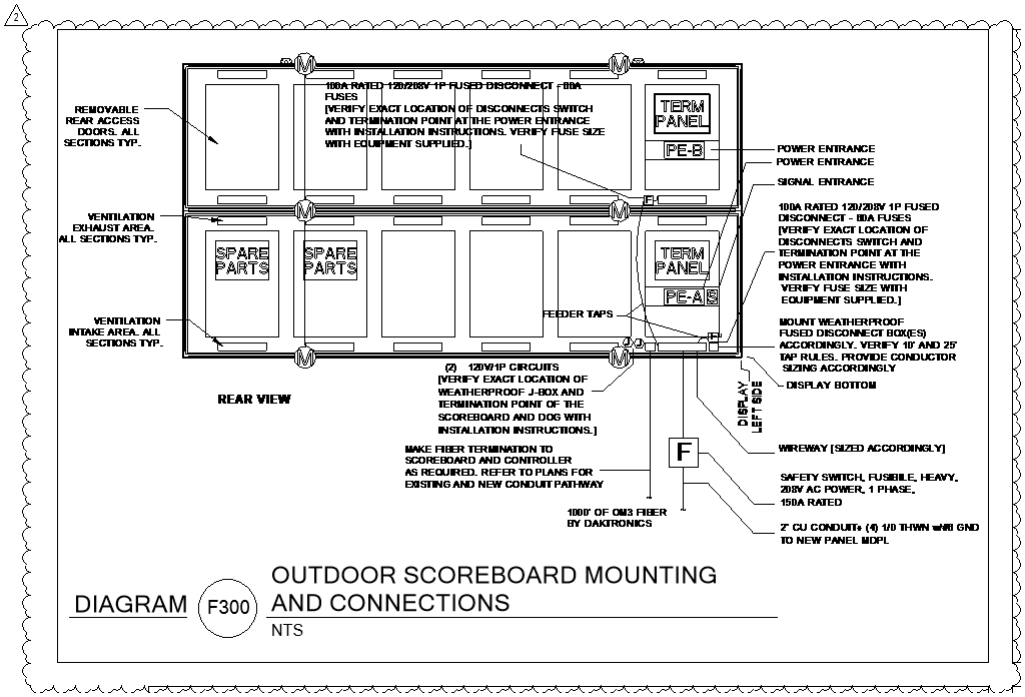
Electrical Addendum #4 **Issue Date: 10/09/2024**

SHEET E704

1. Add diagram p004.



2. Update Diagram F300.



CHANGES TO THE SPECIFICATIONS:

SPECIFICATION 27 4100 AUDIOVISUAL SYSTEMS

1. Make the following changes to section 2.4 EQUIPMENT SCHEDULES

EQUIPMENT REQUIRED PER ROOM TYPE

1. FIELDHOUSE / WIEGHT ROOM EQUIPMENT SCHEDULE
   a. Remove SHURE UA221 and add:

AT	ANTENNA DISTRIBUTION SYSTEM	RF VENUE	DISTRO4 ANTENNA DISTRIBUTOR

b. Remove BT RDL DB-BT1A and TX-TPR3A

c. Remove Network Switch; NETGEAR M4250-9G1F-PoE+ and add:

	NETWORK SWITCH, MANAGED, PoE+, 480W (24) 1GB AND 4SFP+ PORTS	NETGEAR	M4250-26G4XF-POE+

d. Add the following video encoders and decoders:

ENC	A/V ENCODER, 4K/60 4:2:0 UHD OVER IP, POE, 1 HDMI W/LOOPOUT, 1 RS-232, 1 STEREO IN, USB 2.0 EXTENSION, VIDEO SCALER	VISIONARY SOLUTIONS	E4100
DEC	A/V DECODER, 4K/60 4:2:0 UHD OVER IP, POE, 1 HDMI OUT, 1 RS-232, 1 STEREO OUT, 2 USB 2.0 EXTENSION, VIDEO SCALER	VISIONARY SOLUTIONS	D4100
EN1	A/V ENCODER, WALL-PLATE UHD OVER IP, WITH BLUETOOTH, POE	VISIONARY SOLUTIONS	E-WP-BT

e. Add Sliding Shelf SS

SHELF, PULL OUT, RACK MOUNT LATCHING, 1 RU	MIDDLE ATLANTIC	SS

CHANGES TO THE DRAWINGS:

SHEET T201

1. Updated AV Schedules.

SHEET T211-A & T211-B(Attached)

1. Added two (2) D75 displays to Weight Room
2. Moved touch-panel TP7, moved and changed BT to an EN1

SHEET T221-A

1. Changed icons for loudspeakers from ceiling type to cabinet type.
2. Change in speaker zones.
3. Added Sheet Keynote V8.

SHEET T221-B

1. Changed diagram call out.

SHEET T250 AUDIOVISUAL DIAGRAMS

1. Added this page

SHEET T260 (Attached)

1. See clouded changes on diagrams.

CYD CORNER CANYON HS – FIELD HOUSE

Electrical Addendum #4 **Issue Date: 10/09/2024**

PRIOR APPROVAL OF MANUFACTURERS OF ELECTRICAL EQUIPMENT

The following items, trade names, products and manufacturers are approved for bidding. Approval does not relieve the bidder from satisfying the intent of the requirements of drawings, specifications and addenda in every respect. Failure to conform to the design quality and standards specified, established and required may result in later disapproval. If equipment must be disapproved after bidding, supplier shall supply specified equipment at no extra cost to the Owner.

Items are listed generally and specific model number, etc. shall be as submitted. Items submitted but not approved, either did not satisfy the requirements, or showed insufficient data, or arrived after the 8 day deadline established for submittals.]

TYPE	SPECIFIED	QUANTUM APPROVED	BUILD 26 APPROVED	SSCO APPROVED	JRC APPROVED
A44	ILP	METALUX	-	DAYBRITE	LITHONIA
A75	DAY-BRITE	METALUX	COLUMBIA	-	LITHONIA
B33	ILP	METALUX	-	DAYBRITE	LITHONIA
D4A	PRESCOLITE	PORTFOLIO	-	LIGHTOLIER	LITHONIA
EH	COLUMBIA LIGHTING	METALUX	-	DAYBRITE	PA-CO LIGHTING
HB1	GE LIGHTING	METALUX	COLUMBIA	-	LITHONIA
L2RM	PINNACLE	NULITE	LUMENWERX	-	ARCHITECTURAL LTG WORKS
L4H100	METALUX	-	COLUMBIA	SLG LTG	LITHONIA
L8H100	METALUX	-	COLUMBIA	SLG LTG	LITHONIA
OW1	HE WILLIAMS	LUMARK	BEACON	-	SPITZER LTG
S7R	LIGHTOLIER		PRESCOLITE	-	JUNO LTG GROUP
SL2	METALUX	-	COLUMBIA	DAYBRITE	LITHONIA
SL2C	METALUX	-	COLUMBIA	DAYBRITE	LITHONIA
X1	EMERGI-LITE	-	BEGH	PHILIP CHLORIDE	LITHONIA
X2	EMERGI-LITE	-	BEGH	PHILIP CHLORIDE	LITHONIA

END OF ELECTRICAL ADDENDUM

FLOOR BOX SCHEDULE

TYPE	DESCRIPTION	MFR.	CATALOG NUMBER
FB01	MULTI-SERVICE RECESSED EIGHT-COMPARTMENT FLOOR BOXES WITH (3) 1-GANG COMPARTMENTS FOR POWER, (1) 1-GANG COMPARTMENT FOR DATA, (2)-GANG FOR SPARE, (2) 1-GANG COMPARTMENTS FOR AV WHERE INDICATED. INCLUDE MUDCAP, DEVICE PLATES, BLANK PLATES, MOUNTING BRACKETS, SPACERS AND COVER ASSEMBLIES. PROVIDE FLUSH TILE ASSEMBLIES. SEE SECTION 26 2726, WIRING DEVICES AND 27 1500 TELEPHONE/DATA SYSTEM. PROVIDE NUMBER OF DEVICES INDICATED IN DRAWINGS WITH A MINIMUM OF (3) DUPLEX RECEPTACLES, MINIMUM OF TYPE "L-2" DATA OUTLET UNLESS OTHERWISE NOTED, AND CONDUITS REQUIRED FOR AV INFRASTRUCTURE IN EACH FLOOR BOX; STUB (2) SPARE 1-1/4" CONDUIT FROM BOX TO ACCESSIBLE CEILING WITHIN ROOM AND LABEL "SPARE FLOOR BOX CONDUIT"	WIREMOLD	EFB8S-OG-SCBA-XX-XX

LIGHTING CONTROL INTENT NARRATIVE (IECC 2021 COMPLIANT)

THE DRAWINGS SHOW GENERAL ZONING INTENT. THE BIDDING CONTRACTOR ALONG WITH THE LIGHTING CONTROLS MANUFACTURER IS RESPONSIBLE FOR PROVIDING A SYSTEM WITH THE FEATURES NECESSARY AND MUST BE CAPABLE OF MEETING THE INTENT. THE MANUFACTURER'S REPRESENTATIVE FOR DIVISION 26 AND BIDDING CONTROLS SHALL BE ACCOUNTABLE FOR THE COMPREHENSIVE LIGHTING CONTROLS PACKAGE'S FINALIZATION IN ALIGNMENT WITH THE DESIGN INTENT DEPICTED IN THE DRAWINGS AND COMPLYING WITH IECC 2021 REQUIREMENTS. THE LIGHTING REPRESENTATIVE IS REQUIRED TO FURNISH EXHAUSTIVE SHOP DRAWINGS, ELUCIDATING THE LIGHTING CONTROL SYSTEM'S TOPOLOGY AND THE ESSENTIAL CONNECTIONS NECESSARY FOR ITS PROPER FUNCTIONING.

GENERAL PRINCIPLES:
- ALL INDOOR AND OUTDOOR LIGHTING WILL BE CONTROLLED BY A SYSTEM THAT PRIORITIZES ENERGY EFFICIENCY AND OCCUPANT COMFORT, MEETING IECC 2021 REQUIREMENTS.
- LIGHTING WILL PRIMARILY FOLLOW A MASTER CLOCK SCHEDULE PROVIDED BY THE OWNER, WITH MANUAL OVERRIDE THROUGH TOUCH PANELS FOR FINE-TUNING.
- 0-10V DIMMING WILL BE AVAILABLE ON ALL APPLICABLE LUMINAIRES FOR SMOOTH LIGHT LEVEL ADJUSTMENTS.
- OCCUPANCY SENSORS WILL AUTOMATICALLY DIM LIGHTS TO PRESET LEVELS (50% FOR CORRIDORS, STAIRWELLS, VESTIBULES) AFTER PERIODS OF INACTIVITY (15 MINUTES).
- TYPICAL ROOM CONTROLLER STYLE BASED LIGHTING CONTROLLER (NON-NETWORKED). PROVIDE REQUIRED RELAYS AND END DEVICES AS NEEDED E.G. OCCUPANCY SENSORS, DAYLIGHT SENSORS, WALLSTATIONS, ETC.

SPECIFIC AREAS:

VESTIBULES:
- OCCUPANCY SENSORS TRIGGER CORRIDOR RELAY TO DIM ALL LIGHTS TO 50% AFTER 15 MINUTES OF VACANCY.
- OCCUPANCY SENSOR PLACEMENT WILL FOLLOW MANUFACTURER RECOMMENDATIONS FOR OPTIMAL DETECTION.

RC1 WALLSTATION:
- ALL ON: TURNS ALL LIGHTING RELAYS ON, BRINGING ALL DIMMING ZONES TO 100%.
- RAISE & LOWER (PRESS AND HOLD): INCREASES OR DECREASES THE BRIGHTNESS OF ALL DIMMING ZONES.
- ALL OFF: TURNS OFF ALL LIGHTING LOADS.

CORRIDORS:
- LIGHT AUTOMATICALLY TURN ON 100% WHEN USER ENTERS,WITH 50% DIM LEVEL TRIGGERED BY OCCUPANCY SENSORS AFTER 15 MINUTES OF INACTIVITY.

EGRESS CORRIDORS:
- LIGHTS AUTOMATICALLY TURN ON TO 100% WHEN USER ENTERS, BUT EGRESS LIGHTS REMAIN ON AT 30% AFTER BUILDING CLOSURE.
- MOTION SENSORS ACTIVATE EGRESS LIGHTS TO 100% FOR 20 MINUTES AFTER DETECTING MOVEMENT, THEN DIM BACK TO 30% ON VACANCY.
- LIGHTS REMAIN AT 30% UNTIL SCHEDULED BUILDING OPENING.

WASHROOMS:
- OCCUPANCY: LIGHTS AUTOMATICALLY TURN ON 100%, AND LIGHTS WILL AUTOMATICALLY TURN OFF 15 MINUTES AFTER VACATED.

OFFICES:
- ROOM CONTROLLER BASED SYSTEM WITH OCCUPANCY THAT MANAGE OFFICE LIGHTING. LIGHTS AUTOMATICALLY TURN ON TO DAYLIGHT LEVEL WHEN USER ENTERS, AND LIGHTS WILL AUTOMATICALLY TURN OFF 15 MINUTES AFTER VACATED.
- TOGGLE CONTROL BETWEEN ON/OFF. 0-10V DIMMING, RAISE AND LOWER.

BUILDING ENTRY SOFFITS:- RELAY CONTROLLED.
- FOLLOWS THE MASTER CLOCK SCHEDULE WITH ASTRONOMICAL OVERRIDE (DUSK ON AND DAWN OFF) AND ADDITIONAL OVERRIDE (DUSK ON/11:00 PM OFF, 6 AM ON/DAWN OFF).

BUILDING FACADE/WALL PACKS:- RELAY CONTROLLED:
- FOLLOWS THE MASTER CLOCK SCHEDULE WITH TOUCH PANEL OVERRIDE AND ASTRONOMICAL OVERRIDE (DUSK ON). LIGHTS DIM TO 50% AFTER 10 PM AND TURN OFF AT DAWN.
- LIGHTS DIM TO 50% AFTER 10 PM AND TURN OFF AT DAWN.

LC1 WALLSTATION:
- ALL ON: BUTTON SHALL TURN ON ALL RELAYS WITHIN THE NORTH HALF OF THE FIELDHOUSE, ALL DIMMING ZONES TO 100%.
- RAISE: PRESS AND HOLD - INCREASE ALL DIMMING ZONES WITHIN THE NORTH GYM.
- LOWER: PRESS AND HOLD - DECREASE ALL DIMMING ZONES LEVELS WITHIN THE NORTH GYM.
- ALL OFF: BUTTON SHALL TURN AL LIGHTING LOADS OFF WITHIN THE NORTH GYM.

LC2 WALLSTATION:
- ALL ON: BUTTON SHALL TURN ON ALL RELAYS WITHIN THE SOUTH HALF OF THE FIELDHOUSE, ALL DIMMING ZONES TO 100%.
- RAISE: PRESS AND HOLD INCREASE ALL DIMMING ZONES WITHIN THE SOUTH GYM.
- LOWER: PRESS AND HOLD - DECREASE ALL DIMMING ZONES LEVELS WITHIN THE SOUTH GYM.
- ALL OFF: BUTTON SHALL TURN AL LIGHTING LOADS OFF WITHIN THE SOUTH GYM.

LC3 WALLSTATION:
- ALL ON: TURNS ALL LIGHTS.
- RAISE & LOWER (PRESS AND HOLD): INCREASES OR DECREASES THE BRIGHTNESS OF ALL DIMMING ZONES.
- ALL OFF: TURNS OFF ALL LIGHTING LOADS.

LC4 WALLSTATION:
- ALL ON: TURNS ON ALL LIGHTS IN THE WEIGHT ROOM.
- RAISE & LOWER (PRESS AND HOLD): INCREASES OR DECREASES THE BRIGHTNESS OF ALL DIMMING ZNES IN THE WEIGHT ROOM.
- ALL OFF: TURNS OFF ALL LIGHTING LOADS IN THE WEIGHT ROOM.

COMPLIANCE:
THIS NARRATIVE OUTLINES A LIGHTING CONTROL SYSTEM THAT COMPLIES WITH THE LATEST IECC 2021 REQUIREMENTS, EMPHASIZING AUTOMATED CONTROLS, DAYLIGHT HARVESTING, AND ENERGY-EFFICIENT DIMMING BASED ON OCCUPANCY AND AMBIENT LIGHT LEVELS. THIS APPROACH HELPS MINIMIZE ENERGY CONSUMPTION WHILE ENSURING ADEQUATE LIGHTING FOR OCCUPANT SAFETY AND COMFORT.

EMERGENCY LIGHTING AND IBC/IECC COMPLIANCE IN ADDITION TO THE STANDARD LIGHTING CONTROL SYSTEM, THE PROJECT WILL INCLUDE AN EMERGENCY LIGHTING SYSTEM DESIGNED TO MEET THE REQUIREMENTS OF THE INTERNATIONAL BUILDING CODE (IBC) AND THE INTERNATIONAL ENERGY CONSERVATION CODE (IECC). THIS SYSTEM PRIORITIZES OCCUPANT SAFETY AND EGRESS DURING POWER OUTAGES.

EMERGENCY LIGHTING FEATURES:
- AUTOMATIC ACTIVATION: UPON DETECTION OF A POWER FAILURE, EMERGENCY LIGHTS WILL AUTOMATICALLY SWITCH ON TO 100% BRIGHTNESS WITHIN THE FACILITY.
- EXIT PATH ILLUMINATION: EMERGENCY LIGHTING WILL BE STRATEGICALLY PLACED TO EFFECTIVELY TO ILLUMINATE ALL DESIGNATED. EXIT PATHS AND STAIRWELLS, FACILITATING SAFE EVACUATION.
- COMPLIANCE AND INSPECTION: THE EMERGENCY LIGHTING SYSTEM WILL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH IBC AND IECC REQUIREMENTS, AND WILL BE SUBJECT TO REGULAR INSPECTIONS TO ENSURE PROPER FUNCTIONALITY.

ADDITIONAL NOTES:
- THE SPECIFIED TIME DELAYS AND LIGHT LEVELS CAN BE ADJUSTED TO SUIT THE SPECIFIC NEEDS OF THE BUILDING AND OCCUPANTS. AFTER 2 MONTHS OF OCCUPANCY, LIGHTING PROGRAMMER SHALL RETURN TO MAKE ADJUSTMENTS PER THE OWNERS REQUEST.

GENERAL NOTES

1. PROGRAM SYSTEM TO MEET THE REQUIREMENTS OF IECC 2018 OR CURRENT ENERGY CODE.
2. CONFIRM SWITCHING AND PROGRAMMING SCHEME WITH OWNER PRIOR TO PROGRAMMING.
3. PROGRAM SYSTEM TO INCORPORATE AUTO DAYLIGHT SAVINGS ADJUSTMENTS, ASTRONOMICAL CLOCK WITH OFFSETS, HOLIDAY DATES, AND NETWORK OVERRIDE.
4. REFER TO WALLSTATION DIAGRAMS FOR FACTORY ENGRAVED LABELING FOR ALL INDIVIDUAL PUSH-BUTTONS. DEVICE AND COVERPLATE COLORS SELECTED BY ARCHITECT.
5. SUBMIT ALL WALLSTATION LAYOUTS, ENGRAVING AND CONTROL SEQUENES DURING THE SHOP DRAWINGS REVIEW PROCESS.
6. PROVIDE RELAY BARRIER FOR VOLTAGE AND POWER SOURCE SEPARATION (EMERGENCY AND NORMAL CIRCUITS, VOLTAGE DIFFERENCES).
7. SYSTEM MUST INTERFACE WITH NEW OR EXISTING ENERGY MANAGEMENT SYSTEM/BMS. PROVIDE SYSTEM CONSISTING WITH MONITOR(S), COMMUNICATIONS EQUIPMENT, A CONTROLLER(S), TIMER(S), OR OTHER DEVICE(S) THAT MONITOR AND/OR CONTROL AN ELECTRICAL LOAD OR POWER PRODUCTION OR STORAGE SOURCE. COORDINATE EXACT TIE-IN POINTS AND COMMUNICATION PROTOCOL/MODULES REQUIRED. PROGRAM ACCORDINGLY AND PER OWNERS REQUIREMENTS.

CONTROL ROUGH-IN NOTES

1. DIVISION-26 IS RESPONSIBLE TO PROVIDE CONDUIT AND ROUGH-IN FOR ALL THERMOSTAT CONTROLS LOCATED WITHIN WALLS. REFER TO DIVISION 21-23 DRAWINGS AND COORDINATE WITH CONTROLS CONTRACTOR TO VERIFY EXACT LOCATION OF ALL THERMOSTATS. PROVIDE ELECTRICAL BOXES, METAL CONDUIT, TUBING, AND FITTINGS OF TYPES, GRADES, SIZES, AND WEIGHTS (WALL THICKNESS) AS INDICATED; WITH MINIMUM TRADE SIZE OF 3/4". SURFACE MOUNTED RACEWAY IN FINISH AREAS IS NOT ALLOWED.
2. ELECTRICAL CONTRACTOR SHALL VERIFY ALL CONDUIT AND ROUGH-IN REQUIREMENTS PRIOR TO ANY ROUGH-IN OF THERMOSTAT PATHWAYS, AND ELECTRICAL CONTRACTOR SHALL HAVE THE FINAL RESPONSIBILITY FOR PROPERLY COORDINATING THE ELECTRICAL WORK, INCLUDING THE EXACT LOCATION OF THE THERMOSTATS. OBTAIN SUBMITTALS OF ALL WALL MOUNTED THERMOSTATS FROM CONTROLS CONTRACTOR AND DIVISION 21 THROUGH 23 CONTRACTOR(S).
3. NOTIFY ENGINEER OF ANY MODIFICATIONS BETWEEN CONTRACT DOCUMENTS AND SUBMITTALS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ENSURE COMPLIANCE WITH THE DOCUMENTS.
4. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL THEIR OWN BLOCKOUTS AND COORDINATING THEIR SPACE OF A SHARED BLOCKOUT.
5. COORDINATE ALL INTERFACES BETWEEN MECHANICAL/TEMPERATURE CONTROLS AND ELECTRICAL/COMMUNICATIONS/SECURITY DIVISIONS BEFORE SUBMITTING ANY EQUIPMENT FOR REVIEW OR BEGINNING INSTALLATION.

EQUIPMENT SCHEDULE

CONNECTION TYPE NOTES:

1. NON-FUSED DISCONNECT SWITCH
2. FUSED DISCONNECT SWITCH
3. BREAKER IN ENCLOSURE
4. MANUAL STARTER WITH THERMAL OVERLOAD
5. MAGNETIC STARTER
6. MAGNETIC STARTER/NON-FUSED DISCONNECT COMBINATION
7. MAGNETIC STARTER/FUSED DISCONNECT COMBINATION
8. MAGNETIC STARTER/BREAKER COMBINATION
9. VARIABLE FREQUENCY DRIVE
10. REDUCED VOLTAGE STARTER
11. DIRECT CONNECTION
12. RECEPTACLE/SPECIAL PURPOSE OUTLET/ETC.
13. TWO-SPEED STARTER. COORDINATE WITH MOTOR TYPE
14. SOLID STATE SOFT-STARTER

RESPONSIBILITY LEGEND:

A. FURNISHED, INSTALLED AND CONNECTED UNDER DIVISION 26(16)
B. FURNISHED AND INSTALLED UNDER ANOTHER DIVISION. REQUIRED CONNECTION UNDER DIVISION 26(16)
C. FURNISHED UNDER ANOTHER DIVISION BUT INSTALLED AND CONNECTED UNDER DIVISION 26(16)
D. FURNISHED, INSTALLED AND CONNECTED UNDER ANOTHER DIVISION

CB = CIRCUIT BREAKER

NOTE 1: PER 250.122(A), EQUIPMENT GROUND IS NOT REQUIRED TO BE LARGER THAN THE PHASE CONDUCTOR
NOTE 2: OVERCURRENT PROTECTION DEVICE (OCPD) SHOWN IS LOCATED AT POWER PANEL. ALL FUSING TO BE SIZED IN ACCORDANCE WITH FUSE MFR RECOMMENDATION FOR MOTOR NAME PLATE RATING.
NOTE 3: ALL EQUIPMENT TO BE RATED FOR THE ENVIRONMENT FOR WHICH IT IS INSTALLED.

UNIT	#	DESCRIPTION	ELECTRICAL EQUIPMENT INFORMATION							CONDUIT SIZE	WIRE				OCPD		STARTER/ DISC/ VFD OTHER (SEE NOTES)	REMARKS
			LOAD				VOLTAGE	PHASE	FULL LOAD AMPS		SETS	QTY	SIZE	EQ. GROUND	TYPE	AMPS		
			HP	FLA	MCA	VA												
		SCORE BOARD CONNECTION	0.00	93 A	0 A	0 VA	208 V	1	93.0 A	1 1/2"	1	2	1/0	6	CB	150 A	2 A	do not used
		SCORE BOARD CONNECTION	0.00	0 A	0 A	0 VA	208 V	3	0.0 A	0"	0	3	Error	Error	CB	0 A	11 A	do not used
			0.00	0 A	0 A	0 VA	120 V	1	0.0 A	0"	0	2	Error	Error	CB	0 A	0 A	do not used
AC	1	AC OUTDOOR UNIT	0.00	0 A	9 A	0 VA	208 V	1	7.2 A	3/4"	1	2	12	12	CB	15 A	2 A	
ACI	1	AC INDOOR UNIT	0.00	0 A	1 A	0 VA	208 V	1	0.8 A	3/4"	1	2	12	12	CB	15 A	0 A	FED FROM OUTDOOR UNIT
ATC	1	ATU CONTROL PANEL	0.00	0.4 A	0 A	0 VA	120 V	1	0.4 A	3/4"	1	2	12	12	CB	15 A	11 A	
ATC	1	ATU CONTROL PANEL	0.00	0.4 A	0 A	0 VA	120 V	1	0.4 A	3/4"	1	2	12	12	CB	15 A	11 A	
ATC	1	ATU CONTROL PANEL	0.00	0.4 A	0 A	0 VA	120 V	1	0.4 A	3/4"	1	2	12	12	CB	15 A	11 A	
ATC	1	ATU CONTROL PANEL	0.00	0.4 A	0 A	0 VA	120 V	1	0.4 A	3/4"	1	2	12	12	CB	15 A	11 A	
ATH	1	AIR TURNOVER UNIT	15.00	0 A	0 A	0 VA	480 V	3	21.0 A	3/4"	1	3	10	10	CB	35 A	7 A	DIV. 26 TO PROVIDE CONDUIT AND WIRING TO ATH CONTROL PANEL. REFER TO DIV. 23 FOR LOCATION
CP	1	RECIRCULATING PUMP	0.25	0 A	0 A	0 VA	120 V	1	5.8 A	3/4"	1	2	12	12	CB	15 A	11 A	
CP	1	RECIRCULATING PUMP	0.25	0 A	0 A	0 VA	120 V	1	5.8 A	3/4"	1	2	12	12	CB	15 A	11 A	
DSF	1	DE-STRAT FAN	0.00	0.4 A	0 A	0 VA	120 V	1	0.4 A	3/4"	1	2	12	12	CB	15 A	4 A	
DSF	1	DE-STRAT FAN	0.00	0.4 A	0 A	0 VA	120 V	1	0.4 A	3/4"	1	2	12	12	CB	15 A	4 A	
DSF	1	DE-STRAT FAN	0.00	0.4 A	0 A	0 VA	120 V	1	0.4 A	3/4"	1	2	12	12	CB	15 A	4 A	
EC	1	EVAPORATIVE COOLER	1.50	0 A	0 A	0 VA	480 V	3	3.0 A	3/4"	1	3	12	12	CB	15 A	7 A	DIV. 26 TO PROVIDE CONDUIT AND WIRING TO EVAP CONTROL LOCATION. REFER TO DIV. 23 FOR LOCATION. DIV. 26 TO EXTEND WIRING TO MOTORIZED CONTROL DAMPER L-1.
EC	1	EVAPORATIVE COOLER	1.50	0 A	0 A	0 VA	480 V	3	3.0 A	3/4"	1	3	12	12	CB	15 A	7 A	DIV. 26 TO PROVIDE CONDUIT AND WIRING TO EVAP CONTROL LOCATION. REFER TO DIV. 23 FOR LOCATION. DIV. 26 TO EXTEND WIRING TO MOTORIZED CONTROL DAMPER L-1.
EC	1	EVAPORATIVE COOLER	1.50	0 A	0 A	0 VA	480 V	3	3.0 A	3/4"	1	3	12	12	CB	15 A	7 A	DIV. 26 TO PROVIDE CONDUIT AND WIRING TO EVAP CONTROL LOCATION. REFER TO DIV. 23 FOR LOCATION. DIV. 26 TO EXTEND WIRING TO MOTORIZED CONTROL DAMPER L-1.
EC	1	EVAPORATIVE COOLER	1.50	0 A	0 A	0 VA	480 V	3	3.0 A	3/4"	1	3	12	12	CB	15 A	7 A	DIV. 26 TO PROVIDE CONDUIT AND WIRING TO EVAP CONTROL LOCATION. REFER TO DIV. 23 FOR LOCATION. DIV. 26 TO EXTEND WIRING TO MOTORIZED CONTROL DAMPER L-1.
EC	1	EVAPORATIVE COOLER	1.50	0 A	0 A	0 VA	480 V	3	3.0 A	3/4"	1	3	12	12	CB	15 A	7 A	DIV. 26 TO PROVIDE CONDUIT AND WIRING TO EVAP CONTROL LOCATION. REFER TO DIV. 23 FOR LOCATION. DIV. 26 TO EXTEND WIRING TO MOTORIZED CONTROL DAMPER L-1.
EC	1	EVAPORATIVE COOLER	1.50	0 A	0 A	0 VA	480 V	3	3.0 A	3/4"	1	3	12	12	CB	15 A	7 A	DIV. 26 TO PROVIDE CONDUIT AND WIRING TO EVAP CONTROL LOCATION. REFER TO DIV. 23 FOR LOCATION. DIV. 26 TO EXTEND WIRING TO MOTORIZED CONTROL DAMPER L-1.
ECP	1	EVAPORATIVE COOLER PUMP	0.00	0.8 A	0 A	0 VA	120 V	1	0.8 A	3/4"	1	2	12	12	CB	15 A	4 A	
ECP	1	EVAPORATIVE COOLER PUMP	0.00	0.8 A	0 A	0 VA	120 V	1	0.8 A	3/4"	1	2	12	12	CB	15 A	4 A	
ECP	1	EVAPORATIVE COOLER PUMP	0.00	0.8 A	0 A	0 VA	120 V	1	0.8 A	3/4"	1	2	12	12	CB	15 A	4 A	
ECP	1	EVAPORATIVE COOLER PUMP	0.00	0.8 A	0 A	0 VA	120 V	1	0.8 A	3/4"	1	2	12	12	CB	15 A	4 A	
ECP	1	EVAPORATIVE COOLER PUMP	0.00	0.8 A	0 A	0 VA	120 V	1	0.8 A	3/4"	1	2	12	12	CB	15 A	4 A	
ECP	1	EVAPORATIVE COOLER PUMP	0.00	0.8 A	0 A	0 VA	120 V	1	0.8 A	3/4"	1	2	12	12	CB	15 A	4 A	
ECP	2	EVAPORATIVE COOLER PUMP	0.00	0.8 A	0 A	0 VA	120 V	1	0.8 A	3/4"	1	2	12	12	CB	15 A	4 A	
ECP	2	EVAPORATIVE COOLER PUMP	0.00	0.8 A	0 A	0 VA	120 V	1	0.8 A	3/4"	1	2	12	12	CB	15 A	4 A	
ECP	2	EVAPORATIVE COOLER PUMP	0.00	0.8 A	0 A	0 VA	120 V	1	0.8 A	3/4"	1	2	12	12	CB	15 A	4 A	
ECP	2	EVAPORATIVE COOLER PUMP	0.00	0.8 A	0 A	0 VA	120 V	1	0.8 A	3/4"	1	2	12	12	CB	15 A	4 A	
ECP	2	EVAPORATIVE COOLER PUMP	0.00	0.8 A	0 A	0 VA	120 V	1	0.8 A	3/4"	1	2	12	12	CB	15 A	4 A	
ECP	2	EVAPORATIVE COOLER PUMP	0.00	0.8 A	0 A	0 VA	120 V	1	0.8 A	3/4"	1	2	12	12	CB	15 A	4 A	
EF	1	EXHAUST FAN	1.50	0 A	0 A	0 VA	120 V	1	20.0 A	3/4"	1	2	10	10	CB	30 A	4 A	
EF	1	EXHAUST FAN	1.50	0 A	0 A	0 VA	120 V	1	20.0 A	3/4"	1	2	10	10	CB	30 A	4 A	
EF	2	EXHAUST FAN	0.75	0 A	0 A	0 VA	120 V	1	13.8 A	3/4"	1	2	12	12	CB	25 A	4 A	ALTERNATE #1
EF	3	EXHAUST FAN	0.50	0 A	0 A	0 VA	120 V	1	9.8 A	3/4"	1	2	12	12	CB	15 A	4 A	ALTERNATE #1
EF	4	EXHAUST FAN	0.50	0 A	0 A	0 VA	120 V	1	9.8 A	3/4"	1	2	12	12	CB	15 A	4 A	ALTERNATE #1
EF	5	EXHAUST FAN	0.50	0 A	0 A	0 VA	120 V	1	9.8 A	3/4"	1	2	12	12	CB	15 A	4 A	ALTERNATE #1
EUH	1	ELECTRIC UNIT HEATER	0.00	15.9 A	0 A	0 VA	208 V	1	15.9 A	3/4"	1	2	12	12	CB	25 A	2 A	
EUH	1	ELECTRIC UNIT HEATER	0.00	15.9 A	0 A	0 VA	208 V	1	15.9 A	3/4"	1	2	12	12	CB	25 A	2 A	
EUH	1	ELECTRIC UNIT HEATER	0.00	15.9 A	0 A	0 VA	208 V	1	15.9 A	3/4"	1	2	12	12	CB	25 A	2 A	
GUH	1	GAS FIRED UNIT HEATER	0.00	11 A	0 A	0 VA	120 V	1	11.0 A	3/4"	1	2	12	12	CB	20 A	4 A	
GUH	1	GAS FIRED UNIT HEATER	0.00	11 A	0 A	0 VA	120 V	1	11.0 A	3/4"	1	2	12	12	CB	20 A	4 A	
GUH	1	GAS FIRED UNIT HEATER	0.00	11 A	0 A	0 VA	120 V	1	11.0 A	3/4"	1	2	12	12	CB	20 A	4 A	
GUH	1	GAS FIRED UNIT HEATER	0.00	11 A	0 A	0 VA	120 V	1	11.0 A	3/4"	1	2	12	12	CB	20 A	4 A	
GUH	1	GAS FIRED UNIT HEATER	0.00	11 A	0 A	0 VA	120 V	1	11.0 A	3/4"	1	2	12	12	CB	20 A	4 A	
M	1	BASEBALL NET	1.50	0 A	0 A	0 VA	208 V	3	6.6 A	3/4"	1	3	12	12	CB	15 A	7 A	
M	1	BASEBALL NET	1.50	0 A	0 A	0 VA	208 V	3	6.6 A	3/4"	1	3	12	12	CB	15 A	7 A	
RT	1	ROOFTOP UNIT	0.00	0 A	15 A	0 VA	480 V	3	12.0 A	3/4"	1	3	12	12	CB	15 A	2 A	
RT	2	ROOFTOP UNIT	0.00	0 A	25 A	0 VA	480 V	3	20.0 A	3/4"	1	3	10	10	CB	20 A	2 A	ALTERNATE #1
RT	3	ROOFTOP UNIT	0.00	0 A	14 A	0 VA	480 V	3	11.2 A	3/4"	1	3	12	12	CB	15 A	2 A	ALTERNATE #1
RT	4	ROOFTOP UNIT	0.00	0 A	13 A	0 VA	480 V	3	10.4 A	3/4"	1	3	12	12	CB	15 A	2 A	ALTERNATE #1
RT	5	ROOFTOP UNIT	0.00	0 A	23 A	0 VA	480 V	3	18.4 A	3/4"	1	3	10	10	CB	25 A	2 A	ALTERNATE #1
RT	6	ROOFTOP UNIT	0.00	0 A	23 A	0 VA	480 V	3	18.4 A	3/4"	1	3	10	10	CB	25 A	2 A	ALTERNATE #1
RT	7	ROOFTOP UNIT	0.00	0 A	14 A	0 VA	480 V	3	11.2 A	3/4"	1	3	12	12	CB	15 A	2 A	ALTERNATE #1
WH	1	WATER HEATER	0.00	0 A	0 A	13500 VA	480 V	3	16.2 A	3/4"	1	3	10	10	CB	25 A	2 A	

LIGHT FIXTURE SCHEDULE

LIGHT FIXTURE ABBREVIATION SCHEDULE — PROJECT MANAGER: SERENA CUMMINGS

A.F.F.	ABOVE FINISH FLOOR	SCBA	STANDARD PAINTED COLOR AS SELECTED BY THE ARCHITECT
WALL@CLG	WALL MOUNT AT CORNER OF WALL AND CEILING	CFBA	CUSTOM FINISH AS SELECTED BY THE ARCHITECT
CCBA	CUSTOM PAINTED COLOR AS SELECTED BY THE ARCHITECT	SFBA	STANDARD FINISH AS SELECTED BY THE ARCHITECT

LIGHT FIXTURE GENERAL NOTES

1. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR LOCATIONS OF LIGHT FIXTURES AND, CONFIRM CEILING TYPES WITH LIGHT FIXTURE TRIMS. BRING ALL DISCREPANCIES OF LOCATIONS AND QUANTITIES TO THE ATTENTION OF THE ARCHITECT AND ELECTRICAL ENGINEER PRIOR TO BIDDING.
2. REFER TO ARCHITECTURAL ELEVATIONS FOR MOUNTING HEIGHTS AND LOCATIONS OF LIGHT FIXTURES. BRING ALL DISCREPENCIES TO THE ATTENTION OF THE ARCHITECT PRIOR TO BIDDING.
3. REFER TO THE SPECIFICATIONS FOR OTHER LIGHT FIXTURE, FUSING, LED DRIVERS, AND LAMP REQUIREMENTS AND ACCEPTABLE MANUFACTURERS.
4. CONFIRM AVAILABLE MOUNTING DEPTHS OF ALL LIGHT FIXTURES AND COMPARE WITH DEPTHS SHOWN ON SHOP DRAWINGS. BRING ALL POTENTIAL CONFLICT AREAS TO THE ATTENTION OF THE ARCHITECT AND ELECTRICAL ENGINEER PRIOR TO RELEASE.
5. REFER TO LIGHTING PLANS FOR ALL LINEAR FIXTURE LENGTHS. THE CATALOG NUMBER IS BASED ON THE FIXTURE SPECIFIED AND MAY NOT REFLECT THE QUANTITY OR OVERALL LENGTH OF LINEAR FIXTURES REQUIRED. CONTRACTOR TO NOTE THAT VARIOUS FIXTURE LENGTHS MAY BE REQUIRED TO ACHIEVE THE OVERALL RUN LENGTH.
6. REFER TO LIGHTING PLANS FOR ALL UNDERCABINET FIXTURE LENGTHS. THE CATALOG NUMBER IS BASED ON THE FIXTURE SPECIFIED AND MAY NOT REFLECT THE QUANTITY OR OVERALL LENGTH OF THE UNDERCABINET FIXTURES REQUIRED. CONTRACTOR TO NOTE THAT VARIOUS FIXTURE LENGTHS MAY BE REQUIRED TO ACHIEVE THE OVERALL RUN LENGTH OR TO FIT WITHIN THE MILLWORK. COORDINATE FIXTURE LAYOUT WITH MILLWORK SHOP DRAWINGS PRIOR TO LIGHTING SUBMITTALS.
7. WHEN A CONTRADICTION EXISTS BETWEEN A SPECIFIC MODEL NUMBER AND THE DESCRIPTION, NOTIFY THE ELECTRICAL ENGINEER AND/OR LIGHTING DESIGNER.
8. PRIOR APPROVALS ARE REQUIRED BEFORE BIDDING THE PROJECT AND SHALL BE SUBMITTED TO THE ELECTRICAL ENGINEER'S OFFICE AT LEAST (8) EIGHT WORKING DAYS BEFORE THE BID. PRIOR APPROVALS RECEIVED AFTER THIS TIME PERIOD SHALL BE...
9. REFER TO SPECIFICATIONS 20 0500, 26 5100 & 26 5600 (16001, 16510 & 16551).
10. VALUE ENGINEERING CONDUCTED WITHOUT THE DESIGN TEAM IE; ARCHITECT, ENGINEER & LIGHTING CONSULTANT/DESIGNER WILL NOT BE ALLOWED, REVIEWED OR APPROVED.

TYPE	DESCRIPTION	MFR.	CATALOG #	VOLTS	TOTAL WATTS	LAMP TYPE	DELIVERED LUMENS	COLOR TEMP	CRI
A44	2'X4' HIGH PERFORMANCE LED FLAT PANEL LUMINAIRE; ULTRA-THIN <2-3/8"; GLARE-FREE; NARROW ALUMINUM BEZEL; ACRYLIC LIGHT GUIDE, WHITE FROST LENS WITH SMOOTH PATTERN; SCRATCH AND IMPACT RESISTANT; 0-10 DIMMING; FIELD-SELECTABLE LUMEN OUTPUT (MEDIUM, 4000K)	ILP	VPAN24-33L/44L/55L-U-40	277 V	48 VA	LED	4,600	4000 K	80
A75	2'X4' HIGH PERFORMANCE FLAT PANEL LUMINAIRE; EXTRUDED ALUMINUM FRAME WITH DIFFUSED, GLARE-FREE LENS; 3" FIXTURE DEPTH; EASY TO CLEAN; 90,000 HOUR (L70); 5 YR. WARRANTY; 0-10 DIMMING; DLC PREMIUM LISTED.	DAY-BRITE	2FPZ-80L-840-4-DS-UNV-DIM	277 V	65 VA	LED	8,000	4000 K	80
B33	2'X2' HIGH PERFORMANCE LED FLAT PANEL LUMINAIRE; ULTRA-THIN <2-3/8"; GLARE-FREE; NARROW ALUMINUM BEZEL; ACRYLIC LIGHT GUIDE, WHITE FROST LENS WITH SMOOTH PATTERN; SCRATCH AND IMPACT RESISTANT; RECESSED; EASY TO CLEAN; 60,000 HOUR (L73); 5 YR. WARRANTY; 0-10	ILP	VPAN22-22L/33L/44L-U-40	277 V	39 VA	LED	3,500	4000 K	80
D4A	4" LED RECESSED ROUND DOWNLIGHT; FRAME + TRIM KIT; SELF-FLANGED; 55,000 HOUR (L90); 5 YR WARRANTY; 0-10 DIMMING; SCBA; MEDIUM DISTRIBUTION	PRESCOLITE	LTR-4RD-H-SL75L-DM1-UNV/LTR-4RD-T-SL40 K8MD-SCBA-SCBA-SCBA	277 V	10 VA	LED	750	4000 K	80+
EH	4' LED WALL MOUNTED GASKETED LINEAR STRIPLIGHT; RUGGED ENCLOSED FROSTED ACRYLIC LENS; 60,000 HOUR (L80); 5YR WARRANTY	COLUMBIA LIGHTING	LXEM4-40HL-RFA-E-U-GLR-SSL	277 V	50 VA	LED	6,222	4000 K	80+
HB1	HIGH EFFICIENT HIGH BAY LED LUMINAIRE; DIE-CAST ALUMINUM HOUSING; PRECISION 120 DEGREE BEAM ANGLE; DIFFUSED LENS FOR GLARE REDUCTION; IMPACT RESISTANT LENS WITH WIREGUARD; FIXTURE MOUNTED TO BOTTOM OF TRUSS; SCBA; 5 YR WARRANTY; 0-10 DIMMING; 250,000 HOUR (L70)	GE LIGHTING	ABV4-0-48-48-WD-QV-XX-XX-XX-WHTE	277 V	271 VA	LED	48,000	4000 K	80+
L2RM	2" WIDE LINEAR LED; RECESSED INTO ARCHITECTURAL CEILING GRID; BATWING HIGH EFFICIENCY LENS; FIXTURE LENS SHALL BE CONTINUOUS (NO BREAKS); BUILT TO LENGTH (SEE PLANS); 50,000 HOUR (DRIVER), 146,500 HOUR (L70); 0-10 DIMMING; COORDINATE MOUNTING DETAILS WITH CEILING MANUFACTURER; CUSTOM COLOR BY ARCHITECT; 8W/FT, 1000 LUMEN/FT; 4000K, 80+ CRI	PINNACLE	EV2D-BW-840HO-(SEE PLANS)-XX-U-0-10V-1-0-CCBA	277 V	7 VA	LED			80+
L4H100	6"X4' HIGH PERFORMANCE LED FLAT PANEL LUMINAIRE; ULTRA-THIN <2-3/8"; GLARE-FREE; NARROW ALUMINUM BEZEL; ACRYLIC LIGHT GUIDE, WHITE FROST LENS WITH SMOOTH PATTERN; SCRATCH AND IMPACT RESISTANT; RECESSED; DRYWALL FLANGE KIT; EASY TO CLEAN; 60,000 HOUR (L73); 5 YR. WARRANTY; 0-10 DIMMING	METALUX	4RBG6-100D-UNV-L840+DF-64W-U	277 V	38 VA	LED	4,195	4000 K	80+
L8H100	6"X8' HIGH PERFORMANCE LED FLAT PANEL LUMINAIRE; ULTRA-THIN <2-3/8"; GLARE-FREE; NARROW ALUMINUM BEZEL; ACRYLIC LIGHT GUIDE, WHITE FROST LENS WITH SMOOTH PATTERN; SCRATCH AND IMPACT RESISTANT; RECESSED; DRYWALL FLANGE KIT; EASY TO CLEAN; 60,000 HOUR (L73); 5 YR. WARRANTY; 0-10 DIMMING	METALUX	8RBG6-100D-UNV-L840+DF-68W-U	277 V	75 VA	LED	8,428	4000 K	80+
OW1	ARCHITECTURAL WALL MOUNTED LED SITE LUMINAIRE; DIE-CAST & EXTRUDED ALUMINUM HOUSING; TYPE IV DISTRIBUTION, FULL CUTOFF; IP66 RATED; 50,000 HOUR (L70); 5 YR WARRANTY; 0-10 DIMMING; INTEGRAL PHOTOCELL	HE WILLIAMS	VWPV-L60/L735-T4-SCBA-SDGL-UNV-PC	277 V	70 VA	LED	6,376	4000 K	70+
S7R	7" ROUND SURFACE MOUNTED LED LUMINAIRE; LOW-PROFILE; MOUNTS IN STANDARD 4" DEEP OCTAGONAL JUNCTION BOX; PROVIDE JUNCTION BOX/HOUSING AS REQUIRED; 50,000 HOUR (L70); 5 YR WARRANTY; 0-10 DIMMING	LIGHTOLIER	S7R-8-40K-10-SCBA-Z10U	277 V	14 VA	LED	1,000	4000 K	80+
SL2	4' LED SURFACE MOUNTED LINEAR STRIPLIGHT; RUGGED ENCLOSED FULLY FROSTED ACRYLIC LENS; 303,000 HOUR (L70); 5 YR. WARRANTY; 0-10 DIMMING	METALUX	4SNLED-LD5-56SL-LW-UNV-L840-CD1-U	277 V	30 VA	LED	5,000	4000 K	80+
SL2C	4' LED CHAIN MOUNTED LINERA STRIPLIGHT; RUGGED ENCLOSED FULLY FROSTED ACRYLIC LENS; 303,000 HOUR (L70); 5 YR. WARRANTY; 0-10 DIMMING	METALUX	4SNLED-LD5-56SL-LW-UNV-L840-CD1-U-AYC-CHAIN/SET	277 V	30 VA	LED	5,000	4000 K	80+
X1	UNIVERSAL EDGE-LIT EXIT SIGN; BRUSHED ALUMINUM HOUSING AND BLACK PLASTIC END-CAPS, WITH HIGH GRADE ACRYLIC PANEL; UNIVERSAL FACE, SINGLE, DOUBLE; UNIVERSAL MOUNTING, SURFACE, RECESSED OR END-MOUNT; AC ONLY	EMERGI-LITE	PAG6	277 V	5 VA	LED, 4100K CCT, 82+ CRI	100	4000 K	80+
X2	THIN DIE-CAST ALUMINUM SLIM PROFILE LED EXIT SIGN, MATTE BLACK WITH BRUSHED ALUM. FACES; AC ONLY; UNIVERSAL MOUNTING - WALL, SIDE, OR CEILING; AC ONLY; SEE PLANS FOR ARROWS AND MOUNTING; PROVIDE WIRE GUARD AS INDICATED = "WG"	EMERGI-LITE	BA-TX-UNV-G	277 V	5 VA	LED, 4100K CCT, 82+ CRI	100	4000 K	80+

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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
1	Addendum 4	10/09/2024

PROJECT INFORMATION

DATE: SEPTEMBER 12, 2024
PROJECT #: 24-013
PM / PA: BNA
PIC: BNA

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

SYMBOLS, SCHEDULES, AND NOTES

SHEET NUMBER

E002

Autodesk Docs://24-013 CCHS Fieldhouse & Soccer Field/CCHS Fieldhouse & Soccer Field BP2.rvt
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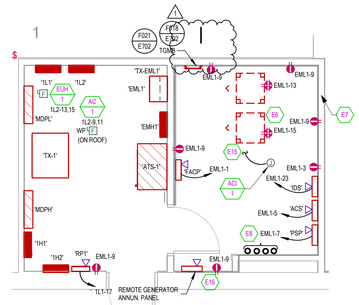
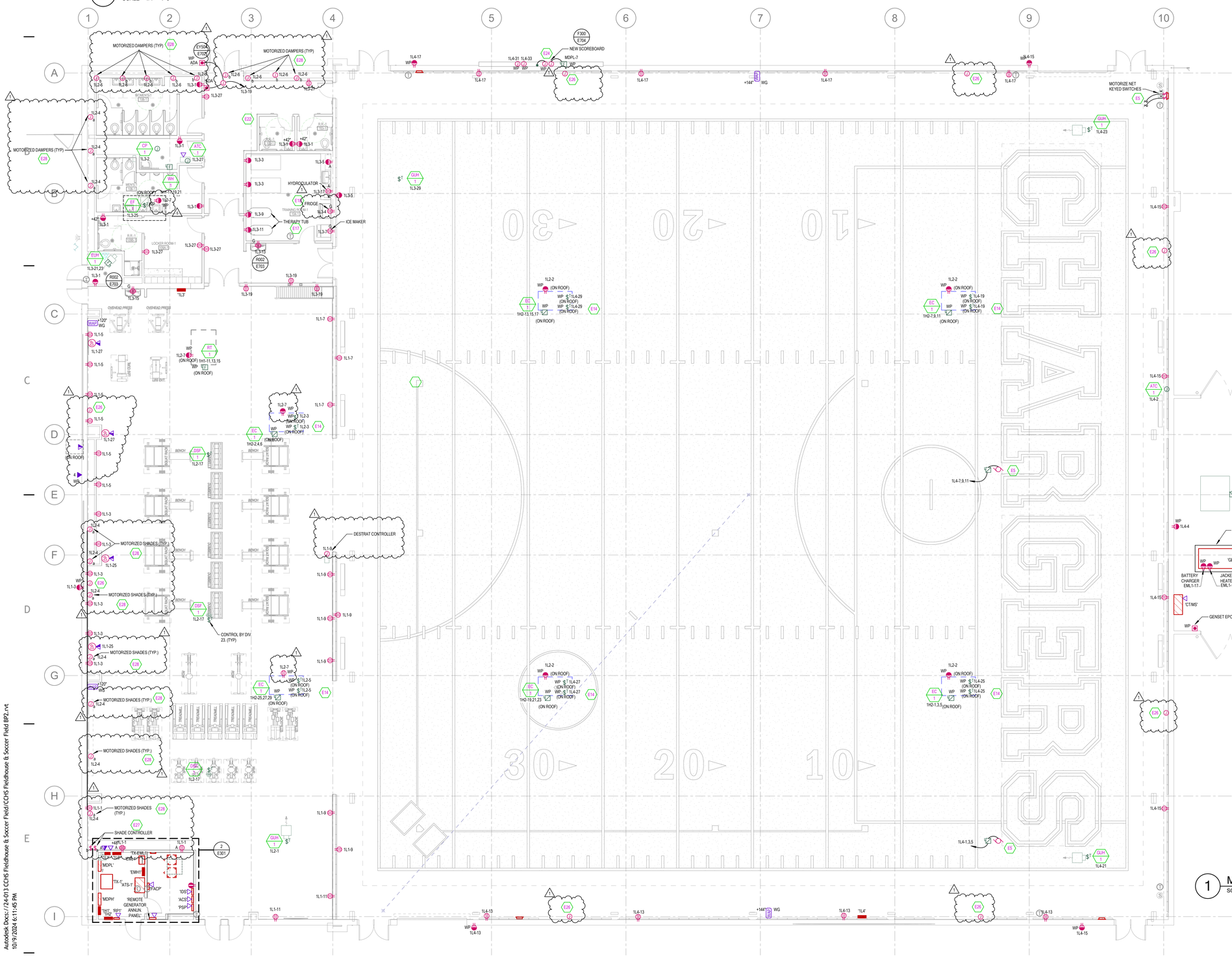


2 ENLARGED ELECTRICAL AND TDR ROOM

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



1 MAIN LEVEL ELECTRICAL FLOOR PLAN

SCALE = 1/8" = 1'-0"

POWER GENERAL SHEET NOTES

1. COORDINATE PLACEMENT OF ELECTRICAL DEVICES WITH ARCHITECT PRIOR TO ROUGH-IN. WHERE DEVICES ARE SHOWN IN SAME WALL SPACE, ALIGN VERTICALLY AND HORIZONTALLY. COORDINATE WITH ARCHITECTURAL DRAWINGS, ATHLETIC SAFETY WALL PADDING AND CABINETRY DRAWINGS.
2. ALL THE LOW VOLTAGE WIRE/CABLE FOR LIGHTING SENSORS, AUDIO/VISUAL EQUIPMENT, SOUND AMPLIFICATION, ETC. TO BE ROUTED THROUGH CONDUIT IN EXPOSED AND CLOUDED CEILING AREAS.
3. ALL LOW VOLTAGE WIRE/CABLE FOR LIGHTING SENSORS, AUDIO/VISUAL EQUIPMENT, CLASSROOM SOUND, AMPLIFICATION, ETC. TO BE PROPERLY SUPPORTED PER THE TELE/DATA SPEC. AND AT 5'-0" INTERVALS AND TO FOLLOW BUILDING STRUCTURAL LINES. PULLING WIRE DIAGONALLY ACROSS ROOMS IS NOT ALLOWED. USING CEILING SYSTEM OR LIGHT FIXTURE SUPPORT/SEISMIC WIRES FOR SUPPORT IS NOT ALLOWED.
4. PROVIDED GFCI PROTECTION ON ALL DEVICES AND EQUIPMENT PER THE NEC REQUIREMENTS. DEVICES SHALL BE READILY ACCESSIBLE. IF ANY OUTLET IS INSTALLED WITHIN 6 FEET OF OUTSIDE EDGE OF SINK, CONTRACTOR SHALL PROVIDE GFCI RECEPTACLE PER NEC, WHETHER SHOWN OR NOT.
5. ALL RECEPTACLES LOCATED THROUGHOUT THE BUILDING SHALL BE TAMPER RESISTANT PER NEC 406.12.
6. ELECTRICAL CONTRACTOR SHALL COORDINATE EXACT LOCATION OF ALL MECHANICAL UNITS WITH MECHANICAL CONTRACTOR. CIRCUITS TO ALL MECHANICAL EQUIPMENT SHALL BE DEDICATED UNLESS NOTED OTHERWISE.
7. FOR VAV POWER, PROVIDE A DEDICATED 120V/20A CIRCUIT FROM A PANEL LOCATED IN THE ELECTRICAL ROOM OF THE ASSOCIATED QUADRANT. COORDINATE EXACT LOCATION OF ALL VAV BOXES WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.
8. PROVIDE 120V CIRCUIT FROM THE NEAREST PANELBOARD FOR FIRE/SMOKE DAMPER RELAYS. PROVIDE FIRE ALARM MODULES AND RELAYS AS NECESSARY FOR ALL FIRE/SMOKE DAMPERS SHOWN ON DIVISION 23 DRAWINGS. ALL FIRE/SMOKE DAMPERS SHALL HAVE A MANUAL OVERRIDE SWITCH. PROVIDE DUCT DETECTOR WITHIN 5 FEET OF EACH FIRE/SMOKE DAMPER. REFER TO DIAGRAM D012 ON SHEET E701.
9. CONTRACTOR TO COORDINATE ALL LOCATIONS OF FIRE/SMOKE AND SMOKE DAMPERS WITH MECHANICAL CONTRACTOR. CONTRACTOR TO PROVIDE POWER, MONITOR MODULES, AND RELAYS AS REQUIRED FOR A COMPLETE SYSTEM.
10. DIVISION-26 IS RESPONSIBLE TO PROVIDE CONDUIT AND ROUGH-IN FOR ALL THERMOSTAT CONTROLS LOCATED WITHIN WALLS. COORDINATE WITH THE CONTROLS CONTRACTOR AND VERIFY EXACT LOCATION OF ALL THERMOSTATS.

SHEET KEYNOTES

E5 COORDINATE POWER REQUIREMENTS FOR SPORTS NETTING MOTORS PRIOR TO ROUGH-IN AND ADJUST CIRCUIT WIRING AND OCPD AS REQUIRED. LOCATE AND TERMINATE COMPLETELY THE CONTROLLER E.G. SWITCHES, TRANSFORMERS, TERMINAL BLOCK, #OF WIRES, ETC. PER MANUFACTURER'S RECOMMENDATIONS. LOCATE MOMENTARY TOGGLE SWITCH IN SWITCHING CABINET. SEE DIAGRAM P004 FOR MORE INFORMATION.

E6 ROUTE CONDUIT DOWN ALONG RACK POST AND MOUNT +18 INCH A.F.F.

E7 PROVIDE 3/4 INCH FIRE-TREATED PLYWOOD ON WALLS. REFER TO SPECIFICATIONS (SECTION 27 1500) FOR REQUIREMENTS.

E8 PROVIDE A MINIMUM OF (4) 4" CONDUIT STUBS BETWEEN FLOORS. ASSURE THAT THERE ARE AT LEAST (2) SPARE/EMPTY CONDUITS AVAILABLE. PROVIDE FIRE CAULKING AS REQUIRED PER SPECIFICATIONS.

E14 DIV. 26 2 ELECTRICAL CONNECTIONS FOR 2 PUMPS PER COOLER. VERIFY WITH MECHANICAL PRIOR TO ROUGH-IN.

E15 SPLIT AC SYSTEM. PROVIDE 3/4" CONDUIT AND REQUIRED UNIT WIRING BETWEEN OUTDOOR AND INDOOR UNIT. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR ALL CONTROL CONDUIT AND WIRING. COORDINATE LOCATION TERMINATION REQUIREMENTS WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.

E16 CONFIRM LOCATION OF REMOTE GENERATOR ANNUNCIATOR PANEL WITH OWNER PRIOR TO ROUGH-IN. INSTALL PER MANUFACTURER'S REQUIREMENTS.

E17 VERIFY LOCATION OF OUTLET WITH THERAPY TUB MANUFACTURER PRIOR TO ROUGH-IN TO ENSURE OUTLET REMAINS ACCESSIBLE.

E18 DIV. 26 TO VERIFY ELECTRICAL REQUIREMENTS OF ALL EQUIPMENT WITHIN THE TRAINING ROOM WITH MANUFACTURER SHOP DRAWINGS DURING CONSTRUCTION. REVISE BREAKERS AND CONDUCTORS AS NEEDED.

E22 HAND DRYER LOCATION. COORDINATE WITH ARCHITECTURAL ELEVATIONS FOR EXACT LOCATION PRIOR TO ROUGH-IN. PROVIDE GFCI BREAKER WITHIN PANELBOARD.

E24 DIV. 26 TO COORDINATE POWER AND FIBER ROUGH-IN LOCATIONS AND REQUIREMENTS CLOSELY WITH DIVISION 27 AND THE SCOREBOARD VENDOR. REFER TO SHEET A701 FOR DIMENSIONS FROM THE PRESS BOX.

E26 PROVIDE CONNECTION TO MOTORIZED CONTROL DAMPER TO EVAP COOLER CONTROLLER.

E27 WINDOW SHADE SWITCH(ES) (WALL) AND CONTROLLER(S) LOCATION (ABOVE CEILING). PROVIDE POWER TO CONTROLLERS AND ALL CONDUIT, WIRE, ETC. REQUIRED FROM CONTROLLERS TO SHADE MOTORS. SHADING COORDINATE EXACT LOCATION AND TERMINATION REQUIREMENTS WITH SHADE SHOP DRAWINGS AND SHADE INSTALLER PRIOR TO ROUGH-IN.

E28 PROVIDE JUNCTION BOX ABOVE WINDOW FOR SHADE MOTOR(S). COORDINATE LOCATION OF JUNCTION BOX WITH SHOP DRAWINGS AND ARCHITECTURAL RCP DRAWINGS. ENSURE THAT ALL ELECTRICAL CONNECTIONS ARE CONCEALED BY SHADE HEADER. PROVIDE ADDITIONAL CONNECTIONS TO SHADES FOR WINDOWS THAT EXCEED 12' IN HEIGHT. PROVIDE CONDUIT AND ALL WIRE, TERMINAATIONS ETC. TO SHADE CONTROLLER(S).

BASE BID

1. INFORMATION SHOWN PERTAINS TO THE BASE BID. BIDDING CONTRACTOR SHALL REFERENCE ALL GENERAL CONTRACTOR DOCUMENTATION DETAILING BASE BID AND ALTERNATE PLANS WITHIN THE PROJECT. PROVIDE BROKEN OUT NUMBERS AS DIRECTED BY GENERAL CONTRACTOR DOCUMENTATION.

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PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
1	Addendum 4	10/09/2024
2		

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	BNA
PIC:	BNA

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

MAIN LEVEL ELECTRICAL FLOOR PLAN

SHEET NUMBER

E301

Autodesk Docs://24-013 CCHS Fieldhouse & Soccer Field/CCHS Fieldhouse & Soccer Field BP2.rvt
10/9/2024 6:11:45 PM

ABBREVIATIONS INDEX

ABBREV.	DESCRIPTION	ABBREV.	DESCRIPTION
#	NUMBER	MEP	MECHANICAL, ELECTRICAL AND PLUMBING
AFF	ABOVE FINISH FLOOR	MFG	MANUFACTURER
ARCH	ARCHITECTURE	MAX	MAXIMUM
AUX	AUXILIARY	MIC	MICROPHONE
AWG	AMERICAN WIRE GAUGE	MIN	MINIMUM
BC	BARE COPPER	MTG	MOUNTING
C	CONDUIT	N/A	NOT APPLICABLE
CATV	CABLE TELEVISION	NIC	NOT IN CONTRACT
CLG	CEILING	NTS	NOT TO SCALE
CNTR	CONTRACTOR	PLEN	PLENUM
CU	COPPER	(R)	RELOCATE
C/W	COMPLETE WITH	RECPT	RECEPTACLE
DWG	DRAWING	SPEC	SPECIFICATIONS
(E)	EXISTING	SPKR	SPEAKER
FT	FOOT	TV	TELEVISION
GND	GROUND	TYP	TYPICAL
IG	ISOLATED GROUND	UG	UNDERGROUND
IN	INCH	UPS	UNINTERRUPTED POWER SUPPLY
J-BOX	JUNCTION BOX	W	WATTS
LTG	LIGHTING	W/O	WITHOUT

CABLING GROUPS AND CONDUIT SEPARATION SCHEDULE

AUDIO AND VIDEO WIRING TYPES:

AUDIO AND VIDEO SYSTEM WIRING IS DIVIDED INTO WIRING GROUPS ACCORDING TO THEIR NOMINAL LEVELS:

GROUP	WIRING TYPE
GROUP 1	FIBER OPTIC CABLE
GROUP 2	O mV TO 100 mV SIGNALS, EXAMPLE: MICROPHONE LEVEL SIGNAL
GROUP 3	100 mV TO 10 V SIGNALS, EXAMPLE: LINE-LEVEL SIGNAL
GROUP 4	10 V TO 70 V SIGNALS, EXAMPLE: SPEAKER LEVEL SIGNAL
GROUP 5	CONTROL, DIGITAL CIRCUITS, DATA AND VIDEO

NOTE: GROUPS LISTED ABOVE SHALL NEVER BE COMBINED WITHIN THE SAME CONDUIT

AUDIO AND VIDEO CONDUIT SEPARATION

MINIMUM CONDUIT SEPARATION BETWEEN CONDUITS CARRYING WIRING OF DIFFERENT AUDIO AND VIDEO GROUPS IS AS FOLLOWS:

GROUP	GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5
GROUP 1	ADJACENT	ADJACENT	ADJACENT	ADJACENT	ADJACENT
GROUP 2	ADJACENT	ADJACENT	6"	12"	12"
GROUP 3	ADJACENT	6"	ADJACENT	12"	6"
GROUP 4	ADJACENT	12"	12"	ADJACENT	6"
GROUP 5	ADJACENT	12"	6"	6"	ADJACENT

NOTE: NINETY DEGREE CROSSING IN CLOSE PROXIMITY IS PERMITTED.

ELECTRICAL CONDUIT SEPARATION

MINIMUM CONDUIT SEPARATION BETWEEN CONDUITS CARRYING AUDIO AND VIDEO WIRING AND OTHER ELECTRICAL SERVICE CONDUIT IS AS FOLLOWS:

	GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5
277/480V AC CIRCUIT	ADJACENT	24"	24"	24"	24"
120/208V AC CIRCUIT	ADJACENT	24"	12"	12"	24"

NOTE: CONDUITS SHALL NOT RUN MORE THAN 20 FEET IN PARALLEL WITHIN THE GIVEN DISTANCES ABOVE.

AUDIOVISUAL CABLE AND CONDUIT SCHEDULE

NOTES:

1. APPROVED EQUALS FROM OTHER MANUFACTURERS ARE BELDEN, GEPCO/GENERAL, ICE, KRAMER, EXTRON, CRESTRON, LIBERTY CABLE, AND WINDY CITY WIRE.
2. PROVIDE PLENUM RATED CABLES IN ANY "AIR HANDLING" SPACES E.G. ABOVE CEILINGS, RAISED FLOORS, CHASES, ETC.
3. CABLE QUANTITY INDICATED ON DRAWINGS SHOWS ON FINAL RUN. IF NOT NOTED PROVIDE CABLING FOR SINGLE DEVICE.
4. CONDUIT REQUIREMENTS SHOWN ARE MINIMUM CONDUIT SIZE REQUIRED FOR A SINGLE CABLE, UNLESS OTHERWISE NOTED ON DRAWINGS. NUMBER OF CABLES LISTED IS THE MAXIMUM AMOUNT ALLOWED FOR CONDUIT SIZE INDICATED.
5. WHEN COMBINING CABLE TYPES OF THE SAME GROUP, THE TYPE WITH THE LARGEST CONDUIT REQUIREMENT DICTATES CONDUIT SIZE.
6. PROVIDE ON ALL HDMI CABLES LONGER THAN 35' OR WITH MORE THAN (3) CONNECTION POINTS (1) ACTIVE HDMI EXTENSION DEVICE.
7. ALL CATEGORY CABLE SHALL BE TESTED AND CERTIFIED TO ANSI/TIA/EIA-568C AND IEEE 802.3an STANDARDS USING A LEVEL IIIe TESTER.
8. REFER TO SPECIFICATIONS FOR STP CABLE REQUIREMENTS. ALL UNSHIELDED (UTP) CATEGORY CABLES WITHIN THE PROJECT SHALL BE SUPPLIED FROM A SINGLE MANUFACTURER AND MATCH MAKE/MODEL.
9. HDMI CABLES ARE INTENDED TO PASS 4K 60 4:4:4 FROM SOURCE TO DESTINATION. CONTRACTOR TO VERIFY THE LENGTH OF ALL CABLES USED MEET THIS REQUIREMENT.

* INDICATES DEFAULT CABLE IF MANUFACTURER DOES NOT RECOMMEND A SPECIFIC CABLE.

** INDICATES DEFAULT CABLE IF HORIZONTAL CABLING IS EXCLUDED FROM THE PROJECT AND NOT OWNER PROVIDED.

CABLE TYPE	DESCRIPTION	CONDUIT REQUIREMENTS	MANUFACTURER	MODEL NUMBER	CABLE GROUP
(#)AT	ANTENNA, COAXIAL RG8X	1" CONDUIT = (7) CABLES 1 1/2" CONDUIT = (12) CABLES	WEST PENN	807 *	5
(#)CT	CONTROL, 2/22 SHIELDED, 2/18 UNSHIELDED	1" CONDUIT = (7) CABLES 1 1/4" CONDUIT = (12) CABLES	WEST PENN	77350 * D25350 (P) *	5
(#)HD	HDMI < 20', ULTRA FLEXIBLE	1 1/4" CONDUIT = (1) CABLES 2" CONDUIT = (3) CABLES	EXTRON CRESTRON	HDMI ULTRA/## CBL-HD-##	5
(#)HD	HDMI > 20'	1 1/4" CONDUIT = (1) CABLES 2" CONDUIT = (3) CABLES	EXTRON KRAMER	HDMI PRO P/XX CP-HM/HM/ETH (P)	5
(#)LA (#)MA	LINE LEVEL, 22 AWG MICROPHONE, 22 AWG	1" CONDUIT = (23) CABLES 1 1/2" CONDUIT = (77) CABLES	WEST PENN	291 D25454 (P)	3 2
(#)MFB	MULTIMODE FIBER OPTIC	1" CONDUIT MINIMUM	PER SPEC	27 1500	1
(#)RG6	RG-6 COAXIAL CABLE	1" CONDUIT = (8) CABLES 1 1/2" CONDUIT = (18) CABLES	WEST PENN	841 25841 (P)	5
(#)RG11	RG-11 COAXIAL CABLE	1" CONDUIT = (3) CABLES 1 1/4" CONDUIT = (6) CABLES	WEST PENN	821 D25821 (P)	5
(#)S12	SPEAKER, 12 AWG	1" CONDUIT = (3) CABLES 1 1/2" CONDUIT = (7) CABLES 2" CONDUIT = (11) CABLES	WEST PENN	227 25227B (P)	4
(#)S16	SPEAKER, 16 AWG	1" CONDUIT = (10) CABLES 1 1/4" CONDUIT = (17) CABLES	WEST PENN	225 25225B (P)	4
(#)SFB	SINGLE MODE FIBER OPTIC	1" CONDUIT MINIMUM	PER SPEC	27 1500	1
(#)STP	SHIELDED TWISTED PAIR, CAT 6A	1" CONDUIT = (4) CABLES 1 1/4" CONDUIT = (8) CABLES	PER MFG WEST PENN	4246AF * 254246AF (P) *	5
(#)UTP	UN-SHIELDED TWISTED PAIR CAT 6	1" CONDUIT = (9) CABLES 1 1/4" CONDUIT = (15) CABLES	PER SPEC WEST PENN	4246 ** 254246 (P) ** SPEC 27 1500	5
(#)VG	HIGH RESOLUTION VIDEO	1" CONDUIT = (1) CABLES 1 1/4" CONDUIT = (4) CABLES	WEST PENN	5CRGB 255CRGB (P)	5
(#)SDI	SERIAL DIGITAL INTERFACE (RG-6 COAX)	1" CONDUIT = (8) CABLES 1 1/2" CONDUIT = (18) CABLES	WEST PENN	841 25841 (P)	5
(#)USB	USB EXTENSION CABLE	1" CONDUIT = (3) CABLES 1 1/4" CONDUIT = (10) CABLES	CABLES TO GO	52108	5
(#)X#	MANUFACTURER PROPRIETARY CABLE	AS NOTED	SPEC. 27 4100	SPEC. 27 4100	NA

AUDIOVISUAL SYMBOL SCHEDULE

NOTES:

1. HEIGHT MEASURED TO BOTTOM OF THE DEVICE FROM FINISHED FLOOR.
2. HEIGHT MEASURED TO CENTER LINE OF THE DEVICE FROM THE FINISHED FLOOR.
3. REFER TO DIAGRAMS AND ELEVATIONS FOR CUSTOM ROUGH-IN REQUIREMENTS.
4. STANDARD MOUNTING HEIGHT UNLESS OTHERWISE NOTED ON PLANS.
5. ROUGH-IN TO BE HORIZONTAL.
6. ROUGH-IN TO BE INSTALLED ABOVE ACCESSIBLE CEILING.
7. ROUGH-IN TO BE INSTALLED ABOVE CEILING.
8. DEVICE IS TYPICALLY LOCATED IN MILLWORK, FURNITURE, BEHIND A MONITOR OR ABOVE A PROJECTOR.
9. ABOVE TABLE/COUNTER MOUNTED DEVICE.
10. REFER TO MANUFACTURER'S RECOMMENDED CABLE REQUIREMENTS FOR EXACT CABLE REQUIRED.
11. FOLLOW BICSI STANDARDS FOR CABLE ROUTING AND DISTANCES.
12. JUNCTION BOX INDICATED IS FOR MOST INSTALLATIONS. DEVICE WILL BE NOTED WHEN JUNCTION BOX SIZE REQUIREMENTS ARE DIFFERENT FROM INDICATED.
13. MOUNTING HEIGHT SHOWN IS FROM THE BOTTOM OF THE MONITOR TO THE FINISHED FLOOR.

GENERAL SCHEDULE NOTES:

A. TYPICAL SYMBOL SCHEDULE. SOME SYMBOLS MAY NOT BE USED IN THIS SET OF DRAWINGS.
B. DEVICES WITH "A" ADJACENT TO IT INDICATE DEVICE TO BE COORDINATED WITH MILLWORK PRIOR TO ROUGH-IN.
C. ROUGH-IN JUNCTION BOX, CONDUIT, AND MOUNTING HEIGHT ARE DEFAULT REQUIREMENTS. REFER TO PLANS FOR SPECIFIC NOTES AND REQUIREMENTS FOR A SPECIFIC INSTANCE.
D. CONDUIT STUBBED INTO ACCESSIBLE CEILING UNLESS OTHERWISE NOTED.
E. CABLE FROM DEVICE TO BE HOMERUN TO DESTINATION WITHOUT SPLICES.

SYMBOL	DESCRIPTION	J-BOX	CONDUIT	MOUNTING HEIGHT	CABLE TYPE	NOTES
M#	MICROPHONE INPUT, WALL PLATE (M1/M2 = D1, M3/M4 = D2)	D1,D2	(1) 3/4"	RECEPTACLE HEIGHT	(#) MA	2,4.
AX	AUXILIARY INPUT, 3.5MM/RCA CONNECTION, WALL PLATE	D1	(1) 3/4"	RECEPTACLE HEIGHT	(1) LA	2,4.
T / TS	AUDIO OUTPUT, WALL PLATE, T = XLR MALE CONNECTION, TS = 1/4 TS CONNECTION	D1	(1) 3/4"	RECEPTACLE HEIGHT	(1) LA	2,4.
MA	MICROPHONE INPUT WITH AUXILIARY INPUT, WALL PLATE	D1	(1) 3/4"	RECEPTACLE HEIGHT	(1) MA (1) LA	2,4.
MC	MICROPHONE INPUT, CEILING	D1	(1) 3/4"	CEILING	(1) MA	2,4.
MB	TABLE TOP BOUNDARY MICROPHONE		(1) 1/2"	ON TABLE/ MILLWORK	(1) MA	2,3,9.
MW	WALL MOUNTED, PUSH TO TALK MICROPHONE	D1	(1) 3/4"	SWITCH HEIGHT	(1) MA	2,4.
MDT	DUAL MICROPHONE INPUT, WALL PLATE, UTP TRANSMITTER EXTENDER	D1	(1) 3/4"	RECEPTACLE HEIGHT	(1) UTP	2,4.
MAT	MICROPHONE AND AUXILIARY INPUT, WALL PLATE, UTP TRANSMITTER EXTENDER	D1	(1) 3/4"	RECEPTACLE HEIGHT	(1) UTP	2,4,11.
MXT	MICROPHONE AND AUXILIARY INPUT, WALL PLATE, UTP TRANSMITTER AUDIO ENCODER	D2	(1) 1"	RECEPTACLE HEIGHT	(1) UTP	2,4,11.
MT	DUAL MICROPHONE INPUT/OUTPUT WALL PLATE, UTP TRANSMITTER AUDIO ENCODER	D1	(1) 1"	RECEPTACLE HEIGHT	(1) UTP	2,4,11.
M2D	DUAL MICROPHONE INPUT/OUTPUT WALL PLATE, UTP TRANSMITTER AUDIO ENCODER	D2	(1) 1"	RECEPTACLE HEIGHT	(1) UTP	2,4,11.
M4D	FOUR MICROPHONE INPUT WALL PLATE, UTP TRANSMITTER AUDIO ENCODER	D2	(1) 1"	RECEPTACLE HEIGHT	(1) UTP	2,4,11.
BXT	BLUETOOTH AND AUXILIARY INPUT, WALL PLATE, UTP TRANSMITTER AUDIO ENCODER	D2	(1) 1"	SWITCH HEIGHT	(1) UTP	2,4,11.
CI	CREWCOM HEADSET INPUT, WALL PLATE	D1	(1) 3/4"	SWITCH HEIGHT	(1) MA	2,4.
CIS	CREWCOM WALL STATION, WALL PLATE	D3	(1) 3/4"	SWITCH HEIGHT	(1) MA	2,4.
BT	BLUETOOTH, WALL PLATE, AUDIO EXTENDER	D1	(1) 1"	SWITCH HEIGHT	(1) UTP	2,4,11.
VG	VGA INPUT, WALL PLATE	D1	(1) 1 1/4"	RECEPTACLE HEIGHT	(1) VG	2,4.
HD	HDMI INPUT, WALL PLATE	D1	(1) 1 1/4"	RECEPTACLE HEIGHT	(1) HD (1) LA	2,4.
HV	HDMI AND VGA INPUT, WALL PLATE	D2	(1) 1 1/4"	RECEPTACLE HEIGHT	(1) HD (1) VG	2,4.
EN#	AVoIP ENCODER, WALL PLATE (# IDENTIFIES UNIQUE PLATES)	SCH	(1) 1"		(1) UTP	2,4,11.
DC#	AVoIP DECODER, WALL PLATE (# IDENTIFIES UNIQUE PLATES)	SCH	(1) 1"		(1) UTP	2,4,11.
TxH	HDBaseT, HDMI INPUT TRANSMITTER, WALL PLATE	D1	(1) 1"	RECEPTACLE HEIGHT	(1) STP	2,4,11.
TxD	HDBaseT, HDMI AND VGA TRANSMITTER, WALL PLATE	D2	(1) 1"	RECEPTACLE HEIGHT	(1) STP	2,4,11.
TxM	HDBaseT, HDMI, DISPLAY PORT AND/OR VGA TRANSMITTER BOX, SURFACE MOUNTED			IN MILLWORK/ UNDER TABLE	(1) STP	2,4,11.
TxT	HDBaseT CATEGORY INPUT, WALL PLATE	D1	(1) 1"	RECEPTACLE HEIGHT	(1) STP	2,4,11.
RxH	HDBaseT, HDMI RECEIVER, WALL PLATE	D1	(1) 1"	AS NOTED	(1) STP	2,4,11.
US	USB INPUT, WALL PLATE, UTP EXTENSION	D1	(1) 1"	RECEPTACLE HEIGHT	(1) STP	2,4,11.
Rx	HDBaseT RECEIVER DEVICE, SURFACE MOUNTED		(1) 1"	IN MILLWORK/ UNDER TABLE	(1) STP	2,4,8,11.
CHV	HDMI AND VGA TRANSMITTER, WALL PLATE (CLASSROOM SYSTEM)	D2	(1) 1 1/4"	RECEPTACLE HEIGHT	(1) STP	2,4,11.
CHD	DUAL HDMI TRANSMITTER, WALL PLATE (CLASSROOM SYSTEM)	D2	(1) 1 1/4"	RECEPTACLE HEIGHT	(1) STP	2,4,11.
HDU	HDMI AND USB TRANSMITTER, WALL PLATE	D1	(1) 1"	RECEPTACLE HEIGHT	(2) STP	2,4,11.
CAL	2-WAY INTERCOMMUNICATION PUSHBUTTON STATION	D1	(1) 3/4"	SWITCH HEIGHT	AS NOTED	2,7,10.
CSA	CLASSROOM SOUND AMPLIFICATION SYSTEM		(1) 1 1/4" (1) 1"	IN MILLWORK/ AS NOTED		2,3.
IR	INFRARED SENSOR, WALL/CEILING	D1	(1) 3/4"	CEILING	(1) UTP OR (1) CT	2,6,11.
ALS	ASSISTIVE LISTENING SYSTEM ANTENNA/EMITTER, WALL/CEILING	A1	(1) 1"	AS NOTED	AS NOTED	2,6.
AT	AV ANTENNA, WALL/CEILING	D1	(1) 1"	AS NOTED	(1) AT	2,6.
V	VOLUME CONTROL	D1	(1) 1"	SWITCH HEIGHT	(1) S16	2,4.
SV	VOLUME CONTROL WITH SOURCE SELECTOR	D2	(1) 1"	SWITCH HEIGHT	(1) S16 (1) UTP	2,4,9,11.
TPT	TOUCH PANEL, TABLE TOP		(1) 1"	AS NOTED	(1) UTP	
TP#	TOUCH PANEL, WALL MOUNTED, REFER TO SPECIFICATIONS FOR TOUCH PANEL TYPE AND ORIENTATION	SCH	(1) 1"	SWITCH HEIGHT	(1) UTP	2,4,5,11.
KP#	KEYPAD, WALL MOUNTED, REFER TO SPECIFICATIONS FOR KEYPAD TYPE	SCH	(1) 1"	SWITCH HEIGHT	(1) CT or (1) UTP	2,4,10.
RS#	ROOM SCHEDULING TOUCHPANEL	SCH	(1) 1"	SWITCH HEIGHT	(1) STP	
TB#	TABLE/FURNITURE BOX, NUMBER REFERS TO TYPE REFER TO SPECIFICATIONS/DIAGRAMS FOR REQUIREMENTS			IN MILLWORK	SEE DIAGRAMS.	
	LOUDSPEAKER, WALL MOUNTED	C#	(1) 3/4"	AS NOTED	(1) S16	2,4.
	LOUDSPEAKER, ARRAY, CABINET, CLUSTER	A0	(1) 3/4"	AS NOTED	(1) S12	2,4.
	LOUDSPEAKER, CEILING RECESSED OR PENDANT	C#	(1) 3/4"	CEILING	(1) S16	2,7.
SB#	SOUND BAR, REFER TO SPECIFICATIONS FOR TYPE	D1	(1) 1"	UNDER DISPLAY OR AS NOTED		1,5.
X##	DISPLAY, REFER TO SPECIFICATIONS FOR DISPLAY TYPE AND SIZE	PER SCH	(1) 1 1/4" (1) 1"	AS NOTED	AS NOTED	4,13.
SC#	PROJECTION SCREEN REFER TO SPECIFICATIONS FOR SCREEN TYPE AND SIZE	(2) A0	(1) 3/4"	CEILING OR WALL	(1) UTP	2,7.
P#	PROJECTOR	D2	(1) 1 1/4"	CEILING OR AS NOTED	AS NOTED	2,6.
	AV CAMERA	C#	(1) 1"	AS NOTED	AS NOTED	1.
	EQUIPMENT CABINET/RACK	C#	SCH	AS NOTED		
CLG	EQUIPMENT CEILING RACK	C#	SCH	AS NOTED		
	EQUIPMENT 2-POST CABINET/RACK	C#	SCH	AS NOTED		
GP#	PASS THROUGH PLATE, # = NUMBER OF GANGS	D#	(1) 1-1/2"	AS NOTED		2.
J	JUNCTION BOX, ABOVE ACCESSIBLE CEILING	A0	AS NOTED	AS NOTED		
C##	CUSTOM JUNCTION BOX, REFER TO SCHEDULE AND DIAGRAM FOR EQUIPMENT, JUNCTION BOX AND CONDUIT	SCH	SCH	AS NOTED	AS NOTED	
FB	FLOOR BOX - REFER TO ELECTRICAL DOCUMENTS FOR MAKE/MODEL - REFER TO DIAGRAMS FOR AV DEVICE LAYOUT		AS NOTED		AS NOTED	
PT	POKE THRU - REFER TO ELECTRICAL DOCUMENTS FOR MAKE/MODEL - REFER TO DIAGRAMS FOR AV DEVICE LAYOUT		(1) 1 1/2"		AS NOTED	
	CONDUIT RUN CONCEALED IN WALL OR CEILING		AS NOTED			
	CONDUIT RUN CONCEALED IN FLOOR OR GROUND		AS NOTED			
	CONDUIT UP		AS NOTED			
	CONDUIT DOWN		AS NOTED			
	CONDUIT STUB LOCATION		AS NOTED			
	CONDUIT/CIRCUIT CONTINUATION		AS NOTED			
####	DEVICE/EQUIPMENT TYPE CALLOUT					
## #	ELEVATION VIEW TAG (# = VIEW NUMBER, ## = SHEET NUMBER)					
# ##	DIAGRAM CALLOUT TAG					

AUDIOVISUAL GENERAL NOTES

1. THIS SHEET SET SHOWS WORK AND MATERIALS BY DIVISION 26 AND DIVISION 27. SEE SPECIFICATIONS AND DRAWING NOTES FOR RESPONSIBILITY FOR EACH ITEM.
2. ELECTRICAL CONTRACTOR SHALL COORDINATE REQUIRED PROVISIONS WITH THE PROJECT AV SYSTEMS INTEGRATOR PRIOR TO INSTALLATION OF AV SYSTEM ROUGH-IN. WHERE CONDUIT AND JUNCTION BOX PROVISIONS ARE SIGNIFICANTLY DIFFERENT FROM THOSE SHOWN ON THE DRAWINGS, NOTIFY THE AV CONSULTANT IN WRITING OF THE REQUIREMENTS. WHERE MINOR MODIFICATIONS TO PROVISIONS ARE REQUIRED, THEY SHALL BE MADE AT NO ADDITIONAL COST AS A MATTER OF JOB COORDINATION.
3. BIDDERS SHALL THOROUGHLY ACQUAINT AND EXAMINE THE EXISTING PROJECT CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. INCLUDING THE COMPLETE SET OF PLANS AND SPECIFICATIONS COVERING THE ENTIRE PROJECT. BIDDERS SHALL BECOME FULLY CONVERSANT WITH THE TYPE OF GENERAL CONSTRUCTION AS WELL AS ALL PERTINENT FACTS AFFECTING THE COST OF CARRYING OUT THE WORK THEY WILL CONTRACT TO PERFORM AND BRING ANY DISCREPANCIES OR OMISSIONS FOUND IN THE DRAWINGS TO THE AV CONSULTANT'S ATTENTION BEFORE SUBMITTING BID.
4. AV SYSTEMS INTEGRATOR SHALL PROVIDE A FULLY FUNCTIONING SYSTEM IN EVERY RESPECT. ANY DISCREPANCIES IN THE DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE PROJECT AV CONSULTANT PRIOR TO BIDDING.
5. THE FOREGOING WORK SHALL BE COMPLETE IN EVERY RESPECT, AND ANY MATERIAL OR WORK NOT SPECIFICALLY MENTIONED OR SHOWN ON THE DRAWINGS. BUT NECESSARY TO FULLY COMPLETE THE WORK, SHALL BE FURNISHED BY THE PROJECT AV SYSTEMS INTEGRATOR.
6. NO CHANGES TO THE DESIGN SHALL BE MADE WITHOUT THE PROJECT AV CONSULTANT'S WRITTEN CONSENT.
7. WHERE APPLICABLE, AV SYSTEMS INTEGRATOR SHALL FOLLOW ALL MANUFACTURER'S INSTALLATION GUIDELINES.
8. REFER TO DRAWINGS FOR EXACT NUMBER OF COMPONENTS USED IF NOT SPECIFIED IN EQUIPMENT LIST.
9. COORDINATE EXACT SPEAKER LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS. ANY CONFLICT SHALL BE BROUGHT TO THE ATTENTION OF THE PROJECT AV CONSULTANT PRIOR TO BIDDING.
10. CONFIRM AVAILABLE MOUNTING DEPTHS OF ALL SPEAKERS AND COMPARE WITH DEPTHS SHOWN ON SHOP DRAWINGS. BRING ALL POTENTIAL CONFLICT AREAS TO THE ATTENTION OF THE ARCHITECT AND AV CONSULTANT PRIOR TO RELEASE.
11. INSTALL/SUSPEND ALL AUDIOVISUAL SYSTEMS EQUIPMENT IN COMPLIANCE WITH SEISMIC CODES, MANUFACTURER'S WRITTEN INSTRUCTIONS, AND INDUSTRY BEST PRACTICES. DURING THE SUBMITTAL PROCESS, PROVIDE SHOP DRAWINGS WHICH DETAIL PROPOSED MOUNTING FOR ALL SUCH EQUIPMENT.
12. ALL TWISTED-PAIR (U/UTP, F/UTP, U/FTP, S/FTP) CATEGORY TYPE CABLING SHALL BE TERMINATED BY CERTIFIED DATA TECHNICIANS. TEST PER SPECIFICATIONS REQUIREMENTS AND PROVIDE DATA TO AV CONSULTANT.
13. ALL HDBaseT SIGNAL CABLING, TERMINATIONS, AND TERMINATION HARDWARE SHALL COMPLY WITH TIA/EIA WIRING CONFIGURATION T568 B. ALL HDBaseT SIGNAL CABLING SHALL BE SHIELDED/FOIL (SF/UTP) CATEGORY TYPE CABLE.
14. CONDUCT A RADIO FREQUENCY AUDIT OF THE SITE PRIOR TO SELECTING RF OPERATIONAL FREQUENCIES. AV SYSTEMS INTEGRATOR TO ENSURE INTERFERENCE FREE OPERATION OF ALL RF DEVICES. AV SYSTEMS INTEGRATOR SHALL COORDINATE AUDIT RESULTS WITH MANUFACTURER PRIOR TO PURCHASING RF EQUIPMENT.
15. PROVIDE RACK MOUNT KITS FOR ALL RACK MOUNTED EQUIPMENT. PROVIDE CUSTOM RACK MOUNT KITS WHEN NOT AVAILABLE FROM THE EQUIPMENT MANUFACTURER.
16. PROVIDE SURGE PROTECTION DEVICE (SPD) IN ALL AV EQUIPMENT RACKS.
17. ALL AV EQUIPMENT RACKS SHALL BE GROUNDED AND BONDED TO MEET OR EXCEED THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE (NED), IEC 1000-5-2 ANSI/J-STD-607-A.
18. ALL AV EQUIPMENT SHALL BE GROUNDED PER MANUFACTURER'S SPECIFICATIONS.
19. PROVIDE MANUFACTURER RECOMMENDED POWER SUPPLIES OR TRANSFORMERS FOR ALL SPECIFIED EQUIPMENT.
20. THE CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR LACK OF COORDINATION WITH AV CONSULTANT AS ADDRESSED IN THE DOCUMENTS
21. UNLESS SPECIFICALLY SPECIFIED OR NOTED PROVIDE COMMERCIAL QUALITY EQUIPMENT, MATERIALS AND COMPONENTS DESIGNED FOR CONTINUOUS USE. CONSUMER QUALITY COMPONENTS ARE NOT ACCEPTABLE.

AUDIOVISUAL SHEET INDEX

T200 AUDIOVISUAL SYMBOLS, SCHEDULES, AND NOTES
T201 AUDIOVISUAL SCHEDULES
T211-A MAIN LEVEL AUDIOVISUAL FLOOR PLAN
T211-B ALTERNATE AUDIOVISUAL FLOOR PLAN
T221-A MAIN LEVEL AUDIOVISUAL RCP
T221-B SECOND FLOOR AUDIOVISUAL ALTERNATE RCP
T250 AUDIOVISUAL ROUGH IN DIAGRAMS 1
T260 AUDIOVISUAL SIGNAL FLOW DIAGRAMS
T411 MAIN LEVEL INTERCOM PLAN
T412 ALTERNATE INTERCOM PLAN

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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
1	Addendum 4	10/09/2024

PROJECT INFORMATION

DATE: SEPTEMBER 12, 2024
PROJECT #: 24-013
PM / PA: BNA
PIC: BNA

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

AUDIOVISUAL SYMBOLS, SCHEDULES, AND NOTES

SHEET NUMBER

T200

Autodesk Docs://24-013 CCHS Fieldhouse & Soccer Field/CCHS Fieldhouse & Soccer Field BP2.rvt
10/9/2024 6:11:46 PM

PROJECTOR SCREEN SCHEDULE

TYPE	IMAGE SIZE (lx) IN INCHES				BLACK DROP LENGTH	BOTTOM OF IMAGE A/F	CASE DIMENSIONS (Cx) IN INCHES			WEIGHT	OPERATION	PROJECTION ORIENTATION	CONTROL TYPE	MOUNTING TYPE	NOTES
	DIAGONAL	HEIGHT	WIDTH	ASPECT RATIO			LENGTH	WIDTH	DEPTH						
SC1	164	87"	139"	16:10	18"	48"	160 3/4"	6"	6"	126 LBS	MOTORIZED, 120V	FRONT	AV SYSTEM, RELAY, RS-232	CEILING, RECESSED	

AV FLAT PANEL MONITOR SCHEDULE

TYPE	IMAGE SIZE (lx) IN INCHES			MONITOR DIMENSIONS (Cx) IN INCHES			WEIGHT	CONTROL TYPE	NOTES
	DIAGONAL	HEIGHT	WIDTH	HEIGHT	WIDTH	DEPTH			
D65	65	32"	56 5/8"	32 7/8"	57 5/16"	2 1/2"	60 LBS	RS-232, IP	
D75	75	36 15/16"	65 5/16"	37 7/8"	66 1/4"	2 1/2"	85 LBS	RS-232, IP	TV'S WILL BE CONTROLLED BY LOCAL REMOTE UNLESS OTHERWISE NOTED.
D85	60	29 9/16"	52 1/4"	30 7/16"	53"	2 1/2"	60 LBS	RS-232, IP	

AV CUSTOM BACK BOX SCHEDULE

TYPE	MANUFACTURER	MODEL	BOX DIMENSIONS (Cx) IN INCHES			CONDUIT'S	MOUNTING TYPE	MOUNTING HEIGHT	NOTES
			HEIGHT	WIDTH	DEPTH				
KP1	HUBBELL	HBL263	4 3/16"	2 1/8"	3 1/4"	(1) 4", (3) 2", (5) 1"	RECESSED	HORIZONTAL	3-GANG
TP7	HUBBELL	HBL260	4 3/16"	4 3/16"	4"	(1) 4", (3) 2", (5) 1"	WALL MOUNTED	HORIZONTAL	

AV EQUIPMENT RACK SCHEDULE

TYPE	DIMENSIONS				JUNCTION BOX	MOUNTING TYPE	NOTES
	HEIGHT	WIDTH	DEPTH	RU's			
R1	32 1/8"	23 1/2"	22"	16	C2	WALL	WALL MOUNTED EQUIPMENT RACK, HEIGHT INDICATED IS FROM BOTTOM OF RACK.
R3	19 1/8"	23 1/2"	22"	12	C2	WALL	

AV LOUDSPEAKER SCHEDULE

TYPE	DIMENSIONS				SHAPE	WEIGHT	INSTALLATION	NOTES
	WIDTH (H)	WIDTH (V)	DIAMETER	DEPTH				
A1	<varies>	<varies>	<varies>	<varies>	TRAPEZOID	<varies>	SURFACE	THIS IS A CAB LOUDSPEAKER
A2	16 1/2"	9 1/16"		7 7/16"	TRAPEZOID	15 LBS	SURFACE	THIS IS A CAB LOUDSPEAKER
C4	12"	24"	12"	3"	SQUARE	4.7 LBS	RECESSED	POLEVAULT CLASSROOM LOUDSPEAKER
P6	0"	0"	12 5/16"	13"	ROUND	11.5 LBS	PENDENT	MOUNT PENDANT SO THAT SLEVEL WITH LIGHT FIXTURE
S1	8 11/16"	12 1/8"		1/4"	SQUARE	10 LBS	RECESSED	THIS IS A RECESSED WALL LOUDSPEAKER

FLAT PANEL WALL BOX SCHEDULE

TYPE	DESCRIPTION	DATA	COAX	DUPL EX	AV	MFR.	MODEL
DP01	WALL MOUNTED FLAT PANEL WITH (2) DATA DROPS, (1) COAX, (1) SURGE PROTECTED DUPLEX, (1) AV PASS THROUGH	(2) DATA DROPS	(1) COAX	(1) SURGE PROTECTED DUPLEX	(1) AV PASS THROUGH	CHIEF , LEGRAND, FSR	PAC 525, EFB4, PWB4

LOW VOLTAGE SCOPE OF WORK

NOTES:...

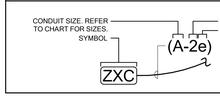
1. RESPONSIBILITY MATRIX DELINEATES THE SCOPE OF WORK BETWEEN THE OWNER AND THE CONTRACTORS. CONTRACTORS ARE RESPONSIBLE TO COORDINATE BETWEEN EACH OTHER FOR THE FULL SCOPE OF WORK THEY ARE RESPONSIBLE FOR.
2. ADDITIONAL NOTES MAY BE PRESENT WITHIN THE CONTRACT DOCUMENTS INDICATING SPECIFIC EQUIPMENT PROVIDED BY OTHERS OR REQUIRE INSTALLATION BY SPECIFIC DIVISIONS.
3. INSTALLER PROVIDING THE SYSTEM CABLING SHALL PROVIDE THE CABLING, TERMINATION AND CERTIFICATION FOR A COMPLETE SYSTEM INSTALLATION, UNLESS OTHERWISE SPECIFICALLY NOTED WITHIN THE CONTRACT DOCUMENTS.
4. INSTALLER TO VERIFY WITH CONTRACT DOCUMENTS FOR THE CONNECTION TYPE (MALE OR FEMALE) REQUIRED FOR EACH SYSTEM.
5. REFER TO DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

LEGEND

AC	ACCESS CONTROL CONTRACTOR
AV	AUDIOVISUAL CONTRACTOR
DC	DOOR HARDWARE CONTRACTOR
EC	ELECTRICAL CONTRACTOR
FR	FURNITURE CONTRACTOR
GC	GENERAL CONTRACTOR
IC	INTRUSTION DETECTION
LVC	CONTRACTOR TELEPHONE/DATA CABLING
NIC	CONTRACTOR
OWNER	NOT IN CONTRACT
SC	OWNER
SPEC	VIDEO SURVEILLANCE CONTRACTOR SEE SPECIFICATIONS

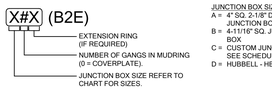
DESCRIPTION	FURNISHED BY	INSTALLED BY
GENERAL		
EQUIPMENT POWER (120V, 208V, 240V, 277V, 480V)	EC	EC
ROUGH OR FINISHED TRIM, CASEWORK, MILLWORK, EQUIPMENT RACK PEDESTALS, STRUCTURAL WORK FOR SPECIAL CONSTRUCTION	GC	GC
STRUCTURAL BACKING AND SUPPORT FOR WALL MOUNTED EQUIPMENT	GC	GC
SUPPORT CABLES, PRE-CONSTRUCTION KITS, TILE BRIDGES AND/OR BACK BOXES FOR CEILING MOUNTED DEVICES.	EC	EC
ACCESS CONTROL SYSTEM		
ACCESS CONTROL OPERATING SOFTWARE	AC	AC
ACCESS CONTROL SERVER	OWN	OWN
ACCESS CONTROL SYSTEM HEAD-END CONTROL PANEL(S), AND POWER SUPPLY(S)	AC	AC
CREDENTIALS (E.G. CARDS, FOBS, TAGS, MOBILE CREDENTIALS)	AC	AC
INSTALLATION OF ACCESS CONTROL CABLING	AC	AC
TERMINATING AND TESTING THE ACCESS CONTROL CABLES	AC	AC
INDIVIDUAL ACCESS CONTROL DOOR CONTROLLERS (IF APPLICABLE)	AC	AC
END DEVICES (E.G., CREDENTAIL CARD READERS, DOOR POSITION CONTACTS, REQUEST TO EXIT MOTIONS, PUSH TO EXIT BUTTONS, DESK DOOR RELEASE BUTTONS, DESK PANIC / DURESS/LOCKDOWN BUTTONS, ETC.)	AC	AC
RECHARGABLE SEALED LEAD ACID BACK-UP BATTERIES	AC	AC
CREDENTIAL CARD/BADGE PRINTER	AC	AC
ELECTRIFIED LOCKING DOOR HARDWARE	DC	DC
EXTERIOR EQUIPMENT PEDESTALS AND ENCLOSURES	EC	EC
IP TWO-WAY AUDIO VIDEO INTERCOM SYSTEM (EXTERIOR STATIONS, ANSWERING BASE STATIONS, IP LICENSES)	AC	AC
NETWORK EQUIPMENT SPECIFICALLY FOR THE ACCESS CONTROL SYSTEM (E.G. NETWORK SWITCHES, POE SWITCHES, ROUTERS, PATCH PANELS, EQUIPMENET RACKS, ETC.)	AC	AC
OPERATING BASE STATION AND WORK STATION EQUIPMENT (COMPUTER SERVER, MONITOR, KEYBOARD, MOUSE)	OWN	OWN
POWER SUPPLIES FOR ELECTRIFIED LOCKING DOOR HARDWARE	AC	AC
AUDIOVISUAL		
ROUGH-IN - CONDUIT W/PULL STRING, JUNCTION BOXES, FLOOR BOXES, FLAT PANEL DISPLAY BACK BOXES, ETC.	EC	EC
SPECIALTY BACK BOXES, TILE BRIDGES, SUPPORT CABLES, PRECONSTRUCTION KITS, ETC. FOR AUDIOVISUAL COMPONENTS (TOUCH PANELS, LOUDSPEAKERS, KEYPADS, ETC.)	AV	AV
CATEGORY CABLE / FIBER OPTIC CABLE FROM DEVICE LOCATION TO TR(MDF)/ER(IDF) TERMINATED IN PATCH PANEL	LVC	LVC
CATEGORY CABLING FROM DEVICE TO DEVICE, NOT TERMINTATED IN PATCH PANELS WITHIN THE ER(MDF/TR(IDF)	AV	AV
COAXIAL CABLE	LVC	LVC
LIGHTING CONTROL SYSTEM INTERFACE DEVICE(S) AND CABLING TO AV CONTROL SYSTEM. TERMINATION INTO AV SYSTEM CONTROLLER BY AV INSTALLER	EC	EC
MOTORIZED SHADE CONTROL SYSTEM INTERFACE DEVICE(S) AND CABLING TO AV CONTROL SYSTEM. TERMINATION INTO AV SYSTEM	AV	AV
CUSTOM AUDIOVISUAL CONNECTOR INSERT PLATE FOR FLOOR BOXES AND/OR WALL PLATES	AV	AV
FURNITURE BOX TABLE CUTTING	GC	GC
FURNITURE BOXES WITH AUDIOVISUAL CONNECTIONS AND/OR CABLES	AV	AV
PROJECTOR SCREEN MANUAL AND/OR MOTORIZED HOUSING	AV	AV
PROJECTOR SCREEN MANUAL AND/OR MOTORIZED ROLLER	AV	AV
PROJECTOR SCREEN, FIXED FRAME (SIMILAR TO WHITEBOARD)	GC	GC
FLAT PANEL MONITOR MOUNTS	AV	AV
FLAT PANEL MONITORS	AV	AV
INSTRUCTOR'S LECTERNS/CONSOLES WITH INTEGRATED AUDIOVISUAL SYSTEMS COMPONENTS	AV	AV
INTERACTIVE FLAT PANEL MONITORS AND MOUNTS	AV	AV
NETWORK SWITCHES WITHIN THE ER(MDF)/TR(IDF) FOR AUDIOVISUAL NETWORK, AUDIO, CONTROL AND VIDEO	OWNER	OWNER
VIDEO PROJECTOR	AV	AV
VIDEO PROJECTOR MOUNTS	AV	AV
INTRUSION DETECTION SYSTEM (BURGLAR ALARM)		
ANY INTRUSION DETECTION WIRELESS EQUIPMENT (RECEIVERS, REPEATERS, TRANSMITTERS, ETC.)	IC	IC
CELLULAR BACKUP COMMUNICATOR	IC	IC
END DEVICES (E.G. DOOR, WINDOW, GARAGE CONTACTS. MOTION, GLASS BREAK DETECTORS. SMOKE, HEAT DETECTORS. TEMPERATURE, MOISTURE, LEAK SENSORS, ETC.)	IC	IC
INTERIOR/EXTERIOR SIRENS AND/OR STROBES	IC	IC
INTRUSION DETECTION (ARM/DISARM) ALPHA KEYPAD(S)	IC	IC
INTRUSION DETECTION HEAD-END CONTROL PANEL & SLAVE PANELS	IC	IC
INTRUSION DETECTION LOW VOLTAGE CABLING	IC	IC
RECHARGABLE BACK UP BATTERY(S)	IC	IC
TERMINATING AND TESTING LOW VOLTAGE CABLES	IC	IC
IP CAMERAS AND VIDEO SURVEILLANCE SYSTEM		
NETWORK VIDEO RECORDER (NVR)	SC	SC
VIDEO MANAGEMENT SYSTEM (VMS) OPERATING SOFTWARE	SC	SC
VIDEO ANALYTIC SOFTWARE AND LICENSING	SC	SC
IP SURVEILLANCE CAMERA MOUNTS, MOUNTING HARDWARE AND EQUIPMENT	SC	SC
IP SURVEILLANCE CAMERA SOFTWARE LICENSES	SC	SC
IP SURVEILLANCE CAMERAS	SC	SC
MICRO SDXC MEMORY CARD(S) FOR IP SURVEILLANCE CAMERAS	SC	SC
IN-LINE CAT6 CATEGORY CABLE SURGE PROTECTORS, POWER SURGE & SUPRPESSION EQUIPMENT, AND UNINTERRUPTIBLE POWER SUPPLY (UPS)	SC	SC
IP SURVEILLANCE CAMERA ETHERNET EXTENDERS, POE INJECTORS, AND POWER SUPPLIES	SC	SC
NETWORK EQUIPMENT SPECIFICALLY FOR THE IP VIDEO SURVEILLANCE SYSTEM (E.G. NETWORK SWITCHES, POE SWITCHES, ROUTERS, PATCH PANELS, EQUIPMENET RACKS, ETC.)	OWNER	OWNER
OPERATING BASE STATION AND WORK STATION EQUIPMENT (COMPUTER SERVERS, MONITORS, KEYBOARDS, MOUSES)	OWNER	OWNER
SPECIFIED CATEGORY CABLE AND FIBER OPTIC CABLE	LVC	LVC
TERMINATING AND TESTING THE SPECIFIED CATEGORY CABLING AND FIBER OPTIC CABLING	LVC	LVC
TELEPHONE / DATA		
ROUGH-IN - CONDUIT W/PULL STRING, JUNCTION BOXES, FLOOR BOXES, FLAT PANEL DISPLAY BACK BOXES, ETC.	EC	EC
CATEGORY CABLE / FIBER OPTIC CABLE	LVC	LVC
PATCH CABLES FOR DEVICES WITHIN THE TR/ER FOR CONNECTION BETWEEN PATCH PANELS AND NETWORK SWITCHES	LVC	LVC
TERMINATE CABLE (PATCH PANEL AND DATA PORT), INCLUDING TESTING	LVC	LVC
CUSTOM TELECOMMUNICATIONS CONNECTOR INSERT PLATE FOR FLOOR BOXES AND/OR WALL PLATES	EC	EC
DATA SWITCHES, SERVERS, FIREWALL, ETC	OWNER	OWNER
EQUIPMENT RACKS WITHIN THE ER(MDF)/TR(IDF) FOR SYSTEM COMPONENTS	LVC	LVC
RACK MOUNT UPS, POWER DISTRIBUTION UNIT (PDU)	LVC	LVC
WIRELESS ACCESS POINTS	OWNER	OWNER

CONDUIT SCHEDULE LEGEND:



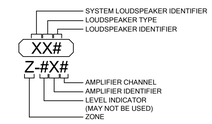
CONDUIT SIZE CHART
A = 3/4" CONDUIT
B = 1" CONDUIT
C = 1-1/4" CONDUIT
D = 1-1/2" CONDUIT
E = 2" CONDUIT
F = 3" CONDUIT
G = 4" CONDUIT

ROUGH-IN JUNCTION BOX LEGEND:



JUNCTION BOX SIZE
A = 4" SQ. 2-1/8" DEEP JUNCTION BOX
B = 4-11/16" SQ. JUNCTION BOX
C = CUSTOM JUNCTION BOX, SEE SCHEDULE FOR SIZE
D = HUBBELL - HBL260/HBL985

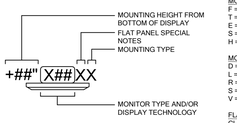
LOUDSPEAKER LEGEND:



LOUDSPEAKER TYPES
A = ARRAY, CABINET, CLUSTER
C = CEILING RECESSED
P = PENDANT MOUNTED
R = WALL RECESSED
S = CEILING SURFACE MOUNTED
W = WALL SURFACE MOUNTED

SYSTEM LOUDSPEAKER IDENTIFIER
BLANK = SYSTEM SPECIFIC
I = INTERCOM SYSTEM
SM = SOUND MASKING SYSTEM

FLAT PANEL MONITOR LEGEND:



NOTES:

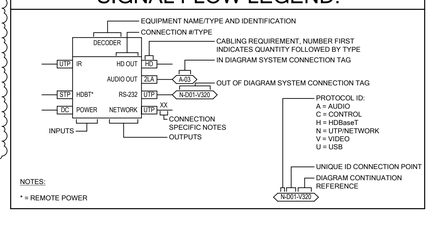
* HEIGHT INDICATED IS THE MAX HEIGHT, MOUNT SHALL ADJUST DOWN

MOUNT TYPES
F = FLAT MOUNT
T = TILT MOUNT
E = EXTENSION MOUNT
S = ARTICULATING MOUNT
H = ADJUSTABLE HEIGHT MOUNT*

MONITOR TYPES
D = TYPICAL COMMERCIAL GRADE
L = DIRECT VIEW LED PRODUCT
R = RESIDENTIAL GRADE
S = INTERACTIVE COMMERCIAL GRADE
V = VIDEO WALL (SLIM BEZEL)

FLAT PANEL SPECIAL NOTES
CLG = CEILING (POLE) MOUNTED
D = DIGITAL SIGNAGE
P = PORTRAIT ORIENTATION
R = RECESSED

SIGNAL FLOW LEGEND:



NOTES:

* = REMOTE POWER

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SALT LAKE ST. GEORGE

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
1	Addendum 4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	BNA
PIC:	BNA

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

AUDIOVISUAL SCHEDULES

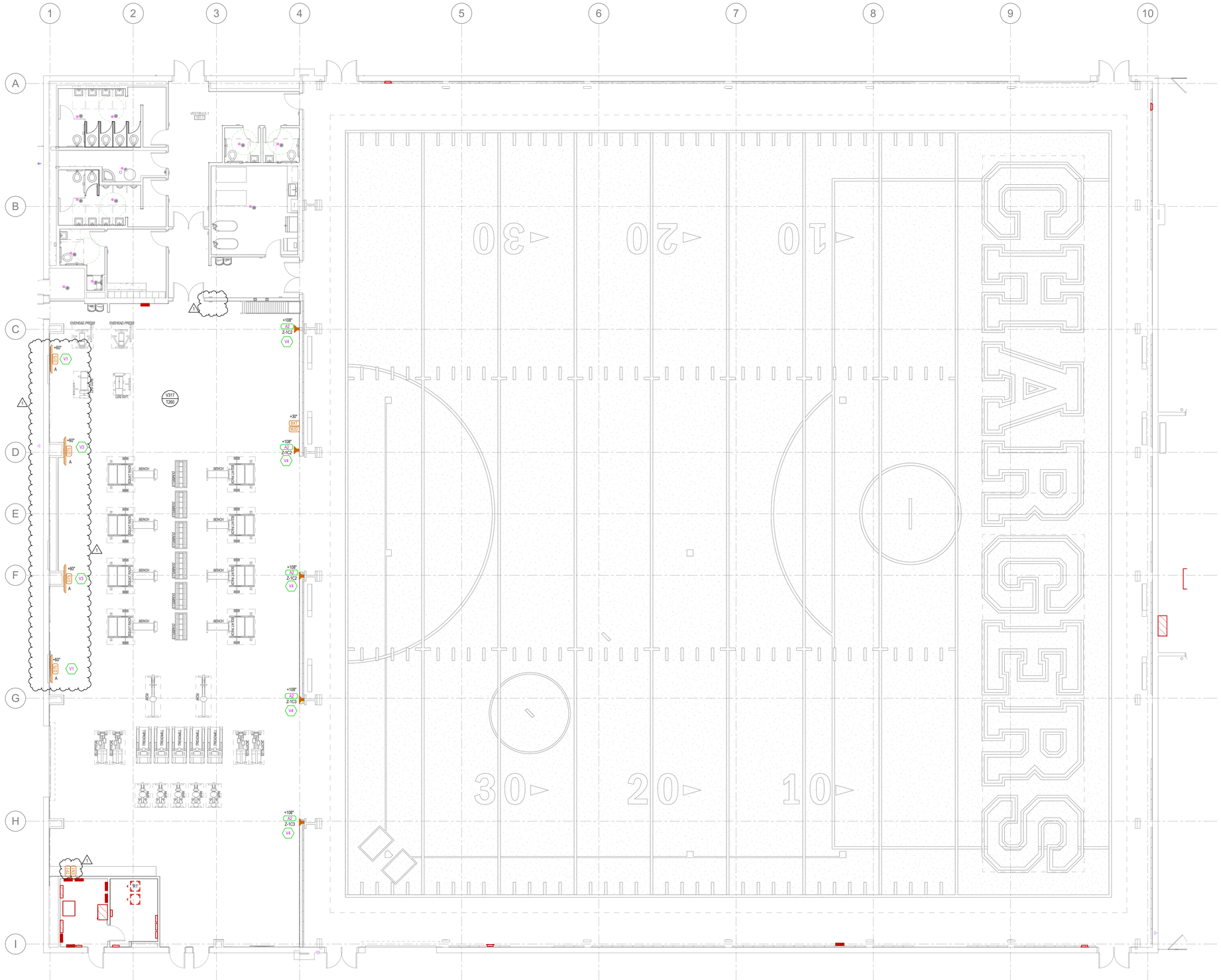
SHEET NUMBER

T201

Autodesk Docs://24-013 CCHS Fieldhouse & Soccer Field/CCHS Fieldhouse & Soccer Field BP2.rvt
10/9/2024 6:11:49 PM

SHEET KEYNOTES

V1	MOUNT ABOVE MIRRORS. CONNECTS TO OWNER-FURNISHED STREAMING DEVICE.
V3	CENTER ON COLUMN. VERIFY FINAL MOUNTING LOCATION WITH ARCHITECT.
V4	MOUNT LOUDSPEAKER TO COLUMN.



MAIN AUDIOVISUAL FLOOR PLAN
SCALE = 1/8" = 1'-0"

BASE BID

1. INFORMATION SHOWN PERTAINS TO THE BASE BID. BIDDING CONTRACTOR SHALL REFERENCE ALL GENERAL CONTRACTOR DOCUMENTATION DETAILING BASE BID AND ALTERNATE PLANS WITHIN THE PROJECT. PROVIDE BROKEN OUT NUMBERS AS DIRECTED BY GENERAL CONTRACTOR DOCUMENTATION.

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1	Addendum 4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	BNA
PIC:	BNA

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

MAIN LEVEL AUDIOVISUAL FLOOR PLAN

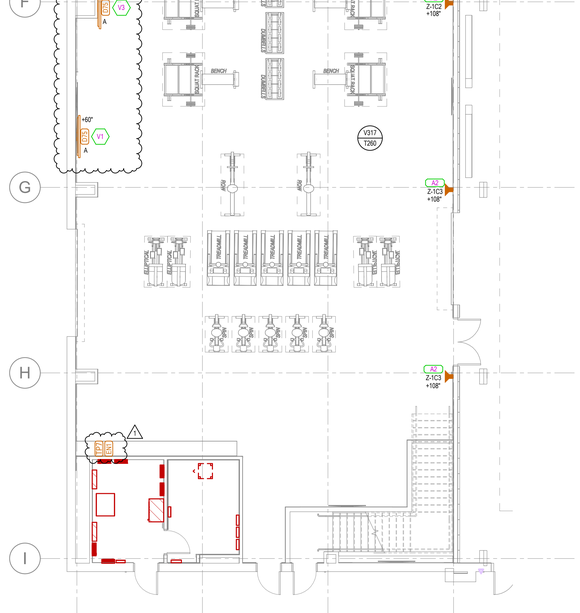
SHEET NUMBER

T211-A

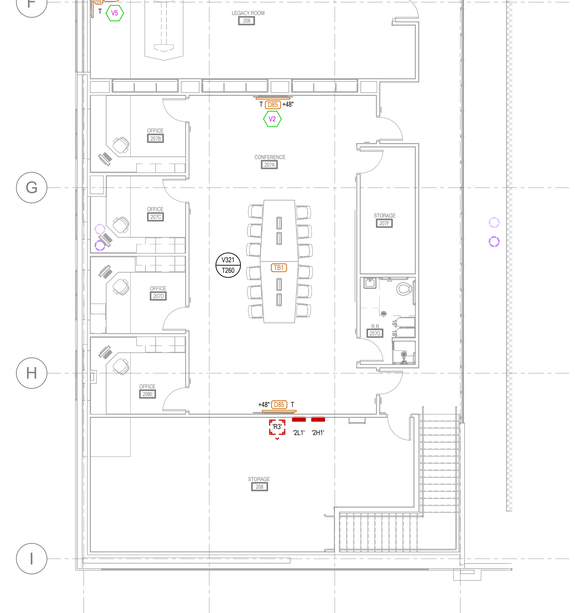
Autodesk Docs://24-013 CCHS Fieldhouse & Soccer Field/CCHS Fieldhouse & Soccer Field BP2.rvt
10/9/2024 6:11:53 PM

SHEET KEYNOTES

V1	MOUNT ABOVE MIRRORS. CONNECTS TO OWNER-FURNISHED STREAMING DEVICE.
V2	SECURE AUDIO AMPLIFIER BEHIND DISPLAY.
V3	CENTER ON COLUMN. VERIFY FINAL MOUNTING LOCATION WITH ARCHITECT.
V5	MOUNT DISPLAY TO COLUMN.



2 MAIN LEVEL AUDIOVISUAL FLOOR PLAN - ALTERNATIVE
SCALE = 1/8" = 1'-0"



3 UPPER LEVEL AUDIOVISUAL FLOOR PLAN - ALTERNATIVE
SCALE = 1/8" = 1'-0"

ALTERNATE #1

1. REFER TO FLOORPLANS SHOWN FOR ALTERNATE #1 PLAN CONFIGURATIONS. BIDDING CONTRACTOR SHALL REFERENCE ALL GENERAL CONTRACTOR DOCUMENTATION DETAILING BASE BID AND ALTERNATE PLANS WITHIN THE PROJECT. PROVIDE BROKEN OUT NUMBERS AS DIRECTED BY GENERAL CONTRACTOR DOCUMENTATION.

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BNA Proj. No. #####
SALT LAKE · ST. GEORGE

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
1	Addendum 4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	BNA
PIC:	BNA

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

ALTERNATE AUDIOVISUAL FLOOR PLAN

SHEET NUMBER

T211-B

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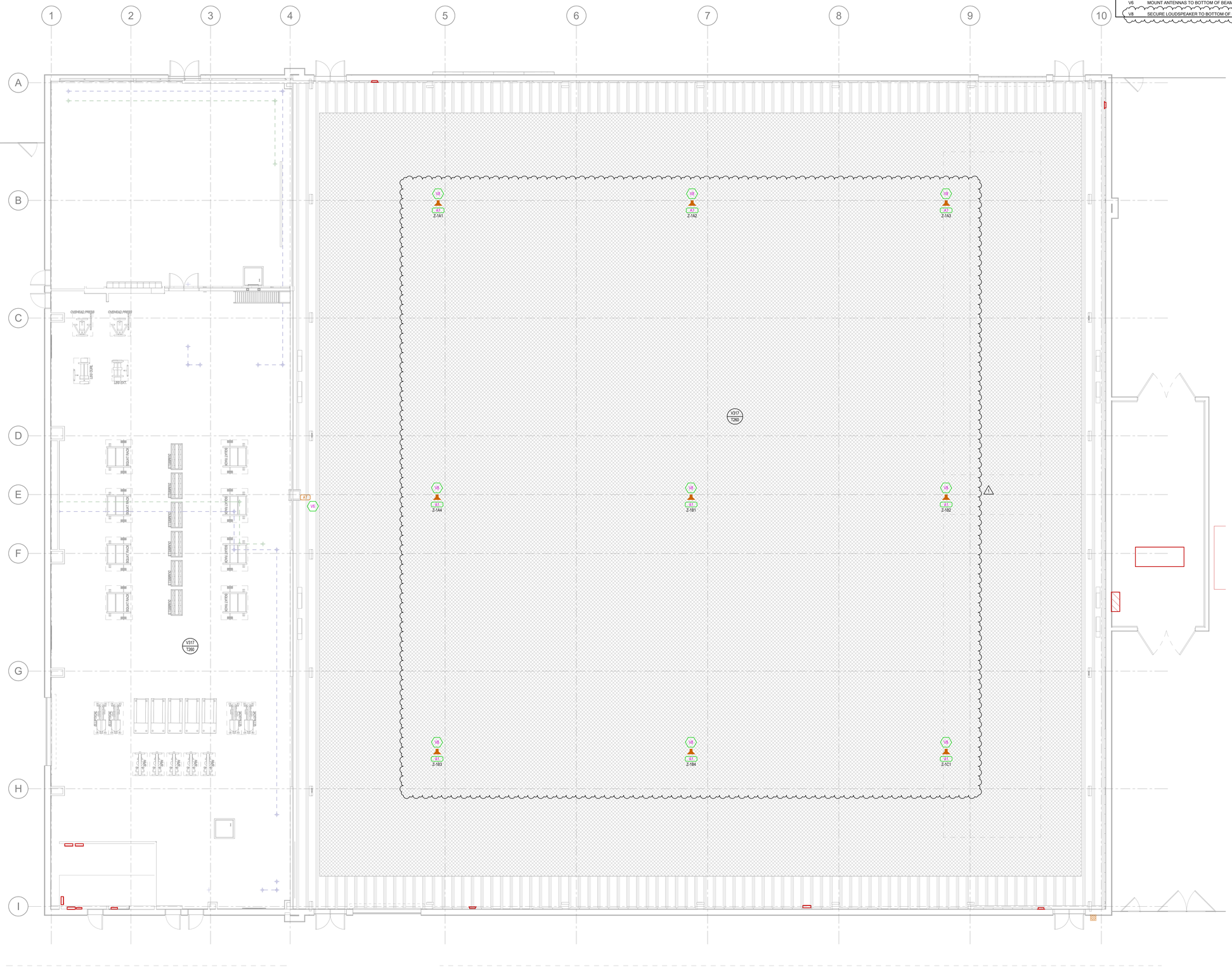
10/9/2024 6:11:59 PM

SHEET KEYNOTES

V6	MOUNT ANTENNAS TO BOTTOM OF BEAM. ENSURE PROPER FIELD RECEPTION.
V8	SECURE LOUDSPEAKER TO BOTTOM OF BEAM.



AUDIOVISUAL MAIN FLOOR REFLECTED CEILING PLAN
SCALE = 1/8" = 1'-0"

BASE BID

1. INFORMATION SHOWN PERTAINS TO THE BASE BID. BIDDING CONTRACTOR SHALL REFERENCE ALL GENERAL CONTRACTOR DOCUMENTATION DETAILING BASE BID AND ALTERNATE PLANS WITHIN THE PROJECT. PROVIDE BROKEN OUT NUMBERS AS DIRECTED BY GENERAL CONTRACTOR DOCUMENTATION.

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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

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PROJECT INFORMATION

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PIC:	BNA

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

MAIN LEVEL AUDIOVISUAL RCP

SHEET NUMBER

T221-A

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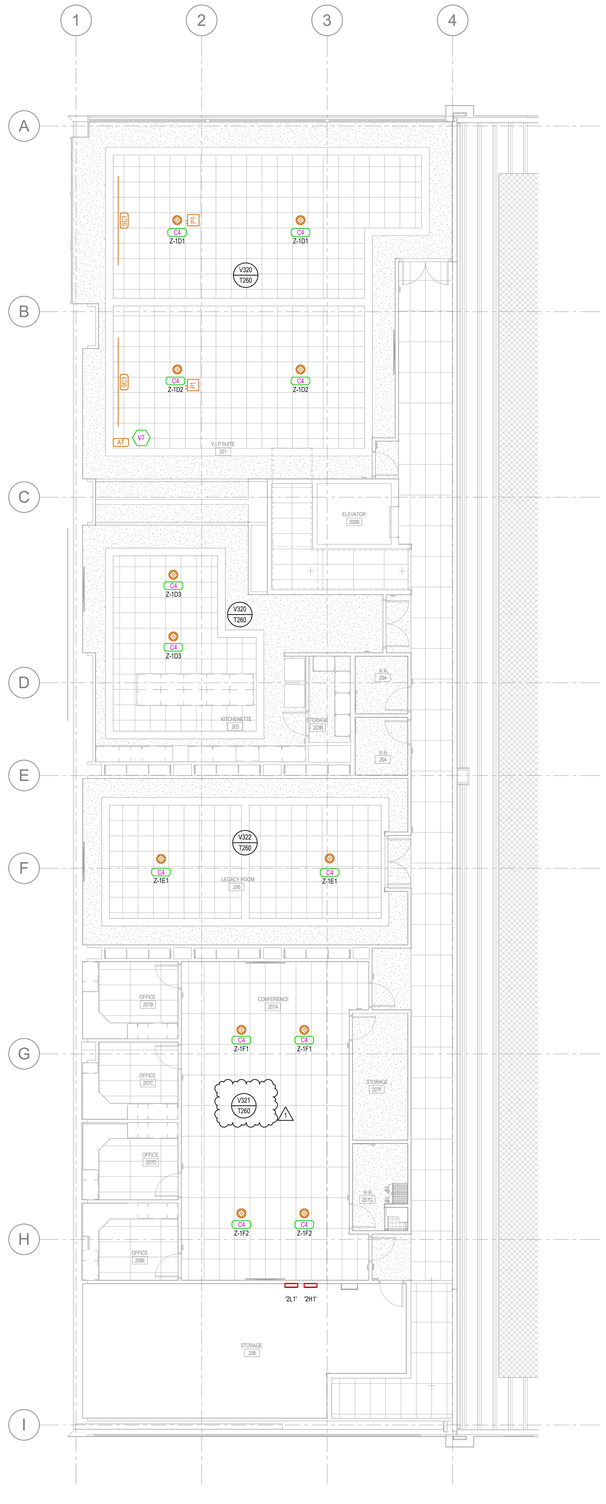

UPPER MAIN AV RCP - ALTERNATIVE
SCALE = 1/8" = 1'-0"

SHEET KEYNOTES

V7	COORDINATE FINAL ANTENNA MOUNTING LOCATION WITH ARCHITECT. ANTENNA RECEPTION NEEDS TO COVER VIP AND KITCHENETTE AREAS.

ALTERNATE #1

1. REFER TO FLOORPLANS SHOWN FOR ALTERNATE #1 PLAN CONFIGURATIONS. BIDDING CONTRACTOR SHALL REFERENCE ALL GENERAL CONTRACTOR DOCUMENTATION DETAILING BASE BID AND ALTERNATE PLANS WITHIN THE PROJECT. PROVIDE BROKEN OUT NUMBERS AS DIRECTED BY GENERAL CONTRACTOR DOCUMENTATION.

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SALT LAKE ST. GEORGE

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
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PROJECT INFORMATION

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PIC:	BNA

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BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

SECOND FLOOR AUDIOVISUAL ALTERNATE RCP

SHEET NUMBER

T221-B

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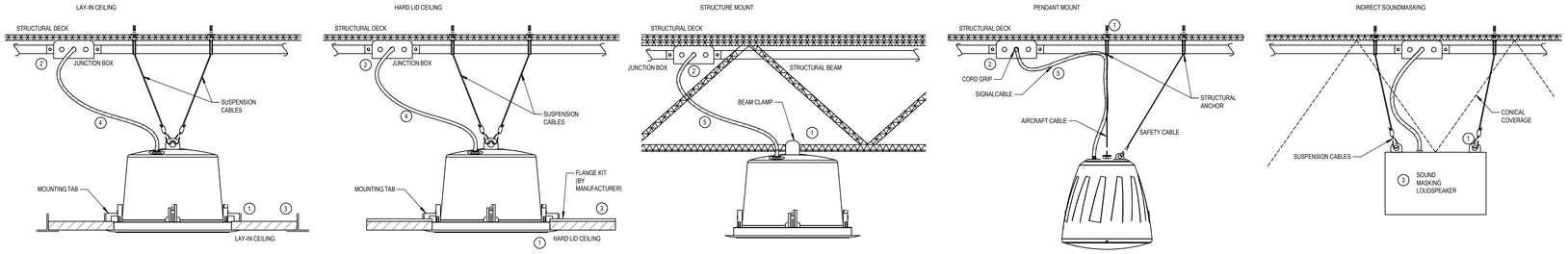
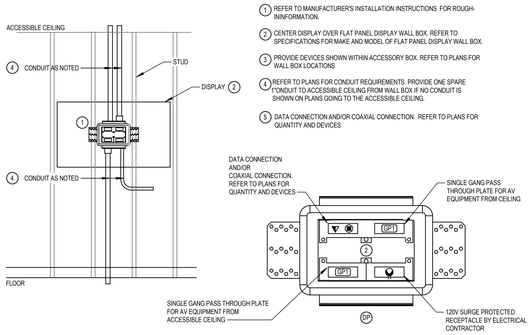


DIAGRAM V010 TYPICAL CEILING LOUDSPEAKER INSTALLATION METHODS

NTS

DIAGRAM KEY NOTES:

1. AV CONTRACTOR IS RESPONSIBLE FOR DETERMINING FINAL MOUNTING METHOD AND REQUIRED MOUNTING ACCESSORIES BASED ON CEILING TYPE AND INSTALLATION REQUIREMENTS.
2. POSITION JUNCTION BOX OVER LOUDSPEAKER LOCATION SHOWN. INSTALL WITH BLANK COVER FACING DOWNWARD. REFER TO SPECIFICATIONS AND DRAWINGS FOR PATHWAY REQUIREMENTS.
3. PROVIDE TILE BRIDGE FOR LAY-IN TILE INSTALLATION. PROVIDE SECONDARY SEISMIC SUPPORT HARDWARE FROM STRUCTURE ABOVE (AS REQUIRED PER AHJ).
4. PROVIDE 1/2" FLEXIBLE CONDUIT AS REQUIRED PER INSTALLATION. FLEXIBLE CONDUIT AND/OR CABLING SHALL NOT DIP BELOW THE LOUDSPEAKER BUT ALLOW ENOUGH CABLE FOR THE LOUDSPEAKER TO BE REPLACED.
5. PROVIDE CABLE GRIP IN JUNCTION BOX WHERE CABLING EXITS. CABLING SHALL BE NEATLY SECURED, OUT OF SITE, TO THE LOUDSPEAKER.
6. PROVIDE SEISMIC SUSPENSION CABLES LONG ENOUGH TO PROVIDE ACCESS TO THE MOUNTING POINT PRIOR TO THE LOUDSPEAKER INSTALLATION. SEISMIC SAFETY CABLES SHALL PREVENT THE LOUDSPEAKER FROM FALLING TO THE FLOOR.



KEYNOTES:

1. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR ROUGH-ININFORMATION.
2. CENTER DISPLAY OVER FLAT PANEL DISPLAY WALL BOX. REFER TO SPECIFICATIONS FOR MAKE AND MODEL OF FLAT PANEL DISPLAY WALL BOX.
3. PROVIDE DEVICES SHOWN WITHIN ACCESSORY BOX. REFER TO PLANS FOR WALL BOX LOCATIONS
4. REFER TO PLANS FOR CONDUIT REQUIREMENTS. PROVIDE ONE SPARE 1"CONDUIT TO ACCESSIBLE CEILING FROM WALL BOX IF NO CONDUIT IS SHOWN ON PLANS GOING TO THE ACCESSIBLE CEILING.
5. DATA CONNECTION AND/OR COAXIAL CONNECTION. REFER TO PLANS FOR QUANTITY AND DEVICES

DIAGRAM V031 FLAT PANEL DISPLAY WALL BOX

NTS

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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
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PROJECT INFORMATION

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PROJECT #:	24-0131
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PIC:	BNA

DRAWING SET STATUS

BID SET

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SHEET TITLE

AUDIOVISUAL ROUGH IN DIAGRAMS

SHEET NUMBER

T250

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10/9/2024 6:12:04 PM

DIAGRAM NOTES: #

1. DEVICE LOCATED IN RACK 'R1'
2. SUM SIGNAL TO MONO
3. LOCATED IN WEIGHT ROOM
4. MOUNT ON RACK SHELF. FOR CONNECTION TO OWNER-FURNISHED APPLE TV
5. MOUNT ON RACK SHELF. FOR CONNECTION TO OWNER-FURNISHED DIGITAL SIGNAGE
6. SECURE DEVICE BEHIND DISPLAY
7. DISPLAY 'D75'

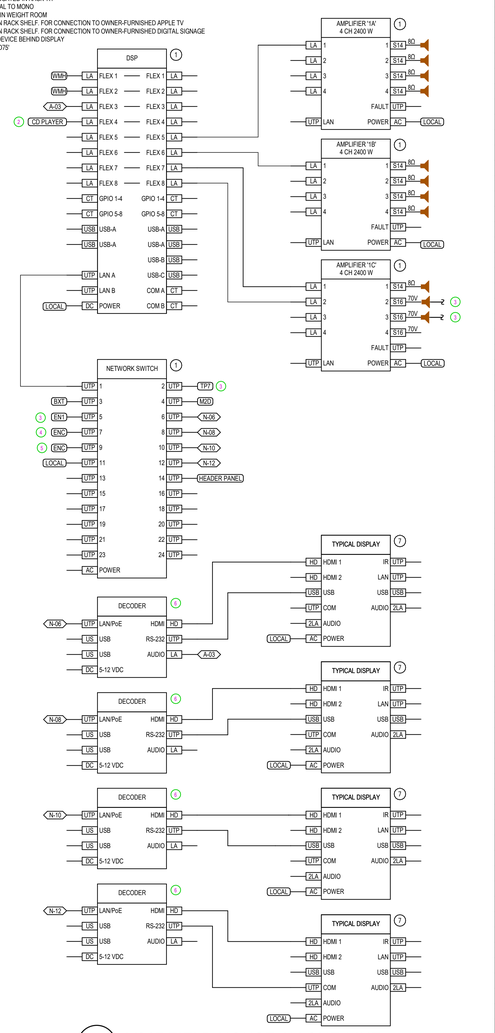

DIAGRAM 3 V317 FIELD HOUSE AV ONE-LINE
NTS

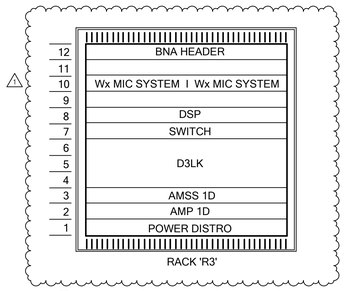

DIAGRAM 2 VIP / KITCHENETTE RACK ELEVATION
NTS

DIAGRAM NOTES: #

1. SECURE DEVICE BEHIND DISPLAY

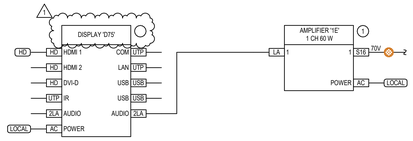

DIAGRAM V322 LEGACY ROOM AUDIOVISUAL SIGNAL FLOW
NTS

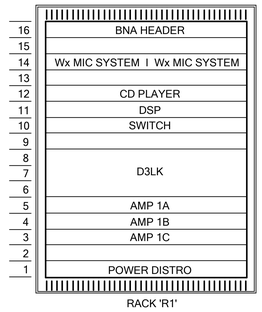

DIAGRAM 1 FIELDHOUSE AND SOCCER RACK ELEVATION
NTS

DIAGRAM NOTES: #

1. SECURE DEVICE TO UNDERSIDE OF TABLE.
2. SECURE DEVICE BEHIND DISPLAY

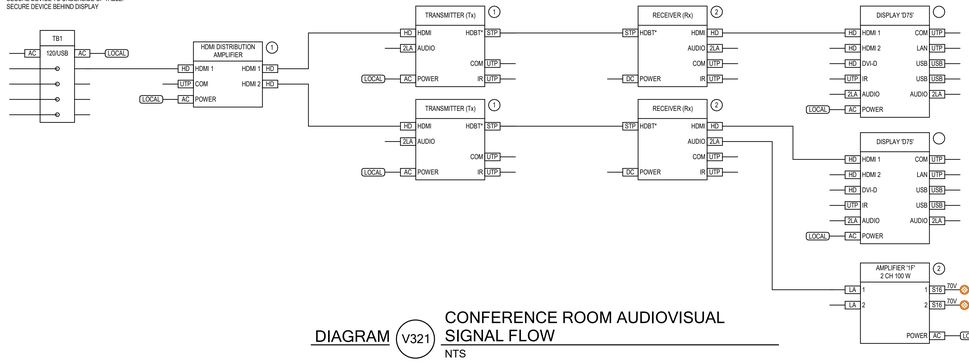

DIAGRAM V321 CONFERENCE ROOM AUDIOVISUAL SIGNAL FLOW
NTS

GENERAL DIAGRAM NOTES:

A. INTEGRATOR IS RESPONSIBLE TO ENSURE COMPLETE FUNCTIONALITY OF INTERCOM SYSTEMS IN ALL OCCUPIED AREAS OF THE SCHOOL THROUGHOUT ALL ZONES OF CONSTRUCTION. USING CEILING SYSTEM OR LIGHT FIXTURE SUPPORT/SEISMIC WIRES FOR SUPPORT IS NOT ALLOWED. AT SERVICE LOOPS MAINTAIN PROPER BEND RADIUS ON ALL CABLE.
B. PROVIDE (1) PAGING MODULE FOR EACH CORRIDOR THAT WILL REQUIRE A SEPARATE ZONE. REFER TO DRAWINGS AND SPECIFICATIONS FOR ZONE DESIGNATION.
C. MULTIPLE ZONES SHALL NOT SHARE A SINGLE AMPLIFIER CHANNEL OR IP MODULE.
D. AMPLIFIER REFERENCES SHOWN ON PLANS ARE INTENDED TO SHOW ZONING INFORMATION NOT MULTI-CHANNEL AMPLIFIER REQUIREMENTS. REFER TO SPECIFICATIONS FOR AMPLIFIER REQUIREMENTS.
E. REFER TO FLOOR PLANS FOR QUANTITY OF CLASSROOMS REQUIRING CLASSROOM MODULE CONNECTIONS.
F. EXTERIOR LOUDSPEAKERS SHALL EACH BE HOME RUN BACK TO THE AMPLIFIER CHANNEL FOR THEIR ZONE. LABEL AND CONNECT THE ZONES AS INDICATED ON PLANS.

DIAGRAM NOTES: #

1. PROVIDE (1) RELAY FROM INTERCOM SYSTEM TO ACCESS CONTROL SYSTEM. PROGRAM THIS RELAY TO TRIGGER A PREVENTATIVE LOCK DOWN. WHICH LOCKS THE OFFICE ENTRANCES. COORDINATE EXACT TERMINATION AND PROGRAMMING REQUIREMENTS WITH ACCESS CONTROL INSTALLER.
2. CONFIRM EXACT LOCATION OF DEVICE(S) WITH OWNER. REFER TO E SERIES SHEETS FOR LOCATION OF DATA CONNECTIONS.
3. REFER TO CLASSROOM SIGNAL FLOWS FOR ADDITIONAL REQUIREMENTS.
4. AMPLIFIERS ARE SHOWN FOR REFERENCE ONLY. COORDINATE WITH THE PLANS FOR ZONE REQUIREMENTS.
5. LOCATE NETWORK SWITCH(ES) IN THE ER/TR (MDF/IDF) FOR THE AREA REQUIRING DEVICE CONNECTION(S). NETWORK SWITCH(ES) WILL USE THE OWNERS BACKBONE FOR SIGNAL ROUTING BETWEEN EACH OTHER. REFER TO SPECIFICATIONS FOR NETWORK COORDINATION AND ADDITIONAL REQUIREMENTS.
6. ROOM SPECIFIC REQUIREMENT. REFER TO FLOOR PLANS FOR LOCATION AND REQUIREMENTS. ZONES UNDER 3 LOUDSPEAKERS MAY USE THE IP MODULES BUILT IN AMPLIFIER. ZONES WITH 3 AND MORE WILL REQUIRE AN ADDITIONAL AMPLIFIER.
7. EACH ZONE WILL REQUIRE AN UNIQUE IP MODULE TO COVER THAT ZONE. COMBINING IP MODULES FOR MULTIPLE ZONES IS NOT ALLOWED.
8. CONNECT TO CSA CONTACT CLOSURE FOR PANIC BUTTON INPUT INTO THE SCHOOL SAFETY SYSTEM.
9. CONNECT TO CSA CONTACT CLOSURE FOR RETURN SIGNAL FROM THE INTERCOM SYSTEM INDICATING THE MESSAGE WAS SENT.

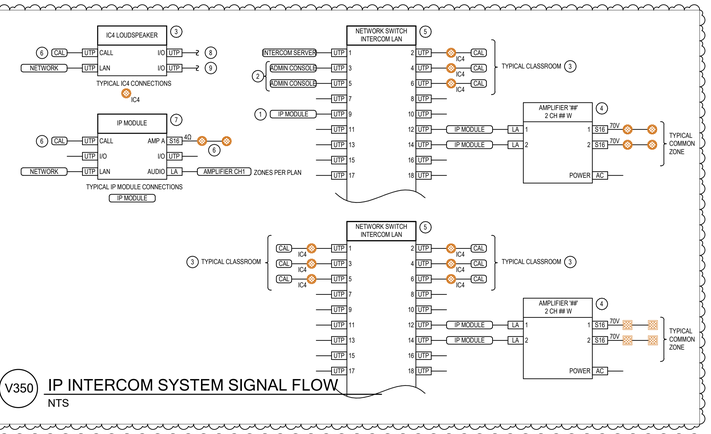

DIAGRAM V350 IP INTERCOM SYSTEM SIGNAL FLOW
NTS

DIAGRAM NOTES: #

1. LOCATED IN EQUIPMENT RACK 'R3'.
2. SECURE DEVICE TO PROJECTOR.
3. LOCATED IN KITCHENETTE
4. SECURE DEVICE BEHIND DISPLAY
5. LOCATED IN VIP ROOM
6. LOCATED IN KITCHENETTE

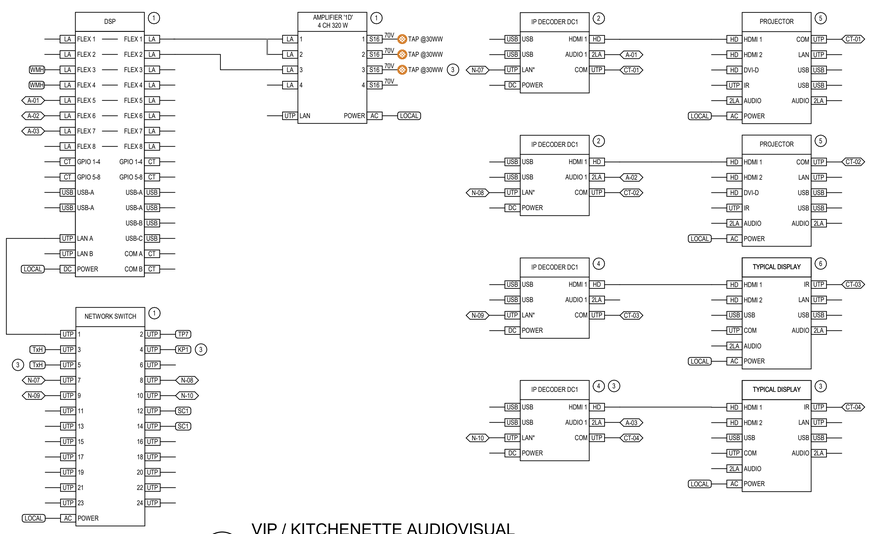

DIAGRAM V320 VIP / KITCHENETTE AUDIOVISUAL SIGNAL FLOW
NTS

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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
1	Addendum 4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
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PIC:	BNA

DRAWING SET STATUS

BID SET

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SHEET TITLE

AUDIOVISUAL SIGNAL FLOW DIAGRAMS

SHEET NUMBER

T260

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10/9/2024 6:12:06 PM

Corner Canyon High School
Fieldhouse & soccer Fields
Canyons School District

MECHANICAL ADDENDUM 04

October 9, 2024

Revisions to the Specifications:

Item:	*Section #:*	*Description:*
4.1	220000-4.2.5.C	Add fill faucet F-1 at Therapy Tubs
F-1	Faucet (Therapy Tub)	Moen 8124 polished chrome faucet with vacuum breaker, threaded hose end with hose, bucket hook, wall brace integral stops and chrome finish. Faucet to be mounted 30" above finish floor.
4.2	Section 251000	See attached Section 251000 – Automatic Temperature Controls

APPROVED MANUFACTURERS' PRODUCTS:

The following manufacturers, tradenames, and products are approved with the provision that they shall completely satisfy all and every requirement of the Drawings, Specifications, and all Addenda, and shall conform to the design, quality, and standards specified, established, and required for the complete and satisfactory installation and performance of the building and all its respective parts.

PRODUCT	MANUFACTURER
Stainless Steel Sinks	Franke/Kindred
Water Closets	Sloan
Urinals	Sloan
Lavatories	Sloan

Revisions to the Drawings:

Item:	*Sheet #:*	*Description:*
4.1	M401	See attached sheet M401
4.2	M501	Register & Grille Schedule - Added Register R-4 Revised Rooftop Unit schedule Added ventilation calculations
4.3	M901	RR 207G - Revised callout to exhaust duct thru roof
4.4	M1001	See attached sheet M1001

Attachments:

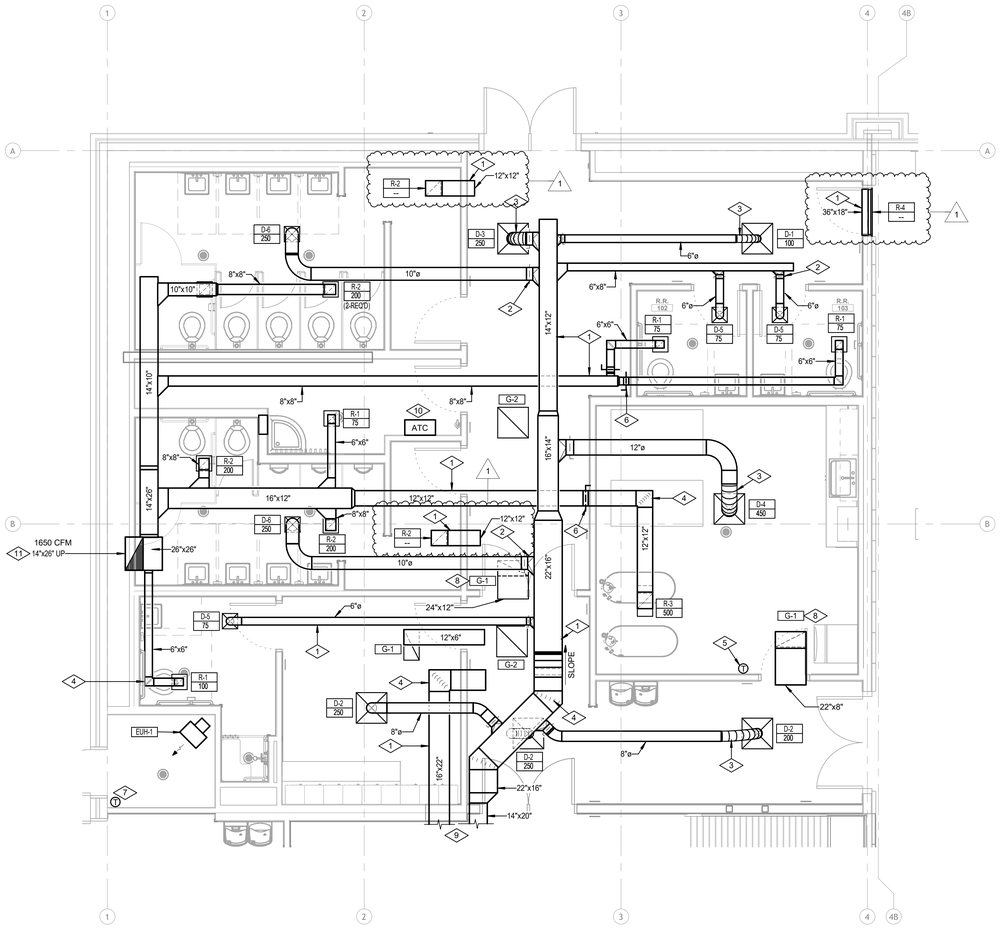
Specifications

- Section 251000

Drawings

- M401, M501, M901, M1001

End of Addendum 04



1 LEVEL 1 ENLARGED MECHANICAL PLAN

0 2' - 0" 4' - 0" 8' - 0"

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

N

REFERENCE NOTES

1. DUCT TO RUN ABOVE CEILING. (TYPICAL) COORDINATE WITH STRUCTURE & ALL TRADES.
2. H.E.T. FITTING WITH MANUAL BALANCING DAMPER. (TYPICAL)
3. FLEXIBLE DUCT. (TYPICAL) MAXIMUM LENGTH 5'-0"
4. TURNING VANES. (TYPICAL)
5. WALL MOUNTED HEATING & COOLING THERMOSTAT (TYPICAL) MOUNT AT 48" AFF.
6. MANUAL BALANCING DAMPER. (TYPICAL)
7. WALL MOUNTED HEATING THERMOSTAT.
8. SOUND BOOT AT GRILLE. (TYPICAL) SEE DETAIL 5/M601.
9. SEE SHEET M101 FOR CONTINUATION.
10. ATC PANEL. 120/1/60 POWER REQUIRED.
11. DUCT UP TO ABOVE. SEE M102.

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#334524-2202
JAMES AUSTIN BERRETT
11/1/2024
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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
1	ADDENDUM 04	10/9/24

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
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BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

Level 1 Enlarged Mechanical Plan

SHEET NUMBER

M401

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10/8/2024 4:21:23 PM

ATHLETICS BUILDING
MECHANICAL EQUIPMENT SCHEDULES

ROOFTOP UNIT SCHEDULE

	SYMBOL	ROOM	CFM	ESP	FAN MOTOR B.H.P.	MIN O.A.	HEATING CAPACITY (5) TYPE	MBH 1ST STAGE	MBH 2ND STAGE	STAGES	COOLING CAPACITY (2)(5) EAT	OAT	TOTAL MBH	SENSIBLE MBH	STAGES	IEER	POWER	MCA 460/3/60	MOCP 460/3/60	UNIT DIMENSIONS	WEIGHT LBS.	(1)(3)(4) MODEL & MANUFACTURER
(BASE BID)	RT-1	TRAINING ROOMS	1950	.65	1.12	963	NATURAL GAS	70.4	-	1	80.0	95	52.25	36.62	1	14.0	480/3/60	15.0	20	74.4 L x 46.6 W x 33.4 H	900	CARRIER, DAIKIN, TRANE OR APPROVED EQUAL
(ALT. #1)	RT-2	VIP & KITCHENETTE	2400	.80	1.19	520	NATURAL GAS	82.4	-	1	80.0	95	88.89	55.22	1	15.0	460/3/60	25.0	25	88.1 L x 59.5 W x 41.3 H	1200	CARRIER, DAIKIN, TRANE OR APPROVED EQUAL
(ALT. #1)	RT-3	LEGACY RM.	1200	.80	0.62	205	NATURAL GAS	43.2	-	1	80.0	95	47.37	27.86	1	14.0	460/3/60	14.0	15	88.1 L x 59.5 W x 33.4 H	800	CARRIER, DAIKIN, TRANE OR APPROVED EQUAL
(ALT. #1)	RT-4	CONFERENCE ROOM	800	.80	0.33	147	NATURAL GAS	43.2	-	1	80.0	95	31.82	18.07	1	14.0	460/3/60	13.0	15	88.1 L x 59.5 W x 33.4 H	1200	CARRIER, DAIKIN, TRANE OR APPROVED EQUAL
(ALT. #1)	RT-5	WEIGHT ROOM	3000	.80	1.70	653	NATURAL GAS	82.4	-	1	80.0	95	90.26	62.05	1	14.0	460/3/60	23.0	25	88.1 L x 59.5 W x 41.3 H	1200	CARRIER, DAIKIN, TRANE OR APPROVED EQUAL
(ALT. #1)	RT-6	WEIGHT ROOM	3000	.80	1.70	653	NATURAL GAS	82.4	-	1	80.0	95	90.26	62.05	1	14.0	460/3/60	23.0	25	88.1 L x 59.5 W x 41.3 H	1200	CARRIER, DAIKIN, TRANE OR APPROVED EQUAL
(ALT. #1)	RT-7	OFFICES	1200	.80	0.62	70	NATURAL GAS	43.2	-	1	80.0	95	47.37	27.86	1	14.0	460/3/60	14.0	15	74.4 L x 46.6 W x 33.4 H	800	CARRIER, DAIKIN, TRANE OR APPROVED EQUAL

NOTES:
(1) ROOFTOP UNIT TO BE COMPLETE WITH HINGED ACCESS DOORS, FACTORY POWER EXHAUST, 100% OUTDOOR AIR ECONOMIZER PACKAGE WITH BUILT-IN 100% RELIEF AIR, 14" HIGH FACTORY ROOF CURB, WEATHERPROOF FACTORY GFI CONVENIENCE OUTLET AND ALL CONTROLS FOR AUTOMATIC OPERATION. UNIT SHALL BE U.L. LISTED, ARI CERTIFIED AND AGA APPROVED.
(2) COOLING CAPACITY BASED ON 45 DEG. F. S.S.T., 80 DEG. F. db TEMP, 67 DEG. F. wb TEMP. AND 95 DEG. F.O.A. TEMP.
(3) UNITS SHALL BE COMPLETE WITH 2" MERV 8 FILTERS.
(4) UNITS SHALL USE A2L REFRIGERANT.
(5) CAPACITIES BASED ON 4200 FT. ELEVATION.

MINIMUM VENTILATION CALCULATIONS

SYMBOL	OCCUPATION CLASSIFICATION	OA (CFM) / PERSON	# OF PEOPLE	OA (CFM) / AREA (SF)	SF	# OF FIXTURES	MIN OA (CFM)
RT-1	SPORTS LOCKER ROOMS	-	-	0.5	452	-	226
	TOILET ROOMS	-	-	50 CFM / FIXTURE	-	14	700
	COORIDORS	-	-	0.06	615	-	37
TOTAL							963
RT-2	MULTIUSE ASSEMBLY	7.5	50	0.06	2415	-	520
RT-3	MULTIUSE ASSEMBLY	7.5	20	0.06	922	-	205
RT-4	CONFERENCE ROOMS	5	18	0.06	945	-	147
RT-5	WEIGHT ROOM	20	25	0.06	2551	-	653
RT-6	WEIGHT ROOM	20	25	0.06	2551	-	653
RT-7	OFFICE SPACES	7.5	8	0.06	504	-	70
ATU-1	SPECTATOR AREAS	7.5	100	0.06	27891	-	2423

NOTES:
(1) CALCULATIONS USE METHOD DESCRIBED IN IMC 403.3.1.1.

EVAPORATIVE COOLER SCHEDULE

SYMBOL	CFM	E.S.P. IN.	H.P.	NOMINAL SIZE L x W x H	WEIGHT	MAKE & MODEL	VOLTAGE
EC-1	7225	0.20	1 1/2	82" L x 45" W x 44" H	800 lbs.	MASTERCOOL AD 1000B	480V/3/60 (1)

NOTES:
1. EVAPORATIVE COOLERS SHALL HAVE WEATHER PROOF ENCLOSURE, 8" CELL-DEK TYPE EVAPORATIVE MEDIA, PUMP(S), FLOAT, SWITCH AND GFI RECEPTACLE.
2. THESE COOLERS REQUIRE 2 CIRCUITS EACH. 480V-3 PHASE, FOR COOLER ON ONE CIRCUIT, 0.75 AMPS AT 120V 1 PHASE FOR THE PUMP CIRCUIT. (THIS AMPERAGE IS FOR 2 PUMPS PER COOLER.)

ELECTRIC UNIT HEATER SCHEDULE

SYMBOL	TYPE	CFM	BTUH	AMPS	VOLTAGE	MAKE & MODEL (1)
EUH-1	HORIZONTAL	400	11,200	15.9	208/1/60	MARKEL 5100 - F1F5103N

NOTES:
(1) PROVIDE MOUNTING BRACKET, DISCONNECT, SUMMER FAN SWITCH AND THERMOSTAT.

DIFFUSER SCHEDULE

SYMBOL	TYPE	NECK SIZE	LOCATION	AIR PATTERN	FACE SIZE	MAKE & MODEL
D-1 / CFM	SUPPLY	6" DIA.	LAY-IN CEILING	4-WAY	24" x 24"	TITUS OMNI (1)(2)
D-2 / CFM	SUPPLY	8" DIA.	LAY-IN CEILING	4-WAY	24" x 24"	TITUS OMNI (1)(2)
D-3 / CFM	SUPPLY	10" DIA.	LAY-IN CEILING	4-WAY	24" x 24"	TITUS OMNI (1)(2)
D-4 / CFM	SUPPLY	6" DIA.	LAY-IN CEILING	4-WAY	24" x 24"	TITUS OMNI (1)(2)
D-5 / CFM	SUPPLY	10" DIA.	GYP. BD. CEILING	4-WAY	12" x 12"	TITUS OMNI (1)(2)
D-6 / CFM	SUPPLY	12" DIA.	LAY-IN CEILING	4-WAY	12" x 12"	TITUS OMNI (1)(2)
D-7 / CFM	SUPPLY	20"x12"	SEE 7/M601	2-WAY	--	TITUS DL (3)

NOTES:
(1) DIFFUSER SUPPLIER SHALL COORDINATE W/ REFLECTED CEILING PLANS TO DETERMINE TYPE OF FRAMES.
(2) COLOR & FINISH TO MATCH CEILING GRID. COORDINATE WITH ARCHITECT.
(3) PROVIDE MANUAL DAMPERS

EXHAUST FAN SCHEDULE

	SYMBOL	TYPE	AREA SERVED	CFM	S.P.	RPM	MOTOR	DRIVE	WEIGHT LBS.	MAKE & MODEL (1)
(BASE BID)	EF-1	ROOF	RR 106/108	1650	1.0"	1171	1-1/2 HP 120/1/60	BELT	224	TWIN CITY BCRD 180D
(ALT. #1)	EF-2	CEILING	KITCHEN 203	400	1.0"	1350	3/4 HP 120/1/60	DIRECT	192	TWIN CITY BCRD 160D
(ALT. #1)	EF-3	CEILING	RR 204	75	0.75"	1194	1/3 HP 120/1/60	DIRECT	178	TWIN CITY BCRD 140D
(ALT. #1)	EF-4	CEILING	RR 205	75	0.75"	1559	1/3 HP 120/1/60	DIRECT	85	TWIN CITY DCRD 120B
(ALT. #1)	EF-5	CEILING	RR 207G	100	0.75"	1559	1/3 HP 120/1/60	DIRECT	85	TWIN CITY DCRD 120B

NOTES:
(1) EXHAUST FANS TO BE ROOF-MOUNTED CENTRIFUGAL TYPE, COMPLETE WITH SPUN ALUMINUM HOOD, BIRDSCREEN, DISCONNECT SWITCH UNDER HOOD, PREFAB CURB AND BACKDRAFT DAMPER.

LOUVER SCHEDULE

SYMBOL	SIZE	LOCATION	TYPE	MAKE & MODEL (1)(2)(3)(5)
L-1	96" x 72"	HIGH SIDE WALL	RELIEF	AIROLITE K609A (6)

NOTES:
(1) PROVIDE 1/2" MESH BRONZE BIRDSCREEN.
(2) PROVIDE KYNAR 500 COATING. PROVIDE COLOR SELECTIONS WITH SUBMITTALS.
(3) COORDINATE EXACT MOUNTING LOCATIONS WITH ARCHITECTURAL ELEVATIONS.
(4) SHEET METAL CONTRACTOR TO PROVIDE FRAME @ EXPOSED WALL WITH INSIDE FLANGE.
(5) LOUVER FRAME TO BE RECESSED TYPE.
(6) MOTORIZED DAMPER AND BACKDRAFT DAMPER REQUIRED.

ATU-1 AIR TURNOVER UNIT: OUTDOOR UNIT @ 17,860 CFM AT 0.125" S.P., DIRECT GAS FIRED, 1,660 MBH, PREMIUM EFFICIENCY 15 H.P. MOTOR, 460/3/60 POWER, FACTORY THERMOSTAT AND CONTROL PANEL. 80/20 30% 2" PLEATED FILTER SECTION, DISCHARGE DAMPER AND ACTUATOR, HEAVY DUTY DISCHARGE DIFFUSER, AND RETURN GRILLE GAS PRESSURE SWITCH, DOOR INTERLOCKED NON-FUSED DISCONNECT SWITCH, INTERRUPTED IGNITION, LON CARD FOR BMS INTERFACE. FACTORY STAND WITH EXTENSION AS REQUIRED FOR BUILDING HEIGHT. FACTORY SERVICE PLATFORM WITH SAFETY RAIL AND ACCESS LADDER. MOTOR FLA = 21, UNIT FLA = 22
WEIGHT: 3,373 LBS
MANUFACTURER: TITAN AIR, OR APPROVED EQUAL
MODEL: TA-122 NG VRH AR/80

AC-1 INDOOR UNIT: HEATING/COOLING, CEILING CASSETTE, 230-265-300CFM, 3,600-9,000 BTUH TOTAL COOLING CAPACITY AT 95°F O.A. TEMP, 80°F D.B. & 67°F W.B., 6,900 BTUH TOTAL HEATING CAPACITY AT 17°F O.A. TEMP, 70°F D.B. & 60°F W.B., MCA=1.0, 208/230/1/60 MOTOR TO BE UL LISTED. UNIT TO BE COMPLETE WITH CLEANABLE FILTER, CONDENSATE PUMP, CHECK & EXPANSION VALVE KIT, PRE-CHARGED LINE SET, DRIP PAN AND DRAIN CONNECTION. PROVIDE WALL MOUNTED THERMOSTAT WITH NIGHT SET BACK. THERMOSTAT SHALL BE HARD WIRED TO UNIT.
UNIT DIM: 22 7/16" L x 22 7/16" W x 9 21/32" H.
WEIGHT: 31 LBS.
SEER : 22.4
MANUFACTURER: MITSUBISHI
MODEL: SLZ-KF09NA

OUTDOOR UNIT: AIR COOLED, HORIZONTAL DISCHARGE, INVERTER COMPRESSOR, UNIT TO BE MOUNTED ON ROOF. 3,600-9,000 BTUH TOTAL COOLING CAPACITY AT 95°F O.A. TEMP, 80°F D.B. & 67°F W.B., 6,900 BTUH TOTAL HEATING CAPACITY AT 17°F O.A. TEMP, 70°F D.B. & 60°F W.B., MCA=9.0, 208/230/1/60. UNIT TO BE COMPLETE WITH CRANKCASE HEATER, AMBIENT CONTROL KIT TO 0°F, AND ALL CONTROLS FOR AUTOMATIC OPERATION. CONTRACTOR TO PROVIDE A ROOF CURB 12" ABOVE FINISHED ROOF LEVEL.
UNIT DIM: 31 1/2" L x 11 1/4" W x 21 5/8" H.
WEIGHT: 51 LBS.
MANUFACTURER: MITSUBISHI
WEIGHU: SUZ-KA09NA2

DSF-1 DE-STRAT FAN: MIXED AIR TYPE FOR EXPOSED MOUNTING. MULTI-VANE STATOR AND VENTURI NOZZLE, 6'-0" STEEL SEISMIC SAFETY LEASH, BACNET/IP CONTROL PACKAGE, FACTORY SMART CONTROLLER WITH HIGH/LOW TEMPERATURE SENSORS AND FACTORY INLET GRILLE.
ELECTRICAL: 120/1/60, 0.4 AMPS
MANUFACTURER: AIRIUS FANS OR APPROVED EQUAL
A: AIR PEAR 25. 'OFF-WHITE'

REGISTER & GRILLE SCHEDULE

SYMBOL	SIZE	LOCATION	TYPE	MAKE & MODEL (1)
R-1 / CFM	8"x8"	CEILING	EXHAUST	TITUS 4FL (2)(5)
R-2 / CFM	12"x12"	CEILING	EXHAUST	TITUS 4FL (2)(5)
R-3 / CFM	24"x24"	CEILING	EXHAUST	TITUS 4FL
R-4 / CFM	36"x18"	SIDEWALL	EXHAUST	TITUS 33RL
G-1	24"x12"	CEILING	RETURN	TITUS 4FL
G-2	24"x24"	CEILING	RETURN	TITUS 4FL

NOTES:
(1) COLOR AND FINISH TO MATCH CEILING GRID. COORDINATE WITH ARCHITECT. SUPPLIER OF REGISTERS AND GRILLES SHALL COORDINATE WITH REFLECTED CEILING PLANS TO DETERMINE PROPER FRAMES.
(2) ALL REGISTERS TO BE C/W OPPOSED BLADE VOLUME CONTROL DAMPER.
(3) GRILLE SHALL HAVE BRIGHT WHITE FINISH AND FLANGE FOR SURFACE MOUNTING.
(4) GRILLE SHALL BE HEAVY DUTY GYMNASIUM TYPE WITH CONTINUOUS LOUVER BLADES.
(5) REGISTER TO BE OF ALUMINUM CONSTRUCTION.

GAS FIRED UNIT HEATER SCHEDULE

SYMBOL	TYPE	MBH INPUT	MBH OUTPUT	FLUE	CFM	MOTOR	MAKE & MODEL (1)(2)(3)
GUH-1	HORIZONTAL	300	249	6" DIA.	3843	1/4 HP, 115/60/1, 11.0 AMPS	REZNOR MODEL UDAS-300

NOTE:
(1) WITH THERMOSTAT & OUTLET LOUVERS EQUIPPED FOR HIGH ALTITUDE.
(2) TWO-STAGE GAS CONTROL.
(3) PROVIDE VERTICAL VENTILATION/COMBUSTION AIR ARRANGEMENT KIT.

SYMBOL LIST

- SUPPLY DIFFUSER
- RETURN OR EXHAUST GRILLE
- SUPPLY DROP THRU ROOF OR FLOOR ABOVE
- RETURN OR EXHAUST RISER THRU ROOF OR FLOOR ABOVE
- FLEXIBLE DUCTWORK
- TURNING VANES
- HIGH EFFICIENCY FITTING WITH VOLUME CONTROL DAMPER
- EQUIPMENT ON ROOF
- (T) WALL MOUNTED THERMOSTAT

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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS
CCHS FIELDHOUSE & SOCCER FIELD
12943 SOUTH 700 EAST DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
1	ADDENDUM 04	10/9/24

PROJECT INFORMATION
DATE: SEPTEMBER 12, 2024
PROJECT #: 24-013
PM / PA: KJM
PIC: CLL

DRAWING SET STATUS
BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE
Mechanical Schedules

SHEET NUMBER
M501

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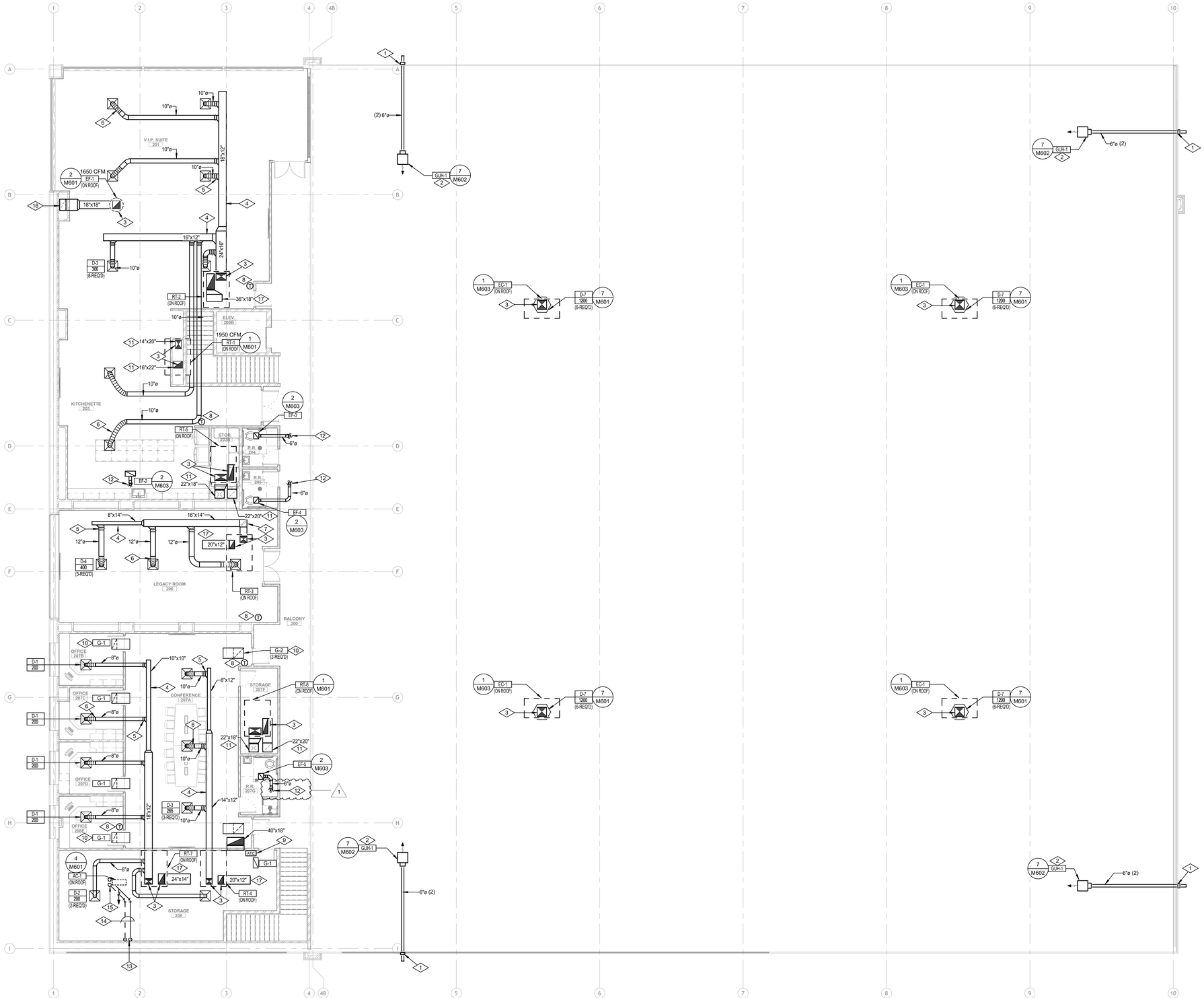

LEVEL 2 ALTERNATE - OVERALL MECHANICAL PLAN

0 4' - 0" 8' - 0" 16' - 0"

SCALE: 1/8" = 1'-0"

N

REFERENCE NOTES

1. COMBUSTION AIR AND EXHAUST FLUES TO CONCENTRIC SIDEWALL KIT, INSTALL AS PER MANUFACTURERS INSTRUCTIONS.
2. GUH-1 MOUNTED AS PER MANUFACTURER'S INSTRUCTIONS. FIELD COORDINATE EXACT MOUNTING HEIGHT WITH G.C.
3. DUCT THRU ROOF. COORDINATE WITH STRUCTURE.
4. DUCT TO RUN ABOVE CEILING. (TYPICAL) COORDINATE WITH STRUCTURE & ALL TRADES.
5. HET FITTING WITH MANUAL BALANCING DAMPER. (TYPICAL)
6. FLEXIBLE DUCT. (TYPICAL) MAXIMUM LENGTH 5'-0".
7. TURNING VANES. (TYPICAL)
8. WALL MOUNTED HEATING COOLING THERMOSTAT. (TYPICAL) MOUNT AT 4'-0" AFF.
9. ATC PANEL. 120/1/60 POWER REQUIRED.
10. SOUND BOOT AT GRILLE. (TYPICAL) SEE DETAIL 5/M601.
11. DUCT DOWN TO BELOW. SEE M901. COORDINATE WITH STRUCTURE.
12. EXHAUST DUCT THRU ROOF. MAINTAIN 10"-0" FROM ALL O.A. INTAKES. SEE DETAIL 8/M601.
13. REFRIGERANT LINE UP FROM BELOW. SEE M901.
14. RUN TIGHT BELOW ROOF DECK.
15. REFRIGERANT LINES UP THRU ROOF TO AC-1 OUTDOOR UNIT.
16. DUCT UP FROM BELOW. SEE M901.
17. LINED RETURN AIR DUCT.

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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
1	ADDENDUM 04	10/9/24

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

Level 2 Alternate Mechanical Plan

SHEET NUMBER

M902

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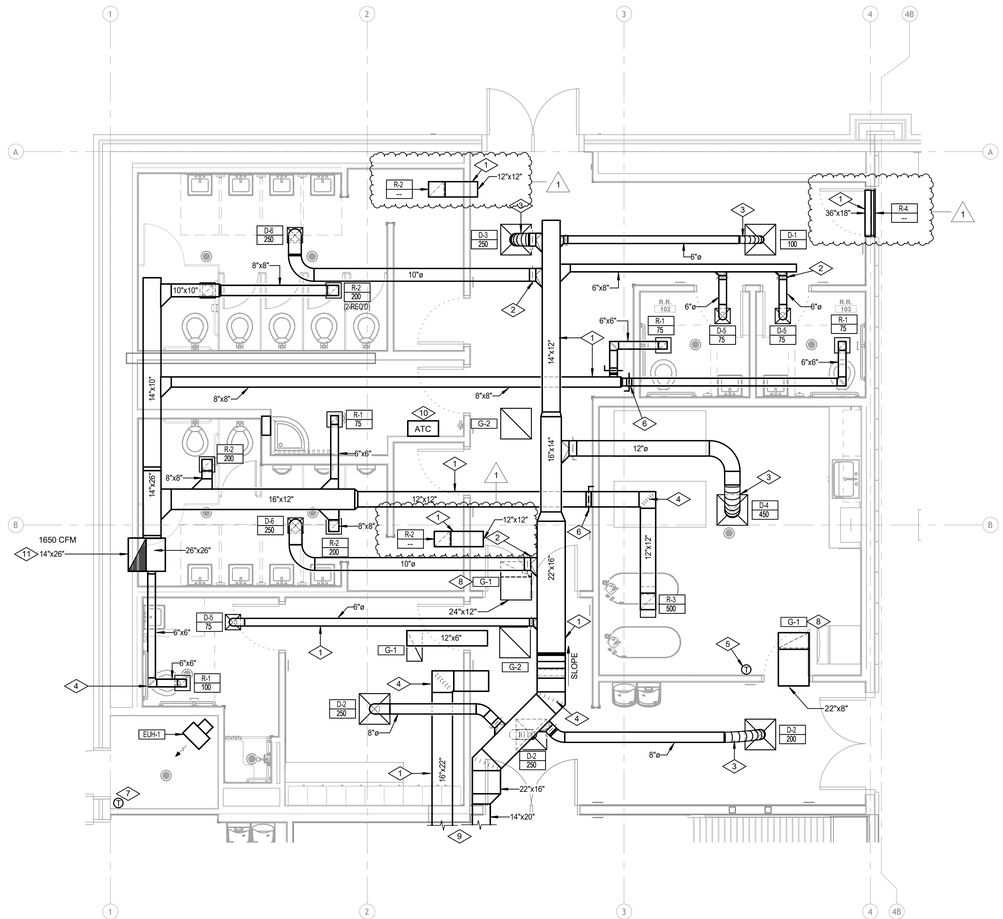

1 LEVEL 1 ALTERNATE - ENLARGED MECHANICAL PLAN

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

REFERENCE NOTES

1. DUCT TO RUN ABOVE CEILING. (TYPICAL) COORDINATE WITH STRUCTURE & ALL TRADES.
2. H.E.T. FITTING WITH MANUAL BALANCING DAMPER. (TYPICAL)
3. FLEXIBLE DUCT. (TYPICAL) MAXIMUM LENGTH 5'-0"
4. TURNING VANES. (TYPICAL)
5. WALL MOUNTED HEATING & COOLING THERMOSTAT (TYPICAL) MOUNT AT 48" AFF.
6. MANUAL BALANCING DAMPER. (TYPICAL)
7. WALL MOUNTED HEATING THERMOSTAT.
8. SOUND BOOT AT GRILLE. (TYPICAL) SEE DETAIL 5/M601.
9. SEE SHEET M901 FOR CONTINUATION.
10. ATC PANEL. 120/1/60 POWER REQUIRED.
11. DUCT UP TO ABOVE. SEE SHEET M902.

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11/1/2024
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PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
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REVISIONS

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1	ADDENDUM 04	10/9/24

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
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BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

Level 1 Alternate Enlarged Mechanical Plan

SHEET NUMBER

M1001

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State of Utah

SPENCER J. COX
Governor

DEIDRE M. HENDERSON
Lieutenant Governor

Department of Public Safety

JESS L. ANDERSON
Commissioner

TED BLACK
State Fire Marshal

** PLAN REVIEW FEE NOTICE **

UNDER REVIEW

PROJECT: Corner Canyon HS Fieldhouse SFMO PLAN #24-692
ADDRESS: 12943 South 700 E Draper UT TYPE OF REVIEW: General Fire & Life Safety
DATE: 10/9/2024 REVIEWER: Shane D. Cook CFM, CBO PHONE: 801-702-7749
ARCHITECT: Kyle Mendoza PHONE: 801-367-4839 EMAIL: kylem@corearch.com
COMPANY: Core ADDRESS: 233 S Pleasant Grove Blvd Suite 105 840
****
Occupancy Class: E Construction Type: IIB Plan: Occ. Load: 2,001
Total Square Footage: 39,167 Allowable Square Footage:
Stories: 1 Height of Bldg. 38'10" Sep. Reqd.: Area Sep. Required:
Sprinklers Required: Yes Reason: 903.2.3 Frontage: Fire Flow Required:
****

A plan review, as specified, was held to review the above project for compliance with the regulations adopted by the Utah State Fire Prevention Board. This review is made in the interest of assisting design professionals to identify compliance of projects with key fire or life safety related code provisions. This review cannot be considered as being totally comprehensive or regarded as sanctioning any code deficiencies not identified. The following comments and deficiencies were noted, and are listed below for your response and correction.

1. **Occupancy of this project is prohibited until a final inspection is conducted by this office.**
   Response: Acknowledged

2. **Please ensure review fees have been paid, this review cannot be completed until related fees have been paid.**
   Response: Acknowledged

3. **Please submit a separate set of Fire Sprinklers System Plans, to our office. These plans shall include an Engineered Water Flow Analysis that is current within the previous 12 months. This Engineered Water Supply Analysis shall include information as spelled out in NFPA 13: 23.2.1 and A.23.2.1. The analysis shall include an allowance for seasonal and daily fluctuation, future potential changes to the existing water supply, and a reasonable safety factor to consider these variables. In no case will an allowance of less than 10% below the water supply curve be permitted. As per Utah Administrative Code R710-4-3.3.2, the Architects or Engineer shall provide the Water Supply Analysis during the preliminary design phase of the proposed construction. Note that a complete submittal form From Utah State Fire Marshal's website firemarshal.utah.gov shall be provided with completed information in order to be reviewed.**

   a. **If Fire Sprinkler details are uploaded as part of the original submittal and are intended for review and not for reference only, they must be submitted separately with the fire sprinkler submittal form or as a deferred submittal and noted as such. The General Fire review never includes Fire Sprinkler reviews.**
      Response: Fire sprinkler system drawings will be submitted as a differed submittal. A copy of the Engineered Water Flow Analysis has been attached for your review and reference.

4. **Please submit a separate set of Fire Alarm Plans to our office. THIS IS GENERALLY DETAILED PLANS FROM THE ALARM COMPANY, NOT ARCHITECTURAL PLAN SHEETS. Complete submittal form From Utah State Fire Marshal's web site firemarshal.utah.gov . Please include CO detection locations with fire alarm plans.**

   a. **If Fire Alarm details are uploaded as part of the original submittal and are intended for review and not for**

reference only, they must be submitted separately with the fire alarm submittal form or as a deferred submittal and noted as such. The General Fire review never includes Fire Alarm reviews.

Response: Fire Alarm system drawings will be submitted as a differed submittal.

5. **Please clarify how compliance with IFC 510 Emergency Responder Communication Coverage will be met?**

   Response: The new school building does not include provisions for an ERRCS. Following construction, CSD will collaborate with first responders on a comprehensive study to assess ERRCS needs in the entire building. If the study identifies any IFC 510 compliance gaps, CSD will conduct further analysis and implement necessary solutions to ensure compliance.

6. **Please show plans submitted for review meet state requirements for having stamps or seals and no "NOT FOR CONSTRUCTION" Watermarks.**

   Response: Plans have been finalized for bid and we have removed "NOT FOR CONSTRUCTION"

   a. **Deferred submittals nots should be updated to 2021.**

      Response: Acknowledged

7. **Please provide proof of completed building and structural reviews.**

   Response: See attached review comments

8. **Please identify in plan sheets door hardware that will have ratings, panic hardware etc.**

9. **Please clarify; there are no spectator or other seating in the turf filed area?**

   Response: There is no spectator seating within turf field area.

   a. **The site plan notes new bleachers? Will these have any storage underneath or fencing and gates enclosing the bleachers where equipment may be stored?**

      Response: These will be existing bleachers, reused. No storage or fencing at these bleachers.

10. **Please show exit signage at the turf field, wrestling room primary sheet north egress, second floor alt. VIP suite doors etc.**

    a. **Please clarify how the perimeter batting net meet egress and exiting requirements.**

       Response: Emergency Exit signage shown at the indicated points of egress.

11. **Please provide spec sheets.**

    a. **Please clarify; does the finishes analyses classifications apply to the turf and batting netting?**

       Response: See attached specifications. Turf is provided by owner, see attached product from owner.

12. **Please show how IBC/IFC 1004.7 is met for outdoor areas where required building exits to the public way may be obstructed by gates and fences preventing free egress to the public way.**

    a. **Please ensure gates swing in the direction of travel where the outdoor area has more than 49 occupants.**

       Response: North exits directly onto extended existing football plaza, south exits directly onto grass fields with no gates, only bollards at openings.

13. **Please provide proof of a WSA to justify adequate water availability at fire hydrants.**

    Response: See attached WSA

14. **Please note, a plan search for "FIRE LANE" Returned no results.**

    a. **Please show how fire lanes extend to with in 150' of all main level exterior walls.**

    Response: After Review additional fire lanes have been added on east and west sides of the building, to capture the 150' requirement. See updated Civil Drawings.

b. **Please identify fire lane locations that will require "NO PARKING FIRE LANE" signage.**
   i. **Response:** No parking is permitted within the concrete plaza

c. **Please identify at least one location for aerial apparatus operation access where a fire truck can park and access the roof.**
   i. **Response:** The apparatus can happen within any portion of the fire lanes permitted.

d. **Please note; since we are not a responding fire agency and the local LFA may have accepted appendices in the IFC that increase hydrant locations or numbers, please ensure this is address as part of #11.**
   i. **Response:** Acknowledged.

15. **Please provide proof that the LFA has no outstanding concerns and was consulted as the responding fire agency about water for firefighting, the placement of fire hydrants, FDC's, site access, fire lanes, marking etc. Or any ordinances that may specifically apply to this project?**

    a. **Confirmation that the LFA's largest fire apparatus access vehicle will be able to traverse all roadways, fire lanes etc. should be verified as part of the LFA discussion and modeling submitted as part of this review.**

16. **Please be certain that all precautions are taken during construction to maintain fire protection and protect the construction crew.**
    Response: Acknowledged

- **Please respond in a written form pdf files or word docs to the Office of the State Fire Marshal with a course of action to the above listed concerns. Response can be emailed to SDCook@utah.gov. Please show corrections by word or pdf with clouds showing plan modifications. If challenging issues please respond showing code references.**

- **On-site inspections and evaluations during the course of construction that are related to fire protection, fire safety or life safety concerns as defined in adopted fire codes and standards are to be administered by Deputy State Fire Marshal Cory Feese Phone: 801-419-9392. A fire clearance required by the adopted fire code is to be administered by Deputy State Fire Marshal.**

- **Plan reviews are not exhaustive and acceptance does not relieve any responsibility for full compliance with applicable codes and rules.**

Thank you for your participation with our plan review process.

September 27, 2024

Canyon School District- FIRST CHECK
SCA Job No:20240093-0004

Re: Plan Review: CCHS Fieldhouse and Soccer Field
Address: 12943 South 700 East

Shums Coda Associates (SCA) has completed a review on behalf of the city.

This project was reviewed for conformance to the provisions of the 2021 International Building Code, 2021 IPC, 2021 IMC, 2021 IFGC 2020 NEC and 2021 IECC. and 2009 ANSI 117

Our comments follow on the attached list.

Please submit an itemized response letter with the appropriate number of **complete and revised** plans and documents with all revisions clouded.

Sincerely,

SHUMS CODA ASSOCIATES

Willie Chidester
Plans Examiner
willie.chidester@shumscoda.com

Rouhi El-Rabaa
Sr Plan Check Engineer – Structural
Rouhi.el-rabaa@shumscoda.com

GENERAL BUILDING COMMENTS:

G1. Provide compliance certificates and installation specification for all exterior finishes and weather resistive systems. IBC 107.2

Response: See attached specification Sections
Division 07 Section 2500
Division 13 Section 3419

SITE PLAN REVIEW COMMENTS:

Approved as submitted.

ARCHITECTURAL COMMENTS:

A1. Clarify what material is being used for the required vapor barrier. Indicate this on the plans at all applicable pages. IBC 1404.3

Response: See attached specification Section **Division 07 Section 1100**

A2. ADA shower compartments shall meet the clear space requirements of A117.1 608.2.1

1. **Response:** ADA Shower Compartment is Compliant Per A117.1-608.2.1 See revised sheet A102 for items noted by revision cloud Mark 2

A3. A5/A810 provide dimension for the required ADA bench in the locker room. Accessible locker(s) are required. A117.1 803.4 and IBC 1110.14

Response: ADA Shower Bench is Compliant See revised sheet A102, 550 for items noted by revision cloud Mark 1 for items noted by revision cloud Mark 2

A4. A001 and A900 Provide vestibules for main entrances. IECC C402.5.9

Response: Vestibule is provided.

A5. A001 and A900 Provide travel distances for all areas of the building. IBC 1017.3

Response: Travel distances provided**. See revised sheet A900** for items noted by revision cloud Mark 2

A6. A001 and A900 Code analysis indicates that there are no required plumbing facilities because it is an auxiliary building. To be exempt facilities shall be provided that are less than 500' away. Please provide clarification. IBC 2902.3.3

Response: Plumbing requirements updated. See Revised sheets **A001 & A900** for items noted by revision cloud Mark 2

A7. A001 and A900 provide a calculated occupancy load and required exit width. IBC 1004 and 1005.3

Response: Occupancy and Exit widths Provided.

A8. A940 and A941 The bottom handrail extension shall continue to slope to a point of one tread depth beyond the bottom stair. IBC 1014.6

Response: See Revised Sheets, **A940, A941** for items noted by revision cloud Mark 2

A9. Provide two-way communication for the second level elevator IBC 1009.8

Response: Two-way communication is provided per our specifications. Division 14 Section 2400

A10. A900 Indicate the location of all required fire rated assemblies. (Elevator shaft) IBC 713.4
Response: See Revised Sheets, **A900, A911, A942, A960** for items noted by revision cloud Mark 2

A11. A601and A60 notes indicate panic hardware but schedule does not indicate what doors shall have panic hardware. Indicate on door schedule type of hardware being used. IBC 1010.2.9
Response: See Specification section 08 7100

MECHANICAL COMMENTS:

M1. M102 indicate on plans that the exhaust termination is a minimum of 10' away from the air intake. IMC 501.3.1
Response: See Specifications ***233000-3.2.11***

M2. M501 Provide ventilation calculations indicating that the requirements of M403.3.1.1
- **Response:** ***Calculations will be provided in addendum 04***

M3. M501 Provide smoke detectors in air handlers exceeding 2000 CFM. 606.2.1

Response: See Specifications ***233000-12.2.42***

Response: Duct detectors provided on air handlers exceeding 2000 CFM.

PLUMBING COMMENTS:

Approved as submitted.

ELECTRICAL COMMENTS:

E1. E201 Provide emergency lighting at all exterior exits. IBC 1008.3.2
Response: Emergency lighting provided at all exterior exits.

E2. E201 Provide Illuminated exit signs at all exterior exits. IBC 1013
Response: Emergency powered exit signs have been added to all exterior exits.

E3. E301 Provide service receptacle within 25' of mechanical equipment. E210.63
Response: Service receptacles have been added within 25' of mechanical equipment.

E4. E501 Provide disconnects, feeder sizes, service entry conductor sizes, and fault current ratings for all panels and services. IBC 107.2.1
Response: Disconnect, feeder, and service entry conductor sizes indicated on the plans. Fault current ratings are provided for reference only but will be finalized in the deferred submittal with the protective device study.

E5. E501 provide and indicate details for the grounding electrode system. NEC 250.50
Response: Grounding Electrode System size clarified on the plans.

ENERGY COMMENTS:

EN1. Provide all applicable energy compliance reports. IECC C407.
Response: Please see attached COMcheck.

STRUCTURAL COMMENTS:

Structural Comments Response: For all Structural Comments please see attached:
CCHS Field House I Structural Review Responses
CCHS Field House - structural calculations
2024-10-09 - CCHS Fieldhouse - Addendum 4 - Drawings

S1. Sheet C231: Please clarify the responsible engineer who will detail mechanical yard walls connection to the PEMB, as is currently shown on the various discipline drawing sets. Alternatively, provide information within the plan set for structural separation.
Response: See Structural Comments Response above

S2. Sheet A751: Please verify the operating weight of any suspended equipment, noting that ASCE 7 Section 13.1.4 requires seismic anchorage of any suspended equipment weighing in excess of 20 lbs. Provide complete information in the next submittal for any suspended equipment such as motors or similar.
Response: See Structural Comments Response above

S3. Sheet S001: All structural drawings shall be stamped and signed by the engineer of record in the next submittal.
Response: See Structural Comments Response above

S4. Sheet S001: Please remove all “Not For Construction” notes from the plans in the next submittal.
Response: See Structural Comments Response above

S5. Sheet S001: Provide a stamped and signed version of the structural calculations in the next submittal.
Response: See Structural Comments Response above

S6. Sheet S001: Please include geotechnical investigation report for review in the next submittal. [CBC 1803.2]
Response: See Structural Comments Response above

S7. Sheet S001: Please verify if the geotechnical report recommends that the project geotechnical engineer review the foundation plans and details for general conformance with the report's findings. If so, provide a foundation review letter by the geotechnical engineer in the next submittal.
Response: See Structural Comments Response above

S8. Sheet S001: Verify that Footings Note #3 is in line with geotechnical report recommendations for minimum frost depth. This will be verified in the next review when geotechnical report is provided.
Response: See Structural Comments Response above

S9. Sheet S101: Plan Notes #2 appears incomplete. Please update as needed and treat as a typical comment for other plan sheets.
Response: See Structural Comments Response above

S10. Sheet S101: In order to verify that foundation system will be adequate to support imposed design loads from the PEMB, provide structural calculation and drawings for the PEMB in the next submittal.
Response: See Structural Comments Response above

S11. Sheet S101: Please verify the footing type denoted on plan for trash enclosure. Per calculation Page 54 of 549, the required footing width is 4'-0".
Response: See Structural Comments Response above

S12. Sheet S102: On Line 4, it appears that a collector beam splice should also be provided for the W16x26 beam to the left of the steel braced frame for shear transfer per ASCE 7 Section 12.10.2.
Response: See Structural Comments Response above

S13. Sheet S102: Near Line 1, there are drag collectors provided for shear transfer to slightly out-of- plane offset Frame BF-2. Please clarify how shear transfer will occur across the discontinuity due to out-of-plane offset. Consider adding specific detail on the framing plan.
Response: See Structural Comments Response above

S14. Sheet S103: Calculation and detailing for seismic anchorage of mechanical rooftop units is required per ASCE 7 Section 13.1.4. Please provide required information within the next submittal.
Response: See Structural Comments Response above

S15. Sheet S201: It is unclear where Detail E5 may apply on the structural floor plans for the bid alternative. Please add more information to clarify this on plan.
Response: See Structural Comments Response above

S16. Sheet S511: Detail B3 (and others) make reference to welded reinforcement at closure of conventional slab to steel composite deck. However, it was not clear how this information was presented on the framing plan. For example, Level 2 plan on Sheet S901. Please clarify or update plans to provide additional clarity.
Response: See Structural Comments Response above

S17. Sheet S601, Detail B5: Please clarify how reader is to identify concrete pier minimum depth. The information does not appear to be included in schedule, on foundation plan, or on enlarged details contained on Sheet S501.
Response: See Structural Comments Response above

S18. Sheet S901: It appears that the mezzanine is designed and detailed to be self-supporting for both gravity and lateral loads. Please provide a calculation for the required structural separation and add a dimension on the plan to confirm the separation based on the calculation results. Use ASCE 7 Equation 12.12-2 with strength level structure displacements. Alternatively, clarify how PEMB engineer will design for any increased effective seismic weight of the mezzanine structure.
Response: See Structural Comments Response above

S19. Sheet S901: Further to the previous comment, under the assumption that the mezzanine structure and PEMB are separate, please provide seismic gap dimensioning on plans where needed.
Response: See Structural Comments Response above

S20. Sheet S901: Detail drag to Frame BF-5 in the north-south direction. [ASCE 7 Section 12.10.2]
Response: See Structural Comments Response above

S21. Structural calculations, Page 12 of 549: Clarify the Redundancy Factor that was utilized for the seismic lateral analysis. Per ASCE 7 Section 12.3.4.2, rho shall equal 1.3 for Irregularity Type 1b.
Response: See Structural Comments Response above

S21. Structural calculations, Page 22 of 549: Provide a model loading diagram to verify how loads were applied. For example, assembly VIP Suite and Kitchenette area on mezzanine level. A load diagram plan may also be warranted in the plan set to address this comment.
Response: See Structural Comments Response above

S22. Structural calculations, Page 152 of 549: For concrete pier P-1, clarify how to coordinate the number of layers of middle bars that are required with the schedule on Sheet S601. The pier “Type” sections do not appear to indicate this information. Treat as a typical comment for each unique pier type.
Response: See Structural Comments Response above

Additional comments may follow after review of the requested information. If you have any questions regarding the above comments, please contact Shums Coda Associates at (844) 674-5179 between 8:30 A.M. to 5:00 P.M., M-F.

CODE ANALYSIS & BUILDING CRITERIA

BUILDING OCCUPANCY ANALYSIS

	CCHS FIELDHOUSE
Area (S.F.)	36,997 SF
Total Design Occupancy	2,001

PATH LEGEND

COMMON PATH — EGRESS PATH — FEC PATH

DEFERRED SUBMITTALS

Fire Protection Sprinkler Drawings - Section 211310

Fire Alarm Drawings - Section 283123

DEFERRED SUBMITTALS ARE TO BE MADE IN COMPLIANCE WITH SECTION 107.3.4.1 OF THE 2018 INTERNATIONAL BUILDING CODE. DEFERRED SUBMITTAL DOCUMENTS SHALL RESUBMITTED TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE WHO SHALL REVIEW THEM AND FORWARD THEM TO THE BUILDING OFFICIAL HAVING JURISDICTION WITH A NOTATION INDICATING THAT THE DEFERRED SUBMITTAL DOCUMENTS HAVE BEEN REVIEWED AND THAT THEY HAVE BEEN FOUND TO BE IN GENERAL COMPLIANCE WITH THE DESIGN OF THE PROJECT. THE DEFERRED SUBMITTAL ITEMS SHALL NOT BE INSTALLED UNTIL THEIR DESIGN AND SUBMITTAL DOCUMENTS HAVE BEEN REVIEWED AND APPROVED. THE DEFERRED SUBMITTAL SHALL BE SUBMITTED TO THE BUILDING OFFICIAL HAVING JURISDICTION PRIOR TO INSPECTIONS. THE WORK RELATED TO THE DEFERRED SUBMITTALS IS NOT TO COMMENCE UNTIL THE BUILDING OFFICIAL HAS APPROVED THE SUBMITTAL.

FINISHES ANALYSIS

Roof Table 1505	
Provided	Class A
Interior Walls & Ceilings	
Provided @ Egress Enclosures & passages	Class B
Provided @ Corridors & other exit ways	Class C
Provided @ Room & Enclosures	Class C
Interior Floors	
Provided	Class 1 & 2

BUILDING EGRESS ANALYSIS

	CCHS FIELDHOUSE
Required Points of Egress Table 1006.3.3	4
Actual points of Egress	7 COMPLIANT
Min. Required Corridor Width Table 1020.2	76"
Actual Min. Corridor Width	76" COMPLIANT
Max. Allowable Dead End	50'
Actual Max. Dead End	0' COMPLIANT
Max. Allowable Common Path of Egress Table 1006.2.1	75'
Actual Max. Common path of Egress	27' COMPLIANT
Max. Allowable Travel Distance 1017.2	250'
Actual Max. Travel Distance	113' COMPLIANT

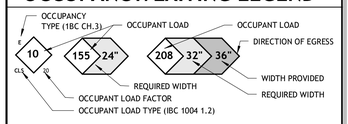
EGREES TRAVEL PATH

Type	Egress Path Length
COMMON PATH 1-1	26'-9 1/4"
EGRESS PATH 1-1	87'-3 5/8"
EGRESS PATH 1-2	113'-5 1/8"
EGRESS PATH 1-3	108'-8 1/4"

CODE ANALYSIS

	CCHS FIELDHOUSE
Occupancy Section 305	E
Construction Type Section 602	II-B
Fire-Sprinkler System Section 903	YES, Fully Sprinkled NFPA 13
Allowable Stories Section 504.4	3
Actual Stories	1 COMPLIANT
Allowable Height 504.4	75'-0"
Actual Height	38'-10" COMPLIANT
Base Allowable Floor Area (A_a) Table 506.2	58,000 SF per story
Non Sprinkled Allowable Area (NS) Table 506.2	14,500 SF
Building Perimeter with Frontage (F) Section 506.3.2	784'-0"
Building Perimeter (P)	784'-0"
Weighted Average Frontage Width (W) Section 506.3.2	30
Frontage Increase Factor (I_f = [F/P-0.25] X W/30) Section 506.3	.75
Total Allowable Area (A_a+A_a +[NS X I_f]) Section 506.2	68,875 SF per story
Actual Main Floor Square Footage	37,872 SF COMPLIANT
Actual Mezzanine Square Footage	2,260 SF COMPLIANT
Total Area	39,632 SF

OCCUPANCY/EXITING LEGEND



LOAD TYPE	LOAD FACTOR	LOAD TYPE	LOAD FACTOR
ACC	300 gross	EXE	50 gross
AGG	300 gross	FAB	200 gross
HAN	500 gross	IND	100 gross
TER	20 gross	TRT	240 gross
BAC	300 gross	OUT	100 gross
BAH	100 gross	SLP	120 gross
CON	15 gross	KIT	200 gross
GAM	11 gross	RED	50 net
EXH	30 net	STA	100 gross
FIX	see section 1004.6	LOC	50 gross
CHR	7 net	MAL	see section 402.8.2
STD	5 net	MER	60 gross
UNC	15 net	STO	300 gross
BOW	7 net	PRK	200 gross
BUS	150	RES	200 gross
CON		REC	50 gross
CRT			
DAY	35 net	DEC	15 gross
DOR	50 gross	STG	15 net
CLS	20 net	WAR	500 gross
VOC	50 net	*** PER FIRE MARSHALL	35 net

OCCUPANCY TYPES

A1, A2, A3, A4, A5	ASSEMBLY
B	BUSINESS
E	EDUCATIONAL
F1, F2	FACTORY AND INDUSTRIAL
H1, H2, H3, H4, H5	HIGH HAZARD
I1, I2, I3, I4	INSTITUTIONAL
M	MERCANTILE
R1, R2, R3, R4	RESIDENTIAL
S1, S2	STORAGE
U	UTILITY AND MISCELLANEOUS

FIRE EXTINGUISHER LEGEND

- BRACKET MOUNTED
- SEMI-RECESSED
- SEMI-RECESSED CABINET WITH TYPE K EXTINGUISHER

APPLICABLE CODES AND STANDARDS

- *2021 INTERNATIONAL BUILDING CODE.*
- *2021 INTERNATIONAL FIRE CODE.*
- *2021 INTERNATIONAL MECHANICAL CODE.*
- *2021 INTERNATIONAL PLUMBING CODE*
- *2021 INTERNATIONAL FUEL GAS CODE.*
- *2020 NATIONAL ELECTRICAL CODE.*
- *ASHRAE 90.1 (2018 STANDARD)*
- *ICC 117.1 -2009*
- NFPA 101 - LIFE SAFETY CODE, 2009 EDITION
- UTAH STATE CODE AMENDMENTS, EFFECTIVE 1 JULY 2023

PLUMBING FIXTURE ANALYSIS (IBC 2021)

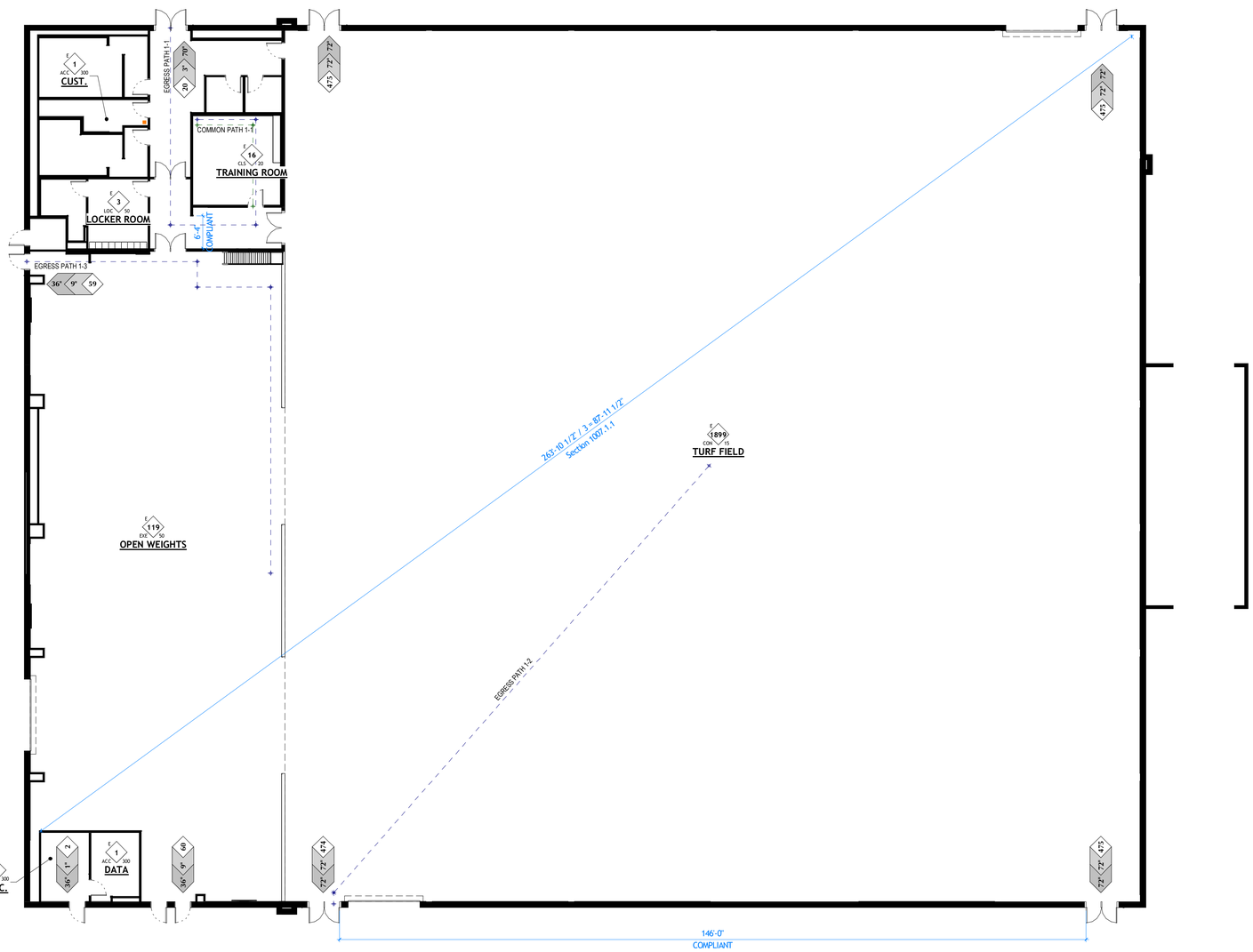
Max Occupancy as Directed by School District	200	
Required Water Closet Male	4	
Provided Water Closet Male	5	*COMPLIANT*
Required Water Closet Female	4	
Provided Water Closet Female	5	*COMPLIANT*
Required Water Closet Unisex	0	
Provided Water Closet Unisex	3	*COMPLIANT*
Required Lavatories Male	4	
Provided Lavatories Male	4	*COMPLIANT*
Required Lavatories Female	4	
Provided Lavatories Female	4	*COMPLIANT*
Required Lavatories Unisex	0	
Provided Lavatories Unisex	3	*COMPLIANT*
Required Drinking Fountains	2	
Provided Drinking Fountains	2	*COMPLIANT*
Required Service Sinks	1	
Provided Service Sinks	1	*COMPLIANT*

SEPARATION LEGEND

- ONE-HOUR VERTICAL EXTERIOR ENCLOSURE (FIRE BARRIER).
- ONE-HOUR FIRE PARTITION.
- TWO-HOUR FIRE PARTITION (FIRE BARRIER).
- SMOKE PARTITION.INCIDNTAL USE RESITANT TO SMOKE PASSAGE
- ONE-HOUR FIRE SEPARATION.(CEILING)
- ##' COMMON PATH OF TRAVEL TO EXIT
- ##' PATH OF TRAVEL TO EXIT
- ##' DEAD END

NOTE:

2-HR SEPARATION WALLS SHALL CONSIST OF MASONRY; FIRE RATED DOORS, SMOKE AND FIRE DAMPERS AND ALL OTHER REQUIRED ELEMENTS TO CREATE A COMPLETED FIRE ASSEMBLY.



LEVEL 1 LIFE SAFETY PLAN

A001 | SCALE: 3/32" = 1'-0"

GENERAL NOTES

A. SEE SHEET G001 FOR ALL RELATED CODE COMPLIANCE INFORMATION.
B. FILL VOIDS BETWEEN SEPARATION WALLS AND ROOF DECK WITH PRE-FORMED MINERAL WOOL OR SOLID GROUT. SEE WALL TYPES AND SECTIONS FOR TYPCIAL DETAILS.
C. THIS PROJECT SHALL BE INSTALLED ACCORDING TO THE LATEST EDITON OF THE FOLLOWING STANDARDS AND AMENDMENTS TO THEM AS ADOPTED BY THE AUTHORITY HAVING JURSIDICTION.
   - IBC (International Building Code)
   - NEC (National Electrical Code)
   - NFPA (National Fire Protection Association)
   - UL (Underwriters Laboratories, Inc.)
   - NEMA (National Electrial manufactuer's Association)
   - IFC (International Fire Code)
   - IECC (International Energy Conservation Code)
   - IEC (International Electrical Code)
   - State and Local Buildign Authority and Code
D. REFER TO SPECIFICAION SECTION 078413-7 THRU 078413-10 FOR PENETRATION AND FIRE STOPPING REQUIRMENTS.

CORE ARCHITECTURE
233 SOUTH PLEASANT GROVE BLVD. SUITE #105
PLEASANT GROVE, UTAH 84062
PHONE: (801) 769-3000
core@corearch.com

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PROFESSIONAL STAMP

LICENSED ARCHITECT — CURTIS LEONARD LIVINGSTON — NO. 10041247 — STATE OF UTAH

09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

	DESCRIPTION	DATE
2	PLAN REVIEW	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

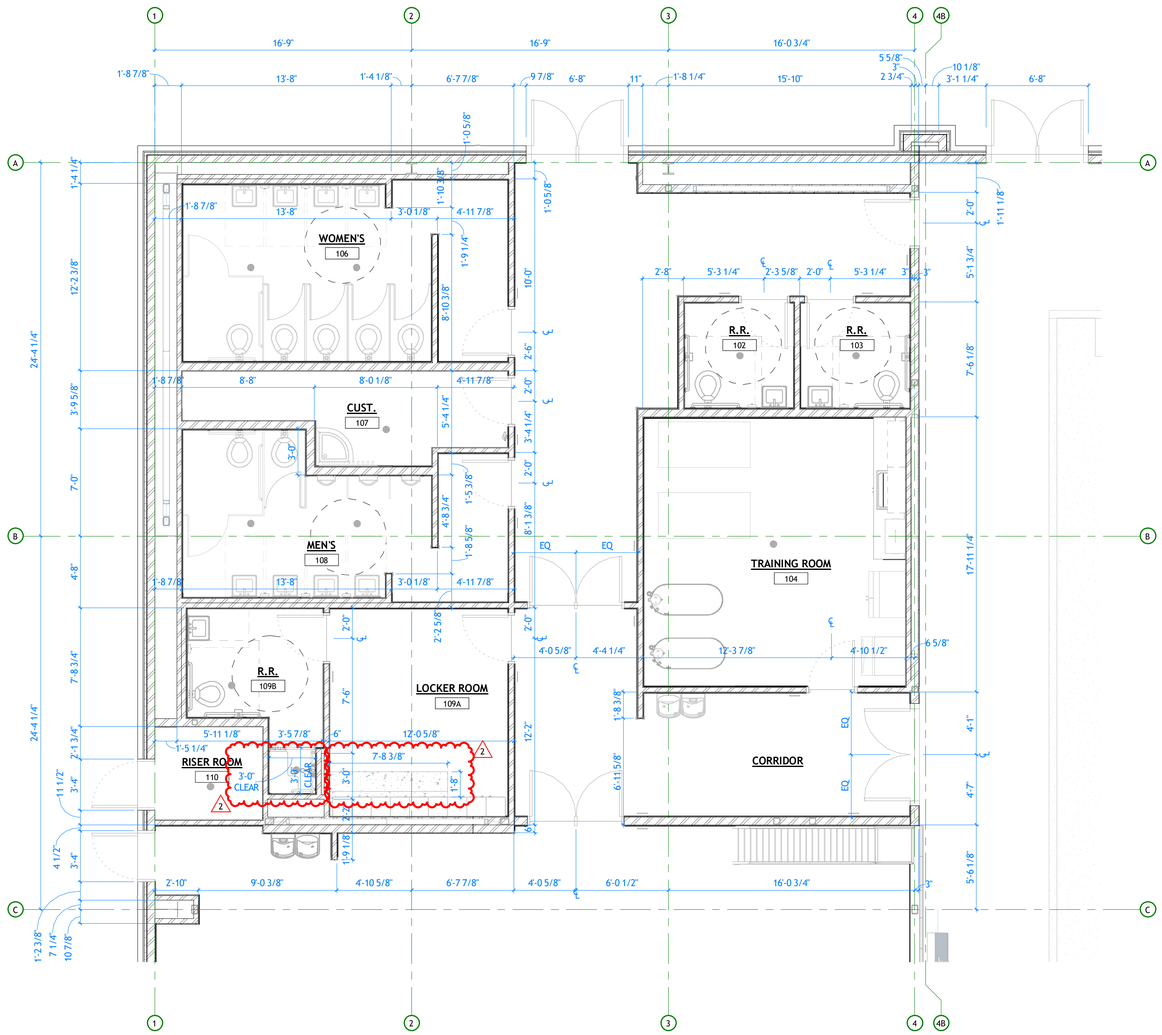
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

CODE COMPLIANCE PLAN

SHEET NUMBER

A001



FLOOR PLAN - ENLARGED MAIN FLOOR DIMENSIONPLAN

A102 | SCALE: 1/4" = 1'-0"

KEYNOTES

GENERAL NOTES

A. GENERAL CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION. REPORT ANY SIGNIFICANT DISCREPANCIES TO THE ARCHITECT.
B. COORDINATE INSTALLATIONS OF ALL "AFTER CONTRACT" ASSEMBLIES WITH OWNER PRIOR TO CONSTRUCTION OF ADJOINING OR RELATED STRUCTURES.
C. PROVIDE 18" MINIMUM CLEAR FLOOR SPACE AT PULL SIDE OF ALL DOORS. PROVIDE 12" MINIMUM CLEAR FLOOR SPACE AT PUSH SIDE OF ALL DOORS.
D. DIMENSIONS ARE TO FACE OF STUD TO FACE OF STUD.
E. ALL COLORS SELECTIONS AND FINISH MATERIALS AND STYLES SHALL BE COORDINATED WITH OWNER.
F. LOCATE DOOR JAMBS 4" FROM FACE OF STUD. U.N.O.
G. SEE SHEET A151 FOR REFLECTED CEILING PLAN.
H. SEE SHEET AI101 FOR FINISH INFORMATION.
I. SEE A601 FOR DOOR AND WINDOW INFORMATION.
J. GENERAL CONTRACTOR SHALL REVIEW AND APPROVE ALL APPLIANCES WITH OWNER PRIOR TO PURCHASING EQUIPMENT AND FABRICATING MILLWORK.
K. SEE G004 FOR WALL TYPES.
L. PROVIDE BACKING FOR WALL MOUNTED ITEMS AND EQUIPMENT.
M. NOTED DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALE DIMENSIONS; DETAILS OVER SMALLER SCALE DRAWINGS.
N. "FLOOR LINE" REFERS TO TOP OF CONCRETE SLABS. FOR DEPRESSED FLOORS AND CURBS, SEE STRUCTURAL DRAWINGS.
O. VERIFY ALL ROUGH-IN, CONCRETE PAD, OR PLATFORM DIMENSIONS FOR EQUIPMENT PROVIDED IN THIS PROJECT, OR BY OTHERS.
P. DO NOT SCALE DRAWINGS.

CORE ARCHITECTURE
233 SOUTH PLEASANT GROVE BLVD.
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core@corearch.com

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PROFESSIONAL STAMP

LICENSED ARCHITECT
CURTIS LEONARD LIVINGSTON
NO. 10021449
STATE OF UTAH

09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
2	PLAN REVIEW	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

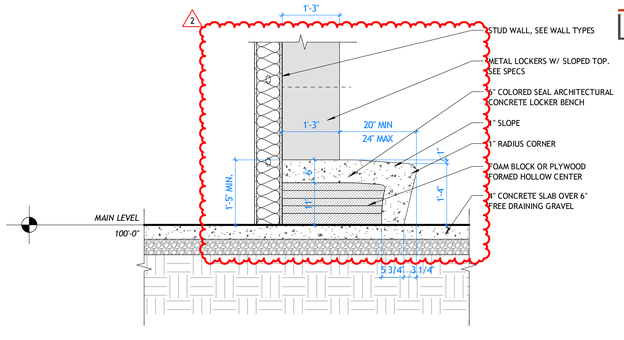
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

ENLARGED MAIN FLOOR DIMENSION PLAN

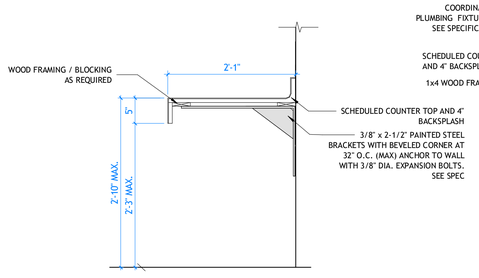
SHEET NUMBER

A102



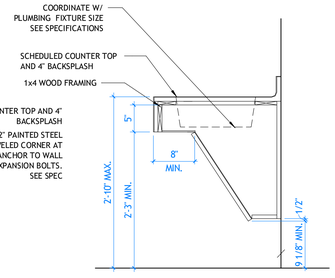
E3 LOCKER BENCH BASE DETAIL

A550 | SCALE: 3/4" = 1'-0"



D5 VANITY DETAIL

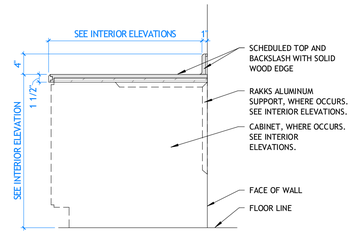
A550 | SCALE: 1" = 1'-0"



THE B2522 SINK CABINET MEETS THE AMERICANS WITH DISABILITIES ACT STANDARD FOR ACCESSIBLE DESIGN. TO CONFORM TO THESE FEDERAL REGULATIONS, NO MODIFICATIONS ARE ALLOWED.

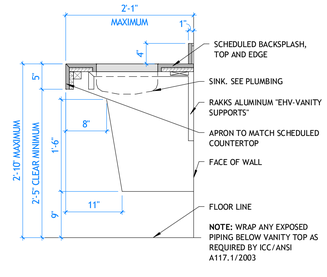
D6 ADA SINK CABINET DETAIL

A550 | SCALE: 1" = 1'-0"



E5 TYPICAL COUNTER

A550 | SCALE: 1" = 1'-0"



E6 RESTROOM COUNTER

A550 | SCALE: 1" = 1'-0"

GENERAL NOTES

A. BACKSPLASH SHALL BE PROVIDED ON BACK WALL AND SIDE WALL WHERE PLUMBING IS SHOWN AS PART OF THE CABINETRY. IF NO PLUMBING IS PRESENT A BACKSPLASH SHALL NOT BE REQUIRED. BACKSPLASH SHALL BE 3/4" THICK AND 4" MINIMUM IN HEIGHT, TO MATCH COUNTERTOP FINISHED MATERIAL. PROVIDE BULLNOSE TOP AND RADIUS BACKSPLASH BOTTOM.
B. COUNTERTOPS SHALL BE (2) LAYERS 3/4" PLYWOOD WITH PLASTIC LAMINATE FINISH AT COUNTERTOP, UNLESS OTHERWISE NOTED. FRONT EDGE SHALL HAVE HALF BULLNOSE FINISH.
C. IF THE TOP OF THE CABINET IS LESS THAN 18" AWAY FROM THE FINISHED CEILING ENCLOSURE, A PLASTIC LAMINATE PANEL SHALL BE REQUIRED.
D. SEE ENLARGED FLOOR PLANS ON A401 FOR GROMMET AND HOLE PLACEMENT.

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PROFESSIONAL STAMP

LICENSED ARCHITECT
CURTIS LEONARD LIVINGSTON
NO. 10071445
STATE OF UTAH
09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
2	PLAN REVIEW	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
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PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

MILLWORK DETAILS

SHEET NUMBER

A550

CODE ANALYSIS & BUILDING CRITERIA

BUILDING OCCUPANCY ANALYSIS

	CCHS FIELDHOUSE
Area (S.F.)	36,981 SF
Design Occupancy Level 1	1,987
Design Occupancy Level 2	229
Total Design Occupancy	2,216

PATH LEGEND

COMMON PATH — EGRESS PATH — FEC PATH

DEFERRED SUBMITTALS

Fire Protection Sprinkler Drawings - Section 211310

Fire Alarm Drawings - Section 283123

DEFERRED SUBMITTALS ARE TO BE MADE IN COMPLIANCE WITH SECTION 107.3.4.1 OF THE 2018 INTERNATIONAL BUILDING CODE. DEFERRED SUBMITTAL DOCUMENTS SHALL RESUBMITTED TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE WHO SHALL REVIEW THEM AND FORWARD THEM TO THE BUILDING OFFICIAL HAVING JURISDICTION WITH A NOTATION INDICATING THAT THE DEFERRED SUBMITTAL DOCUMENTS HAVE BEEN REVIEWED AND THAT THEY HAVE BEEN FOUND TO BE IN GENERAL COMPLIANCE WITH THE DESIGN OF THE PROJECT. THE DEFERRED SUBMITTAL ITEMS SHALL NOT BE INSTALLED UNTIL THEIR DESIGN AND SUBMITTAL DOCUMENTS HAVE BEEN REVIEWED AND APPROVED. THE DEFERRED SUBMITTAL SHALL BE SUBMITTED TO THE BUILDING OFFICIAL HAVING JURISDICTION PRIOR TO INSPECTIONS. THE WORK RELATED TO THE DEFERRED SUBMITTALS IS NOT TO COMMENCE UNTIL THE BUILDING OFFICIAL HAS APPROVED THE SUBMITTAL.

FINISHES ANALYSIS

Roof Table 1505	
Provided	Class A
Interior Walls & Ceilings	
Provided @ Egress Enclosures & passages	Class B
Provided @ Corridors & other exit ways	Class C
Provided @ Room & Enclosures	Class C
Interior Floors	
Provided	Class 1 & 2

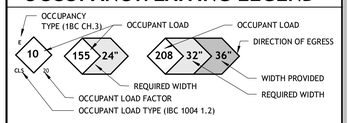
BUILDING EGRESS ANALYSIS

	CCHS FIELDHOUSE
Required Points of Egress Table 1006.3.2	4
Actual points of Egress	7 **COMPLIANT**
Min. Required Corridor Width Table 1020.2	72"
Actual Min. Corridor Width	72" **COMPLIANT**
Max. Allowable Dead End	50'
Actual Max. Dead End	0' **COMPLIANT**
Max. Allowable Common Path of Egress Table 1006.2.1	75'
Actual Max. Common path of Egress	56' **COMPLIANT**
Max. Allowable Travel Distance 1017.2	250'
Actual Max. Travel Distance	183' **COMPLIANT**

CODE ANALYSIS

	CCHS FIELDHOUSE
Occupancy Section 305	E
Construction Type Section 602	II-B
Fire-Sprinkler System Section 903	YES, Fully Sprinkled NFPA 13
Allowable Stories Section 504.4	3
Actual Stories	2 **COMPLIANT**
Allowable Height 504.4	75'-0"
Actual Height	38'-10" **COMPLIANT**
Base Allowable Floor Area (A_a) Table 506.2	43,500 SF per story
Non Sprinkled Allowable Area (NS) Table 506.2	14,500 SF
Building Perimeter with Frontage (F) Section 506.3.2	775'-0"
Building Perimeter (P)	775'-0"
Weighted Average Frontage Width (W) Section 506.3.2	30
Frontage Increase Factor (I_f = [F/P-0.25] X W/30) Section 506.3	.75
Total Allowable Area (A_a=A_t +[NS X I_f]) Section 506.2	54,375 SF per story
Actual Main Floor Square Footage	37,872 SF **COMPLIANT**
Actual Upper Floor Square Footage	8,800 SF **COMPLIANT**
Total Area	46,672 SF

OCCUPANCY/EXITING LEGEND



LOAD TYPE	LOAD FACTOR	LOAD TYPE	LOAD FACTOR
ACC	300 gross	EXE	50 gross
AGG	300 gross	FAB	200 gross
HAN	500 gross	IND	100 gross
TER	20 gross	TRT	240 gross
BAC	300 gross	OUT	100 gross
BAH	100 gross	SLP	120 gross
CON	15 gross	KIT	200 gross
GAM	11 gross	RED	50 net
EXH	30 net	STA	100 gross
FIX	see section 1004.6	LOC	50 gross
CHR	7 net	MAL	see section 402.8.2
STD	5 net	MER	60 gross
UNC	15 net	STO	300 gross
BOW	7 net	PRK	200 gross
BUS	150	RES	200 gross
CON		REC	50 gross
CRT			
DAY	35 net	DEC	15 gross
DOR	50 gross	STG	15 net
CLS	20 net	WAR	500 gross
VOC	50 net	*** PER FIRE MARSHALL	35 net

OCCUPANCY TYPES

A1, A2, A3, A4, A5	ASSEMBLY
B	BUSINESS
E	EDUCATIONAL
F1, F2	FACTORY AND INDUSTRIAL
H1, H2, H3, H4, H5	HIGH HAZARD
I1, I2, I3, I4	INSTITUTIONAL
M	MERCANTILE
R1, R2, R3, R4	RESIDENTIAL
S1, S2	STORAGE
U	UTILITY AND MISCELLANEOUS

PLUMBING FIXTURE ANALYSIS (IBC 2021)

Max Occupancy as Directed by School District	200	
Required Water Closet Male	4	
Provided Water Closet Male	5	*COMPLIANT*
Required Water Closet Female	4	
Provided Water Closet Female	5	*COMPLIANT*
Required Water Closet Unisex	0	
Provided Water Closet Unisex	6	*COMPLIANT*
Required Lavatories Male	4	
Provided Lavatories Male	4	*COMPLIANT*
Required Lavatories Female	4	
Provided Lavatories Female	4	*COMPLIANT*
Required Lavatories Unisex	0	
Provided Lavatories Unisex	6	*COMPLIANT*
Required Drinking Fountains	2	
Provided Drinking Fountains	2	*COMPLIANT*
Required Service Sinks	1	
Provided Service Sinks	1	*COMPLIANT*

EGREES TRAVEL PATH (ALT)

Type	Egress Path Length
COMMON PATH (ALT) 2-1	55'-6 1/8"
COMMON PATH (ALT) 2-2	50'-7 1/2"
EGRESS PATH 1-2 (ALT)	111'-2 3/8"
EGRESS PATH (ALT) 1-1	112'-9 1/2"
EGRESS PATH (ALT) 2-1	183'-1 3/8"
EGRESS PATH (ALT) 2-2	147'-7 1/2"

FIRE EXTINGUISHER LEGEND

- BRACKET MOUNTED
- SEMI-RECESSED
- SEMI-RECESSED CABINET WITH TYPE K EXTINGUISHER

APPLICABLE CODES AND STANDARDS

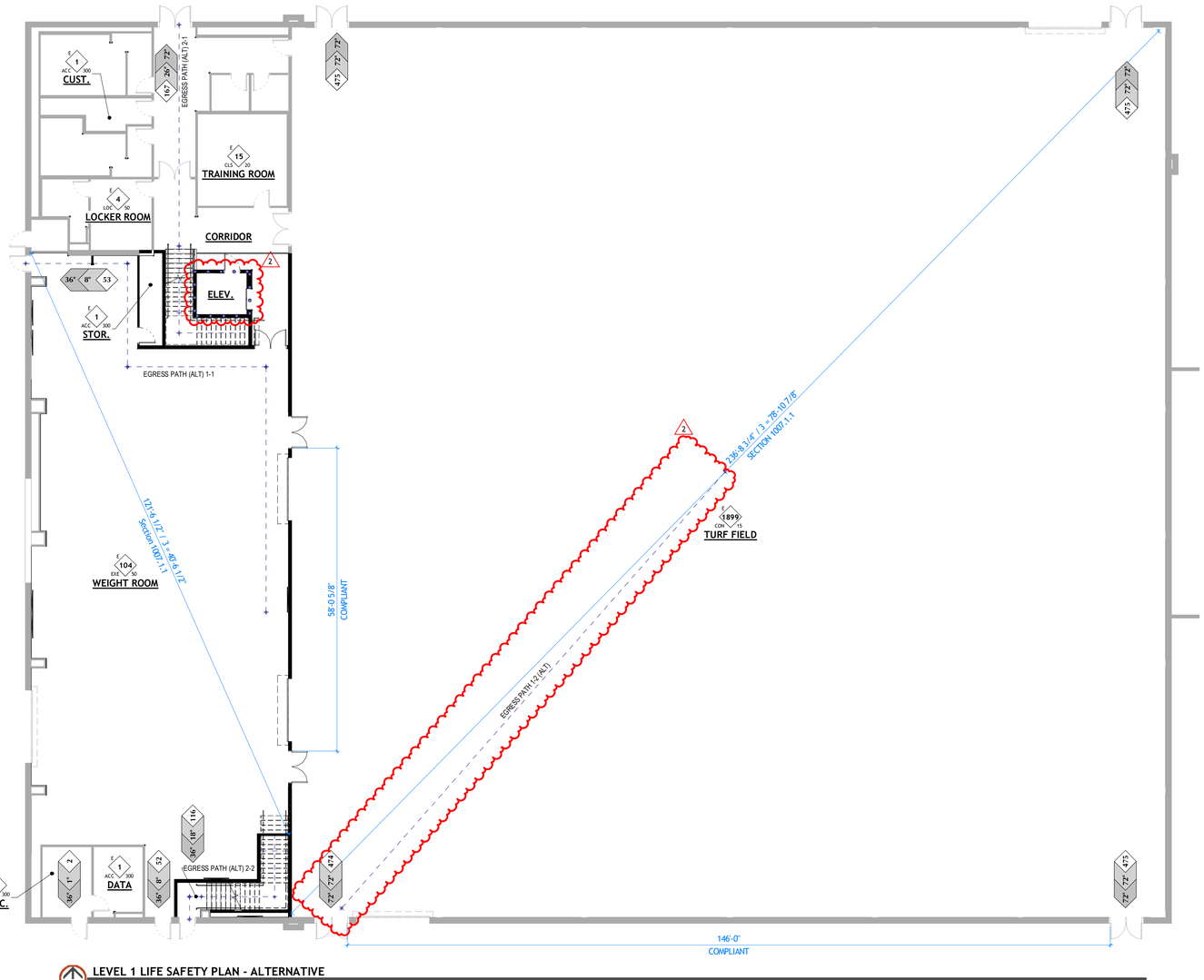
- *2021 INTERNATIONAL BUILDING CODE.*
- *2021 INTERNATIONAL FIRE CODE.*
- *2021 INTERNATIONAL MECHANICAL CODE.*
- *2021 INTERNATIONAL PLUMBING CODE*
- *2021 INTERNATIONAL FUEL GAS CODE.*
- *2020 NATIONAL ELECTRICAL CODE.*
- *ASHRAE 90.1 (2018 STANDARD)*
- *ICC 117.1 -2009*
- NFPA 101 - LIFE SAFETY CODE, 2009 EDITION
- UTAH STATE CODE AMENDMENTS, EFFECTIVE 1 JULY 2023

SEPARATION LEGEND

- ONE-HOUR VERTICAL EXTERIOR ENCLOSURE (FIRE BARRIER).
- ONE-HOUR FIRE PARTITION.
- TWO-HOUR FIRE PARTITION (FIRE BARRIER).
- SMOKE PARTITION.INCIDNTAL USE RESITANT TO SMOKE PASSAGE
- ONE-HOUR FIRE SEPARATION.(CEILING)
- COMMON PATH OF TRAVEL TO EXIT
- PATH OF TRAVEL TO EXIT
- DEAD END

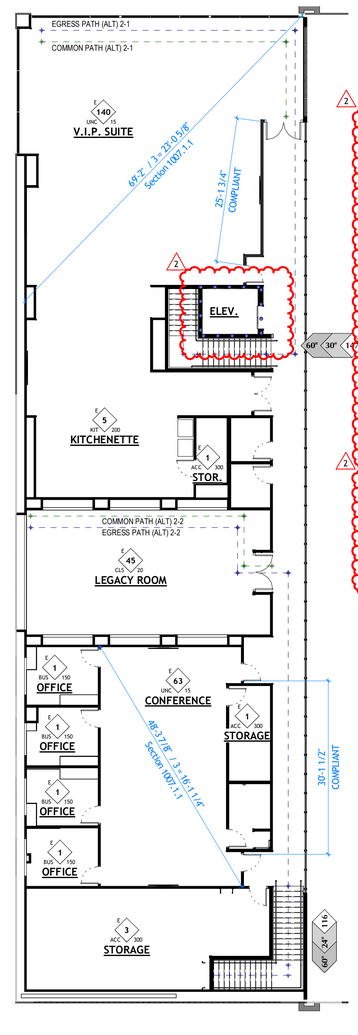
NOTE:

2-HR SEPARATION WALLS SHALL CONSIST OF MASONRY; FIRE RATED DOORS, SMOKE AND FIRE DAMPERS AND ALL OTHER REQUIRED ELEMENTS TO CREATE A COMPLETED FIRE ASSEMBLY.



LEVEL 1 LIFE SAFETY PLAN - ALTERNATIVE

A900 | SCALE: 3/32" = 1'-0"



LEVEL 2 LIFE SAFTEY PLAN - ALTERNATIVE

A900 | SCALE: 3/32" = 1'-0"

GENERAL NOTES

A. SEE SHEET G001 FOR ALL RELATED CODE COMPLIANCE INFORMATION.
B. FILL VOIDS BETWEEN SEPARATION WALLS AND ROOF DECK WITH PRE-FORMED MINERAL WOOL OR SOLID GROUT. SEE WALL TYPES AND SECTIONS FOR TYPICAL DETAILS.
C. THIS PROJECT SHALL BE INSTALLED ACCORDING TO THE LATEST EDITON OF THE FOLLOWING STANDARDS AND AMENDMENTS TO THEM AS ADOPTED BY THE AUTHORITY HAVING JURSIDICTION.
   - IBC (International Building Code)
   - NEC (National Electrical Code)
   - NFPA (National Fire Protection Association)
   - UL (Underwriters Laboratories, Inc.)
   - NEMA (National Electrial manufactuer's Association)
   - IFC (International Fire Code)
   - IECC (International Energy Conservation Code)
   - IEC (International Electrical Code)
   - State and Local Buildign Authority and Code
D. REFER TO SPECIFICAIOIN SECTION 078413-7 THRU 078413-10 FOR PENETRATION AND FIRE STOPPING REQUIRMENTS.

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LICENSED ARCHITECT CURTIS LEONARD LIVINGSTON NO. 10024445 STATE OF UTAH

09 OCT. 24

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OWNER INFORMATION

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CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

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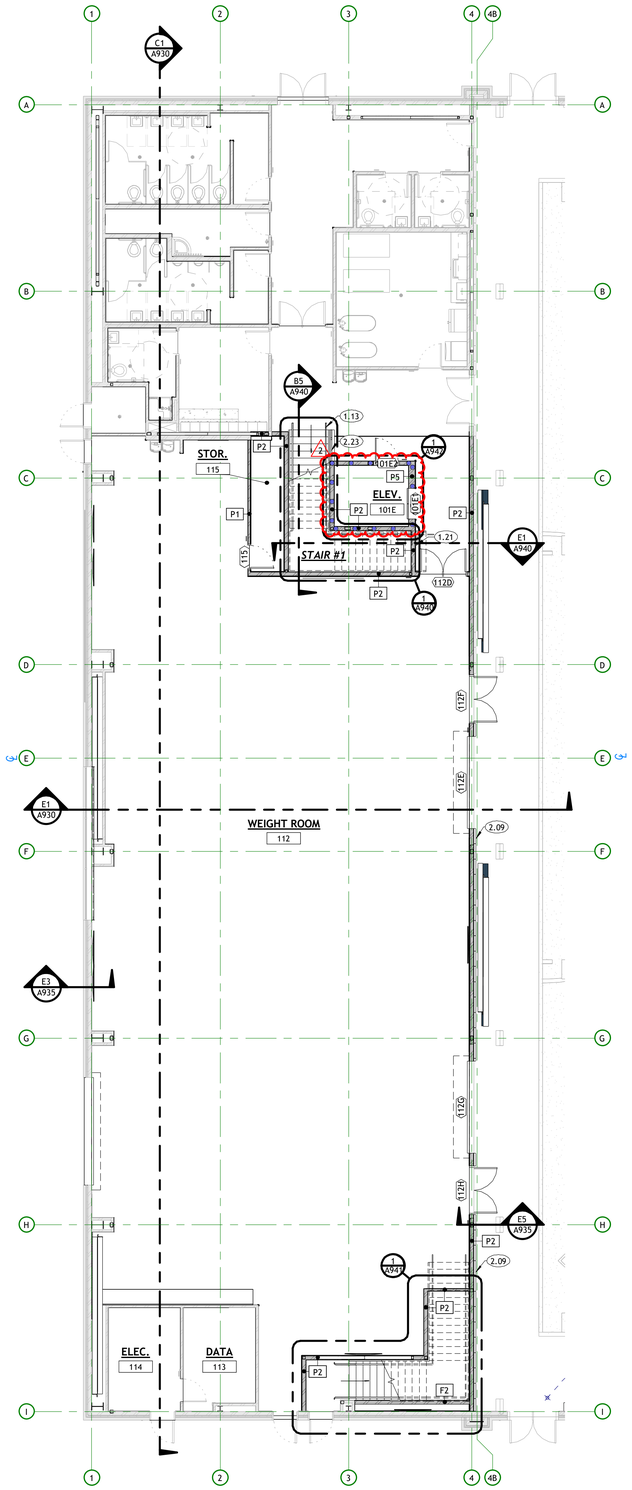
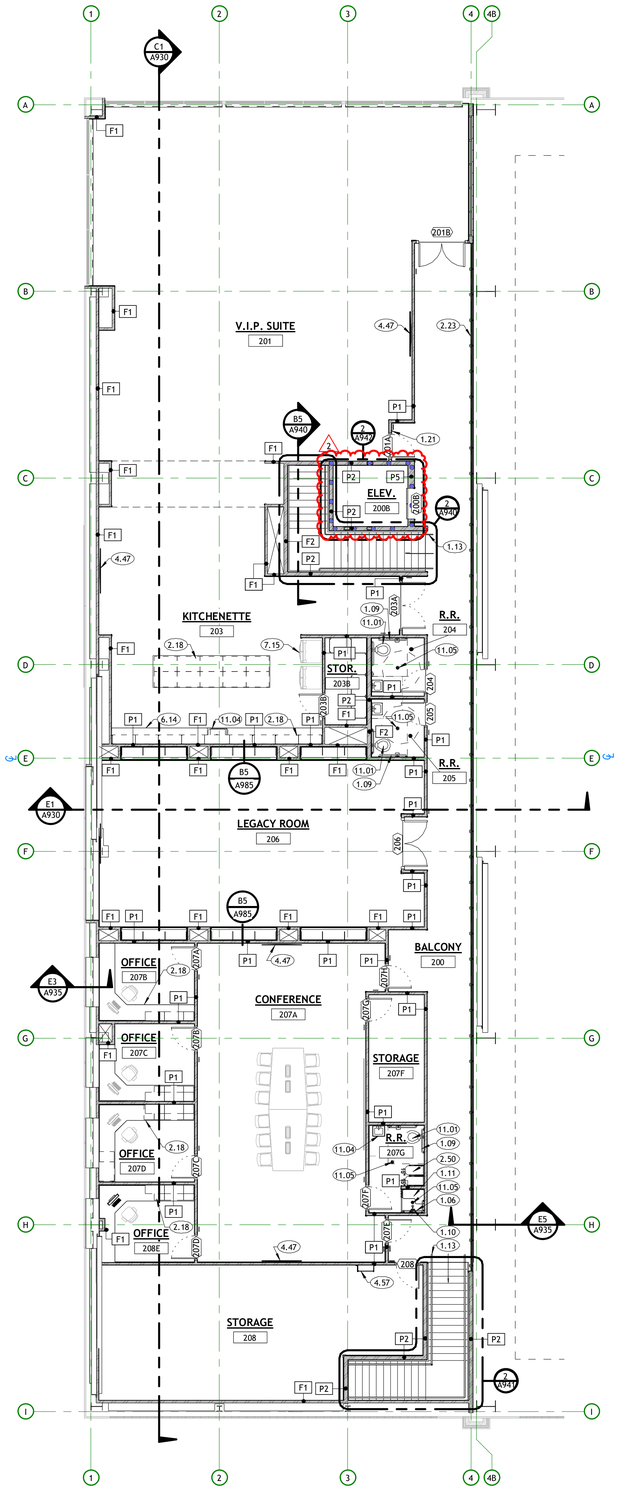
A900



FLOOR PLAN - OVERALL MAIN FLOOR PLAN - ALTERNATIVE

A911 | SCALE: 1/8" = 1'-0"



FLOOR PLAN - OVERALL UPPER MAIN FLOOR PLAN - ALTERNATIVE

A911 | SCALE: 1/8" = 1'-0"

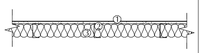
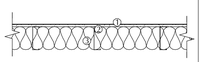
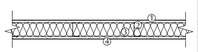
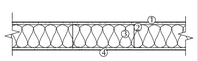
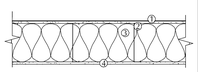
KEYNOTES

1.06	ADA COMPLIANT 36" HORIZONTAL GRAB BAR. SEE DETAILS AND SPECIFICATIONS.
1.09	ADA COMPLIANT GRAB BAR. SEE DETAILS AND SPECIFICATIONS.
1.10	ADA COMPLIANT SHOWER HEAD AND CONTROLS. SEE DETAILS AND SPECIFICATIONS.
1.11	ADA COMPLIANT FOLD-UP SHOWER SEAT AND SHOWER GRAB BARS. SEE DETAILS AND SPECIFICATIONS.
1.13	ADA COMPLIANT HANDRAIL 36" ABOVE FINISHED FLOOR. SEE RAILING DETAILS.
1.21	DIGITAL CARD READER. SEE SPECIFICATIONS.
2.09	6'-0" TALL ATHLETIC WALL PAD. SEE INTERIOR ELEVATIONS AND SPECIFICATIONS. COLOR SELECTION BY ARCHITECT.
2.18	ARCHITECTURAL MILLWORK. SEE FURNISHING PLANS, INTERIOR ELEVATIONS AND SPECIFICATIONS.
2.23	PAINTED STEEL GUARDRAIL. 42" ABOVE FINISHED FLOOR OR NOSE OF STAIRS. SEE TYPICAL DETAILS.
2.50	METAL GRID TEAM LOCKERS. SEE SPECIFICATIONS.
4.47	TELEVISION (CPCI). CONTRACTOR TO PROVIDE BACKING NEEDED FOR MOUNTING AND TO ROUGH IN POWER AND DATA FOR TELEVISION. SEE ELECTRICAL FOR POWER AND DATA LOCATIONS.
4.57	ALTERNATE STEEL ACCESS LADDER SEE DETAILS.
6.14	SOLID SURFACE COUNTER TOPS. SEE SPECIFICATIONS.
7.15	REFRIGERATOR WITH FREEZER (N.I.C.)
11.01	TOILET. SEE PLUMBING.
11.04	SINK. SEE PLUMBING.
11.05	FLOOR DRAIN. SEE PLUMBING SCHEDULE. VERIFY LOCATION WITH PLUMBING. SLOPE FLOOR 1/4" PER 1'-0" TOWARD DRAIN.

GENERAL NOTES

A. GENERAL CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR CONSTRUCTION. REPORT ANY SIGNIFICANT DISCREPANCIES TO THE ARCHITECT.
B. COORDINATE INSTALLATIONS OF ALL "AFTER CONTRACT" ASSEMBLIES WITH OWNER PRIOR TO CONSTRUCTION OF ADJOINING OR RELATED STRUCTURES.
C. PROVIDE 18" MINIMUM CLEAR FLOOR SPACE AT PULL SIDE OF ALL DOORS. PROVIDE 12" MINIMUM CLEAR FLOOR SPACE AT PUSH SIDE OF ALL DOORS.
D. UNLESS OTHERWISE NOTED OR DIMENSIONED, LOCATE DOORS AS FOLLOWS:
   - MASONRY WALLS- OUTSIDE OF FRAME 8" FROM FACE OF WALL (ON BLOCK MODULE),
   - FRAMED WALLS-INSIDE OF JAMB 4" FROM FINISHED WALL (ADJUST FOR TILE WHERE SHOWN).
E. CONCRETE FOUNDATION WALLS RETAINING EARTH TO RECEIVE TWO COATS OF BITUMINOUS DAMP PROOFING MATERIAL.
F. AN AUTOMATIC FIRE SPRINKLER SYSTEM IS TO BE INSTALLED THROUGHOUT THE ENTIRE BUILDING PER NFPA 13.
G. SEE STRUCTURAL, MECHANICAL, AND ELECTRICAL SHEETS FOR ADDITIONAL INFORMATION
H. SEE INTERIOR ELEVATIONS ON A850 SHEETS AND MILLWORK DETAILS ON A550 SHEETS FOR FINISHES OF MILLWORK BASES, AND COUNTERTOPS. SEE A120 SHEETS FOR REFLECTED CEILING PLAN INFORMATION.
I. SEE A800 SHEETS, FOR FINISH INFORMATION. CONFIRM FINISHES WITH OWNER PRIOR TO ORDERING.
J. SEE A600 SHEETS FOR DOOR AND WINDOW INFORMATION.
K. GENERAL CONTRACTOR SHALL REVIEW AND APPROVE ALL APPLIANCES WITH OWNER PRIOR TO PURCHASING EQUIPMENT AND FABRICATING MILLWORK.
L. SEE THE SPECIFICATION FOR ADDITIONAL INFORMATION.
M. SEE G000 FOR LEGENDS, SYMBOLS, ABBREVIATIONS AND OTHER ARCHITECTURAL GENERAL INFORMATION.
N. SEE A110 FOR WALL TYPES.
O. PROVIDE BACKING/BLOCKING FOR WALL MOUNTED ITEMS-INCLUDING GRAB BARS, HANDRAILS, SIGNAGE AND EQUIPMENT AS REQUIRED.
P. TILE IS TO BE SET OVER CEMENTITIOUS BACKER BOARD UNDERLAYMENT. RECESS SLAB AS/IF REQUIRED. VERIFY WITH OWNER.
Q. SEE STRUCTURAL DRAWINGS FOR LOCATION OF DEPRESSED SLABS
R. PROVIDE 1" RADIUS BULLNOSE AT ALL MASONRY WALL CORNERS. BASE COURSE OF MASONRY TO REMAIN SQUARE FOR WALL BASE INSTALLATION.
S. ALL DIMENSIONS ARE TO FACE OF MASONRY, WOOD, AND METAL STUD FACES UNLESS NOTED OTHERWISE.
T. EXTEND ALL WALLS TO UNDERSIDE OF DECK ABOVE UNLESS OTHERWISE NOTED. CONTRACTORS OPTION TO FILL METAL DECK VOIDS WITH MINERAL WOOL INSULATION OR FIELD CUT GYP. BOARD INTO FLUTES. INCLUDING MASONRY WALLS. REFER TO STRUCTURAL SHEETS FOR EXACT LOCATIONS OF BEARING WALLS.
U. FILL VOIDS BETWEEN SEPARATION WALLS AND ROOF DECK WITH FIREDAM SPRAY INSULATION. SEE SPECS.
V. **FOR ALL METAL STUD WALLS THAT EXTEND TO BOTTOM OF ROOF DECK & WHERE METAL STUD WALLS CUT PERPENDICULAR THROUGH ROOF TRUSSES, SEE DETAILS.**
W. DO NOT SCALE DRAWINGS.

WALL TYPE LEGEND

F1	 PLAN VIEW	**WALL TYPE F1** FROM EXTERIOR TO INTERIOR 1. 5/8" TYPE "X" GYPSUM BOARD 2. 3 5/8" METAL STUD 3. SOUND ATTENUATION BATTS *SEE FURNISHING PLANS & SHEET A801 FOR FINISH OF EACH ROOM
F2		**WALL TYPE F2** FROM EXTERIOR TO INTERIOR 1. 5/8" TYPE "X" GYPSUM BOARD 2. 6" METAL STUD 3. SOUND ATTENUATION BATTS *SEE FURNISHING PLANS & SHEET A801 FOR FINISH OF EACH ROOM
P1	 PLAN VIEW	**WALL TYPE P1** FROM EXTERIOR TO INTERIOR 1. 5/8" TYPE "X" GYPSUM BOARD 2. 3 5/8" METAL STUD 3. SOUND ATTENUATION BATTS 4. 5/8" TYPE "X" GYPSUM BOARD *SEE FURNISHING PLANS & SHEET A801 FOR FINISH OF EACH ROOM
P2	 PLAN VIEW	**WALL TYPE P2** FROM EXTERIOR TO INTERIOR 1. 5/8" TYPE "X" GYPSUM BOARD 2. 6" METAL STUD 3. SOUND ATTENUATION BATTS 4. 5/8" TYPE "X" GYPSUM BOARD *SEE FURNISHING PLANS & SHEET A801 FOR FINISH OF EACH ROOM
P5	 PLAN VIEW	**WALL TYPE P5** FROM EXTERIOR TO INTERIOR 1. 5/8" TYPE "X" GYPSUM BOARD 2. 10" METAL STUD 3. SOUND ATTENUATION BATTS 4. 5/8" TYPE "X" GYPSUM BOARD *SEE FURNISHING PLANS & SHEET A801 FOR FINISH OF EACH ROOM

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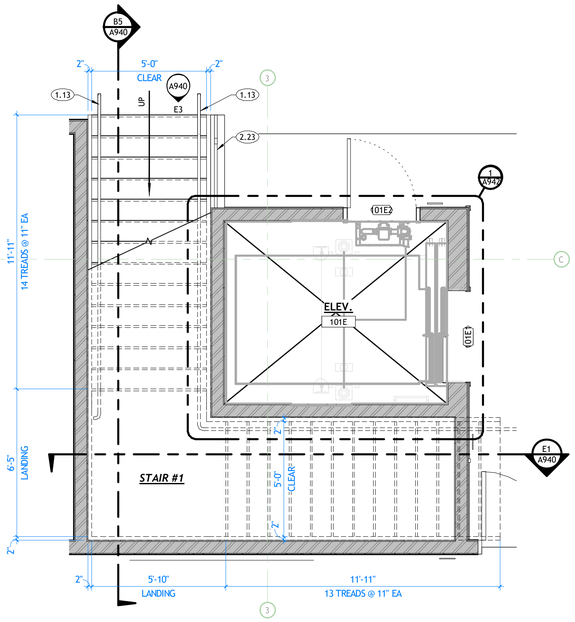
ALTERNATE - OVERALL FLOOR PLANS

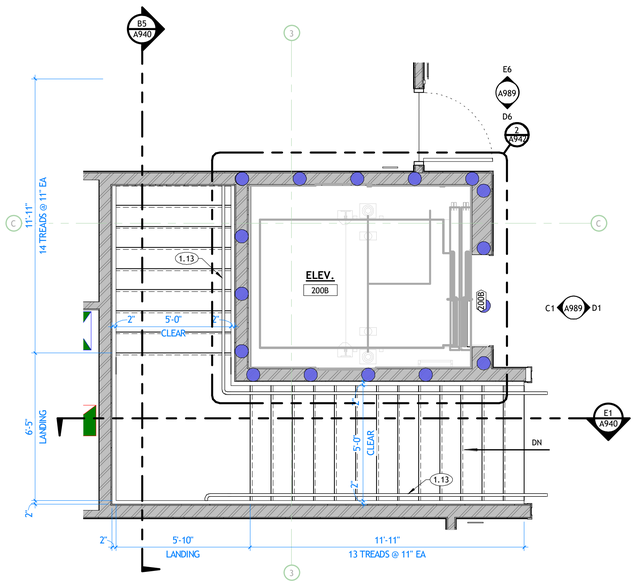
SHEET NUMBER

A911



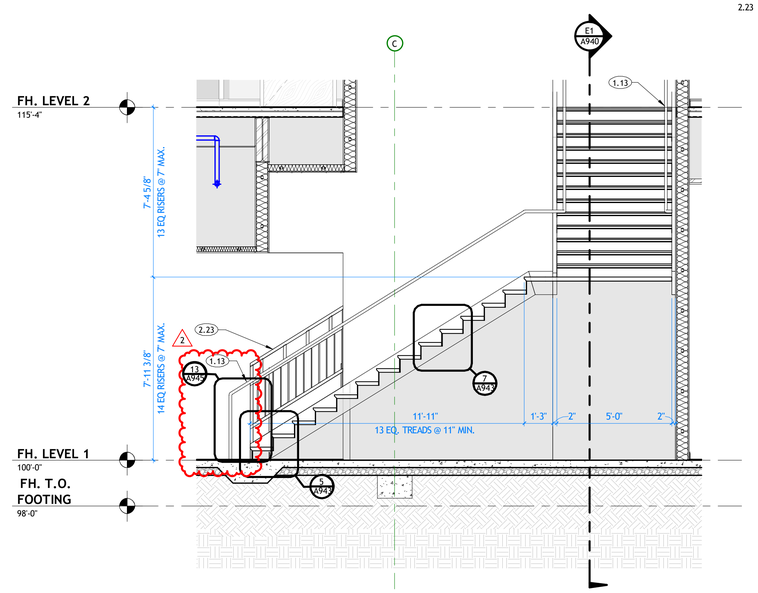
STAIR #1 - MAIN FLOOR PLAN

A940 | SCALE: 3/8" = 1'-0"



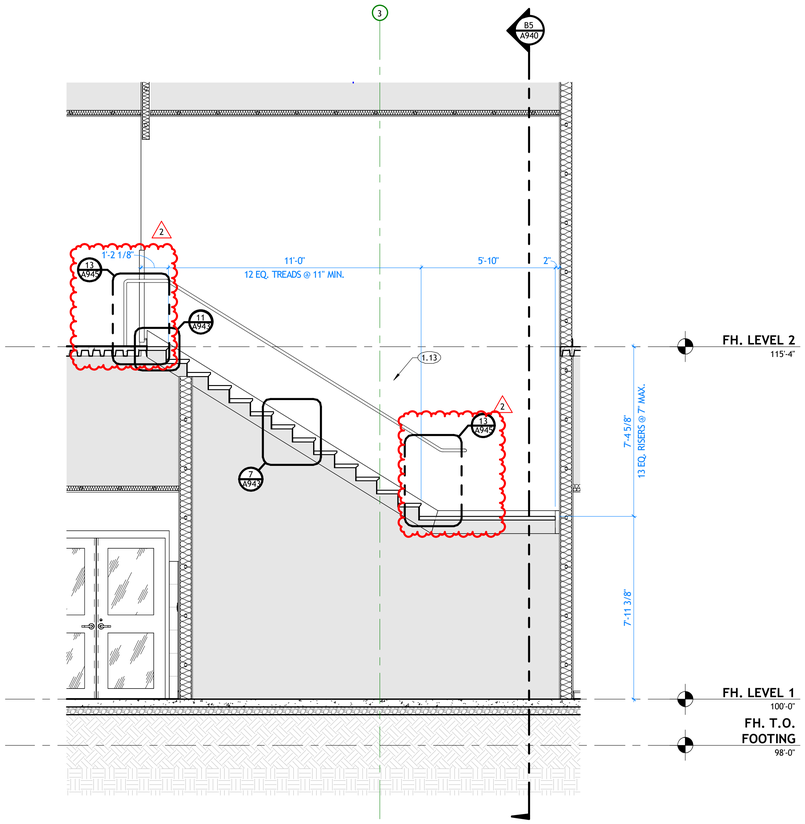
STAIR #1 - UPPER FLOOR PLAN

A940 | SCALE: 3/8" = 1'-0"



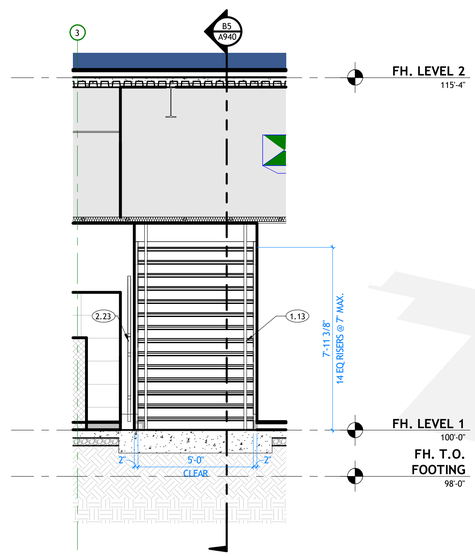
B5 STAIR #1 - SECTION A

A940 | SCALE: 3/8" = 1'-0"



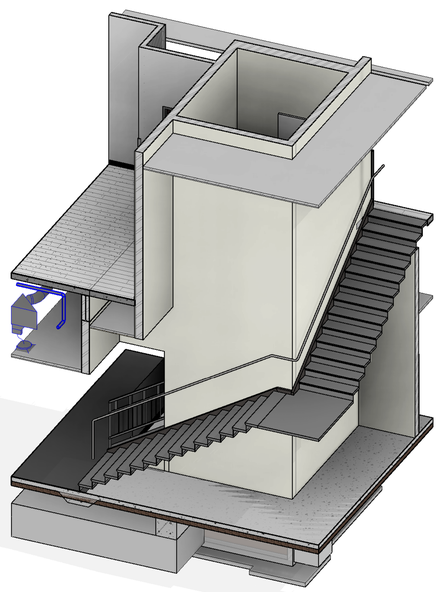
E1 STAIR #1 - SECTION B

A940 | SCALE: 3/8" = 1'-0"



E3 STAIR #1 - ELEVATION A

A940 | SCALE: 3/8" = 1'-0"



E5 STAIR #1 PERSPECTIVE

A940 | SCALE:

KEYNOTES

1.13 ADA COMPLIANT HANDRAIL 36" ABOVE FINISHED FLOOR. SEE RAILING DETAILS.

2.23 PAINTED STEEL GUARDRAIL. 42" ABOVE FINISHED FLOOR OR NOSE OF STAIRS. SEE TYPICAL DETAILS.

GENERAL NOTES

A. GENERAL CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS, AND ASSEMBLIES PRIOR TO CONSTRUCTION. REPORT ANY SIGNIFICANT DISCREPANCIES TO THE ARCHITECT.
B. AN AUTOMATIC FIRE SPRINKLER SYSTEM IS TO BE INSTALLED THROUGHOUT THE ENTIRE BUILDING PER NFPA 13.
C. CONCRETE FOUNDATION WALLS RETAINING EARTH TO RECEIVE TWO COATS OF BITUMINOUS DAMP PROOFING MATERIAL.
D. MINIMUM ROOF CLASSIFICATION TO BE CLASS 'C' AS NOTED ON THE CODE ANALYSIS
E. MINIMUM ROOF SLOPE TO BE 1/4" PER FOOT.
F. INSULATE ENTIRE ROOF WITH R-30 POLYISOCYANURATE ABOVE ROOF DECKING.
G. EXPOSED FOUNDATION WALLS TO RECEIVE RUBBED FINISH.
H. SEE ENGINEERING SHEETS FOR ADDITIONAL INFORMATION.
I. MASONRY TO HAVE CONTROL JOINTS AT 30' O.C. MAXIMUM.
J. COORDINATE INSTALLATION OF ALL "AFTER CONTRACT" ASSEMBLIES WITH THE OWNER PRIOR TO CONSTRUCTION OF ADJOINING OR RELATED STRUCTURES.
K. PROVIDE METAL FLASHING AND COUNTER FLASHING AS REQUIRED TO PROVIDE WATERPROOF BUILDING. NO PLASTIC FLASHING ALLOWED.
L. WALL TYPES ARE ON SHEET A110.
M. SEE A120 SHEETS FOR REFLECTED CEILING PLANS.
N. SEE A800 SHEETS FOR FURNISHINGS AND FINISH SCHEDULE.
O. ALL STEEL STAIR COMPONENTS SHALL BE GROUND SMOOTH AND PAINT (2 COATS MINIMUM).
P. CONTRACTOR SHALL BE RESPONSIBLE TO ASSURE THAT ALL GUARD AND HANDRAIL SYSTEMS SHALL MEET IBC STRENGTH REQUIREMENTS.
Q. PROVIDE HANDRAIL BRACKET SUPPORTS AS REQUIRED. ATTACH DIRECTLY PROVIDE BLOCKING/ METAL BACKING WHEN ATTACHING TO FRAMED WALLS. FASTEN FRAMED WALL CONDITIONS AS REQUIRED. WELD TO VERTICAL STEEL BALUSTERS AS REQUIRED.

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PROFESSIONAL STAMP

LICENSED ARCHITECT CURTIS LEONARD LIVINGSTON-JAY NO. 10021445 UTAH

09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
2	PLAN REVIEW	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

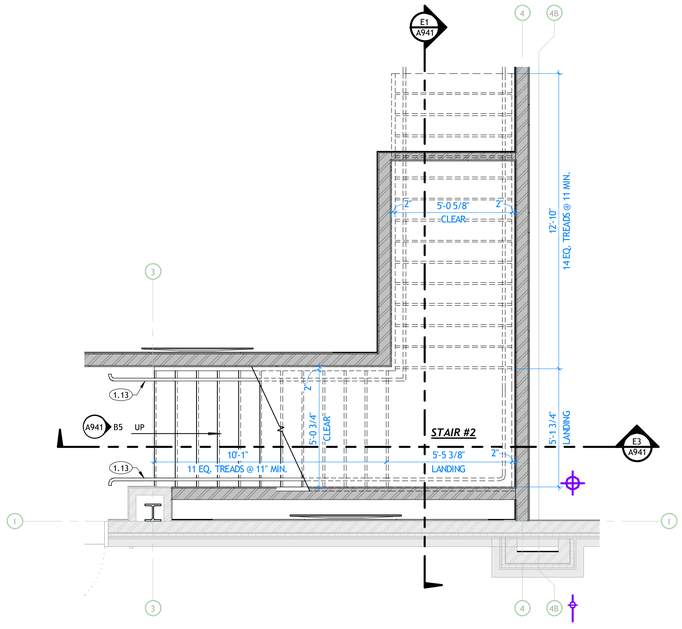
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

STAIR #1 - PLAN AND SECTIONS

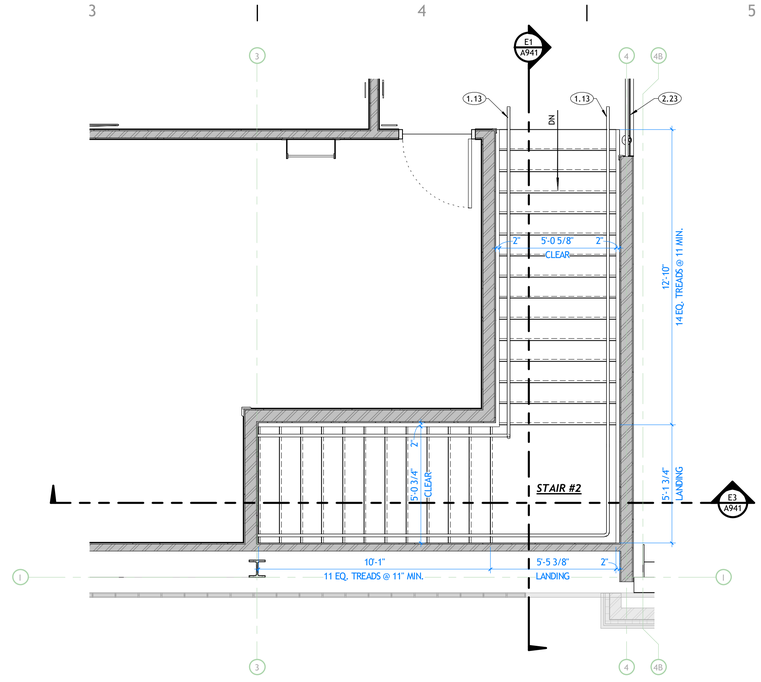
SHEET NUMBER

A940



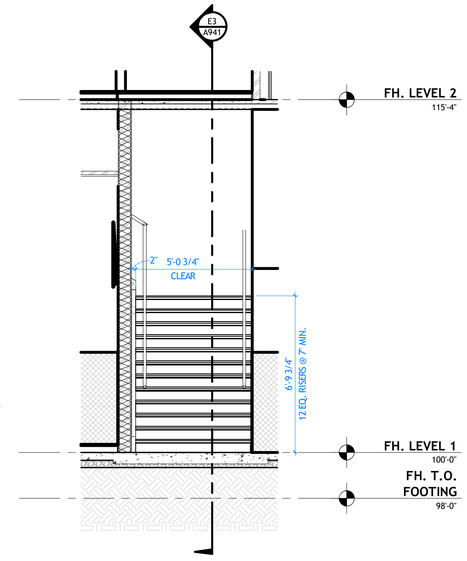
STAIR #2 - MAIN FLOOR PLAN

A941 | SCALE: 3/8" = 1'-0"



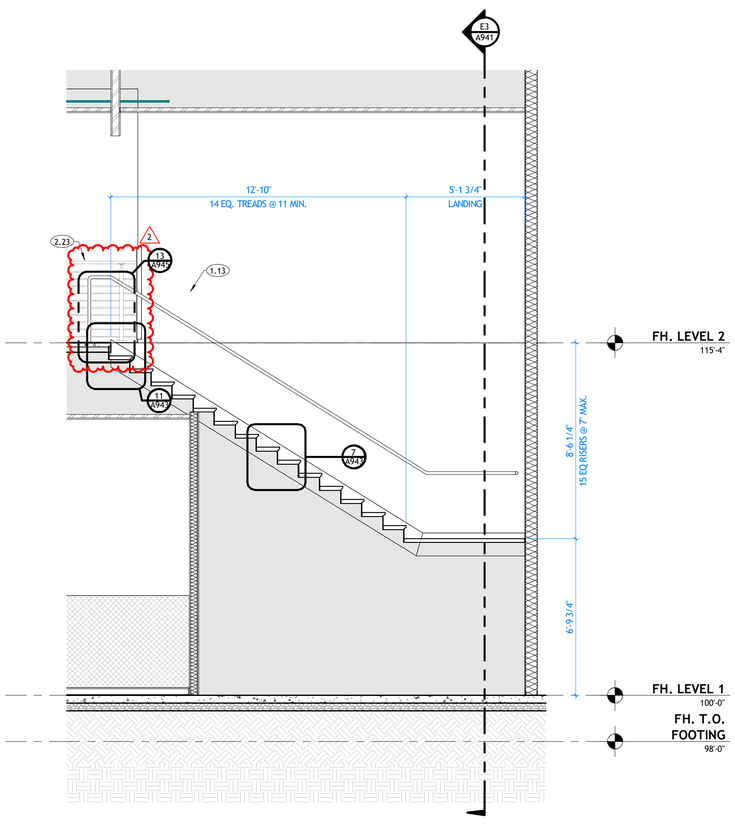
STAIR #2 - UPPER FLOOR PLAN

A941 | SCALE: 3/8" = 1'-0"



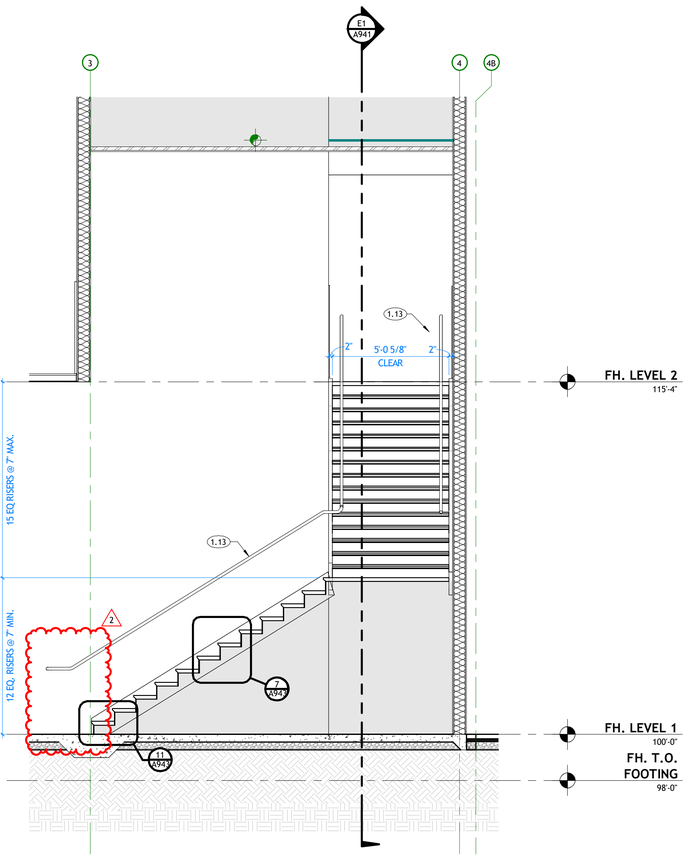
B5 STAIR #2 - ELEVATION B

A941 | SCALE: 3/8" = 1'-0"



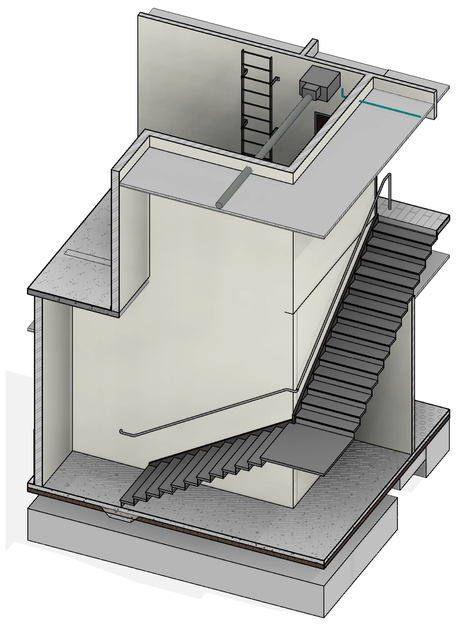
E1 STAIR #2 - SECTION A

A941 | SCALE: 3/8" = 1'-0"



E3 STAIR #2 - SECTION B

A941 | SCALE: 3/8" = 1'-0"



E5 STAIR #2 PERSPECTIVE

A941 | SCALE:

KEYNOTES

1.13 ADA COMPLIANT HANDRAIL 36" ABOVE FINISHED FLOOR. SEE RAILING DETAILS.

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PROFESSIONAL STAMP

LICENSED ARCHITECT CURTIS LEONARD LIVINGSTON NO. 10021449 STATE OF UTAH

09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

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BID SET

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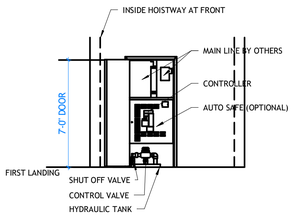
SHEET TITLE

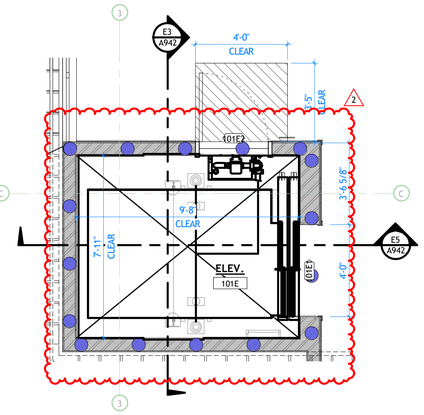
STAIR #2 - PLAN AND SECTIONS

SHEET NUMBER

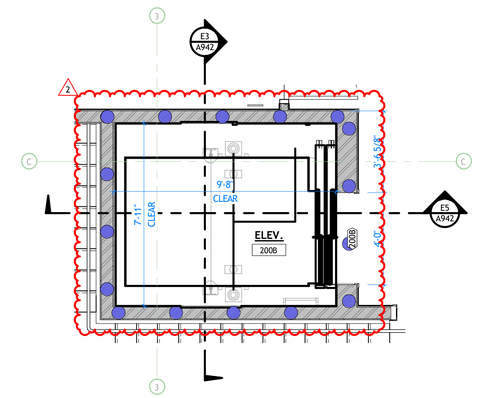
A941



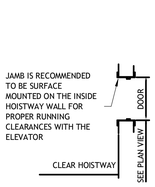
B1 CONTROLLER/MAIN LINE/TANK IN PIT @ BOTTOM LANDING REQUIREMENTS
A942 | SCALE: 1/4" = 1'-0"



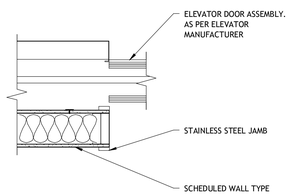
ELEVATOR #1 - MAIN FLOOR PLAN
A942 | SCALE: 3/8" = 1'-0"



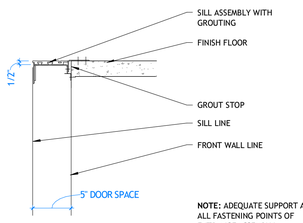
ELEVATOR #1 - UPPER FLOOR PLAN
A942 | SCALE: 3/8" = 1'-0"



C1 ELEVATOR JAMB DETAIL
A942 | SCALE: 1/4" = 1'-0"

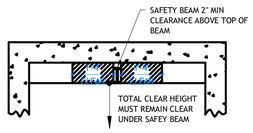


C2 ELEVATOR DOOR JAMB DETAIL
A942 | SCALE: 1" = 1'-0"

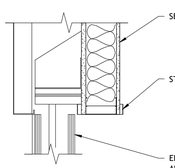


NOTE: ADEQUATE SUPPORT AT ALL FASTENING POINTS OF ENTRANCE ASSEMBLY REQUIRED

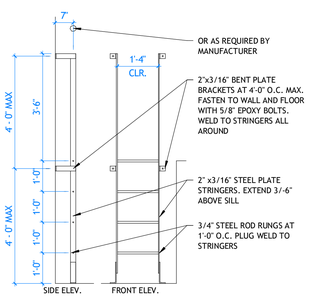
D1 ELEVATOR DOOR SILL DETAIL
A942 | SCALE: 1 1/2" = 1'-0"



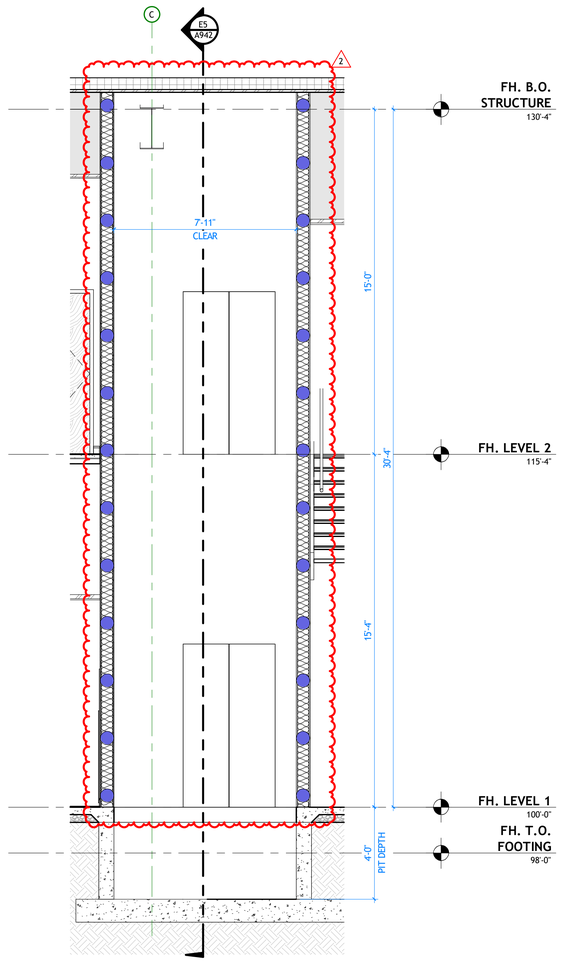
D2 OVERHEAD BEAM CLEARANCE
A942 | SCALE: 1/2" = 1'-0"



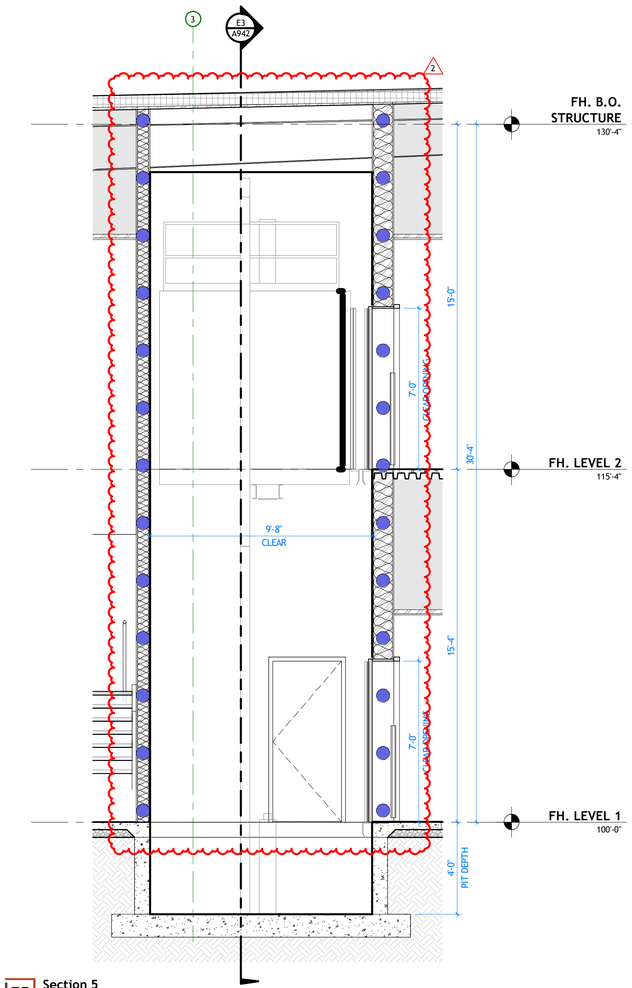
E1 ELEVATOR DOOR HEAD DETAIL
A942 | SCALE: 1" = 1'-0"



E2 ELEVATOR PIT LADDER DETAIL
A942 | SCALE: 1/2" = 1'-0"



E3 Section 4
A942 | SCALE: 3/8" = 1'-0"



E5 Section 5
A942 | SCALE: 3/8" = 1'-0"

KEYNOTES

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PROFESSIONAL STAMP

LICENSED ARCHITECT
CURTIS LEONARD LIVINGSTON
NO. 10071445
STATE OF UTAH
09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

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DRAPER, UTAH 84020

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BID SET

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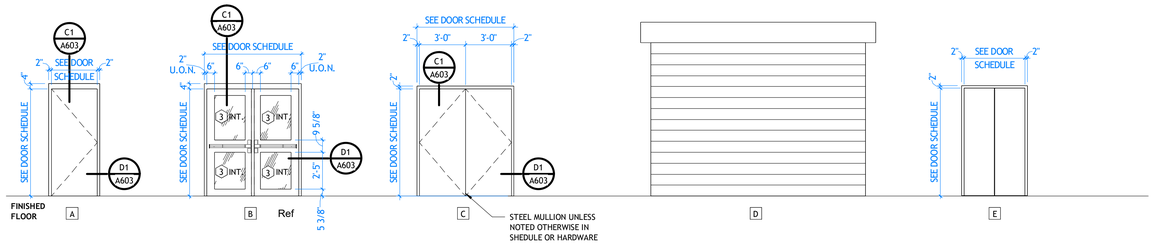
SHEET TITLE

ELEVATOR #1 - PLAN AND SECTION

SHEET NUMBER

A942



A1 DOOR TYPES

A601 | SCALE: 1/4" = 1'-0"

KEYNOTES

DOOR SCHEDULE - FH ALTERNATE 1

MARK	TYPE	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	MATERIAL DOOR	MATERIAL FRAME	HARDWARE	RATING	DOOR SIGNAGE	COMMENTS
FH. LEVEL 1									
101E1	E					E1		Yes	ELEVATOR DOOR PER MANUFACTURER
101E2	H	3'-0"	7'-0"	HM	HM	11	1 HR	Yes	
112D	B	6'-0"	7'-0"	HM	HM	06		Yes	
112E	D	12'-0"	10'-0"	STL	STL	R1		No	
112F	B	6'-0"	7'-0"	HM	HM	18		Yes	
112G	D	12'-0"	10'-0"	STL	STL	R1		No	
112H	B	6'-0"	7'-0"	HM	HM	18		Yes	
115	A	3'-0"	7'-0"	HM	HM	11		Yes	
FH. LEVEL 2									
200B	E					E1		Yes	ELEVATOR DOOR PER MANUFACTURER
201A	A	3'-0"	7'-0"	WD	HM	09		Yes	
201B	B	6'-0"	7'-0"	WD	HM	08		Yes	
203A	C	6'-0"	7'-0"	WD	HM	07		Yes	
203B	A	3'-0"	7'-0"	WD	HM	12		Yes	
204	A	3'-0"	7'-0"	WD	HM	16		Yes	
205	A	3'-0"	7'-0"	WD	HM	16		Yes	
206	B	6'-0"	7'-0"	WD	HM	07		Yes	
207A	A	3'-0"	7'-0"	WD	HM	13		Yes	
207B	A	3'-0"	7'-0"	WD	HM	13		Yes	
207C	A	3'-0"	7'-0"	WD	HM	13		Yes	
207D	A	3'-0"	7'-0"	WD	HM	13		Yes	
207E	A	3'-0"	7'-0"	WD	HM	14		Yes	
207F	A	3'-0"	7'-0"	WD	HM	16		Yes	
207G	A	3'-0"	7'-0"	WD	HM	11		Yes	
207H	A	3'-0"	7'-0"	WD	HM	14		Yes	
208	A	3'-0"	7'-0"	WD	HM	11		Yes	

GLAZING SCHEDULE

1. 1" INSULATED TEMPERED LOW-E GLASS
2. 1" INSULATED ANNEALED CLEAR LOW-E GLASS
3. 1/4" TEMPERED CLEAR GLASS
3. KALWALL WINDOW SYSTEM - SEE SPECS

NOTE:
- EXTERIOR DOORS & WINDOWS TO BE GLAZING TYPES 1 & 2
- INTERIOR DOORS & WINDOWS TO BE GLAZING TYPE 3
-TEMPERED GLASS WITHIN 4'-0" OF ANY DOOR/OPENING

GENERAL NOTES

A. THE CONTRACTOR IS TO VERIFY THE DIMENSIONS OF ALL OPENINGS PRIOR TO THE FABRICATION OF ALL DOORS AND FRAMES.
B. DUE TO MULTIPLE USE, SOME OF THE DETAILS REFERRED TO ON THE DOOR SCHEDULE ARE REVERSED OR TURNED FROM THE DIRECTION SHOWN ON THE FLOOR PLANS. THE INTENT OF THE DETAILS IS TO BE FOLLOWED. CONSULT THE ARCHITECT WHEN QUESTIONS ARISE.
C. ALL EXIT ACCESS DOORS AND EXIT DOORS SHALL BE OPENABLE FROM THE INSIDE WITHOUT THE USE OF A KEY, SPECIAL KNOWLEDGE, OR EFFORT. USE OF MANUAL FLUSH BOLTS, EDGE BOLTS, TOP OR BOTTOM BOLTS, ETC., IS PROHIBITED.
D. 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.
E. FIRE DOORS SHALL HAVE THE MINIMUM OPENING FORCE ALLOWABLE BY THE APPROPRIATE ADMINISTRATIVE AUTHORITY. THE REQUIRED FORCE FOR PUSHING OPEN OR PULLING OPEN DOORS OTHER THAN FIRE DOORS SHALL BE 5 POUNDS. THESE FORCES DO NOT APPLY TO THE FORCE REQUIRED TO RETRACT LATCH BOLTS OR DISENGAGE OTHER DEVICES THAT HOLD THE DOOR IN A CLOSED POSITION.
F. 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. WHEN NARROW STILE AND RAIL DOORS ARE USED, A 10" MINIMUM, SMOOTH PANEL, EXTENDING THE FULL WIDTH OF THE DOOR, SHALL BE INSTALLED ON THE PUSH SIDE(S) OF THE DOOR WHICH ALLOW THE DOOR TO BE OPENED BY A WHEELCHAIR FOOTREST WITHOUT CREATING A TRAP OR HAZARDOUS CONDITION. CAVITIES CREATED BY KICK PLATES SHALL BE CAPPED.
G. ALL DOOR LOCKSETS AND PANIC DEVICES SHALL BE ADA COMPLIANT LEVER TYPE.
H. CAULK HEAD, JAMBS, AND SILLS OF ALL DOORS AND WINDOWS WITH SEALANT CONTINUOUSLY APPLIED TO BOTH SIDES OF THE FRAMES.
I. COORDINATE KEYING TYPE AND SCHEDULE WITH OWNER.
J. ALL DOOR CLOSURES TO BE SET IN ACCORDANCE WITH THE ADA REDUCED OPENING FORCE REQUIREMENTS.
K. SEE SPECIFICATIONS FOR DOOR HARDWARE. GLAZING OF CURTAIN WALL AND SUPPORT AS PER MANUFACTURER RECOMMENDATIONS. COORDINATE LOADS WITH STRUCTURAL PRIOR TO STEEL FABRICATION.

CORE ARCHITECTURE
233 SOUTH PLEASANT GROVE BLVD.
SUITE #105
PLEASANT GROVE, UTAH 84062
PHONE: (801) 769-3000
core@corearch.com

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PROFESSIONAL STAMP

LICENSED ARCHITECT
CURTIS LEONARD LIVINGSTON
NO. 10021445
UTAH
09 OCT. 24

CONSULTANT INFORMATION

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
2	PLAN REVIEW	10/09/2024
3	ADDENDUM #4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	24-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

DOOR AND WINDOWS

SHEET NUMBER

A960

CALDER RICHARDS
CONSULTING ENGINEERS

STRUCTURAL REVIEW RESPONSES

Date: 10/09/2024
Client: CORE Architecture
Project: Corner Canyon High School – Field House
By: Matthew Kobs

Structural Review Responses

The following are CRCE's responses to the comments from Shums Coda Associates, dated September 27, 2024. It should be noted that the structural drawings and calculations submitted previously for this review were the 95% submittal, in accordance with Utah State Law for Schools. Those drawings and calculations were incomplete and not intended to be for construction, which is why the structural drawings and calculations were not stamped. The updated bid-set drawings and calculations are attached with the responses to the review and are stamped. Please note the super-structure for this building is a pre-engineered metal building (PEMB) and is a deferred submittal item that has not yet been designed. The loading and forces of the PEMB found in the calculations are estimated forces that we assumed. Once PEMB drawings and calculations are submitted, the structural design will be updated accordingly, and the drawings will be revised with an addendum.

STRUCTURAL COMMENTS:

1. There is no connection of the mechanical yard screen walls to the PEMB. Structural separation is shown in 100% CD Drawings on sheet S101.
2. Attachment of mechanical units to support is a deferred submittal (not part of the primary structural system). It is the responsibility of the mechanical engineer to provide seismic anchorage criteria for the required units.
3. See updated drawings and description above.
4. See updated drawings and description above.
5. See updated calculations and description above.
6. The Geotechnical Report can be found in the appendix of the structural calculations previously submitted. For clarification, the CBC is not adopted by the State of Utah.
7. The geotechnical report does recommend that the project geotechnical engineer review the foundation plans. Please refer to notes 1 and 10 under the Footings section on sheet S001.
8. Footings Note #3 on S001 complies with geotechnical report recommendations.
9. Plan #2 on sheet S101 has been updated.
10. See description above.
11. Footings for trash enclosure have been updated, see updated drawings.
12. Thank you, see updated drawings.
13. See detail C4/S511 on current drawings.
14. See response to comment 2 above.

15. An elevation callout for the BF-5 braced-frame found in detail E5/S201 is part of “phase 2” of mezzanine, see S901 for complete layout of mezzanine under the bid alternate.
16. Details have been updated to clear confusion. See updated drawings.
17. By “concrete pier minimum depth” we assume you mean the overall height of the piers. Please see the top of pier elevations shown on sheet S101. This, along with the top of footing elevations determines the overall height of each pier. Please also see detail B4/S601 for additional information (previously, detail B5/S601).
18. The required structural separation calculation can be found on page 618 of calculations.
19. See plan note L on S102 and S901, as well as details C6/S501, B3/S511, and C4/S511 for seismic gap dimension.
20. See detail B2/S201 of updated drawings.
21. See page 485 of calculations for clarification of the redundancy factor used for seismic lateral analysis. Rho of 1.3 was used in the analysis.
22. See pages 15-16 of calculations for the loading floor map of phase one and pages 18-19 for phase two.
23. Concrete pier schedule B4/S601 has been updated to reflect concrete pier calculations. See calculation key on page 180 of calculations to help correlate pier calculations with pier locations on drawings.

Prepared by:

Matthew Kobs

Reviewed by:

PROFESSIONAL STRUCTURAL ENGINEER
10-9-2024
HENNING T. UNGERMAN
#7801713
STATE OF UTAH

Henning Ungerman, S.E.

CALDER RICHARDS
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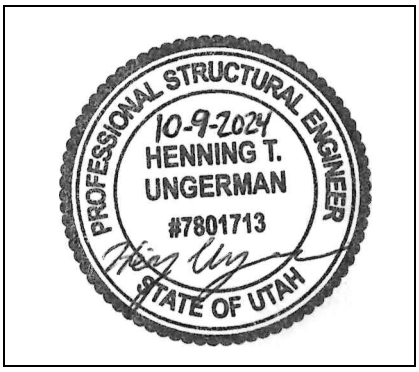


100% CD STRUCTURAL CALCULATIONS

DATE: 10/09/2024

PROJECT: CCHS Field House & Soccer Field
12943 South 700 East
Draper, Utah 84020

PREPARED FOR: Core Architects
233 South Pleasant Grove Blvd Suite #105
Please Grove, Utah 84062

PREPARED BY: Calder Richards Consulting Engineers, LLC
1805 South Redwood Road Ste. 102
Salt Lake City, UT 84104

SECTION BREAK

Loading

SUBSECTION BREAK

Load Sheet

DESCRIPTION/NOTES:

CALDER RICHARDS
CONSULTING ENGINEERS

JOB TITLE: CCHS Field House (24047) **BY:** MDK **DATE:** 09/03/24
SUBJECT: Load Sheet **CHECKED:** **SHEET:**

CODE: 2021 INTERNATIONAL BUILDING CODE

Elevation: 4467 ft
12943 South 700 East,
Draper, Utah 84020

RISK CATEGORY: III

ROOF LOADING

ROOF DEAD LOAD: 5 psf

COLLATERAL: 5 psf Min
10 psf Max

ROOF LIVE LOAD: 20 psf

SNOW LOAD

P_g = 32.0 psf
I_s = 1.1
C_e = 1.0
C_t = 1.0
P_f = 25.0 psf

FLOOR LOADS

DEAD LOAD:

W2 Floor Deck	= 2.1 psf
5" NW Conc	= 48.3 psf
Framing	= 8.0 psf
Ceiling	= 2.0 psf
Flooring	= 2.0 psf
Mech/Misc	= 2.6 psf

	∑ = 65.0 psf

LIVE LOADS

Office	= 50psf + 15 psf Partitions
Restrooms	= 60 psf + 15 psf Partitions
Corridors and Lobbies	= 80 psf
Light Storage	= 125 psf
Assembly	= 100 psf

WALL LOADS

Typical Wall	= 10 psf
Veneer	= 55 psf

SEISMIC

S_S = 1.488
S_1 = 0.551
S_{DS} = 0.992
S_{D1} = 0.643

I_e = 1.25
Seismic Design Category= D
Site Class = D

WIND

V = 109 mph
Exposure Category = C

LATERAL FORCE RESISTING SYSTEM

Main Building

Steel Ordinary Concentrically Braced Frames
R = 3.25
Ω_o = 2.0
C_d = 3.25

Steel Ordinary Moment Frames
R = 3.5
Ω_o = 3.0
C_d = 3.0

Mezzanine

Steel Ordinary Concentrically Braced Frames
R = 3.25
Ω_o = 2.0
C_d = 3.25

SOILS

Allowable Soil Bearing Pressure = 1500 psf (per soils report by AGEC 07-30-2024)
Frost Depth = 30 in

Created with PTC Mathcad Express. See www.mathcad.com for more information.

SECTION BREAK

Loading

SUBSECTION BREAK

Snow Loading

DESCRIPTION/NOTES:

Description details.

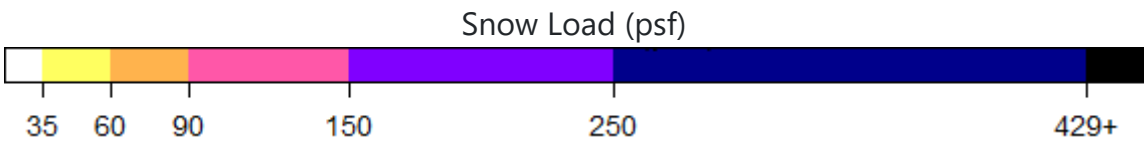
Utah Ground Snow Load Map

CCHS Field House

Latitude: 40.517
Longitude: -111.870
Elevation: 4,472 ft

Ground Snow Load:
32 psf / 1.55 kPa

*This document is not legally binding. The user is urged to verify ground snow load values with the local authority having jurisdiction.



These ground snow load values represent 50-year ground snow load estimated value at a 2% probability of exceedance for the location given. The grid used in the map is 3350ft by 3350ft. Elevations for these grid cells were estimated by aggregating data from 100ft by 100ft USGS digital elevation models and may not coincide with the actual site elevation. These predictions are calculated using the process outlined in The Utah Snow Load Study.[1]

Final predictions given are bounded at a lower limit for a minimum ground snow load of 21 psf to meet ASCE 7. Estimated values for snow loads at elevations significantly higher than all nearby stations lead to unreasonably high snow load estimates, therefore, the predictions in the map are not allowed to extend beyond the highest 50-year station ground snow load of 429 psf. Elevations over 9,000 ft are also considered less accurate due to the limited number of stations at these elevations. The results shown in this report have included a warning if the results have reached or exceeded the upper limit.

While great efforts have been made to ensure these predictions are as accurate as possible, designers must use expert judgement to ensure that such predictions are appropriate for their particular project. The SEAU and the authors cannot accept responsibility for prediction errors or any consequences resulting therefrom.

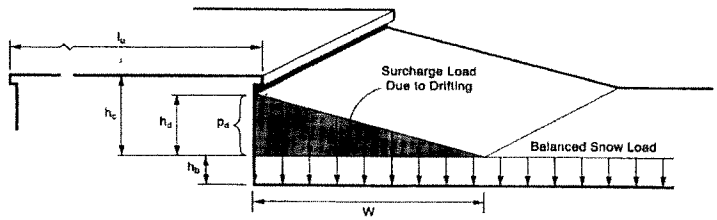
1 Bean, Brennan; Maguire, Marc; and Sun, Yan, "The Utah Snow Load Study" (2018). Civil and Environmental Engineering Faculty Publications. Paper 3589.

CALDER RICHARDS

Snow Drift Analysis

Design per ASCE 7-16 and IBC 2018

Project:							
Date:	8/28/2024						
Ground Snow:	P_g:	**32**	PSF	Flat Roof	P_f:	25	PSF
Importance Factor:	I_s:	**1.1**		Sloped Roof Snow:	P_s:	25	PSF
Thermal Factor:	C_t:	**1.0**		Snow density:	γ:	18.16	PCF
Exposure Factor:	C_e:	**1.0**		Snow base depth:	h_b:	1.36	FT
Slope Factor:	C_s:	**1.0**					



High To Low Roof

L_w = Low Roof Length

L_l = High Roof Length

Parapet

L_w = Roof Length

L_l = 0

Drift Location 1:	**High/Low Roof**				Drift Required?		Yes
Windward Length:	L_w:	**51.0**	FT	Leeward Drift:	h_{dl}:	4.74	FT
Leeward Length:	L_l:	**166.0**	FT	Leeward Drift Max	h_{dlmax}:	30.60	FT
Roof Height Change:	h_r:	**4.3**	FT	Windward Drift:	h_{dw}:	2.01	FT
Effective L_w	L_{we}:	51.00	FT	Windward Drift Max:	h_{dwmax}:	999	FT
Effective L_l	L_{le}:	166.00	FT	Drift Depth:	h_d:	4.74	FT
Clear Height	h_c:	2.98	FT	Actual Drift Depth:	h_d:	**2.98**	FT
Max Drift Pressure:	p_d:	**54.0**	**PSF**	**Drift Width:**	**w:**	**23.8**	**FT**

Drift Location 2:					Drift Required?		No
Windward Length:	L_w:		FT	Leeward Drift:	h_{dl}:	0.00	FT
Leeward Length:	L_l:		FT	Leeward Drift Max	h_{dlmax}:	0.00	FT
Roof Height Change:	h_r:		FT	Windward Drift:	h_{dw}:	0.00	FT
Effective L_w	L_{we}:	0.00	FT	Windward Drift Max:	h_{dwmax}:	0.00	FT
Effective L_l	L_{le}:	0.00	FT	Drift Depth:	h_d:	0.00	FT
Clear Height	h_c:	0.00	FT	Actual Drift Depth:	h_d:	**0.00**	FT
Max Drift Pressure:	p_d:	**0.0**	**PSF**	**Drift Width:**	**w:**	**0.0**	**FT**

Drift Location 3:					Drift Required?		No
Windward Length:	L_w:		FT	Leeward Drift:	h_{dl}:	0.00	FT
Leeward Length:	L_l:		FT	Leeward Drift Max	h_{dlmax}:	0.00	FT
Roof Height Change:	h_r:		FT	Windward Drift:	h_{dw}:	0.00	FT
Effective L_w	L_{we}:	0.00	FT	Windward Drift Max:	h_{dwmax}:	0.00	FT
Effective L_l	L_{le}:	0.00	FT	Drift Depth:	h_d:	0.00	FT
Clear Height	h_c:	0.00	FT	Actual Drift Depth:	h_d:	**0.00**	FT
Max Drift Pressure:	p_d:	**0.0**	**PSF**	**Drift Width:**	**w:**	**0.0**	**FT**

Drift Location 4:					Drift Required?		No
Windward Length:	L_w:		FT	Leeward Drift:	h_{dl}:	0.00	FT
Leeward Length:	L_l:		FT	Leeward Drift Max	h_{dlmax}:	0.00	FT
Roof Height Change:	h_r:		FT	Windward Drift:	h_{dw}:	0.00	FT
Effective L_w	L_{we}:	0.00	FT	Windward Drift Max:	h_{dwmax}:	0.00	FT
Effective L_l	L_{le}:	0.00	FT	Drift Depth:	h_d:	0.00	FT
Clear Height	h_c:	0.00	FT	Actual Drift Depth:	h_d:	**0.00**	FT
Max Drift Pressure:	p_d:	**0.0**	**PSF**	**Drift Width:**	**w:**	**0.0**	**FT**

SECTION BREAK

Loading

SUBSECTION BREAK

Wind Loading

DESCRIPTION/NOTES:

Description details.

This is a beta release of the new ATC Hazards by Location website. Please contact us with feedback.

The ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Hazards by Location

Search Information

Address: 12943 S 700 E, Draper, UT 84020, USA

Coordinates: 40.5169481, -111.870315

Elevation: 4467 ft

Timestamp: 2024-05-16T17:18:16.763Z

Hazard Type: Wind

ASCE 7-16

MRI 10-Year	74 mph
MRI 25-Year	79 mph
MRI 50-Year	84 mph
MRI 100-Year	89 mph
Risk Category I	97 mph
Risk Category II	103 mph
Risk Category III	109 mph
Risk Category IV	113 mph

ASCE 7-10

MRI 10-Year	76 mph
MRI 25-Year	84 mph
MRI 50-Year	90 mph
MRI 100-Year	96 mph
Risk Category I	105 mph
Risk Category II	115 mph
Risk Category III-IV	120 mph

ASCE 7-05

ASCE 7-05 Wind Speed	90 mph

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Please note that the ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

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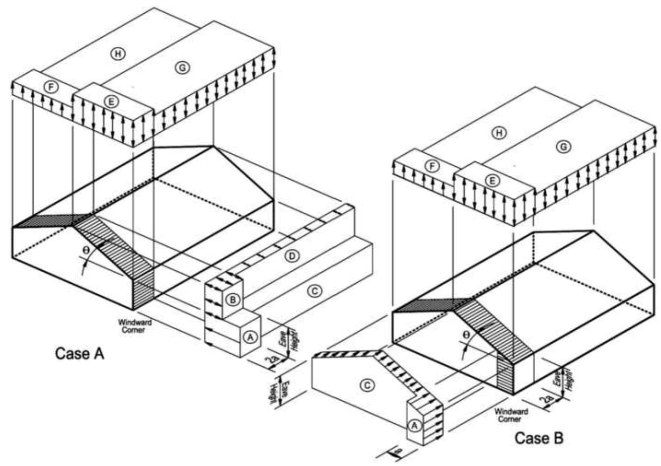
Main Wind Force Resisting System (ASCE 7-16 Chapter 28)

$V := 109\ mph$
$Exp := C$
$K_{zt} := 1.0$
$L := 216\ ft$
$W := 170\ ft$

$$H_{mean} := \frac{39.5\ ft + 33.75\ ft}{2} = 36.6\ ft$$

$$p_{roof} := \frac{0.75}{12} = 0.1$$

$\Omega := atan(p_{roof}) = 3.6\ °$ Roof Pitch



$\Theta := 1.49$

$a_1 := 0.1 \cdot min(L, W) = 17.0\ ft$
$a_2 := 0.4 \cdot H_{mean} = 14.7\ ft$
$a := min(a_1, a_2) = 14.7\ ft$

Horizontal Pressures

$p_{s30.A} := 19.2\ psf$ $\quad p_{s.A} := 0.6 \cdot max(\Theta \cdot p_{s30.A}, 16\ psf) = 17.2\ psf$
$p_{s30.B} := 10\ psf$ $\quad p_{s.B} := 0.6 \cdot max(\Theta \cdot p_{s30.B}, 8\ psf) = 8.9\ psf$
$p_{s30.C} := 12.7\ psf$ $\quad p_{s.C} := 0.6 \cdot max(\Theta \cdot p_{s30.C}, 16\ psf) = 11.4\ psf$
$p_{s30.D} := 5.9\ psf$ $\quad p_{s.D} := 0.6 \cdot max(\Theta \cdot p_{s30.D}, 8\ psf) = 5.3\ psf$

Vertical Pressures

$p_{s30.E} := 23.1\ psf$ $\quad p_{s.E} := 0.6 \cdot \Theta \cdot p_{s30.E} = 20.7\ psf$
$p_{s30.F} := 13.1\ psf$ $\quad p_{s.F} := 0.6 \cdot \Theta \cdot p_{s30.F} = 11.7\ psf$
$p_{s30.G} := 16\ psf$ $\quad p_{s.G} := 0.6 \cdot \Theta \cdot p_{s30.G} = 14.3\ psf$
$p_{s30.H} := 10.1\ psf$ $\quad p_{s.H} := 0.6 \cdot \Theta \cdot p_{s30.H} = 9.0\ psf$

$L_{end} := 2 \cdot a = 29.3\ ft$
$Trib := 24.5\ ft$

Worst Case Frame in the Second Frame from end, half trib of End of Building Case and half of interior

Worst Case Wind Loading on Frame

$$W_{Horz.bottom} := \frac{Trib}{2} \cdot (p_{s.A} + p_{s.C}) = 349.4\ plf$$

$$W_{Horz.top} := \frac{Trib}{2} \cdot (p_{s.B} + p_{s.D}) = 174.1\ plf$$

$$W_{Vert.Right} := \frac{Trib}{2} \cdot (p_{s.E} + p_{s.G}) = 428.2\ plf$$

$$W_{Vert.Left} := \frac{Trib}{2} \cdot (p_{s.F} + p_{s.H}) = 254.1\ plf$$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

CALDER RICHARDS
CONSULTING ENGINEERS

Component & Cladding Wind Loads for
Low-Rise Buildings with heights less than 60'
Design per ASCE 7-16, section 30.4

Project	**CCHS**
Date	**8/28/2024**
Designer	**PSS**

V (mph)	**109**	Basic Wind Speed
Exposure	**C**	B, C, or D
Rf Ht, h (ft)	**35**	Mean Roof Height
Elev (ft)	**4467**	Ground Elevation

Ke	0.85	
Kzt	**1.00**	Topographic Factor per Section 26.8.2 and Figure 26.8-1
Kd	**0.85**	Wind Directionality Factor per Section 26.6 and Table 26.6-1
GCpi	**0.18**	Internal Pressure Coefficient per Table 26.13-1

Exposure	B	C	D
alpha	7.0	9.5	11.5
zg	1200	900	700
Kz @ h	0.73	1.01	1.19
Kz min	0.70	0.85	1.03
qh	16.10	22.32	26.26

q_h = 0.00256 * Kz * Kzt * Kd * Ke* V^2

Windward pressure			
$p = qh(GC_p) - qh(-GC_{pi})$			
Typical and Corner Areas			
p (psf)	p (psf)	area (ft^2)	GCp
15.80	26.34	0	**1.00**
15.80	26.34	10	**1.00**
15.13	25.22	20	0.95
14.73	24.55	30	0.92
14.47	24.11	40	0.90
14.20	23.66	50	0.88
14.06	23.44	60	0.87
13.93	23.21	70	0.86
13.79	22.99	80	0.85
13.66	22.77	90	0.84
13.52	22.54	100	0.83
13.12	21.87	150	0.80
12.86	21.43	200	0.78
11.78	19.64	500	**0.70**
11.78	19.64	1000	**0.70**
ASD	**LRFD**		

Leeward pressure			
$p = qh(GC_p) - qh(-GC_{pi})$			
Typical Areas			
p (psf)	p (psf)	area (ft^2)	GCp
-17.14	-28.57	0	**-1.10**
-17.14	-28.57	10	**-1.10**
-16.47	-27.45	20	-1.05
-16.07	-26.78	30	-1.02
-15.80	-26.34	40	-1.00
-15.53	-25.89	50	-0.98
-15.40	-25.67	60	-0.97
-15.26	-25.44	70	-0.96
-15.13	-25.22	80	-0.95
-15.00	-25.00	90	-0.94
-14.86	-24.77	100	-0.93
-14.47	-24.11	150	-0.90
-14.20	-23.66	200	-0.88
-13.12	-21.87	500	**-0.80**
-13.12	-21.87	1000	**-0.80**
ASD	**LRFD**		

Leeward pressure			
$p = qh(GC_p) - qh(-GC_{pi})$			
Corner Areas			
p (psf)	p (psf)	area (ft^2)	GCp
-21.16	-35.26	0	**-1.40**
-21.16	-35.26	10	**-1.40**
-19.82	-33.03	20	-1.30
-19.01	-31.69	30	-1.24
-18.35	-30.58	40	-1.19
-17.95	-29.91	50	-1.16
-17.54	-29.24	60	-1.13
-17.27	-28.79	70	-1.11
-17.01	-28.35	80	-1.09
-16.74	-27.90	90	-1.07
-16.47	-27.45	100	-1.05
-15.67	-26.11	150	-0.99
-15.13	-25.22	200	-0.95
-13.12	-21.87	500	**-0.80**
-13.12	-21.87	1000	**-0.80**
ASD	**LRFD**		

Notes:
Values for GCp in bold were taken directly from Figure 30.3-1 of ASCE 7-16. The other values have been interpolated.

SECTION BREAK

Loading

SUBSECTION BREAK

Seismic Loading

DESCRIPTION/NOTES:

Description details.

This is a beta release of the new ATC Hazards by Location website. Please contact us with feedback.

The ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Hazards by Location

Search Information

Address:	12943 S 700 E, Draper, UT 84020, USA
Coordinates:	40.5169481, -111.870315
Elevation:	4467 ft
Timestamp:	2024-05-16T17:27:24.250Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	III
Site Class:	D

Basic Parameters

Name	Value	Description
S_S	1.484	MCE_R ground motion (period=0.2s)
S_1	0.549	MCE_R ground motion (period=1.0s)
S_{MS}	1.484	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	0.989	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.857	Coefficient of risk (0.2s)
CR_1	0.862	Coefficient of risk (1.0s)
PGA	0.677	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.745	Site modified peak ground acceleration
T_L	8	Long-period transition period (s)
SsRT	1.484	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.731	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.962	Factored deterministic acceleration value (0.2s)
S1RT	0.549	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.636	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.205	Factored deterministic acceleration value (1.0s)
PGAd	1.203	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Please note that the ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

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SECTION BREAK

Loading

SUBSECTION BREAK

Mezzanine 3D Modeling Loading

DESCRIPTION/NOTES:

Description details.

SECTION BREAK

Loading

SUBSECTION BREAK

Ram Loading Phase 1

DESCRIPTION/NOTES:

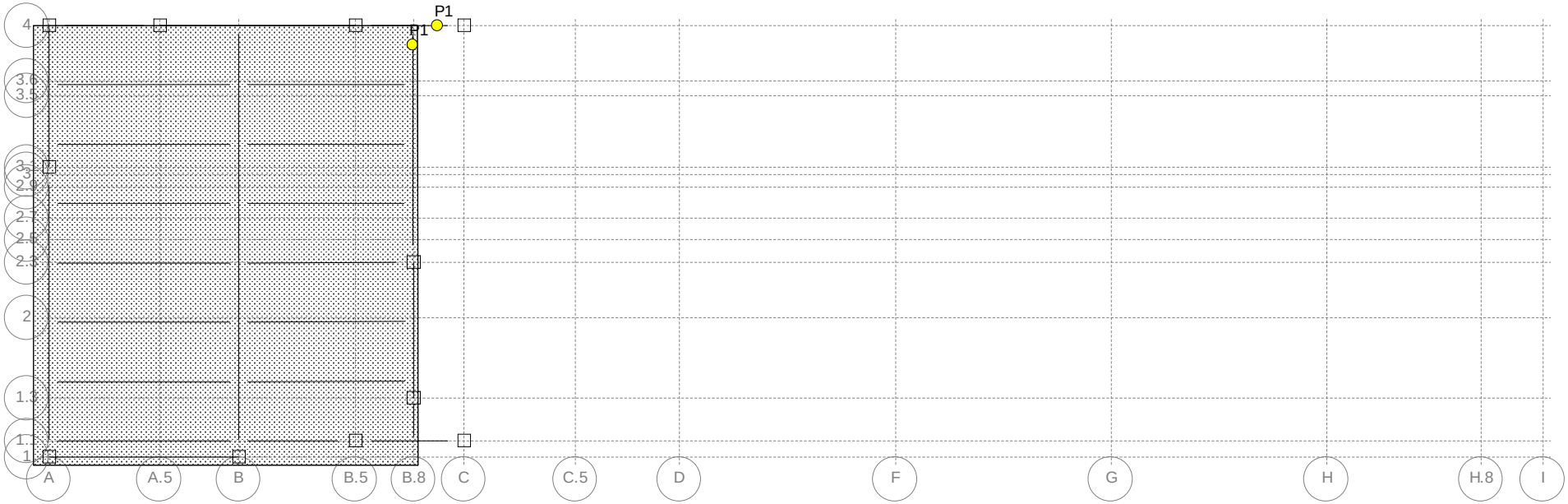
Description details.

Floor Map

RAM Steel 24.00.00.160
CCHS Field House Mezz
DataBase: (9-10-24) CCHS Field House Mezz Phase 1
Building Code: IBC

10/04/24 08:31:38
Steel Code: AISC360-16 LRFD

Floor Type: First



Floor Map

Surface Loads

	Label	DL psf	CDL psf	LLReduction psf	Type	PLL psf	CLL psf	Mass DL psf
	Assembly	65.0	58.4	100.0	Unreducible	0.0	20.0	75.0

Point Loads

	Label	DL kips	CDL kips	LLReduction kips	Type	PLL kips	CLL kips	Mass DL kips
P1	Stair Loading	0.500	0.500	0.720	Unreducible	0.000	20.000	0.500

SECTION BREAK

Loading

SUBSECTION BREAK

Ram Loading Phase 2

DESCRIPTION/NOTES:

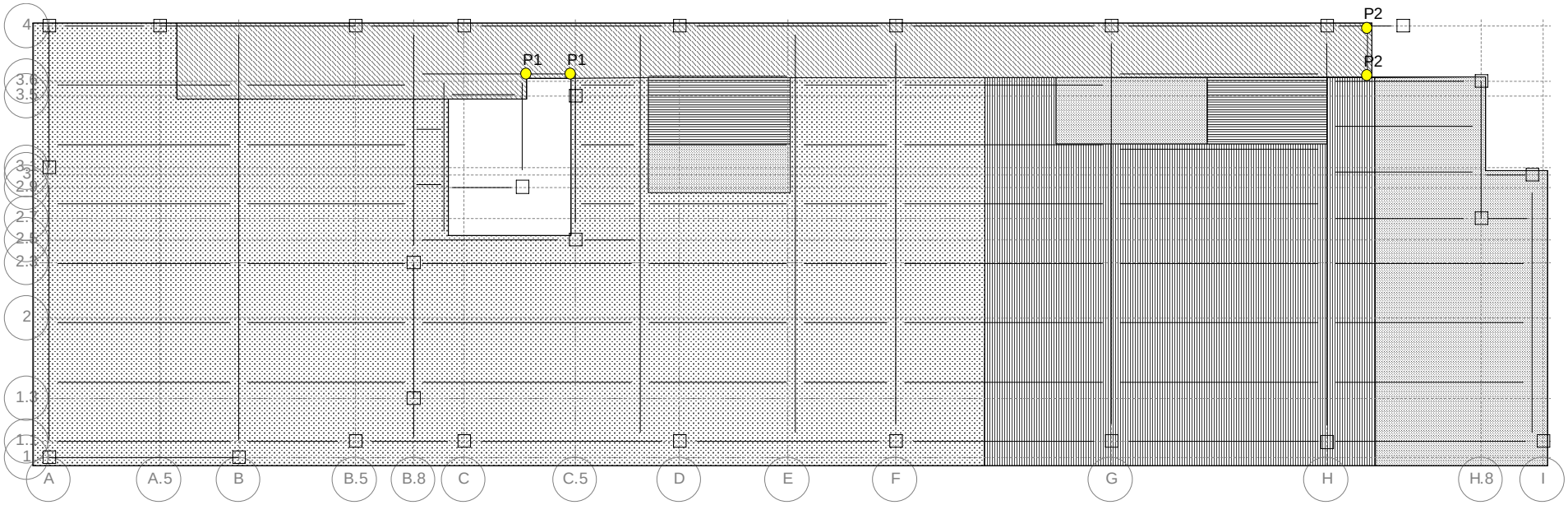
Description details.

Floor Map

RAM Steel 24.00.00.160
CCHS Field House Mezz
DataBase: (9-10-24) CCHS Field House Mezz Phase 2
Building Code: IBC

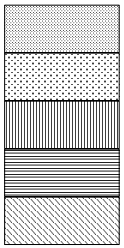
09/11/24 12:57:16
Steel Code: AISC360-16 LRFD

Floor Type: First



Floor Map

Surface Loads



Label	DL psf	CDL psf	LLReduction psf	Type	PLL psf	CLL psf	Mass DL psf
Light Storage	65.0	58.4	125.0	Storage	0.0	20.0	96.2
Assembly	65.0	58.4	100.0	Unreducible	0.0	20.0	75.0
Office	65.0	58.4	50.0	Reducible	15.0	20.0	80.0
Restroom	90.0	58.4	60.0	Reducible	15.0	20.0	105.0
Cooridors	65.0	58.4	80.0	Reducible	0.0	20.0	75.0

Point Loads

	Label	DL kips	CDL kips	LLReduction kips	Type	PLL kips	CLL kips	Mass DL kips
P1	Stair (Grid C.5)	1.040	1.040	1.600	Reducible	0.000	0.320	1.040
P2	Stair (Grid H.5)	1.200	1.200	1.710	Reducible	0.000	0.340	1.200

SECTION BREAK

Gravity

SUBSECTION BREAK

Decking

DESCRIPTION/NOTES:

Description details.

20 ga W2-36 FormLok® Grade 50 Composite Deck-Slab (ASD)

5 in. Total Slab Depth, f'c = 4000 psi, 150 pcf NWC

3/4" Visible Dia. Arc Spot Weld Connections to Supports
36 / 4 Perpendicular Connection Pattern to Supports
Button Punch Sidelap Connections

A992 GR50 Support member or equivalent
0.25 ≤ Support Thickness (in.)

Allowable Diaphragm Shear Strength Sn/Ω, plf

Sidelap Connection Spacing (in.)	Span								
	6'-0"	7'-0"	8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	13'-0"	14'-0"
4	2510	2479	2455	2437	2423	2411	2401	2393	2386
6	2479	2448	2425	2407	2392	2380	2370	2362	2355
8	2464	2435	2409	2393	2377	2366	2355	2348	2339
12	2448	2417	2394	2376	2361	2349	2340	2331	2324
18	2438	2408	2386	2365	2352	2341	2329	2322	2315
24	2433	2404	2378	2362	2346	2335	2324	2317	2309
36	2428	2400	2375	2355	2343	2330	2319	2312	2304

Dipahragm Shear Stifness, G', kip/in.

Sidelap Connection Spacing (in.)	Span								
	6'-0"	7'-0"	8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	13'-0"	14'-0"
4	3765	3761	3757	3754	3751	3749	3747	3745	3744
6	3756	3751	3746	3742	3738	3735	3732	3729	3727
8	3751	3745	3739	3735	3729	3726	3722	3720	3716
12	3744	3737	3730	3724	3719	3714	3710	3706	3702
18	3740	3732	3725	3717	3711	3707	3700	3696	3693
24	3737	3729	3720	3714	3706	3701	3694	3691	3685
36	3734	3727	3717	3708	3703	3695	3688	3685	3679

Average Connection Spacing to Supports at all Parallel and Perpendicular Chords & Collectors (in.)

Sidelap Connection Spacing (in.)	Span								
	6'-0"	7'-0"	8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	13'-0"	14'-0"
4	4	4	4	4	4	5	5	5	5
6	4	4	4	5	5	5	5	5	5
8	4	4	5	5	5	5	5	5	5
12	4	5	5	5	5	5	5	5	5
18	4	5	5	5	5	5	5	5	5
24	4	5	5	5	5	5	5	5	5
36	4	5	5	5	5	5	5	5	5

Tables generated using calculator V2.1 based on AISI S310-16. Date: 9/11/2024

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W2-36 FormLok® Composite Steel Deck-Slab (ASD)

with 5 in. 150 pcf 4000 psi NWC

Maximum Unshored Span

Gage	1 Span	2 Span	3 Span
22	7'-1"	8'-2"	8'-5"
21	7'-9"	8'-9"	9'-1"
20	8'-5"	9'-4"	9'-8"
19	9'-3"	10'-5"	10'-9"
18	9'-7"	11'-2"	11'-7"
16	10'-4"	12'-10"	12'-4"

Maximum Unshored Span based on:

Construction Live Load w/ Concrete	20.00	psf			
Constructio	50.00	psf	Minimum end bearing	3.00	in.
Concentrated Construction Load	150.00	plf	Minimum interior bearing	5.50	in.
Concrete Ponding Allowance	3.00	psf	Maximum Deflection L/	180	≤ 0.75 in.
Concrete Volume	1.23	yd^3 / 100 ft^2 (Note: Does not include allowance for ponding)			

Composite Steel Deck Properties (steel deck only)

Gage	F_y ksi	w_{dd} psf	S_e^+ $in.^3/ft$	S_e^- $in.^3/ft$	I_d^+ $in.^4/ft$	I_d^- $in.^4/ft$	V_n/Ω kip/ft
22	50	1.80	0.246	0.256	0.341	0.339	1.699
21	50	2.00	0.283	0.294	0.381	0.379	2.056
20	50	2.10	0.323	0.333	0.422	0.419	2.444
19	50	2.40	0.405	0.415	0.503	0.499	2.885
18	50	2.70	0.471	0.481	0.564	0.562	3.224
16	50	3.30	0.623	0.638	0.708	0.708	4.034

Superimposed Allowable Load, Wn/Ω, Limited by L/360, psf [1]

Gage	8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	13'-0"	14'-0"	15'-0"	16'-0"
22	348	264	204	159	126	99	78	62	48
21	384	293	227	179	142	113	90	72	57
20	419	320	249	197	157	126	101	82	65
19	488	375	294	233	188	152	124	101	82
18	544	419	329	263	212	173	142	117	96
16	674	521	412	331	270	222	180	146	120

Notes: [1] For high loads, long term concrete creep should be considered.

Composite Steel Deck-Slab Properties							Min. Temperature & Shrinkage	
Gage	w_1 psf	Ic $in.^4/ft$	Iu $in.^4/ft$	Id [1] $in.^4/ft$	Mno/Ω kip-ft/ft	Vno/Ω kip/ft	As min [2] $in.^2/ft$	or Dramix® Steel Fiber 4D 65/60BG, lbs/cy
22	51.8	4.82	13.18	9.00	3.20	3.92	0.028	15
21	52.0	5.19	13.35	9.27	3.49	4.25	0.028	15
20	52.1	5.54	13.52	9.53	3.77	4.61	0.028	15
19	52.4	6.21	13.85	10.03	4.33	4.74	0.028	15
18	52.7	6.74	14.11	10.42	4.78	4.74	0.028	15
16	53.3	7.91	14.73	11.32	5.82	4.74	0.028	15

Notes: [1] Id = (Ic + Iu)/2

[2] Minimum area of steel for temperature and shrinkage

Composite Deck-Slab V4.0 is based on:

ANSI/SDI C-2017, IAPMO UES ER-2018, and IAPMO UES ER-0423

Date: 9/3/2024

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SECTION BREAK

Gravity

SUBSECTION BREAK

Steel Beams (Phase 1)

DESCRIPTION/NOTES:

Description details.

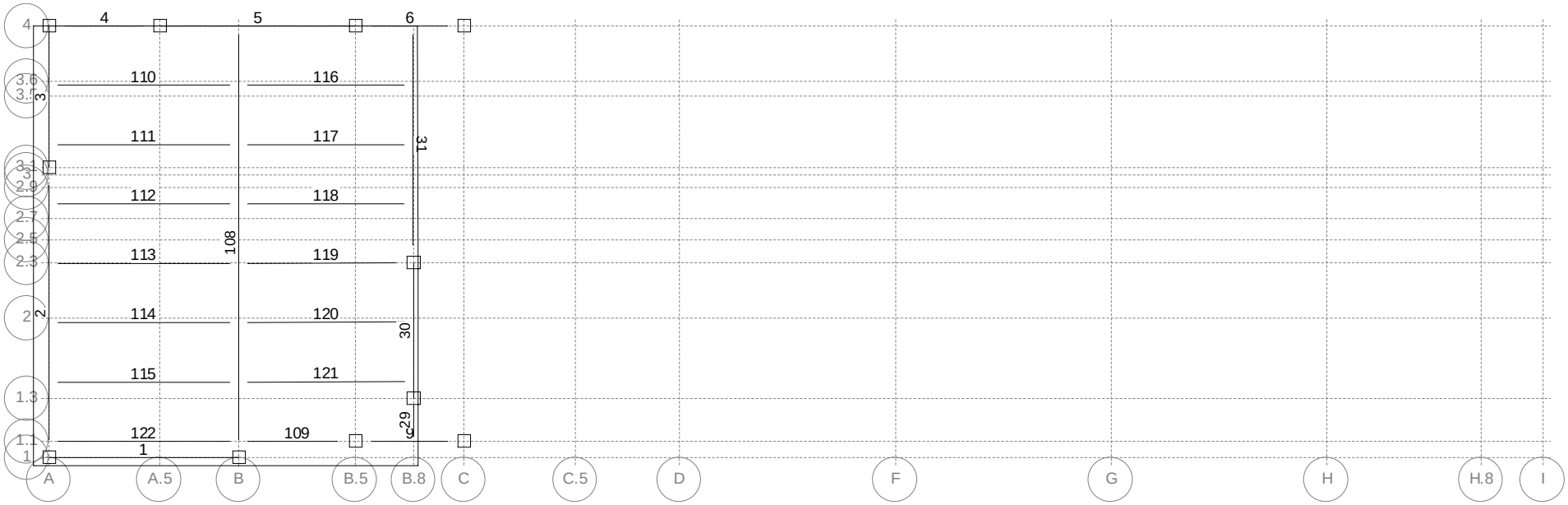
Floor Map

RAM Steel 24.00.00.160
CCHS Field House Mezz
DataBase: CCHS Field House Mezz Phase 1
Building Code: IBC

08/30/24 14:30:42
Steel Code: AISC360-16 LRFD

Floor Type: First

Beam Numbers



Design Warnings

RAM Steel 24.00.00.160
CCHS Field House Mezz
DataBase: (9-10-24) CCHS Field House Mezz Phase 1

10/04/24 08:31:38

STEEL BEAM DESIGN SUMMARY:

Demand/Capacity Limits for: Strength: 0.900 Deflection: 0.950

Floor Type: First

Beam #	Length ft	+Mu kip-ft	-Mu kip-ft	ΦMn kip-ft	Fy ksi	Beam Size		Studs
2	32.77	404.7	0.0	2037.9	50.0	W33X118	u	37
4	12.56	15.8	0.0	249.9	50.0	W16X26	u	14
6	12.29	92.5	0.0	502.5	50.0	W24X55	u	
9	12.29	17.7	0.0	165.8	50.0	W16X26	u	
29	4.88	0.4	0.0	254.5	50.0	W16X26	u	14
31	26.75	222.6	0.0	686.7	50.0	W24X55	u	16
108	48.81	1442.8	0.0	2355.2	50.0	W33X118	u	80
109	13.18	31.4	0.0	247.0	50.0	W16X26	u	14
110	21.44	91.7	0.0	258.4	50.0	W16X26	u	14
111	21.44	91.7	0.0	258.4	50.0	W16X26	u	14
112	21.44	91.7	0.0	258.4	50.0	W16X26	u	14
113	21.44	91.7	0.0	258.4	50.0	W16X26	u	14
114	21.44	91.7	0.0	258.4	50.0	W16X26	u	14
115	21.44	91.7	0.0	258.4	50.0	W16X26	u	14
116	19.72	77.6	0.0	258.1	50.0	W16X26	u	14
117	19.72	77.4	0.0	258.1	50.0	W16X26	u	14
118	19.73	77.4	0.0	258.2	50.0	W16X26	u	14
119	19.73	77.6	0.0	258.2	50.0	W16X26	u	14
120	19.73	77.7	0.0	258.2	50.0	W16X26	u	14
121	19.73	77.9	0.0	258.2	50.0	W16X26	u	14
122	21.44	58.5	0.0	257.2	50.0	W16X26	u	14

* after Size denotes beam failed stress/capacity criteria.
\# after Size denotes beam failed deflection criteria.
u after Size denotes this size has been assigned by the User.

SECTION BREAK

Gravity

SUBSECTION BREAK

Steel Beams (Phase 2)

DESCRIPTION/NOTES:

Description details.

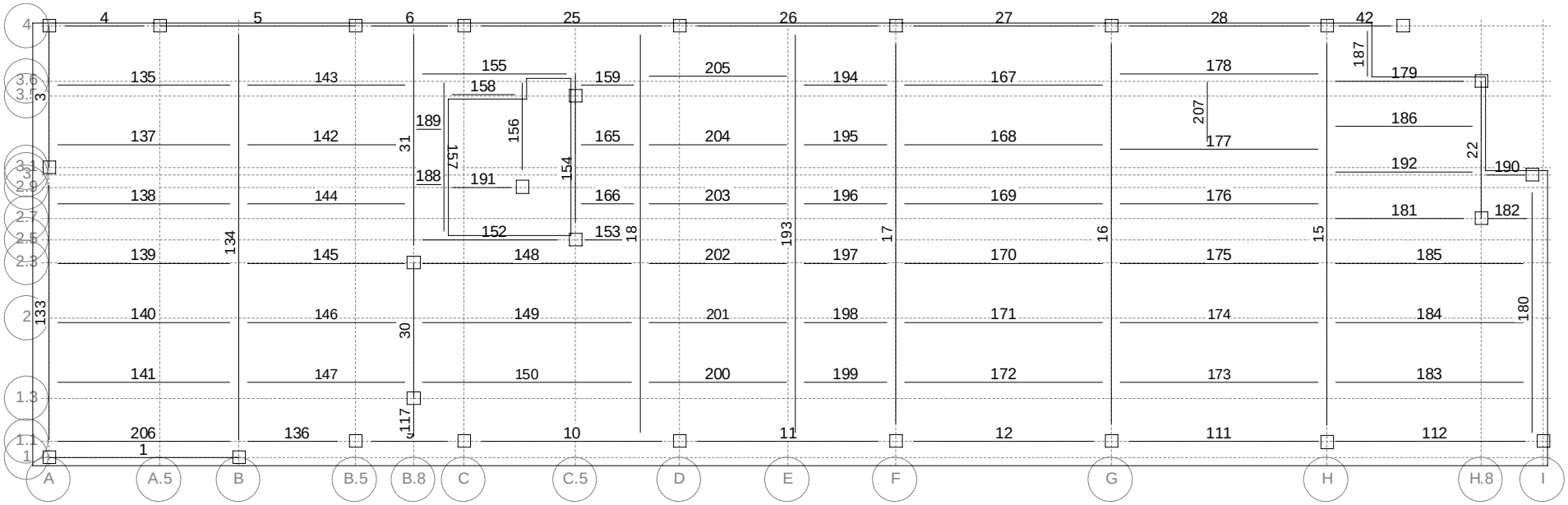
Floor Map

RAM Steel 24.00.00.160
CCHS Field House Mezz
DataBase: (9-10-24) CCHS Field House Mezz Phase 2
Building Code: IBC

09/11/24 12:57:16
Steel Code: AISC360-16 LRFD

Floor Type: First

Beam Numbers



Beam Summary

STEEL BEAM DESIGN SUMMARY:

Demand/Capacity Limits for: Strength: 0.900 Deflection: 0.950

Floor Type: First

Beam #	Length ft	+Mu kip-ft	-Mu kip-ft	ΦMn kip-ft	Fy ksi	Beam Size		Studs
4	12.56	17.3	0.0	165.8	50.0	W16X26	u	
6	12.29	125.8	0.0	502.5	50.0	W24X55	u	
9	12.29	27.7	0.0	165.8	50.0	W16X26	u	
10	24.33	388.3	0.0	1556.2	50.0	W33X118	u	
11	24.37	529.0	0.0	1556.2	50.0	W33X118	u	
12	24.36	91.8	0.0	165.8	50.0	W16X26	u	
15	47.06	1136.0	0.0	1556.2	50.0	W33X118	u	
16	46.96	1123.8	0.0	2333.3	50.0	W33X118	u	80
17	46.96	1083.2	0.0	2332.6	50.0	W33X118	u	80
18	46.96	1088.7	0.0	2323.6	50.0	W33X118	u	80
25	24.33	289.0	0.0	1556.2	50.0	W33X118	u	
26	24.37	474.0	0.0	1556.2	50.0	W33X118	u	
27	24.36	56.0	0.0	165.8	50.0	W16X26	u	
28	24.34	46.8	0.0	165.8	50.0	W16X26	u	
31	26.75	281.2	0.0	688.4	50.0	W24X55	u	16
42	8.53	13.5	0.0	165.8	50.0	W16X26	u	
111	24.34	82.9	0.0	165.8	50.0	W16X26	u	
112	24.36	148.7	0.0	294.0	50.0	W18X40	u	
117	4.88	0.0	0.0	165.8	50.0	W16X26	u	
133	32.77	405.5	0.0	1556.2	50.0	W33X118	u	
134	48.81	1435.6	0.0	2355.2	50.0	W33X118	u	80
135	21.44	89.9	0.0	248.1	50.0	W16X26	u	14
136	13.18	31.4	0.0	165.8	50.0	W16X26	u	
137	21.44	91.7	0.0	258.4	50.0	W16X26	u	14
138	21.44	91.7	0.0	258.4	50.0	W16X26	u	14
139	21.44	91.7	0.0	258.4	50.0	W16X26	u	14
140	21.44	91.7	0.0	258.4	50.0	W16X26	u	14
141	21.44	91.7	0.0	258.4	50.0	W16X26	u	14
142	19.73	77.4	0.0	258.2	50.0	W16X26	u	14
143	19.73	70.4	0.0	258.2	50.0	W16X26	u	14
144	19.73	77.7	0.0	258.2	50.0	W16X26	u	14
145	19.73	77.7	0.0	258.2	50.0	W16X26	u	14
146	19.73	77.7	0.0	258.2	50.0	W16X26	u	14

147	19.73	77.7	0.0	258.2	50.0	W16X26	u	14
148	25.60	91.5	0.0	293.9	50.0	W16X26	u	24
149	25.60	130.8	0.0	296.4	50.0	W16X26	u	24
150	25.60	130.8	0.0	296.4	50.0	W16X26	u	24
152	18.26	27.9	0.0	223.1	50.0	W16X26	u	12
153	7.34	5.4	0.0	242.7	50.0	W16X26	u	14
154	16.20	21.4	-45.4	141.8	50.0	W16X26	u	
	2.54	0.0	-45.4					
155	18.26	57.5	0.0	150.7	50.0	W12X19	u	12
156	12.81	3.1	0.0	68.2	50.0	W12X19	u	
157	18.74	23.0	0.0	150.1	50.0	W12X19	u	10
158	8.84	3.3	0.0	92.6	50.0	W12X19	u	
159	7.34	10.2	0.0	242.7	50.0	W16X26	u	14
165	7.34	10.7	0.0	242.7	50.0	W16X26	u	14
166	7.34	8.6	0.0	242.7	50.0	W16X26	u	14
167	24.36	104.6	0.0	248.4	50.0	W16X26	u	14
168	24.36	103.0	0.0	248.4	50.0	W16X26	u	14
169	24.36	100.2	0.0	248.4	50.0	W16X26	u	14
170	24.36	100.2	0.0	248.4	50.0	W16X26	u	14
171	24.36	100.1	0.0	248.4	50.0	W16X26	u	14
172	24.36	100.1	0.0	248.4	50.0	W16X26	u	14
173	24.34	90.4	0.0	258.7	50.0	W16X26	u	14
174	24.34	90.5	0.0	258.7	50.0	W16X26	u	14
175	24.34	90.5	0.0	258.7	50.0	W16X26	u	14
176	24.34	86.8	0.0	258.7	50.0	W16X26	u	14
177	24.34	116.5	0.0	248.4	50.0	W16X26	u	14
178	24.34	118.2	0.0	248.3	50.0	W16X26	u	14
179	17.41	42.7	0.0	235.6	50.0	W16X26	u	14
180	30.08	380.1	0.0	490.2	50.0	W18X40	u	32
181	17.41	50.7	0.0	247.7	50.0	W16X26	u	14
182	5.75	5.7	0.0	165.8	50.0	W16X26	u	
183	23.16	120.1	0.0	248.3	50.0	W16X26	u	14
184	23.16	120.2	0.0	248.3	50.0	W16X26	u	14
185	23.16	105.7	0.0	248.2	50.0	W16X26	u	14
186	17.41	50.3	0.0	247.7	50.0	W16X26	u	14
187	6.29	2.8	0.0	79.3	50.0	W12X19	u	
188	3.49	2.3	0.0	92.6	50.0	W12X19	u	
189	3.49	2.2	0.0	92.6	50.0	W12X19	u	
190	5.75	3.4	0.0	340.0	50.0	W18X40	u	6

Beam Summary

191	8.83	0.0	0.0	92.6	50.0	W12X19	u	
192	17.41	51.1	0.0	247.7	50.0	W16X26	u	14
193	46.96	934.4	0.0	2332.6	50.0	W33X118	u	80
194	11.35	24.4	0.0	250.5	50.0	W16X26	u	14
195	11.35	25.7	0.0	250.5	50.0	W16X26	u	14
196	11.35	25.7	0.0	250.5	50.0	W16X26	u	14
197	11.35	25.7	0.0	250.5	50.0	W16X26	u	14
198	11.35	25.7	0.0	250.5	50.0	W16X26	u	14
199	11.35	25.7	0.0	250.5	50.0	W16X26	u	14
200	17.50	61.1	0.0	257.8	50.0	W16X26	u	14
201	17.50	61.1	0.0	257.8	50.0	W16X26	u	14
202	17.50	61.1	0.0	257.8	50.0	W16X26	u	14
203	17.50	64.4	0.0	257.8	50.0	W16X26	u	14
204	17.50	68.6	0.0	257.8	50.0	W16X26	u	14
205	17.50	56.0	0.0	257.8	50.0	W16X26	u	14
206	21.44	58.5	0.0	165.8	50.0	W16X26	u	
207	8.50	0.0	0.0	165.8	50.0	W16X26	u	

* after Size denotes beam failed stress/capacity criteria.
# after Size denotes beam failed deflection criteria.
u after Size denotes this size has been assigned by the User.

SECTION BREAK

Gravity

SUBSECTION BREAK

Steel Beams (Vibration)

DESCRIPTION/NOTES:

Description details.

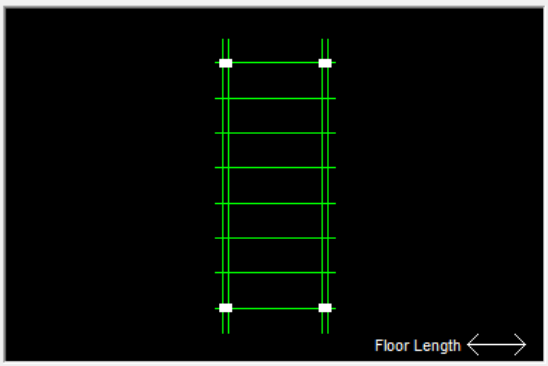
CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	INITIALS	DATE
	SUBJECT	Beam Vibration	CHECKED		SHEET

Input Data

Project ID: CCHS Field House Mezz
Project #:
Bay ID: 1-First: Mdl Beam Grid B-B.8
By:
USC Units

Girder Span: 49.00 ft
Beam/Joist Spans:
Left: 21.44 ft
Center: 19.73 ft
Right: 30.10 ft

Evaluate
Report
Print
Advice



Criterion: Walking
Occupancy: Church/Assembly Area
Acceleration Limit: 0.50 % of g

Girders/Walls:
Left: W33X118
Right: W24X55
Beam/Joist: W16X26
7 spaces at 84.000 in

Damping Ratio: 0.020
Loadings:
Dead: 4.00 psf
Live: 2.00 psf
Collateral: 0.00 psf

Floor Width: 49.00 ft
Floor Length: 167.00 ft

☐ Joist Extended Bottom Chords
☐ Girder Continuity ☐ Stiff. Joist Seats

Concrete:
Total Depth: 5.000 in
f'c: 4.00 ksi
Weight: 150 pcf
Deck Height: 2.000 in

☐ Mezzanine
☐ Beam Parallel to Open Side
☐ Left Girder Parallel to Open Side
☐ Right Girder Parallel to Open Side

◉ Summary Report/Printout
○ Complete Report/Printout

Evaluation:
Combined Mode a_p/g= 0.458 % <= 0.50 %
The system SATISFIES THE CRITERION.

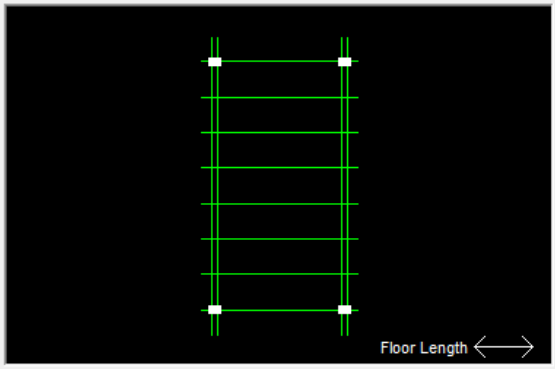
Beam Frequency	17.00 Hz
Left Girder Frequency	5.83 Hz
Right Girder Frequency	2.92 Hz
Bay Frequency	2.87 Hz

Input Data

Project ID: CCHS Field House Mezz
Project #:
Bay ID: Middle Beam BT Grid F-G
By:
USC Units

Girder Span: 47.00 ft
Beam/Joist Spans:
Left: 24.33 ft
Center: 24.33 ft
Right: 24.33 ft

Evaluate
Report
Print
Advice



Criterion: Walking
Occupancy: Church/Assembly Area
Acceleration Limit: 0.50 % of g

Girders/Walls:
Left: W33X118
Right: W33X118
Beam/Joist: W16X26
7 spaces at 80.571 in

Damping Ratio: 0.020
Loadings:
Dead: 4.00 psf
Live: 2.00 psf
Collateral: 0.00 psf

Floor Width: 47.00 ft
Floor Length: 169.00 ft

☐ Joist Extended Bottom Chords
☐ Girder Continuity ☐ Stiff. Joist Seats

Concrete:
Total Depth: 5.000 in
f'c: 4.00 ksi
Weight: 150 pcf
Deck Height: 2.000 in

☐ Mezzanine
☐ Beam Parallel to Open Side
☐ Left Girder Parallel to Open Side
☐ Right Girder Parallel to Open Side

◉ Summary Report/Printout
○ Complete Report/Printout

Evaluation:
Combined Mode a_p/g= 0.329 % <= 0.50 %
The system SATISFIES THE CRITERION.

Beam Frequency	11.36 Hz
Left Girder Frequency	5.84 Hz
Right Girder Frequency	5.84 Hz
Bay Frequency	5.19 Hz

SECTION BREAK

Gravity

SUBSECTION BREAK

Steel Columns (Phase 1)

DESCRIPTION/NOTES:

Description details.

Gravity Column Design Summary

RAM Steel 24.00.00.160
CCHS Field House Mezz
DataBase: (9-10-24) CCHS Field House Mezz Phase 1
Building Code: IBC

10/04/24 08:56:32
Steel Code: AISC360-16 LRFD

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

Column Line B.5-1.1

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	16.8	-0.4	0.0	1	0.34 Eq H1-1a	0.0	50 HSS4X4X1/4

Column Line C-1.1

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	2.7	0.0	0.0	1	0.05 Eq Axial	0.0	50 HSS7X5X1/2

Column Line C-4

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	16.9	-2.8	0.0	1	0.32 Eq H1-1a	0.0	50 HSS7X5X1/2

Gravity Column Design

Story level First, Column Line B.5-1.1, Column # 3

Fy (ksi)	=	50.00	Column Size	=	HSS4X4X1/4
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	4.60	7.07	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	16.83	0.90Pnx (kip)	=	52.07	Pu/0.90Pnx	=	0.323
			0.90Pny (kip)	=	52.07	Pu/0.90Pny	=	0.323
			0.90Pn (kip)	=	52.07	Pu/0.90Pn	=	0.323

DEMAND/CAPACITY LIMIT FOR STRENGTH : 0.900

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		4.60	7.07	0.00
Moments	TopMx (kip-ft)	-0.11	-0.17	0.00
	My (kip-ft)	0.00	0.00	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	16.83	0.90*Pn (kip)	=	52.07
Mux (kip-ft)	=	-0.40	0.90*Mnx (kip-ft)	=	17.59
Muy (kip-ft)	=	0.00	0.90*Mny (kip-ft)	=	17.59
Rm	=	1.00			
Cbx	=	1.67	Cby	=	1.00
Cmx	=	0.60	Cmy	=	1.00
Pex (kip)	=	65.97	Pey (kip)	=	65.97

B1x	=	1.00	B1y	=	1.34

INTERACTION EQUATION

Pu/0.90*Pn = 0.323

Eq H1-1a: 0.323 + 8/9(0.023 + 0.000) = 0.343

Gravity Column Design

Story level First, Column Line C-1.1, Column # 4

Fy (ksi)	=	50.00	Column Size	=	HSS7X5X1/2
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	2
Braced Against Joint Translation		Yes	No
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	0.74	1.15	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	2.73	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.009
			0.90Pny (kip)	=	59.41	Pu/0.90Pny	=	0.046
			0.90Pn (kip)	=	59.41	Pu/0.90Pn	=	0.046

DEMAND/CAPACITY LIMIT FOR STRENGTH : 0.900

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		0.74	1.15	0.00
Moments	TopMx (kip-ft)	-0.12	-0.19	0.00
	My (kip-ft)	0.00	0.00	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	2.73	0.90*Pn (kip)	=	59.41
Mux (kip-ft)	=	-0.45	0.90*Mnx (kip-ft)	=	82.09
Muy (kip-ft)	=	0.00	0.90*Mny (kip-ft)	=	64.88
Rm	=	1.00			
Cbx	=	1.00	Cby	=	1.00
Cmx	=	0.60	Cmy	=	1.00
Pex (kip)	=	512.54	Pey (kip)	=	75.27

B1x	=	1.00	B1y	=	1.04

INTERACTION EQUATION

Pu/0.90*Pn = 0.046

Eq H1-1b: 0.023 + 0.006 + 0.000 = 0.028

Gravity Column Design

Story level First, Column Line C-4, Column # 15

Fy (ksi)	=	50.00	Column Size	=	HSS7X5X1/2
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	2
Braced Against Joint Translation		Yes	No
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	4.65	7.09	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	16.93	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.057
			0.90Pny (kip)	=	59.41	Pu/0.90Pny	=	0.285
			0.90Pn (kip)	=	59.41	Pu/0.90Pn	=	0.285

DEMAND/CAPACITY LIMIT FOR STRENGTH : 0.900

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		4.65	7.09	0.00
Moments	TopMx (kip-ft)	-0.77	-1.18	0.00
	My (kip-ft)	0.00	0.00	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	16.93	0.90*Pn (kip)	=	59.41
Mux (kip-ft)	=	-2.82	0.90*Mnx (kip-ft)	=	82.09
Muy (kip-ft)	=	0.00	0.90*Mny (kip-ft)	=	64.88
Rm	=	1.00			
Cbx	=	1.00	Cby	=	1.00
Cmx	=	0.60	Cmy	=	1.00
Pex (kip)	=	512.54	Pey (kip)	=	75.27

B1x	=	1.00	B1y	=	1.29

INTERACTION EQUATION

Pu/0.90*Pn = 0.285

Eq H1-1a: 0.285 + 8/9(0.034 + 0.000) = 0.315

SECTION BREAK

Gravity

SUBSECTION BREAK

Steel Columns (Phase 2)

DESCRIPTION/NOTES:

Description details.

Gravity Column Design Summary

RAM Steel 24.00.00.160
CCHS Field House Mezz
DataBase: (9-10-24) CCHS Field House Mezz Phase 2
Building Code: IBC

10/04/24 10:28:13
Steel Code: AISC360-16 LRFD

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

Column Line B.5-1.1

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	18.8	-0.1	0.0	1	0.37 Eq H1-1a	0.0	50 HSS4X4X1/4

Column Line C-1.1

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	43.7	0.0	0.0	1	0.20 Eq Axial	0.0	50 HSS7X5X1/2

Column Line C-4

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	45.3	-0.5	0.0	1	0.21 Eq H1-1a	0.0	50 HSS7X5X1/2

Column Line 53.49ft-30.58ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	0.5	0.0	0.0	1	0.01 Eq Axial	0.0	50 HSS4X4X1/4

Column Line C.5-2.5

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	13.6	-0.3	-0.9	1	0.32 Eq H1-1a	0.0	50 HSS4X4X1/4

Column Line C.5-3.5

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	29.9	0.0	0.0	1	0.57 Eq Axial	0.0	50 HSS4X4X1/4

Column Line D-1.1

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	140.8	-6.7	0.0	1	0.70 Eq H1-1a	0.0	50 HSS7X5X1/2

Column Line D-4

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	103.2	-4.1	0.0	1	0.51 Eq H1-1a	0.0	50 HSS7X5X1/2

Column Line F-1.1

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	152.6	-6.4	-16.4	1	0.98 Eq H1-1a	0.0	50 HSS7X5X1/2

Column Line F-4

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	129.3	-5.9	13.6	1	0.83 Eq H1-1a	0.0	50 HSS7X5X1/2

Column Line G-1.1

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size

Gravity Column Design Summary

First	104.9	-0.2	-13.4	1	0.66 Eq H1-1a	0.0	50 HSS7X5X1/2

Column Line G-4

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	102.9	-0.2	14.9	1	0.67 Eq H1-1a	0.0	50 HSS7X5X1/2

Column Line 144.31ft-1.75ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	118.1	0.0	-19.6	1	0.80 Eq H1-1a	0.0	50 HSS7X5X1/2

Column Line H-4

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	94.0	-0.4	14.0	1	0.62 Eq H1-1a	0.0	50 HSS7X5X1/2

Column Line 152.84ft-48.81ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	3.6	0.0	0.0	1	0.14 Eq Axial	0.0	50 HSS5X5X1/4

Column Line 167.47ft-31.93ft

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	39.9	-0.4	6.2	1	0.36 Eq H1-1a	0.0	50 HSS5X5X1/2

Column Line I-1.1

Level	Pu	Mux	Muy	LC	Interaction Eq.	Angle	Fy Size
First	58.7	-10.3	0.0	1	0.91 Eq H1-1a	0.0	50 HSS5X5X1/4

Gravity Column Design

Story level First, Column Line B.5-1.1, Column # 3

Fy (ksi)	=	50.00	Column Size	=	HSS4X4X1/4
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	5.26	7.82	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	18.82	0.90Pnx (kip)	=	52.07	Pu/0.90Pnx	=	0.361
			0.90Pny (kip)	=	52.07	Pu/0.90Pny	=	0.361
			0.90Pn (kip)	=	52.07	Pu/0.90Pn	=	0.361

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		5.26	7.82	0.00
Moments	TopMx (kip-ft)	-0.03	-0.04	0.00
	My (kip-ft)	0.00	0.00	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	18.82	0.90*Pn (kip)	=	52.07
Mux (kip-ft)	=	-0.10	0.90*Mnx (kip-ft)	=	17.59
Muy (kip-ft)	=	0.00	0.90*Mny (kip-ft)	=	17.59
Rm	=	1.00			
Cbx	=	1.67	Cby	=	1.00
Cmx	=	0.60	Cmy	=	1.00
Pex (kip)	=	65.97	Pey (kip)	=	65.97

B1x	=	1.00	B1y	=	1.40

INTERACTION EQUATION

Pu/0.90*Pn = 0.361

Eq H1-1a: 0.361 + 8/9(0.005 + 0.000) = 0.366

Gravity Column Design

Story level First, Column Line C-1.1, Column # 4

Fy (ksi)	=	50.00	Column Size	=	HSS7X5X1/2
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	12.33	18.09	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	43.73	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.149
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.196
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.196

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		12.33	18.09	0.00
Moments	TopMx (kip-ft)	1.15	1.75	0.00
	My (kip-ft)	0.00	0.00	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	43.73	0.90*Pn (kip)	=	222.72
Mux (kip-ft)	=	4.18	0.90*Mnx (kip-ft)	=	82.13
Muy (kip-ft)	=	0.00	0.90*Mny (kip-ft)	=	64.88
Rm	=	1.00			
Cbx	=	1.67	Cby	=	1.00
Cmx	=	0.60	Cmy	=	1.00
Pex (kip)	=	512.54	Pey (kip)	=	301.09

B1x	=	1.00	B1y	=	1.17

INTERACTION EQUATION

Pu/0.90*Pn = 0.196

Eq H1-1b: 0.098 + 0.051 + 0.000 = 0.149

Gravity Column Design

Story level First, Column Line C-4, Column # 15

Fy (ksi)	=	50.00	Column Size	=	HSS7X5X1/2
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	13.79	17.95	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	45.26	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.154
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.203
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.203

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		13.79	17.95	0.00
Moments	TopMx (kip-ft)	-0.12	-0.20	0.00
	My (kip-ft)	0.00	0.00	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	45.26	0.90*Pn (kip)	=	222.72
Mux (kip-ft)	=	-0.46	0.90*Mnx (kip-ft)	=	82.13
Muy (kip-ft)	=	0.00	0.90*Mny (kip-ft)	=	64.88
Rm	=	1.00			
Cbx	=	1.67	Cby	=	1.00
Cmx	=	0.60	Cmy	=	1.00
Pex (kip)	=	512.54	Pey (kip)	=	301.09

B1x	=	1.00	B1y	=	1.18

INTERACTION EQUATION

Pu/0.90*Pn = 0.203

Eq H1-1a: 0.203 + 8/9(0.006 + 0.000) = 0.208

Story level First, Column Line 53.49ft-30.58ft, Column # 27

Fy (ksi)	=	50.00	Column Size	=	HSS4X4X1/4
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	0.27	0.12	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	0.51	0.90Pnx (kip)	=	52.07	Pu/0.90Pnx	=	0.010
			0.90Pny (kip)	=	52.07	Pu/0.90Pny	=	0.010
			0.90Pn (kip)	=	52.07	Pu/0.90Pn	=	0.010

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		0.27	0.12	0.00
Moments	TopMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	-0.02	-0.02	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	0.51	0.90*Pn (kip)	=	52.07
Mux (kip-ft)	=	0.00	0.90*Mnx (kip-ft)	=	17.55
Muy (kip-ft)	=	-0.05	0.90*Mny (kip-ft)	=	17.59
Rm	=	1.00			
Cbx	=	1.00	Cby	=	1.67
Cmx	=	1.00	Cmy	=	0.60
Pex (kip)	=	65.97	Pey (kip)	=	65.97

B1x	=	1.01	B1y	=	1.00

INTERACTION EQUATION

Pu/0.90*Pn = 0.010

Eq H1-1b: 0.005 + 0.000 + 0.003 = 0.008

Gravity Column Design

Story level First, Column Line C.5-2.5, Column # 25

Fy (ksi)	=	50.00	Column Size	=	HSS4X4X1/4
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	3.27	6.02	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	13.55	0.90Pnx (kip)	=	52.07	Pu/0.90Pnx	=	0.260
			0.90Pny (kip)	=	52.07	Pu/0.90Pny	=	0.260
			0.90Pn (kip)	=	52.07	Pu/0.90Pn	=	0.260

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		3.27	6.02	0.00
Moments	TopMx (kip-ft)	-0.09	-0.14	0.00
	My (kip-ft)	-0.16	-0.45	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	13.55	0.90*Pn (kip)	=	52.07
Mux (kip-ft)	=	-0.34	0.90*Mnx (kip-ft)	=	17.59
Muy (kip-ft)	=	-0.91	0.90*Mny (kip-ft)	=	17.59
Rm	=	1.00			
Cbx	=	1.67	Cby	=	1.67
Cmx	=	0.60	Cmy	=	0.60
Pex (kip)	=	65.97	Pey (kip)	=	65.97

B1x	=	1.00	B1y	=	1.00

INTERACTION EQUATION

Pu/0.90*Pn = 0.260

Eq H1-1a: 0.260 + 8/9(0.019 + 0.052) = 0.323

Gravity Column Design

Story level First, Column Line C.5-3.5, Column # 29

Fy (ksi)	=	50.00	Column Size	=	HSS4X4X1/4
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	0.00	0.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	8.76	12.11	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	29.90	0.90Pnx (kip)	=	52.07	Pu/0.90Pnx	=	0.574
			0.90Pny (kip)	=	52.07	Pu/0.90Pny	=	0.574
			0.90Pn (kip)	=	52.07	Pu/0.90Pn	=	0.574

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		8.76	12.11	0.00
Moments	TopMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	29.90	0.90*Pn (kip)	=	52.07
Mux (kip-ft)	=	0.00	0.90*Mnx (kip-ft)	=	17.55
Muy (kip-ft)	=	0.00	0.90*Mny (kip-ft)	=	17.59
Rm	=	1.00			
Cbx	=	1.00	Cby	=	1.00
Cmx	=	1.00	Cmy	=	1.00
Pex (kip)	=	65.97	Pey (kip)	=	65.97

B1x	=	1.83	B1y	=	1.83

INTERACTION EQUATION

Pu/0.90*Pn	=	0.574

Pr/Pc = 0.574

Story level First, Column Line D-1.1, Column # 5

Fy (ksi)	=	50.00	Column Size	=	HSS7X5X1/2
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	39.09	58.71	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	140.84	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.478
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.632
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.632

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		39.09	58.71	0.00
Moments	TopMx (kip-ft)	-1.83	-2.79	0.00
	My (kip-ft)	0.00	0.00	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	140.84	0.90*Pn (kip)	=	222.72
Mux (kip-ft)	=	-6.65	0.90*Mnx (kip-ft)	=	82.13
Muy (kip-ft)	=	0.00	0.90*Mny (kip-ft)	=	64.88
Rm	=	1.00			
Cbx	=	1.67	Cby	=	1.00
Cmx	=	0.60	Cmy	=	1.00
Pex (kip)	=	512.54	Pey (kip)	=	301.09

B1x	=	1.00	B1y	=	1.88

INTERACTION EQUATION

Pu/0.90*Pn = 0.632

Eq H1-1a: 0.632 + 8/9(0.081 + 0.000) = 0.704

Story level First, Column Line D-4, Column # 16

Fy (ksi)	=	50.00	Column Size	=	HSS7X5X1/2
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	32.03	40.45	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	103.16	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.350
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.463
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.463

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		32.03	40.45	0.00
Moments	TopMx (kip-ft)	-1.23	-1.67	0.00
	My (kip-ft)	0.00	0.00	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	103.16	0.90*Pn (kip)	=	222.72
Mux (kip-ft)	=	-4.15	0.90*Mnx (kip-ft)	=	82.13
Muy (kip-ft)	=	0.00	0.90*Mny (kip-ft)	=	64.88
Rm	=	1.00			
Cbx	=	1.67	Cby	=	1.00
Cmx	=	0.60	Cmy	=	1.00
Pex (kip)	=	512.54	Pey (kip)	=	301.09

B1x	=	1.00	B1y	=	1.52

INTERACTION EQUATION

Pu/0.90*Pn = 0.463

Eq H1-1a: 0.463 + 8/9(0.051 + 0.000) = 0.508

Gravity Column Design

Story level First, Column Line F-1.1, Column # 6

Fy (ksi)	=	50.00	Column Size	=	HSS7X5X1/2
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	43.85	62.52	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	152.64	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.518
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.685
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.685

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		43.85	62.52	0.00
Moments	TopMx (kip-ft)	-1.71	-2.74	0.00
	My (kip-ft)	-3.89	-5.49	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	152.64	0.90*Pn (kip)	=	222.72
Mux (kip-ft)	=	-6.43	0.90*Mnx (kip-ft)	=	82.13
Muy (kip-ft)	=	-16.38	0.90*Mny (kip-ft)	=	64.88
Rm	=	1.00			
Cbx	=	1.67	Cby	=	1.67
Cmx	=	0.60	Cmy	=	0.60
Pex (kip)	=	512.54	Pey (kip)	=	301.09

B1x	=	1.00	B1y	=	1.22

INTERACTION EQUATION

Pu/0.90*Pn = 0.685

Eq H1-1a: 0.685 + 8/9(0.078 + 0.252) = 0.979

Gravity Column Design

Story level First, Column Line F-4, Column # 17

Fy (ksi)	=	50.00	Column Size	=	HSS7X5X1/2
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	40.42	50.47	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	129.26	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.439
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.580
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.580

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		40.42	50.47	0.00
Moments	TopMx (kip-ft)	-1.80	-2.36	0.00
	My (kip-ft)	3.89	5.17	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	129.26	0.90*Pn (kip)	=	222.72
Mux (kip-ft)	=	-5.93	0.90*Mnx (kip-ft)	=	82.13
Muy (kip-ft)	=	13.60	0.90*Mny (kip-ft)	=	64.88
Rm	=	1.00			
Cbx	=	1.67	Cby	=	1.67
Cmx	=	0.60	Cmy	=	0.60
Pex (kip)	=	512.54	Pey (kip)	=	301.09

B1x	=	1.00	B1y	=	1.05

INTERACTION EQUATION

Pu/0.90*Pn = 0.580

Eq H1-1a: 0.580 + 8/9(0.072 + 0.210) = 0.831

Gravity Column Design

Story level First, Column Line G-1.1, Column # 7

Fy (ksi)	=	50.00	Column Size	=	HSS7X5X1/2
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	42.23	33.89	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	104.89	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.356
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.471
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.471

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		42.23	33.89	0.00
Moments	TopMx (kip-ft)	-0.00	-0.11	0.00
	My (kip-ft)	-5.33	-4.39	0.00
	BotMx (kip-ft)	-0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	104.89	0.90*Pn (kip)	=	222.72
Mux (kip-ft)	=	-0.18	0.90*Mnx (kip-ft)	=	82.13
Muy (kip-ft)	=	-13.43	0.90*Mny (kip-ft)	=	64.88
Rm	=	1.00			
Cbx	=	1.67	Cby	=	1.67
Cmx	=	0.60	Cmy	=	0.60
Pex (kip)	=	512.54	Pey (kip)	=	301.09

B1x	=	1.00	B1y	=	1.00

INTERACTION EQUATION

Pu/0.90*Pn = 0.471

Eq H1-1a: 0.471 + 8/9(0.002 + 0.207) = 0.657

Story level First, Column Line G-4, Column # 18

Fy (ksi)	=	50.00	Column Size	=	HSS7X5X1/2
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	38.68	35.28	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	102.87	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.349
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.462
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.462

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		38.68	35.28	0.00
Moments	TopMx (kip-ft)	-0.08	-0.06	0.00
	My (kip-ft)	5.47	5.22	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	102.87	0.90*Pn (kip)	=	222.72
Mux (kip-ft)	=	-0.20	0.90*Mnx (kip-ft)	=	82.13
Muy (kip-ft)	=	14.92	0.90*Mny (kip-ft)	=	64.88
Rm	=	1.00			
Cbx	=	1.67	Cby	=	1.67
Cmx	=	0.60	Cmy	=	0.60
Pex (kip)	=	512.54	Pey (kip)	=	301.09

B1x	=	1.00	B1y	=	1.00

INTERACTION EQUATION

Pu/0.90*Pn = 0.462

Eq H1-1a: 0.462 + 8/9(0.002 + 0.230) = 0.668

Story level First, Column Line 144.31ft-1.75ft, Column # 8

Fy (ksi)	=	50.00	Column Size	=	HSS7X5X1/2
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	40.92	43.10	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	118.06	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.401
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.530
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.530

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		40.92	43.10	0.00
Moments	TopMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	-6.73	-7.18	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	118.06	0.90*Pn (kip)	=	222.72
Mux (kip-ft)	=	0.00	0.90*Mnx (kip-ft)	=	82.09
Muy (kip-ft)	=	-19.58	0.90*Mny (kip-ft)	=	64.88
Rm	=	1.00			
Cbx	=	1.00	Cby	=	1.67
Cmx	=	1.00	Cmy	=	0.60
Pex (kip)	=	512.54	Pey (kip)	=	301.09

B1x	=	1.30	B1y	=	1.00

INTERACTION EQUATION

Pu/0.90*Pn = 0.530

Eq H1-1a: 0.530 + 8/9(0.000 + 0.302) = 0.798

Gravity Column Design

Story level First, Column Line H-4, Column # 19

Fy (ksi)	=	50.00	Column Size	=	HSS7X5X1/2
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	34.82	32.65	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	94.03	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.319
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.422
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.422

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		34.82	32.65	0.00
Moments	TopMx (kip-ft)	-0.17	-0.12	0.00
	My (kip-ft)	5.08	4.93	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	94.03	0.90*Pn (kip)	=	222.72
Mux (kip-ft)	=	-0.40	0.90*Mnx (kip-ft)	=	82.13
Muy (kip-ft)	=	13.99	0.90*Mny (kip-ft)	=	64.88
Rm	=	1.00			
Cbx	=	1.67	Cby	=	1.67
Cmx	=	0.60	Cmy	=	0.60
Pex (kip)	=	512.54	Pey (kip)	=	301.09

B1x	=	1.00	B1y	=	1.00

INTERACTION EQUATION

Pu/0.90*Pn = 0.422

Eq H1-1a: 0.422 + 8/9(0.005 + 0.216) = 0.618

Story level First, Column Line 152.84ft-48.81ft, Column # 28

Fy (ksi)	=	50.00	Column Size	=	HSS5X5X1/4
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	2
Braced Against Joint Translation		Yes	No
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	1.22	1.36	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	3.65	0.90Pnx (kip)	=	99.51	Pu/0.90Pnx	=	0.037
			0.90Pny (kip)	=	26.70	Pu/0.90Pny	=	0.137
			0.90Pn (kip)	=	26.70	Pu/0.90Pn	=	0.137

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		1.22	1.36	0.00
Moments	TopMx (kip-ft)	-0.17	-0.23	0.00
	My (kip-ft)	0.00	0.00	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	3.65	0.90*Pn (kip)	=	26.70
Mux (kip-ft)	=	-0.56	0.90*Mnx (kip-ft)	=	28.54
Muy (kip-ft)	=	0.00	0.90*Mny (kip-ft)	=	28.54
Rm	=	1.00			
Cbx	=	1.00	Cby	=	1.00
Cmx	=	0.60	Cmy	=	1.00
Pex (kip)	=	135.32	Pey (kip)	=	33.83

B1x	=	1.00	B1y	=	1.12

INTERACTION EQUATION

Pu/0.90*Pn = 0.137

Eq H1-1b: 0.068 + 0.020 + 0.000 = 0.088

Gravity Column Design

Story level First, Column Line 167.47ft-31.93ft, Column # 20

Fy (ksi)	=	50.00	Column Size	=	HSS5X5X1/2
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	9.74	17.62	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	39.89	0.90Pnx (kip)	=	167.51	Pu/0.90Pnx	=	0.238
			0.90Pny (kip)	=	167.51	Pu/0.90Pny	=	0.238
			0.90Pn (kip)	=	167.51	Pu/0.90Pn	=	0.238

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		9.74	17.62	0.00
Moments	TopMx (kip-ft)	-0.09	-0.18	0.00
	My (kip-ft)	1.46	2.76	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	39.89	0.90*Pn (kip)	=	167.51
Mux (kip-ft)	=	-0.39	0.90*Mnx (kip-ft)	=	49.13
Muy (kip-ft)	=	6.17	0.90*Mny (kip-ft)	=	49.13
Rm	=	1.00			
Cbx	=	1.67	Cby	=	1.67
Cmx	=	0.60	Cmy	=	0.60
Pex (kip)	=	219.90	Pey (kip)	=	219.90

B1x	=	1.00	B1y	=	1.00

INTERACTION EQUATION

Pu/0.90*Pn = 0.238

Eq H1-1a: 0.238 + 8/9(0.008 + 0.126) = 0.357

Story level First, Column Line I-1.1, Column # 9

Fy (ksi)	=	50.00	Column Size	=	HSS5X5X1/4
Orientation (deg.)	=	0.0			

INPUT DESIGN PARAMETERS:

		X-Axis	Y-Axis
Lu (ft)		15.33	15.33
K		1	1
Braced Against Joint Translation		Yes	Yes
Column Eccentricity (in)	Top	2.00	2.00
	Bottom	0.00	0.00

CONTROLLING AXIAL COLUMN LOADS - Skip-Load Case 1:

	Dead	Live	Roof
Axial (kip)	14.13	26.12	0.00

DEMAND CAPACITY RATIO: (1.2DL + 1.6LL)

Pu (kip)	=	58.74	0.90Pnx (kip)	=	99.51	Pu/0.90Pnx	=	0.590
			0.90Pny (kip)	=	99.51	Pu/0.90Pny	=	0.590
			0.90Pn (kip)	=	99.51	Pu/0.90Pn	=	0.590

DEMAND/CAPACITY LIMIT FOR STRENGTH : 1.000

CONTROLLING COMBINED COLUMN LOADS - Skip-Load Case 1:

		Dead	Live	Roof
Axial (kip)		14.13	26.12	0.00
Moments	TopMx (kip-ft)	-2.32	-4.35	0.00
	My (kip-ft)	0.00	0.00	0.00
	BotMx (kip-ft)	0.00	0.00	0.00
	My (kip-ft)	0.00	0.00	0.00

Single curvature about X-Axis
Single curvature about Y-Axis

CALCULATED PARAMETERS: (1.2DL + 1.6LL)

Pu (kip)	=	58.74	0.90*Pn (kip)	=	99.51
Mux (kip-ft)	=	-10.33	0.90*Mnx (kip-ft)	=	28.54
Muy (kip-ft)	=	0.00	0.90*Mny (kip-ft)	=	28.54
Rm	=	1.00			
Cbx	=	1.67	Cby	=	1.00
Cmx	=	0.60	Cmy	=	1.00
Pex (kip)	=	135.32	Pey (kip)	=	135.32

B1x	=	1.06	B1y	=	1.77

INTERACTION EQUATION

Pu/0.90*Pn = 0.590

Eq H1-1a: 0.590 + 8/9(0.362 + 0.000) = 0.912

SECTION BREAK

Gravity

SUBSECTION BREAK

Beam Connection

DESCRIPTION/NOTES:

Description details.

Reactions found in Ram

W12x19

$P_{W12} := 15\ kip$ Max Factored Reaction
$n := 3$ Number of Bolts
$d := 0.75\ in$ Diameter of Bolts
$t_{pl} := 0.375\ in$ Thickness of Shear Plates

AISC Table 10-10a
$P_{LRFD} := 44.2\ kip$ $\quad$ $\text{if}\left(P_{LRFD} > P_{W12}, \text{"ok"}, \text{"no good"}\right) = \text{"ok"}$

W16x26

$P_{W16} := 30\ kip$ Max Factored Reaction
$n := 4$ Number of Bolts
$d := 0.75\ in$ Diameter of Bolts
$t_{pl} := 0.375\ in$ Thickness of Shear Plates

AISC Table 10-10a
$P_{LRFD} := 63.3\ kip$ $\quad$ $\text{if}\left(P_{LRFD} > P_{W16}, \text{"ok"}, \text{"no good"}\right) = \text{"ok"}$

W18x40

$P_{W18} := 59\ kip$ Max Factored Reaction
$n := 5$ Number of Bolts
$d := 0.75\ in$ Diameter of Bolts
$t_{pl} := 0.375\ in$ Thickness of Shear Plates

AISC Table 10-10a
$P_{LRFD} := 82\ kip$ $\quad$ $\text{if}\left(P_{LRFD} > P_{W18}, \text{"ok"}, \text{"no good"}\right) = \text{"ok"}$

W24x55

$P_{W24} := 10\ kip$ Max Factored Reaction
$n := 6$ Number of Bolts
$d := 0.75\ in$ Diameter of Bolts
$t_{pl} := 0.375\ in$ Thickness of Shear Plates

AISC Table 10-10a
$P_{LRFD} := 100\ kip$ $\quad$ $\text{if}\left(P_{LRFD} > P_{W24}, \text{"ok"}, \text{"no good"}\right) = \text{"ok"}$

W33x118

$P_{W33} := 116\ kip$ Max Factored Reaction
$n := 9$ Number of Bolts
$d := 0.75\ in$ Diameter of Bolts
$t_{pl} := 0.375\ in$ Thickness of Shear Plates

AISC Table 10-10a
$P_{LRFD} := 155\ kip$ $\quad$ $\text{if}\left(P_{LRFD} > P_{W33}, \text{"ok"}, \text{"no good"}\right) = \text{"ok"}$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

SECTION BREAK

Gravity

SUBSECTION BREAK

Site Walls

DESCRIPTION/NOTES:

Description details.

Design Criteria

$L := 219\ ft$
$W := 172\ ft$
$H_{wall} := 8\ ft$
$H_{bldg} := 34\ ft$

$Bearing := 2500\ psf$
$Active_{soilpressure} := 40\ pcf$
$Passive_{pressure} := 300\ pcf$

Wind

$K_z := 0.85$ .. Table 26.10-1, Exposure - C, Height above ground level, z = 0'
$K_d := 0.85$ .. Table 26.6-1, Buildings - Components & Claddings
$K_{zt} := 1.0$ .. Section 26.8.2, flat site, Kzt = 1.0
$K_e := 1.0$ .. Table 26.9-1, using worst case Ke = 1.0
$G := 0.85$ .. Section 26.11, Gust Effect, Use G = 1.0
$V := 103\ mph$

$$q_h := 0.00256\ K_z \cdot K_{zt} \cdot K_d \cdot \left(\frac{V^2}{mph^2}\right) \cdot psf = 19.6\ psf$$

$C_f := 1.3$
$A_s := 1\ ft$

$$F := q_h \cdot G \cdot C_f \cdot A_s = 21.7\ plf$$

Seismic

$R := 1.25$ ASCE 16 Table 15.4-2 (Cantilever Walls)
$S_{DS} := 0.989$
$I_e := 1.25$
$C_d := 2.5$

$$EQ_{forcefactor} := \left(\frac{S_{DS}}{R \div I_e}\right) = 0.989 \qquad 0.4 \cdot S_{DS} = 0.4$$

Deflection

Total Building: $\Omega_{max} := 0.015 \cdot H_{bldg} = 6.1\ in$
@Wainscott height: $\Omega_{max} := 1.435\ in$

$C_d := 3$ $$\left(\frac{\Omega_{max} \cdot 0.7 \cdot I_e}{C_d}\right) = 0.4185\ in$$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

With Lower Seismic Factor (Wind still does not control)

8' Tall

6" CMU Wall #4@ 16"oc $\Omega := 0.02701$ in
8" CMU Wall #5 @ 24"oc $\Omega := 0.03014$ in

6' Tall

6" CMU Wall #4 @ 24"oc $\Omega := .0188$ in
8" CMU Wall #5 @ 48"oc $\Omega := 0.02047$ in

With Higher Seismic Factor

8' Tall

8" CMU Wall #6 @ 8"oc $\Omega := 0.04371$ in

7' Tall

8" CMU Wall #6 @ 8"oc $\Omega := 0.0348$ in
8" CMU Wall #5 @ 8"oc $\Omega := 0.0348$ in

6' Tall

8" CMU Wall #6 @ 24"oc $\Omega := 0.02739$ in
8" CMU Wall #5 @ 16"oc $\Omega := 0.02739$ in
6" CMU Wall #5 @ 8"oc $\Omega := 0.02394$ in

5' Tall

8" CMU Wall #6 @ 40"oc $\Omega := 0.02113$ in
8" CMU Wall #5 @ 24"oc $\Omega := 0.02113$ in
6" CMU Wall #5 @ 24"oc $\Omega := 0.01879$ in
6" CMU Wall #4 @ 16"oc $\Omega := 0.02113$ in

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Cantilever CMU WALL.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Exterior CMU Curtain Wall

Code References

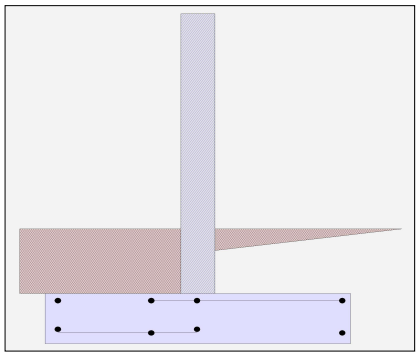
Calculations per IBC 2012 1807.3, CBC 2013, ASCE 7-10

Criteria

Retained Height	=	1.50 ft
Wall height above soil	=	5.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	18.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	2,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	40.0 psf/ft
	=	
Passive Pressure	=	300.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	100.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	7.50 ft
...Height to Bottom	=	1.50 ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.989 g

Added seismic base force 351.0 lbs

Project Title:
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Cantilevered Retaining Wall

Project File: Cantilever CMU WALL.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Exterior CMU Curtain Wall

Design Summary

Wall Stability Ratios

Overturning	=	4.54	OK
Sliding	=	3.92	OK
Global Stability	=	12.20	

Total Bearing Load	=	2,537	lbs
...resultant ecc.	=	7.93	in

Eccentricity within middle third

Soil Pressure @ Toe	=	702	psf	OK
Soil Pressure @ Heel	=	143	psf	OK
Allowable	=	2,500	psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	983	psf	
ACI Factored @ Heel	=	201	psf	
Footing Shear @ Toe	=	7.1	psi	OK
Footing Shear @ Heel	=	0.6	psi	OK
Allowable	=	88.7	psi	

Sliding Calcs

Lateral Sliding Force	=	493.2	lbs	
less 100% Passive Force	-	916.7	lbs	
less 100% Friction Force	-	1,014.8	lbs	
Added Force Req'd	=	0.0	lbs	OK
....for 1.5 Stability	=	0.0	lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom		
		Stem OK		
Design Height Above Ftg	ft =	0.00		
Wall Material Above "Ht"	=	Masonry		
Design Method	=	ASD	SD	SD
Thickness	=	8.00		
Rebar Size	=	# 6		
Rebar Spacing	=	40.00		
Rebar Placed at	=	Center		

Design Data

fb/FB + fa/Fa	=	**0.989**
Total Force @ Section		
Service Level	lbs =	396.0
Strength Level	lbs =	
Moment....Actual		
Service Level	ft-# =	1,163.2
Strength Level	ft-# =	
Moment.....Allowable	=	1,224.8
Shear.....Actual		
Service Level	psi =	4.3
Strength Level	psi =	
Shear.....Allowable	psi =	52.3
Anet (Masonry)	in2 =	91.50
Wall Weight	psf =	78.0
Rebar Depth 'd'	in =	3.81

Masonry Data

f'm	psi =	2,000
Fs	psi =	32,000
Solid Grouting	=	Yes
Modular Ratio 'n'	=	16.11
Equiv. Solid Thick.	in =	7.63
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	
Fy	psi =	

Project Title:
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Cantilevered Retaining Wall

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DESCRIPTION: Exterior CMU Curtain Wall

Footing Data

Toe Width	=	2.67 ft
Heel Width	=	3.33
Total Footing Width	=	6.00
Footing Thickness	=	14.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	983	201	psf
Mu' : Upward	=	3,084	1,126	ft-#
Mu' : Downward	=	1,632	1,632	ft-#
Mu: Design	=	1,452 OK	506	ft-# OK
phiMn	=	15,366	16,851	ft-#
Actual 1-Way Shear	=	7.10	0.64	psi
Allow 1-Way Shear	=	88.74	88.74	psi

Toe Reinforcing = # 6 @ 16.00 in
Heel Reinforcing = # 6 @ 16.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 7.93 in, #5@ 12.30 in, #6@ 17.46 in, #7@ 23.80 in, #8@ 31.34 in, #9@ 39.68 in, #10@ 50.39 in

Heel: #4@ 7.93 in, #5@ 12.30 in, #6@ 17.46 in, #7@ 23.80 in, #8@ 31.34 in, #9@ 39.68 in, #10@ 50.39 in

Key: No key defined

Min footing T&S reinf Area 1.81 in2
Min footing T&S reinf Area per foot 0.30 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 7.94 in	#4@ 15.87 in
#5@ 12.30 in	#5@ 24.60 in
#6@ 17.46 in	#6@ 34.92 in

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Cantilever CMU WALL.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Exterior CMU Curtain Wall

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		142.2	0.89	126.4
HL Act Pres (be water tbl)				
Hydrostatic Force				
Buoyant Force	=			
Surcharge over Heel	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
	=			
Seismic Stem Self Wt		351.0	4.42	1,550.2
Total	=	493.2	**O.T.M.** =	1,676.7

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over HL (ab. water tbl)		440.0	4.67	2,053.3
Soil Over HL (bel. water tbl)			4.67	2,053.3
Water Table				
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=	100.0	3.00	300.0
* Axial Live Load on Stem	=			
Soil Over Toe	=	440.0	1.33	586.7
Surcharge Over Toe	=			
Stem Weight(s)	=	507.0	3.00	1,521.0
Earth @ Stem Transitions	=			
Footing Weight	=	1,050.0	3.00	3,150.0
Key Weight	=			
Vert. Component	=			
Total =		2,537.0 lbs	**R.M.=**	7,611.0

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Resisting/Overturning Ratio = **4.54**

Vertical Loads used for Soil Pressure = 2,537.0 lbs

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.021	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

DESCRIPTION: Exterior CMU Curtain Wall

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing
Calculated Rebar Stress, fs = 30391.01 psi

Lap Splice length for #6 bar specified in this stem design segment =	68.38 in
Development length for #6 bar specified in this stem design segment =	68.38 in
Hooked embedment length into footing for #6 bar specified in this stem design segment =	10.65 in
As Provided =	0.1320 in2/ft
As Required =	0.1294 in2/ft

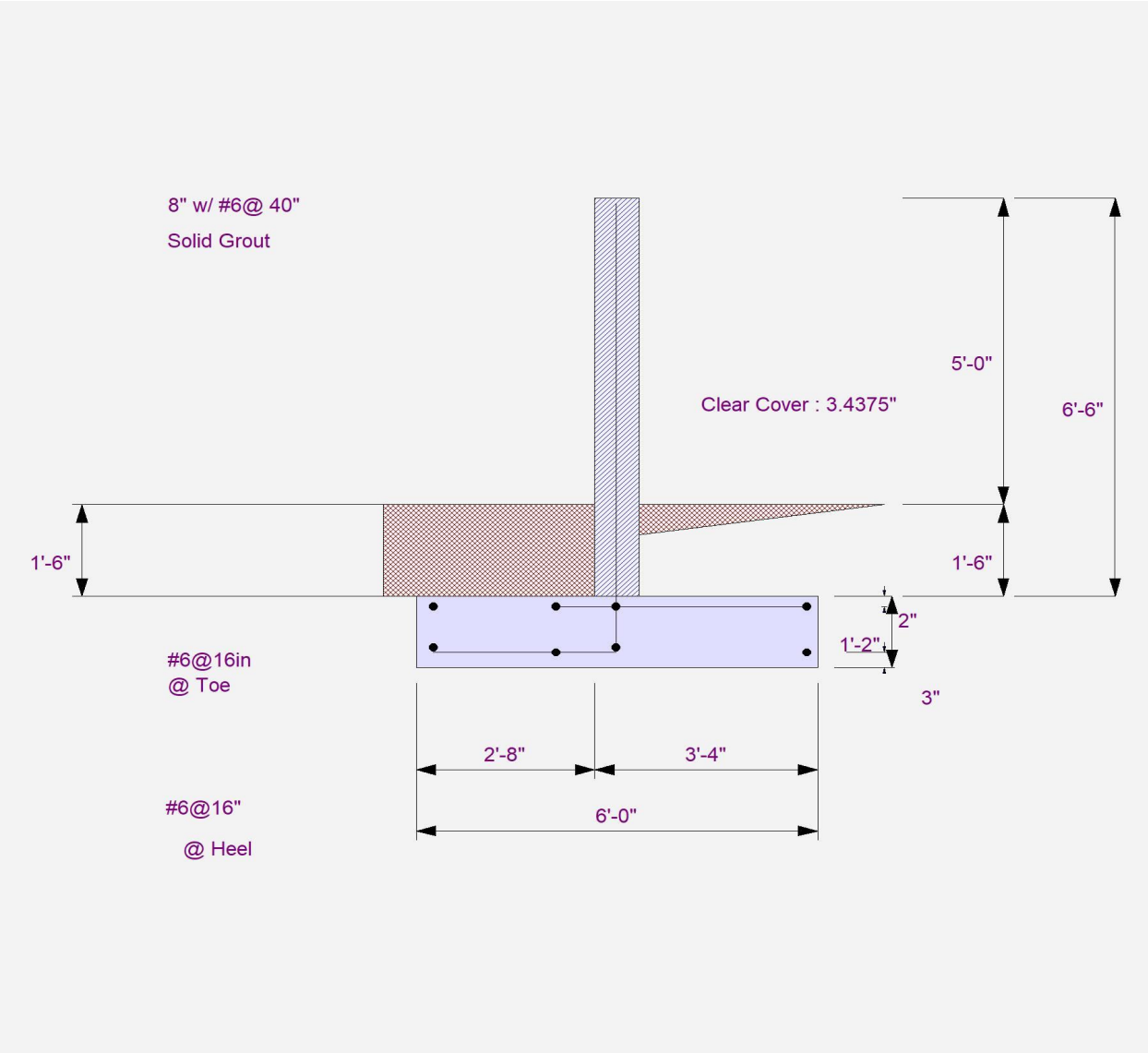
Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Cantilever CMU WALL.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Exterior CMU Curtain Wall



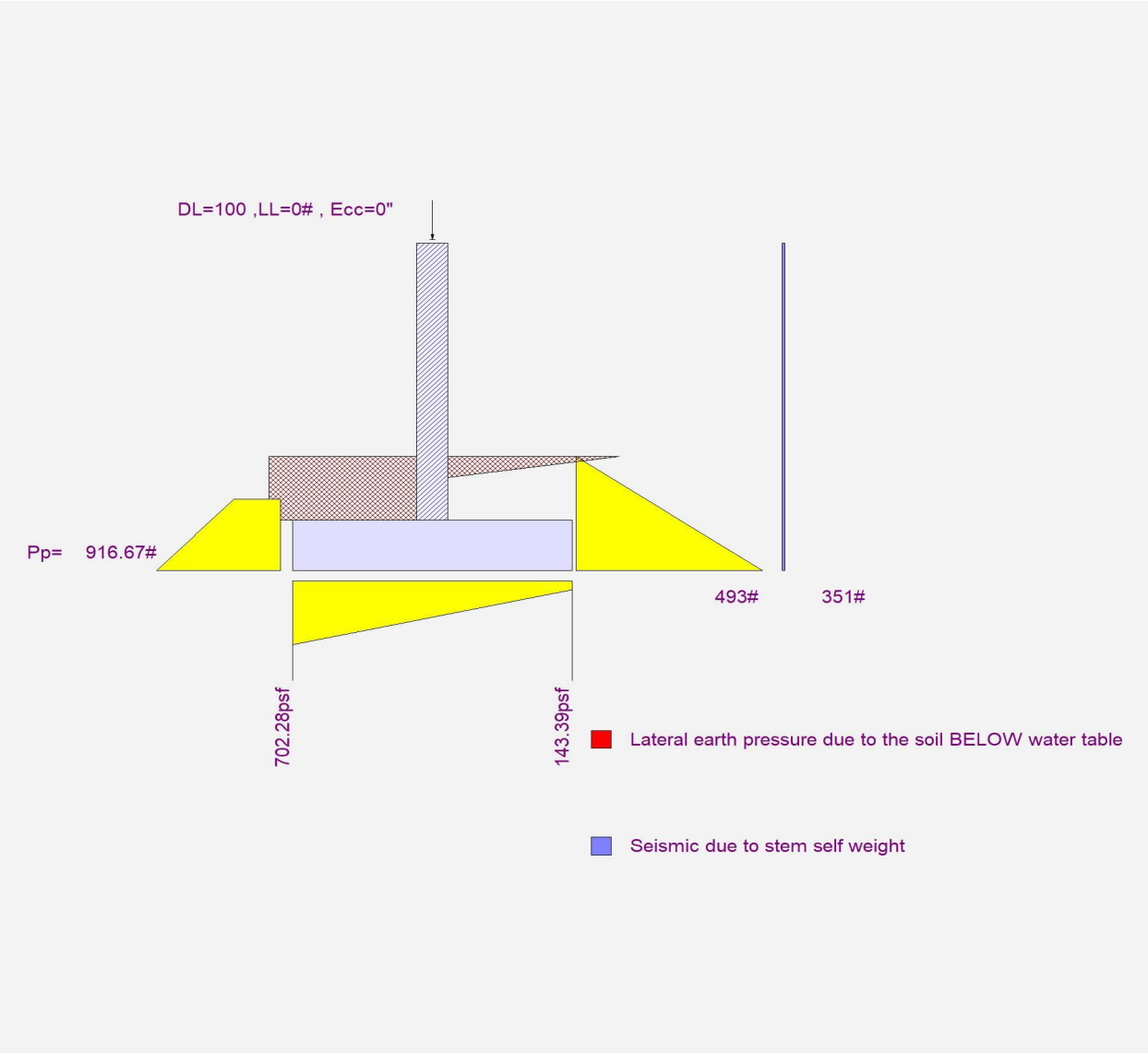
Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Cantilever CMU WALL.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Exterior CMU Curtain Wall



Wind Force on Wall

$K_z := 0.85$ .. Table 26.10-1, Exposure - C, Height above ground level, z = 0-15'

$K_d := 0.85$ .. Table 26.6-1, Buildings - Components & Claddings

$K_{zt} := 1.0$ .. Section 26.8.2, flat site, Kzt = 1.0

$K_e := 1.0$ .. Table 26.9-1, using worst case Ke = 1.0

$V := 109\ mph$

$q_h := 0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot \frac{V^2}{mph^2} \cdot psf = 22.0\ psf$

$L_{sign} := 4\ ft$ (Length of Sign)

$H_{sign} := 8\ ft$ (Height of Sign)

$T_{sign} := 1\ in$ (Thickness of Sign)

$D_{embed} := 6\ in$ (Depth of Embed into Concrete)

$H_{concete} := 6\ ft$ (Height of Sign)

$H := H_{sign} - D_{embed} = 90.0\ in$ (Height of Sign - Depth of Embed)

$G := 0.85$ .. Section 26.11, Guest Effect Factor

$C_f := \frac{1.3 - 1.35}{10 - 5} \cdot (6.56 - 5) + 1.35 = 1.334$ .. Figure 29.3-1, Net Force Coefficient

$F_h := q_h \cdot G \cdot C_f \cdot 1\ ft = 24.93\ plf$ (EQ 29.3-1 wind force)

Seismic Force on Wall

Site Wall Factor

$S_{DS} := 0.992$

$R := 1.25$

$I_e := 1.25$

$$EQ_{factor} := \frac{S_{DS}}{R \div I_e} = 0.9920$$

Non Site Wall Factor

$$EQ_{factor} := 0.4 \cdot S_{DS} \cdot I_e = 0.4960$$

Results

Wind

Stem 8" CMU #5 @ 48" Center
Foundation 8" Concrete #5 @ 16" Center
Footing Width=3' Thickness= 12" #5 @ 12"

Site Wall Seismic

Stem 8" CMU #5 @ 32" Center
Foundation 8" Concrete #5 @ 16" Center
Footing Width=4' Thickness= 12" #5 @ 12"

Non- Site Wall Seismic

Stem 8" CMU #5 @ 48" Center
Foundation 8" Concrete #5 @ 16" Center
Footing Width=3' Thickness= 12" #5 @ 12"

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Project Title:	CCHS
Engineer:	MDK
Project ID:	24047
Project Descr:	Outer Yard Trash Wall

Cantilevered Retaining Wall

Project File: CCHS Outer Yard Trash Wall.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Trash Wall (Site Wall Seismic)

Code References

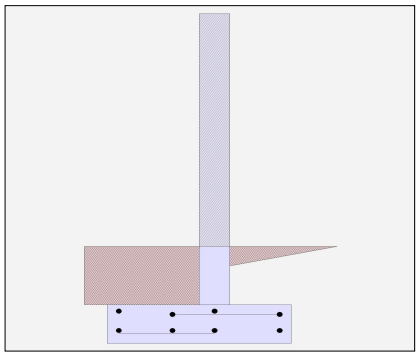
Calculations per IBC 2012 1807.3, CBC 2013, ASCE 7-10

Criteria

Retained Height	=	1.50 ft
Wall height above soil	=	6.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	18.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	2,000.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	45.0 psf/ft
	=	
Passive Pressure	=	45.0 psf/ft
Soil Density, Heel	=	103.00 pcf
Soil Density, Toe	=	103.00 pcf
Footing||Soil Friction	=	1.100
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.992 g

Added seismic base force 429.1 lbs

Project Title:	CCHS
Engineer:	MDK
Project ID:	24047
Project Descr:	Outer Yard Trash Wall

Cantilevered Retaining Wall

Project File: CCHS Outer Yard Trash Wall.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Trash Wall (Site Wall Seismic)

Design Summary

Wall Stability Ratios

Overturning	=	1.84	OK
Sliding	=	3.65	OK
Global Stability	=	4.68	

Total Bearing Load	=	1,733	lbs
...resultant ecc.	=	13.26	in

Eccentricity outside middle third

Soil Pressure @ Toe	=	1,291	psf	OK
Soil Pressure @ Heel	=	0	psf	OK
Allowable	=	2,000	psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	1,807	psf	
ACI Factored @ Heel	=	0	psf	
Footing Shear @ Toe	=	12.0	psi	OK
Footing Shear @ Heel	=	5.5	psi	OK
Allowable	=	88.7	psi	

Sliding Calcs

Lateral Sliding Force	=	569.8	lbs	
less 100% Passive Force	-	118.1	lbs	
less 100% Friction Force	= -	1,960.1	lbs	
Added Force Req'd	=	0.0	lbs	OK
....for 1.5 Stability	=	0.0	lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		2nd	Bottom		
		Stem OK	Stem OK		
Design Height Above Ftg	ft =	1.50	0.00		
Wall Material Above "Ht"	=	Masonry	Concrete		
Design Method	=	ASD	SD	SD	SD
Thickness	=	8.00	8.00		
Rebar Size	=	# 5	# 5		
Rebar Spacing	=	32.00	16.00		
Rebar Placed at	=	Center	Center		
Design Data					
fb/FB + fa/Fa	=	**0.899**	**0.405**		
Total Force @ Section					
Service Level	lbs =	325.0			
Strength Level	lbs =		554.8		
Moment....Actual					
Service Level	ft-# =	974.9			
Strength Level	ft-# =		1,614.5		
Moment.....Allowable	ft-# =	1,084.1	3,980.0		
Shear.....Actual					
Service Level	psi =	3.6			
Strength Level	psi =		11.6		
Shear.....Allowable	psi =	51.8	88.7		
Anet (Masonry)	in2 =	91.50			
Wall Weight	psf =	78.0	100.0		
Rebar Depth 'd'	in =	3.81	4.00		

Masonry Data

f'm	psi =	2,000
Fs	psi =	32,000
Solid Grouting	=	Yes
Modular Ratio 'n'	=	16.11
Equiv. Solid Thick.	in =	7.63
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	3,500.0
Fy	psi =	60,000.0

Project Title:	CCHS
Engineer:	MDK
Project ID:	24047
Project Descr:	Outer Yard Trash Wall

Cantilevered Retaining Wall

Project File: CCHS Outer Yard Trash Wall.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Trash Wall (Site Wall Seismic)

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0975 in2/ft		
(4/3) * As :	0.1299 in2/ft	Min Stem T&S Reinf Area 0.288 in2	
200bd/fy : 200(12)(4)/60000 :	0.16 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.1728 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.2325 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.7586 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Footing Data

Toe Width	=	2.00 ft
Heel Width	=	2.00
Total Footing Width	=	4.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 3.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,807	0	psf
Mu' : Upward	=	2,717	0	ft-#
Mu' : Downward	=	731	429	ft-#
Mu: Design	=	1,986 OK	429	ft-# OK
phiMn	=	11,756	11,756	ft-#
Actual 1-Way Shear	=	11.97	5.54	psi
Allow 1-Way Shear	=	88.74	88.74	psi

Toe Reinforcing = # 5 @ 12.00 in
Heel Reinforcing = # 5 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area	1.04	in2
Min footing T&S reinf Area per foot	0.26	in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Project Title: CCHS
Engineer: MDK
Project ID: 24047
Project Descr: Outer Yard Trash Wall

Cantilevered Retaining Wall

Project File: CCHS Outer Yard Trash Wall.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Trash Wall (Site Wall Seismic)

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		140.6	0.83	117.2
HL Act Pres (be water tbl)				
Hydrostatic Force				
Buoyant Force	=			
Surcharge over Heel	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=			
Load @ Stem Above Soil	=			
	=			
Seismic Stem Self Wt		429.1	4.59	1,969.7
Total	=	569.8	**O.T.M.** =	2,086.9

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over HL (ab. water tbl)		206.0	3.33	686.7
Soil Over HL (bel. water tbl)			3.33	686.7
Water Table				
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=	309.0	1.00	309.0
Surcharge Over Toe	=			
Stem Weight(s)	=	618.0	2.33	1,442.0
Earth @ Stem Transitions	=			
Footing Weight	=	600.0	2.00	1,200.0
Key Weight	=			
Vert. Component	=	48.9	4.00	195.6
	Total =	1,781.9 lbs	**R.M.=**	3,833.3

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Resisting/Overturning Ratio = **1.84**
Vertical Loads used for Soil Pressure = 1,733.0 lbs

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.067	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

DESCRIPTION: Trash Wall (Site Wall Seismic)

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd
Stem Design Height: 1.50 ft above top of footing
Calculated Rebar Stress, fs = 28777.05 psi

Lap Splice length for #5 bar specified in this stem design segment =	53.96 in
Development length for #5 bar specified in this stem design segment =	53.96 in

---

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment =	19.78 in
Development length for #5 bar specified in this stem design segment =	15.21 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	8.87 in
As Provided =	0.2325 in2/ft
As Required =	0.1728 in2/ft

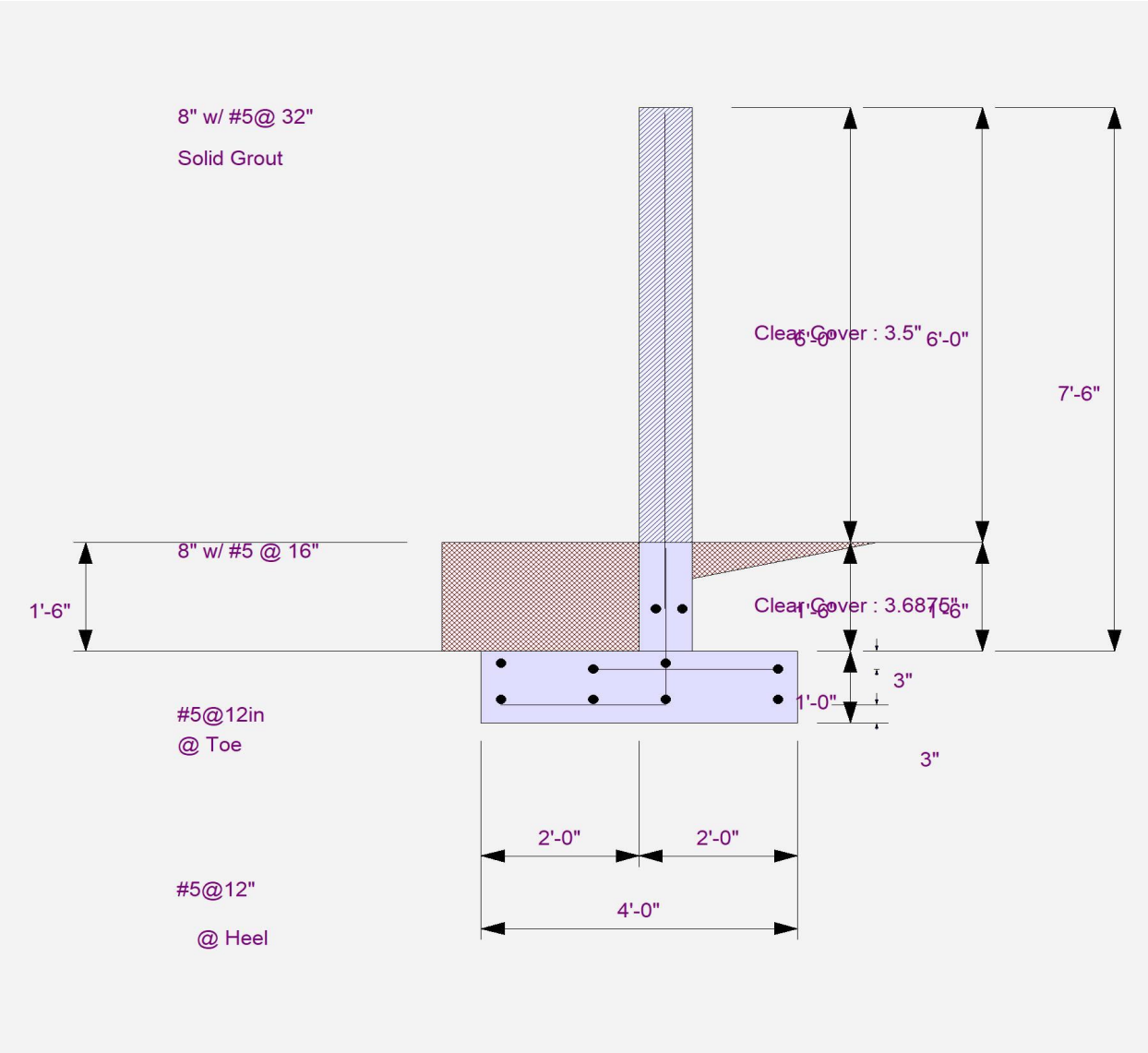
Project Title: CCHS
Engineer: MDK
Project ID: 24047
Project Descr: Outer Yard Trash Wall

Cantilevered Retaining Wall

Project File: CCHS Outer Yard Trash Wall.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Trash Wall (Site Wall Seismic)



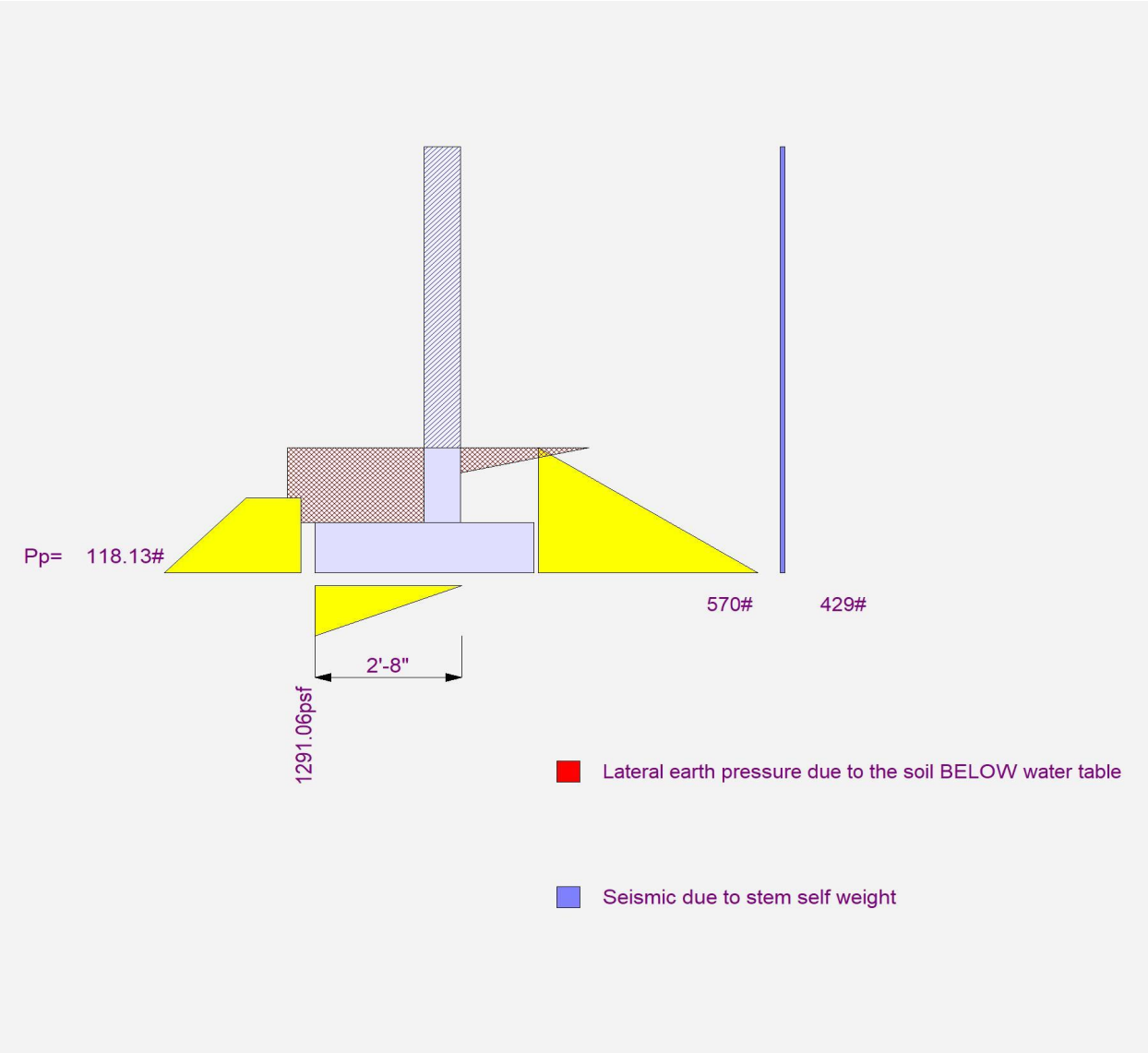
Project Title: CCHS
Engineer: MDK
Project ID: 24047
Project Descr: Outer Yard Trash Wall

Cantilevered Retaining Wall

Project File: CCHS Outer Yard Trash Wall.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Trash Wall (Site Wall Seismic)



Project Title:	CCHS
Engineer:	MDK
Project ID:	24047
Project Descr:	Outer Yard Trash Wall

Cantilevered Retaining Wall

Project File: CCHS Outer Yard Trash Wall.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Trash Wall (Wind)

Code References

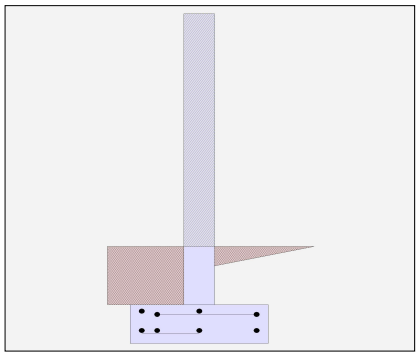
Calculations per IBC 2012 1807.3, CBC 2013, ASCE 7-10

Criteria

Retained Height	=	1.50 ft
Wall height above soil	=	6.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	18.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	45.0 psf/ft
	=	
Passive Pressure	=	45.0 psf/ft
Soil Density, Heel	=	103.00 pcf
Soil Density, Toe	=	103.00 pcf
Footing||Soil Friction	=	0.350
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	24.9 #/ft
...Height to Top	=	7.50 ft
...Height to Bottom	=	1.50 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Project Title:	CCHS
Engineer:	MDK
Project ID:	24047
Project Descr:	Outer Yard Trash Wall

Cantilevered Retaining Wall

Project File: CCHS Outer Yard Trash Wall.ec6

LIC# : KW-06018834, Build:20.22.10.25 — Calder Richards Consulting Engineers — (c) ENERCALC INC 1983-2022

DESCRIPTION: Trash Wall (Wind)

Design Summary

Wall Stability Ratios

Overturning	=	2.44	OK
Sliding	=	2.19	OK
Global Stability	=	4.25	

Total Bearing Load	=	1,429	lbs
...resultant ecc.	=	7.90	in

Eccentricity outside middle third

Soil Pressure @ Toe	=	1,131	psf	OK
Soil Pressure @ Heel	=	0	psf	OK
Allowable	=	1,500	psf	

Soil Pressure Less Than Allowable

ACI Factored @ Toe	=	1,583	psf	
ACI Factored @ Heel	=	0	psf	
Footing Shear @ Toe	=	4.5	psi	OK
Footing Shear @ Heel	=	3.5	psi	OK
Allowable	=	88.7	psi	

Sliding Calcs

Lateral Sliding Force	=	290.2	lbs	
less 100% Passive Force	-	118.1	lbs	
less 100% Friction Force	≡ -	517.1	lbs	
Added Force Req'd	=	0.0	lbs	OK
....for 1.5 Stability	=	0.0	lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		2nd	Bottom		
		Stem OK	Stem OK		
Design Height Above Ftg	ft =	1.50	0.00		
Wall Material Above "Ht"	=	Masonry	Concrete		
Design Method	=	ASD	SD	SD	SD
Thickness	=	8.00	8.00		
Rebar Size	=	# 5	# 5		
Rebar Spacing	=	48.00	16.00		
Rebar Placed at	=	Center	Center		
Design Data					
fb/FB + fa/Fa	=	**0.611**	**0.280**		
Total Force @ Section					
Service Level	lbs =	149.6			
Strength Level	lbs =		320.3		
Moment....Actual					
Service Level	ft-# =	448.7			
Strength Level	ft-# =		1,117.5		
Moment.....Allowable	ft-# =	733.3	3,980.0		
Shear.....Actual					
Service Level	psi =	1.6			
Strength Level	psi =		6.7		
Shear.....Allowable	psi =	51.8	88.7		
Anet (Masonry)	in2 =	91.50			
Wall Weight	psf =	78.0	100.0		
Rebar Depth 'd'	in =	3.81	4.00		

Masonry Data

f'm	psi =	2,000
Fs	psi =	32,000
Solid Grouting	=	Yes
Modular Ratio 'n'	=	16.11
Equiv. Solid Thick.	in =	7.63
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	3,500.0
Fy	psi =	60,000.0

Project Title:	CCHS
Engineer:	MDK
Project ID:	24047
Project Descr:	Outer Yard Trash Wall

Cantilevered Retaining Wall

Project File: CCHS Outer Yard Trash Wall.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Trash Wall (Wind)

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0675 in2/ft		
(4/3) * As :	0.0899 in2/ft	Min Stem T&S Reinf Area 0.288 in2	
200bd/fy : 200(12)(4)/60000 :	0.16 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.1728 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.2325 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.7586 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Footing Data

Toe Width	=	1.17 ft
Heel Width	=	1.83
Total Footing Width	=	3.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 3.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,583	0	psf
Mu' : Upward	=	912	35	ft-#
Mu' : Downward	=	249	340	ft-#
Mu: Design	=	663 OK	305	ft-# OK
phiMn	=	11,756	11,756	ft-#
Actual 1-Way Shear	=	4.55	3.47	psi
Allow 1-Way Shear	=	88.74	88.74	psi

Toe Reinforcing = # 5 @ 12.00 in
Heel Reinforcing = # 5 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area 0.78 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Project Title: CCHS
Engineer: MDK
Project ID: 24047
Project Descr: Outer Yard Trash Wall

Cantilevered Retaining Wall

Project File: CCHS Outer Yard Trash Wall.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Trash Wall (Wind)

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		140.6	0.83	117.2
HL Act Pres (be water tbl)				
Hydrostatic Force				
Buoyant Force	=			
Surcharge over Heel	=			
Surcharge Over Toe	=			
Adjacent Footing Load	=			
Added Lateral Load	=	149.6	5.50	822.7
Load @ Stem Above Soil	=			
	=			
Total	=	290.2	**O.T.M.** =	939.9

		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
Soil Over HL (ab. water tbl)		180.2	2.42	435.6
Soil Over HL (bel. water tbl)			2.42	435.6
Water Table				
Sloped Soil Over Heel	=			
Surcharge Over Heel	=			
Adjacent Footing Load	=			
Axial Dead Load on Stem	=			
* Axial Live Load on Stem	=			
Soil Over Toe	=	180.3	0.58	105.1
Surcharge Over Toe	=			
Stem Weight(s)	=	618.0	1.50	927.0
Earth @ Stem Transitions	=			
Footing Weight	=	450.0	1.50	675.0
Key Weight	=			
Vert. Component	=	48.9	3.00	146.7
Total =		1,477.4 lbs	**R.M.=**	2,289.5

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Resisting/Overturning Ratio = **2.44**
Vertical Loads used for Soil Pressure = 1,428.5 lbs

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.079	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

DESCRIPTION: Trash Wall (Wind)

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd
Stem Design Height: 1.50 ft above top of footing
Calculated Rebar Stress, fs = 19582.10 psi

Lap Splice length for #5 bar specified in this stem design segment =	25.00 in
Development length for #5 bar specified in this stem design segment =	24.48 in

---

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment =	19.78 in
Development length for #5 bar specified in this stem design segment =	15.21 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	8.87 in
As Provided =	0.2325 in2/ft
As Required =	0.1728 in2/ft

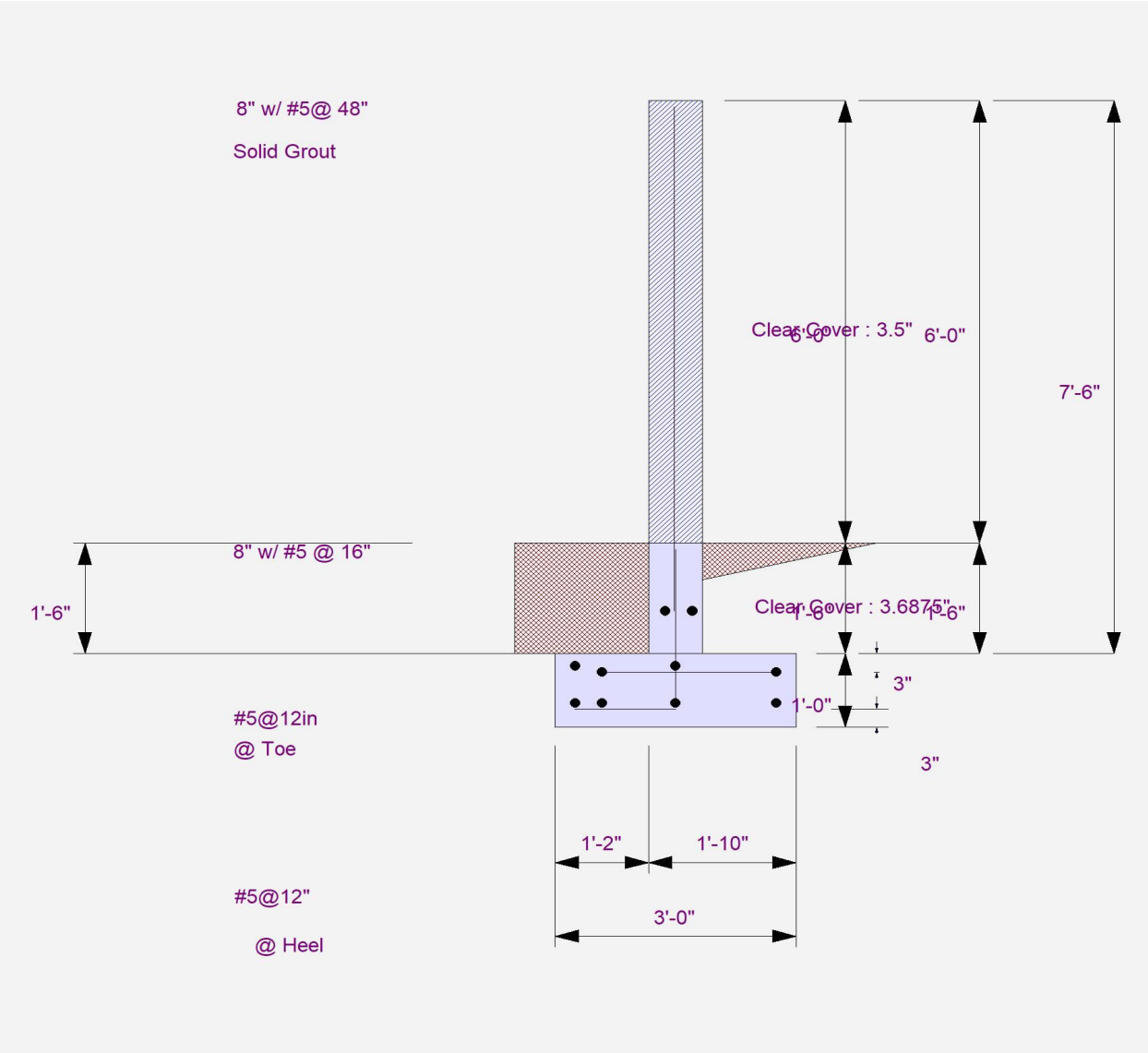
Project Title: CCHS
Engineer: MDK
Project ID: 24047
Project Descr: Outer Yard Trash Wall

Cantilevered Retaining Wall

Project File: CCHS Outer Yard Trash Wall.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Trash Wall (Wind)



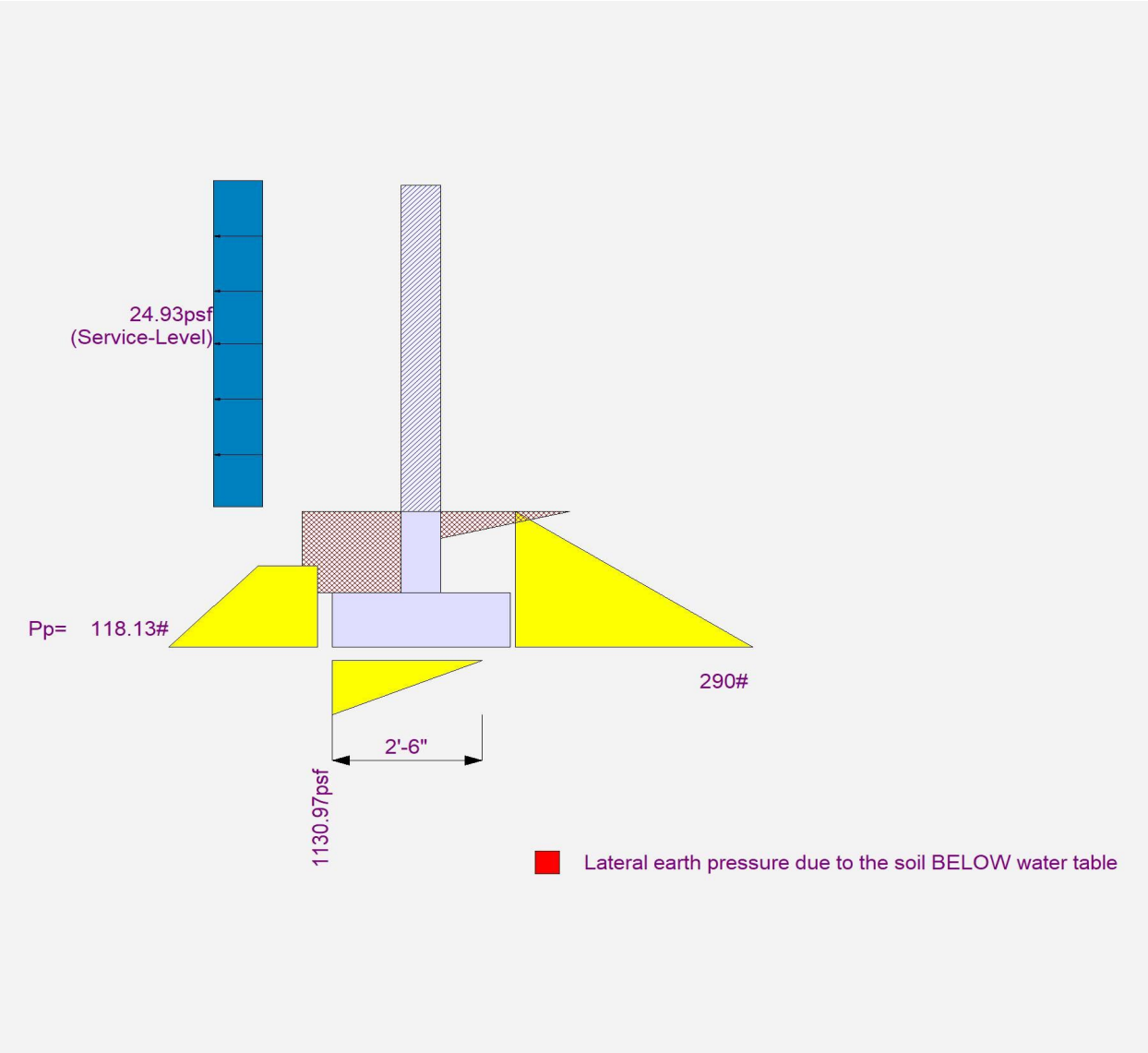
Project Title: CCHS
Engineer: MDK
Project ID: 24047
Project Descr: Outer Yard Trash Wall

Cantilevered Retaining Wall

Project File: CCHS Outer Yard Trash Wall.ec6

LIC# : KW-06018834, Build:20.22.10.25 Calder Richards Consulting Engineers (c) ENERCALC INC 1983-2022

DESCRIPTION: Trash Wall (Wind)



Separation Required for Outer Trash Wall Perpendictural to Building

Deflection From CMU Trash Wall

CMU Wall

$L := 5.5\ ft$

$h := 8\ ft$

$t := 8\ in$

$E_m := 1800000\ psi$

$G := 0.4 \cdot E_m = 720000.0\ psi$

Exterior Cantilever Wall

$R := 2.5$

$a_p := 1$

$S_{DS} := 0.992$

$I_e := 1.25$

$W_{wall} := 78\ psf \cdot L \cdot h = 3432.0\ lbf$

$$P := \frac{0.4 \cdot a_p \cdot S_{DS} \cdot W_{wall}}{R \div I_e} = 680.9\ lbf$$

Wall Deflection

$A_e := t \cdot L = 3.7\ ft^2$

$$I := \frac{t \cdot L^3}{12} = 9.2\ ft^4$$

$$\Omega_{CMU} := \frac{P \cdot h^3}{3 \cdot E_m \cdot I} + \frac{1.2 \cdot P \cdot h}{A_e \cdot G} = 0.00079\ in$$

Deflection From Field House

$\Omega_{FH} := 3\ in$

Max Seperation Need Between Wall and Building

$$\Omega := \sqrt{\Omega_{CMU}^2 + \Omega_{FH}^2} = 3.0\ in$$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

SECTION BREAK

Lateral Analysis (Overview)

SUBSECTION BREAK

Structural Irregularities (Phase1)

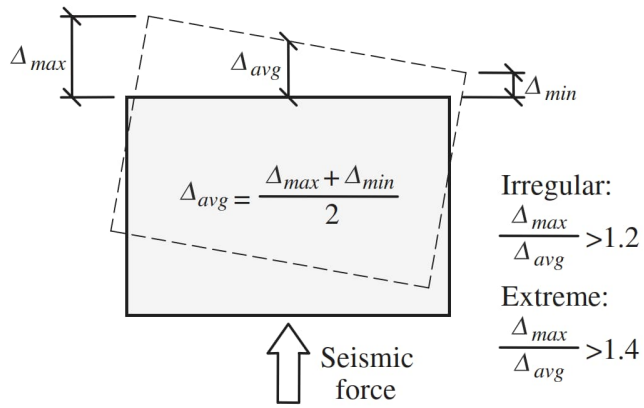
DESCRIPTION/NOTES:

Description details.

CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	MDK	DATE	8/30/2024
	SUBJECT	TORSION CHECK (Phase 1)	CHECKED		SHEET	

$\Delta_{max}/\Delta_{avg}$:	1.19
A_x:	1.00
% Eccentricty	5%

Irregularity Check:	No Torsional Irregularity



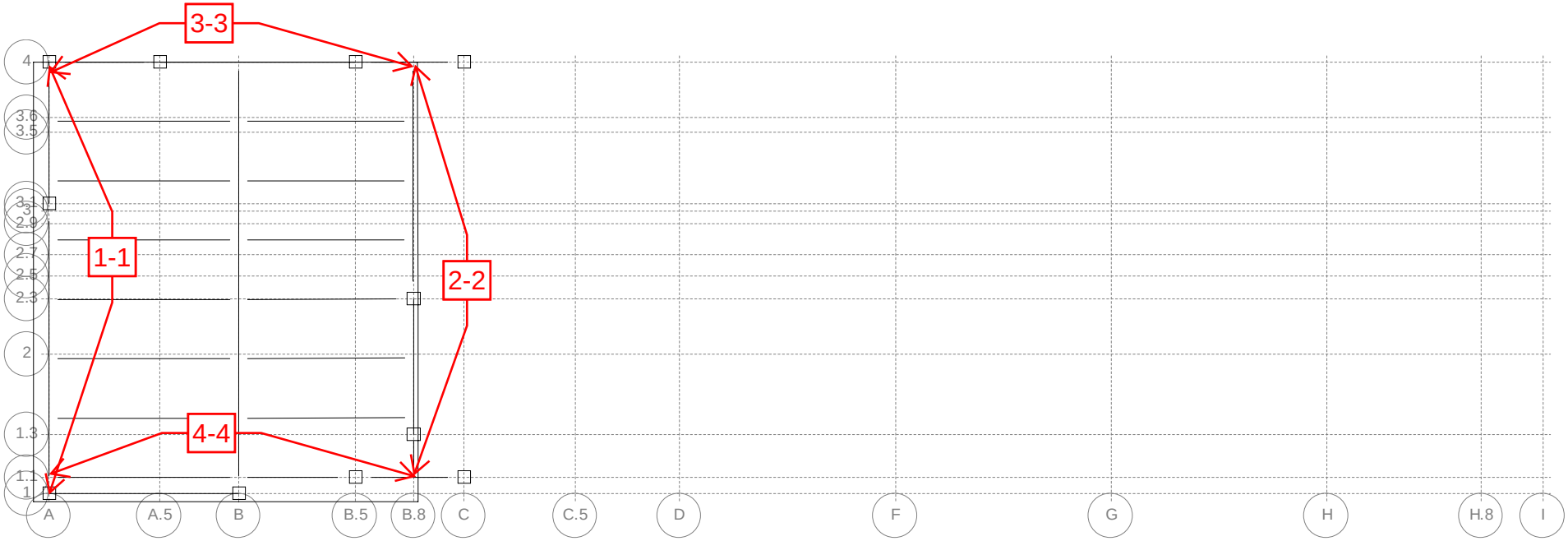
LOCATION	Δ_1 (in)	Δ_2 (in)	Δ_{max} (in)	Δ_{min} (in)	Δ_{avg} (in)	$\Delta_{max}/\Delta_{avg}$
1-1	0.0277	0.041	0.041	0.0277	0.03435	1.19
2-2	0.0434	0.0314	0.0434	0.0314	0.0374	1.16
3-3	0.0642	0.0823	0.0823	0.0642	0.07325	1.12
4-4	0.0843	0.0647	0.0843	0.0647	0.0745	1.13

Floor Map

RAM Steel 24.00.00.160
CCHS Field House Mezz
DataBase: CCHS Field House Mezz Phase 1
Building Code: IBC

08/30/24 15:00:20
Steel Code: AISC360-16 LRFD

Floor Type: First



Drift

1-1

RAM Structural System 24.00.00.160
CCHS Field House Mezz
DataBase: CCHS Field House Mezz Phase 1
Building Code: IBC

08/30/24 15:00:20
Steel Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.60
Scale Factor (Roof): 1.60 Scale Factor (Snow): 1.60
Ground Level: Base

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

Displacements for semirigid diaphragm are reported based on nodal displacements near to selected point.

RESULTS:

Location (ft): (0.100, 0.100)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	0.0036	-0.0030	0.0036	-0.0030	0.0000	0.0000
	Lp	0.0055	-0.0046	0.0055	-0.0046	0.0000	0.0000
	E1	0.0277	0.0125	0.0277	0.0125	0.0002	0.0001
	E2	0.0323	0.0084	0.0323	0.0084	0.0002	0.0000
	E3	0.0013	0.0800	0.0013	0.0800	0.0000	0.0004
	E4	-0.0025	0.0844	-0.0025	0.0844	0.0000	0.0005

Location (ft): (0.100, 48.500)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	-0.0015	-0.0040	-0.0015	-0.0040	0.0000	0.0000
	Lp	-0.0023	-0.0061	-0.0023	-0.0061	0.0000	0.0000
	E1	0.0410	0.0007	0.0410	0.0007	0.0002	0.0000
	E2	0.0355	-0.0034	0.0355	-0.0034	0.0002	0.0000
	E3	-0.0060	0.0642	-0.0060	0.0642	0.0000	0.0003

E4	-0.0018	0.0681	-0.0018	0.0681	0.0000	0.0004

TORSIONAL IRREGULARITY DATA:

X-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	E1	0.0277	(0.10 0.10)	0.0410	(0.10 48.50)	1.480	1.194

Y-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	E4	0.0844	(0.10 0.10)	0.0681	(0.10 48.50)	1.240	1.107

Drift

2-2

RAM Structural System 24.00.00.160
CCHS Field House Mezz
DataBase: CCHS Field House Mezz Phase 1
Building Code: IBC

08/30/24 15:00:20
Steel Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.60
Scale Factor (Roof): 1.60 Scale Factor (Snow): 1.60
Ground Level: Base

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

Displacements for semirigid diaphragm are reported based on nodal displacements near to selected point.

RESULTS:

Location (ft): (41.000, 2.000)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	0.0055	0.0018	0.0055	0.0018	0.0000	0.0000
	Lp	0.0084	0.0028	0.0084	0.0028	0.0000	0.0000
	E1	0.0379	-0.0015	0.0379	-0.0015	0.0002	0.0000
	E2	0.0434	0.0025	0.0434	0.0025	0.0002	0.0000
	E3	-0.0026	0.0687	-0.0026	0.0687	0.0000	0.0004
	E4	-0.0069	0.0647	-0.0069	0.0647	0.0000	0.0004

Location (ft): (41.000, 48.500)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	-0.0008	0.0015	-0.0008	0.0015	0.0000	0.0000
	Lp	-0.0012	0.0023	-0.0012	0.0023	0.0000	0.0000
	E1	0.0367	0.0079	0.0367	0.0079	0.0002	0.0000
	E2	0.0314	0.0116	0.0314	0.0116	0.0002	0.0001
	E3	-0.0003	0.0823	-0.0003	0.0823	0.0000	0.0004

E4	0.0040	0.0781	0.0040	0.0781	0.0000	0.0004

TORSIONAL IRREGULARITY DATA:

X-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	E2	0.0434	(41.00 2.00)	0.0314	(41.00 48.50)	1.381	1.160

Y-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	E3	0.0687	(41.00 2.00)	0.0823	(41.00 48.50)	1.197	1.090

Drift

3-3

RAM Structural System 24.00.00.160
CCHS Field House Mezz
DataBase: CCHS Field House Mezz Phase 1
Building Code: IBC

08/30/24 15:00:20
Steel Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.60
Scale Factor (Roof): 1.60 Scale Factor (Snow): 1.60
Ground Level: Base

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

Displacements for semirigid diaphragm are reported based on nodal displacements near to selected point.

RESULTS:

Location (ft): (0.100, 48.500)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	-0.0015	-0.0040	-0.0015	-0.0040	0.0000	0.0000
	Lp	-0.0023	-0.0061	-0.0023	-0.0061	0.0000	0.0000
	E1	0.0410	0.0007	0.0410	0.0007	0.0002	0.0000
	E2	0.0355	-0.0034	0.0355	-0.0034	0.0002	0.0000
	E3	-0.0060	0.0642	-0.0060	0.0642	0.0000	0.0003
	E4	-0.0018	0.0681	-0.0018	0.0681	0.0000	0.0004

Location (ft): (41.000, 48.500)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	-0.0008	0.0015	-0.0008	0.0015	0.0000	0.0000
	Lp	-0.0012	0.0023	-0.0012	0.0023	0.0000	0.0000
	E1	0.0367	0.0079	0.0367	0.0079	0.0002	0.0000
	E2	0.0314	0.0116	0.0314	0.0116	0.0002	0.0001
	E3	-0.0003	0.0823	-0.0003	0.0823	0.0000	0.0004

E4	0.0040	0.0781	0.0040	0.0781	0.0000	0.0004

TORSIONAL IRREGULARITY DATA:

X-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	E1	0.0410	(0.10 48.50)	0.0367	(41.00 48.50)	1.119	1.056

Y-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	E3	0.0642	(0.10 48.50)	0.0823	(41.00 48.50)	1.282	1.124

Drift

RAM Structural System 24.00.00.160
CCHS Field House Mezz
DataBase: CCHS Field House Mezz Phase 1
Building Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.60
Scale Factor (Roof): 1.60 Scale Factor (Snow): 1.60
Ground Level: Base

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

Displacements for semirigid diaphragm are reported based on nodal displacements near to selected point.

RESULTS:

Location (ft): (0.100, 2.000)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	0.0038	-0.0030	0.0038	-0.0030	0.0000	0.0000
	Lp	0.0058	-0.0047	0.0058	-0.0047	0.0000	0.0000
	E1	0.0298	0.0123	0.0298	0.0123	0.0002	0.0001
	E2	0.0342	0.0082	0.0342	0.0082	0.0002	0.0000
	E3	0.0018	0.0800	0.0018	0.0800	0.0000	0.0004
	E4	-0.0018	0.0843	-0.0018	0.0843	0.0000	0.0005

Location (ft): (41.000, 2.000)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	0.0055	0.0018	0.0055	0.0018	0.0000	0.0000
	Lp	0.0084	0.0028	0.0084	0.0028	0.0000	0.0000
	E1	0.0379	-0.0015	0.0379	-0.0015	0.0002	0.0000
	E2	0.0434	0.0025	0.0434	0.0025	0.0002	0.0000
	E3	-0.0026	0.0687	-0.0026	0.0687	0.0000	0.0004

E4	-0.0069	0.0647	-0.0069	0.0647	0.0000	0.0004

TORSIONAL IRREGULARITY DATA:

X-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	E2	0.0342	(0.10 2.00)	0.0434	(41.00 2.00)	1.267	1.118

Y-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	E4	0.0843	(0.10 2.00)	0.0647	(41.00 2.00)	1.302	1.131

SECTION BREAK

Lateral Analysis (Overview)

SUBSECTION BREAK

Structural Irregularities (Phase 2)

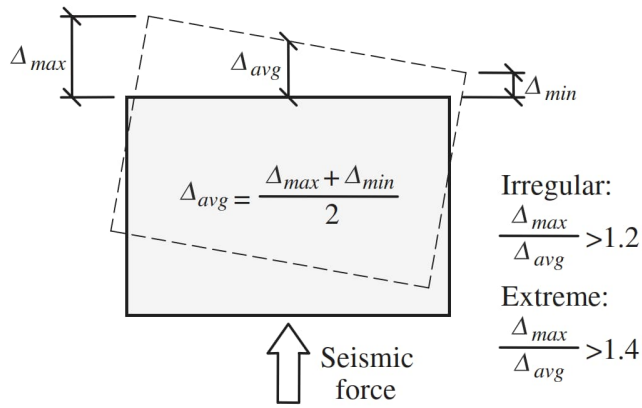
DESCRIPTION/NOTES:

Description details.

CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	MDK	DATE	9/10/2024
	SUBJECT	TORSION CHECK (Phase 2)	CHECKED		SHEET	

$\Delta_{max}/\Delta_{avg}$:	1.18
A_x:	1.00
% Eccentricty	5%

Irregularity Check:	No Torsional Irregularity



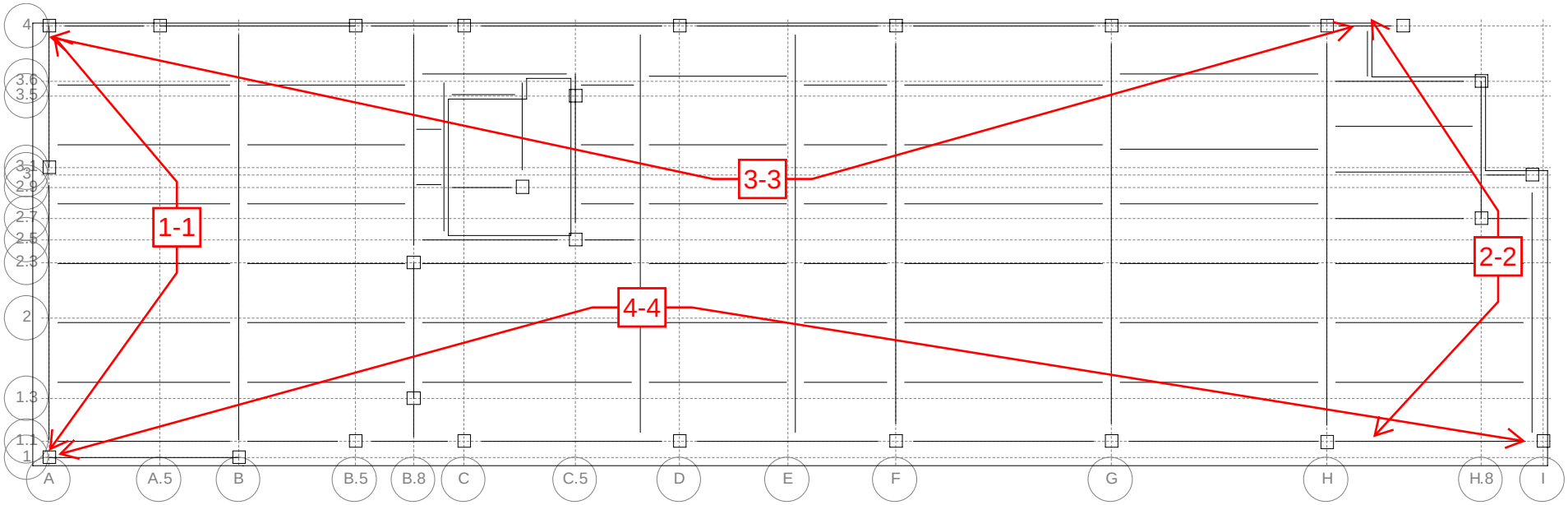
LOCATION	Δ_1 (in)	Δ_2 (in)	Δ_{max} (in)	Δ_{min} (in)	Δ_{avg} (in)	$\Delta_{max}/\Delta_{avg}$
1-1	0.1553	0.1517	0.1553	0.1517	0.1535	1.01
2-2	0.1552	0.1517	0.1552	0.1517	0.15345	1.01
3-3	0.1172	0.1614	0.1614	0.1172	0.1393	1.16
4-4	0.1172	0.1671	0.1671	0.1172	0.14215	1.18

Floor Map

RAM Steel 24.00.00.160
CCHS Field House Mezz
DataBase: CCHS Field House Mezz Phase 2
Building Code: IBC

08/30/24 10:44:12
Steel Code: AISC360-16 LRFD

Floor Type: First



Drift

1-1

RAM Structural System 24.00.00.160
CCHS Field House Mezz
DataBase: (Test) CCHS Field House Mezz Phase 2
Building Code: IBC

09/10/24 08:25:17
Steel Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.60
Scale Factor (Roof): 1.60 Scale Factor (Snow): 1.60
Ground Level: Base

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

RESULTS:

Location (ft): (0.500, 0.500)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	0.0025	-0.0017	0.0025	-0.0017	0.0000	0.0000
	Lp	0.0036	-0.0027	0.0036	-0.0027	0.0000	0.0000
	E1	0.1523	0.0042	0.1523	0.0042	0.0008	0.0000
	E2	0.1553	-0.0063	0.1553	-0.0063	0.0008	0.0000
	E3	0.0071	0.1172	0.0071	0.1172	0.0000	0.0006
	E4	-0.0032	0.1530	-0.0032	0.1530	0.0000	0.0008

Location (ft): (0.500, 48.750)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	0.0017	-0.0017	0.0017	-0.0017	0.0000	0.0000
	Lp	0.0025	-0.0027	0.0025	-0.0027	0.0000	0.0000
	E1	0.1548	0.0042	0.1548	0.0042	0.0008	0.0000
	E2	0.1517	-0.0063	0.1517	-0.0063	0.0008	0.0000
	E3	-0.0074	0.1172	-0.0074	0.1172	0.0000	0.0006
	E4	0.0034	0.1530	0.0034	0.1530	0.0000	0.0008

TORSIONAL IRREGULARITY DATA:

Drift

RAM Structural System 24.00.00.160
CCHS Field House Mezz
DataBase: (Test) CCHS Field House Mezz Phase 2
Building Code: IBC

09/10/24 08:25:17
Steel Code: IBC

X-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	E2	0.1553	(0.50 0.50)	0.1517	(0.50 48.75)	1.024	1.012

Y-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	———	0.0000	(0.00 0.00)	0.0000	(0.00 0.00)	99.999	99.999

Drift

2-2

RAM Structural System 24.00.00.160
CCHS Field House Mezz
DataBase: (Test) CCHS Field House Mezz Phase 2
Building Code: IBC

09/10/24 08:25:17
Steel Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.60
Scale Factor (Roof): 1.60 Scale Factor (Snow): 1.60
Ground Level: Base

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

RESULTS:

Location (ft): (148.000, 2.000)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	0.0024	0.0006	0.0024	0.0006	0.0000	0.0000
	Lp	0.0036	0.0007	0.0036	0.0007	0.0000	0.0000
	E1	0.1524	-0.0034	0.1524	-0.0034	0.0008	0.0000
	E2	0.1552	0.0050	0.1552	0.0050	0.0008	0.0000
	E3	0.0066	0.1614	0.0066	0.1614	0.0000	0.0009
	E4	-0.0030	0.1328	-0.0030	0.1328	0.0000	0.0007

Location (ft): (148.000, 48.750)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	0.0017	0.0006	0.0017	0.0006	0.0000	0.0000
	Lp	0.0025	0.0007	0.0025	0.0007	0.0000	0.0000
	E1	0.1548	-0.0034	0.1548	-0.0034	0.0008	0.0000
	E2	0.1517	0.0050	0.1517	0.0050	0.0008	0.0000
	E3	-0.0074	0.1614	-0.0074	0.1614	0.0000	0.0009
	E4	0.0034	0.1328	0.0034	0.1328	0.0000	0.0007

TORSIONAL IRREGULARITY DATA:

Drift

RAM Structural System 24.00.00.160
CCHS Field House Mezz
DataBase: (Test) CCHS Field House Mezz Phase 2
Building Code: IBC

09/10/24 08:25:17
Steel Code: IBC

X-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	E2	0.1552	(148.00 2.00)	0.1517	(148.00 48.75)	1.024	1.012

Y-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	———	0.0000	(0.00 0.00)	0.0000	(0.00 0.00)	99.999	99.999

Drift

3-3

RAM Structural System 24.00.00.160
CCHS Field House Mezz
DataBase: (Test) CCHS Field House Mezz Phase 2
Building Code: IBC

09/10/24 08:25:17
Steel Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.60
Scale Factor (Roof): 1.60 Scale Factor (Snow): 1.60
Ground Level: Base

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

RESULTS:

Location (ft): (0.500, 48.750)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	0.0017	-0.0017	0.0017	-0.0017	0.0000	0.0000
	Lp	0.0025	-0.0027	0.0025	-0.0027	0.0000	0.0000
	E1	0.1548	0.0042	0.1548	0.0042	0.0008	0.0000
	E2	0.1517	-0.0063	0.1517	-0.0063	0.0008	0.0000
	E3	-0.0074	0.1172	-0.0074	0.1172	0.0000	0.0006
	E4	0.0034	0.1530	0.0034	0.1530	0.0000	0.0008

Location (ft): (148.000, 48.750)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	0.0017	0.0006	0.0017	0.0006	0.0000	0.0000
	Lp	0.0025	0.0007	0.0025	0.0007	0.0000	0.0000
	E1	0.1548	-0.0034	0.1548	-0.0034	0.0008	0.0000
	E2	0.1517	0.0050	0.1517	0.0050	0.0008	0.0000
	E3	-0.0074	0.1614	-0.0074	0.1614	0.0000	0.0009
	E4	0.0034	0.1328	0.0034	0.1328	0.0000	0.0007

TORSIONAL IRREGULARITY DATA:

Drift

3-3

RAM Structural System 24.00.00.160
CCHS Field House Mezz
DataBase: (Test) CCHS Field House Mezz Phase 2
Building Code: IBC

09/10/24 08:25:17
Steel Code: IBC

X-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	———	0.0000	(0.00 0.00)	0.0000	(0.00 0.00)	99.999	99.999

Y-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	E3	0.1172	(0.50 48.75)	0.1614	(148.00 48.75)	1.377	1.159

Drift

4-4

RAM Structural System 24.00.00.160
CCHS Field House Mezz
DataBase: (Test) CCHS Field House Mezz Phase 2
Building Code: IBC

09/10/24 08:25:17
Steel Code: IBC

CRITERIA:

Rigid End Zones: Ignore Effects
Member Force Output: At Face of Joint
P-Delta: Yes Scale Factor (DL): 1.20 Scale Factor (LL): 1.60
Scale Factor (Roof): 1.60 Scale Factor (Snow): 1.60
Ground Level: Base

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

RESULTS:

Location (ft): (0.500, 2.250)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	0.0024	-0.0017	0.0024	-0.0017	0.0000	0.0000
	Lp	0.0036	-0.0027	0.0036	-0.0027	0.0000	0.0000
	E1	0.1524	0.0042	0.1524	0.0042	0.0008	0.0000
	E2	0.1552	-0.0063	0.1552	-0.0063	0.0008	0.0000
	E3	0.0066	0.1172	0.0066	0.1172	0.0000	0.0006
	E4	-0.0030	0.1530	-0.0030	0.1530	0.0000	0.0008

Location (ft): (167.000, 2.250)

Story	LdC	Displacement		Story Drift		Drift Ratio	
		X	Y	X	Y	X	Y
		in	in	in	in		
First	D	0.0024	0.0009	0.0024	0.0009	0.0000	0.0000
	Lp	0.0036	0.0011	0.0036	0.0011	0.0000	0.0000
	E1	0.1524	-0.0044	0.1524	-0.0044	0.0008	0.0000
	E2	0.1552	0.0064	0.1552	0.0064	0.0008	0.0000
	E3	0.0066	0.1671	0.0066	0.1671	0.0000	0.0009
	E4	-0.0030	0.1302	-0.0030	0.1302	0.0000	0.0007

TORSIONAL IRREGULARITY DATA:

Drift

4-4

RAM Structural System 24.00.00.160
CCHS Field House Mezz
DataBase: (Test) CCHS Field House Mezz Phase 2
Building Code: IBC

09/10/24 08:25:17
Steel Code: IBC

X-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	———	0.0000	(0.00 0.00)	0.0000	(0.00 0.00)	99.999	99.999

Y-Axis:

Story	LdC	Drift	Coord	Drift	Coord	Max/Min	Max/Ave
		in	ft	in	ft		
First	E3	0.1172	(0.50 2.25)	0.1671	(167.00 2.25)	1.426	1.175

SECTION BREAK

Lateral Design

SUBSECTION BREAK

Spot and Continuous Footings

DESCRIPTION/NOTES:

Description details.

Design Criteria

$Bearing := 1500\ psf$

INPUTS

REMB Moment Frame Reactions (Unfactored)

View "PEMB Moment Frame Reactions" Calculations for Reactions.

Dead Load Reactions		Live Load Reactions		Snow Load Reactions	
$D_{L\_M10} := 38\ kip$	Force on Grid 10	$L_{L\_M10} := 40\ kip$	Force on Grid 10	$S_{L\_M10} := 50\ kip$	Force on Grid 10
$D_{L\_M4} := 41\ kip$	Force on Grid 4	$L_{L\_M4} := 55\ kip$	Force on Grid 4	$S_{L\_M4} := 68\ kip$	Force on Grid 4
$D_{L\_M1} := 16\ kip$	Force on Grid 1	$L_{L\_M1} := 11\ kip$	Force on Grid 1	$S_{L\_M1} := 13.4\ kip$	Force on Grid 1

Vertical Seismic Forces		Horzontal Seismic Forces	
$T_{M\_EQ10} := 7\ kip$	Force on Grid 10	$V_{M\_EQ10} := 15\ kip$	Force on Grid 10
$T_{M\_EQ4} := 6.5\ kip$	Force on Grid 4	$V_{M\_EQ4} := 16.5\ kip$	Force on Grid 4
$T_{M\_EQ1} := 0.6\ kip$	Force on Grid 1	$V_{M\_EQ1} := 0.6\ kip$	Force on Grid 1

Vertical Wind Forces		Horzontal Wind Forces	
$T_{M\_W10} := 70\ kip$	Force on Grid 10	$V_{M\_W10} := 82\ kip$	Force on Grid 10
$T_{M\_W4} := 85\ kip$	Force on Grid 4	$V_{M\_W4} := 70\ kip$	Force on Grid 4
$T_{M\_W1} := 16\ kip$	Force on Grid 1	$V_{M\_W1} := 12\ kip$	Force on Grid 1

REMB Brace Frame Reactions (Unfactored)

View "PEMB Braced Frame Reactions" Calculations for Reactions.

Vertical Seismic Forces		Horzontal Seismic Forces	
$T_{B\_EQ10} := 70\ kip$	Force on Grid 10	$V_{B\_EQ10} := 50\ kip$	Force on Grid 10
$T_{B\_EQ4} := 80\ kip$	Force on Grid 4	$V_{B\_EQ4} := 65\ kip$	Force on Grid 4
$T_{B\_EQ1} := 20\ kip$	Force on Grid 1	$V_{B\_EQ1} := 15\ kip$	Force on Grid 1

Vertical Wind Forces		Horzontal Wind Forces	
$T_{B\_W10} := 22\ kip$	Force on Grid 10	$V_{B\_W10} := 16\ kip$	Force on Grid 10
$T_{B\_W4} := 18\ kip$	Force on Grid 4	$V_{B\_W4} := 15\ kip$	Force on Grid 4
$T_{B\_W1} := 7\ kip$	Force on Grid 1	$V_{B\_W1} := 6\ kip$	Force on Grid 1

Mezzanine Brace Frame Reactions (Unfactored)

From Ram

Vertical Seismic Forces		Horzontal Seismic Forces	
$T_{MB\_EQ1} := 92\ kip$	Force on Frame 1	$V_{MB\_EQ1} := 65\ kip$	Force on Frame 1
$T_{MB\_EQ2} := 75\ kip$	Force on Frame 2	$V_{MB\_EQ2} := 37\ kip$	Force on Frame 2
$T_{MB\_EQ3} := 87\ kip$	Force on Frame 3	$V_{MB\_EQ3} := 63\ kip$	Force on Frame 3
$T_{MB\_EQ4} := 72\ kip$	Force on Frame 4	$V_{MB\_EQ4} := 38\ kip$	Force on Frame 4
$T_{MB\_EQ5} := 126\ kip$	Force on Frame 5	$V_{MB\_EQ5} := 63.5\ kip$	Force on Frame 5

NOTE: Mezzanine Frame Numbers are Frame Numbers in Ram, Not ones that are shown on plan.

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Worst Case Spot Footing on Grid 1 (Grid G)

Mezzanine Column #7 (View Ram for Reactions Found Below)

$R_{DL} := 43\ kip$
$R_{LL} := 34\ kip$

Field House Moment Frame Column (View Risa 2D for Reactions Found Below)

$R_{DL} := D_{L\_M1} = 16.0\ kip$
$R_{RLL} := L_{L\_M1} = 11.0\ kip$
$R_{SL} := S_{L\_M1} = 13.4\ kip$
$R_{WL} := T_{M\_W1} = 16.0\ kip$
$R_{EQ} := T_{M\_EQ1} = 0.6\ kip$

Seismic Ev in Footing Spreadsheet was the sum of 0.2*SDS* $R_{DL} + R_{EQ}$

Continous Footing on Grid 1 (Grid A & B)

$L := 21.5\ ft$ Brace Frame Length btw Columns

Mezzanine Column #10 (Grid A) (View Ram for Reactions Found Below, Frame #1 in Ram)

$R_{DL.1} := 15\ kip$
$R_{LL.1} := 22\ kip$
$EQ_{vert} := T_{MB\_EQ1} = 92.0\ kip$ Vertical Seismic Reaction

Mezzanine Column #2 (Grid B) (View Ram for Reactions Found Below, Frame #1 in Ram)

$R_{DL.2} := 34\ kip$
$R_{LL.2} := 51\ kip$
$EQ_{vert} := T_{MB\_EQ1} = 92.0\ kip$ Vertical Seismic Reaction

Field House Moment Frame Column (Grid A so half trib)

$R_{DL.3} := D_{L\_M1} \div 2 = 8.0\ kip$ (View Risa 2D for Reactions Found Below)
$R_{RLL.1} := L_{L\_M1} \div 2 = 5.5\ kip$
$R_{SL.1} := S_{L\_M1} \div 2 = 6.7\ kip$

Field House Moment Frame Column (Grid B)

$R_{DL.4} := D_{L\_M1} = 16.0\ kip$ (View Risa 2D for Reactions Found Below)
$R_{RLL.2} := L_{L\_M1} = 11.0\ kip$
$R_{SL.2} := S_{L\_M1} = 13.4\ kip$

Spreadsheet Values

Dead Load

$D_{L\,total} := R_{DL.1} + R_{DL.3} + R_{DL.2} + R_{DL.4} = 73.0\ kip$
$D_{L.left} := R_{DL.1} + R_{DL.3} = 23.0\ kip$
$D_{L.right} := R_{DL.2} + R_{DL.4} = 50.0\ kip$

$M_{left} := \left(\frac{L}{2} - \left(D_{L.left}\right)\right) = 247.3\ ft\text{-}kip$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

$M_{right} := \frac{L}{2} \cdot \left(D_{L.right}\right) = 537500.0\ ft\text{-}lbf$

$M_{total} := M_{right} - M_{left} = 290.3\ kip\text{-}ft$

$e := \frac{M_{total}}{D_{Ltotal}} = 4.0\ ft$

Live Load

$LL_{total} := R_{LL.1} + R_{LL.2} = 73.0\ kip$
$LL_{left} := R_{LL.1} = 22000.0\ lbf$
$LL_{right} := R_{LL.2} = 51000.0\ lbf$

$M_{left} := \frac{L}{2} \cdot LL_{left} = 236.5\ ft\text{-}kip$

$M_{right} := \frac{L}{2} \cdot LL_{right} = 548.3\ ft\text{-}kip$

$M_{total} := M_{right} - M_{left} = 311.8\ kip\text{-}ft$

Roof Live Load

$RLL_{total} := R_{RLL.1} + R_{RLL.2} = 16.5\ kip$
$RLL_{left} := R_{RLL.1} = 5.5\ kip$
$RLL_{right} := R_{RLL.2} = 11.0\ kip$

$M_{left} := \frac{L}{2} \cdot RLL_{left} = 59.1\ ft\text{-}kip$

$M_{right} := \frac{L}{2} \cdot RLL_{right} = 118.3\ ft\text{-}kip$

$M_{total} := M_{right} - M_{left} = 59.1\ kip\text{-}ft$

Snow Load

$SL_{total} := R_{SL.1} + R_{SL.2} = 20.1\ kip$
$SL_{left} := R_{SL.1} = 6.7\ kip$
$SL_{right} := R_{SL.2} = 13.4\ kip$

$M_{left} := \frac{L}{2} \cdot R_{SL.1} = 72.0\ ft\text{-}kip$

$M_{right} := \frac{L}{2} \cdot R_{SL.2} = 144.1\ ft\text{-}kip$

$M_{total} := M_{right} - M_{left} = 72.0\ kip\text{-}ft$

Seismic Load

$M_{eq} := EQ_{vert} \cdot L = 1978.0\ kip\text{-}ft$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Punching Shear

$V_{punching.left.1} := D_{L.left} + LL_{left} = 45.0\ kip$
$V_{punching.left.2} := D_{L.left} + SL_{left} = 29.7\ kip$
$V_{punching.left.3} := D_{L.left} + 0.75 \cdot LL_{left} + 0.75\ SL_{left} = 44.5\ kip$
$V_{punching.left.6} := D_{L.left} + 0.7 \cdot EQ_{vert} = 87.4\ kip$
$V_{punching.left.7} := D_{L.left} + 0.525 \cdot EQ_{vert} + 0.75 \cdot LL_{left} + 0.75 \cdot SL_{left} = 92.8\ kip$
$V_{punching.right.1} := D_{L.right} + LL_{right} = 101.0\ kip$
$V_{punching.right.2} := D_{L.right} + SL_{right} = 63.4\ kip$
$V_{punching.right.3} := D_{L.right} + 0.75 \cdot LL_{right} + 0.75\ SL_{right} = 98.3\ kip$
$V_{punching.right.6} := D_{L.right} + 0.7 \cdot EQ_{vert} = 114.4\ kip$
$V_{punching.right.7} := D_{L.right} + 0.525 \cdot EQ_{vert} + 0.75 \cdot LL_{right} + 0.75 \cdot SL_{right} = 146.6\ kip$

Continous Footing on Grid 1 (BT Grid D & F)

$L := 24.33\ ft$ Brace Frame Length btw Columns

Mezzanine Column #5(Grid D) (View Ram for Reactions Found Below)

$R_{DL.1} := 42\ kip$
$R_{LL.1} := 64\ kip$

Mezzanine Column #6 (Grid F) (View Ram for Reactions Found Below)

$R_{DL.2} := 43\ kip$
$R_{LL.2} := 61\ kip$

Field House Moment Frame Column (Grid D)

$R_{DL.3} := D_{L\_M1} = 16.0\ kip$ (View Risa 2D for Reactions Found Below)
$R_{RLL.1} := L_{L\_M1} = 11.0\ kip$
$R_{SL.1} := S_{L\_M1} = 13.4\ kip$
$EQ_{vert} := T_{B\_EQ1} = 20.0\ kip$ Found in "PEMB Brace Frame Forces" Calcs
$W_{vert} := T_{B\_W1} = 7.0\ kip$ Found in "PEMB Brace Frame Forces" Calcs

Field House Moment Frame Column (Grid F)

$R_{DL.4} := D_{L\_M1}$ (View Risa 2D for Reactions Found Below)
$R_{RLL.2} := L_{L\_M1}$
$R_{SL.2} := S_{L\_M1}$
$EQ_{vert} := T_{B\_EQ1}$ Found in "PEMB Brace Frame Forces" Calcs
$W_{vert} := T_{B\_W1}$ Found in "PEMB Brace Frame Forces" Calcs

Spreadsheet Values

Dead Load

$D_{L.total} := R_{DL.1} + R_{DL.3} + R_{DL.2} + R_{DL.4} = 117.0\ kip$
$D_{L.left} := R_{DL.1} + R_{DL.3} = 58.0\ kip$
$D_{L.right} := R_{DL.2} + R_{DL.4} = 59.0\ kip$

$M_{left} := \frac{L}{2} \cdot \left(D_{L.left}\right) = 705570.0\ ft \cdot lbf$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

$M_{right} := \frac{L}{2} \cdot \left(D_{L.right}\right) = 717735.0\ ft\text{-}lbf$

$M_{total} := M_{right} - M_{left} = 12.2\ kip\text{-}ft$

Live Load

$LL_{total} := R_{LL.1} + R_{LL.2} = 125.0\ kip$
$LL_{left} := R_{LL.1} = 64.0\ kip$
$LL_{right} := R_{LL.2} = 61.0\ kip$

$M_{left} := \frac{L}{2} \cdot LL_{left} = 778.6\ ft\text{-}kip$

$M_{right} := \frac{L}{2} \cdot LL_{right} = 742.1\ ft\text{-}kip$

$M_{total} := M_{left} - M_{right} = 36.5\ kip\text{-}ft$

$e := \frac{M_{total}}{LL_{total}} = 0.3\ ft$

Roof Live Load

$RLL_{total} := R_{RLL.1} + R_{RLL.2} = 22.0\ kip$
$RLL_{left} := R_{RLL.1} = 11.0\ kip$
$RLL_{right} := R_{RLL.2} = 11.0\ kip$

$M_{left} := \frac{L}{2} \cdot RLL_{left} = 133.8\ ft\text{-}kip$

$M_{right} := \frac{L}{2} \cdot RLL_{right} = 133.8\ ft\text{-}kip$

$M_{total} := M_{right} - M_{left} = 0.0\ kip\text{-}ft$

Snow Load

$SL_{total} := R_{SL.1} + R_{SL.2} = 26.8\ kip$
$SL_{left} := R_{SL.1} = 13.4\ kip$
$SL_{right} := R_{SL.2} = 13.4\ kip$

$M_{left} := \frac{L}{2} \cdot R_{SL.1} = 163.0\ ft\text{-}kip$

$M_{right} := \frac{L}{2} \cdot R_{SL.2} = 163.0\ ft\text{-}kip$

$M_{total} := M_{right} - M_{left} = 0.0\ kip\text{-}ft$

Seismic Load

$M_{EQ} := EQ_{vert} \cdot L = 486.6\ kip\text{-}ft$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Wind Load

$M_{Wind} := W_{vert} \cdot L = 170.3\ kip \cdot ft$

Punching Shear

$V_{punching.left.1} := D_{L.left} + LL_{left} = 122.0\ kip$
$V_{punching.left.2} := D_{L.left} + SL_{left} = 71.4\ kip$
$V_{punching.left.3} := D_{L.left} + 0.75 \cdot LL_{left} + 0.75\ SL_{left} = 116.1\ kip$
$V_{punching.left.4} := D_{L.left} + 0.6\ W_{vert} = 62.2\ kip$
$V_{punching.left.5} := D_{L.left} + 0.75 \cdot LL_{left} + 0.75 \cdot 0.6\ W_{vert} + 0.75\ SL_{left} = 119.2\ kip$
$V_{punching.left.6} := D_{L.left} + 0.7 \cdot EQ_{vert} = 72.0\ kip$
$V_{punching.left.7} := D_{L.left} + 0.525 \cdot EQ_{vert} + 0.75 \cdot LL_{left} + 0.75 \cdot SL_{left} = 126.6\ kip$
$V_{punching.right.1} := D_{L.right} + LL_{right} = 120.0\ kip$
$V_{punching.right.2} := D_{L.right} + SL_{right} = 72.4\ kip$
$V_{punching.right.3} := D_{L.right} + 0.75 \cdot LL_{right} + 0.75\ SL_{right} = 114.8\ kip$
$V_{punching.right.4} := D_{L.right} + 0.6\ W_{vert} = 63.2\ kip$
$V_{punching.right.5} := D_{L.right} + 0.75 \cdot LL_{right} + 0.75 \cdot 0.6\ W_{vert} + 0.75\ SL_{right} = 118.0\ kip$
$V_{punching.right.6} := D_{L.right} + 0.7 \cdot EQ_{vert} = 73.0\ kip$
$V_{punching.right.7} := D_{L.right} + 0.525 \cdot EQ_{vert} + 0.75 \cdot LL_{right} + 0.75 \cdot SL_{right} = 125.3\ kip$

Worst Case Spot Footing on Grid 4 (Grid H)

Mezzanine Column #19 (View Ram for Reactions Found Below)

$R_{DL} := 34\ kip$
$R_{LL} := 33\ kip$

Field House Moment Frame Column (View Risa 2D for Reactions Found Below)

$R_{DL} := D_{L\_M4} = 41.0\ kip$
$R_{RLL} := L_{L\_M4} = 55.0\ kip$
$R_{SL} := S_{L\_M4} = 68.0\ kip$
$R_{WL} := T_{M\_W4} = 85.0\ kip$
$R_{EQ} := T_{M\_EQ4} = 6.5\ kip$

Seismic Ev in Footing Spreadsheet was the sum of 0.2*SDS* $R_{DL} + R_{EQ}$

Continous Footing on Grid 4 (Grid A & C)

$L := 22\ ft$ Brace Frame Length btw Columns

Mezzanine Column #13(Grid A.5) (View Ram for Reactions Found Below, Frame #3 in Ram)

$R_{DL.1} := 22\ kip$
$R_{LL.1} := 31\ kip$
$EQ_{vert} := T_{MB\_EQ3}$ Vertical Seismic Reaction

Mezzanine Column #14 (Grid B.5) (View Ram for Reactions Found Below, Frame #3 in Ram)

$R_{DL.2} := 22\ kip$
$R_{LL.2} := 30\ kip$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

$EQ_{vert} := T_{MB\_EQ3}$ Vertical Seismic Reaction

Field House Moment Frame Column (Grid B) (View Risa 2D for Reactions Found Below)

$R_{DL.4} := D_{L\_M4} = 41.0$ kip
$R_{RLL.2} := L_{L\_M4} = 55.0$ kip
$R_{SL.2} := S_{L\_M4} = 68.0$ kip

Column is located in the middle of brace from so loads do not need moments in SS calc

Spreadsheet Values

Dead Load

$D_{L.total} := R_{DL.1} + R_{DL.2} = 44.0$ kip
$D_{L.left} := R_{DL.1} = 22.0$ kip
$D_{L.right} := R_{DL.2} = 22.0$ kip

$M_{left} := \left(\frac{L}{2} - \left|D_{L.left}\right|\right) = 242.0$ kip-ft

$M_{right} := \left(\frac{L}{2} - \left|D_{L.right}\right|\right) = 242.0$ kip-ft

$M_{total} := M_{left} - M_{right} = 0.0$ kip-ft

$e := \left(\frac{M_{total}}{D_{L.total}}\right) = 0.00$ ft

Live Load

$LL_{total} := R_{LL.1} + R_{LL.2} = 61.0$ kip
$LL_{left} := R_{LL.1} = 31.0$ kip
$LL_{right} := R_{LL.2} = 30.0$ kip

$M_{left} := \left(\frac{L}{2} - LL_{left}\right) = 341.0$ ft-kip

$M_{right} := \left(\frac{L}{2} - LL_{right}\right) = 330.0$ ft-kip

$M_{total} := M_{left} - M_{right} = 11.0$ kip-ft

Seismic Load

$M_{eq} := EQ_{vert} \cdot L = 1914.0$ kip-ft

Punching Shear

$V_{punching.left.1} := D_{L.left} + LL_{left} = 53.0$ kip
$V_{punching.left.2} := D_{L.left} + SL_{left} = 35.4$ kip
$V_{punching.left.3} := D_{L.left} + 0.75 \cdot LL_{left} + 0.75\ SL_{left} = 55.3$ kip
$V_{punching.left.6} := D_{L.left} + 0.7 \cdot EQ_{vert} = 82.9$ kip
$V_{punching.left.7} := D_{L.left} + 0.525 \cdot EQ_{vert} + 0.75 \cdot LL_{left} + 0.75 \cdot SL_{left} = 101.0$ kip
$V_{punching.right.1} := D_{L.right} + LL_{right} = 52.0$ kip
$V_{punching.right.2} := D_{L.right} + SL_{right} = 35.4$ kip
$V_{punching.right.3} := D_{L.right} + 0.75 \cdot LL_{right} + 0.75\ SL_{right} = 54.6$ kip

Created with PTC Mathcad Express. See www.mathcad.com for more information.

$V_{punching.right.6} := D_{L.right} + 0.7 \cdot EQ_{vert} = 82.9\ kip$
$V_{punching.right.7} := D_{L.right} + 0.525 \cdot EQ_{vert} + 0.75 \cdot LL_{right} + 0.75 \cdot SL_{right} = 100.2\ kip$

Continous Footing on Grid 4 (BT Grid F & G)

$L := 24.33\ ft$ Brace Frame Length btw Columns

Mezzanine Column #17 (Grid F) (View Ram for Reactions Found Below)

$R_{DL.1} := 39\ kip$
$R_{LL.1} := 50\ kip$

Mezzanine Column #18 (Grid G) (View Ram for Reactions Found Below)

$R_{DL.2} := 40\ kip$
$R_{LL.2} := 36\ kip$

Field House Moment Frame Column (Grid F) (View Risa 2D for Reactions Found Below)

$R_{DL.3} := D_{L\_M4}$
$R_{RLL.1} := L_{L\_M4}$
$R_{SL.1} := S_{L\_M4}$
$EQ_{vert} := T_{B\_EQ4}$ Found in "PEMB Brace Frame Forces" Calcs
$W_{vert} := T_{B\_W4}$ Found in "PEMB Brace Frame Forces" Calcs

Field House Moment Frame Column (Grid G) (View Risa 2D for Reactions Found Below)

$R_{DL.4} := D_{L\_M4}$
$R_{RLL.2} := L_{L\_M4}$
$R_{SL.2} := S_{L\_M4}$
$EQ_{vert} := T_{B\_EQ4}$ Found in "PEMB Brace Frame Forces" Calcs
$W_{vert} := T_{B\_W4}$ Found in "PEMB Brace Frame Forces" Calcs

Spreadsheet Values

Dead Load

$D_{L.total} := R_{DL.1} + R_{DL.3} + R_{DL.2} + R_{DL.4} = 161.0\ kip$
$D_{L.left} := R_{DL.1} + R_{DL.3} = 80.0\ kip$
$D_{L.right} := R_{DL.2} + R_{DL.4} = 81.0\ kip$

$M_{left} := \frac{L}{2} \cdot \left(D_{L.left}\right) = 973200.0\ ft \cdot lbf$

$M_{right} := \frac{L}{2} \cdot \left(D_{L.right}\right) = 985365.0\ ft \cdot lbf$

$M_{total} := M_{right} - M_{left} = 12.2\ kip \cdot ft$

Live Load

$LL_{total} := R_{LL.1} + R_{LL.2} = 86.0\ kip$
$LL_{left} := R_{LL.1} = 50.0\ kip$
$LL_{right} := R_{LL.2} = 36.0\ kip$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

$M_{left} := \frac{L}{2} \cdot LL_{left} = 608.3\ ft\text{-}kip$

$M_{right} := \frac{L}{2} \cdot LL_{right} = 437.9\ ft\text{-}kip$

$M_{total} := M_{left} - M_{right} = 170.3\ kip\text{-}ft$

$e := \frac{M_{total}}{LL_{total}} = 2.0\ ft$

Roof Live Load

$RLL_{total} := R_{RLL.1} + R_{RLL.2} = 110.0\ kip$
$RLL_{left} := R_{RLL.1} = 55.0\ kip$
$RLL_{right} := R_{RLL.2} = 55.0\ kip$

$M_{left} := \frac{L}{2} \cdot RLL_{left} = 669.1\ ft\text{-}kip$

$M_{right} := \frac{L}{2} \cdot RLL_{right} = 669.1\ ft\text{-}kip$

$M_{total} := M_{right} - M_{left} = 0.0\ kip\text{-}ft$

Snow Load

$SL_{total} := R_{SL.1} + R_{SL.2} = 136.0\ kip$
$SL_{left} := R_{SL.1} = 68.0\ kip$
$SL_{right} := R_{SL.2} = 68.0\ kip$

$M_{left} := \frac{L}{2} \cdot R_{SL.1} = 827.2\ ft\text{-}kip$

$M_{right} := \frac{L}{2} \cdot R_{SL.2} = 827.2\ ft\text{-}kip$

$M_{total} := M_{right} - M_{left} = 0.0\ kip\text{-}ft$

Seismic Load

$M_{EQ} := EQ_{vert} \cdot L = 1946.4\ kip\text{-}ft$

Wind Load

$M_{Wind} := W_{vert} \cdot L = 437.9\ kip\text{-}ft$

<u>Punching Shear</u>

$V_{punching.left.1} := D_{L.left} + LL_{left} = 130.0\ kip$
$V_{punching.left.2} := D_{L.left} + SL_{left} = 148.0\ kip$
$V_{punching.left.3} := D_{L.left} + 0.75 \cdot LL_{left} + 0.75\ SL_{left} = 168.5\ kip$
$V_{punching.left.4} := D_{L.left} + 0.6\ W_{vert} = 90.8\ kip$
$V_{punching.left.5} := D_{L.left} + 0.75 \cdot LL_{left} + 0.75 \cdot 0.6\ W_{vert} + 0.75\ SL_{left} = 176.6\ kip$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

$V_{punching.left.6} := D_{L.left} + 0.7 \cdot EQ_{vert} = 136.0$ kip
$V_{punching.left.7} := D_{L.left} + 0.525 \cdot EQ_{vert} + 0.75 \cdot LL_{left} + 0.75 \cdot SL_{left} = 210.5$ kip
$V_{punching.right.1} := D_{L.right} + LL_{right} = 117.0$ kip
$V_{punching.right.2} := D_{L.right} + SL_{right} = 149.0$ kip
$V_{punching.right.3} := D_{L.right} + 0.75 \cdot LL_{right} + 0.75\ SL_{right} = 159.0$ kip
$V_{punching.right.4} := D_{L.right} + 0.6\ W_{vert} = 91.8$ kip
$V_{punching.right.5} := D_{L.right} + 0.75 \cdot LL_{right} + 0.75 \cdot 0.6\ W_{vert} + 0.75\ SL_{right} = 167.1$ kip
$V_{punching.right.6} := D_{L.right} + 0.7 \cdot EQ_{vert} = 137.0$ kip
$V_{punching.right.7} := D_{L.right} + 0.525 \cdot EQ_{vert} + 0.75 \cdot LL_{right} + 0.75 \cdot SL_{right} = 201.0$ kip

Worst Case Spot Footing on Grid 10(Grid H)

Field House Moment Frame Column (View Risa 2D for Reactions Found Below)

$R_{DL} := D_{L\_M10} = 38.0$ kip
$R_{RLL} := L_{L\_M10} = 40.0$ kip
$R_{SL} := S_{L\_M10} = 50.0$ kip
$R_{WL} := T_{M\_W10} = 70.0$ kip
$R_{EQ} := T_{M\_EQ10} = 7.0$ kip

Seismic Ev in Footing Spreadsheet was the sum of 0.2*SDS* $R_{DL} + R_{EQ}$

Continous Footing on Grid 10 (BT Grid C & D)

$L := 24.33$ ft Brace Frame Length btw Columns

Field House Moment Frame Column (Grid C) (View Risa 2D for Reactions Found Below)

$R_{DL.1} := D_{L\_M10}$
$R_{RLL.1} := L_{L\_M10}$
$R_{SL.1} := S_{L\_M10}$
$EQ_{vert} := T_{B\_EQ10}$ Found in "PEMB Brace Frame Forces" Calcs
$W_{vert} := T_{B\_W10}$ Found in "PEMB Brace Frame Forces" Calcs

Field House Moment Frame Column (Grid G) (View Risa 2D for Reactions Found Below)

$R_{DL.2} := D_{L\_M10}$
$R_{RLL.2} := L_{L\_M10}$
$R_{SL.2} := S_{L\_M10}$
$EQ_{vert} := T_{B\_EQ10}$ Found in "PEMB Brace Frame Forces" Calcs
$W_{vert} := T_{B\_W10}$ Found in "PEMB Brace Frame Forces" Calcs

Spreadsheet Values

Dead Load

$D_{L.total} := R_{DL.1} + R_{DL.2} = 76.0$ kip
$D_{L.left} := R_{DL.1} = 38.0$ kip
$D_{L.right} := R_{DL.2} = 38.0$ kip

$M_{left} := \frac{L}{2} \cdot \left(D_{L.left}\right) = 462.3$ kip-ft

Created with PTC Mathcad Express. See www.mathcad.com for more information.

$M_{right} := \left(\frac{L}{2} - \left|D_{L.right}\right|\right) = 462.3\ kip\text{-}ft$

$M_{total} := M_{left} - M_{right} = 0.0\ kip\text{-}ft$

$e := \left(\frac{M_{total}}{D_{L.total}}\right) = 0.00\ ft$

Roof Live Load

$RLL_{total} := R_{RLL.1} + R_{RLL.2} = 80.0\ kip$
$RLL_{left} := R_{RLL.1} = 40.0\ kip$
$RLL_{right} := R_{RLL.2} = 40.0\ kip$

$M_{left} := \left(\frac{L}{2} - RLL_{left}\right) = 486.6\ ft\text{-}kip$

$M_{right} := \left(\frac{L}{2} - RLL_{right}\right) = 486.6\ ft\text{-}kip$

$M_{total} := M_{left} - M_{right} = 0.0\ kip\text{-}ft$

Snow Load

$SL_{total} := R_{SL.1} + R_{SL.2} = 100.0\ kip$
$SL_{left} := R_{SL.1} = 50.0\ kip$
$SL_{right} := R_{SL.2} = 50.0\ kip$

$M_{left} := \left(\frac{L}{2} - R_{SL.1}\right) = 608.3\ ft\text{-}kip$

$M_{right} := \left(\frac{L}{2} - R_{SL.2}\right) = 608.3\ ft\text{-}kip$

$M_{total} := M_{right} - M_{left} = 0.0\ kip\text{-}ft$

Seismic Load

$M_{eq} := EQ_{vert} \cdot L = 1703.1\ kip\text{-}ft$

Wind Load

$M_{eq} := W_{vert} \cdot L = 535.3\ kip\text{-}ft$

<u>Punching Shear</u>

$V_{punching.left.2} := D_{L.left} + SL_{left} = 88.0\ kip$
$V_{punching.left.4} := D_{L.left} + 0.6\ W_{vert} = 51.2\ kip$
$V_{punching.left.6} := D_{L.left} + 0.7 \cdot EQ_{vert} = 87.0\ kip$
$V_{punching.right.2} := D_{L.right} + SL_{right} = 88.0\ kip$
$V_{punching.right.4} := D_{L.right} + 0.6\ W_{vert} = 51.2\ kip$
$V_{punching.right.6} := D_{L.right} + 0.7 \cdot EQ_{vert} = 87.0\ kip$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Continous Footing on Grid A (BT Grid 3&4)

$L := 16\ ft$ Brace Frame Length btw Columns

Field House Moment Frame Column (Grid 4) (View Risa 2D for Reactions Found Below)

$R_{DL.1} := D_{L\_M4} \div 2$

$R_{RLL.1} := L_{L\_M4} \div 2$ On outside, Loads are 1/2

$R_{SL.1} := S_{L\_M4} \div 2$

$EQ_{vert.1} := T_{M\_EQ4} \div 2$

$W_{vert} := T_{M\_W4} \div 2$

Mezzanine Column #12(Grid 4) (View Ram for Reactions Found Below, Frame #4 in Ram)

$R_{DL.2} := 7\ kip$

$R_{LL.1} := 9.5\ kip$

$EQ_{vert.2} := T_{MB\_EQ4}$ Vertical Seismic Reaction

Mezzanine Column #11(Grid 3) (View Ram for Reactions Found Below, Frame #4 in Ram)

$R_{DL.3} := 21\ kip$

$R_{LL.2} := 31\ kip$

$EQ_{vert.3} := T_{MB\_EQ4}$ Vertical Seismic Reaction

Spreadsheet Values

Dead Load

$D_{L.total} := R_{DL.1} + R_{DL.2} + R_{DL.3} = 48.5\ kip$

$D_{L.left} := R_{DL.1} + R_{DL.2} = 27.5\ kip$

$D_{L.right} := R_{DL.3} = 21.0\ kip$

$M_{left} := \frac{L}{2} \cdot D_{L.left} = 220.0\ kip \cdot ft$

$M_{right} := \frac{L}{2} \cdot D_{L.right} = 168.0\ kip \cdot ft$

$M_{total} := M_{left} - M_{right} = 52.0\ kip \cdot ft$

$e := \frac{M_{total}}{D_{L.total}} = 1.1\ ft$

Live Load

$LL_{total} := R_{LL.1} + R_{LL.2} = 40.5\ kip$

$LL_{left} := R_{LL.1} = 9.5\ kip$

$LL_{right} := R_{LL.2} = 31.0\ kip$

$M_{left} := \frac{L}{2} \cdot LL_{left} = 76.0\ ft \cdot kip$

$M_{right} := \frac{L}{2} \cdot LL_{right} = 248.0\ ft \cdot kip$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

$M_{total} := M_{left} - M_{right} = -172.0\ kip\text{-}ft$

Roof Live Load

$RLL_{total} := R_{RLL.1} = 27.5\ kip$
$RLL_{left} := R_{RLL.1} = 27.5\ kip$

$M_{left} := \frac{L}{2} \cdot RLL_{left} = 220.0\ ft\text{-}kip$

$M_{total} := M_{left} = 220.0\ kip\text{-}ft$

Snow Load

$SL_{total} := R_{SL.1} = 34.0\ kip$
$SL_{left} := R_{SL.1} = 34.0\ kip$

$M_{left} := \frac{L}{2} \cdot R_{SL.1} = 272.0\ ft\text{-}kip$

$M_{total} := M_{left} = 272.0\ kip\text{-}ft$

Seismic Load

$M_{eq} := EQ_{vert.2} \cdot L = 1152.0\ kip\text{-}ft$ Acconting for Seismic in Moment Frame will only help so not taken into consideration

Wind Load

$M_{eq} := W_{vert} \cdot \frac{L}{2} = 340.0\ kip\text{-}ft$

<u>Punching Shear</u>

$V_{punching.left.1} := D_{L.left} + LL_{left} = 37.0\ kip$
$V_{punching.left.2} := D_{L.left} + SL_{left} = 61.5\ kip$
$V_{punching.left.3} := D_{L.left} + 0.75 \cdot LL_{left} + 0.75\ SL_{left} = 60.1\ kip$
$V_{punching.left.4} := D_{L.left} + 0.6\ W_{vert} = 53.0\ kip$
$V_{punching.left.5} := D_{L.left} + 0.75 \cdot LL_{left} + 0.75 \cdot 0.6\ W_{vert} + 0.75\ SL_{left} = 79.3\ kip$
$V_{punching.left.6} := D_{L.left} + 0.7 \cdot \left(EQ_{vert.1} + EQ_{vert.2}\right) = 80.2\ kip$

$V_{punching.left.7} := D_{L.left} + 0.525 \cdot \left(EQ_{vert.1} + EQ_{vert.2}\right) + 0.75 \cdot LL_{left} + 0.75 \cdot SL_{left} = 99.6\ kip$

$V_{punching.right.1} := D_{L.right} + LL_{right} = 52.0\ kip$
$V_{punching.right.4} := D_{L.right} + 0.6\ W_{vert} = 46.5\ kip$
$V_{punching.right.6} := D_{L.right} + 0.7 \cdot EQ_{vert.3} = 71.4\ kip$
$V_{punching.right.7} := D_{L.right} + 0.525 \cdot EQ_{vert.3} + 0.75 \cdot LL_{right} + 0.75 \cdot SL_{right} = 119.6\ kip$

<u>Continous Footing on Grid B.9 (BT Grid 1 & 3) (FRAME #2 in RAM)</u>

$L := 15.33\ ft$ Brace Frame Length btw Columns

Mezzanine Column #23(Grid 1) (View Ram for Reactions Found Below)

$R_{DL.1} := 15.5\ kip$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

$R_{LL.1} := 23\ kip$
$EQ_{vert} := T_{MB\_EQ2}$ Vertical Seismic Reaction

Mezzanine Column #24 (Grid 3) (View Ram for Reactions Found Below)

$R_{DL.2} := 28\ kip$
$R_{LL.2} := 41\ kip$
$EQ_{vert} := T_{MB\_EQ2}$ Vertical Seismic Reaction

Spreadsheet Values

Dead Load

$D_{Ltotal} := R_{DL.1} + R_{DL.2} = 43.5\ kip$
$D_{L.left} := R_{DL.1} = 15.5\ kip$
$D_{L.right} := R_{DL.2} = 28.0\ kip$

$M_{left} := \frac{L}{2} \cdot \left(D_{L.left}\right) = 118807.5\ ft\text{-}lbf$

$M_{right} := \frac{L}{2} \cdot \left(D_{L.right}\right) = 214620.0\ ft\text{-}lbf$

$M_{total} := M_{right} - M_{left} = 95.8\ kip\text{-}ft$

$e := \frac{M_{total}}{D_{Ltotal}} = 2.2\ ft$

Live Load

$LL_{total} := R_{LL.1} + R_{LL.2} = 64.0\ kip$
$LL_{left} := R_{LL.1} = 23.0\ kip$
$LL_{right} := R_{LL.2} = 41.0\ kip$

$M_{left} := \frac{L}{2} \cdot LL_{left} = 176.3\ ft\text{-}kip$

$M_{right} := \frac{L}{2} \cdot LL_{right} = 314.3\ ft\text{-}kip$

$M_{total} := M_{right} - M_{left} = 138.0\ kip\text{-}ft$

Seismic Load

$M_{eq} := EQ_{vert} \cdot L = 1149.8\ kip\text{-}ft$

Punching Shear

$V_{punching.left.1} := D_{L.left} + LL_{left} = 38.5\ kip$
$V_{punching.left.6} := D_{L.left} + 0.7 \cdot EQ_{vert} = 68.0\ kip$
$V_{punching.left.7} := D_{L.left} + 0.525 \cdot EQ_{vert} + 0.75 \cdot LL_{left} = 72.1\ kip$
$V_{punching.right.1} := D_{L.right} + LL_{right} = 69.0\ kip$
$V_{punching.right.6} := D_{L.right} + 0.7 \cdot EQ_{vert} = 80.5\ kip$
$V_{punching.right.7} := D_{L.right} + 0.525 \cdot EQ_{vert} + 0.75 \cdot LL_{right} = 98.1\ kip$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Continous Footing on Grid H.5 (BT Grid 2 & 4) (FRAME #5 in RAM)

$L := 15.5\ ft$ Brace Frame Length btw Columns

Mezzanine Column #21 (Grid 2) (View Ram for Reactions Found Below)

$R_{DL.1} := 8\ kip$

$R_{LL.1} := 14\ kip$

$EQ_{vert} := T_{MB\_EQ5}$ Vertical Seismic Reaction

Mezzanine Column #24 (Grid 3) (View Ram for Reactions Found Below)

$R_{DL.2} := 7\ kip$

$R_{LL.2} := 11\ kip$

$EQ_{vert} := T_{MB\_EQ5}$ Vertical Seismic Reaction

Spreadsheet Values

Dead Load

$D_{Ltotal} := R_{DL.1} + R_{DL.2} = 15.0\ kip$

$D_{L.left} := R_{DL.1} = 8.0\ kip$

$D_{L.right} := R_{DL.2} = 7.0\ kip$

$M_{left} := \frac{L}{2} \cdot D_{L.left} = 62000.0\ ft\text{-}lbf$

$M_{right} := \frac{L}{2} \cdot D_{L.right} = 54250.0\ ft\text{-}lbf$

$M_{total} := M_{left} - M_{right} = 7.8\ kip\text{-}ft$

$e := \frac{M_{total}}{D_{Ltotal}} = 0.5\ ft$

Live Load

$LL_{total} := R_{LL.1} + R_{LL.2} = 25.0\ kip$

$LL_{left} := R_{LL.1} = 14.0\ kip$

$LL_{right} := R_{LL.2} = 11.0\ kip$

$M_{left} := \frac{L}{2} \cdot LL_{left} = 108.5\ ft\text{-}kip$

$M_{right} := \frac{L}{2} \cdot LL_{right} = 85.3\ ft\text{-}kip$

$M_{total} := M_{right} - M_{left} = -23.3\ kip\text{-}ft$

Seismic Load

$M_{eq} := EQ_{vert} \cdot L = 1953.0\ kip\text{-}ft$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Punching Shear

$V_{punching.left.1} := D_{L.left} + LL_{left} = 22.0\ kip$
$V_{punching.left.6} := D_{L.left} + 0.7 \cdot EQ_{vert} = 96.2\ kip$
$V_{punching.left.7} := D_{L.left} + 0.525 \cdot EQ_{vert} + 0.75 \cdot LL_{left} = 84.7\ kip$
$V_{punching.right.1} := D_{L.right} + LL_{right} = 18.0\ kip$
$V_{punching.right.6} := D_{L.right} + 0.7 \cdot EQ_{vert} = 95.2\ kip$
$V_{punching.right.7} := D_{L.right} + 0.525 \cdot EQ_{vert} + 0.75 \cdot LL_{right} = 81.4\ kip$

TYP Spot Footing on Grid A&I Field House Columns

Gravity Loads

$D_L := 15\ psf$
$S_L := 25\ psf$

$Trib_{columns} := \left(\frac{55.6\ ft}{2}\right) = 27.8\ ft$

$Trib_{Girders} := \left(\frac{24.5\ ft}{2}\right) = 12.3\ ft$

$P_{DL} := D_L \cdot Trib_{columns} \cdot Trib_{Girders} = 5.11\ kip$

$P_{SL} := S_L \cdot Trib_{columns} \cdot Trib_{Girders} = 8.51\ kip$

Wind Loading

$P_s := 19\ psf$ See "Main Wind Force Resisting System" Calculation

$Trib := \left(\frac{55.6\ ft}{2}\right) = 27.8\ ft$

$L_{col} := 36.5\ ft$

$V_{wind} := \left(\frac{L_{col}}{2}\right) \cdot Trib \cdot P_s = 9.6\ kip$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	MDK	DATE	10/2/2024
	SUBJECT	Combined Footings	CHECKED		SHEET	

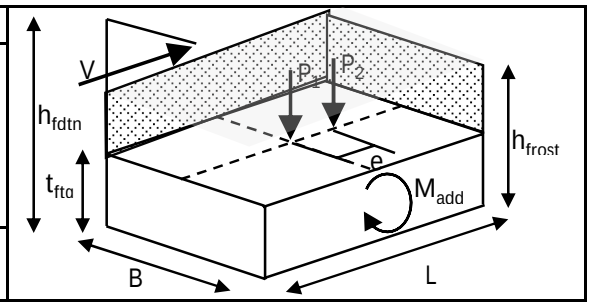
Footing Designation: WC Spot Footing on Grid 1

Note: Seismic Uplift from Moment Frame was added to Ev with DL*K_{EV}

FOOTING DIMENSIONS & PROPERTIES								DESIGN CHECK	
L:	10 ft	e:	0.67 ft	K_{Ev}:	0.1984	☐ Include Self-Weight		DCR_q:	0.86
B:	10 ft	S_{DS}:	0.992	L/6:	1.666666667 ft	☐ Use 100% Self-Weight		DCR_V:	0.00
t_{ftg}:	2 ft	μ:	0.35	A_{ftg}:	100 ft²	DL_{self}:	30 kip	DCR_L:	0.49
h_{frost}:	2 ft	p_{allow}:	1500 psf	S_{xftg}:	166.6666667 ft³	Controlling Load Combo:		Design:	OK
h_{fdtn}:	2 ft	%+EQ:	30%	$p_{allowEQ}$:	1950 psf	D + 0.75L + 0.75(0.6W) + 0.75S		Rebar:	Bottom Only

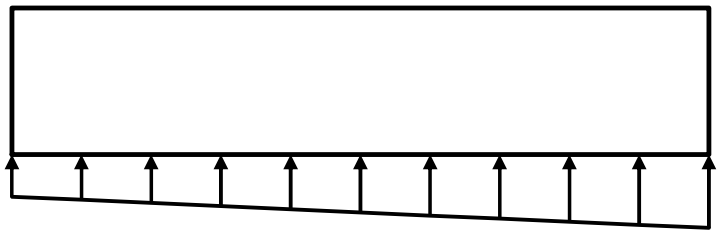
LOADING

	DL	LL	L_rL	SL	WL	Eh	Ev	DL_{self}	
P_1:	16	0	11	13.4	16		3.7744	0	kip
P_2:	43	34	0	0	0		8.5312		kip
M_{add}:	0	0	0	0	0	0			kip-ft
V:	0	0	0	0	0	0			kip
P_{total}:	59.0	34.0	11.0	13.4	16.0	0.0	12.3	0.0	kip
M_{total}:	28.8	22.8	0.0	0.0	0.0	0.0	0.0	N/A	kip-ft



INDIVIDUAL LOAD COMBINATION BREAKDOWN

	Controlling Combo
q_{max}:	1293 psf
q_{min}:	742 psf
V:	35.61 kip
e:	0.45
Kern:	Inside
DCR_q:	0.86
DCR_V:	0.00
DCR_L:	0.49



CALCULATIONS (BY LOAD COMBINATION)

LC	1	2	3	4	5	6	7	8	9	10	11	12	13	9	
P_{total}:	59.0	93.0	70.0	72.4	92.8	94.6	68.6	100.0	101.8	45.0	67.6	101.0	26.8	101.8	kip
M_{total}:	28.8	51.6	28.8	28.8	45.9	45.9	28.8	45.9	45.9	17.3	28.8	45.9	17.3	45.9	kip-ft
V_{total}:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	kip
e:	0.49	0.55	0.41	0.40	0.49	0.49	0.42	0.46	0.45	0.38	0.43	0.45	0.65	0.45	ft
Kern:	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	
q_{max}:	763	1240	873	897	1203	1221	859	1275	1293	554	849	1285	372	1293	psf
q_{min}:	417	620	527	551	652	670	513	724	742	346	503	735	164	742	psf
V_{slide}:	20.7	32.6	24.5	25.3	32.5	33.1	24.0	35.0	35.6	15.8	23.7	35.4	9.4	35.6	kip
L_{load}:	13.5	13.3	13.8	13.8	13.5	13.5	13.7	13.6	13.6	13.8	13.7	13.6	13.1	13.6	ft
$L_{loadmin}$:	1.76	2.00	1.48	1.43	1.78	1.75	1.51	1.65	1.62	1.38	1.53	1.64	2.32	1.62	ft
DCR_q:	0.51	0.83	0.58	0.60	0.80	0.81	0.57	0.85	0.86	0.37	0.44	0.66	0.19	0.86	
DCR_V:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
DCR_L:	0.49	0.50	0.48	0.48	0.49	0.49	0.49	0.49	0.49	0.48	0.49	0.49	0.51	0.49	

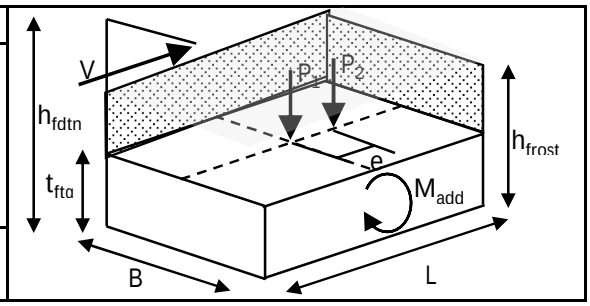
CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	MDK	DATE	10/2/2024
	SUBJECT	Combined Footings	CHECKED		SHEET	

Footing Designation: Cont Footing on Grid 1 (BT A and B)

FOOTING DIMENSIONS & PROPERTIES								DESIGN CHECK	
L:	30 ft	e:	4 ft	K_{Ev}:	0.1984	☑ Include Self-Weight		DCR_q:	0.97
B:	12 ft	S_{DS}:	0.992	L/6:	5 ft	☑ Use 100% Self-Weight		DCR_V:	0.00
t_{ftg}:	2 ft	μ:	0.35	A_{ftg}:	360 ft²	DL_{self}:	187.2 kip	DCR_L:	0.64
h_{frost}:	4 ft	p_{allow}:	1500 psf	S_{xftg}:	1800 ft³	Controlling Load Combo:		Design:	OK
h_{fdtn}:	4 ft	%+EQ:	30%	$p_{allowEQ}$:	1950 psf	D + 0.525Ev + 0.75L + 0.75S		Rebar:	Top & Bottom

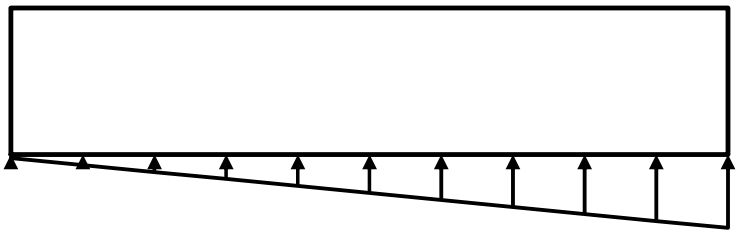
LOADING

	DL	LL	L_rL	SL	WL	Eh	Ev	DL_{self}	
P_1:	0	73	16.5	20.1	0		37.14	187.2	kip
P_2:	73	0	0	0	0		14.483		kip
M_{add}:	0	312	59.1	72	0	1978			kip-ft
V:	0	0	0	0	0	0			kip
P_{total}:	73.0	73.0	16.5	20.1	0.0	0.0	51.6	187.2	kip
M_{total}:	292.0	312.0	59.1	72.0	0.0	1978.0	0.0	N/A	kip-ft



INDIVIDUAL LOAD COMBINATION BREAKDOWN

	Controlling Combo
q_{max}:	1891 psf
q_{min}:	93 psf
V:	124.99 kip
e:	4.53
Kern:	Inside
DCR_q:	0.97
DCR_V:	0.00
DCR_L:	0.64



CALCULATIONS (BY LOAD COMBINATION)

LC	1	2	3	4	5	6	7	8	9	10	11	12	13	12	
P_{total}:	260.2	333.2	276.7	280.3	327.3	330.0	260.2	327.3	330.0	231.0	296.3	357.1	194.9	357.1	kip
M_{total}:	292.0	604.0	351.1	364.0	570.3	580.0	292.0	570.3	580.0	175.2	1676.6	1618.5	1559.8	1618.5	kip-ft
V_{total}:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	kip
e:	1.12	1.81	1.27	1.30	1.74	1.76	1.12	1.74	1.76	0.76	5.66	4.53	8.00	4.53	ft
Kern:	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Outside	Inside	
q_{max}:	885	1261	964	981	1226	1239	885	1226	1239	739	1762	1891	1548	1891	psf
q_{min}:	561	590	574	576	592	595	561	592	595	544	0	93	0	93	psf
V_{slide}:	91.1	116.6	96.8	98.1	114.6	115.5	91.1	114.6	115.5	80.9	103.7	125.0	68.2	125.0	kip
L_{load}:	41.6	39.6	41.2	41.1	39.8	39.7	41.6	39.8	39.7	42.7	28.0	31.4	21.0	31.4	ft
$L_{loadmin}$:	4.04	6.53	4.57	4.67	6.27	6.33	4.04	6.27	6.33	2.73	20.37	16.31	28.82	16.31	ft
DCR_q:	0.59	0.84	0.64	0.65	0.82	0.83	0.59	0.82	0.83	0.49	0.90	0.97	0.79	0.97	
DCR_V:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
DCR_L:	0.48	0.51	0.49	0.49	0.50	0.50	0.48	0.50	0.50	0.47	0.71	0.64	0.96	0.64	

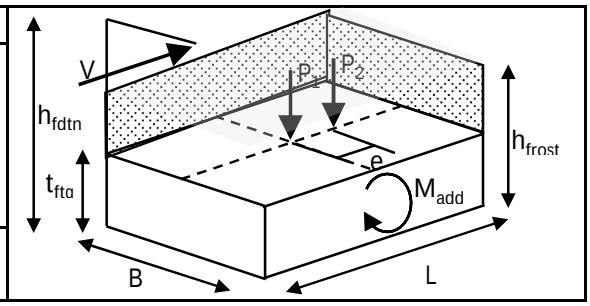
CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	MDK	DATE	10/2/2024
	SUBJECT	Combined Footings	CHECKED		SHEET	

Footing Designation: Cont Footing on Grid 1 (BT D and F)

FOOTING DIMENSIONS & PROPERTIES								DESIGN CHECK	
L:	28 ft	e:	0.3 ft	K_{Ev}:	0.1984	☑ Include Self-Weight		DCR_q:	0.96
B:	10 ft	S_{DS}:	0.992	L/6:	4.666666667 ft	☑ Use 100% Self-Weight		DCR_V:	0.00
t_{ftg}:	2 ft	μ:	0.35	A_{ftg}:	280 ft²	DL_{self}:	145.6 kip	DCR_L:	0.45
h_{frost}:	4 ft	p_{allow}:	1500 psf	S_{xftg}:	1306.666667 ft³	Controlling Load Combo:		Design:	OK
h_{fdtn}:	4 ft	%+EQ:	30%	$p_{allowEQ}$:	1950 psf	D + 0.75L + 0.75(0.6W) + 0.75S		Rebar:	Bottom Only

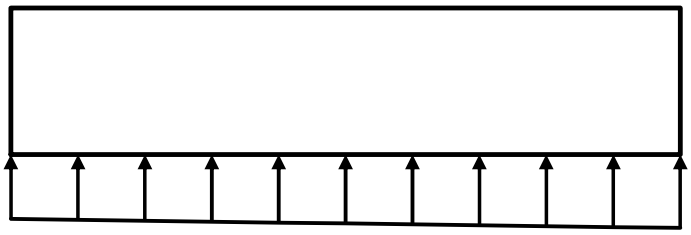
LOADING

	DL	LL	L_rL	SL	WL	Eh	Ev	DL_{self}	
P_1:	117	0	22	26.8	0		52.1	145.6	kip
P_2:	0	125	0	0	0		0		kip
M_{add}:	12.2	0	0	0	170.3	487			kip-ft
V:	0	0	0	0	0	0			kip
P_{total}:	117.0	125.0	22.0	26.8	0.0	0.0	52.1	145.6	kip
M_{total}:	12.2	37.5	0.0	0.0	170.3	487.0	0.0	N/A	kip-ft



INDIVIDUAL LOAD COMBINATION BREAKDOWN

	Controlling Combo
q_{max}:	1434 psf
q_{min}:	1255 psf
V:	131.76 kip
e:	0.31
Kern:	Inside
DCR_q:	0.96
DCR_V:	0.00
DCR_L:	0.45



CALCULATIONS (BY LOAD COMBINATION)

LC	1	2	3	4	5	6	7	8	9	10	11	12	13	9	
P_{total}:	262.6	387.6	284.6	289.4	372.9	376.5	262.6	372.9	376.5	215.8	299.1	403.8	179.3	376.5	kip
M_{total}:	12.2	49.7	12.2	12.2	40.3	40.3	114.4	117.0	117.0	109.5	353.1	296.0	348.2	117.0	kip-ft
V_{total}:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	kip
e:	0.05	0.13	0.04	0.04	0.11	0.11	0.44	0.31	0.31	0.51	1.18	0.73	1.94	0.31	ft
Kern:	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	
q_{max}:	947	1422	1026	1043	1362	1375	1025	1421	1434	855	1338	1669	907	1434	psf
q_{min}:	929	1346	1007	1024	1301	1314	850	1242	1255	687	798	1216	374	1255	psf
V_{slide}:	91.9	135.7	99.6	101.3	130.5	131.8	91.9	130.5	131.8	75.5	104.7	141.3	62.8	131.8	kip
L_{load}:	41.9	41.6	41.9	41.9	41.7	41.7	40.7	41.1	41.1	40.5	38.5	39.8	36.2	41.1	ft
$L_{loadmin}$:	0.17	0.46	0.15	0.15	0.39	0.39	1.57	1.13	1.12	1.83	4.25	2.64	6.99	1.12	ft
DCR_q:	0.63	0.95	0.68	0.70	0.91	0.92	0.68	0.95	0.96	0.57	0.69	0.86	0.47	0.96	
DCR_V:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
DCR_L:	0.45	0.45	0.45	0.45	0.45	0.45	0.46	0.45	0.45	0.46	0.49	0.47	0.52	0.45	

CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	MDK	DATE	10/2/2024
	SUBJECT	Combined Footings	CHECKED		SHEET	

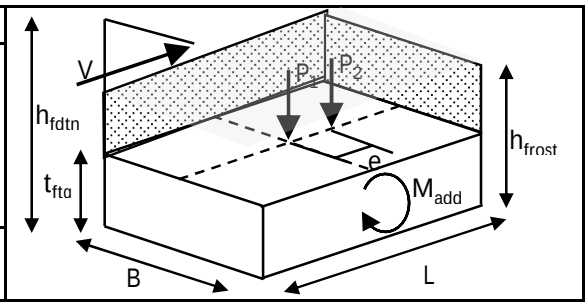
Footing Designation: WC Spot Footing on Grid 4

Note: Seismic Uplift from Moment Frame was added to Ev with DL*K_{EV}

FOOTING DIMENSIONS & PROPERTIES								DESIGN CHECK	
L:	12 ft	e:	0.67 ft	K_{Ev}:	0.1984	☐ Include Self-Weight		DCR_q:	0.97
B:	12 ft	S_{DS}:	0.992	L/6:	2 ft	☐ Use 100% Self-Weight		DCR_V:	0.00
t_{ftg}:	2 ft	μ:	0.35	A_{ftg}:	144 ft²	DL_{self}:	43.2 kip	DCR_L:	0.46
h_{frost}:	2 ft	p_{allow}:	1500 psf	S_{xftg}:	288 ft³	Controlling Load Combo:		Design:	OK
h_{fdtn}:	2 ft	%+EQ:	30%	$p_{allowEQ}$:	1950 psf	D + 0.75L + 0.75(0.6W) + 0.75S		Rebar:	Bottom Only

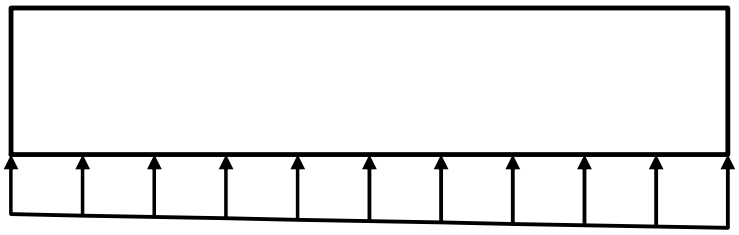
LOADING

	DL	LL	L_rL	SL	WL	Eh	Ev	DL_{self}	
P_1:	41	0	55	68	85		14.634	0	kip
P_2:	34	33	0	0	0		6.7456		kip
M_{add}:	0	0	0	0	0	0			kip-ft
V:	0	0	0	0	0	0			kip
P_{total}:	75.0	33.0	55.0	68.0	85.0	0.0	21.4	0.0	kip
M_{total}:	22.8	22.1	0.0	0.0	0.0	0.0	0.0	N/A	kip-ft



INDIVIDUAL LOAD COMBINATION BREAKDOWN

	Controlling Combo
q_{max}:	1449 psf
q_{min}:	1176 psf
V:	66.15 kip
e:	0.21
Kern:	Inside
DCR_q:	0.97
DCR_V:	0.00
DCR_L:	0.46



CALCULATIONS (BY LOAD COMBINATION)

LC	1	2	3	4	5	6	7	8	9	10	11	12	13	9	
P_{total}:	75.0	108.0	130.0	143.0	141.0	150.8	126.0	179.3	189.0	96.0	90.0	162.0	30.0	189.0	kip
M_{total}:	22.8	44.9	22.8	22.8	39.4	39.4	22.8	39.4	39.4	13.7	22.8	39.4	13.7	39.4	kip-ft
V_{total}:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	kip
e:	0.30	0.42	0.18	0.16	0.28	0.26	0.18	0.22	0.21	0.14	0.25	0.24	0.46	0.21	ft
Kern:	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	
q_{max}:	600	906	982	1072	1116	1184	954	1381	1449	714	704	1261	256	1449	psf
q_{min}:	442	594	824	914	842	910	796	1108	1176	619	546	988	161	1176	psf
V_{slide}:	26.3	37.8	45.5	50.1	49.4	52.8	44.1	62.7	66.2	33.6	31.5	56.7	10.5	66.2	kip
L_{load}:	17.1	16.8	17.5	17.5	17.2	17.2	17.5	17.3	17.4	17.6	17.2	17.3	16.6	17.4	ft
$L_{loadmin}$:	1.09	1.50	0.63	0.57	1.01	0.94	0.65	0.79	0.75	0.51	0.91	0.87	1.64	0.75	ft
DCR_q:	0.40	0.60	0.65	0.71	0.74	0.79	0.64	0.92	0.97	0.48	0.36	0.65	0.13	0.97	
DCR_V:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
DCR_L:	0.47	0.48	0.46	0.46	0.47	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.48	0.46	

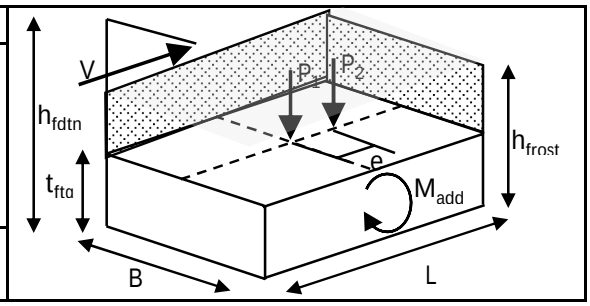
CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	MDK	DATE	10/2/2024
	SUBJECT	Combined Footings	CHECKED		SHEET	

Footing Designation: Grid 4 Cont Footing (BT Grid A & C)

FOOTING DIMENSIONS & PROPERTIES								DESIGN CHECK	
L:	34 ft	e:	0.1 ft	K_{Ev}:	0.1984	☑ Include Self-Weight		DCR_q:	0.64
B:	13 ft	S_{DS}:	0.992	L/6:	5.666666667 ft	☑ Use 100% Self-Weight		DCR_V:	0.00
t_{ftg}:	2.5 ft	μ:	0.35	A_{ftg}:	442 ft²	DL_{self}:	165.75 kip	DCR_L:	0.79
h_{frost}:	2.5 ft	p_{allow}:	1500 psf	S_{xftg}:	2504.666667 ft³	Controlling Load Combo:		Design:	OK
h_{fdtn}:	2.5 ft	%+EQ:	30%	$p_{allowEQ}$:	1950 psf	0.6D - 0.7Ev		Rebar:	Top & Bottom

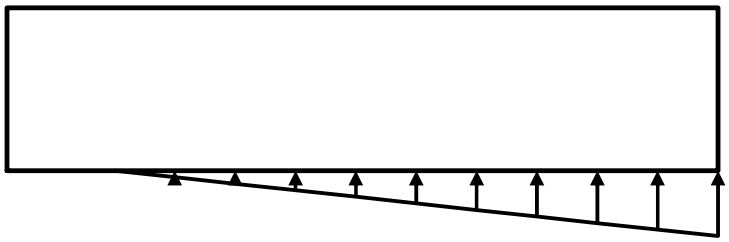
LOADING

	DL	LL	L_rL	SL	WL	Eh	Ev	DL_{self}	
P_1:	41	61	55	68	0		41.019	165.75	kip
P_2:	44	0	0	0	0		8.7296		kip
M_{add}:	0	11	0	0	0	1914			kip-ft
V:	0	0	0	0	0	0			kip
P_{total}:	85.0	61.0	55.0	68.0	0.0	0.0	49.7	165.8	kip
M_{total}:	4.4	11.0	0.0	0.0	0.0	1914.0	0.0	N/A	kip-ft



INDIVIDUAL LOAD COMBINATION BREAKDOWN

	Controlling Combo
q_{max}:	970 psf
q_{min}:	0 psf
V:	63.67 kip
e:	7.38
Kern:	Outside
DCR_q:	0.50
DCR_V:	0.00
DCR_L:	0.79



CALCULATIONS (BY LOAD COMBINATION)

LC	1	2	3	4	5	6	7	8	9	10	11	12	13	13	
P_{total}:	250.8	311.8	305.8	318.8	337.8	347.5	250.8	337.8	347.5	216.8	285.6	373.6	181.9	181.9	kip
M_{total}:	4.4	15.4	4.4	4.4	12.7	12.7	4.4	12.7	12.7	2.6	1344.2	1017.5	1342.4	1342.4	kip-ft
V_{total}:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	kip
e:	0.02	0.05	0.01	0.01	0.04	0.04	0.02	0.04	0.04	0.01	4.71	2.72	7.38	7.38	ft
Kern:	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Outside	Outside	
q_{max}:	569	711	693	723	769	791	569	769	791	491	1183	1252	970	970	psf
q_{min}:	566	699	690	719	759	781	566	759	781	489	109	439	0	0	psf
V_{slide}:	87.8	109.1	107.0	111.6	118.2	121.6	87.8	118.2	121.6	75.9	100.0	130.8	63.7	63.7	kip
L_{load}:	50.9	50.9	51.0	51.0	50.9	50.9	50.9	50.9	50.9	51.0	36.9	42.8	28.9	28.9	ft
$L_{loadmin}$:	0.06	0.18	0.05	0.05	0.13	0.13	0.06	0.13	0.13	0.04	16.95	9.80	26.56	26.56	ft
DCR_q:	0.38	0.47	0.46	0.48	0.51	0.53	0.38	0.51	0.53	0.33	0.61	0.64	0.50	0.50	
DCR_V:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
DCR_L:	0.44	0.45	0.44	0.44	0.45	0.45	0.44	0.45	0.45	0.44	0.61	0.53	0.79	0.79	

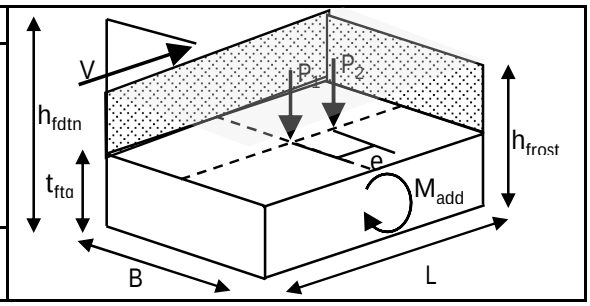
CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	MDK	DATE	10/2/2024
	SUBJECT	Combined Footings	CHECKED		SHEET	

Footing Designation: Grid 4 Cont Footing (BT Grid F&G)

FOOTING DIMENSIONS & PROPERTIES								DESIGN CHECK	
L:	35 ft	e:	2 ft	K_{Ev}:	0.1984	☑ Include Self-Weight		DCR_q:	0.97
B:	10 ft	S_{DS}:	0.992	L/6:	5.833333333 ft	☑ Use 100% Self-Weight		DCR_V:	0.00
t_{ftg}:	2 ft	μ:	0.35	A_{ftg}:	350 ft²	DL_{self}:	105 kip	DCR_L:	0.52
h_{frost}:	2 ft	p_{allow}:	1500 psf	S_{xftg}:	2041.666667 ft³	Controlling Load Combo:		Design:	OK
h_{fdtn}:	2 ft	%+EQ:	30%	$p_{allowEQ}$:	1950 psf	D + 0.525Ev + 0.75L + 0.75S		Rebar:	Top & Bottom

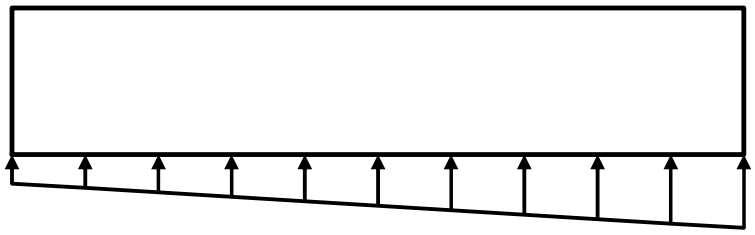
LOADING

	DL	LL	L_rL	SL	WL	Eh	Ev	DL_{self}	
P_1:	161	0	110	136	0		52.774	105	kip
P_2:	0	86	0	0	0		0		kip
M_{add}:	12.2	0	0	0	440	1947			kip-ft
V:	0	0	0	0	0	0			kip
P_{total}:	161.0	86.0	110.0	136.0	0.0	0.0	52.8	105.0	kip
M_{total}:	12.2	172.0	0.0	0.0	440.0	1947.0	0.0	N/A	kip-ft



INDIVIDUAL LOAD COMBINATION BREAKDOWN

	Controlling Combo
q_{max}:	1885 psf
q_{min}:	745 psf
V:	161.07 kip
e:	2.53
Kern:	Inside
DCR_q:	0.97
DCR_V:	0.00
DCR_L:	0.52



CALCULATIONS (BY LOAD COMBINATION)

LC	1	2	3	4	5	6	7	8	9	10	11	12	13	12	
P_{total}:	266.0	352.0	376.0	402.0	413.0	432.5	266.0	413.0	432.5	201.6	302.9	460.2	164.7	460.2	kip
M_{total}:	12.2	184.2	12.2	12.2	141.2	141.2	276.2	339.2	339.2	271.3	1375.1	1163.4	1370.2	1163.4	kip-ft
V_{total}:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	kip
e:	0.05	0.52	0.03	0.03	0.34	0.33	1.04	0.82	0.78	1.35	4.54	2.53	8.32	2.53	ft
Kern:	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	
q_{max}:	766	1096	1080	1155	1249	1305	895	1346	1402	709	1539	1885	1196	1885	psf
q_{min}:	754	915	1068	1143	1111	1167	625	1014	1070	443	192	745	0	745	psf
V_{slide}:	93.1	123.2	131.6	140.7	144.6	151.4	93.1	144.6	151.4	70.6	106.0	161.1	57.6	161.1	kip
L_{load}:	52.4	50.9	52.4	52.4	51.5	51.5	49.4	50.0	50.1	48.5	38.9	44.9	27.5	44.9	ft
$L_{loadmin}$:	0.17	1.88	0.12	0.11	1.23	1.18	3.74	2.96	2.82	4.85	16.34	9.10	29.96	9.10	ft
DCR_q:	0.51	0.73	0.72	0.77	0.83	0.87	0.60	0.90	0.93	0.47	0.79	0.97	0.61	0.97	
DCR_V:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
DCR_L:	0.45	0.46	0.45	0.45	0.45	0.45	0.47	0.47	0.47	0.48	0.60	0.52	0.86	0.52	

CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	MDK	DATE	10/2/2024
	SUBJECT	Combined Footings	CHECKED		SHEET	

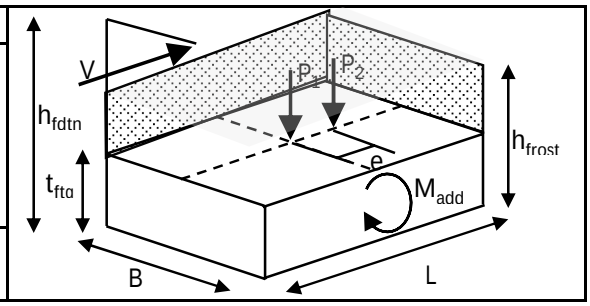
Footing Designation: WC Spot Footing on Grid 10

Note: Seismic Uplift from Moment Frame was added to Ev with DL*K_{EV}

FOOTING DIMENSIONS & PROPERTIES								DESIGN CHECK	
L:	10 ft	e:	0.67 ft	K_{Ev}:	0.1984	☐ Include Self-Weight		DCR_q:	0.71
B:	10 ft	S_{DS}:	0.992	L/6:	1.666666667 ft	☐ Use 100% Self-Weight		DCR_V:	0.00
t_{ftg}:	2 ft	μ:	0.35	A_{ftg}:	100 ft²	DL_{self}:	52 kip	DCR_L:	0.44
h_{frost}:	4 ft	p_{allow}:	1500 psf	S_{xftg}:	166.6666667 ft³	Controlling Load Combo:		Design:	OK
h_{fdtn}:	4 ft	%+EQ:	30%	$p_{allowEQ}$:	1950 psf	D + 0.75L + 0.75(0.6W) + 0.75S		Rebar:	Bottom Only

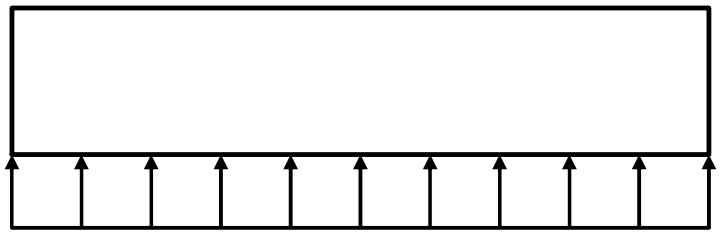
LOADING

	DL	LL	L_rL	SL	WL	Eh	Ev	DL_{self}	
P_1:	38	0	40	50	70		14.539	0	kip
P_2:	0	0	0	0	0		0		kip
M_{add}:	0	0	0	0	0	0			kip-ft
V:	0	0	0	0	0	0			kip
P_{total}:	38.0	0.0	40.0	50.0	70.0	0.0	14.5	0.0	kip
M_{total}:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A	kip-ft



INDIVIDUAL LOAD COMBINATION BREAKDOWN

	Controlling Combo
q_{max}:	1070 psf
q_{min}:	1070 psf
V:	37.45 kip
e:	0.00
Kern:	Inside
DCR_q:	0.71
DCR_V:	0.00
DCR_L:	0.44



CALCULATIONS (BY LOAD COMBINATION)

LC	1	2	3	4	5	6	7	8	9	10	11	12	13	9	
P_{total}:	38.0	38.0	78.0	88.0	68.0	75.5	80.0	99.5	107.0	64.8	48.2	83.1	12.6	107.0	kip
M_{total}:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kip-ft
V_{total}:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	kip
e:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ft
Kern:	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	
q_{max}:	380	380	780	880	680	755	800	995	1070	648	482	831	126	1070	psf
q_{min}:	380	380	780	880	680	755	800	995	1070	648	482	831	126	1070	psf
V_{slide}:	13.3	13.3	27.3	30.8	23.8	26.4	28.0	34.8	37.5	22.7	16.9	29.1	4.4	37.5	kip
L_{load}:	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	ft
$L_{loadmin}$:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ft
DCR_q:	0.25	0.25	0.52	0.59	0.45	0.50	0.53	0.66	0.71	0.43	0.25	0.43	0.06	0.71	
DCR_V:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
DCR_L:	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	

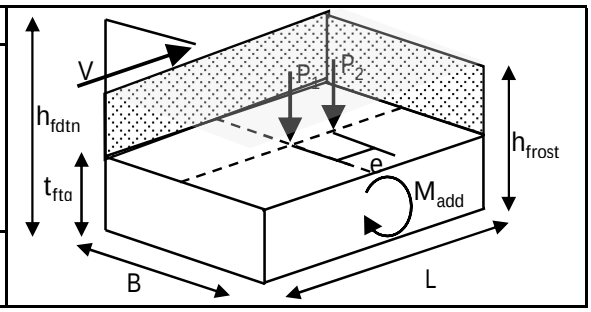
CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	MDK	DATE	10/2/2024
	SUBJECT	Combined Footings	CHECKED		SHEET	

Footing Designation: Cont Footing on Grid 10 (BT C and D)

FOOTING DIMENSIONS & PROPERTIES								DESIGN CHECK	
L:	35 ft	e:	0 ft	K_{Ev}:	0.1984	☑ Include Self-Weight		DCR_q:	0.75
B:	10 ft	S_{DS}:	0.992	L/6:	5.833333333 ft	☑ Use 100% Self-Weight		DCR_V:	0.00
t_{ftg}:	2 ft	μ:	0.35	A_{ftg}:	350 ft²	DL_{self}:	182 kip	DCR_L:	0.52
h_{frost}:	4 ft	p_{allow}:	1500 psf	S_{xftg}:	2041.666667 ft³	Controlling Load Combo:		Design:	OK
h_{fdtn}:	4 ft	%+EQ:	30%	$p_{allowEQ}$:	1950 psf	D + 0.525Ev + 0.75L + 0.75S		Rebar:	Top & Bottom

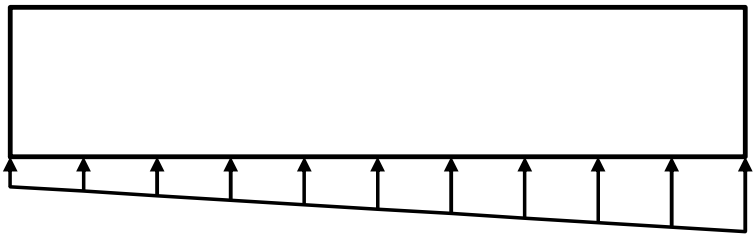
LOADING

	DL	LL	L_rL	SL	WL	Eh	Ev	DL_{self}	
P_1:	76	0	80	100	0		51.187	182	kip
P_2:	0	0	0	0	0		0		kip
M_{add}:	0	0	0	0	540	1705			kip-ft
V:	0	0	0	0	0	0			kip
P_{total}:	76.0	0.0	80.0	100.0	0.0	0.0	51.2	182.0	kip
M_{total}:	0.0	0.0	0.0	0.0	540.0	1705.0	0.0	N/A	kip-ft



INDIVIDUAL LOAD COMBINATION BREAKDOWN

	Controlling Combo
q_{max}:	1467 psf
q_{min}:	590 psf
V:	125.96 kip
e:	2.49
Kern:	Inside
DCR_q:	0.75
DCR_V:	0.00
DCR_L:	0.52



CALCULATIONS (BY LOAD COMBINATION)

LC	1	2	3	4	5	6	7	8	9	10	11	12	13	12	
P_{total}:	258.0	258.0	338.0	358.0	318.0	333.0	258.0	318.0	333.0	227.6	293.8	359.9	191.8	359.9	kip
M_{total}:	0.0	0.0	0.0	0.0	0.0	0.0	324.0	243.0	243.0	324.0	1193.5	895.1	1193.5	895.1	kip-ft
V_{total}:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	kip
e:	0.00	0.00	0.00	0.00	0.00	0.00	1.26	0.76	0.73	1.42	4.06	2.49	6.22	2.49	ft
Kern:	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	
q_{max}:	737	737	966	1023	909	951	896	1028	1070	809	1424	1467	1134	1467	psf
q_{min}:	737	737	966	1023	909	951	578	790	832	492	255	590	0	590	psf
V_{slide}:	90.3	90.3	118.3	125.3	111.3	116.6	90.3	111.3	116.6	79.7	102.8	126.0	67.1	126.0	kip
L_{load}:	52.5	52.5	52.5	52.5	52.5	52.5	48.7	50.2	50.3	48.2	40.3	45.0	33.8	45.0	ft
$L_{loadmin}$:	0.00	0.00	0.00	0.00	0.00	0.00	4.52	2.75	2.63	5.12	14.62	8.95	22.41	8.95	ft
DCR_q:	0.49	0.49	0.64	0.68	0.61	0.63	0.60	0.69	0.71	0.54	0.73	0.75	0.58	0.75	
DCR_V:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
DCR_L:	0.44	0.44	0.44	0.44	0.44	0.44	0.48	0.46	0.46	0.48	0.58	0.52	0.69	0.52	

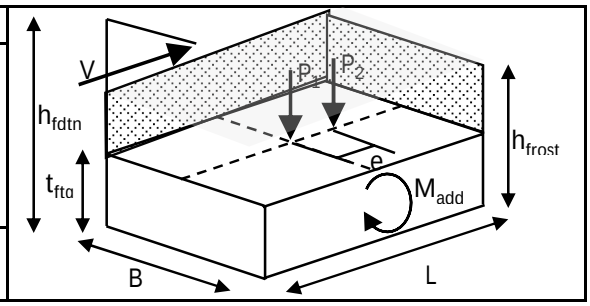
CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	MDK	DATE	10/2/2024
	SUBJECT	Combined Footings	CHECKED		SHEET	

Footing Designation: Cont Footing on Grid A (BT 3 and 4)

FOOTING DIMENSIONS & PROPERTIES								DESIGN CHECK	
L:	28 ft	e:	1.1 ft	K_{Ev}:	0.1984	☑ Include Self-Weight		DCR_q:	0.88
B:	10 ft	S_{DS}:	0.992	L/6:	4.666666667 ft	☑ Use 100% Self-Weight		DCR_V:	0.00
t_{ftg}:	2 ft	μ:	0.35	A_{ftg}:	280 ft²	DL_{self}:	145.6 kip	DCR_L:	0.60
h_{frost}:	4 ft	p_{allow}:	1500 psf	S_{xftg}:	1306.666667 ft³	Controlling Load Combo:		Design:	OK
h_{fdtn}:	4 ft	%+EQ:	30%	$p_{allowEQ}$:	1950 psf	D + 0.525Ev + 0.75L + 0.75S		Rebar:	Top & Bottom

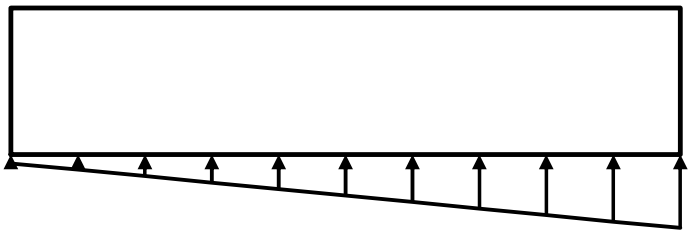
LOADING

	DL	LL	L_rL	SL	WL	Eh	Ev	DL_{self}	
P_1:	0	40.5	27.5	34	0		28.887	145.6	kip
P_2:	48.5	0	0	0	0		9.6224		kip
M_{add}:	0	172	220	272	340	1152			kip-ft
V:	0	0	0	0	0	0			kip
P_{total}:	48.5	40.5	27.5	34.0	0.0	0.0	38.5	145.6	kip
M_{total}:	53.4	172.0	220.0	272.0	340.0	1152.0	0.0	N/A	kip-ft



INDIVIDUAL LOAD COMBINATION BREAKDOWN

	Controlling Combo
q_{max}:	1724 psf
q_{min}:	206 psf
V:	94.57 kip
e:	3.67
Kern:	Inside
DCR_q:	0.88
DCR_V:	0.00
DCR_L:	0.60



CALCULATIONS (BY LOAD COMBINATION)

LC	1	2	3	4	5	6	7	8	9	10	11	12	13	12	
P_{total}:	194.1	234.6	221.6	228.1	245.1	250.0	194.1	245.1	250.0	174.7	221.1	270.2	147.7	270.2	kip
M_{total}:	53.4	225.4	273.4	325.4	347.4	386.4	257.4	500.4	539.4	236.0	859.8	991.2	838.4	991.2	kip-ft
V_{total}:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	kip
e:	0.27	0.96	1.23	1.43	1.42	1.55	1.33	2.04	2.16	1.35	3.89	3.67	5.67	3.67	ft
Kern:	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	
q_{max}:	734	1010	1001	1064	1141	1188	890	1258	1306	805	1447	1724	1183	1724	psf
q_{min}:	652	665	582	566	610	597	496	492	480	443	132	206	0	206	psf
V_{slide}:	67.9	82.1	77.6	79.8	85.8	87.5	67.9	85.8	87.5	61.1	77.4	94.6	51.7	94.6	kip
L_{load}:	41.2	39.1	38.3	37.7	37.7	37.4	38.0	35.9	35.5	37.9	30.3	31.0	25.0	31.0	ft
$L_{loadmin}$:	0.99	3.46	4.44	5.13	5.10	5.56	4.77	7.35	7.77	4.86	14.00	13.21	20.43	13.21	ft
DCR_q:	0.49	0.67	0.67	0.71	0.76	0.79	0.59	0.84	0.87	0.54	0.74	0.88	0.61	0.88	
DCR_V:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
DCR_L:	0.45	0.48	0.49	0.49	0.49	0.50	0.49	0.52	0.53	0.49	0.62	0.60	0.75	0.60	

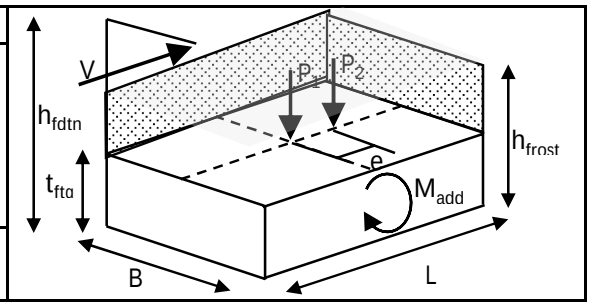
CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	MDK	DATE	10/2/2024
	SUBJECT	Combined Footings	CHECKED		SHEET	

Footing Designation: Cont Footing on Grid B.9 (BT Grid 1 and 3)

FOOTING DIMENSIONS & PROPERTIES								DESIGN CHECK	
L:	31 ft	e:	2.2 ft	K_{Ev}:	0.1984	☑ Include Self-Weight		DCR_q:	0.63
B:	13 ft	S_{DS}:	0.992	L/6:	5.166666667 ft	☑ Use 100% Self-Weight		DCR_V:	0.00
t_{ftg}:	2.5 ft	μ:	0.35	A_{ftg}:	403 ft²	DL_{self}:	217.62 kip	DCR_L:	0.53
h_{frost}:	4 ft	p_{allow}:	1500 psf	S_{xftg}:	2082.166667 ft³	Controlling Load Combo:		Design:	OK
h_{fdtn}:	4 ft	%+EQ:	30%	$p_{allowEQ}$:	1950 psf	D + 0.525Ev + 0.75L + 0.75S		Rebar:	Bottom Only

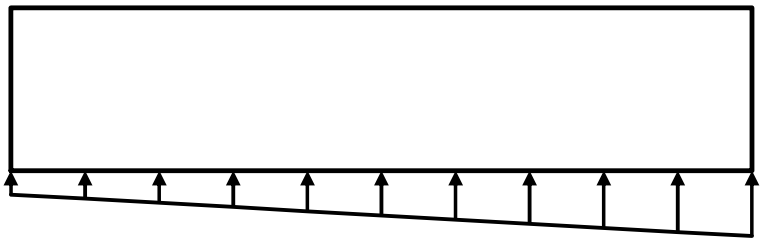
LOADING

	DL	LL	L_rL	SL	WL	Eh	Ev	DL_{self}	
P_1:	0	64	0	0	0		43.176	217.62	kip
P_2:	43.5	0	0	0	0		8.6304		kip
M_{add}:	0	140	0	0	0	1150			kip-ft
V:	0	0	0	0	0	0			kip
P_{total}:	43.5	64.0	0.0	0.0	0.0	0.0	51.8	217.6	kip
M_{total}:	95.7	140.0	0.0	0.0	0.0	1150.0	0.0	N/A	kip-ft



INDIVIDUAL LOAD COMBINATION BREAKDOWN

	Controlling Combo
q_{max}:	1221 psf
q_{min}:	448 psf
V:	117.71 kip
e:	2.39
Kern:	Inside
DCR_q:	0.63
DCR_V:	0.00
DCR_L:	0.53



CALCULATIONS (BY LOAD COMBINATION)

LC	1	2	3	4	5	6	7	8	9	10	11	12	13	12	
P_{total}:	261.1	325.1	261.1	261.1	309.1	309.1	261.1	309.1	309.1	243.7	297.4	336.3	207.5	336.3	kip
M_{total}:	95.7	235.7	95.7	95.7	200.7	200.7	95.7	200.7	200.7	57.4	900.7	804.5	862.4	804.5	kip-ft
V_{total}:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	kip
e:	0.37	0.72	0.37	0.37	0.65	0.65	0.37	0.65	0.65	0.24	3.03	2.39	4.16	2.39	ft
Kern:	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	
q_{max}:	694	920	694	694	863	863	694	863	863	632	1171	1221	929	1221	psf
q_{min}:	602	694	602	602	671	671	602	671	671	577	305	448	101	448	psf
V_{slide}:	91.4	113.8	91.4	91.4	108.2	108.2	91.4	108.2	108.2	85.3	104.1	117.7	72.6	117.7	kip
L_{load}:	45.4	44.3	45.4	45.4	44.6	44.6	45.4	44.6	44.6	45.8	37.4	39.3	34.0	39.3	ft
$L_{loadmin}$:	1.32	2.61	1.32	1.32	2.34	2.34	1.32	2.34	2.34	0.85	10.90	8.61	14.97	8.61	ft
DCR_q:	0.46	0.61	0.46	0.46	0.58	0.58	0.46	0.58	0.58	0.42	0.60	0.63	0.48	0.63	
DCR_V:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
DCR_L:	0.46	0.47	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.45	0.55	0.53	0.61	0.53	

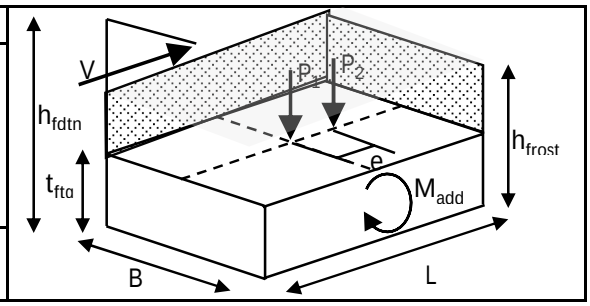
CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	MDK	DATE	10/2/2024
	SUBJECT	Combined Footings	CHECKED		SHEET	

Footing Designation: Cont Footing on Grid H.5 (BT Grid 2 and 4)

FOOTING DIMENSIONS & PROPERTIES								DESIGN CHECK	
L:	35 ft	e:	0.5 ft	K_{Ev}:	0.1984	☑ Include Self-Weight		DCR_q:	0.63
B:	13 ft	S_{DS}:	0.992	L/6:	5.833333333 ft	☑ Use 100% Self-Weight		DCR_V:	0.00
t_{ftg}:	2.5 ft	μ:	0.35	A_{ftg}:	455 ft²	DL_{self}:	270.725 kip	DCR_L:	0.66
h_{frost}:	4.5 ft	p_{allow}:	1500 psf	S_{xftg}:	2654.166667 ft³	Controlling Load Combo:		Design:	OK
h_{fdtn}:	4.5 ft	%+EQ:	30%	$p_{allowEQ}$:	1950 psf	0.6D - 0.7Ev		Rebar:	Bottom Only

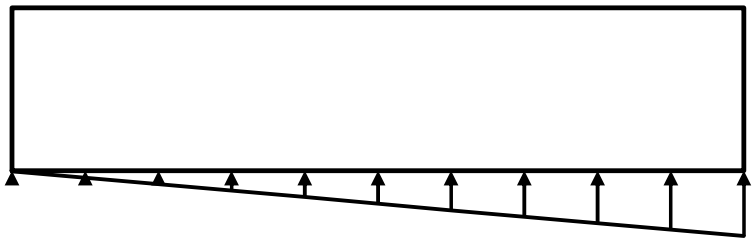
LOADING

	DL	LL	L_rL	SL	WL	Eh	Ev	DL_{self}	
P_1:	0	25	0	0	0		53.712	270.73	kip
P_2:	15	0	0	0	0		2.976		kip
M_{add}:	0	23.5	0	0	0	1955			kip-ft
V:	0	0	0	0	0	0			kip
P_{total}:	15.0	25.0	0.0	0.0	0.0	0.0	56.7	270.7	kip
M_{total}:	7.5	23.5	0.0	0.0	0.0	1955.0	0.0	N/A	kip-ft



INDIVIDUAL LOAD COMBINATION BREAKDOWN

	Controlling Combo
q_{max}:	1045 psf
q_{min}:	10 psf
V:	84.02 kip
e:	5.72
Kern:	Inside
DCR_q:	0.54
DCR_V:	0.00
DCR_L:	0.66



CALCULATIONS (BY LOAD COMBINATION)

LC	1	2	3	4	5	6	7	8	9	10	11	12	13	13	
P_{total}:	285.7	310.7	285.7	285.7	304.5	304.5	285.7	304.5	304.5	279.7	325.4	334.2	240.0	240.0	kip
M_{total}:	7.5	31.0	7.5	7.5	25.1	25.1	7.5	25.1	25.1	4.5	1376.0	1051.5	1373.0	1373.0	kip-ft
V_{total}:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	kip
e:	0.03	0.10	0.03	0.03	0.08	0.08	0.03	0.08	0.08	0.02	4.23	3.15	5.72	5.72	ft
Kern:	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	
q_{max}:	631	695	631	631	679	679	631	679	679	616	1234	1131	1045	1045	psf
q_{min}:	625	671	625	625	660	660	625	660	660	613	197	338	10	10	psf
V_{slide}:	100.0	108.8	100.0	100.0	106.6	106.6	100.0	106.6	106.6	97.9	113.9	117.0	84.0	84.0	kip
L_{load}:	52.4	52.2	52.4	52.4	52.3	52.3	52.4	52.3	52.3	52.5	39.8	43.1	35.3	35.3	ft
$L_{loadmin}$:	0.09	0.36	0.09	0.09	0.30	0.30	0.09	0.30	0.30	0.06	15.22	11.33	20.59	20.59	ft
DCR_q:	0.42	0.46	0.42	0.42	0.45	0.45	0.42	0.45	0.45	0.41	0.63	0.58	0.54	0.54	
DCR_V:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
DCR_L:	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.44	0.59	0.54	0.66	0.66	

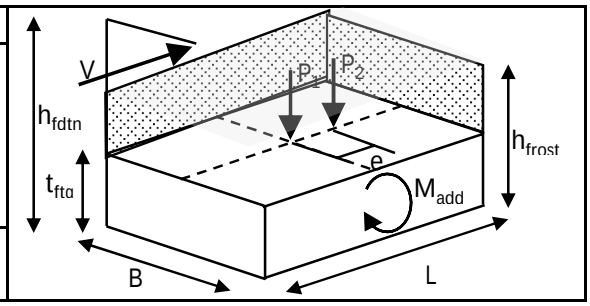
CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	MDK	DATE	10/2/2024
	SUBJECT	Combined Footings	CHECKED		SHEET	

Footing Designation: TYP Spot Footing on Grid A&I Field House Columns

FOOTING DIMENSIONS & PROPERTIES								DESIGN CHECK	
L:	7 ft	e:	0.67 ft	K_{Ev}:	0.1984	☑ Include Self-Weight		DCR_q:	0.71
B:	7 ft	S_{DS}:	0.992	L/6:	1.166666667 ft	☐ Use 100% Self-Weight		DCR_V:	0.89
t_{ftg}:	2 ft	μ:	0.35	A_{ftg}:	49 ft²	DL_{self}:	25.48 kip	DCR_L:	0.69
h_{frost}:	4 ft	p_{allow}:	1500 psf	S_{xftg}:	57.16666667 ft³	Controlling Load Combo:		Design:	OK
h_{fdtn}:	4 ft	%+EQ:	30%	$p_{allowEQ}$:	1950 psf	0.6D + 0.6W		Rebar:	Top & Bottom

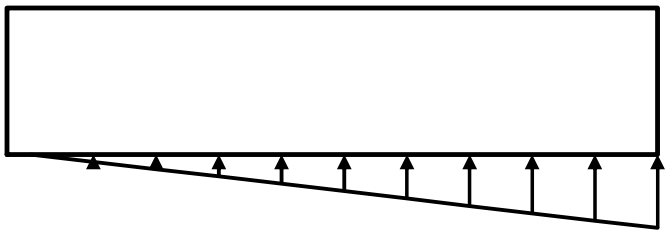
LOADING

	DL	LL	L_rL	SL	WL	Eh	Ev	DL_{self}	
P_1:	5.2	0	0	8.6	0		6.0869	25.48	kip
P_2:	0	0	0	0	0		0		kip
M_{add}:	0	0	0	0	0	0			kip-ft
V:	0	0	0	0	9.6	0			kip
P_{total}:	5.2	0.0	0.0	8.6	0.0	0.0	6.1	25.5	kip
M_{total}:	0.0	0.0	0.0	0.0	38.4	0.0	0.0	N/A	kip-ft



INDIVIDUAL LOAD COMBINATION BREAKDOWN

	Controlling Combo
q_{max}:	780 psf
q_{min}:	0 psf
V:	6.44 kip
e:	1.25
Kern:	Outside
DCR_q:	0.52
DCR_V:	0.89
DCR_L:	0.69



CALCULATIONS (BY LOAD COMBINATION)

LC	1	2	3	4	5	6	7	8	9	10	11	12	13	10	
P_{total}:	30.7	30.7	30.7	39.3	30.7	37.1	30.7	30.7	37.1	18.4	34.9	40.3	14.1	18.4	kip
M_{total}:	0.0	0.0	0.0	0.0	0.0	0.0	23.0	17.3	17.3	23.0	0.0	0.0	0.0	23.0	kip-ft
V_{total}:	0	0	0	0	0	0	5.76	4.32	4.32	5.76	0	0	0	5.76	kip
e:	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.56	0.47	1.25	0.00	0.00	0.00	1.25	ft
Kern:	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Inside	Outside	Inside	Inside	Inside	Outside	
q_{max}:	626	626	626	802	626	758	1029	928	1060	780	713	823	289	780	psf
q_{min}:	626	626	626	802	626	758	223	324	455	0	713	823	289	0	psf
V_{slide}:	10.7	10.7	10.7	13.7	10.7	13.0	10.7	10.7	13.0	6.4	12.2	14.1	5.0	6.4	kip
L_{load}:	10.5	10.5	10.5	10.5	10.5	10.5	8.2	8.8	9.1	6.7	10.5	10.5	10.5	6.7	ft
$L_{loadmin}$:	0.00	0.00	0.00	0.00	0.00	0.00	2.70	2.03	1.68	4.51	0.00	0.00	0.00	4.51	ft
DCR_q:	0.42	0.42	0.42	0.53	0.42	0.51	0.69	0.62	0.71	0.52	0.37	0.42	0.15	0.52	
DCR_V:	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.40	0.33	0.89	0.00	0.00	0.00	0.89	
DCR_L:	0.44	0.44	0.44	0.44	0.44	0.44	0.57	0.53	0.51	0.69	0.44	0.44	0.44	0.69	

CALDER RICHARDS CONSULTING ENGINEERS	JOB	PROJECT NAME	BY	DATE	8/29/2024
	SUBJECT	CONCENTRIC SPOT FOOTINGS	CHECKED	PAGE	1 OF 1

Net Allowable Bearing Pressure (psf)	1500
Average Load Factor	1.5
Factored Bearing Pressure (psf)	2250

fy (psi)	60000
f'c (psi)	3500
phi bending	0.9
phi shear	0.75
rho minimum	0.0018

Square pedestal size (in)	12

Design based upon requirements in ACI 318-19 & IBC 2021

Notes:

1. One-Way shear checked at d from support
2. Punching shear checked at d/2 from support
3. Bending checked at face of support
4. Depth d used in design is footing depth minus 4"
5. As bare minimum is 0.0018 * Width * Depth for Shrinkage Reinf
6. Reduce pedestal size accordingly, where base plates are used.

Footing Size & Reinforcement Each Direction					P allow	One-Way Shear		Punching Shear		Bending	
L & W		Depth		As min (in^2)	(kips)	Vu (kips)	phi Vc (kips)	Vu (kips)	phi Vc (kips)	Mu (k-ft)	phi Mn (k-ft)
13'-0''	(156'')	2'-0''	(24'')	7.93	253.5	126.75	134.75	364.25	454.35	526.50	695.70
2'-6''	(30'')	1'-0''	(12'')	0.65	9.4	0.47	10.37	7.81	113.59	1.58	22.69
3'-0''	(36'')	1'-0''	(12'')	0.78	13.5	2.25	12.44	14.00	113.59	3.38	27.23
3'-6''	(42'')	1'-0''	(12'')	0.91	18.4	4.59	14.51	21.31	113.59	6.15	31.77
4'-0''	(48'')	1'-0''	(12'')	1.04	24.0	7.50	16.58	29.75	113.59	10.13	36.31
4'-6''	(54'')	1'-0''	(12'')	1.17	30.4	10.97	18.66	39.31	113.59	15.50	40.85
5'-0''	(60'')	1'-0''	(12'')	1.30	37.5	15.00	20.73	50.00	113.59	22.50	45.39
5'-6''	(66'')	1'-0''	(12'')	1.43	45.4	19.59	22.80	61.81	113.59	31.32	49.92
6'-0''	(72'')	1'-0''	(12'')	1.59	54.0	24.75	24.88	74.75	113.59	42.19	55.71
6'-6''	(78'')	1'-2''	(14'')	1.97	63.4	28.03	33.69	87.50	156.18	55.30	86.20
7'-0''	(84'')	1'-3''	(15'')	2.27	73.5	32.81	39.91	101.98	179.61	70.88	109.49
7'-6''	(90'')	1'-3''	(15'')	2.44	84.4	39.38	42.76	118.30	179.61	89.12	117.79
8'-0''	(96'')	1'-4''	(16'')	2.77	96.0	45.00	49.75	135.00	204.46	110.25	145.74
8'-6''	(102'')	2'-0''	(24'')	4.41	108.4	39.84	88.10	146.56	454.35	134.47	387.94
9'-0''	(108'')	2'-0''	(24'')	4.67	121.5	47.25	93.29	166.25	454.35	162.00	410.76
9'-6''	(114'')	2'-0''	(24'')	4.92	135.4	55.22	98.47	187.06	454.35	193.04	433.58
10'-0''	(120'')	2'-0''	(24'')	5.18	150.0	63.75	103.65	209.00	454.35	227.81	456.40
10'-6''	(126'')	2'-0''	(24'')	5.44	165.4	72.84	108.83	232.06	454.35	266.52	479.22
11'-0''	(132'')	2'-0''	(24'')	5.70	181.5	82.50	114.02	256.25	454.35	309.38	502.04
11'-6''	(138'')	2'-0''	(24'')	5.96	198.4	92.72	119.20	281.56	454.35	356.59	524.86
12'-0''	(144'')	2'-0''	(24'')	6.22	216.0	103.50	124.38	308.00	454.35	408.38	547.68

CALDER RICHARDS CONSULTING ENGINEERS	JOB	PROJECT NAME	BY	DATE	8/29/2024
	SUBJECT	CONTINUOUS FOOTINGS	CHECKED	PAGE	1 OF 1

Design based upon requirements in ACI 318-19 & IBC 2021

Net Allowable Bearing Pressure (psf)	1500
Average Load Factor	1.5
Factored Bearing Pressure (psf)	2250

fy (psi)	60000
f'c (psi)	3500
phi bending	0.9
phi shear	0.75
phi for plain concrete	0.6
rho minimum	0.0018

Wall Thickness (in)	12

Notes:

1. One-Way shear checked at d from face of support
2. Bending checked at face of support
3. Depth d used in design is footing depth minus 4"
4. As bare minimum is 0.0018 * 12" * Depth for shrinkage
5. As minimum equals 0.002 * Width * Depth for required longitudinal reinf
6. fr equals 6*f'c^0.5
7. Plane concrete uses the total depth minus 2"

Footing Size & Reinforcement		Transverse	Longitudinal	P allow	One-Way Shear		Bending	
Width (in)	Depth (in)	As min (in^2/ft)	As min (in^2)	(klf)	Vu (k/ft)	phi Vc (k/ft)	Mu (k-ft/ft)	phi Mn (k-ft/ft)
24	12	phi*fr*S > Mu	0.58	3.0	-0.38	8.52	0.28	3.25
30	12	phi*fr*S > Mu	0.72	3.8	0.19	8.52	0.63	3.25
36	12	phi*fr*S > Mu	0.86	4.5	0.75	8.52	1.13	3.25
42	12	phi*fr*S > Mu	1.01	5.3	1.31	8.52	1.76	3.25
48	12	phi*fr*S > Mu	1.15	6.0	1.88	8.52	2.53	3.25
54	12	0.26	1.30	6.8	2.44	4.15	3.45	9.08
60	12	0.26	1.44	7.5	3.00	4.15	4.50	9.08
66	12	0.26	1.58	8.3	3.56	4.15	5.70	9.08
72	13	0.28	1.87	9.0	3.94	4.66	7.03	11.07
78	14	0.30	2.18	9.8	4.31	5.18	8.51	13.26
84	15	0.32	2.52	10.5	4.69	5.70	10.13	15.64
90	16	0.35	2.88	11.3	5.06	6.22	11.88	18.21
96	17	0.37	3.26	12.0	5.44	6.74	13.78	20.97
102	18	0.39	3.67	12.8	5.81	7.26	15.82	23.92
108	18	0.39	3.89	13.5	6.38	7.26	18.00	23.92
114	19	0.41	4.33	14.3	6.75	7.77	20.32	27.07
120	24	0.52	5.76	15.0	6.38	10.37	22.78	45.64
126	21	0.45	5.29	15.8	7.50	8.81	25.38	33.92
144	24	0.52	6.91	18.0	8.63	10.37	34.03	45.64
144	30	0.65	8.64	18.0	7.50	13.47	34.03	74.23
156	30	0.65	9.36	19.5	8.63	13.47	40.50	74.23

SECTION BREAK

Lateral Design

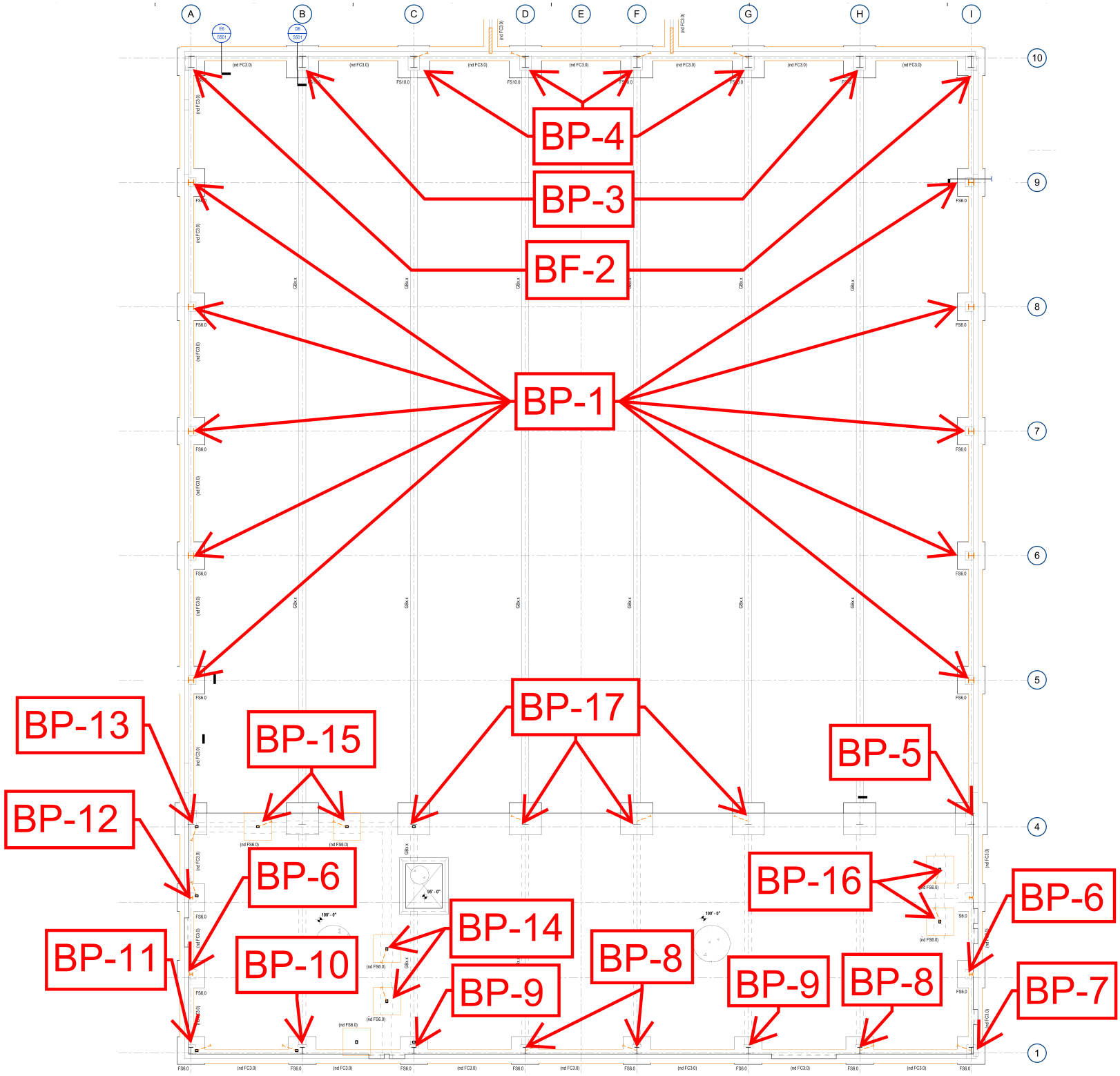
SUBSECTION BREAK

Baseplate Design

DESCRIPTION/NOTES:

Description details.

CALDER RICHARDS CONSULTING ENGINEERS	JOB TITLE	CCHS Field House	BY	MDK	DATE
	SUBJECT	Baseplate Key Map	CHECKED		SHEET



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Company:	Calder Richards Consulting Engineers	Page:	1
Address:	1805 South Redwood Road Suite 102, SLC, UT 8410	Specifier:	
Phone I Fax:	801-466-1699 |	E-Mail:	matthew@crceng.com
Design:	BP-1 Anchorage for P-1	Date:	10/3/2024
Fastening point:			

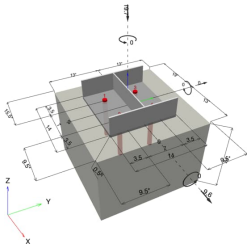
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 36 1**
Item number:	not available
Specification text:	Hilti Heavy Hex Head headed stud anchor with 8.5 in embedment, 1, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 8.500 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate[R] :	l_x x l_y x t = 14.000 in. x 14.000 in. x 0.500 in.;
Profile:	W shape (AISC), ; (L x W x T x FT) = 14.000 in. x 14.000 in. x 0.230 in. x 0.335 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 24.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear
	edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d))
	Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



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BP-1

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Company:	Calder Richards Consulting Engineers	Page:	2
Address:	1805 South Redwood Road Suite 102, SLC, UT 8410	Specifier:	
Phone I Fax:	801-466-1699 |	E-Mail:	matthew@crceng.com
Design:	BP-1 Anchorage for P-1	Date:	10/3/2024
Fastening point:			

1.1 Design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = -19.700; V_x = 9.600; V_y = 0.000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	18

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Design:	BP-1 Anchorage for P-1	Date:	10/3/2024
Fastening point:			

2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	-	-	-	- / -	N/A
Shear	Steel Strength	2.400	13.708	- / 18	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	-	-	-	-	N/A

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

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Phone I Fax:	801-466-1699 |	E-Mail:	matthew@crceng.com
Design:	BP-1 Anchorage for P-1	Date:	10/3/2024
Fastening point:			

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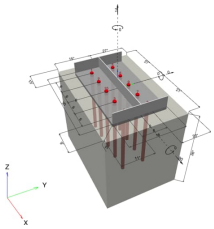
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 55 1 1/4**
Item number:	not available
Additional plate or washer (17.6.2.1.3):	$d_{pl,hole}$ = 3.000 in.. t_{plate} = 0.375 in.
Specification text:	Hilti Heavy Hex Head headed stud anchor with 24 in embedment, 1 1/4, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 24.000 in.. $h_{ef,17.6.2.1.3}$ = 0.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.000 in.
Anchor plate[R] :	l_x x l_y x t = 30.000 in. x 18.000 in. x 1.000 in.;
Profile:	W shape (AISC), ; (L x W x T x FT) = 30.000 in. x 18.000 in. x 0.250 in. x 0.250 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 36.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



1.1 Design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 14.000; V_x = 90.000; V_y = 0.000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	87

2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	1.400	37.582	4 / -	OK
Shear	Pryout Strength	90.000	104.410	- / 87	OK

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	0.037	0.862	1.000	75	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

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Phone I Fax:	801-466-1699 |	E-Mail:	matthew@crceng.com
Design:	BP-3 Anchorage for P-3	Date:	10/3/2024
Fastening point:			

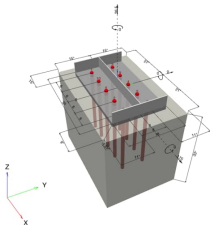
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 55 1 1/4**
Item number:	not available
Additional plate or washer (17.6.2.1.3):	$d_{pl,hole}$ = 3.000 in.. t_{plate} = 0.500 in.
Specification text:	Hilti Heavy Hex Head headed stud anchor with 24 in embedment, 1 1/4, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 24.000 in.. $h_{ef,17.6.2.1.3}$ = 0.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.250 in.
Anchor plate[R] :	l_x x l_y x t = 30.000 in. x 18.000 in. x 1.250 in.;
Profile:	W shape (AISC), ; (L x W x T x FT) = 30.000 in. x 18.000 in. x 0.230 in. x 0.335 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 33.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



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BP-3

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Phone I Fax:	801-466-1699 |	E-Mail:	matthew@crceng.com
Design:	BP-3 Anchorage for P-3	Date:	10/3/2024
Fastening point:			

1.1 Design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 26.500; V_x = 175.000; V_y = 0.000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	185

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Design:	BP-3 Anchorage for P-3	Date:	10/3/2024
Fastening point:			

2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	2.650	37.582	8 / -	OK
Shear	Pryout Strength	175.000	94.618	- / 185	not recommended

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	0.071	1.850	1.000	161	not recommended

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening does not meet the design criteria!

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Design:	BP-3 Anchorage for P-3	Date:	10/3/2024
Fastening point:			

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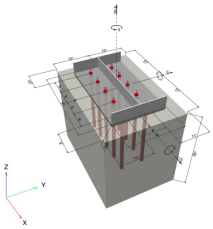
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 55 1 1/4**
Item number:	not available
Additional plate or washer (17.6.2.1.3):	$d_{pl,hole}$ = 3.000 in.. t_{plate} = 0.325 in.
Specification text:	Hilti Heavy Hex Head headed stud anchor with 24 in embedment, 1 1/4, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 24.000 in.. $h_{ef,17.6.2.1.3}$ = 0.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.000 in.
Anchor plate[R] :	l_x x l_y x t = 30.000 in. x 18.000 in. x 1.000 in.; (Recommended plate thickness: not calculated)
Profile:	W shape (AISC), ; (L x W x T x FT) = 30.000 in. x 18.000 in. x 0.230 in. x 0.335 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 36.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear edge reinforcement: > No. 4 bar with stirrups
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



1.1 Load combination and design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 26.500; V_x = 175.000; V_y = 0.000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	185
2	Combination 1	N = 133.200; V_x = 0.000; V_y = 93.300; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	112

2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	13.320	37.582	36 / -	OK
Shear	Pryout Strength	175.000	94.618	- / 185	not recommended

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	0.071	1.850	1.000	161	not recommended

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening does not meet the design criteria!

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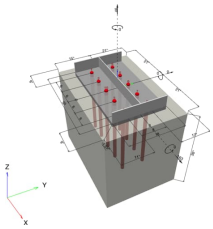
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 55 1 1/4**
Item number:	not available
Additional plate or washer (17.6.2.1.3):	$d_{pl,hole}$ = 3.000 in.. t_{plate} = 0.375 in.
Specification text:	Hilti Heavy Hex Head headed stud anchor with 24 in embedment, 1 1/4, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 24.000 in.. $h_{ef,17.6.2.1.3}$ = 0.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.250 in.
Anchor plate[R] :	l_x x l_y x t = 30.000 in. x 18.000 in. x 1.250 in.; (Recommended plate thickness: not calculated)
Profile:	W shape (AISC), ; (L x W x T x FT) = 30.000 in. x 18.000 in. x 0.230 in. x 0.335 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 36.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



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1.1 Design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 46.000; V_x = 163.000; V_y = 0.000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	180

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2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	4.600	37.582	13 / -	OK
Shear	Pryout Strength	163.000	90.999	- / 180	not recommended

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	0.122	1.791	1.000	160	not recommended

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening does not meet the design criteria!

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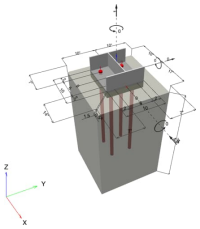
Specifier's comments:

1 Input data

Anchor type and diameter:	**Hex Head ASTM F 1554 GR. 55 1**
Item number:	not available
Specification text:	Hilti Hex Head headed stud anchor with 24 in embedment, 1, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 24.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	without clamping (anchor); restraint level (anchor plate): 2.00; e_b = 1.500 in.; t = 0.500 in.
	Hilti Grout: CB-G EG, epoxy, $f_{c,Grout}$ = 14,939 psi
Anchor plate[R] :	l_x x l_y x t = 10.000 in. x 10.000 in. x 0.500 in.;
Profile:	W shape (AISC), ; (L x W x T x FT) = 10.000 in. x 10.000 in. x 0.230 in. x 0.335 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 36.000 in.
Reinforcement:	tension: present, shear: present;
	edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d))
	Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



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1.1 Design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 1.000; V_x = -4.500; V_y = 0.000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	67

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2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Concrete Breakout Failure	1.000	14.253	8 / -	OK
Shear	Concrete edge failure in direction x-	4.500	6.777	- / 67	OK

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	0.070	0.664	5/3	52	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

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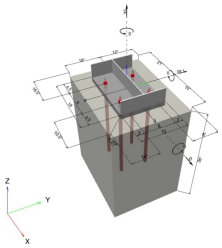
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 36 1**
Item number:	not available
Specification text:	Hilti Heavy Hex Head headed stud anchor with 24 in embedment, 1, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 24.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.250 in.
Anchor plate[R] :	l_x x l_y x t = 18.000 in. x 12.000 in. x 1.250 in.;
Profile:	W shape (AISC), ; (L x W x T x FT) = 18.000 in. x 12.000 in. x 0.230 in. x 0.335 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 36.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear
	edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d))
	Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



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1.1 Load combination and design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1 (Moment Frame)	N = 0.500; V_x = 7.150; V_y = 0.000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	14
2	Combo 2 (Brace Frame	N = 35.000; V_x = 0.000; V_y = 28.100; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	52

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2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	8.750	25.217	35 / -	OK
Shear	Steel Strength	7.025	13.708	- / 52	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.347	0.512	5/3	50	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

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Address:	1805 South Redwood Road Suite 102, SLC, UT 8410	Specifier:	
Phone I Fax:	801-466-1699 |	E-Mail:	matthew@crceng.com
Design:	BP-8 Anchorage for P-8	Date:	10/3/2024
Fastening point:			

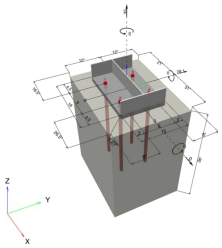
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 36 1**
Item number:	not available
Specification text:	Hilti Heavy Hex Head headed stud anchor with 24 in embedment, 1, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 24.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.250 in.
Anchor plate[R] :	l_x x l_y x t = 18.000 in. x 12.000 in. x 1.250 in.;
Profile:	W shape (AISC), ; (L x W x T x FT) = 18.000 in. x 12.000 in. x 0.230 in. x 0.335 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 36.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear
	edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d))
	Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



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Phone I Fax:	801-466-1699 |	E-Mail:	matthew@crceng.com
Design:	BP-8 Anchorage for P-8	Date:	10/3/2024
Fastening point:			

1.1 Load combination and design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1 (Moment Frame)	N = 1.000; V_x = 14.300; V_y = 0.000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	27
2	Combo 2 (Brace Frame	N = 35.000; V_x = 0.000; V_y = 28.100; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	52

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Address:	1805 South Redwood Road Suite 102, SLC, UT 8410	Specifier:	
Phone I Fax:	801-466-1699 |	E-Mail:	matthew@crceng.com
Design:	BP-8 Anchorage for P-8	Date:	10/3/2024
Fastening point:			

2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	8.750	25.217	35 / -	OK
Shear	Steel Strength	7.025	13.708	- / 52	OK

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	0.347	0.512	5/3	50	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

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Address:	1805 South Redwood Road Suite 102, SLC, UT 8410	Specifier:	
Phone I Fax:	801-466-1699 |	E-Mail:	matthew@crceng.com
Design:	BP-8 Anchorage for P-8	Date:	10/3/2024
Fastening point:			

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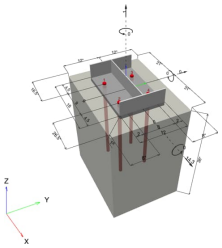
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 36 1**
Item number:	not available
Specification text:	Hilti Heavy Hex Head headed stud anchor with 24 in embedment, 1, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 24.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.000 in.
Anchor plate[R] :	l_x x l_y x t = 18.000 in. x 12.000 in. x 1.000 in.;
Profile:	W shape (AISC), ; (L x W x T x FT) = 18.000 in. x 12.000 in. x 0.230 in. x 0.335 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 36.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



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1.1 Design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1 (Moment Frame)	N = 1.000; V_x = 14.300; V_y = 0.000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	27

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2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	0.250	25.217	1 / -	OK
Shear	Steel Strength	3.575	13.708	- / 27	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.010	0.261	5/3	11	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

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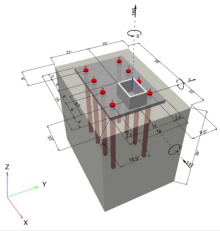
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 55 1 1/2**
Item number:	not available
Additional plate or washer (17.6.2.1.3):	$d_{pl,hole}$ = 4.000 in.. t_{plate} = 0.500 in.
Specification text:	Hilti Heavy Hex Head headed stud anchor with 24 in embedment, 1 1/2, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 24.000 in.. $h_{ef,17.6.2.1.3}$ = 0.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.000 in.
Anchor plate[R] :	l_x x l_y x t = 25.000 in. x 16.000 in. x 1.000 in.; (Recommended plate thickness: not calculated)
Profile:	Rectangular HSS (AISC), HSS7X5X.500; (L x W x T) = 7.000 in. x 5.000 in. x 0.500 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 36.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



1.1 Design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1 (Mezz Brace Frame)	N = 166.000; V_x = -142.000; V_y = 0.000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	216

2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	52.938	52.382	102 / -	not recommended
Shear	Pryout Strength	142.000	89.908	- / 158	not recommended

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	1.011	1.579	1.000	216	not recommended

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening does not meet the design criteria!

4 Remarks; Your Cooperation Duties

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This Baseplate will sit on a pier that will have hatbar reinforcement, Pullout not be a concern which will result in combination utilization to be ok

This Baseplate will sit on a pier that will be located next to and tied to a foundation wall, Pryout not be a concern which will result in combination utilization to be ok

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Address:	1805 South Redwood Road Suite 102, SLC, UT 8410	Specifier:	
Phone I Fax:	801-466-1699 |	E-Mail:	matthew@crceng.com
Design:	BP-11 Anchorage for BF-2 Left Side (On P-11)	Date:	10/3/2024
Fastening point:			

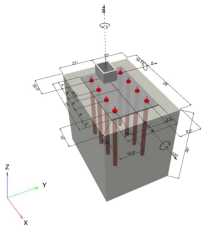
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 55 1 1/2**
Item number:	not available
Additional plate or washer (17.6.2.1.3):	$d_{pl,hole}$ = 4.000 in.. t_{plate} = 0.500 in.
Specification text:	Hilti Heavy Hex Head headed stud anchor with 24 in embedment, 1 1/2, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 24.000 in.. $h_{ef,17.6.2.1.3}$ = 0.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate[R] :	l_x x l_y x t = 25.000 in. x 16.000 in. x 0.500 in.; (Recommended plate thickness: not calculated)
Profile:	Rectangular HSS (AISC), HSS7X5X.500; (L x W x T) = 7.000 in. x 5.000 in. x 0.500 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 36.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



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Phone I Fax:	801-466-1699 |	E-Mail:	matthew@crceng.com
Design:	BP-11 Anchorage for BF-2 Left Side (On P-11)	Date:	10/3/2024
Fastening point:			

1.1 Design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1 (Mezz Brace Frame)	N = 166,000; V_x = 142,000; V_y = 0,000; M_x = 0,00000; M_y = 0,00000; M_z = 0,00000;	yes	207

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Design:	BP-11 Anchorage for BF-2 Left Side (On P-11)	Date:	10/3/2024
Fastening point:			

2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	52.938	52.382	102 / -	not recommended
Shear	Pryout Strength	142.000	96.869	- / 147	not recommended

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	1.011	1.466	1.000	207	not recommended

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening does not meet the design criteria!

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Design:	BP-11 Anchorage for BF-2 Left Side (On P-11)	Date:	10/3/2024
Fastening point:			

4 Remarks; Your Cooperation Duties

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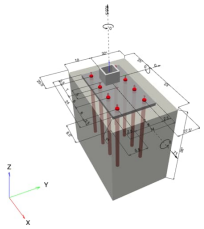
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 55 1 1/4**
Item number:	not available
Additional plate or washer (17.6.2.1.3):	$d_{pl,hole}$ = 4.000 in.. t_{plate} = 0.500 in.
Specification text:	Hilti Heavy Hex Head headed stud anchor with 24 in embedment, 1 1/4, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 24.000 in.. $h_{ef,17.6.2.1.3}$ = 0.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.000 in.
Anchor plate[R] :	l_x x l_y x t = 24.000 in. x 14.000 in. x 1.000 in.; (Recommended plate thickness: not calculated)
Profile:	Square HSS (AISC), HSS5X5X.500; (L x W x T) = 5.000 in. x 5.000 in. x 0.500 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 36.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



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1.1 Design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1 (Mezz Brace Frame)	N = 105.500; V_x = 71.000; V_y = 0.000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	126

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2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	26.337	37.582	71 / -	OK
Shear	Pryout Strength	71.000	91.466	- / 78	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.734	0.776	5/3	126	not recommended

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening does not meet the design criteria!

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4 Remarks; Your Cooperation Duties

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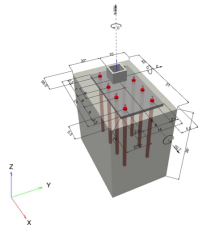
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 55 1 1/4**
Item number:	not available
Additional plate or washer (17.6.2.1.3):	$d_{pl,hole}$ = 4.000 in.. t_{plate} = 0.500 in.
Specification text:	Hilti Heavy Hex Head headed stud anchor with 24 in embedment, 1 1/4, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 24.000 in.. $h_{ef,17.6.2.1.3}$ = 0.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.000 in.
Anchor plate[R] :	l_x x l_y x t = 24.000 in. x 14.000 in. x 1.000 in.; (Recommended plate thickness: not calculated)
Profile:	Square HSS (AISC), HSS5X5X.500; (L x W x T) = 5.000 in. x 5.000 in. x 0.500 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 36.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



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1.1 Design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1 (Mezz Brace Frame)	N = 105.400; V_x = 70.700; V_y = 0.000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	121

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2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	28.297	37.582	76 / -	OK
Shear	Pryout Strength	70.700	99.088	- / 72	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.762	0.714	5/3	121	not recommended

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening does not meet the design criteria!

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4 Remarks; Your Cooperation Duties

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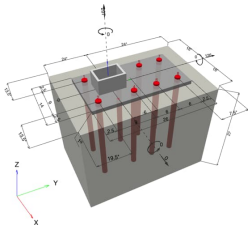
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 55 1 1/2**
Item number:	not available
Additional plate or washer (17.6.2.1.3):	$d_{pl,hole}$ = 4.000 in.. t_{plate} = 0.500 in.
Specification text:	Hilti Heavy Hex Head headed stud anchor with 24 in embedment, 1 1/2, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 24.000 in.. $h_{ef,17.6.2.1.3}$ = 0.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.000 in.
Anchor plate[R] :	l_x x l_y x t = 14.000 in. x 26.000 in. x 1.000 in.; (Recommended plate thickness: not calculated)
Profile:	Rectangular HSS (AISC), HSS7X5X.500; (L x W x T) = 7.000 in. x 5.000 in. x 0.500 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 27.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



BP-14

1.1 Design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1 (Mezz Brace Frame)	N = 207.000; V_x = 0.000; V_y = 126.000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	203

2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	57.179	52.382	110 / -	not recommended
Shear	Pryout Strength	126.000	94.325	- / 134	not recommended

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	1.092	1.336	1.000	203	not recommended

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening does not meet the design criteria!

4 Remarks; Your Cooperation Duties

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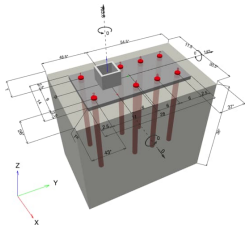
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 55 1 1/2**
Item number:	not available
Additional plate or washer (17.6.2.1.3):	$d_{pl,hole}$ = 4.000 in.. t_{plate} = 0.500 in.
Specification text:	Hilti Heavy Hex Head headed stud anchor with 24 in embedment, 1 1/2, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 24.000 in.. $h_{ef,17.6.2.1.3}$ = 0.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.000 in.
Anchor plate[R] :	l_x x l_y x t = 14.000 in. x 28.000 in. x 1.000 in.; (Recommended plate thickness: not calculated)
Profile:	Square HSS (AISC), HSS5X5X.500; (L x W x T) = 5.000 in. x 5.000 in. x 0.500 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 36.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



1.1 Design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1 (Mezz Brace Frame)	N = 163,800; V_x = 0,000; V_y = 142,000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	145

2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	45.950	52.382	88 / -	OK
Shear	Pryout Strength	142.000	166.715	- / 86	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.877	0.852	1.000	145	not recommended

3 Warnings

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Fastening does not meet the design criteria!

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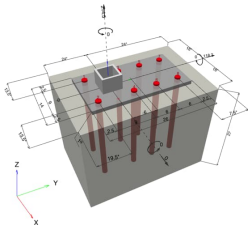
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 55 1 1/2**
Item number:	not available
Additional plate or washer (17.6.2.1.3):	$d_{pl,hole}$ = 4.000 in.. t_{plate} = 0.500 in.
Specification text:	Hilti Heavy Hex Head headed stud anchor with 24 in embedment, 1 1/2, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 24.000 in.. $h_{ef,17.6.2.1.3}$ = 0.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.000 in.
Anchor plate[R] :	l_x x l_y x t = 14.000 in. x 26.000 in. x 1.000 in.; (Recommended plate thickness: not calculated)
Profile:	Square HSS (AISC), HSS5X5X.500; (L x W x T) = 5.000 in. x 5.000 in. x 0.500 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 27.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



BP-16

1.1 Design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1 (Mezz Brace Frame)	N = 214.500; V_x = 0.000; V_y = 118.200; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	199

2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	59.250	52.382	114 / -	not recommended
Shear	Pryout Strength	118.200	94.325	- / 126	not recommended

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	1.131	1.253	1.000	199	not recommended

3 Warnings

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Fastening does not meet the design criteria!

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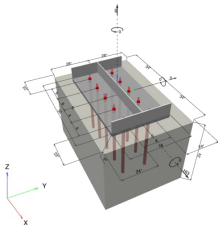
Specifier's comments:

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 55 1**
Item number:	not available
Additional plate or washer (17.6.2.1.3):	$d_{pl,hole}$ = 3.000 in.. t_{plate} = 0.375 in.
Specification text:	Hilti Heavy Hex Head headed stud anchor with 20 in embedment, 1, Steel galvanized, installation per instruction for use
Effective embedment depth:	h_{ef} = 20.000 in.. $h_{ef,17.6.2.1.3}$ = 0.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.000 in.
Anchor plate[R] :	l_x x l_y x t = 30.000 in. x 18.000 in. x 1.000 in.; (Recommended plate thickness: not calculated)
Profile:	W shape (AISC), ; (L x W x T x FT) = 30.000 in. x 18.000 in. x 0.230 in. x 0.335 in.
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 24.000 in.
Reinforcement:	tension: present, shear: present; anchor reinforcement: tension, shear edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



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1.1 Load combination and design results

Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Moment Frame	N = 46.000; V_x = 163.000; V_y = 0.000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	yes	92
2	Brace Frame	N = 151.200; V_x = 0.000; V_y = 122.000; M_x = 0.00000; M_y = 0.00000; M_z = 0.00000;	no	81

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2 Proof I Utilization (Governing Cases)

		Design values [kip]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	Pullout Strength	4.600	25.217	19 / -	OK
Shear	Steel Strength	16.300	17.725	- / 92	OK

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	0.182	0.920	1.000	92	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

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SECTION BREAK

Lateral Design

SUBSECTION BREAK

Concrete Pier Design

DESCRIPTION/NOTES:

Description details.

INPUTS

REMB Moment Frame Reactions (Unfactored)

View "PEMB Moment Frame Reactions" Calculations for Reactions.

Dead Load Reactions

$D_{L\_M10} := 38\ kip$ Force on Grid 10
$D_{L\_M4} := 41\ kip$ Force on Grid 4
$D_{L\_M1} := 16\ kip$ Force on Grid 1

Snow Load Reactions

$S_{L\_M10} := 50\ kip$ Force on Grid 10
$S_{L\_M4} := 68\ kip$ Force on Grid 4
$S_{L\_M1} := 13.4\ kip$ Force on Grid 1

Vertical Seismic Forces

$T_{M\_EQ10} := 7\ kip$ Force on Grid 10
$T_{M\_EQ4} := 6.5\ kip$ Force on Grid 4
$T_{M\_EQ1} := 0.6\ kip$ Force on Grid 1

Horzontal Seismic Forces

$V_{M\_EQ10} := 15\ kip$ Force on Grid 10
$V_{M\_EQ4} := 16.5\ kip$ Force on Grid 4
$V_{M\_EQ1} := 0.6\ kip$ Force on Grid 1

Vertical Wind Forces

$T_{M\_W10} := 70\ kip$ Force on Grid 10
$T_{M\_W4} := 85\ kip$ Force on Grid 4
$T_{M\_W1} := 16\ kip$ Force on Grid 1

Horzontal Wind Forces

$V_{M\_W10} := 82\ kip$ Force on Grid 10
$V_{M\_W4} := 70\ kip$ Force on Grid 4
$V_{M\_W1} := 12\ kip$ Force on Grid 1

REMB Brace Frame Reactions (Unfactored)

View "PEMB Braced Frame Reactions" Calculations for Reactions.

Vertical Seismic Forces

$T_{B\_EQ10} := 70\ kip$ Force on Grid 10
$T_{B\_EQ4} := 80\ kip$ Force on Grid 4
$T_{B\_EQ1} := 20\ kip$ Force on Grid 1

Horzontal Seismic Forces

$V_{B\_EQ10} := 50\ kip$ Force on Grid 10
$V_{B\_EQ4} := 65\ kip$ Force on Grid 4
$V_{B\_EQ1} := 15\ kip$ Force on Grid 1

Vertical Wind Forces

$T_{B\_W10} := 22\ kip$ Force on Grid 10
$T_{B\_W4} := 18\ kip$ Force on Grid 4
$T_{B\_W1} := 7\ kip$ Force on Grid 1

Horzontal Wind Forces

$V_{B\_W10} := 16\ kip$ Force on Grid 10
$V_{B\_W4} := 15\ kip$ Force on Grid 4
$V_{B\_W1} := 6\ kip$ Force on Grid 1

Mezzanine Brace Frame Reactions (Unfactored)

From Ram

Vertical Seismic Forces

$T_{MB\_EQ1} := 92\ kip$ Force on Frame 1
$T_{MB\_EQ2} := 75\ kip$ Force on Frame 2
$T_{MB\_EQ3} := 87\ kip$ Force on Frame 3
$T_{MB\_EQ4} := 72\ kip$ Force on Frame 4
$T_{MB\_EQ5} := 126\ kip$ Force on Frame 5

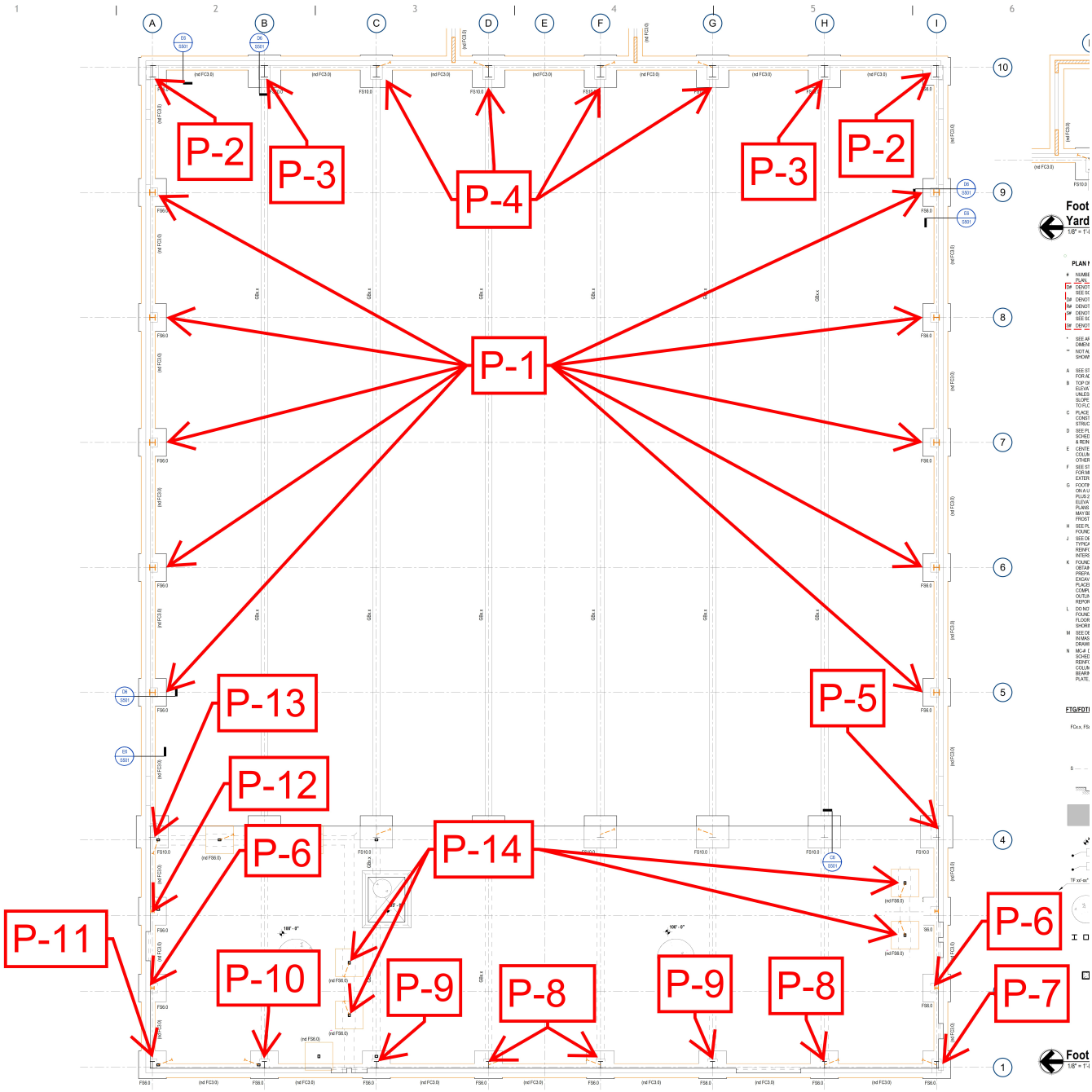
Horzontal Seismic Forces

$V_{MB\_EQ1} := 65\ kip$ Force on Frame 1
$V_{MB\_EQ2} := 37\ kip$ Force on Frame 2
$V_{MB\_EQ3} := 63\ kip$ Force on Frame 3
$V_{MB\_EQ4} := 38\ kip$ Force on Frame 4
$V_{MB\_EQ5} := 63.5\ kip$ Force on Frame 5

NOTE: Mezzanine Frame Numbers are Frame Numbers in Ram, Not ones that are shown on plan.

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Calculation Key



Created with PTC Mathcad Express. See www.mathcad.com for more information.

P-1 - Typical Pier on Grids A/I in Field House

Gravity Loads

$D_L := 15\ psf$
$S_L := 25\ psf$

$Trib_{columns} := 55.6\ ft \div 2 = 27.8\ ft$
$Trib_{Girders} := 24.5\ ft \div 2 = 12.3\ ft$
$P_{DL} := D_L \cdot Trib_{columns} \cdot Trib_{Girders} = 5.11\ kip$
$P_{SL} := S_L \cdot Trib_{columns} \cdot Trib_{Girders} = 8.51\ kip$

Wind Loading

$P_s := 19\ psf$ See "Main Wind Force Resisting System" Calculation

$Trib := 55.6\ ft \div 2 = 27.8\ ft$
$L_{col} := 36.5\ ft$

$V_{wind} := \left(\frac{L_{col}}{2}\right) \cdot Trib \cdot P_s = 9.6\ kip$

$H_{pier} := 2\ ft$

$M_{wind} := V_{wind} \cdot H_{pier} = 19.3\ kip \cdot ft$

P-2 - Corner Piers on Grid 10

Gravity Loads

$D_L := 15\ psf$
$S_L := 25\ psf$

$Trib_{columns} := 27.75\ ft \div 2 = 13.9\ ft$
$Trib_{Girders} := 24.5\ ft \div 2 = 12.3\ ft$
$P_{DL} := D_L \cdot Trib_{columns} \cdot Trib_{Girders} = 2.55\ kip$
$P_{SL} := S_L \cdot Trib_{columns} \cdot Trib_{Girders} = 4.25\ kip$

Seismic Loading

$EQ_{shear} := V_{M\_EQ10} \div 2 = 7.5\ kip$
$EQ_{Tension} := T_{M\_EQ10} \div 2 = 3.5\ kip$
$H_{pier} := 2\ ft$
$M_{EQ} := EQ_{shear} \cdot H_{pier} = 15.0\ kip \cdot ft$

View "PEMB Moment Frame Reactions" Calculations for Reactions. Reactions are Half because Pier is at the end so half trib

Wind Loading

$W_{shear} := V_{M\_W10} \div 2 = 41.0\ kip$
$W_{Tension} := T_{M\_W10} \div 2 = 35.0\ kip$
$H_{pier} := 2\ ft$
$M_{wind} := W_{shear} \cdot H_{pier} = 82.0\ kip \cdot ft$

View "PEMB Moment Frame Reactions" Calculations for Reactions. Reactions are Half because Pier is at the end so half trib

Created with PTC Mathcad Express. See www.mathcad.com for more information.

P-3 - Typical Pier on Grids 10 w/out Brace Frames

Gravity Loads

$P_{DL} := D_{L\_M10} = 38.00\ kip$
$P_{SL} := S_{L\_M10} = 50.00\ kip$

Seismic Loading

$EQ_{shear} := V_{M\_EQ10} = 15.0\ kip$
$EQ_{Tension} := T_{M\_EQ10} = 7.0\ kip$
$H_{pier} := 2\ ft$
$M_{EQ} := EQ_{shear} \cdot H_{pier} = 30.0\ kip \cdot ft$

Wind Loading

$W_{shear} := V_{M\_W10} = 82.0\ kip$
$W_{Tension} := T_{M\_W10} = 70.0\ kip$
$H_{pier} := 2\ ft$
$M_{wind} := W_{shear} \cdot H_{pier} = 164.0\ kip \cdot ft$

P-4 - Typical Pier on Grids 10 w/ Brace Frames

Gravity Loads

$P_{DL} := D_{L\_M10} = 38.00\ kip$
$P_{SL} := S_{L\_M10} = 50.00\ kip$

Seismic Loading (Y-Axis) - Moment Frame Forces

$EQ_{shear} := V_{M\_EQ10} = 15.0\ kip$
$EQ_{Tension} := T_{M\_EQ10} = 7.0\ kip$
$H_{pier} := 2\ ft$
$M_{EQ} := EQ_{shear} \cdot H_{pier} = 30.0\ kip \cdot ft$

Wind Loading (Y-Axis) - Moment Frame Forces

$W_{shear} := V_{M\_W10} = 82.0\ kip$
$W_{Tension} := T_{M\_W10} = 70.0\ kip$
$H_{pier} := 2\ ft$
$M_{wind} := W_{shear} \cdot H_{pier} = 164.0\ kip \cdot ft$

Seismic Loading (X-Axis) - Brace Frame Forces

$EQ_{shear} := V_{B\_EQ10} = 50.0\ kip$
$EQ_{Tension} := T_{B\_EQ10} = 70.0\ kip$
$H_{pier} := 2\ ft$
$M_{EQ} := EQ_{shear} \cdot H_{pier} = 100.0\ kip \cdot ft$

Wind Loading (X-Axis)- Brace Frame Forces

$W_{shear} := V_{B\_W10} = 16.0\ kip$
$W_{Tension} := T_{B\_W10} = 22.0\ kip$
$H_{pier} := 2\ ft$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

$M_{wind} := W_{shear} \cdot H_{pier} = 32.0\ kip \cdot ft$

P-5 - Pier on Grids I/4

Gravity Loads

$P_{DL} := D_{L\_M4} \div 2 = 20.50\ kip$

$P_{SL} := S_{L\_M4} \div 2 = 34.00\ kip$

View "PEMB Moment Frame Reactions" Calculations for Reactions. Reactions Half BC End Frame (Half Trib)

Seismic Loading (Y-Axis) - Moment Frame Forces

$EQ_{shear} := V_{M\_EQ4} \div 2 = 8.3\ kip$

$EQ_{Tension} := T_{M\_EQ4} \div 2 = 3.3\ kip$

View "PEMB Moment Frame Reactions" Calculations for Reactions. Reactions Half BC End Frame (Half Trib)

$H_{pier} := 2\ ft$

$M_{EQ} := EQ_{shear} \cdot H_{pier} = 16.5\ kip \cdot ft$

Wind Loading (Y-Axis) - Moment Frame Forces

$W_{shear} := V_{M\_W4} \div 2 = 35.0\ kip$

$W_{Tension} := T_{M\_W4} \div 2 = 42.5\ kip$

View "PEMB Moment Frame Reactions" Calculations for Reactions. Reactions Half BC End Frame (Half Trib)

$H_{pier} := 2\ ft$

$M_{wind} := W_{shear} \cdot H_{pier} = 70.0\ kip \cdot ft$

P-6 - Piers For Spot Columns on Grids I in Mezzanine

Gravity Loads

$D_L := 15\ psf$

$S_L := 25\ psf$

$Trib_{columns} := \left(\frac{33.5\ ft}{2}\right) = 16.8\ ft$

$Trib_{Girders} := \left(\frac{24.5\ ft}{2}\right) = 12.3\ ft$

$P_{DL} := D_L \cdot Trib_{columns} \cdot Trib_{Girders} = 3.08\ kip$

$P_{SL} := S_L \cdot Trib_{columns} \cdot Trib_{Girders} = 5.13\ kip$

Wind Loading

$P_s := 19\ psf$ See "Main Wind Force Resisting System" Calculation

$Trib := \left(\frac{33.5\ ft}{2}\right) = 16.8\ ft$

$L_{col} := 28.5\ ft$

$V_{wind} := \left(\frac{L_{col}}{2}\right) \cdot Trib \cdot P_s = 4.5\ kip$

$H_{pier} := 2\ ft$

$M_{wind} := V_{wind} \cdot H_{pier} = 9.1\ kip \cdot ft$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

P-7 - Pier on Grids 1/I

Gravity Loads

Mezzanine Column #9 (Grid I) (View Ram for Reactions Found Below)

$R_{DL.1} := 14.4\ kip$
$R_{LL.1} := 26.2\ kip$
$e := 11\ in$
$M_{DL.1} := R_{DL.1} \cdot e = 13.2\ kip \cdot ft$
$M_{LL} := R_{LL.1} \cdot e = 24.0\ kip \cdot ft$

Moment Frame Column (Grid D)

$R_{DL.2} := D_{L\_M1} \div 2 = 8.0\ kip$
$R_{SL.1} := S_{L\_M1} \div 2 = 6.7\ kip$
$e := 11\ in$
$M_{DL.2} := R_{DL.2} \cdot e = 7.3\ kip \cdot ft$
$M_{SL} := R_{SL.1} \cdot e = 6.1\ kip \cdot ft$

View "PEMB Moment Frame Reactions" Calculations for Reactions. Reactions Half BC End Frame (Half Trib)

Resulting Dead Load Moment

$M_{DL.total} := M_{DL.1} - M_{DL.2} = 5.9\ kip \cdot ft$

Seismic Loading (Y-Axis) - Moment Frame Forces

$EQ_{tension} := T_{M\_EQ1} \div 2 = 0.3\ kip$
$EQ_{shear} := V_{M\_EQ1} \div 2 = 0.3\ kip$
$e := 11\ in$
$M_{EQ.Tension} := EQ_{tension} \cancel{\cdot e} = 0.3\ kip \cancel{\cdot ft}$
$H_{pier} := 2\ ft$
$M_{EQ.Shear} := EQ_{shear} \cdot H_{pier} = 0.6\ kip \cdot ft$

View "PEMB Moment Frame Reactions" Calculations for Reactions. Reactions Half BC End Frame (Half Trib)

Wind Loading (Y-Axis) - Moment Frame Forces

$W_{shear} := V_{M\_W1} \div 2 = 6.0\ kip$
$W_{Tension} := T_{M\_W1} \div 2 = 8.0\ kip$
$e := 11\ in$
$M_{Wind.Tension} := W_{Tension} \cdot e = 7.3\ kip \cdot ft$
$H_{pier} := 2\ ft$
$M_{wind} := W_{shear} \cdot H_{pier} = 12.0\ kip \cdot ft$

View "PEMB Moment Frame Reactions" Calculations for Reactions. Reactions Half BC End Frame (Half Trib)

Seismic Loading (X-Axis) - Brace Frame Forces

$EQ_{tension} := T_{B\_EQ1} = 20.0\ kip$
$EQ_{shear} := V_{B\_EQ1} = 15.0\ kip$
$e := 11\ in$
$M_{EQ.Tension} := EQ_{tension} \cdot e = 18.3\ kip \cdot ft$

$H_{pier} := 2\ ft$
$M_{EQ} := EQ_{shear} \cdot H_{pier} = 30.0\ kip \cdot ft$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Wind Loading (X-Axis) - Brace Frame Forces

$W_{shear} := V_{B\_W1} = 6.0\ kip$
$W_{Tension} := T_{B\_W1} = 7.0\ kip$
$e := 11\ in$
$M_{Wind.Tension} := W_{Tension} \cdot e = 6.4\ kip \cdot ft$
$H_{pier} := 2\ ft$
$M_{wind} := W_{shear} \cdot H_{pier} = 12.0\ kip \cdot ft$

P-8 - Piers on Grids 1 for Metal Building Brace Frames

Gravity Loads

Mezzanine Column #8 (Grid H) (View Ram for Reactions Found Below)

$R_{DL.1} := 41\ kip$
$R_{LL.1} := 43\ kip$
$e := 11\ in$
$M_{DL.1} := R_{DL.1} \cdot e = 37.6\ kip \cdot ft$
$M_{LL} := R_{LL.1} \cdot e = 39.4\ kip \cdot ft$

Moment Frame Column (Grid H)

$R_{DL.2} := D_{L\_M1} = 16.0\ kip$
$R_{SL.1} := S_{L\_M1} = 13.4\ kip$
$e := 11\ in$
$M_{DL.2} := R_{DL.2} \cdot e = 14.7\ kip \cdot ft$
$M_{SL} := R_{SL.1} \cdot e = 12.3\ kip \cdot ft$

Resulting Dead Load Moment

$M_{DL.total} := M_{DL.1} - M_{DL.2} = 22.9\ kip \cdot ft$

Seismic Loading (Y-Axis) - Moment Frame Forces

$EQ_{tension} := T_{M\_EQ1} = 0.6\ kip$
$EQ_{shear} := V_{M\_EQ1} = 0.6\ kip$
$e := 11\ in$
$M_{EQ.Tension} := EQ_{tension} \cdot e = 0.6\ kip \cdot ft$
$H_{pier} := 2\ ft$
$M_{EQ.Shear} := EQ_{shear} \cdot H_{pier} = 1.2\ kip \cdot ft$

Wind Loading (Y-Axis) - Moment Frame Forces

$W_{shear} := V_{M\_W1} = 12.0\ kip$
$W_{Tension} := T_{M\_W1} = 16.0\ kip$
$e := 11\ in$
$M_{Wind.Tension} := W_{Tension} \cdot e = 14.7\ kip \cdot ft$
$H_{pier} := 2\ ft$

$M_{wind} := W_{shear} \cdot H_{pier} = 24.0\ kip \cdot ft$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Seismic Loading (X-Axis) - Brace Frame Forces

$EQ_{tension} := T_{B\_EQ1} = 20.0\ kip$
$EQ_{shear} := V_{B\_EQ1} = 15.0\ kip$
$e := 11\ in$
$M_{EQ.Tension} := EQ_{tension} \cdot e = 18.3\ kip \cdot ft$
$H_{pier} := 2\ ft$
$M_{EQ} := EQ_{shear} \cdot H_{pier} = 30.0\ kip \cdot ft$

Wind Loading (X-Axis) - Brace Frame Forces

$W_{shear} := V_{B\_W1} = 6.0\ kip$
$W_{Tension} := T_{B\_W1} = 7.0\ kip$
$e := 11\ in$
$M_{Wind.Tension} := W_{Tension} \cdot e = 6.4\ kip \cdot ft$
$H_{pier} := 2\ ft$
$M_{wind} := W_{shear} \cdot H_{pier} = 12.0\ kip \cdot ft$

P-9 - Piers on Grids 1 for Metal Building Moment Frames

Gravity Loads

Mezzanine Column #8 (Grid G) (View Ram for Reactions Found Below)

$R_{DL.1} := 42\ kip$
$R_{LL.1} := 34\ kip$
$e := 11\ in$
$M_{DL.1} := R_{DL.1} \cdot e = 38.5\ kip \cdot ft$
$M_{LL} := R_{LL.1} \cancel{\cdot e} = 31.2\ kip \cancel{\cdot ft}$

Moment Frame Column (Grid G)

$R_{DL.2} := D_{L\_M1} = 16.0\ kip$
$R_{SL.1} := S_{L\_M1} = 13.4\ kip$
$e := 11\ in$
$M_{DL.2} := R_{DL.2} \cdot e = 14.7\ kip \cdot ft$
$M_{SL} := R_{SL.1} \cdot e = 12.3\ kip \cdot ft$

Resulting Dead Load Moment

$M_{DL.total} := M_{DL.1} - M_{DL.2} = 23.8\ kip \cdot ft$

Seismic Loading (Y-Axis) - Moment Frame Forces

$EQ_{tension} := T_{M\_EQ1} = 0.6\ kip$
$EQ_{shear} := V_{M\_EQ1} = 0.6\ kip$
$e := 11\ in$
$M_{EQ.Tension} := EQ_{tension} \cdot e = 0.6\ kip \cdot ft$
$H_{pier} := 2\ ft$
$M_{EQ.Shear} := EQ_{shear} \cdot H_{pier} = 1.2\ kip \cdot ft$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Wind Loading (Y-Axis) - Moment Frame Forces

$W_{shear} := V_{M\_W1} = 12.0\ kip$
$W_{Tension} := T_{M\_W1} = 16.0\ kip$
$e := 11\ in$
$M_{Wind.Tension} := W_{Tension} \cdot e = 14.7\ kip \cdot ft$
$H_{pier} := 2\ ft$
$M_{wind} := W_{shear} \cdot H_{pier} = 24.0\ kip \cdot ft$

P-10 - Pier on Grids 1&B Mezz Brace Frames

Gravity Loads

Mezzanine Column #2 (Grid B) (View Ram for Reactions Found Below)

$R_{DL.1} := 33\ kip$
$R_{LL.1} := 50\ kip$
$e := 7\ in$
$M_{DL.1} := R_{DL.1} \cdot e = 19.3\ kip \cdot ft$
$M_{LL} := R_{LL.1} \cdot e = 29.2\ kip \cdot ft$

Moment Frame Column (Grid B)

$R_{DL.2} := D_{L\_M1} = 16.0\ kip$
$R_{SL.1} := S_{L\_M1} = 13.4\ kip$
$e := 7\ in$
$M_{DL.2} := R_{DL.2} \cdot e = 9.3\ kip \cdot ft$
$M_{SL} := R_{SL.1} \cdot e = 7.8\ kip \cdot ft$

Resulting Dead Load Moment

$M_{DL.total} := M_{DL.1} - M_{DL.2} = 9.9\ kip \cdot ft$

Seismic Loading (Y-Axis) - Moment Frame Forces

$EQ_{tension} := T_{M\_EQ1} = 0.6\ kip$
$EQ_{shear} := V_{M\_EQ1} = 0.6\ kip$
$e := 7\ in$
$M_{EQ.Tension} := EQ_{tension} \cdot e = 0.4\ kip \cdot ft$
$H_{pier} := 2\ ft$
$M_{EQ.Shear} := EQ_{shear} \cdot H_{pier} = 1.2\ kip \cdot ft$

Wind Loading (Y-Axis) - Moment Frame Forces

$W_{shear} := V_{M\_W1} = 12.0\ kip$
$W_{Tension} := T_{M\_W1} = 16.0\ kip$
$e := 7\ in$
$M_{Wind.Tension} := W_{Tension} \cdot e = 9.3\ kip \cdot ft$
$H_{pier} := 2\ ft$
$M_{wind} := W_{shear} \cdot H_{pier} = 24.0\ kip \cdot ft$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Seismic Loading (X-Axis) - Brace Frame Forces

$EQ_{tension} := T_{MB\_EQ1} = 92.0\ kip$ Vertical Seismic Reaction (Frame 1)

$EQ_{shear} := V_{MB\_EQ1} = 65.0\ kip$ Horzontal Seismic Reaction (Frame 1)

$e := 7\ in$

$M_{EQ.Tension} := EQ_{tension} \cdot e = 53.7\ kip \cdot ft$

$H_{pier} := 2\ ft$

$M_{EQ.Shear} := EQ_{shear} \cdot H_{pier} = 130.0\ kip \cdot ft$

No Moment Reaction for Shear, inline with Center of Pier

P-11 - Pier on Grids 1&A Mezz Brace Frames Corner Condition

Gravity Loads

Mezzanine Column #10 (Grid A) (View Ram for Reactions Found Below)

$R_{DL.1} := 15\ kip$

$R_{LL.1} := 22\ kip$

$e := 7\ in$

$M_{DL.1} := R_{DL.1} \cdot e = 8.8\ kip \cdot ft$

$M_{LL} := R_{LL.1} \cdot e = 12.8\ kip \cdot ft$

Moment Frame Column (Grid A)

$R_{DL.2} := D_{L\_M1} \div 2 = 8.0\ kip$ View "PEMB Moment Frame Reactions" Calculations for Reactions. Reactions Half BC End Frame (Half Trib)

$R_{SL.1} := S_{L\_M1} \div 2 = 6.7\ kip$

$e := 7\ in$

$M_{DL.2} := R_{DL.2} \cdot e = 4.7\ kip \cdot ft$

$M_{SL} := R_{SL.1} \cdot e = 3.9\ kip \cdot ft$

Resulting Dead Load Moment

$M_{DL.total} := M_{DL.1} - M_{DL.2} = 4.1\ kip \cdot ft$

Seismic Loading (Y-Axis) - Moment Frame Forces

$EQ_{tension} := T_{M\_EQ1} \div 2 = 0.3\ kip$ View "PEMB Moment Frame Reactions" Calculations for Reactions. Reactions Half BC End Frame (Half Trib)

$EQ_{shear} := V_{M\_EQ1} \div 2 = 0.3\ kip$

$e := 7\ in$

$M_{EQ.Tension} := EQ_{tension} \cdot e = 0.2\ kip \cdot ft$

$H_{pier} := 2\ ft$

$M_{EQ.Shear} := EQ_{shear} \cdot H_{pier} = 0.6\ kip \cdot ft$

Wind Loading (Y-Axis) - Moment Frame Forces

$W_{shear} := V_{M\_W1} \div 2 = 6.0\ kip$ View "PEMB Moment Frame Reactions" Calculations for Reactions. Reactions Half BC End Frame (Half Trib)

$W_{Tension} := T_{M\_W1} \div 2 = 8.0\ kip$

$e := 7\ in$

$M_{Wind.Tension} := W_{Tension} \cdot e = 4.7\ kip \cdot ft$

$H_{pier} := 2\ ft$

$M_{wind} := W_{shear} \cdot H_{pier} = 12.0\ kip \cdot ft$

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Seismic Loading (X-Axis) - Brace Frame Forces

$EQ_{tension} := T_{MB\_EQ1} = 92.0\ kip$ Vertical Seismic Reaction (Frame 1)

$EQ_{shear} := V_{MB\_EQ1} = 65.0\ kip$ Horzontal Seismic Reaction (Frame 1)

$e := 7\ in$

$M_{EQ.Tension} := EQ_{tension} \cdot e = 53.7\ kip \cdot ft$

$H_{pier} := 2\ ft$

$M_{EQ.Shear} := EQ_{shear} \cdot H_{pier} = 130.0\ kip \cdot ft$

P-12 - Pier on Grids A/3 for Mezz Brace Frames

Gravity Loads

Mezzanine Column #11 (Grid 3) (View Ram for Reactions Found Below)

$R_{DL.1} := 20\ kip$

$R_{LL.1} := 31\ kip$

$e := 11\ in$

$M_{DL.1} := R_{DL.1} \cdot e = 18.3\ kip \cdot ft$

$M_{LL} := R_{LL.1} \cdot e = 28.4\ kip \cdot ft$

Seismic Loading (X-Axis) - Brace Frame Forces

$EQ_{tension} := T_{MB\_EQ4} = 72.0\ kip$ Vertical Seismic Reaction (Frame 4)

$EQ_{shear} := V_{MB\_EQ4} = 38.0\ kip$ Horzontal Seismic Reaction (Frame 4)

$e := 11\ in$

$M_{EQ.Tension} := EQ_{tension} \cdot e = 66.0\ kip \cdot ft$

$H_{pier} := 2\ ft$

$M_{EQ} := EQ_{shear} \cdot H_{pier} = 76.0\ kip \cdot ft$

P-13 - Pier on Grids A/4 for Mezz Brace Frames

Gravity Loads

Mezzanine Column #12 (Grid 4) (View Ram for Reactions Found Below)

$R_{DL.1} := 6.5\ kip$

$R_{LL.1} := 9.2\ kip$

$e_x := 9\ in$

$e_y := 21\ in$

$M_{DL.1x} := R_{DL.1} \cdot e_x = 4.9\ kip \cdot ft$

$M_{DL.1y} := R_{DL.1} \cdot e_y = 11.4\ kip \cdot ft$

$M_{LL} := R_{LL.1} \cdot e_x = 6.9\ kip \cdot ft$

$M_{LL} := R_{LL.1} \cdot e_y = 16.1\ kip \cdot ft$

Gravity Load from Moment Frame

$P_{DL.2} := D_{L\_M4} \div 2 = 20.50\ kip$ View "PEMB Moment Frame Reactions" Calculations for Reactions.

$P_{SL} := S_{L\_M4} \div 2 = 34.00\ kip$ Reactions Half BC End Frame (Half Trib)

$e_x := 7\ in$

$e_y := 6\ in$

$M_{DL.2x} := P_{DL.2} \cdot e_x = 12.0\ kip \cdot ft$

$M_{DL.2y} := P_{DL.2} \cdot e_y = 10.3\ kip \cdot ft$

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$M_{SLx} := P_{SL} \cdot e_x = 19.8\ kip\text{-}ft$
$M_{SLy} := P_{SL} \cdot e_y = 17.0\ kip\text{-}ft$

Resulting Dead Load Moment

$M_{DL.total.x} := M_{DL.1x} - M_{DL.2x} = -7.1\ kip\text{-}ft$
$M_{DL.total.y} := M_{DL.1y} - M_{DL.2y} = 1.1\ kip\text{-}ft$

Seismic Loading (Y-Axis) - Brace Frame Forces

$EQ_{tension.1} := T_{MB\_EQ4} = 72.0\ kip$ Vertical Seismic Reaction (Frame 4)
$EQ_{shear.1} := V_{MB\_EQ4} = 38.0\ kip$ Horzontal Seismic Reaction (Frame 4)
$e_x := 9\ in$
$e_y := 21\ in$
$M_{EQ.Tension.1x} := EQ_{tension.1} \cdot e_x = 54.0\ kip\text{-}ft$
$M_{EQ.Tension.1y} := EQ_{tension.1} \cdot e_y = 126.0\ kip\text{-}ft$
$H_{pier} := 2\ ft$
$M_{EQ.1} := EQ_{shear.1} \cdot H_{pier} = 76.0\ kip\text{-}ft$

Seismic Loading (Y-Axis) - Moment Frame Forces

$EQ_{shear.2} := V_{M\_EQ4} \div 2 = 8.3\ kip$ View "PEMB Moment Frame Reactions" Calculations for Reactions.
$EQ_{Tension.2} := T_{M\_EQ4} \div 2 = 3.3\ kip$ Reactions Half BC End Frame (Half Trib)
$e_x := 7\ in$
$e_y := 6\ in$
$M_{EQ.Tension.2x} := EQ_{Tension.2} \cdot e_x = 1.9\ kip\text{-}ft$
$M_{EQ.Tension.2y} := EQ_{Tension.2} \cdot e_y = 1.6\ kip\text{-}ft$
$H_{pier} := 2\ ft$
$M_{EQ.2} := EQ_{shear.2} \cdot H_{pier} = 16.5\ kip\text{-}ft$

Total Seismic (Both Frames are in Same Direction)

$EQ_{tension.total} := EQ_{tension.1} + EQ_{Tension.2} = 75.3\ kip$
$M_{EQ.Tension.x\_total} := M_{EQ.Tension.1x} - M_{EQ.Tension.2x} = 52.1\ ft\text{-}kip$
$M_{EQ.Tension.y\_total} := M_{EQ.Tension.1y} - M_{EQ.Tension.2y} = 124.4\ ft\text{-}kip$

$M_{EQ\_shear} := M_{EQ.1} + M_{EQ.2} = 92.5\ kip\text{-}ft$

Wind Loading (Y-Axis) - Moment Frame Forces

$W_{shear} := V_{M\_W4} \div 2 = 35.0\ kip$ View "PEMB Moment Frame Reactions" Calculations for Reactions.
$W_{Tension} := T_{M\_W4} \div 2 = 42.5\ kip$ Reactions Half BC End Frame (Half Trib)
$e_x := 7\ in$
$e_y := 6\ in$
$M_{Wind.Tension.x} := W_{Tension} \cdot e_x = 24.8\ kip\text{-}ft$
$M_{Wind.Tension.y} := W_{Tension} \cdot e_y = 21.3\ kip\text{-}ft$
$H_{pier} := 2\ ft$
$M_{wind} := W_{shear} \cdot H_{pier} = 70.0\ kip\text{-}ft$

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P-14 - Pier for Interior Mezz Brace Frames (Frames 3 and 5) Worst Case

Gravity Loads

Mezzanine Column #22 (Grid H.9) (View Ram for Reactions Found Below)

$R_{DL.1} := 8\ kip$

$R_{LL.1} := 10\ kip$

$e := 5.5\ in$

$M_{DL.1} := R_{DL.1} \cdot e = 3.7\ kip \cdot ft$

$M_{LL} := R_{LL.1} \cdot e = 4.6\ kip \cdot ft$

Seismic Loading (X-Axis) - Brace Frame Forces

$EQ_{tension} := T_{MB\_EQ5} = 126.0\ kip$ Vertical Seismic Reaction (Frame 5)

$EQ_{shear} := V_{MB\_EQ5} = 63.5\ kip$ Horzontal Seismic Reaction (Frame 5)

$e := 11\ in$

$M_{EQ.Tension} := EQ_{tension} \cdot e = 115.5\ kip \cdot ft$

$H_{pier} := 2\ ft$

$M_{EQ} := EQ_{shear} \cdot H_{pier} = 127.0\ kip \cdot ft$

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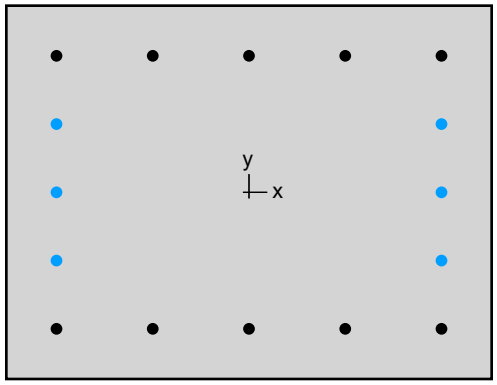

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Figure 1: Column section 4

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1. General Information

File Name	...\P-1 TYP Pier on Grid A and I in FH (No Wal...
Project	CCHS Field Hous
Column	CP-1 - Typical Pier on Grids A/I in Field House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	X - axis
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	4	ksi
E_c	3605	ksi
f_c	3.4	ksi
ε_u	0.003	in/in
β_1	0.85	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{ty}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	26	in
Depth	20	in
A_g	520	in^2
I_x	17333.3	in^4
I_y	29293.3	in^4
r_x	5.7735	in
r_y	7.50555	in
X_o	0	in
Y_o	0	in

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3.2. Section Figure

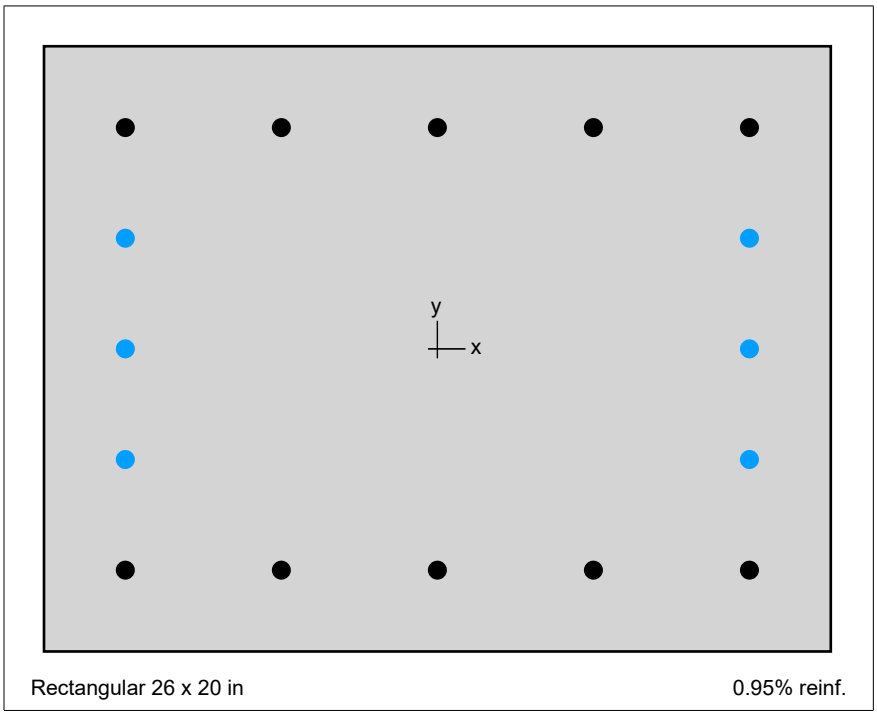

Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter	Area	Bar	Diameter	Area	Bar	Diameter	Area
	in	in^2		in	in^2		in	in^2
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #3 bars or less	#3 ties
For larger bars	#3 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---

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Total steel area, A_s	4.96 in^2
Rho	0.95 %
Minimum clear spacing	3.03 in

(Note: Rho < 1.0%)

4.4. Bars Provided

		Bars	Clear cover
			in
Top	5	#5	2
Bottom	5	#5	2
Left	3	#5	2
Right	3	#5	2

5. Loading

5.1. Load Cases

Case	Type	Sustained Load
		%
A	Dead	100
B	Live	0
C	Wind	0
D	EQ	0
E	Snow	0

5.2. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.500	0.000	1.600
U5	1.200	0.000	-0.500	0.000	1.600
U6	1.200	1.000	1.000	0.000	0.500
U7	1.200	1.000	-1.000	0.000	0.500
U8	1.200	1.000	0.000	1.000	0.200
U9	1.200	1.000	0.000	-1.000	0.200
U10	0.900	0.000	1.000	0.000	0.000
U11	0.900	0.000	-1.000	0.000	0.000
U12	0.900	0.000	0.000	1.000	0.000
U13	0.900	0.000	0.000	-1.000	0.000

5.3. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	5.20	0.00	0.00	0.00	0.00
1	Live	0.00	0.00	0.00	0.00	0.00
1	Wind	0.00	0.00	19.30	0.00	0.00
1	EQ	0.00	0.00	0.00	0.00	0.00
1	Snow	8.51	0.00	0.00	0.00	0.00

6. Slenderness

6.1. Sway Criteria

X-Axis	Non-sway column

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6.2. Columns

Column	Axis	Height	Width	Depth/Dia.	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	X	2	26	20	17333.3	4	3605
Above	X	(no column specified...)					
Below	X	(no column specified...)					

6.3. X - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults
Stiffness reduction factor, ϕ_K	0.75
Cracked section coefficients, cI(beams)	0.35
Cracked section coefficients, cI(columns)	0.7
$0.2\ E_c\ I_g + E_s\ I_{se}$ (X-axis)	1.78e+007 kip-in^2
Minimum eccentricity, $e_{x\ min}$	1.20 in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
X	999.000	999.000	1.000	(N/A)	4.16

7.3. Magnification Factors: X - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	7.28	(N/A)	152496.30	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	10.50	(N/A)	191269.64	0.595	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.86	(N/A)	232063.66	0.314	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.86	(N/A)	232063.66	0.314	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.86	(N/A)	232063.66	0.314	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	10.50	(N/A)	191269.64	0.595	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	10.50	(N/A)	191269.64	0.595	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	7.94	(N/A)	170797.58	0.786	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	7.94	(N/A)	170797.58	0.786	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	4.68	(N/A)	152496.30	1.000	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	4.68	(N/A)	152496.30	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	4.68	(N/A)	152496.30	1.000	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	4.68	(N/A)	152496.30	1.000	(N/A)	(N/A)	*

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8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. X - axis

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	-9.65	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	9.65	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	-19.30	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	19.30	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	-19.30	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	19.30	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

9. Control Points

About	Point	P kip	X-Moment k-ft	Y-Moment k-ft	NA Depth in	d_t Depth in	ε_t	ϕ
X	@ Max compression	1279.1	0.00	0.00	55.78	17.31	-0.00207	0.65000
X	@ Allowable comp.	1023.3	161.94	0.00	19.52	17.31	-0.00034	0.65000
X	@ f_s = 0.0	903.9	216.85	0.00	17.31	17.31	0.00000	0.65000
X	@ f_s = 0.5 f_y	647.3	285.16	0.00	12.87	17.31	0.00103	0.65000
X	@ Balanced point	475.1	303.35	0.00	10.25	17.31	0.00207	0.65000
X	@ Tension control	337.8	352.95	0.00	6.44	17.31	0.00507	0.90000
X	@ Pure bending	0.0	185.73	0.00	2.79	17.31	0.01563	0.90000
X	@ Max tension	-267.8	0.00	0.00	0.00	17.31	9.99999	0.90000
-X	@ Max compression	1279.1	0.00	0.00	55.78	17.31	-0.00207	0.65000
-X	@ Allowable comp.	1023.3	-161.94	0.00	19.52	17.31	-0.00034	0.65000
-X	@ f_s = 0.0	903.9	-216.85	0.00	17.31	17.31	0.00000	0.65000
-X	@ f_s = 0.5 f_y	647.3	-285.16	0.00	12.87	17.31	0.00103	0.65000
-X	@ Balanced point	475.1	-303.35	0.00	10.25	17.31	0.00207	0.65000
-X	@ Tension control	337.8	-352.95	0.00	6.44	17.31	0.00507	0.90000
-X	@ Pure bending	0.0	-185.73	0.00	2.79	17.31	0.01563	0.90000
-X	@ Max tension	-267.8	0.00	0.00	0.00	17.31	9.99999	0.90000

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10. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand P_u kip	Demand M_{ux} k-ft	Capacity ϕP_n kip	Capacity ϕM_{nx} k-ft	Parameters at Capacity NA Depth in	Parameters at Capacity ε_t	Parameters at Capacity ϕ	Capacity Ratio
1	1	U1	Top	7.28	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
2	1	U1	Bot	7.28	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
3	1	U2	Top	10.50	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
4	1	U2	Bot	10.50	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
5	1	U3	Top	19.86	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
6	1	U3	Bot	19.86	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
7	1	U4	Top	19.86	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
8	1	U4	Bot	19.86	-9.65	0.00	-185.73	2.79	0.01563	0.900	0.50
9	1	U5	Top	19.86	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
10	1	U5	Bot	19.86	9.65	0.00	185.73	2.79	0.01563	0.900	0.50
11	1	U6	Top	10.50	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
12	1	U6	Bot	10.50	-19.30	0.00	-185.73	2.79	0.01563	0.900	0.53
13	1	U7	Top	10.50	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
14	1	U7	Bot	10.50	19.30	0.00	185.73	2.79	0.01563	0.900	0.53
15	1	U8	Top	7.94	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
16	1	U8	Bot	7.94	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
17	1	U9	Top	7.94	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
18	1	U9	Bot	7.94	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
19	1	U10	Top	4.68	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
20	1	U10	Bot	4.68	-19.30	0.00	-185.73	2.79	0.01563	0.900	0.53
21	1	U11	Top	4.68	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
22	1	U11	Bot	4.68	19.30	0.00	185.73	2.79	0.01563	0.900	0.53
23	1	U12	Top	4.68	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
24	1	U12	Bot	4.68	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
25	1	U13	Top	4.68	0.00	26.10	201.93	3.04	0.01408	0.900	0.43
26	1	U13	Bot	4.68	0.00	26.10	201.93	3.04	0.01408	0.900	0.43

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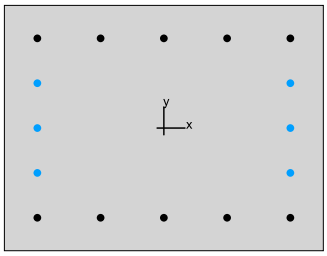
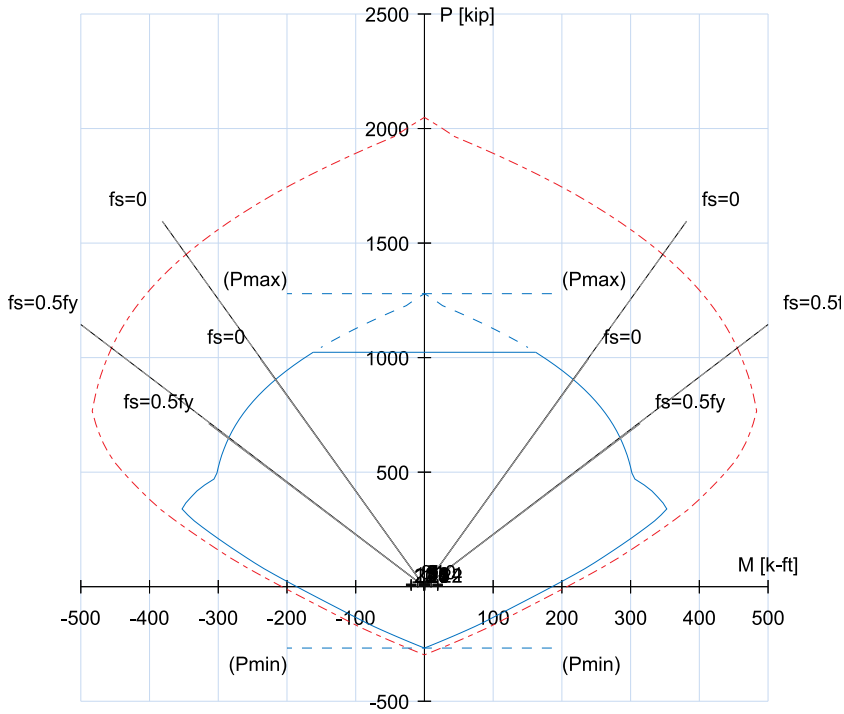
11. Diagrams

11.1. PM at θ=0 [deg]



26 x 20 in



PM at 0.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	X - axis
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	26 in
Depth	20 in
A_g	520 in^2
I_x	17333.3 in^4
I_y	29293.3 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	4.96 in^2
Rho	0.95 %
Min. clear spacing	3.03 in

No.	Load Combo			P_u kip	M_{ux} k-ft	ϕP_n kip	ϕM_{nx} k-ft	Capacity Ratio
12	1	U6	Bot	10.5	-19.3	0.00	-185.73	0.53
14	1	U7	Bot	10.5	19.3	0.00	185.73	0.53
20	1	U10	Bot	4.7	-19.3	0.00	-185.73	0.53
22	1	U11	Bot	4.7	19.3	0.00	185.73	0.53
8	1	U4	Bot	19.9	-9.6	0.00	-185.73	0.50
10	1	U5	Bot	19.9	9.6	0.00	185.73	0.50
1	1	U1	Top	7.3	0.0	26.10	201.93	0.43
2	1	U1	Bot	7.3	0.0	26.10	201.93	0.43
3	1	U2	Top	10.5	0.0	26.10	201.93	0.43
4	1	U2	Bot	10.5	0.0	26.10	201.93	0.43
5	1	U3	Top	19.9	0.0	26.10	201.93	0.43
6	1	U3	Bot	19.9	0.0	26.10	201.93	0.43
7	1	U4	Top	19.9	0.0	26.10	201.93	0.43
9	1	U5	Top	19.9	0.0	26.10	201.93	0.43
11	1	U6	Top	10.5	0.0	26.10	201.93	0.43

Only 15 points out of 26 are listed.

Max. Capacity Ratio: 0.53

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spColumn v10.00 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections
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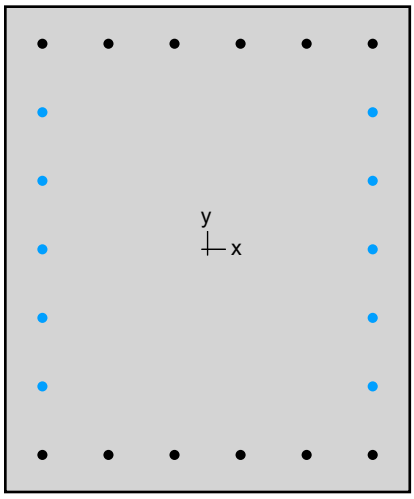

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Figure 1: Column section 4

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1. General Information

File Name	X:\Proje...\P-2Corner Piers Grid 10(No Wall).colx
Project	CCHS Field House
Column	CP-2 - Corner Piers on Grid 10
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	X - axis
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	4	ksi
E_c	3605	ksi
f_c	3.4	ksi
ε_u	0.003	in/in
β_1	0.85	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{ty}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	30	in
Depth	36	in
A_g	1080	in^2
I_x	116640	in^4
I_y	81000	in^4
r_x	10.3923	in
r_y	8.66025	in
X_o	0	in
Y_o	0	in

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3.2. Section Figure

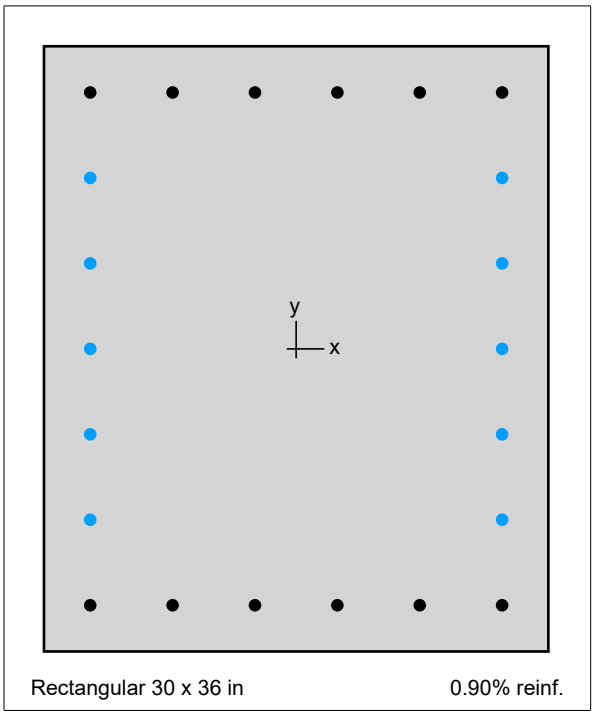

Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter in	Area in²	Bar	Diameter in	Area in²	Bar	Diameter in	Area in²
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #3 bars or less	#3 ties
For larger bars	#3 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---

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Total steel area, A_s	9.68 in^2
Rho	0.90 %
Minimum clear spacing	4.15 in

(Note: Rho < 1.0%)

4.4. Bars Provided

		Bars	Clear cover
			in
Top	6	#6	2
Bottom	6	#6	2
Left	5	#6	2
Right	5	#6	2

5. Loading

5.1. Load Cases

Case	Type	Sustained Load
		%
A	Dead	100
B	Live	0
C	Wind	0
D	EQ	0
E	Snow	0

5.2. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.500	0.000	1.600
U5	1.200	0.000	-0.500	0.000	1.600
U6	1.200	1.000	1.000	0.000	0.500
U7	1.200	1.000	-1.000	0.000	0.500
U8	1.200	1.000	0.000	1.000	0.200
U9	1.200	1.000	0.000	-1.000	0.200
U10	0.900	0.000	1.000	0.000	0.000
U11	0.900	0.000	-1.000	0.000	0.000
U12	0.900	0.000	0.000	1.000	0.000
U13	0.900	0.000	0.000	-1.000	0.000

5.3. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	2.60	0.00	0.00	0.00	0.00
1	Live	0.00	0.00	0.00	0.00	0.00
1	Wind	35.00	0.00	82.00	0.00	0.00
1	EQ	3.50	0.00	15.00	0.00	0.00
1	Snow	4.25	0.00	0.00	0.00	0.00

6. Slenderness

6.1. Sway Criteria

X-Axis	Non-sway column

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6.2. Columns

Column	Axis	Height	Width	Depth/Dia.	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	X	2	30	36	116640	4	3605
Above	X	(no column specified...)					
Below	X	(no column specified...)					

6.3. X - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults
Stiffness reduction factor, ϕ_K	0.75
Cracked section coefficients, cI(beams)	0.35
Cracked section coefficients, cI(columns)	0.7
$0.2\ E_c\ I_g + E_s\ I_{se}$ (X-axis)	1.26e+008 kip-in^2
Minimum eccentricity, $e_{x\ min}$	1.68 in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
X	999.000	999.000	1.000	(N/A)	2.31

7.3. Magnification Factors: X - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	3.64	(N/A)	1082952.00	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	5.24	(N/A)	1358059.38	0.595	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	9.92	(N/A)	1647681.63	0.315	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	27.42	(N/A)	1944633.00	0.114	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-7.58	(N/A)	2165904.00	0.000	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	40.24	(N/A)	2010072.75	0.078	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-29.75	(N/A)	2165904.00	0.000	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	7.47	(N/A)	1527790.63	0.418	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	0.47	(N/A)	1082952.00	1.000	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	37.34	(N/A)	2038176.75	0.063	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-32.66	(N/A)	2165904.00	0.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	5.84	(N/A)	1546317.88	0.401	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-1.16	(N/A)	2165904.00	0.000	(N/A)	(N/A)	*

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8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. X - axis

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	-41.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	41.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	-82.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	82.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	-15.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	15.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	-82.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	82.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	-15.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	15.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

9. Control Points

About	Point	P kip	X-Moment k-ft	Y-Moment k-ft	NA Depth in	d_t Depth in	ε_t	ϕ
X	@ Max compression	2497.6	0.00	0.00	107.14	33.25	-0.00207	0.65000
X	@ Allowable comp.	1998.1	582.99	0.00	35.33	33.25	-0.00018	0.65000
X	@ f_s = 0.0	1877.3	693.97	0.00	33.25	33.25	0.00000	0.65000
X	@ f_s = 0.5 f_y	1356.3	1009.43	0.00	24.72	33.25	0.00103	0.65000
X	@ Balanced point	1005.5	1104.47	0.00	19.68	33.25	0.00207	0.65000
X	@ Tension control	749.5	1348.60	0.00	12.36	33.25	0.00507	0.90000
X	@ Pure bending	0.0	686.68	0.00	4.43	33.25	0.01952	0.90000
X	@ Max tension	-522.7	0.00	0.00	0.00	33.25	9.99999	0.90000
-X	@ Max compression	2497.6	0.00	0.00	107.14	33.25	-0.00207	0.65000
-X	@ Allowable comp.	1998.1	-582.99	0.00	35.33	33.25	-0.00018	0.65000
-X	@ f_s = 0.0	1877.3	-693.97	0.00	33.25	33.25	0.00000	0.65000
-X	@ f_s = 0.5 f_y	1356.3	-1009.44	0.00	24.72	33.25	0.00103	0.65000
-X	@ Balanced point	1005.5	-1104.47	0.00	19.68	33.25	0.00207	0.65000
-X	@ Tension control	749.5	-1348.60	0.00	12.36	33.25	0.00507	0.90000
-X	@ Pure bending	0.0	-686.68	0.00	4.43	33.25	0.01952	0.90000
-X	@ Max tension	-522.7	0.00	0.00	0.00	33.25	9.99999	0.90000

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10. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand P_u kip	Demand M_{ux} k-ft	Capacity ϕP_n kip	Capacity ϕM_{nx} k-ft	Parameters at Capacity NA Depth in	ε_t	ϕ	Capacity Ratio
1	1	U1	Top	3.64	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
2	1	U1	Bot	3.64	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
3	1	U2	Top	5.24	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
4	1	U2	Bot	5.24	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
5	1	U3	Top	9.92	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
6	1	U3	Bot	9.92	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
7	1	U4	Top	27.42	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
8	1	U4	Bot	27.42	-41.00	0.00	-686.68	4.43	0.01952	0.900	0.52
9	1	U5	Top	-7.58	0.00	-113.36	546.09	3.38	0.02651	0.900	0.54
10	1	U5	Bot	-7.58	41.00	-106.98	554.17	3.43	0.02605	0.900	0.57
11	1	U6	Top	40.24	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
12	1	U6	Bot	40.24	-82.00	0.00	-686.68	4.43	0.01952	0.900	0.55
13	1	U7	Top	-29.75	0.00	-131.77	522.75	3.16	0.02852	0.900	0.56
14	1	U7	Bot	-29.75	82.00	-118.41	539.69	3.34	0.02689	0.900	0.62
15	1	U8	Top	7.47	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
16	1	U8	Bot	7.47	-15.00	0.00	-686.68	4.43	0.01952	0.900	0.50
17	1	U9	Top	0.47	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
18	1	U9	Bot	0.47	15.00	0.00	686.68	4.43	0.01952	0.900	0.50
19	1	U10	Top	37.34	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
20	1	U10	Bot	37.34	-82.00	0.00	-686.68	4.43	0.01952	0.900	0.55
21	1	U11	Top	-32.66	0.00	-134.10	519.78	3.15	0.02871	0.900	0.57
22	1	U11	Bot	-32.66	82.00	-120.74	536.73	3.32	0.02706	0.900	0.62
23	1	U12	Top	5.84	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
24	1	U12	Bot	5.84	-15.00	0.00	-686.68	4.43	0.01952	0.900	0.50
25	1	U13	Top	-1.16	0.00	-108.20	552.62	3.42	0.02614	0.900	0.54
26	1	U13	Bot	-1.16	15.00	-105.87	555.58	3.44	0.02597	0.900	0.55

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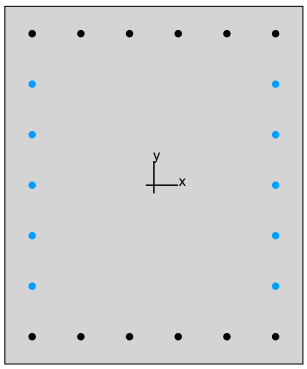
11. Diagrams

11.1. PM at θ=0 [deg]



30 x 36 in

General Information

Project	CCHS Field House
Column	CP-2 - Corn... on Grid 10
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	X - axis
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

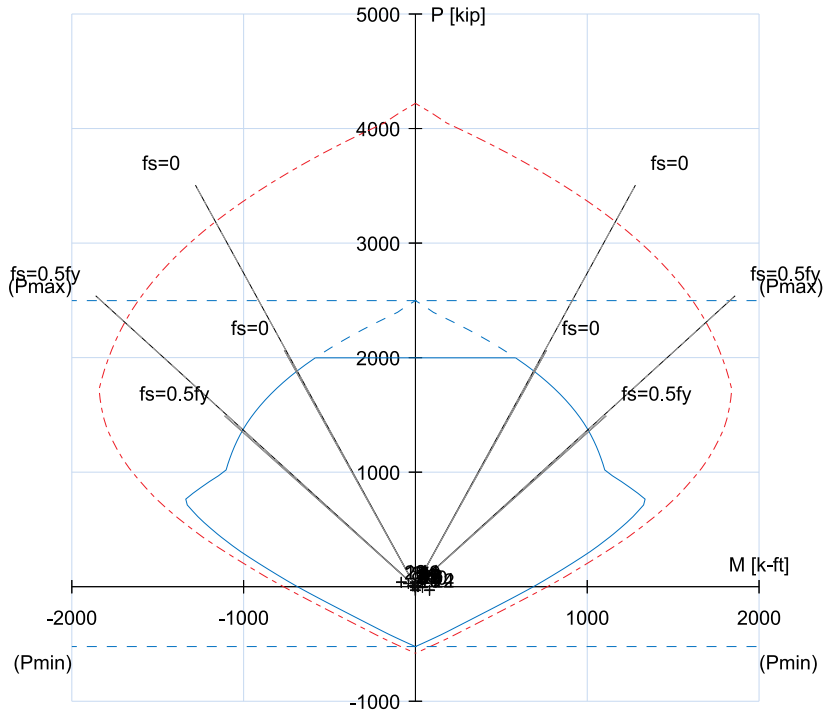
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	30 in
Depth	36 in
A_g	1080 in^2
I_x	116640 in^4
I_y	81000 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	9.68 in^2
Rho	0.90 %
Min. clear spacing	4.15 in



PM at 0.0 [deg]

No.	Load Combo			P_u kip	M_{ux} k-ft	ϕP_n kip	ϕM_{nx} k-ft	Capacity Ratio
14	1	U7	Bot	-29.8	82.0	-118.41	539.69	0.62
22	1	U11	Bot	-32.7	82.0	-120.74	536.73	0.62
10	1	U5	Bot	-7.6	41.0	-106.98	554.17	0.57
21	1	U11	Top	-32.7	0.0	-134.10	519.78	0.57
13	1	U7	Top	-29.8	0.0	-131.77	522.75	0.56
12	1	U6	Bot	40.2	-82.0	0.00	-686.68	0.55
20	1	U10	Bot	37.3	-82.0	0.00	-686.68	0.55
26	1	U13	Bot	-1.2	15.0	-105.87	555.58	0.55
9	1	U5	Top	-7.6	0.0	-113.36	546.09	0.54
25	1	U13	Top	-1.2	0.0	-108.20	552.62	0.54
8	1	U4	Bot	27.4	-41.0	0.00	-686.68	0.52
16	1	U8	Bot	7.5	-15.0	0.00	-686.68	0.50
18	1	U9	Bot	0.5	15.0	0.00	686.68	0.50
24	1	U12	Bot	5.8	-15.0	0.00	-686.68	0.50
1	1	U1	Top	3.6	0.0	50.97	745.56	0.44

Only 15 points out of 26 are listed.

Max. Capacity Ratio: 0.62

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spColumn v10.00 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections
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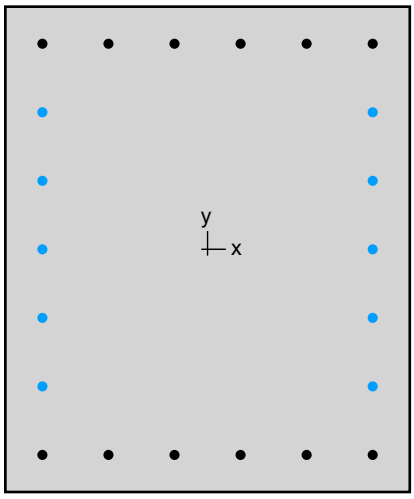

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Figure 1: Column section 4

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1. General Information

File Name	...\P-3 Typical Pier on Grids 10 (No Brace Fra...
Project	CCHS Field House
Column	CP-3 - Typical Pier on Grids 10 w/out Brace Frames
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	X - axis
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	4	ksi
E_c	3605	ksi
f_c	3.4	ksi
ε_u	0.003	in/in
β_1	0.85	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{ty}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	30	in
Depth	36	in
A_g	1080	in^2
I_x	116640	in^4
I_y	81000	in^4
r_x	10.3923	in
r_y	8.66025	in
X_o	0	in
Y_o	0	in

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3.2. Section Figure

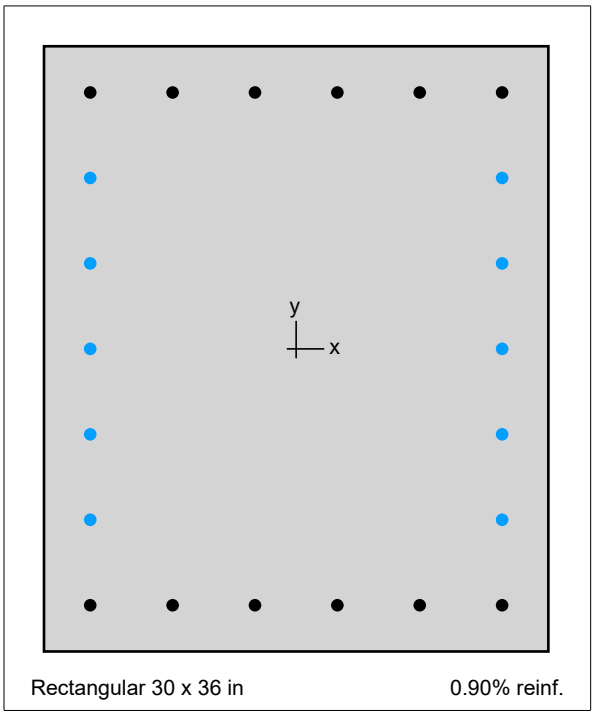

Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter in	Area in²	Bar	Diameter in	Area in²	Bar	Diameter in	Area in²
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #3 bars or less	#3 ties
For larger bars	#3 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---

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Total steel area, A_s	9.68 in^2
Rho	0.90 %
Minimum clear spacing	4.15 in

(Note: Rho < 1.0%)

4.4. Bars Provided

		Bars	Clear cover
			in
Top	6	#6	2
Bottom	6	#6	2
Left	5	#6	2
Right	5	#6	2

5. Loading

5.1. Load Cases

Case	Type	Sustained Load
		%
A	Dead	100
B	Live	0
C	Wind	0
D	EQ	0
E	Snow	0

5.2. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.500	0.000	1.600
U5	1.200	0.000	-0.500	0.000	1.600
U6	1.200	1.000	1.000	0.000	0.500
U7	1.200	1.000	-1.000	0.000	0.500
U8	1.200	1.000	0.000	1.000	0.200
U9	1.200	1.000	0.000	-1.000	0.200
U10	0.900	0.000	1.000	0.000	0.000
U11	0.900	0.000	-1.000	0.000	0.000
U12	0.900	0.000	0.000	1.000	0.000
U13	0.900	0.000	0.000	-1.000	0.000

5.3. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	38.00	0.00	0.00	0.00	0.00
1	Live	0.00	0.00	0.00	0.00	0.00
1	Wind	70.00	0.00	164.00	0.00	0.00
1	EQ	7.00	0.00	30.00	0.00	0.00
1	Snow	50.00	0.00	0.00	0.00	0.00

6. Slenderness

6.1. Sway Criteria

X-Axis	Non-sway column

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6.2. Columns

Column	Axis	Height	Width	Depth/Dia.	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	X	2	30	36	116640	4	3605
Above	X	(no column specified...)					
Below	X	(no column specified...)					

6.3. X - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults
Stiffness reduction factor, ϕ_K	0.75
Cracked section coefficients, cI(beams)	0.35
Cracked section coefficients, cI(columns)	0.7
$0.2\ E_c\ I_g + E_s\ I_{se}$ (X-axis)	1.26e+008 kip-in^2
Minimum eccentricity, $e_{x\ min}$	1.68 in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
X	999.000	999.000	1.000	(N/A)	2.31

7.3. Magnification Factors: X - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	53.20	(N/A)	1082952.00	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	70.60	(N/A)	1315945.13	0.646	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	125.60	(N/A)	1589004.25	0.363	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	160.60	(N/A)	1686926.00	0.284	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	90.60	(N/A)	1440755.50	0.503	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	140.60	(N/A)	1635478.38	0.324	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	0.60	(N/A)	1082952.00	1.000	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	62.60	(N/A)	1253101.50	0.728	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	48.60	(N/A)	1117440.88	0.938	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	104.20	(N/A)	1630687.75	0.328	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-35.80	(N/A)	2165904.00	0.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	41.20	(N/A)	1183491.38	0.830	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	27.20	(N/A)	1082952.00	1.000	(N/A)	(N/A)	*

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8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. X - axis

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	-82.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	82.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	-164.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	164.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	-30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	-164.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	164.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	-30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

9. Control Points

About	Point	P kip	X-Moment k-ft	Y-Moment k-ft	NA Depth in	d_t Depth in	ε_t	ϕ
X	@ Max compression	2497.6	0.00	0.00	107.14	33.25	-0.00207	0.65000
X	@ Allowable comp.	1998.1	582.99	0.00	35.33	33.25	-0.00018	0.65000
X	@ f_s = 0.0	1877.3	693.97	0.00	33.25	33.25	0.00000	0.65000
X	@ f_s = 0.5 f_y	1356.3	1009.43	0.00	24.72	33.25	0.00103	0.65000
X	@ Balanced point	1005.5	1104.47	0.00	19.68	33.25	0.00207	0.65000
X	@ Tension control	749.5	1348.60	0.00	12.36	33.25	0.00507	0.90000
X	@ Pure bending	0.0	686.68	0.00	4.43	33.25	0.01952	0.90000
X	@ Max tension	-522.7	0.00	0.00	0.00	33.25	9.99999	0.90000
-X	@ Max compression	2497.6	0.00	0.00	107.14	33.25	-0.00207	0.65000
-X	@ Allowable comp.	1998.1	-582.99	0.00	35.33	33.25	-0.00018	0.65000
-X	@ f_s = 0.0	1877.3	-693.97	0.00	33.25	33.25	0.00000	0.65000
-X	@ f_s = 0.5 f_y	1356.3	-1009.44	0.00	24.72	33.25	0.00103	0.65000
-X	@ Balanced point	1005.5	-1104.47	0.00	19.68	33.25	0.00207	0.65000
-X	@ Tension control	749.5	-1348.60	0.00	12.36	33.25	0.00507	0.90000
-X	@ Pure bending	0.0	-686.68	0.00	4.43	33.25	0.01952	0.90000
-X	@ Max tension	-522.7	0.00	0.00	0.00	33.25	9.99999	0.90000

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10. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand P_u kip	Demand M_{ux} k-ft	Capacity ϕP_n kip	Capacity ϕM_{nx} k-ft	Parameters at Capacity NA Depth in	Parameters at Capacity ε_t	Parameters at Capacity ϕ	Capacity Ratio
1	1	U1	Top	53.20	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
2	1	U1	Bot	53.20	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
3	1	U2	Top	70.60	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
4	1	U2	Bot	70.60	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
5	1	U3	Top	125.60	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
6	1	U3	Bot	125.60	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
7	1	U4	Top	160.60	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
8	1	U4	Bot	160.60	-82.00	0.00	-686.68	4.43	0.01952	0.900	0.54
9	1	U5	Top	90.60	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
10	1	U5	Bot	90.60	82.00	0.00	686.68	4.43	0.01952	0.900	0.55
11	1	U6	Top	140.60	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
12	1	U6	Bot	140.60	-164.00	0.00	-686.68	4.43	0.01952	0.900	0.60
13	1	U7	Top	0.60	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
14	1	U7	Bot	0.60	164.00	0.00	686.68	4.43	0.01952	0.900	0.61
15	1	U8	Top	62.60	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
16	1	U8	Bot	62.60	-30.00	0.00	-686.68	4.43	0.01952	0.900	0.51
17	1	U9	Top	48.60	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
18	1	U9	Bot	48.60	30.00	0.00	686.68	4.43	0.01952	0.900	0.51
19	1	U10	Top	104.20	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
20	1	U10	Bot	104.20	-164.00	0.00	-686.68	4.43	0.01952	0.900	0.61
21	1	U11	Top	-35.80	0.00	-136.61	516.57	3.13	0.02891	0.900	0.57
22	1	U11	Bot	-35.80	164.00	-110.51	549.70	3.40	0.02631	0.900	0.68
23	1	U12	Top	41.20	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
24	1	U12	Bot	41.20	-30.00	0.00	-686.68	4.43	0.01952	0.900	0.51
25	1	U13	Top	27.20	0.00	50.97	745.56	4.90	0.01737	0.900	0.44
26	1	U13	Bot	27.20	30.00	0.00	686.68	4.43	0.01952	0.900	0.51

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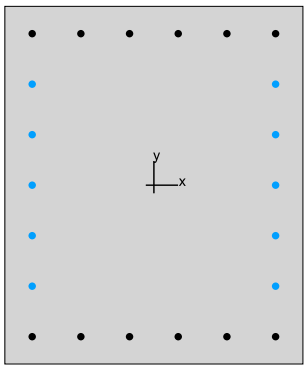
11. Diagrams

11.1. PM at θ=0 [deg]



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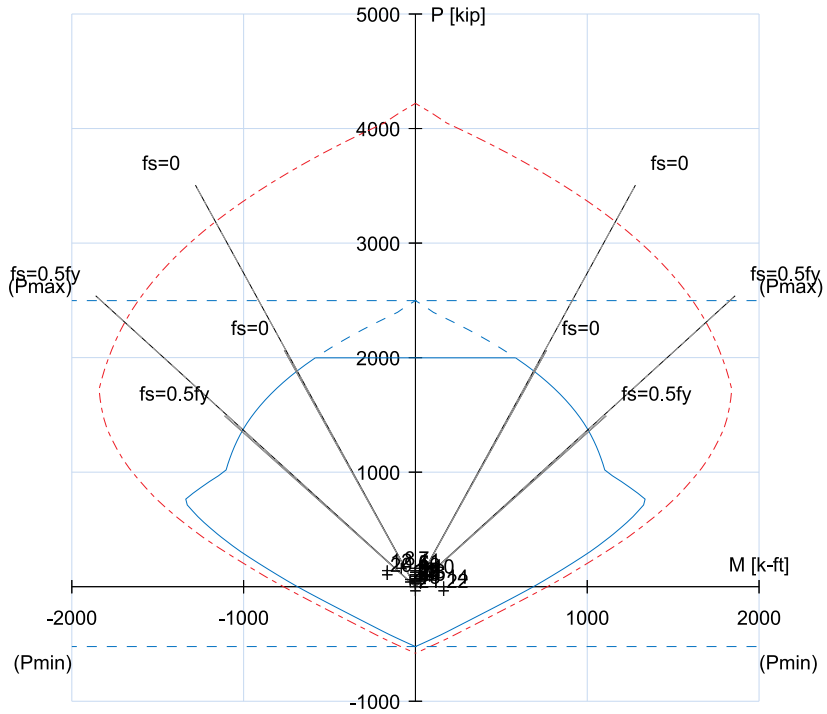

PM at 0.0 [deg]

General Information

Project	CCHS Field House
Column	CP-3 - Typi...race Frames
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	X - axis
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	30 in
Depth	36 in
A_g	1080 in^2
I_x	116640 in^4
I_y	81000 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	9.68 in^2
Rho	0.90 %
Min. clear spacing	4.15 in

No.	Load Combo			P_u kip	M_{ux} k-ft	ϕP_n kip	ϕM_{nx} k-ft	Capacity Ratio
22	1	U11	Bot	-35.8	164.0	-110.51	549.70	0.68
14	1	U7	Bot	0.6	164.0	0.00	686.68	0.61
20	1	U10	Bot	104.2	-164.0	0.00	-686.68	0.61
12	1	U6	Bot	140.6	-164.0	0.00	-686.68	0.60
21	1	U11	Top	-35.8	0.0	-136.61	516.57	0.57
10	1	U5	Bot	90.6	82.0	0.00	686.68	0.55
8	1	U4	Bot	160.6	-82.0	0.00	-686.68	0.54
16	1	U8	Bot	62.6	-30.0	0.00	-686.68	0.51
18	1	U9	Bot	48.6	30.0	0.00	686.68	0.51
24	1	U12	Bot	41.2	-30.0	0.00	-686.68	0.51
26	1	U13	Bot	27.2	30.0	0.00	686.68	0.51
1	1	U1	Top	53.2	0.0	50.97	745.56	0.44
2	1	U1	Bot	53.2	0.0	50.97	745.56	0.44
3	1	U2	Top	70.6	0.0	50.97	745.56	0.44
4	1	U2	Bot	70.6	0.0	50.97	745.56	0.44

Only 15 points out of 26 are listed.

Max. Capacity Ratio: 0.68

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Computer program for the Strength Design of Reinforced Concrete Sections
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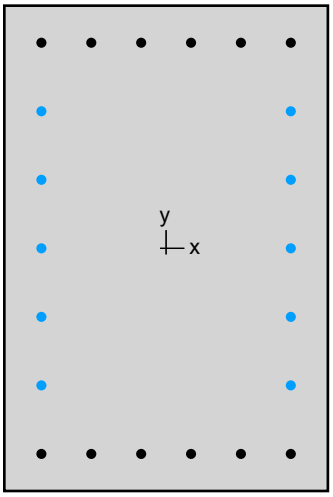

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Figure 1: Column section 4

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1. General Information

File Name	...\P-4 Typical Pier on Grids 10 Brace Frames....
Project	CCHS Field House
Column	CP-4 - Typical Pier on Grids 10 w/ Brace Frames
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	4	ksi
E_c	3605	ksi
f_c	3.4	ksi
ε_u	0.003	in/in
β_1	0.85	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{ty}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	24	in
Depth	36	in
A_g	864	in^2
I_x	93312	in^4
I_y	41472	in^4
r_x	10.3923	in
r_y	6.9282	in
X_o	0	in
Y_o	0	in

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3.2. Section Figure

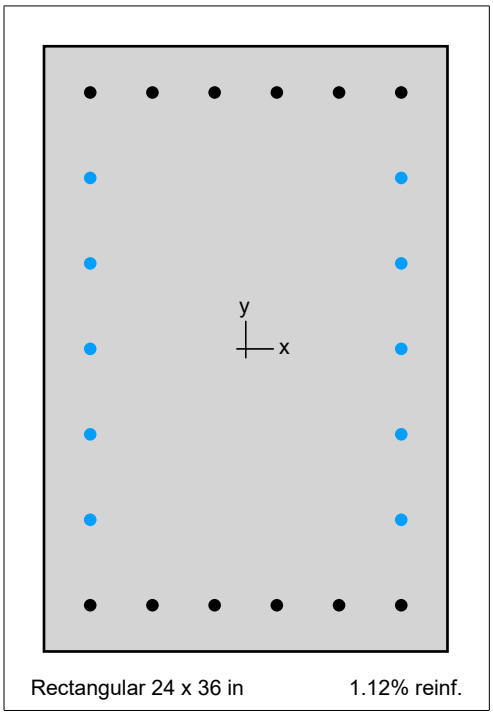

Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter	Area	Bar	Diameter	Area	Bar	Diameter	Area
	in	in^2		in	in^2		in	in^2
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #3 bars or less	#3 ties
For larger bars	#3 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---

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Total steel area, A_s	9.68 in^2
Rho	1.12 %
Minimum clear spacing	2.95 in

4.4. Bars Provided

		Bars	Clear cover
			in
Top	6	#6	2
Bottom	6	#6	2
Left	5	#6	2
Right	5	#6	2

5. Loading

5.1. Load Cases

Case	Type	Sustained Load
		%
A	Dead	100
B	Live	0
C	Wind	0
D	EQ	0
E	Snow	0

5.2. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.500	0.000	1.600
U5	1.200	0.000	-0.500	0.000	1.600
U6	1.200	1.000	1.000	0.000	0.500
U7	1.200	1.000	-1.000	0.000	0.500
U8	1.200	1.000	0.000	1.000	0.200
U9	1.200	1.000	0.000	-1.000	0.200
U10	0.900	0.000	1.000	0.000	0.000
U11	0.900	0.000	-1.000	0.000	0.000
U12	0.900	0.000	0.000	1.000	0.000
U13	0.900	0.000	0.000	-1.000	0.000

5.3. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	38.00	0.00	0.00	0.00	0.00
1	Live	0.00	0.00	0.00	0.00	0.00
1	Wind	16.00	0.00	0.00	0.00	32.00
1	EQ	70.00	0.00	0.00	0.00	100.00
1	Snow	50.00	0.00	0.00	0.00	0.00
2	Dead	38.00	0.00	0.00	0.00	0.00
2	Live	0.00	0.00	0.00	0.00	0.00
2	Wind	70.00	0.00	164.00	0.00	0.00
2	EQ	7.00	0.00	30.00	0.00	0.00
2	Snow	50.00	0.00	0.00	0.00	0.00

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6. Slenderness

6.1. Sway Criteria

X-Axis	Non-sway column
Y-Axis	Non-sway column

6.2. Columns

Column	Axis	Height	Width	Depth/Dia.	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	X	2	24	36	93312	4	3605
Design	Y	2	24	36	41472	4	3605
Above	X	(no column specified...)					
Above	Y	(no column specified...)					
Below	X	(no column specified...)					
Below	Y	(no column specified...)					

6.3. X - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

6.4. Y - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults	
Stiffness reduction factor, ϕ_K	0.75	
Cracked section coefficients, cI(beams)	0.35	
Cracked section coefficients, cI(columns)	0.7	
$0.2\ E_c\ I_g + E_s\ I_{se}$ (X-axis)	1.09e+008	$kip\text{-}in^2$
$0.2\ E_c\ I_g + E_s\ I_{se}$ (Y-axis)	4.69e+007	$kip\text{-}in^2$
Minimum eccentricity, $e_{x\ min}$	1.68	in
Minimum eccentricity, $e_{y\ min}$	1.32	in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
X	999.000	999.000	1.000	(N/A)	2.31
Y	999.000	999.000	1.000	(N/A)	3.46

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7.3. Magnification Factors: X - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	53.20	(N/A)	938736.38	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	70.60	(N/A)	1140702.00	0.646	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	125.60	(N/A)	1377398.25	0.363	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	133.60	(N/A)	1399723.00	0.341	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	117.60	(N/A)	1352884.75	0.388	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	86.60	(N/A)	1229872.50	0.527	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	54.60	(N/A)	1023054.13	0.835	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	125.60	(N/A)	1377398.25	0.363	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-14.40	(N/A)	1877472.75	0.000	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	50.20	(N/A)	1116695.88	0.681	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	18.20	(N/A)	938736.38	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	104.20	(N/A)	1413530.75	0.328	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-35.80	(N/A)	1877472.75	0.000	(N/A)	(N/A)	*
2	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	53.20	(N/A)	938736.38	1.000	(N/A)	(N/A)	*
2	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	70.60	(N/A)	1140702.00	0.646	(N/A)	(N/A)	*
2	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	125.60	(N/A)	1377398.25	0.363	(N/A)	(N/A)	*
2	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	160.60	(N/A)	1462279.88	0.284	(N/A)	(N/A)	*
2	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	90.60	(N/A)	1248891.63	0.503	(N/A)	(N/A)	*
2	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	140.60	(N/A)	1417683.50	0.324	(N/A)	(N/A)	*
2	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	0.60	(N/A)	938736.38	1.000	(N/A)	(N/A)	*
2	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	62.60	(N/A)	1086227.38	0.728	(N/A)	(N/A)	*
2	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	48.60	(N/A)	968632.50	0.938	(N/A)	(N/A)	*
2	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	104.20	(N/A)	1413530.75	0.328	(N/A)	(N/A)	*
2	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-35.80	(N/A)	1877472.75	0.000	(N/A)	(N/A)	*
2	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	41.20	(N/A)	1025887.06	0.830	(N/A)	(N/A)	*
2	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	27.20	(N/A)	938736.38	1.000	(N/A)	(N/A)	*

7.4. Magnification Factors: Y - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	53.20	(N/A)	402418.72	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	70.60	(N/A)	488997.59	0.646	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	125.60	(N/A)	590464.81	0.363	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	133.60	(N/A)	600035.00	0.341	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	117.60	(N/A)	579956.38	0.388	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	86.60	(N/A)	527223.31	0.527	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	54.60	(N/A)	438564.13	0.835	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	125.60	(N/A)	590464.81	0.363	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-14.40	(N/A)	804837.44	0.000	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	50.20	(N/A)	478706.63	0.681	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	18.20	(N/A)	402418.72	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	104.20	(N/A)	605954.13	0.328	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-35.80	(N/A)	804837.44	0.000	(N/A)	(N/A)	*
2	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	53.20	(N/A)	402418.72	1.000	(N/A)	(N/A)	*
2	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	70.60	(N/A)	488997.59	0.646	(N/A)	(N/A)	*
2	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	125.60	(N/A)	590464.81	0.363	(N/A)	(N/A)	*
2	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	160.60	(N/A)	626852.00	0.284	(N/A)	(N/A)	*
2	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	90.60	(N/A)	535376.44	0.503	(N/A)	(N/A)	*

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Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
2	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	140.60	(N/A)	607734.31	0.324	(N/A)	(N/A)	*
2	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	0.60	(N/A)	402418.72	1.000	(N/A)	(N/A)	*
2	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	62.60	(N/A)	465645.31	0.728	(N/A)	(N/A)	*
2	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	48.60	(N/A)	415234.59	0.938	(N/A)	(N/A)	*
2	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	104.20	(N/A)	605954.13	0.328	(N/A)	(N/A)	*
2	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-35.80	(N/A)	804837.44	0.000	(N/A)	(N/A)	*
2	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	41.20	(N/A)	439778.56	0.830	(N/A)	(N/A)	*
2	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	27.20	(N/A)	402418.72	1.000	(N/A)	(N/A)	*

8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. X - axis

Load Combo			1st Order					2nd Order		Ratio
			M_{ns}	M_s	M_u	M_{min}		M_i	M_c	2nd/1st
			k-ft	k-ft	k-ft	k-ft		k-ft	k-ft	
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U4	Bot	0.00	(N/A)	-82.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U5	Bot	0.00	(N/A)	82.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft	2nd Order	M_i k-ft	M_c k-ft	Ratio 2nd/1st
2	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U6	Bot	0.00	(N/A)	-164.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U7	Bot	0.00	(N/A)	164.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U8	Bot	0.00	(N/A)	-30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U9	Bot	0.00	(N/A)	30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U10	Bot	0.00	(N/A)	-164.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U11	Bot	0.00	(N/A)	164.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U12	Bot	0.00	(N/A)	-30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U13	Bot	0.00	(N/A)	30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

8.2. Y - axis

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft	2nd Order	M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	-16.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	16.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	-32.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	32.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	-100.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	100.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	-32.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	32.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	-100.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	100.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
2	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

9. Control Points

About	Point	P kip	X-Moment k-ft	Y-Moment k-ft	NA Depth in	d_t Depth in	ε_t	ϕ
X	@ Max compression	2265.6	0.00	0.00	107.14	33.25	-0.00207	0.65000
X	@ Allowable comp.	1812.5	529.31	0.00	35.44	33.25	-0.00019	0.65000
X	@ f_s = 0.0	1696.8	635.79	0.00	33.25	33.25	0.00000	0.65000
X	@ f_s = 0.5 f_y	1222.2	925.66	0.00	24.72	33.25	0.00103	0.65000
X	@ Balanced point	898.7	1018.72	0.00	19.68	33.25	0.00207	0.65000
X	@ Tension control	656.6	1249.93	0.00	12.36	33.25	0.00507	0.90000
X	@ Pure bending	0.0	680.89	0.00	4.77	33.25	0.01793	0.90000
X	@ Max tension	-522.7	0.00	0.00	0.00	33.25	9.99999	0.90000
Y	@ Max compression	2265.6	0.00	0.00	68.47	21.25	-0.00207	0.65000
Y	@ Allowable comp.	1812.5	0.00	348.73	23.57	21.25	-0.00030	0.65000
Y	@ f_s = 0.0	1628.9	0.00	456.07	21.25	21.25	0.00000	0.65000
Y	@ f_s = 0.5 f_y	1165.8	0.00	620.98	15.80	21.25	0.00103	0.65000
Y	@ Balanced point	848.9	0.00	672.98	12.58	21.25	0.00207	0.65000
Y	@ Tension control	616.6	0.00	805.80	7.90	21.25	0.00507	0.90000
Y	@ Pure bending	0.0	0.00	437.54	3.41	21.25	0.01570	0.90000
Y	@ Max tension	-522.7	0.00	0.00	0.00	21.25	9.99999	0.90000
-X	@ Max compression	2265.6	0.00	0.00	107.14	33.25	-0.00207	0.65000
-X	@ Allowable comp.	1812.5	-529.31	0.00	35.44	33.25	-0.00019	0.65000
-X	@ f_s = 0.0	1696.8	-635.79	0.00	33.25	33.25	0.00000	0.65000
-X	@ f_s = 0.5 f_y	1222.2	-925.66	0.00	24.72	33.25	0.00103	0.65000
-X	@ Balanced point	898.7	-1018.72	0.00	19.68	33.25	0.00207	0.65000
-X	@ Tension control	656.6	-1249.93	0.00	12.36	33.25	0.00507	0.90000
-X	@ Pure bending	0.0	-680.89	0.00	4.77	33.25	0.01793	0.90000
-X	@ Max tension	-522.7	0.00	0.00	0.00	33.25	9.99999	0.90000
-Y	@ Max compression	2265.6	0.00	0.00	68.47	21.25	-0.00207	0.65000
-Y	@ Allowable comp.	1812.5	0.00	-348.73	23.57	21.25	-0.00030	0.65000
-Y	@ f_s = 0.0	1628.9	0.00	-456.07	21.25	21.25	0.00000	0.65000
-Y	@ f_s = 0.5 f_y	1165.8	0.00	-620.98	15.80	21.25	0.00103	0.65000
-Y	@ Balanced point	848.9	0.00	-672.98	12.58	21.25	0.00207	0.65000

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About Point	P	X-Moment	Y-Moment	NA Depth	d_t Depth	ε_t	ϕ
	kip	k-ft	k-ft	in	in		
-Y @ Tension control	616.6	0.00	-805.80	7.90	21.25	0.00507	0.90000
-Y @ Pure bending	0.0	0.00	-437.54	3.41	21.25	0.01570	0.90000
-Y @ Max tension	-522.7	0.00	0.00	0.00	21.25	9.99999	0.90000

10. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand			Capacity			Parameters at Capacity			Capacity Ratio
				P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
1	1	U1	Top	53.20	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
2	1	U1	Bot	53.20	0.00	0.00	46.24	-732.38	0.00	5.20	0.01619	0.900	0.41
3	1	U2	Top	70.60	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
4	1	U2	Bot	70.60	0.00	0.00	46.24	-732.38	0.00	5.20	0.01619	0.900	0.41
5	1	U3	Top	125.60	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
6	1	U3	Bot	125.60	0.00	0.00	46.24	-732.38	0.00	5.20	0.01619	0.900	0.41
7	1	U4	Top	133.60	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
8	1	U4	Bot	133.60	0.00	-16.00	0.00	0.00	-437.54	3.41	0.01570	0.900	0.47
9	1	U5	Top	117.60	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
10	1	U5	Bot	117.60	0.00	16.00	0.00	0.00	437.54	3.41	0.01570	0.900	0.47
11	1	U6	Top	86.60	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
12	1	U6	Bot	86.60	0.00	-32.00	0.00	0.00	-437.54	3.41	0.01570	0.900	0.49
13	1	U7	Top	54.60	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
14	1	U7	Bot	54.60	0.00	32.00	0.00	0.00	437.54	3.41	0.01570	0.900	0.49
15	1	U8	Top	125.60	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
16	1	U8	Bot	125.60	0.00	-100.00	0.00	0.00	-437.54	3.41	0.01570	0.900	0.57
17	1	U9	Top	-14.40	0.00	0.00	-130.06	522.06	0.00	3.46	0.02585	0.900	0.53
18	1	U9	Bot	-14.40	0.00	100.00	-101.55	0.00	358.53	2.74	0.02031	0.900	0.64
19	1	U10	Top	50.20	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
20	1	U10	Bot	50.20	0.00	-32.00	0.00	0.00	-437.54	3.41	0.01570	0.900	0.49
21	1	U11	Top	18.20	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
22	1	U11	Bot	18.20	0.00	32.00	0.00	0.00	437.54	3.41	0.01570	0.900	0.49
23	1	U12	Top	104.20	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
24	1	U12	Bot	104.20	0.00	-100.00	0.00	0.00	-437.54	3.41	0.01570	0.900	0.57
25	1	U13	Top	-35.80	0.00	0.00	-147.59	499.83	0.00	3.30	0.02721	0.900	0.55
26	1	U13	Bot	-35.80	0.00	100.00	-118.78	0.00	344.91	2.64	0.02112	0.900	0.65
27	2	U1	Top	53.20	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
28	2	U1	Bot	53.20	0.00	0.00	46.24	-732.38	0.00	5.20	0.01619	0.900	0.41
29	2	U2	Top	70.60	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
30	2	U2	Bot	70.60	0.00	0.00	46.24	-732.38	0.00	5.20	0.01619	0.900	0.41
31	2	U3	Top	125.60	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
32	2	U3	Bot	125.60	0.00	0.00	46.24	-732.38	0.00	5.20	0.01619	0.900	0.41
33	2	U4	Top	160.60	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
34	2	U4	Bot	160.60	-82.00	0.00	0.00	-680.89	0.00	4.77	0.01793	0.900	0.51
35	2	U5	Top	90.60	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
36	2	U5	Bot	90.60	82.00	0.00	0.00	680.89	0.00	4.77	0.01793	0.900	0.52
37	2	U6	Top	140.60	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
38	2	U6	Bot	140.60	-164.00	0.00	0.00	-680.89	0.00	4.77	0.01793	0.900	0.58
39	2	U7	Top	0.60	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
40	2	U7	Bot	0.60	164.00	0.00	0.00	680.89	0.00	4.77	0.01793	0.900	0.58
41	2	U8	Top	62.60	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
42	2	U8	Bot	62.60	-30.00	0.00	0.00	-680.89	0.00	4.77	0.01793	0.900	0.48

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No.	Load Combo			Demand P_u	M_{ux}	M_{uy}	Capacity ϕP_n	ϕM_{nx}	ϕM_{ny}	Parameters at Capacity NA Depth	ε_t	ϕ	Capacity Ratio
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
43	2	U9	Top	48.60	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
44	2	U9	Bot	48.60	30.00	0.00	0.00	680.89	0.00	4.77	0.01793	0.900	0.48
45	2	U10	Top	104.20	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
46	2	U10	Bot	104.20	-164.00	0.00	0.00	-680.89	0.00	4.77	0.01793	0.900	0.58
47	2	U11	Top	-35.80	0.00	0.00	-147.59	499.83	0.00	3.30	0.02721	0.900	0.55
48	2	U11	Bot	-35.80	164.00	0.00	-118.38	536.73	0.00	3.57	0.02497	0.900	0.66
49	2	U12	Top	41.20	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
50	2	U12	Bot	41.20	-30.00	0.00	0.00	-680.89	0.00	4.77	0.01793	0.900	0.48
51	2	U13	Top	27.20	0.00	0.00	46.24	732.38	0.00	5.20	0.01619	0.900	0.41
52	2	U13	Bot	27.20	30.00	0.00	0.00	680.89	0.00	4.77	0.01793	0.900	0.48

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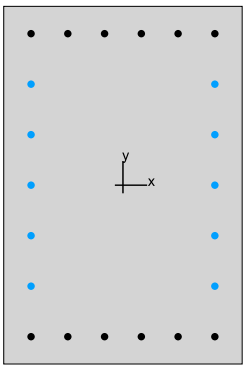
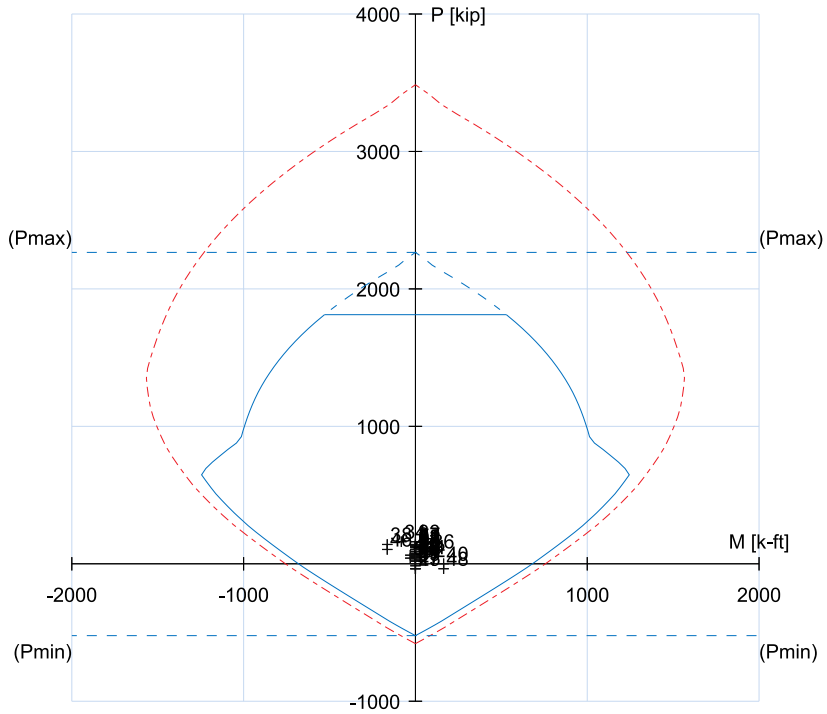
11. Diagrams

11.1. PM at θ=0 [deg]



24 x 36 in



PM at 0.0 [deg]

General Information

Project	CCHS Field House
Column	CP-4 - Typ...ace Frames
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	24 in
Depth	36 in
A_g	864 in^2
I_x	93312 in^4
I_y	41472 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	9.68 in^2
Rho	1.12 %
Min. clear spacing	2.95 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
48	2	U11	Bot	-35.8	164.0	0.0	-118.38	536.73	0.00	0.66
38	2	U6	Bot	140.6	-164.0	0.0	0.00	-680.89	0.00	0.58
40	2	U7	Bot	0.6	164.0	0.0	0.00	680.89	0.00	0.58
46	2	U10	Bot	104.2	-164.0	0.0	0.00	-680.89	0.00	0.58
25	1	U13	Top	-35.8	0.0	0.0	-147.59	499.83	0.00	0.55
47	2	U11	Top	-35.8	0.0	0.0	-147.59	499.83	0.00	0.55
17	1	U9	Top	-14.4	0.0	0.0	-130.06	522.06	0.00	0.53
36	2	U5	Bot	90.6	82.0	0.0	0.00	680.89	0.00	0.52
34	2	U4	Bot	160.6	-82.0	0.0	0.00	-680.89	0.00	0.51
42	2	U8	Bot	62.6	-30.0	0.0	0.00	-680.89	0.00	0.48
44	2	U9	Bot	48.6	30.0	0.0	0.00	680.89	0.00	0.48
50	2	U12	Bot	41.2	-30.0	0.0	0.00	-680.89	0.00	0.48
52	2	U13	Bot	27.2	30.0	0.0	0.00	680.89	0.00	0.48
1	1	U1	Top	53.2	0.0	0.0	46.24	732.38	0.00	0.41
2	1	U1	Bot	53.2	0.0	0.0	46.24	-732.38	0.00	0.41

Only 15 points out of 42 are listed.

Max. Capacity Ratio: 0.66

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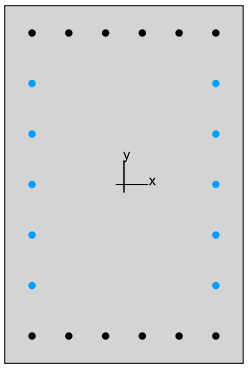
11.2. PM at θ=90 [deg]



24 x 36 in

General Information

Project	CCHS Field House
Column	CP-4 - Typ...ace Frames
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials

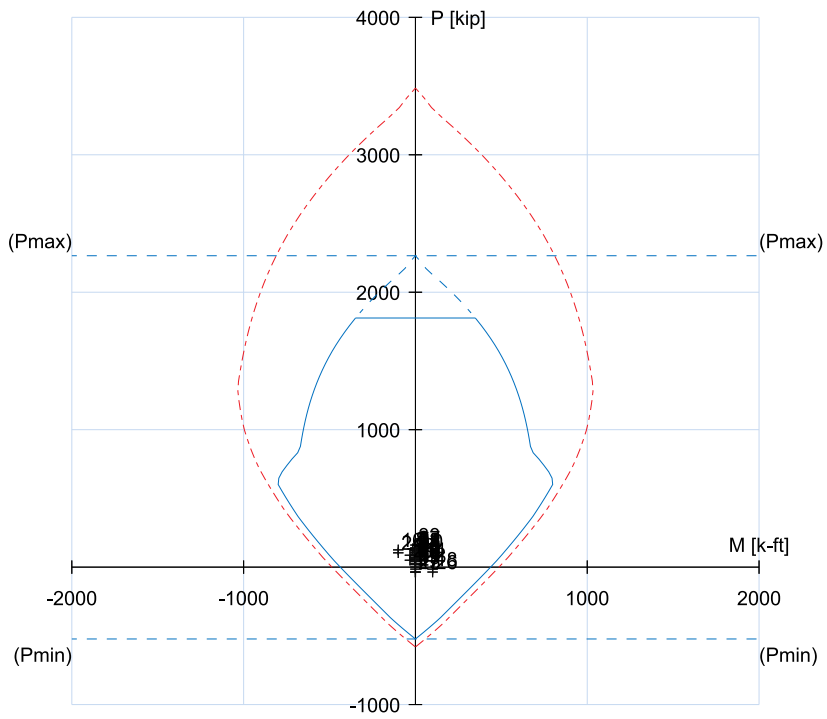
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	24 in
Depth	36 in
A_g	864 in^2
I_x	93312 in^4
I_y	41472 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	9.68 in^2
Rho	1.12 %
Min. clear spacing	2.95 in



PM at 90.0 [deg]

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
26	1	U13	Bot	-35.8	0.0	100.0	-118.78	0.00	344.91	0.65
18	1	U9	Bot	-14.4	0.0	100.0	-101.55	0.00	358.53	0.64
16	1	U8	Bot	125.6	0.0	-100.0	0.00	0.00	-437.54	0.57
24	1	U12	Bot	104.2	0.0	-100.0	0.00	0.00	-437.54	0.57
25	1	U13	Top	-35.8	0.0	0.0	-147.59	499.83	0.00	0.55
47	2	U11	Top	-35.8	0.0	0.0	-147.59	499.83	0.00	0.55
17	1	U9	Top	-14.4	0.0	0.0	-130.06	522.06	0.00	0.53
12	1	U6	Bot	86.6	0.0	-32.0	0.00	0.00	-437.54	0.49
14	1	U7	Bot	54.6	0.0	32.0	0.00	0.00	437.54	0.49
20	1	U10	Bot	50.2	0.0	-32.0	0.00	0.00	-437.54	0.49
22	1	U11	Bot	18.2	0.0	32.0	0.00	0.00	437.54	0.49
8	1	U4	Bot	133.6	0.0	-16.0	0.00	0.00	-437.54	0.47
10	1	U5	Bot	117.6	0.0	16.0	0.00	0.00	437.54	0.47
1	1	U1	Top	53.2	0.0	0.0	46.24	732.38	0.00	0.41
2	1	U1	Bot	53.2	0.0	0.0	46.24	-732.38	0.00	0.41

Only 15 points out of 42 are listed.

Max. Capacity Ratio: 0.66

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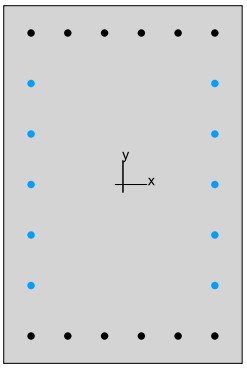
11.3. MM at P=-36 [kip]



24 x 36 in

General Information

Project	CCHS Field House
Column	CP-4 - Typ...ace Frames
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials

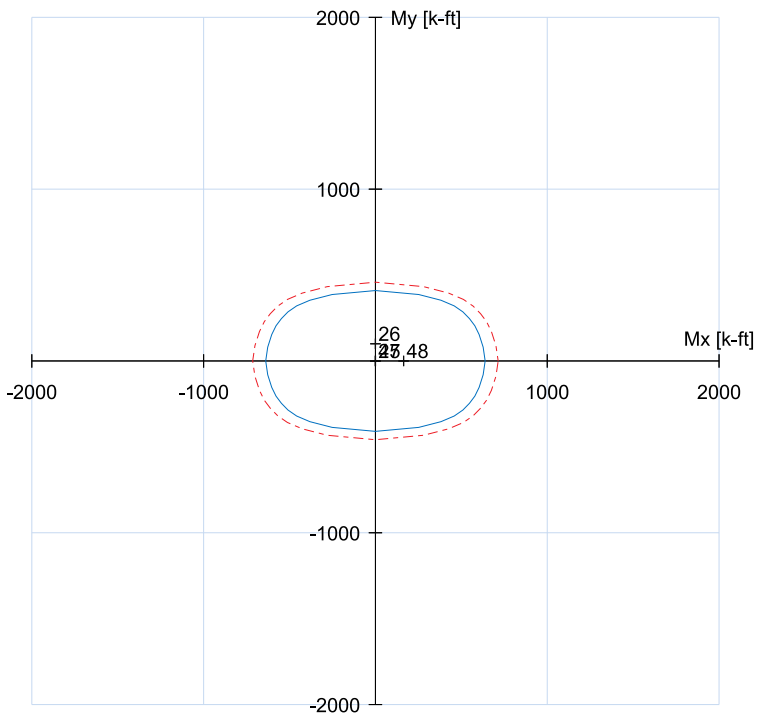
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	24 in
Depth	36 in
A_g	864 in^2
I_x	93312 in^4
I_y	41472 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	9.68 in^2
Rho	1.12 %
Min. clear spacing	2.95 in



MM at P=-36.0 [kip]

No.	Load Combo			P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	Capacity
				kip	k-ft	k-ft	kip	k-ft	k-ft	Ratio
48	2	U11	Bot	-35.8	164.0	0.0	-118.38	536.73	0.00	0.66
26	1	U13	Bot	-35.8	0.0	100.0	-118.78	0.00	344.91	0.65
25	1	U13	Top	-35.8	0.0	0.0	-147.59	499.83	0.00	0.55
47	2	U11	Top	-35.8	0.0	0.0	-147.59	499.83	0.00	0.55

Max. Capacity Ratio: 0.66

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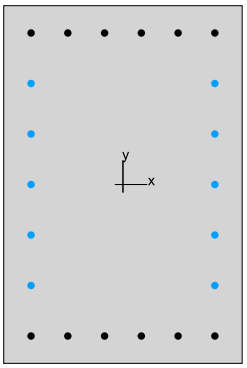
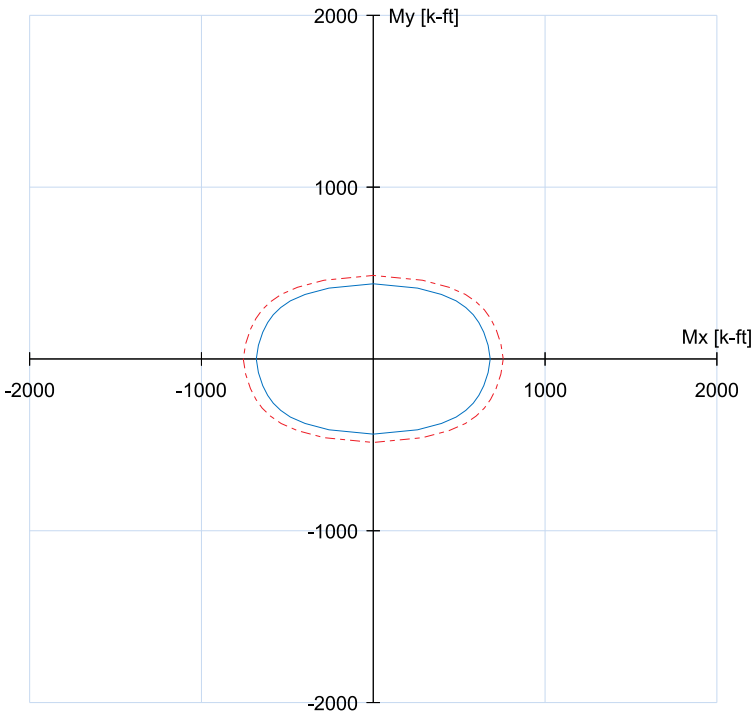
11.4. MM at P=0 [kip]



24 x 36 in



MM at P=0.0 [kip]

General Information	
Project	CCHS Field House
Column	CP-4 - Typ...ace Frames
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials	
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	24 in
Depth	36 in
A_g	864 in^2
I_x	93312 in^4
I_y	41472 in^4

Reinforcement	
Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	9.68 in^2
Rho	1.12 %
Min. clear spacing	2.95 in

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spColumn v10.00 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections
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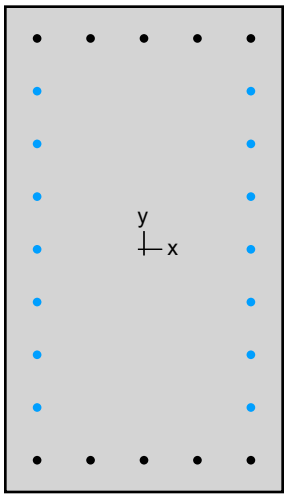

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Figure 1: Column section 4

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1. General Information

File Name	X:\Project Files\20...\P-5 Pier on Grids I-4.colx
Project	CCHS Field House
Column	CP-5 - Pier on Grids I/4
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	4	ksi
E_c	3605	ksi
f_c	3.4	ksi
ε_u	0.003	in/in
β_1	0.85	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{ty}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	24	in
Depth	42	in
A_g	1008	in^2
I_x	148176	in^4
I_y	48384	in^4
r_x	12.1244	in
r_y	6.9282	in
X_o	0	in
Y_o	0	in

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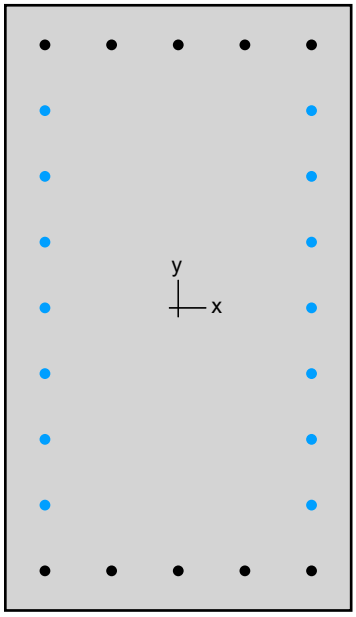
3.2. Section Figure



Rectangular 24 x 42 in 1.05% reinf.

Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter (in)	Area (in^2)	Bar	Diameter (in)	Area (in^2)	Bar	Diameter (in)	Area (in^2)
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #3 bars or less	#3 ties
For larger bars	#3 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---

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Total steel area, A_s	10.56 in^2
Rho	1.05 %
Minimum clear spacing	3.81 in

4.4. Bars Provided

		Bars	Clear cover
			in
Top	5	#6	2
Bottom	5	#6	2
Left	7	#6	2
Right	7	#6	2

5. Loading

5.1. Load Cases

Case	Type	Sustained Load
		%
A	Dead	100
B	Live	0
C	Wind	0
D	EQ	0
E	Snow	0

5.2. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.500	0.000	1.600
U5	1.200	0.000	-0.500	0.000	1.600
U6	1.200	1.000	1.000	0.000	0.500
U7	1.200	1.000	-1.000	0.000	0.500
U8	1.200	1.000	0.000	1.000	0.200
U9	1.200	1.000	0.000	-1.000	0.200
U10	0.900	0.000	1.000	0.000	0.000
U11	0.900	0.000	-1.000	0.000	0.000
U12	0.900	0.000	0.000	1.000	0.000
U13	0.900	0.000	0.000	-1.000	0.000

5.3. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	20.50	0.00	0.00	0.00	0.00
1	Live	0.00	0.00	0.00	0.00	0.00
1	Wind	41.00	0.00	70.00	0.00	0.00
1	EQ	3.30	0.00	16.50	0.00	0.00
1	Snow	34.00	0.00	0.00	0.00	0.00

6. Slenderness

6.1. Sway Criteria

X-Axis	Non-sway column

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Y-Axis	Non-sway column

6.2. Columns

Column	Axis	Height	Width	Depth/Dia.	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	X	2	24	42	148176	4	3605
Design	Y	2	24	42	48384	4	3605
Above	X	(no column specified...)					
Above	Y	(no column specified...)					
Below	X	(no column specified...)					
Below	Y	(no column specified...)					

6.3. X - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

6.4. Y - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults
Stiffness reduction factor, ϕ_K	0.75
Cracked section coefficients, cI(beams)	0.35
Cracked section coefficients, cI(columns)	0.7
$0.2\ E_c\ I_g + E_s\ I_{se}$ (X-axis)	1.64e+008 kip-in^2
$0.2\ E_c\ I_g + E_s\ I_{se}$ (Y-axis)	5.56e+007 kip-in^2
Minimum eccentricity, $e_{x\ min}$	1.86 in
Minimum eccentricity, $e_{y\ min}$	1.32 in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
X	999.000	999.000	1.000	(N/A)	1.98
Y	999.000	999.000	1.000	(N/A)	3.46

7.3. Magnification Factors: X - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	28.70	(N/A)	1407973.38	1.000	(N/A)	(N/A)	*

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Load Combo		At Ends					Along Length						
		$\sum P_u$ kip	P_c kip	$\sum P_c$ kip	β_{ds}	δ_s	P_u kip	$k'l_u/r$	P_c kip	β_{dns}	C_m	δ	
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	41.60	(N/A)	1769537.38	0.591	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	79.00	(N/A)	2147295.25	0.311	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	99.50	(N/A)	2257749.25	0.247	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	58.50	(N/A)	1982345.13	0.421	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	82.60	(N/A)	2169750.00	0.298	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	0.60	(N/A)	1407973.38	1.000	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	34.70	(N/A)	1647779.88	0.709	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	28.10	(N/A)	1501482.13	0.875	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	59.45	(N/A)	2149012.00	0.310	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-22.55	(N/A)	2815946.75	0.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	21.75	(N/A)	1523553.25	0.848	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	15.15	(N/A)	1407973.38	1.000	(N/A)	(N/A)	*

7.4. Magnification Factors: Y - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$ kip	P_c kip	$\sum P_c$ kip	β_{ds}	δ_s	P_u kip	$k'l_u/r$	P_c kip	β_{dns}	C_m	δ	
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	28.70	(N/A)	476977.53	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	41.60	(N/A)	599464.19	0.591	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	79.00	(N/A)	727436.81	0.311	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	99.50	(N/A)	764855.19	0.247	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	58.50	(N/A)	671556.81	0.421	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	82.60	(N/A)	735043.75	0.298	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	0.60	(N/A)	476977.53	1.000	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	34.70	(N/A)	558216.50	0.709	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	28.10	(N/A)	508655.38	0.875	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	59.45	(N/A)	728018.38	0.310	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-22.55	(N/A)	953955.06	0.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	21.75	(N/A)	516132.41	0.848	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	15.15	(N/A)	476977.53	1.000	(N/A)	(N/A)	*

8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. X - axis

Load Combo			1st Order					2nd Order		Ratio
			M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		M_i k-ft	M_c k-ft	2nd/1st
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	-35.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	35.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	-70.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	70.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	-16.50	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	16.50	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	-70.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	70.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	-16.50	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	16.50	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

8.2. Y - axis

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

9. Control Points

About	Point	P kip	X-Moment k-ft	Y-Moment k-ft	NA Depth in	d_t Depth in	ε_t	ϕ
X	@ Max compression	2616.2	0.00	0.00	126.47	39.25	-0.00207	0.65000
X	@ Allowable comp.	2092.9	705.56	0.00	41.18	39.25	-0.00014	0.65000
X	@ f_s = 0.0	1994.2	811.97	0.00	39.25	39.25	0.00000	0.65000

P-5

About Point	P	X-Moment	Y-Moment	NA Depth	d_t Depth	ε_t	ϕ
	kip	k-ft	k-ft	in	in		
X @ $f_s = 0.5\ f_y$	1440.8	1205.89	0.00	29.19	39.25	0.00103	0.65000
X @ Balanced point	1070.0	1324.33	0.00	23.23	39.25	0.00207	0.65000
X @ Tension control	764.5	1623.41	0.00	14.59	39.25	0.00507	0.90000
X @ Pure bending	0.0	868.93	0.00	5.54	39.25	0.01825	0.90000
X @ Max tension	-570.2	0.00	0.00	0.00	39.25	9.99999	0.90000
Y @ Max compression	2616.2	0.00	0.00	68.47	21.25	-0.00207	0.65000
Y @ Allowable comp.	2092.9	0.00	411.31	23.55	21.25	-0.00029	0.65000
Y @ $f_s = 0.0$	1881.4	0.00	535.42	21.25	21.25	0.00000	0.65000
Y @ $f_s = 0.5\ f_y$	1347.2	0.00	731.30	15.80	21.25	0.00103	0.65000
Y @ Balanced point	988.4	0.00	794.99	12.58	21.25	0.00207	0.65000
Y @ Tension control	760.6	0.00	952.97	7.90	21.25	0.00507	0.90000
Y @ Pure bending	0.0	0.00	479.87	3.01	21.25	0.01815	0.90000
Y @ Max tension	-570.2	0.00	0.00	0.00	21.25	9.99999	0.90000
-X @ Max compression	2616.2	0.00	0.00	126.47	39.25	-0.00207	0.65000
-X @ Allowable comp.	2092.9	-705.56	0.00	41.18	39.25	-0.00014	0.65000
-X @ $f_s = 0.0$	1994.2	-811.97	0.00	39.25	39.25	0.00000	0.65000
-X @ $f_s = 0.5\ f_y$	1440.8	-1205.89	0.00	29.19	39.25	0.00103	0.65000
-X @ Balanced point	1070.0	-1324.33	0.00	23.23	39.25	0.00207	0.65000
-X @ Tension control	764.5	-1623.41	0.00	14.59	39.25	0.00507	0.90000
-X @ Pure bending	0.0	-868.93	0.00	5.54	39.25	0.01825	0.90000
-X @ Max tension	-570.2	0.00	0.00	0.00	39.25	9.99999	0.90000
-Y @ Max compression	2616.2	0.00	0.00	68.47	21.25	-0.00207	0.65000
-Y @ Allowable comp.	2092.9	0.00	-411.31	23.55	21.25	-0.00029	0.65000
-Y @ $f_s = 0.0$	1881.4	0.00	-535.42	21.25	21.25	0.00000	0.65000
-Y @ $f_s = 0.5\ f_y$	1347.2	0.00	-731.30	15.80	21.25	0.00103	0.65000
-Y @ Balanced point	988.4	0.00	-794.99	12.58	21.25	0.00207	0.65000
-Y @ Tension control	760.6	0.00	-952.97	7.90	21.25	0.00507	0.90000
-Y @ Pure bending	0.0	0.00	-479.87	3.01	21.25	0.01815	0.90000
-Y @ Max tension	-570.2	0.00	0.00	0.00	21.25	9.99999	0.90000

10. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand P_u	M_{ux}	M_{uy}	Capacity ϕP_n	ϕM_{nx}	ϕM_{ny}	Parameters at Capacity NA Depth	ε_t	ϕ	Capacity Ratio
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
1	1	U1	Top	28.70	0.00	0.00	53.39	940.13	0.00	6.13	0.01622	0.900	0.42
2	1	U1	Bot	28.70	0.00	0.00	53.39	-940.13	0.00	6.13	0.01622	0.900	0.42
3	1	U2	Top	41.60	0.00	0.00	53.39	940.13	0.00	6.13	0.01622	0.900	0.42
4	1	U2	Bot	41.60	0.00	0.00	53.39	-940.13	0.00	6.13	0.01622	0.900	0.42
5	1	U3	Top	79.00	0.00	0.00	53.39	940.13	0.00	6.13	0.01622	0.900	0.42
6	1	U3	Bot	79.00	0.00	0.00	53.39	-940.13	0.00	6.13	0.01622	0.900	0.42
7	1	U4	Top	99.50	0.00	0.00	53.39	940.13	0.00	6.13	0.01622	0.900	0.42
8	1	U4	Bot	99.50	-35.00	0.00	0.00	-868.93	0.00	5.54	0.01825	0.900	0.48
9	1	U5	Top	58.50	0.00	0.00	53.39	940.13	0.00	6.13	0.01622	0.900	0.42
10	1	U5	Bot	58.50	35.00	0.00	0.00	868.93	0.00	5.54	0.01825	0.900	0.48
11	1	U6	Top	82.60	0.00	0.00	53.39	940.13	0.00	6.13	0.01622	0.900	0.42
12	1	U6	Bot	82.60	-70.00	0.00	0.00	-868.93	0.00	5.54	0.01825	0.900	0.50
13	1	U7	Top	0.60	0.00	0.00	53.39	940.13	0.00	6.13	0.01622	0.900	0.42
14	1	U7	Bot	0.60	70.00	0.00	0.00	868.93	0.00	5.54	0.01825	0.900	0.50
15	1	U8	Top	34.70	0.00	0.00	53.39	940.13	0.00	6.13	0.01622	0.900	0.42
16	1	U8	Bot	34.70	-16.50	0.00	0.00	-868.93	0.00	5.54	0.01825	0.900	0.47

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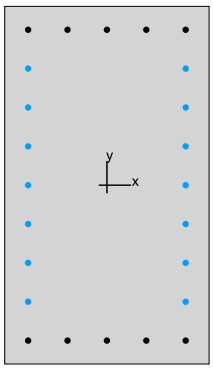
No.	Load Combo			Demand P_u kip	M_{ux} k-ft	M_{uy} k-ft	Capacity ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Parameters at Capacity NA Depth in	ε_t	ϕ	Capacity Ratio
17	1	U9	Top	28.10	0.00	0.00	53.39	940.13	0.00	6.13	0.01622	0.900	0.42
18	1	U9	Bot	28.10	16.50	0.00	0.00	868.93	0.00	5.54	0.01825	0.900	0.47
19	1	U10	Top	59.45	0.00	0.00	53.39	940.13	0.00	6.13	0.01622	0.900	0.42
20	1	U10	Bot	59.45	-70.00	0.00	0.00	-868.93	0.00	5.54	0.01825	0.900	0.50
21	1	U11	Top	-22.55	0.00	0.00	-146.30	666.29	0.00	4.09	0.02578	0.900	0.53
22	1	U11	Bot	-22.55	70.00	0.00	-133.16	685.35	0.00	4.24	0.02478	0.900	0.57
23	1	U12	Top	21.75	0.00	0.00	53.39	940.13	0.00	6.13	0.01622	0.900	0.42
24	1	U12	Bot	21.75	-16.50	0.00	0.00	-868.93	0.00	5.54	0.01825	0.900	0.47
25	1	U13	Top	15.15	0.00	0.00	53.39	940.13	0.00	6.13	0.01622	0.900	0.42
26	1	U13	Bot	15.15	16.50	0.00	0.00	868.93	0.00	5.54	0.01825	0.900	0.47

P-5

11. Diagrams

11.1. PM at θ=0 [deg]



24 x 42 in

General Information

Project	CCHS Field House
Column	CP-5 - Pier on Grids I/4
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials

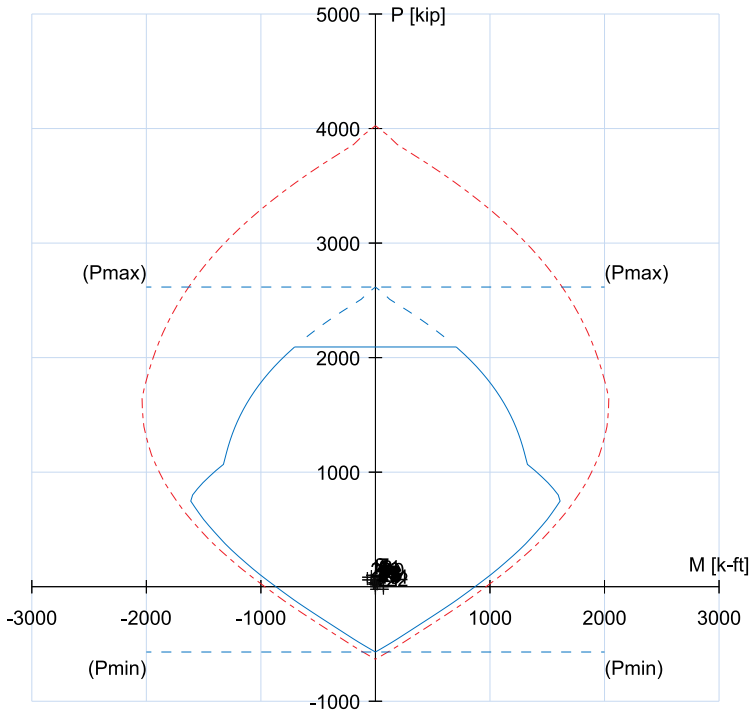
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	24 in
Depth	42 in
A_g	1008 in^2
I_x	148176 in^4
I_y	48384 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	10.56 in^2
Rho	1.05 %
Min. clear spacing	3.81 in



PM at 0.0 [deg]

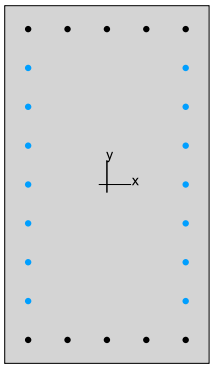
No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
22	1	U11	Bot	-22.6	70.0	0.0	-133.16	685.35	0.00	0.57
21	1	U11	Top	-22.6	0.0	0.0	-146.30	666.29	0.00	0.53
12	1	U6	Bot	82.6	-70.0	0.0	0.00	-868.93	0.00	0.50
14	1	U7	Bot	0.6	70.0	0.0	0.00	868.93	0.00	0.50
20	1	U10	Bot	59.4	-70.0	0.0	0.00	-868.93	0.00	0.50
8	1	U4	Bot	99.5	-35.0	0.0	0.00	-868.93	0.00	0.48
10	1	U5	Bot	58.5	35.0	0.0	0.00	868.93	0.00	0.48
16	1	U8	Bot	34.7	-16.5	0.0	0.00	-868.93	0.00	0.47
18	1	U9	Bot	28.1	16.5	0.0	0.00	868.93	0.00	0.47
24	1	U12	Bot	21.7	-16.5	0.0	0.00	-868.93	0.00	0.47
26	1	U13	Bot	15.1	16.5	0.0	0.00	868.93	0.00	0.47
1	1	U1	Top	28.7	0.0	0.0	53.39	940.13	0.00	0.42
2	1	U1	Bot	28.7	0.0	0.0	53.39	-940.13	0.00	0.42
3	1	U2	Top	41.6	0.0	0.0	53.39	940.13	0.00	0.42
4	1	U2	Bot	41.6	0.0	0.0	53.39	-940.13	0.00	0.42

Only 15 points out of 26 are listed.

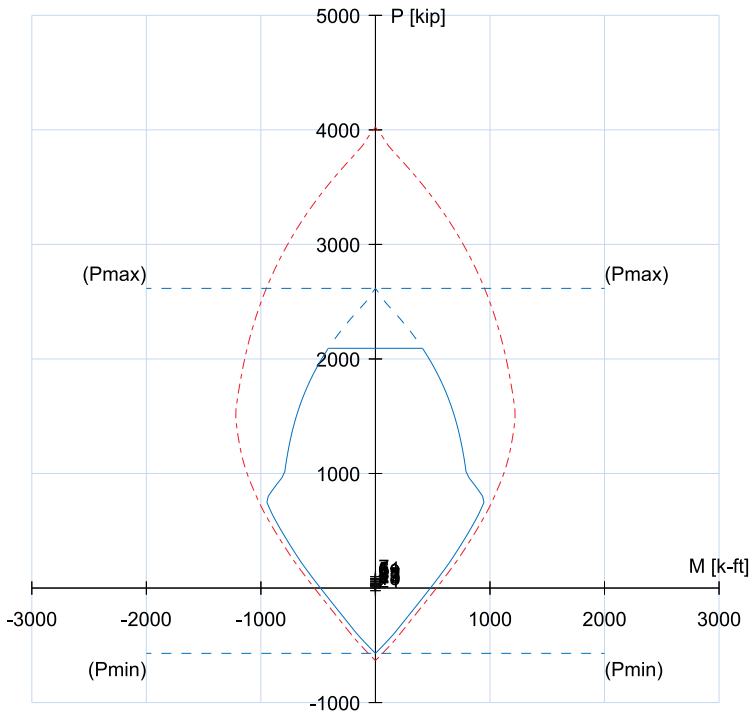
Max. Capacity Ratio: 0.57

P-5

11.2. PM at θ=90 [deg]



24 x 42 in



PM at 90.0 [deg]

General Information

Project	CCHS Field House
Column	CP-5 - Pier on Grids I/4
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	24 in
Depth	42 in
A_g	1008 in^2
I_x	148176 in^4
I_y	48384 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	10.56 in^2
Rho	1.05 %
Min. clear spacing	3.81 in

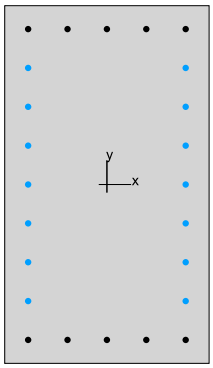
No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
21	1	U11	Top	-22.6	0.0	0.0	-146.30	666.29	0.00	0.53
1	1	U1	Top	28.7	0.0	0.0	53.39	940.13	0.00	0.42
2	1	U1	Bot	28.7	0.0	0.0	53.39	-940.13	0.00	0.42
3	1	U2	Top	41.6	0.0	0.0	53.39	940.13	0.00	0.42
4	1	U2	Bot	41.6	0.0	0.0	53.39	-940.13	0.00	0.42
5	1	U3	Top	79.0	0.0	0.0	53.39	940.13	0.00	0.42
6	1	U3	Bot	79.0	0.0	0.0	53.39	-940.13	0.00	0.42
7	1	U4	Top	99.5	0.0	0.0	53.39	940.13	0.00	0.42
9	1	U5	Top	58.5	0.0	0.0	53.39	940.13	0.00	0.42
11	1	U6	Top	82.6	0.0	0.0	53.39	940.13	0.00	0.42
13	1	U7	Top	0.6	0.0	0.0	53.39	940.13	0.00	0.42
15	1	U8	Top	34.7	0.0	0.0	53.39	940.13	0.00	0.42
17	1	U9	Top	28.1	0.0	0.0	53.39	940.13	0.00	0.42
19	1	U10	Top	59.4	0.0	0.0	53.39	940.13	0.00	0.42
23	1	U12	Top	21.7	0.0	0.0	53.39	940.13	0.00	0.42

Only 15 points out of 16 are listed.

Max. Capacity Ratio: 0.57

P-5

11.3. MM at P=-23 [kip]



24 x 42 in

General Information

Project	CCHS Field House
Column	CP-5 - Pier on Grids I/4
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials

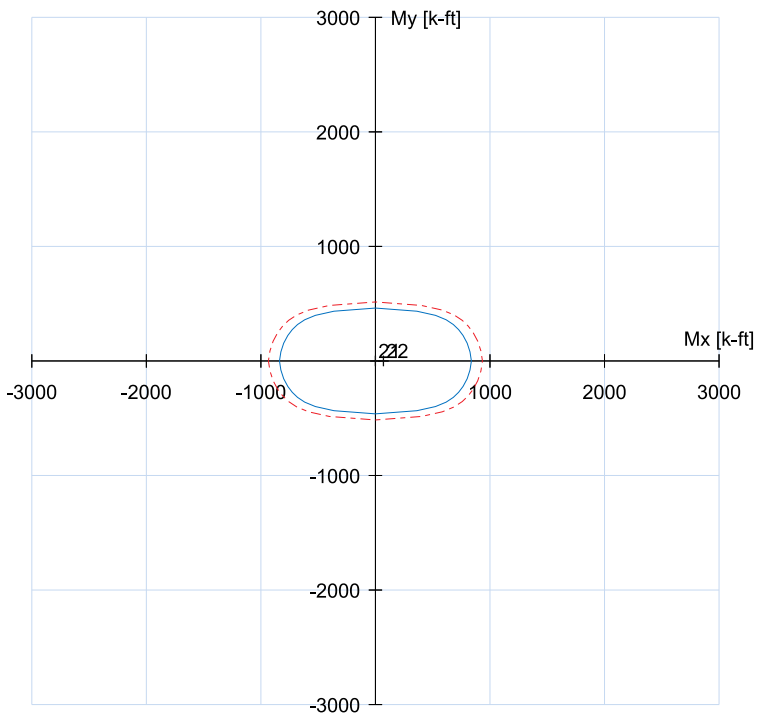
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	24 in
Depth	42 in
A_g	1008 in^2
I_x	148176 in^4
I_y	48384 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	10.56 in^2
Rho	1.05 %
Min. clear spacing	3.81 in



MM at P=-23.0 [kip]

No.	Load Combo			P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	Capacity
				kip	k-ft	k-ft	kip	k-ft	k-ft	Ratio
22	1	U11	Bot	-22.6	70.0	0.0	-133.16	685.35	0.00	0.57
21	1	U11	Top	-22.6	0.0	0.0	-146.30	666.29	0.00	0.53

Max. Capacity Ratio: 0.57

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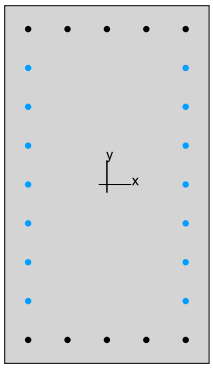
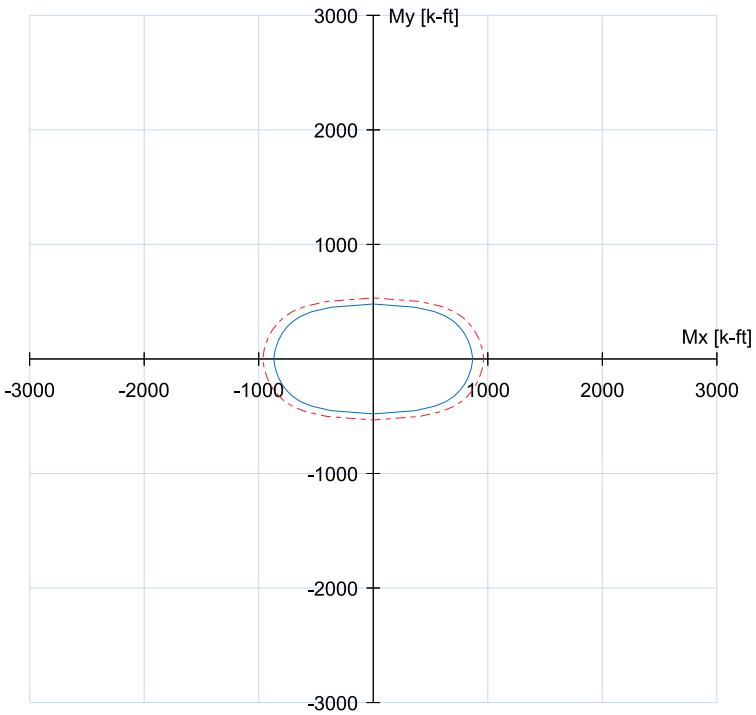
11.4. MM at P=0 [kip]



24 x 42 in



MM at P=0.0 [kip]

General Information	
Project	CCHS Field House
Column	CP-5 - Pier on Grids I/4
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials	
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	24 in
Depth	42 in
A_g	1008 in^2
I_x	148176 in^4
I_y	48384 in^4

Reinforcement	
Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	10.56 in^2
Rho	1.05 %
Min. clear spacing	3.81 in

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Computer program for the Strength Design of Reinforced Concrete Sections
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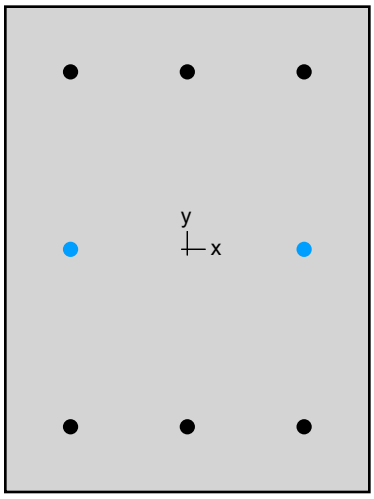

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List of Figures

Figure 1: Column section 4

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1. General Information

File Name	X:\Project Fi...\P-6 Piers on Grid I in Mezz.colx
Project	CCHS Field Hous
Column	CP-1 - Typical Pier on Grids A/I in Field House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	4	ksi
E_c	3605	ksi
f_c	3.4	ksi
ε_u	0.003	in/in
β_1	0.85	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{ty}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	15	in
Depth	20	in
A_g	300	in^2
I_x	10000	in^4
I_y	5625	in^4
r_x	5.7735	in
r_y	4.33013	in
X_o	0	in
Y_o	0	in

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3.2. Section Figure

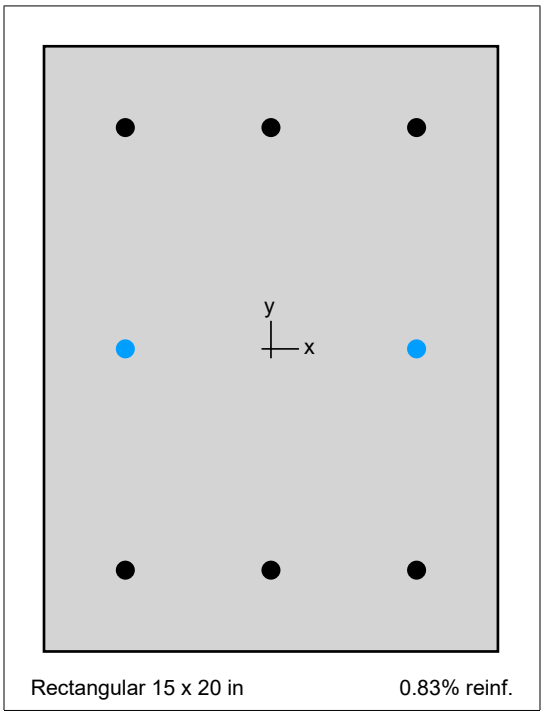

Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter in	Area in^2	Bar	Diameter in	Area in^2	Bar	Diameter in	Area in^2
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #3 bars or less	#3 ties
For larger bars	#3 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---

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Total steel area, A_s	2.48 in^2
Rho	0.83 %
Minimum clear spacing	4.18 in

(Note: Rho < 1.0%)

4.4. Bars Provided

		Bars	Clear cover
			in
Top	3	#5	2
Bottom	3	#5	2
Left	1	#5	2
Right	1	#5	2

5. Loading

5.1. Load Cases

Case	Type	Sustained Load
		%
A	Dead	100
B	Live	0
C	Wind	0
D	EQ	0
E	Snow	0

5.2. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.500	0.000	1.600
U5	1.200	0.000	-0.500	0.000	1.600
U6	1.200	1.000	1.000	0.000	0.500
U7	1.200	1.000	-1.000	0.000	0.500
U8	1.200	1.000	0.000	1.000	0.200
U9	1.200	1.000	0.000	-1.000	0.200
U10	0.900	0.000	1.000	0.000	0.000
U11	0.900	0.000	-1.000	0.000	0.000
U12	0.900	0.000	0.000	1.000	0.000
U13	0.900	0.000	0.000	-1.000	0.000

5.3. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	3.10	0.00	0.00	0.00	0.00
1	Live	0.00	0.00	0.00	0.00	0.00
1	Wind	0.00	0.00	0.00	0.00	9.10
1	EQ	0.00	0.00	0.00	0.00	0.00
1	Snow	5.15	0.00	0.00	0.00	0.00

6. Slenderness

6.1. Sway Criteria

X-Axis	Non-sway column

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Y-Axis	Non-sway column

6.2. Columns

Column	Axis	Height	Width	Depth/Dia.	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	X	2	15	20	10000	4	3605
Design	Y	2	15	20	5625	4	3605
Above	X	(no column specified...)					
Above	Y	(no column specified...)					
Below	X	(no column specified...)					
Below	Y	(no column specified...)					

6.3. X - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

6.4. Y - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults
Stiffness reduction factor, ϕ_K	0.75
Cracked section coefficients, cI(beams)	0.35
Cracked section coefficients, cI(columns)	0.7
$0.2\ E_c\ I_g + E_s\ I_{se}$ (X-axis)	1.01e+007 $kip\text{-}in^2$
$0.2\ E_c\ I_g + E_s\ I_{se}$ (Y-axis)	5.30e+006 $kip\text{-}in^2$
Minimum eccentricity, $e_{x\ min}$	1.20 in
Minimum eccentricity, $e_{y\ min}$	1.05 in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
X	999.000	999.000	1.000	(N/A)	4.16
Y	999.000	999.000	1.000	(N/A)	5.54

7.3. Magnification Factors: X - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	4.34	(N/A)	86551.85	1.000	(N/A)	(N/A)	*

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Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	6.30	(N/A)	108805.57	0.591	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	11.96	(N/A)	132035.73	0.311	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	11.96	(N/A)	132035.73	0.311	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	11.96	(N/A)	132035.73	0.311	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	6.30	(N/A)	108805.57	0.591	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	6.30	(N/A)	108805.57	0.591	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	4.75	(N/A)	97077.05	0.783	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	4.75	(N/A)	97077.05	0.783	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	2.79	(N/A)	86551.85	1.000	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	2.79	(N/A)	86551.85	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	2.79	(N/A)	86551.85	1.000	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	2.79	(N/A)	86551.85	1.000	(N/A)	(N/A)	*

7.4. Magnification Factors: Y - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	4.34	(N/A)	45485.75	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	6.30	(N/A)	57180.79	0.591	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	11.96	(N/A)	69388.98	0.311	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	11.96	(N/A)	69388.98	0.311	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	11.96	(N/A)	69388.98	0.311	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	6.30	(N/A)	57180.79	0.591	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	6.30	(N/A)	57180.79	0.591	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	4.75	(N/A)	51017.07	0.783	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	4.75	(N/A)	51017.07	0.783	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	2.79	(N/A)	45485.75	1.000	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	2.79	(N/A)	45485.75	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	2.79	(N/A)	45485.75	1.000	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	2.79	(N/A)	45485.75	1.000	(N/A)	(N/A)	*

8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. X - axis

Load Combo			1st Order				2nd Order		Ratio
			M_{ns}	M_s	M_u	M_{min}	M_i	M_c	2nd/1st
			k-ft	k-ft	k-ft	k-ft	k-ft	k-ft	
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1= (N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2= (N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1= (N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2= (N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1= (N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2= (N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1= (N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_2= (N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1= (N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_2= (N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1= (N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_2= (N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

8.2. Y - axis

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	-4.55	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	4.55	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	-9.10	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	9.10	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	-9.10	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	9.10	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

9. Control Points

About Point	P kip	X-Moment k-ft	Y-Moment k-ft	NA Depth in	d_t Depth in	ε_t	ϕ
X @ Max compression	640.3	0.00	0.00	55.78	17.31	-0.00207	0.65000
X @ Allowable comp.	512.2	80.89	0.00	19.58	17.31	-0.00035	0.65000
X @ f_s = 0.0	450.9	109.64	0.00	17.31	17.31	0.00000	0.65000

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About	Point	P	X-Moment	Y-Moment	NA Depth	d_t Depth	ε_t	ϕ
		kip	k-ft	k-ft	in	in		
X	@ $f_s = 0.5\ f_y$	322.4	145.07	0.00	12.87	17.31	0.00103	0.65000
X	@ Balanced point	237.5	155.23	0.00	10.25	17.31	0.00207	0.65000
X	@ Tension control	170.1	180.39	0.00	6.44	17.31	0.00507	0.90000
X	@ Pure bending	0.0	92.71	0.00	2.64	17.31	0.01669	0.90000
X	@ Max tension	-133.9	0.00	0.00	0.00	17.31	9.99999	0.90000
Y	@ Max compression	640.3	0.00	0.00	39.67	12.31	-0.00207	0.65000
Y	@ Allowable comp.	512.2	0.00	59.11	14.68	12.31	-0.00048	0.65000
Y	@ $f_s = 0.0$	428.9	0.00	85.97	12.31	12.31	0.00000	0.65000
Y	@ $f_s = 0.5\ f_y$	305.4	0.00	106.51	9.16	12.31	0.00103	0.65000
Y	@ Balanced point	220.2	0.00	110.07	7.29	12.31	0.00207	0.65000
Y	@ Tension control	142.9	0.00	122.18	4.58	12.31	0.00507	0.90000
Y	@ Pure bending	0.0	0.00	67.70	2.26	12.31	0.01332	0.90000
Y	@ Max tension	-133.9	0.00	0.00	0.00	12.31	9.99999	0.90000
-X	@ Max compression	640.3	0.00	0.00	55.78	17.31	-0.00207	0.65000
-X	@ Allowable comp.	512.2	-80.89	0.00	19.58	17.31	-0.00035	0.65000
-X	@ $f_s = 0.0$	450.9	-109.64	0.00	17.31	17.31	0.00000	0.65000
-X	@ $f_s = 0.5\ f_y$	322.4	-145.07	0.00	12.87	17.31	0.00103	0.65000
-X	@ Balanced point	237.5	-155.23	0.00	10.25	17.31	0.00207	0.65000
-X	@ Tension control	170.1	-180.39	0.00	6.44	17.31	0.00507	0.90000
-X	@ Pure bending	0.0	-92.71	0.00	2.64	17.31	0.01669	0.90000
-X	@ Max tension	-133.9	0.00	0.00	0.00	17.31	9.99999	0.90000
-Y	@ Max compression	640.3	0.00	0.00	39.67	12.31	-0.00207	0.65000
-Y	@ Allowable comp.	512.2	0.00	-59.11	14.68	12.31	-0.00048	0.65000
-Y	@ $f_s = 0.0$	428.9	0.00	-85.97	12.31	12.31	0.00000	0.65000
-Y	@ $f_s = 0.5\ f_y$	305.4	0.00	-106.51	9.16	12.31	0.00103	0.65000
-Y	@ Balanced point	220.2	0.00	-110.07	7.29	12.31	0.00207	0.65000
-Y	@ Tension control	142.9	0.00	-122.18	4.58	12.31	0.00507	0.90000
-Y	@ Pure bending	0.0	0.00	-67.70	2.26	12.31	0.01332	0.90000
-Y	@ Max tension	-133.9	0.00	0.00	0.00	12.31	9.99999	0.90000

10. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand			Capacity			Parameters at Capacity			Capacity
				P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	Ratio
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
1	1	U1	Top	4.34	0.00	0.00	13.07	100.89	0.00	2.86	0.01514	0.900	0.44
2	1	U1	Bot	4.34	0.00	0.00	13.07	-100.89	0.00	2.86	0.01514	0.900	0.44
3	1	U2	Top	6.30	0.00	0.00	13.07	100.89	0.00	2.86	0.01514	0.900	0.44
4	1	U2	Bot	6.30	0.00	0.00	13.07	-100.89	0.00	2.86	0.01514	0.900	0.44
5	1	U3	Top	11.96	0.00	0.00	13.07	100.89	0.00	2.86	0.01514	0.900	0.44
6	1	U3	Bot	11.96	0.00	0.00	13.07	-100.89	0.00	2.86	0.01514	0.900	0.44
7	1	U4	Top	11.96	0.00	0.00	13.07	100.89	0.00	2.86	0.01514	0.900	0.44
8	1	U4	Bot	11.96	0.00	-4.55	0.00	0.00	-67.70	2.26	0.01332	0.900	0.48
9	1	U5	Top	11.96	0.00	0.00	13.07	100.89	0.00	2.86	0.01514	0.900	0.44
10	1	U5	Bot	11.96	0.00	4.55	0.00	0.00	67.70	2.26	0.01332	0.900	0.48
11	1	U6	Top	6.30	0.00	0.00	13.07	100.89	0.00	2.86	0.01514	0.900	0.44
12	1	U6	Bot	6.30	0.00	-9.10	0.00	0.00	-67.70	2.26	0.01332	0.900	0.52
13	1	U7	Top	6.30	0.00	0.00	13.07	100.89	0.00	2.86	0.01514	0.900	0.44
14	1	U7	Bot	6.30	0.00	9.10	0.00	0.00	67.70	2.26	0.01332	0.900	0.52
15	1	U8	Top	4.75	0.00	0.00	13.07	100.89	0.00	2.86	0.01514	0.900	0.44
16	1	U8	Bot	4.75	0.00	0.00	13.07	-100.89	0.00	2.86	0.01514	0.900	0.44

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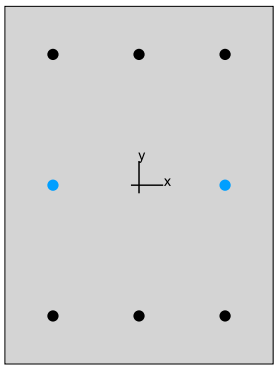
No.	Load Combo			Demand P_u kip	M_{ux} k-ft	M_{uy} k-ft	Capacity ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Parameters at Capacity NA Depth in	ε_t	ϕ	Capacity Ratio
17	1	U9	Top	4.75	0.00	0.00	13.07	100.89	0.00	2.86	0.01514	0.900	0.44
18	1	U9	Bot	4.75	0.00	0.00	13.07	-100.89	0.00	2.86	0.01514	0.900	0.44
19	1	U10	Top	2.79	0.00	0.00	13.07	100.89	0.00	2.86	0.01514	0.900	0.44
20	1	U10	Bot	2.79	0.00	-9.10	0.00	0.00	-67.70	2.26	0.01332	0.900	0.52
21	1	U11	Top	2.79	0.00	0.00	13.07	100.89	0.00	2.86	0.01514	0.900	0.44
22	1	U11	Bot	2.79	0.00	9.10	0.00	0.00	67.70	2.26	0.01332	0.900	0.52
23	1	U12	Top	2.79	0.00	0.00	13.07	100.89	0.00	2.86	0.01514	0.900	0.44
24	1	U12	Bot	2.79	0.00	0.00	13.07	-100.89	0.00	2.86	0.01514	0.900	0.44
25	1	U13	Top	2.79	0.00	0.00	13.07	100.89	0.00	2.86	0.01514	0.900	0.44
26	1	U13	Bot	2.79	0.00	0.00	13.07	-100.89	0.00	2.86	0.01514	0.900	0.44

P-6

11. Diagrams

11.1. PM at θ=0 [deg]



15 x 20 in

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

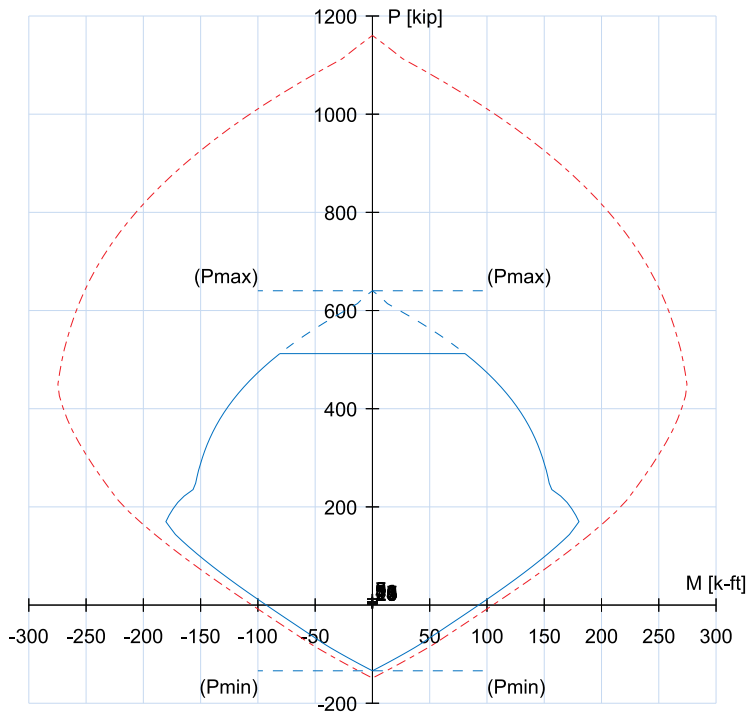
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	15 in
Depth	20 in
A_g	300 in^2
I_x	10000 in^4
I_y	5625 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	2.48 in^2
Rho	0.83 %
Min. clear spacing	4.18 in



PM at 0.0 [deg]

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
1	1	U1	Top	4.3	0.0	0.0	13.07	100.89	0.00	0.44
2	1	U1	Bot	4.3	0.0	0.0	13.07	-100.89	0.00	0.44
3	1	U2	Top	6.3	0.0	0.0	13.07	100.89	0.00	0.44
4	1	U2	Bot	6.3	0.0	0.0	13.07	-100.89	0.00	0.44
5	1	U3	Top	12.0	0.0	0.0	13.07	100.89	0.00	0.44
6	1	U3	Bot	12.0	0.0	0.0	13.07	-100.89	0.00	0.44
7	1	U4	Top	12.0	0.0	0.0	13.07	100.89	0.00	0.44
9	1	U5	Top	12.0	0.0	0.0	13.07	100.89	0.00	0.44
11	1	U6	Top	6.3	0.0	0.0	13.07	100.89	0.00	0.44
13	1	U7	Top	6.3	0.0	0.0	13.07	100.89	0.00	0.44
15	1	U8	Top	4.8	0.0	0.0	13.07	100.89	0.00	0.44
16	1	U8	Bot	4.8	0.0	0.0	13.07	-100.89	0.00	0.44
17	1	U9	Top	4.8	0.0	0.0	13.07	100.89	0.00	0.44
18	1	U9	Bot	4.8	0.0	0.0	13.07	-100.89	0.00	0.44
19	1	U10	Top	2.8	0.0	0.0	13.07	100.89	0.00	0.44

Only 15 points out of 20 are listed.

Max. Capacity Ratio: 0.52

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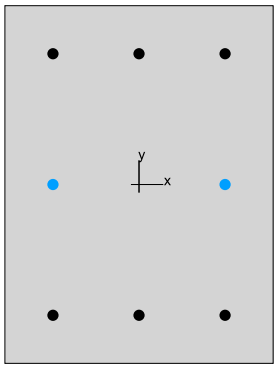
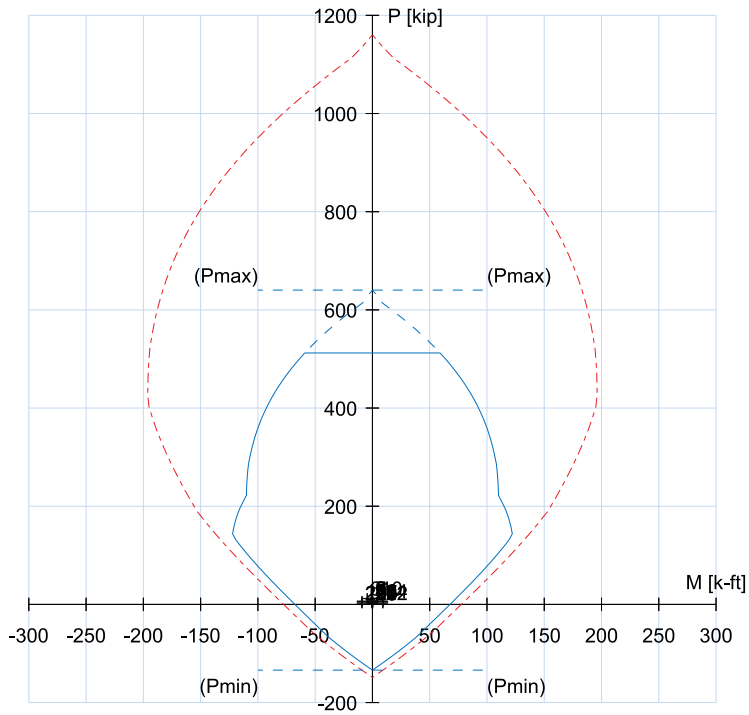
11.2. PM at θ=90 [deg]



15 x 20 in



PM at 90.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	15 in
Depth	20 in
A_g	300 in^2
I_x	10000 in^4
I_y	5625 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	2.48 in^2
Rho	0.83 %
Min. clear spacing	4.18 in

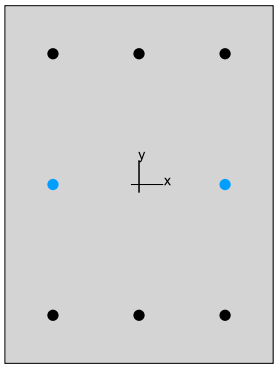
No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
12	1	U6	Bot	6.3	0.0	-9.1	0.00	0.00	-67.70	0.52
14	1	U7	Bot	6.3	0.0	9.1	0.00	0.00	67.70	0.52
20	1	U10	Bot	2.8	0.0	-9.1	0.00	0.00	-67.70	0.52
22	1	U11	Bot	2.8	0.0	9.1	0.00	0.00	67.70	0.52
8	1	U4	Bot	12.0	0.0	-4.6	0.00	0.00	-67.70	0.48
10	1	U5	Bot	12.0	0.0	4.6	0.00	0.00	67.70	0.48
1	1	U1	Top	4.3	0.0	0.0	13.07	100.89	0.00	0.44
2	1	U1	Bot	4.3	0.0	0.0	13.07	-100.89	0.00	0.44
3	1	U2	Top	6.3	0.0	0.0	13.07	100.89	0.00	0.44
4	1	U2	Bot	6.3	0.0	0.0	13.07	-100.89	0.00	0.44
5	1	U3	Top	12.0	0.0	0.0	13.07	100.89	0.00	0.44
6	1	U3	Bot	12.0	0.0	0.0	13.07	-100.89	0.00	0.44
7	1	U4	Top	12.0	0.0	0.0	13.07	100.89	0.00	0.44
9	1	U5	Top	12.0	0.0	0.0	13.07	100.89	0.00	0.44
11	1	U6	Top	6.3	0.0	0.0	13.07	100.89	0.00	0.44

Only 15 points out of 26 are listed.

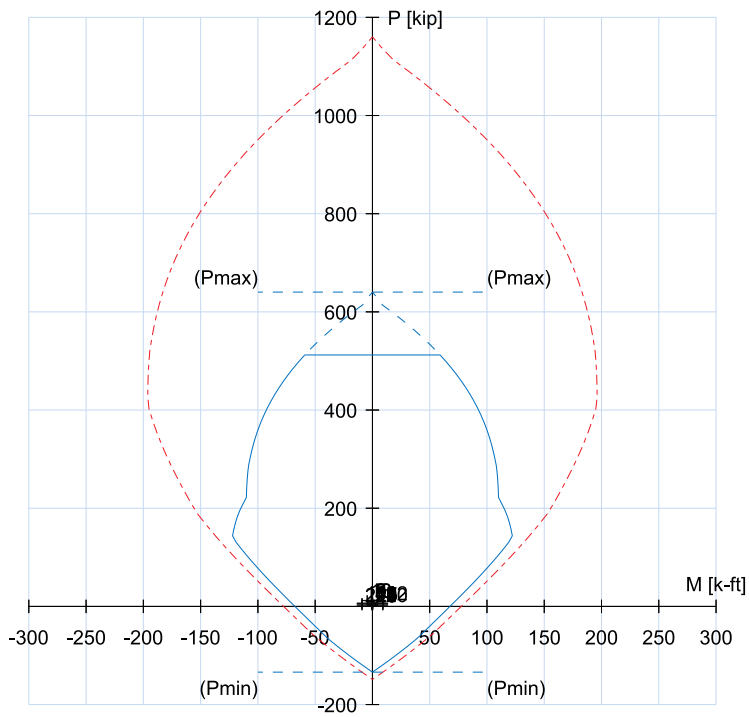
Max. Capacity Ratio: 0.52

P-6

11.3. PM at θ=270 [deg]



15 x 20 in



PM at 270.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	15 in
Depth	20 in
A_g	300 in^2
I_x	10000 in^4
I_y	5625 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	2.48 in^2
Rho	0.83 %
Min. clear spacing	4.18 in

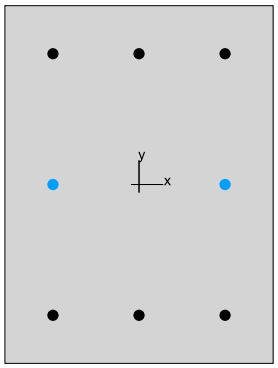
No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
12	1	U6	Bot	6.3	0.0	-9.1	0.00	0.00	-67.70	0.52
14	1	U7	Bot	6.3	0.0	9.1	0.00	0.00	67.70	0.52
20	1	U10	Bot	2.8	0.0	-9.1	0.00	0.00	-67.70	0.52
22	1	U11	Bot	2.8	0.0	9.1	0.00	0.00	67.70	0.52
8	1	U4	Bot	12.0	0.0	-4.6	0.00	0.00	-67.70	0.48
10	1	U5	Bot	12.0	0.0	4.6	0.00	0.00	67.70	0.48
1	1	U1	Top	4.3	0.0	0.0	13.07	100.89	0.00	0.44
2	1	U1	Bot	4.3	0.0	0.0	13.07	-100.89	0.00	0.44
3	1	U2	Top	6.3	0.0	0.0	13.07	100.89	0.00	0.44
4	1	U2	Bot	6.3	0.0	0.0	13.07	-100.89	0.00	0.44
5	1	U3	Top	12.0	0.0	0.0	13.07	100.89	0.00	0.44
6	1	U3	Bot	12.0	0.0	0.0	13.07	-100.89	0.00	0.44
7	1	U4	Top	12.0	0.0	0.0	13.07	100.89	0.00	0.44
9	1	U5	Top	12.0	0.0	0.0	13.07	100.89	0.00	0.44
11	1	U6	Top	6.3	0.0	0.0	13.07	100.89	0.00	0.44

Only 15 points out of 26 are listed.

Max. Capacity Ratio: 0.52

P-6

11.4. MM at P=0 [kip]



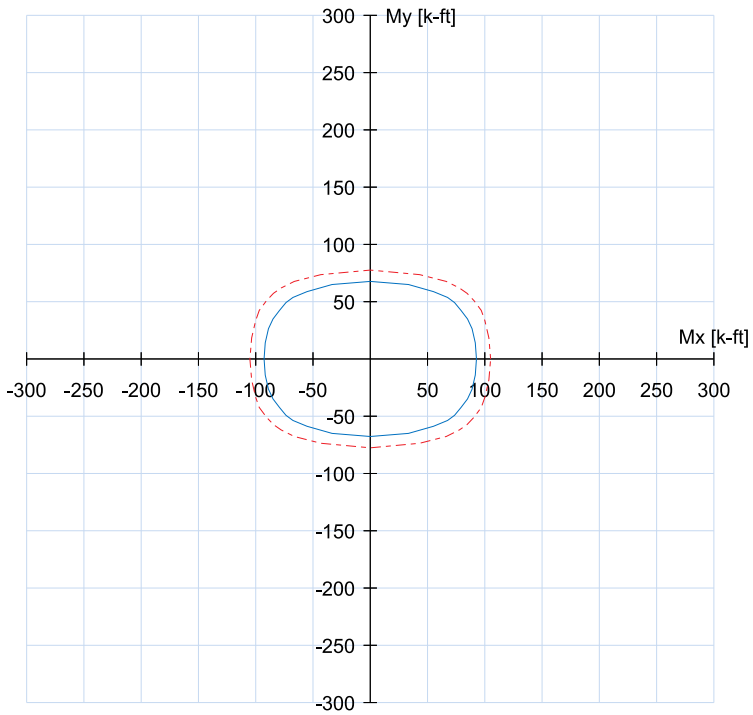
15 x 20 in

General Information	
Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials	
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	15 in
Depth	20 in
A_g	300 in^2
I_x	10000 in^4
I_y	5625 in^4

Reinforcement	
Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	2.48 in^2
Rho	0.83 %
Min. clear spacing	4.18 in



MM at P=0.0 [kip]

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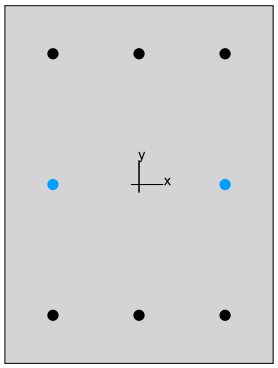
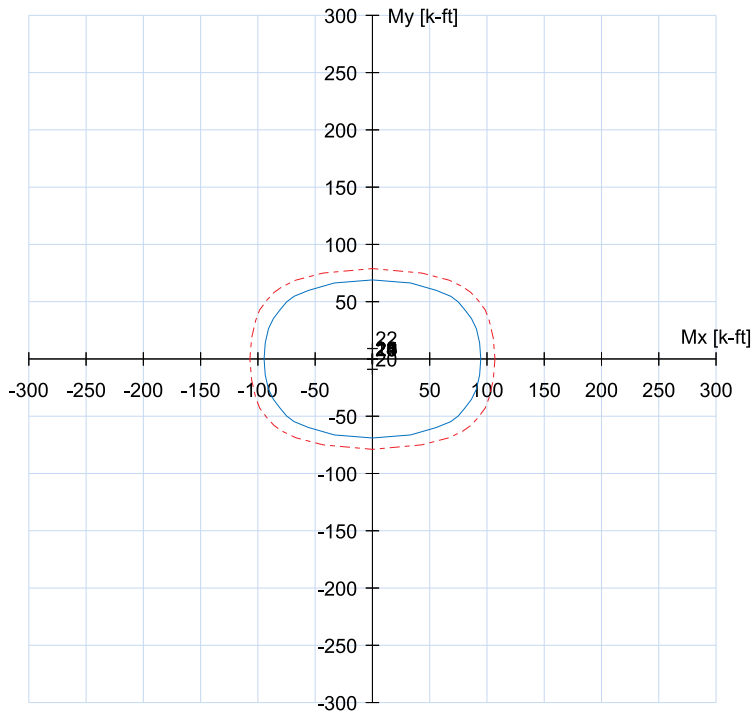
11.5. MM at P=3 [kip]



15 x 20 in



MM at P=3.0 [kip]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	15 in
Depth	20 in
A_g	300 in^2
I_x	10000 in^4
I_y	5625 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	2.48 in^2
Rho	0.83 %
Min. clear spacing	4.18 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
20	1	U10	Bot	2.8	0.0	-9.1	0.00	0.00	-67.70	0.52
22	1	U11	Bot	2.8	0.0	9.1	0.00	0.00	67.70	0.52
19	1	U10	Top	2.8	0.0	0.0	13.07	100.89	0.00	0.44
21	1	U11	Top	2.8	0.0	0.0	13.07	100.89	0.00	0.44
23	1	U12	Top	2.8	0.0	0.0	13.07	100.89	0.00	0.44
24	1	U12	Bot	2.8	0.0	0.0	13.07	-100.89	0.00	0.44
25	1	U13	Top	2.8	0.0	0.0	13.07	100.89	0.00	0.44
26	1	U13	Bot	2.8	0.0	0.0	13.07	-100.89	0.00	0.44

Max. Capacity Ratio: 0.52

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spColumn v10.00 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections
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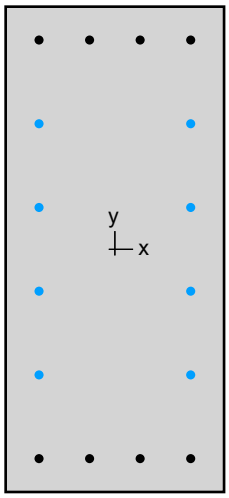

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Figure 1: Column section 4

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1. General Information

File Name	X:\Project Files\202...\P-7 Pier on Grid I&1.colx
Project	CCHS Field Hous
Column	CP-1 - Typical Pier on Grids A/I in Field House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	4	ksi
E_c	3605	ksi
f_c	3.4	ksi
ε_u	0.003	in/in
β_1	0.85	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{ty}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	18	in
Depth	40	in
A_g	720	in^2
I_x	96000	in^4
I_y	19440	in^4
r_x	11.547	in
r_y	5.19615	in
X_o	0	in
Y_o	0	in

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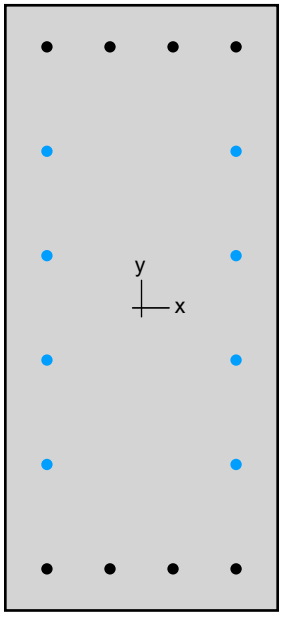
3.2. Section Figure



Rectangular 18 x 40 in 0.98% reinf.

Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter (in)	Area (in^2)	Bar	Diameter (in)	Area (in^2)	Bar	Diameter (in)	Area (in^2)
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #3 bars or less	#3 ties
For larger bars	#3 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---

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Total steel area, A_s	7.04 in^2
Rho	0.98 %
Minimum clear spacing	3.42 in

(Note: Rho < 1.0%)

4.4. Bars Provided

		Bars	Clear cover
			in
Top	4	#6	2
Bottom	4	#6	2
Left	4	#6	2
Right	4	#6	2

5. Loading

5.1. Load Cases

Case	Type	Sustained Load
		%
A	Dead	100
B	Live	0
C	Wind	0
D	EQ	0
E	Snow	0

5.2. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.500	0.000	1.600
U5	1.200	0.000	-0.500	0.000	1.600
U6	1.200	1.000	1.000	0.000	0.500
U7	1.200	1.000	-1.000	0.000	0.500
U8	1.200	1.000	0.000	1.000	0.200
U9	1.200	1.000	0.000	-1.000	0.200
U10	0.900	0.000	1.000	0.000	0.000
U11	0.900	0.000	-1.000	0.000	0.000
U12	0.900	0.000	0.000	1.000	0.000
U13	0.900	0.000	0.000	-1.000	0.000

5.3. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	22.50	6.00	0.00	0.00	0.00
1	Live	26.20	-24.00	0.00	0.00	0.00
1	Wind	8.00	-7.30	12.00	0.00	0.00
1	EQ	0.30	-0.30	0.60	0.00	0.00
1	Snow	6.70	6.10	0.00	0.00	0.00
2	Dead	22.50	6.00	0.00	0.00	0.00
2	Live	26.20	-24.00	0.00	0.00	0.00
2	Wind	7.00	6.40	0.00	0.00	12.00
2	EQ	20.00	18.30	0.00	0.00	30.00
2	Snow	6.70	6.10	0.00	0.00	0.00

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6. Slenderness

6.1. Sway Criteria

X-Axis	Non-sway column
Y-Axis	Non-sway column

6.2. Columns

Column	Axis	Height	Width	Depth/Dia.	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	X	2	18	40	96000	4	3605
Design	Y	2	18	40	19440	4	3605
Above	X	(no column specified...)					
Above	Y	(no column specified...)					
Below	X	(no column specified...)					
Below	Y	(no column specified...)					

6.3. X - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

6.4. Y - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults	
Stiffness reduction factor, ϕ_K	0.75	
Cracked section coefficients, cI(beams)	0.35	
Cracked section coefficients, cI(columns)	0.7	
$0.2\ E_c\ I_g + E_s\ I_{se}$ (X-axis)	1.06e+008	$kip\text{-}in^2$
$0.2\ E_c\ I_g + E_s\ I_{se}$ (Y-axis)	2.02e+007	$kip\text{-}in^2$
Minimum eccentricity, $e_{x\ min}$	1.80	in
Minimum eccentricity, $e_{y\ min}$	1.14	in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
X	999.000	999.000	1.000	(N/A)	2.08
Y	999.000	999.000	1.000	(N/A)	4.62

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7.3. Magnification Factors: X - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	31.50	(N/A)	906015.44	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	72.27	(N/A)	1319184.75	0.374	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	63.92	(N/A)	1273922.38	0.422	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	41.72	(N/A)	1100086.13	0.647	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	33.72	(N/A)	1006285.94	0.801	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	64.55	(N/A)	1277625.25	0.418	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	48.55	(N/A)	1164448.63	0.556	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	54.84	(N/A)	1214220.13	0.492	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	54.24	(N/A)	1209805.00	0.498	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	28.25	(N/A)	1055461.38	0.717	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	12.25	(N/A)	906015.44	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	20.55	(N/A)	912677.25	0.985	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.95	(N/A)	906015.44	1.000	(N/A)	(N/A)	*
2	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	31.50	(N/A)	906015.44	1.000	(N/A)	(N/A)	*
2	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	72.27	(N/A)	1319184.75	0.374	(N/A)	(N/A)	*
2	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	63.92	(N/A)	1273922.38	0.422	(N/A)	(N/A)	*
2	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	41.22	(N/A)	1094868.25	0.655	(N/A)	(N/A)	*
2	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	34.22	(N/A)	1012866.69	0.789	(N/A)	(N/A)	*
2	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	63.55	(N/A)	1271723.50	0.425	(N/A)	(N/A)	*
2	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	49.55	(N/A)	1172908.25	0.545	(N/A)	(N/A)	*
2	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	74.54	(N/A)	1330202.63	0.362	(N/A)	(N/A)	*
2	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	34.54	(N/A)	1017022.25	0.782	(N/A)	(N/A)	*
2	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	27.25	(N/A)	1039533.50	0.743	(N/A)	(N/A)	*
2	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	13.25	(N/A)	906015.44	1.000	(N/A)	(N/A)	*
2	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	40.25	(N/A)	1205524.63	0.503	(N/A)	(N/A)	*
2	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	0.25	(N/A)	906015.44	1.000	(N/A)	(N/A)	*

7.4. Magnification Factors: Y - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	31.50	(N/A)	173364.25	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	72.27	(N/A)	252423.38	0.374	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	63.92	(N/A)	243762.50	0.422	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	41.72	(N/A)	210499.31	0.647	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	33.72	(N/A)	192550.81	0.801	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	64.55	(N/A)	244471.06	0.418	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	48.55	(N/A)	222814.94	0.556	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	54.84	(N/A)	232338.59	0.492	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	54.24	(N/A)	231493.78	0.498	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	28.25	(N/A)	201960.42	0.717	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	12.25	(N/A)	173364.25	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	20.55	(N/A)	174638.98	0.985	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.95	(N/A)	173364.25	1.000	(N/A)	(N/A)	*
2	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	31.50	(N/A)	173364.25	1.000	(N/A)	(N/A)	*
2	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	72.27	(N/A)	252423.38	0.374	(N/A)	(N/A)	*
2	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	63.92	(N/A)	243762.50	0.422	(N/A)	(N/A)	*
2	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	41.22	(N/A)	209500.86	0.655	(N/A)	(N/A)	*
2	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	34.22	(N/A)	193810.03	0.789	(N/A)	(N/A)	*

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Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
2	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	63.55	(N/A)	243341.77	0.425	(N/A)	(N/A)	*
2	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	49.55	(N/A)	224433.67	0.545	(N/A)	(N/A)	*
2	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	74.54	(N/A)	254531.63	0.362	(N/A)	(N/A)	*
2	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	34.54	(N/A)	194605.19	0.782	(N/A)	(N/A)	*
2	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	27.25	(N/A)	198912.67	0.743	(N/A)	(N/A)	*
2	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	13.25	(N/A)	173364.25	1.000	(N/A)	(N/A)	*
2	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	40.25	(N/A)	230674.73	0.503	(N/A)	(N/A)	*
2	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	0.25	(N/A)	173364.25	1.000	(N/A)	(N/A)	*

8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. X - axis

Load Combo			1st Order					2nd Order		Ratio
			M_{ns}	M_s	M_u	M_{min}		M_i	M_c	2nd/1st
			k-ft	k-ft	k-ft	k-ft		k-ft	k-ft	
1	U1	Top	8.40	(N/A)	8.40	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Top	-28.15	(N/A)	-28.15	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Top	-7.04	(N/A)	-7.04	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Top	16.96	(N/A)	13.31	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	-6.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Top	16.96	(N/A)	20.61	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	6.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Top	-13.75	(N/A)	-21.05	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	-12.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Top	-13.75	(N/A)	-6.45	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	-15.58	(N/A)	-15.88	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	-0.60	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Top	-15.58	(N/A)	-15.28	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.60	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Top	5.40	(N/A)	-1.90	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	-12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	5.40	(N/A)	12.70	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	12.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Top	5.40	(N/A)	5.10	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	-0.60	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Top	5.40	(N/A)	5.70	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.60	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U1	Top	8.40	(N/A)	8.40	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U2	Top	-28.15	(N/A)	-28.15	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U3	Top	-7.04	(N/A)	-7.04	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U4	Top	16.96	(N/A)	20.16	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U5	Top	16.96	(N/A)	13.76	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft	2nd Order	M_i k-ft	M_c k-ft	Ratio 2nd/1st
2	U6	Top	-13.75	(N/A)	-7.35	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U7	Top	-13.75	(N/A)	-20.15	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U8	Top	-15.58	(N/A)	2.72	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U9	Top	-15.58	(N/A)	-33.88	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U10	Top	5.40	(N/A)	11.80	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U11	Top	5.40	(N/A)	-1.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U12	Top	5.40	(N/A)	23.70	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U13	Top	5.40	(N/A)	-12.90	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)

8.2. Y - axis

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft	2nd Order	M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
2	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U4	Bot	0.00	(N/A)	-6.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U5	Bot	0.00	(N/A)	6.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U6	Bot	0.00	(N/A)	-12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U7	Bot	0.00	(N/A)	12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U8	Bot	0.00	(N/A)	-30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U9	Bot	0.00	(N/A)	30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U10	Bot	0.00	(N/A)	-12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U11	Bot	0.00	(N/A)	12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U12	Bot	0.00	(N/A)	-30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U13	Bot	0.00	(N/A)	30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

9. Control Points

About	Point	P kip	X-Moment k-ft	Y-Moment k-ft	NA Depth in	d_t Depth in	ε_t	ϕ
X	@ Max compression	1815.2	0.00	0.00	120.03	37.25	-0.00207	0.65000
X	@ Allowable comp.	1452.2	469.21	0.00	39.20	37.25	-0.00015	0.65000
X	@ f_s = 0.0	1378.1	545.21	0.00	37.25	37.25	0.00000	0.65000
X	@ f_s = 0.5 f_y	995.7	804.29	0.00	27.70	37.25	0.00103	0.65000
X	@ Balanced point	739.6	879.98	0.00	22.05	37.25	0.00207	0.65000
X	@ Tension control	538.3	1077.66	0.00	13.85	37.25	0.00507	0.90000
X	@ Pure bending	0.0	558.44	0.00	4.99	37.25	0.01938	0.90000
X	@ Max tension	-380.2	0.00	0.00	0.00	37.25	9.99999	0.90000
Y	@ Max compression	1815.2	0.00	0.00	49.14	15.25	-0.00207	0.65000
Y	@ Allowable comp.	1452.2	0.00	207.35	17.57	15.25	-0.00040	0.65000
Y	@ f_s = 0.0	1254.4	0.00	288.12	15.25	15.25	0.00000	0.65000
Y	@ f_s = 0.5 f_y	897.4	0.00	370.49	11.34	15.25	0.00103	0.65000
Y	@ Balanced point	655.6	0.00	393.23	9.03	15.25	0.00207	0.65000
Y	@ Tension control	469.9	0.00	447.87	5.67	15.25	0.00507	0.90000
Y	@ Pure bending	0.0	0.00	233.87	2.52	15.25	0.01515	0.90000
Y	@ Max tension	-380.2	0.00	0.00	0.00	15.25	9.99999	0.90000
-X	@ Max compression	1815.2	0.00	0.00	120.03	37.25	-0.00207	0.65000
-X	@ Allowable comp.	1452.2	-469.21	0.00	39.20	37.25	-0.00015	0.65000
-X	@ f_s = 0.0	1378.1	-545.21	0.00	37.25	37.25	0.00000	0.65000
-X	@ f_s = 0.5 f_y	995.7	-804.29	0.00	27.70	37.25	0.00103	0.65000
-X	@ Balanced point	739.6	-879.98	0.00	22.05	37.25	0.00207	0.65000
-X	@ Tension control	538.3	-1077.66	0.00	13.85	37.25	0.00507	0.90000
-X	@ Pure bending	0.0	-558.44	0.00	4.99	37.25	0.01938	0.90000
-X	@ Max tension	-380.2	0.00	0.00	0.00	37.25	9.99999	0.90000
-Y	@ Max compression	1815.2	0.00	0.00	49.14	15.25	-0.00207	0.65000
-Y	@ Allowable comp.	1452.2	0.00	-207.35	17.57	15.25	-0.00040	0.65000
-Y	@ f_s = 0.0	1254.4	0.00	-288.12	15.25	15.25	0.00000	0.65000
-Y	@ f_s = 0.5 f_y	897.4	0.00	-370.49	11.34	15.25	0.00103	0.65000
-Y	@ Balanced point	655.6	0.00	-393.23	9.03	15.25	0.00207	0.65000

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About Point	P	X-Moment	Y-Moment	NA Depth	d_t Depth	ε_t	ϕ
	kip	k-ft	k-ft	in	in		
-Y @ Tension control	469.9	0.00	-447.87	5.67	15.25	0.00507	0.90000
-Y @ Pure bending	0.0	0.00	-233.87	2.52	15.25	0.01515	0.90000
-Y @ Max tension	-380.2	0.00	0.00	0.00	15.25	9.99999	0.90000

10. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand			Capacity			Parameters at Capacity			Capacity Ratio
				P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
1	1	U1	Top	31.50	8.40	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.48
2	1	U1	Bot	31.50	0.00	0.00	37.04	-607.45	0.00	5.62	0.01689	0.900	0.43
3	1	U2	Top	72.27	-28.15	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.50
4	1	U2	Bot	72.27	0.00	0.00	37.04	-607.45	0.00	5.62	0.01689	0.900	0.43
5	1	U3	Top	63.92	-7.04	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.48
6	1	U3	Bot	63.92	0.00	0.00	37.04	-607.45	0.00	5.62	0.01689	0.900	0.43
7	1	U4	Top	41.72	13.31	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.49
8	1	U4	Bot	41.72	-6.00	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.48
9	1	U5	Top	33.72	20.61	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.49
10	1	U5	Bot	33.72	6.00	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.48
11	1	U6	Top	64.55	-21.05	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.49
12	1	U6	Bot	64.55	-12.00	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.48
13	1	U7	Top	48.55	-6.45	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.48
14	1	U7	Bot	48.55	12.00	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.49
15	1	U8	Top	54.84	-15.88	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.49
16	1	U8	Bot	54.84	-0.60	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.47
17	1	U9	Top	54.24	-15.28	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.49
18	1	U9	Bot	54.24	0.60	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.47
19	1	U10	Top	28.25	-1.90	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.48
20	1	U10	Bot	28.25	-12.00	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.49
21	1	U11	Top	12.25	12.70	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.49
22	1	U11	Bot	12.25	12.00	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.49
23	1	U12	Top	20.55	5.10	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.48
24	1	U12	Bot	20.55	-0.60	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.48
25	1	U13	Top	19.95	5.70	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.48
26	1	U13	Bot	19.95	0.60	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.48
27	2	U1	Top	31.50	8.40	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.48
28	2	U1	Bot	31.50	0.00	0.00	37.04	-607.45	0.00	5.62	0.01689	0.900	0.43
29	2	U2	Top	72.27	-28.15	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.50
30	2	U2	Bot	72.27	0.00	0.00	37.04	-607.45	0.00	5.62	0.01689	0.900	0.43
31	2	U3	Top	63.92	-7.04	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.48
32	2	U3	Bot	63.92	0.00	0.00	37.04	-607.45	0.00	5.62	0.01689	0.900	0.43
33	2	U4	Top	41.22	20.16	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.49
34	2	U4	Bot	41.22	0.00	-6.00	0.00	0.00	-233.87	2.52	0.01515	0.900	0.49
35	2	U5	Top	34.22	13.76	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.49
36	2	U5	Bot	34.22	0.00	6.00	0.00	0.00	233.87	2.52	0.01515	0.900	0.49
37	2	U6	Top	63.55	-7.35	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.48
38	2	U6	Bot	63.55	0.00	-12.00	0.00	0.00	-233.87	2.52	0.01515	0.900	0.50
39	2	U7	Top	49.55	-20.15	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.49
40	2	U7	Bot	49.55	0.00	12.00	0.00	0.00	233.87	2.52	0.01515	0.900	0.50
41	2	U8	Top	74.54	2.72	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.48
42	2	U8	Bot	74.54	0.00	-30.00	0.00	0.00	-233.87	2.52	0.01515	0.900	0.54

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No.	Load Combo			Demand P_u kip	M_{ux} k-ft	M_{uy} k-ft	Capacity ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Parameters at Capacity NA Depth in	ε_t	ϕ	Capacity Ratio
43	2	U9	Top	34.54	-33.88	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.51
44	2	U9	Bot	34.54	0.00	30.00	0.00	0.00	233.87	2.52	0.01515	0.900	0.54
45	2	U10	Top	27.25	11.80	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.49
46	2	U10	Bot	27.25	0.00	-12.00	0.00	0.00	-233.87	2.52	0.01515	0.900	0.50
47	2	U11	Top	13.25	-1.00	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.48
48	2	U11	Bot	13.25	0.00	12.00	0.00	0.00	233.87	2.52	0.01515	0.900	0.50
49	2	U12	Top	40.25	23.70	0.00	0.00	558.44	0.00	4.99	0.01938	0.900	0.50
50	2	U12	Bot	40.25	0.00	-30.00	0.00	0.00	-233.87	2.52	0.01515	0.900	0.54
51	2	U13	Top	0.25	-12.90	0.00	0.00	-558.44	0.00	4.99	0.01938	0.900	0.49
52	2	U13	Bot	0.25	0.00	30.00	0.00	0.00	233.87	2.52	0.01515	0.900	0.54

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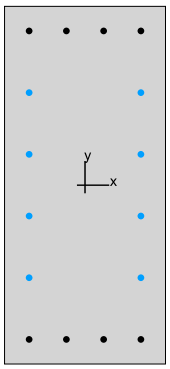
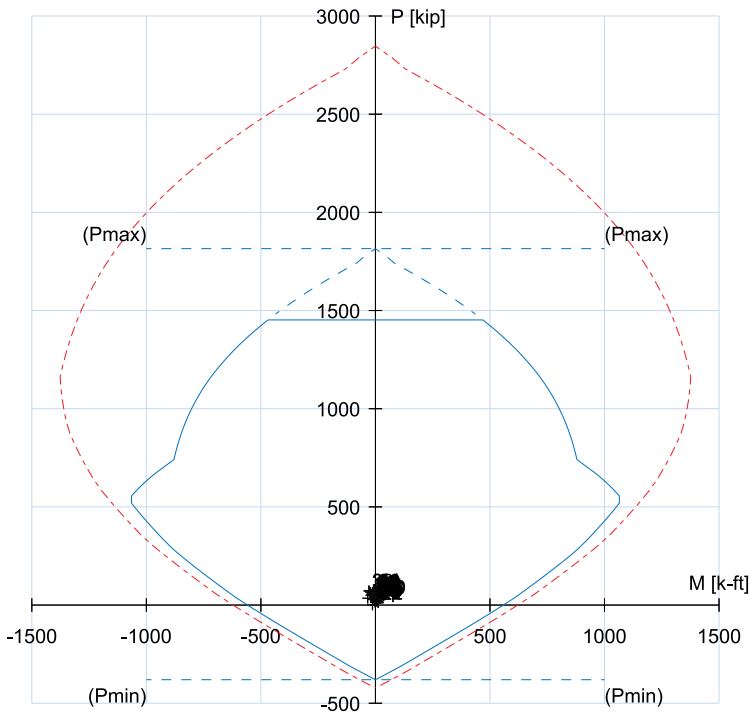
11. Diagrams

11.1. PM at θ=0 [deg]



18 x 40 in



PM at 0.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	18 in
Depth	40 in
A_g	720 in^2
I_x	96000 in^4
I_y	19440 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	7.04 in^2
Rho	0.98 %
Min. clear spacing	3.42 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
43	2	U9	Top	34.5	-33.9	0.0	0.00	-558.44	0.00	0.51
3	1	U2	Top	72.3	-28.2	0.0	0.00	-558.44	0.00	0.50
29	2	U2	Top	72.3	-28.2	0.0	0.00	-558.44	0.00	0.50
49	2	U12	Top	40.3	23.7	0.0	0.00	558.44	0.00	0.50
7	1	U4	Top	41.7	13.3	0.0	0.00	558.44	0.00	0.49
9	1	U5	Top	33.7	20.6	0.0	0.00	558.44	0.00	0.49
11	1	U6	Top	64.6	-21.0	0.0	0.00	-558.44	0.00	0.49
14	1	U7	Bot	48.6	12.0	0.0	0.00	558.44	0.00	0.49
15	1	U8	Top	54.8	-15.9	0.0	0.00	-558.44	0.00	0.49
17	1	U9	Top	54.2	-15.3	0.0	0.00	-558.44	0.00	0.49
20	1	U10	Bot	28.3	-12.0	0.0	0.00	-558.44	0.00	0.49
21	1	U11	Top	12.3	12.7	0.0	0.00	558.44	0.00	0.49
22	1	U11	Bot	12.3	12.0	0.0	0.00	558.44	0.00	0.49
33	2	U4	Top	41.2	20.2	0.0	0.00	558.44	0.00	0.49
35	2	U5	Top	34.2	13.8	0.0	0.00	558.44	0.00	0.49

Only 15 points out of 42 are listed.

Max. Capacity Ratio: 0.54

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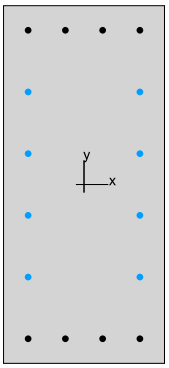
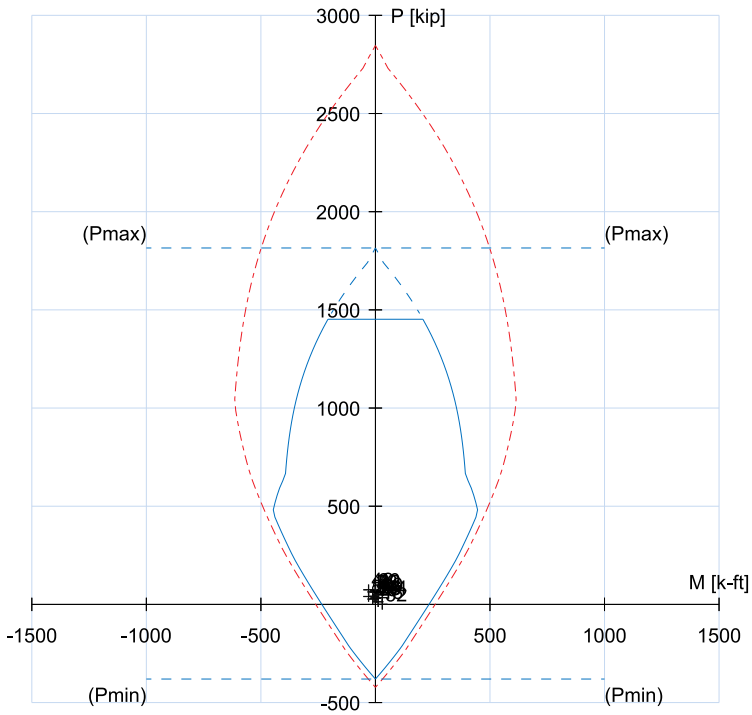
11.2. PM at θ=90 [deg]



18 x 40 in



PM at 90.0 [deg]

General Information	
Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials	
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	18 in
Depth	40 in
A_g	720 in^2
I_x	96000 in^4
I_y	19440 in^4

Reinforcement	
Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	7.04 in^2
Rho	0.98 %
Min. clear spacing	3.42 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
42	2	U8	Bot	74.5	0.0	-30.0	0.00	0.00	-233.87	0.54
44	2	U9	Bot	34.5	0.0	30.0	0.00	0.00	233.87	0.54
50	2	U12	Bot	40.3	0.0	-30.0	0.00	0.00	-233.87	0.54
52	2	U13	Bot	0.3	0.0	30.0	0.00	0.00	233.87	0.54
38	2	U6	Bot	63.6	0.0	-12.0	0.00	0.00	-233.87	0.50
40	2	U7	Bot	49.6	0.0	12.0	0.00	0.00	233.87	0.50
46	2	U10	Bot	27.3	0.0	-12.0	0.00	0.00	-233.87	0.50
48	2	U11	Bot	13.3	0.0	12.0	0.00	0.00	233.87	0.50
34	2	U4	Bot	41.2	0.0	-6.0	0.00	0.00	-233.87	0.49
36	2	U5	Bot	34.2	0.0	6.0	0.00	0.00	233.87	0.49
2	1	U1	Bot	31.5	0.0	0.0	37.04	-607.45	0.00	0.43
4	1	U2	Bot	72.3	0.0	0.0	37.04	-607.45	0.00	0.43
6	1	U3	Bot	63.9	0.0	0.0	37.04	-607.45	0.00	0.43
28	2	U1	Bot	31.5	0.0	0.0	37.04	-607.45	0.00	0.43
30	2	U2	Bot	72.3	0.0	0.0	37.04	-607.45	0.00	0.43

Only 15 points out of 16 are listed.

Max. Capacity Ratio: 0.54

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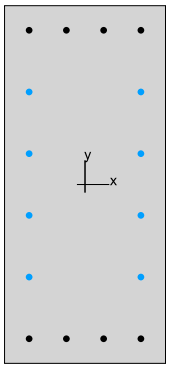
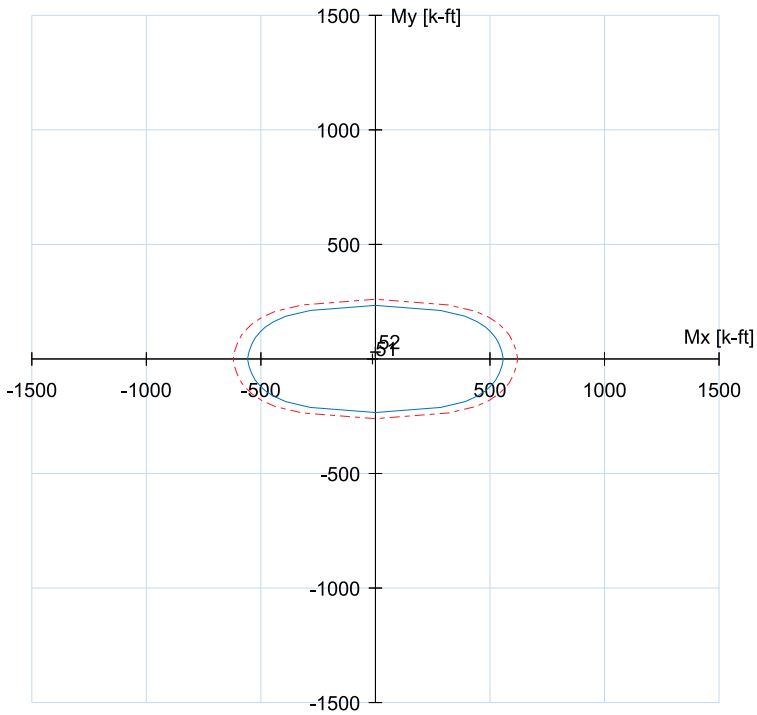
11.3. MM at P=0 [kip]



18 x 40 in



MM at P=0.0 [kip]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	18 in
Depth	40 in
A_g	720 in^2
I_x	96000 in^4
I_y	19440 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	7.04 in^2
Rho	0.98 %
Min. clear spacing	3.42 in

No.	Load Combo			P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	Capacity
				kip	k-ft	k-ft	kip	k-ft	k-ft	Ratio
52	2	U13	Bot	0.3	0.0	30.0	0.00	0.00	233.87	0.54
51	2	U13	Top	0.3	-12.9	0.0	0.00	-558.44	0.00	0.49

Max. Capacity Ratio: 0.54

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spColumn v10.00 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections
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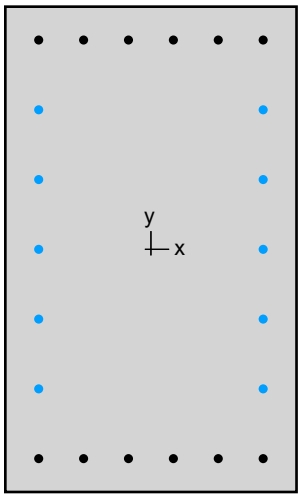

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Figure 1: Column section 4

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1. General Information

File Name	...\P-8 Pier on Grid 1 (Metal Building Brace F...
Project	CCHS Field Hous
Column	CP-1 - Typical Pier on Grids A/I in Field House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	4	ksi
E_c	3605	ksi
f_c	3.4	ksi
ε_u	0.003	in/in
β_1	0.85	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{ty}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	24	in
Depth	40	in
A_g	960	in^2
I_x	128000	in^4
I_y	46080	in^4
r_x	11.547	in
r_y	6.9282	in
X_o	0	in
Y_o	0	in

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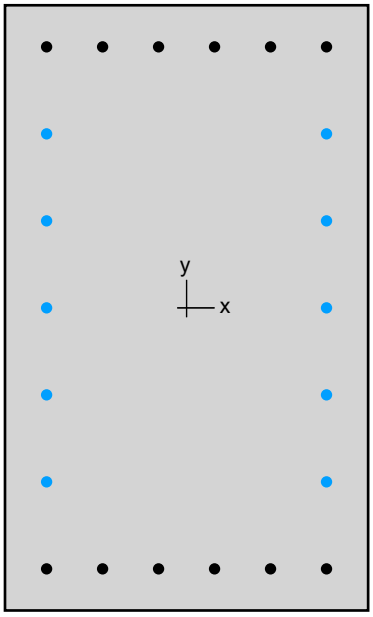
3.2. Section Figure



Rectangular 24 x 40 in 1.01% reinf.

Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter in	Area in²	Bar	Diameter in	Area in²	Bar	Diameter in	Area in²
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #3 bars or less	#3 ties
For larger bars	#3 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---

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Total steel area, A_s	9.68 in^2
Rho	1.01 %
Minimum clear spacing	2.95 in

4.4. Bars Provided

		Bars	Clear cover
			in
Top	6	#6	2
Bottom	6	#6	2
Left	5	#6	2
Right	5	#6	2

5. Loading

5.1. Load Cases

Case	Type	Sustained Load
		%
A	Dead	100
B	Live	0
C	Wind	0
D	EQ	0
E	Snow	0

5.2. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.500	0.000	1.600
U5	1.200	0.000	-0.500	0.000	1.600
U6	1.200	1.000	1.000	0.000	0.500
U7	1.200	1.000	-1.000	0.000	0.500
U8	1.200	1.000	0.000	1.000	0.200
U9	1.200	1.000	0.000	-1.000	0.200
U10	0.900	0.000	1.000	0.000	0.000
U11	0.900	0.000	-1.000	0.000	0.000
U12	0.900	0.000	0.000	1.000	0.000
U13	0.900	0.000	0.000	-1.000	0.000

5.3. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	57.00	23.00	0.00	0.00	0.00
1	Live	43.00	40.00	0.00	0.00	0.00
1	Wind	16.00	-15.00	24.00	0.00	0.00
1	EQ	0.60	-0.60	1.20	0.00	0.00
1	Snow	13.50	-12.50	0.00	0.00	0.00
2	Dead	57.00	23.00	0.00	0.00	0.00
2	Live	43.00	40.00	0.00	0.00	0.00
2	Wind	7.00	6.40	0.00	0.00	12.00
2	EQ	20.00	18.30	0.00	0.00	30.00
2	Snow	13.50	-12.50	0.00	0.00	0.00

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6. Slenderness

6.1. Sway Criteria

X-Axis	Non-sway column
Y-Axis	Non-sway column

6.2. Columns

Column	Axis	Height	Width	Depth/Dia.	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	X	2	24	40	128000	4	3605
Design	Y	2	24	40	46080	4	3605
Above	X	(no column specified...)					
Above	Y	(no column specified...)					
Below	X	(no column specified...)					
Below	Y	(no column specified...)					

6.3. X - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

6.4. Y - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults	
Stiffness reduction factor, ϕ_K	0.75	
Cracked section coefficients, cI(beams)	0.35	
Cracked section coefficients, cI(columns)	0.7	
$0.2\ E_c\ I_g + E_s\ I_{se}$ (X-axis)	1.46e+008	$kip\text{-}in^2$
$0.2\ E_c\ I_g + E_s\ I_{se}$ (Y-axis)	5.03e+007	$kip\text{-}in^2$
Minimum eccentricity, $e_{x\ min}$	1.80	in
Minimum eccentricity, $e_{y\ min}$	1.32	in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
X	999.000	999.000	1.000	(N/A)	2.08
Y	999.000	999.000	1.000	(N/A)	3.46

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7.3. Magnification Factors: X - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	79.80	(N/A)	1254322.38	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	143.95	(N/A)	1700586.00	0.475	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	133.00	(N/A)	1656652.13	0.514	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	98.00	(N/A)	1477447.00	0.698	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	82.00	(N/A)	1367745.00	0.834	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	134.15	(N/A)	1661489.50	0.510	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	102.15	(N/A)	1502539.13	0.670	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	114.70	(N/A)	1571499.38	0.596	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	113.50	(N/A)	1565317.00	0.603	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	67.30	(N/A)	1423539.50	0.762	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	35.30	(N/A)	1254322.38	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	51.90	(N/A)	1261614.88	0.988	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	50.70	(N/A)	1254322.38	1.000	(N/A)	(N/A)	*
2	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	79.80	(N/A)	1254322.38	1.000	(N/A)	(N/A)	*
2	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	143.95	(N/A)	1700586.00	0.475	(N/A)	(N/A)	*
2	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	133.00	(N/A)	1656652.13	0.514	(N/A)	(N/A)	*
2	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	93.50	(N/A)	1448784.88	0.732	(N/A)	(N/A)	*
2	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	86.50	(N/A)	1400889.38	0.791	(N/A)	(N/A)	*
2	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	125.15	(N/A)	1622097.13	0.547	(N/A)	(N/A)	*
2	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	111.15	(N/A)	1552970.50	0.615	(N/A)	(N/A)	*
2	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	134.10	(N/A)	1661280.13	0.510	(N/A)	(N/A)	*
2	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	94.10	(N/A)	1452698.25	0.727	(N/A)	(N/A)	*
2	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	58.30	(N/A)	1334434.13	0.880	(N/A)	(N/A)	*
2	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	44.30	(N/A)	1254322.38	1.000	(N/A)	(N/A)	*
2	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	71.30	(N/A)	1458942.63	0.719	(N/A)	(N/A)	*
2	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	31.30	(N/A)	1254322.38	1.000	(N/A)	(N/A)	*

7.4. Magnification Factors: Y - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	79.80	(N/A)	430905.75	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	143.95	(N/A)	584213.69	0.475	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	133.00	(N/A)	569120.81	0.514	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	98.00	(N/A)	507557.25	0.698	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	82.00	(N/A)	469870.59	0.834	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	134.15	(N/A)	570782.63	0.510	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	102.15	(N/A)	516177.31	0.670	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	114.70	(N/A)	539867.69	0.596	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	113.50	(N/A)	537743.81	0.603	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	67.30	(N/A)	489038.06	0.762	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	35.30	(N/A)	430905.75	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	51.90	(N/A)	433411.00	0.988	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	50.70	(N/A)	430905.75	1.000	(N/A)	(N/A)	*
2	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	79.80	(N/A)	430905.75	1.000	(N/A)	(N/A)	*
2	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	143.95	(N/A)	584213.69	0.475	(N/A)	(N/A)	*
2	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	133.00	(N/A)	569120.81	0.514	(N/A)	(N/A)	*
2	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	93.50	(N/A)	497710.78	0.732	(N/A)	(N/A)	*
2	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	86.50	(N/A)	481256.91	0.791	(N/A)	(N/A)	*

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Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
2	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	125.15	(N/A)	557249.88	0.547	(N/A)	(N/A)	*
2	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	111.15	(N/A)	533502.38	0.615	(N/A)	(N/A)	*
2	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	134.10	(N/A)	570710.69	0.510	(N/A)	(N/A)	*
2	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	94.10	(N/A)	499055.16	0.727	(N/A)	(N/A)	*
2	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	58.30	(N/A)	458427.06	0.880	(N/A)	(N/A)	*
2	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	44.30	(N/A)	430905.75	1.000	(N/A)	(N/A)	*
2	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	71.30	(N/A)	501200.34	0.719	(N/A)	(N/A)	*
2	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	31.30	(N/A)	430905.75	1.000	(N/A)	(N/A)	*

8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. X - axis

Load Combo			1st Order					2nd Order		Ratio
			M_{ns}	M_s	M_u	M_{min}		M_i	M_c	2nd/1st
			k-ft	k-ft	k-ft	k-ft		k-ft	k-ft	
1	U1	Top	32.20	(N/A)	32.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Top	85.35	(N/A)	85.35	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Top	47.60	(N/A)	47.60	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Top	7.60	(N/A)	0.10	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	-12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	7.60	(N/A)	15.10	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	12.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Top	61.35	(N/A)	46.35	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	-24.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Top	61.35	(N/A)	76.35	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	24.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Top	65.10	(N/A)	64.50	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	-1.20	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Top	65.10	(N/A)	65.70	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	1.20	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Top	20.70	(N/A)	5.70	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	-24.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	20.70	(N/A)	35.70	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	24.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Top	20.70	(N/A)	20.10	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	-1.20	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Top	20.70	(N/A)	21.30	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	1.20	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U1	Top	32.20	(N/A)	32.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U2	Top	85.35	(N/A)	85.35	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U3	Top	47.60	(N/A)	47.60	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U4	Top	7.60	(N/A)	10.80	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U5	Top	7.60	(N/A)	4.40	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft	2nd Order	M_i k-ft	M_c k-ft	Ratio 2nd/1st
2	U6	Top	61.35	(N/A)	67.75	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U7	Top	61.35	(N/A)	54.95	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U8	Top	65.10	(N/A)	83.40	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U9	Top	65.10	(N/A)	46.80	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U10	Top	20.70	(N/A)	27.10	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U11	Top	20.70	(N/A)	14.30	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U12	Top	20.70	(N/A)	39.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U13	Top	20.70	(N/A)	2.40	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)

8.2. Y - axis

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft	2nd Order	M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
2	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U4	Bot	0.00	(N/A)	-6.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U5	Bot	0.00	(N/A)	6.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U6	Bot	0.00	(N/A)	-12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U7	Bot	0.00	(N/A)	12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U8	Bot	0.00	(N/A)	-30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U9	Bot	0.00	(N/A)	30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U10	Bot	0.00	(N/A)	-12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U11	Bot	0.00	(N/A)	12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U12	Bot	0.00	(N/A)	-30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U13	Bot	0.00	(N/A)	30.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

9. Control Points

About	Point	P kip	X-Moment k-ft	Y-Moment k-ft	NA Depth in	d_t Depth in	ε_t	ϕ
X	@ Max compression	2477.7	0.00	0.00	120.03	37.25	-0.00207	0.65000
X	@ Allowable comp.	1982.2	648.25	0.00	39.26	37.25	-0.00015	0.65000
X	@ f_s = 0.0	1877.9	755.92	0.00	37.25	37.25	0.00000	0.65000
X	@ f_s = 0.5 f_y	1357.6	1116.40	0.00	27.70	37.25	0.00103	0.65000
X	@ Balanced point	1007.3	1227.51	0.00	22.05	37.25	0.00207	0.65000
X	@ Tension control	752.7	1505.36	0.00	13.85	37.25	0.00507	0.90000
X	@ Pure bending	0.0	769.12	0.00	4.80	37.25	0.02026	0.90000
X	@ Max tension	-522.7	0.00	0.00	0.00	37.25	9.99999	0.90000
Y	@ Max compression	2477.7	0.00	0.00	68.47	21.25	-0.00207	0.65000
Y	@ Allowable comp.	1982.2	0.00	382.82	23.48	21.25	-0.00029	0.65000
Y	@ f_s = 0.0	1788.6	0.00	495.57	21.25	21.25	0.00000	0.65000
Y	@ f_s = 0.5 f_y	1284.6	0.00	673.26	15.80	21.25	0.00103	0.65000
Y	@ Balanced point	943.4	0.00	725.39	12.58	21.25	0.00207	0.65000
Y	@ Tension control	698.8	0.00	865.00	7.90	21.25	0.00507	0.90000
Y	@ Pure bending	0.0	0.00	441.46	3.14	21.25	0.01731	0.90000
Y	@ Max tension	-522.7	0.00	0.00	0.00	21.25	9.99999	0.90000
-X	@ Max compression	2477.7	0.00	0.00	120.03	37.25	-0.00207	0.65000
-X	@ Allowable comp.	1982.2	-648.25	0.00	39.26	37.25	-0.00015	0.65000
-X	@ f_s = 0.0	1877.9	-755.92	0.00	37.25	37.25	0.00000	0.65000
-X	@ f_s = 0.5 f_y	1357.6	-1116.40	0.00	27.70	37.25	0.00103	0.65000
-X	@ Balanced point	1007.3	-1227.51	0.00	22.05	37.25	0.00207	0.65000
-X	@ Tension control	752.7	-1505.36	0.00	13.85	37.25	0.00507	0.90000
-X	@ Pure bending	0.0	-769.12	0.00	4.80	37.25	0.02026	0.90000
-X	@ Max tension	-522.7	0.00	0.00	0.00	37.25	9.99999	0.90000
-Y	@ Max compression	2477.7	0.00	0.00	68.47	21.25	-0.00207	0.65000
-Y	@ Allowable comp.	1982.2	0.00	-382.82	23.48	21.25	-0.00029	0.65000
-Y	@ f_s = 0.0	1788.6	0.00	-495.57	21.25	21.25	0.00000	0.65000
-Y	@ f_s = 0.5 f_y	1284.6	0.00	-673.26	15.80	21.25	0.00103	0.65000
-Y	@ Balanced point	943.4	0.00	-725.39	12.58	21.25	0.00207	0.65000

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About	Point	P	X-Moment	Y-Moment	NA Depth	d_t Depth	ε_t	ϕ
		kip	k-ft	k-ft	in	in		
-Y	@ Tension control	698.8	0.00	-865.00	7.90	21.25	0.00507	0.90000
-Y	@ Pure bending	0.0	0.00	-441.46	3.14	21.25	0.01731	0.90000
-Y	@ Max tension	-522.7	0.00	0.00	0.00	21.25	9.99999	0.90000

10. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand			Capacity			Parameters at Capacity			Capacity Ratio
				P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
1	1	U1	Top	79.80	32.20	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.51
2	1	U1	Bot	79.80	0.00	0.00	50.57	-834.53	0.00	5.33	0.01799	0.900	0.44
3	1	U2	Top	143.95	85.35	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.54
4	1	U2	Bot	143.95	0.00	0.00	50.57	-834.53	0.00	5.33	0.01799	0.900	0.44
5	1	U3	Top	133.00	47.60	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.51
6	1	U3	Bot	133.00	0.00	0.00	50.57	-834.53	0.00	5.33	0.01799	0.900	0.44
7	1	U4	Top	98.00	0.10	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.49
8	1	U4	Bot	98.00	-12.00	0.00	0.00	-769.12	0.00	4.80	0.02026	0.900	0.49
9	1	U5	Top	82.00	15.10	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.50
10	1	U5	Bot	82.00	12.00	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.49
11	1	U6	Top	134.15	46.35	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.51
12	1	U6	Bot	134.15	-24.00	0.00	0.00	-769.12	0.00	4.80	0.02026	0.900	0.50
13	1	U7	Top	102.15	76.35	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.54
14	1	U7	Bot	102.15	24.00	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.50
15	1	U8	Top	114.70	64.50	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.53
16	1	U8	Bot	114.70	-1.20	0.00	0.00	-769.12	0.00	4.80	0.02026	0.900	0.48
17	1	U9	Top	113.50	65.70	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.53
18	1	U9	Bot	113.50	1.20	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.48
19	1	U10	Top	67.30	5.70	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.49
20	1	U10	Bot	67.30	-24.00	0.00	0.00	-769.12	0.00	4.80	0.02026	0.900	0.50
21	1	U11	Top	35.30	35.70	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.51
22	1	U11	Bot	35.30	24.00	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.50
23	1	U12	Top	51.90	20.10	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.50
24	1	U12	Bot	51.90	-1.20	0.00	0.00	-769.12	0.00	4.80	0.02026	0.900	0.49
25	1	U13	Top	50.70	21.30	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.50
26	1	U13	Bot	50.70	1.20	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.49
27	2	U1	Top	79.80	32.20	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.51
28	2	U1	Bot	79.80	0.00	0.00	50.57	-834.53	0.00	5.33	0.01799	0.900	0.44
29	2	U2	Top	143.95	85.35	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.54
30	2	U2	Bot	143.95	0.00	0.00	50.57	-834.53	0.00	5.33	0.01799	0.900	0.44
31	2	U3	Top	133.00	47.60	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.51
32	2	U3	Bot	133.00	0.00	0.00	50.57	-834.53	0.00	5.33	0.01799	0.900	0.44
33	2	U4	Top	93.50	10.80	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.49
34	2	U4	Bot	93.50	0.00	-6.00	0.00	0.00	-441.46	3.14	0.01731	0.900	0.49
35	2	U5	Top	86.50	4.40	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.49
36	2	U5	Bot	86.50	0.00	6.00	0.00	0.00	441.46	3.14	0.01731	0.900	0.49
37	2	U6	Top	125.15	67.75	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.53
38	2	U6	Bot	125.15	0.00	-12.00	0.00	0.00	-441.46	3.14	0.01731	0.900	0.50
39	2	U7	Top	111.15	54.95	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.52
40	2	U7	Bot	111.15	0.00	12.00	0.00	0.00	441.46	3.14	0.01731	0.900	0.50
41	2	U8	Top	134.10	83.40	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.54
42	2	U8	Bot	134.10	0.00	-30.00	0.00	0.00	-441.46	3.14	0.01731	0.900	0.52

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No.	Load Combo			Demand P_u	M_{ux}	M_{uy}	Capacity ϕP_n	ϕM_{nx}	ϕM_{ny}	Parameters at Capacity NA Depth	ε_t	ϕ	Capacity Ratio
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
43	2	U9	Top	94.10	46.80	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.52
44	2	U9	Bot	94.10	0.00	30.00	0.00	0.00	441.46	3.14	0.01731	0.900	0.52
45	2	U10	Top	58.30	27.10	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.50
46	2	U10	Bot	58.30	0.00	-12.00	0.00	0.00	-441.46	3.14	0.01731	0.900	0.50
47	2	U11	Top	44.30	14.30	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.50
48	2	U11	Bot	44.30	0.00	12.00	0.00	0.00	441.46	3.14	0.01731	0.900	0.50
49	2	U12	Top	71.30	39.00	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.51
50	2	U12	Bot	71.30	0.00	-30.00	0.00	0.00	-441.46	3.14	0.01731	0.900	0.52
51	2	U13	Top	31.30	2.40	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.49
52	2	U13	Bot	31.30	0.00	30.00	0.00	0.00	441.46	3.14	0.01731	0.900	0.52

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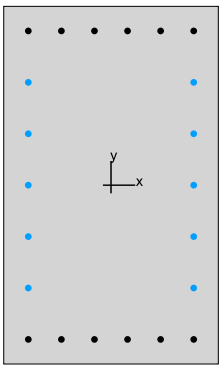
11. Diagrams

11.1. PM at θ=0 [deg]



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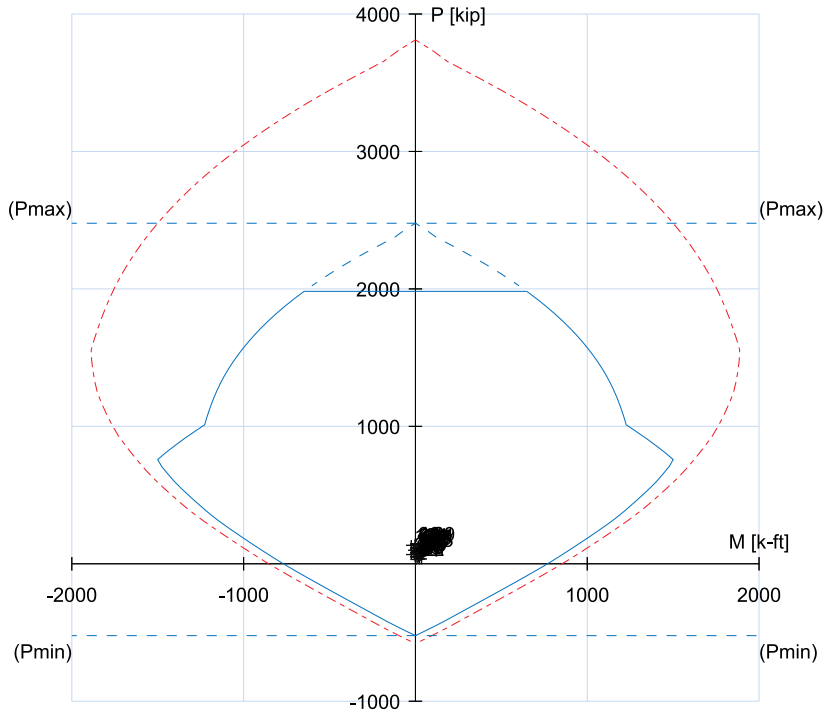

PM at 0.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	24 in
Depth	40 in
A_g	960 in^2
I_x	128000 in^4
I_y	46080 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	9.68 in^2
Rho	1.01 %
Min. clear spacing	2.95 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
3	1	U2	Top	144.0	85.3	0.0	0.00	769.12	0.00	0.54
13	1	U7	Top	102.2	76.3	0.0	0.00	769.12	0.00	0.54
29	2	U2	Top	144.0	85.3	0.0	0.00	769.12	0.00	0.54
41	2	U8	Top	134.1	83.4	0.0	0.00	769.12	0.00	0.54
15	1	U8	Top	114.7	64.5	0.0	0.00	769.12	0.00	0.53
17	1	U9	Top	113.5	65.7	0.0	0.00	769.12	0.00	0.53
37	2	U6	Top	125.2	67.8	0.0	0.00	769.12	0.00	0.53
39	2	U7	Top	111.2	54.9	0.0	0.00	769.12	0.00	0.52
43	2	U9	Top	94.1	46.8	0.0	0.00	769.12	0.00	0.52
1	1	U1	Top	79.8	32.2	0.0	0.00	769.12	0.00	0.51
5	1	U3	Top	133.0	47.6	0.0	0.00	769.12	0.00	0.51
11	1	U6	Top	134.1	46.3	0.0	0.00	769.12	0.00	0.51
21	1	U11	Top	35.3	35.7	0.0	0.00	769.12	0.00	0.51
27	2	U1	Top	79.8	32.2	0.0	0.00	769.12	0.00	0.51
31	2	U3	Top	133.0	47.6	0.0	0.00	769.12	0.00	0.51

Only 15 points out of 42 are listed.

Max. Capacity Ratio: 0.54

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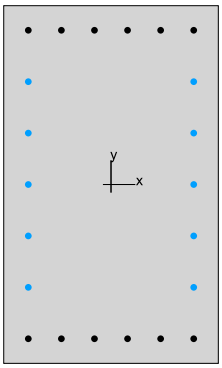
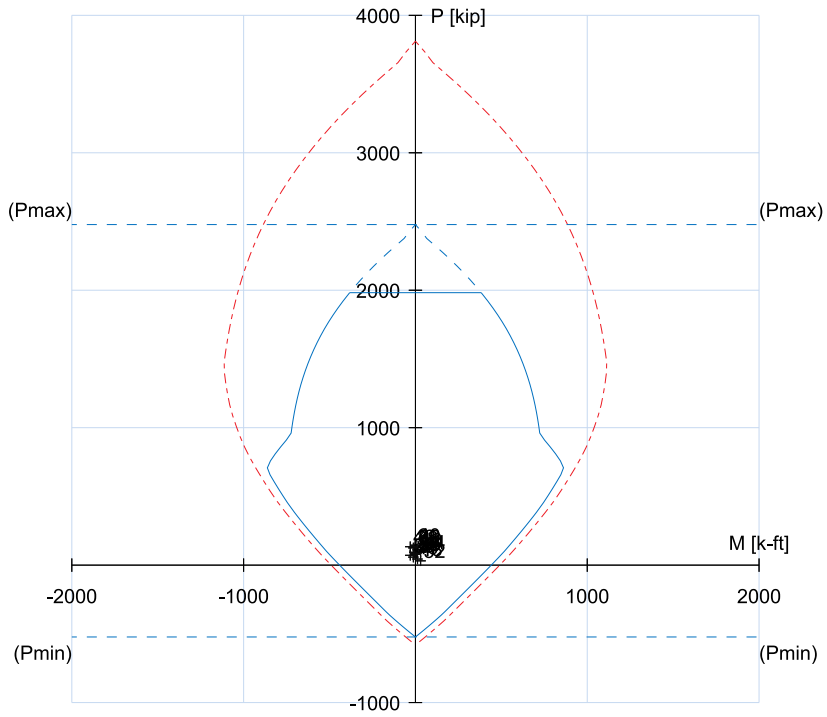
11.2. PM at θ=90 [deg]



24 x 40 in



PM at 90.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	24 in
Depth	40 in
A_g	960 in^2
I_x	128000 in^4
I_y	46080 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	9.68 in^2
Rho	1.01 %
Min. clear spacing	2.95 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
42	2	U8	Bot	134.1	0.0	-30.0	0.00	0.00	-441.46	0.52
44	2	U9	Bot	94.1	0.0	30.0	0.00	0.00	441.46	0.52
50	2	U12	Bot	71.3	0.0	-30.0	0.00	0.00	-441.46	0.52
52	2	U13	Bot	31.3	0.0	30.0	0.00	0.00	441.46	0.52
38	2	U6	Bot	125.2	0.0	-12.0	0.00	0.00	-441.46	0.50
40	2	U7	Bot	111.2	0.0	12.0	0.00	0.00	441.46	0.50
46	2	U10	Bot	58.3	0.0	-12.0	0.00	0.00	-441.46	0.50
48	2	U11	Bot	44.3	0.0	12.0	0.00	0.00	441.46	0.50
34	2	U4	Bot	93.5	0.0	-6.0	0.00	0.00	-441.46	0.49
36	2	U5	Bot	86.5	0.0	6.0	0.00	0.00	441.46	0.49
2	1	U1	Bot	79.8	0.0	0.0	50.57	-834.53	0.00	0.44
4	1	U2	Bot	144.0	0.0	0.0	50.57	-834.53	0.00	0.44
6	1	U3	Bot	133.0	0.0	0.0	50.57	-834.53	0.00	0.44
28	2	U1	Bot	79.8	0.0	0.0	50.57	-834.53	0.00	0.44
30	2	U2	Bot	144.0	0.0	0.0	50.57	-834.53	0.00	0.44

Only 15 points out of 16 are listed.

Max. Capacity Ratio: 0.54

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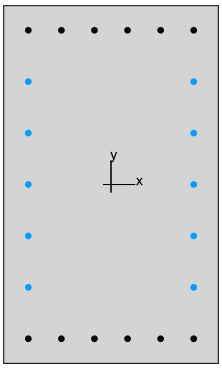
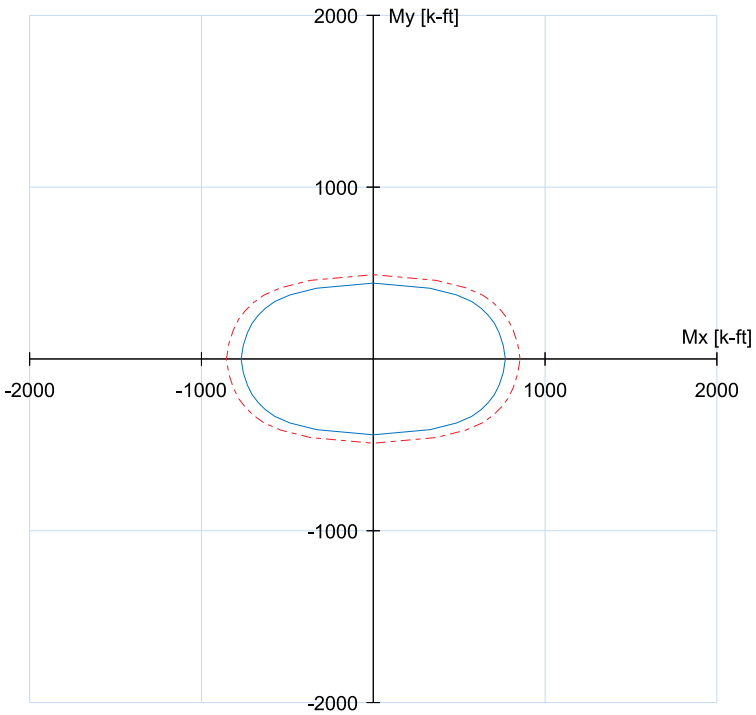
11.3. MM at P=0 [kip]



24 x 40 in



MM at P=0.0 [kip]

General Information	
Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials	
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	24 in
Depth	40 in
A_g	960 in^2
I_x	128000 in^4
I_y	46080 in^4

Reinforcement	
Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	9.68 in^2
Rho	1.01 %
Min. clear spacing	2.95 in

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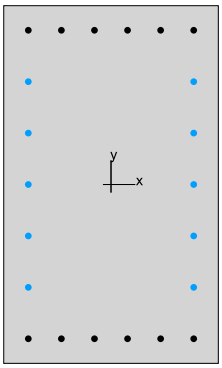
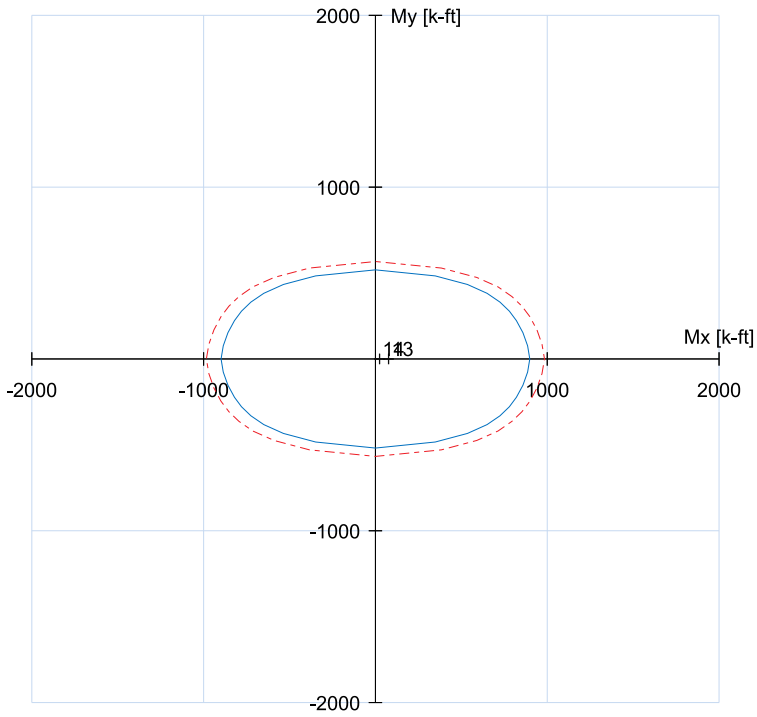
11.4. MM at P=102 [kip]



24 x 40 in



MM at P=102.0 [kip]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	24 in
Depth	40 in
A_g	960 in^2
I_x	128000 in^4
I_y	46080 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	9.68 in^2
Rho	1.01 %
Min. clear spacing	2.95 in

No.	Load Combo			P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	Capacity
				kip	k-ft	k-ft	kip	k-ft	k-ft	Ratio
13	1	U7	Top	102.2	76.3	0.0	0.00	769.12	0.00	0.54
14	1	U7	Bot	102.2	24.0	0.0	0.00	769.12	0.00	0.50

Max. Capacity Ratio: 0.54

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Computer program for the Strength Design of Reinforced Concrete Sections
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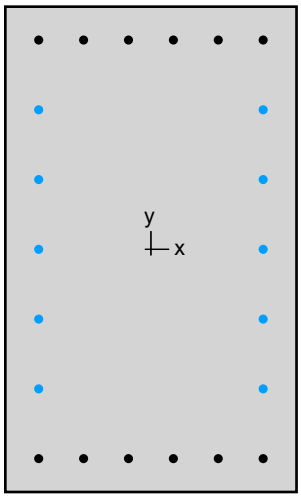

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Figure 1: Column section 4

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1. General Information

File Name	...\P-9 Piers on Grid 1 (Metal Building Moment...
Project	CCHS Field Hous
Column	CP-1 - Typical Pier on Grids A/I in Field House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	4	ksi
E_c	3605	ksi
f_c	3.4	ksi
ε_u	0.003	in/in
β_1	0.85	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{ty}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	24	in
Depth	40	in
A_g	960	in^2
I_x	128000	in^4
I_y	46080	in^4
r_x	11.547	in
r_y	6.9282	in
X_o	0	in
Y_o	0	in

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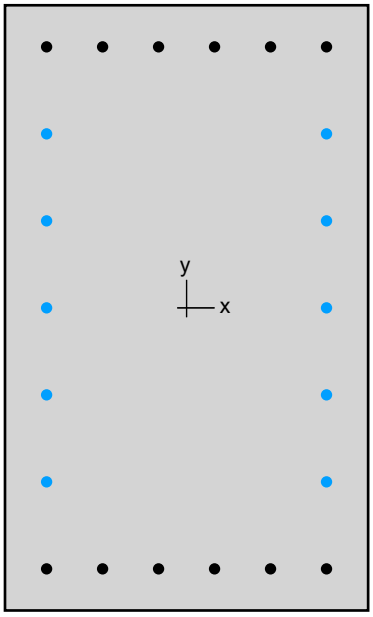
3.2. Section Figure



Rectangular 24 x 40 in 1.01% reinf.

Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter in	Area in^2	Bar	Diameter in	Area in^2	Bar	Diameter in	Area in^2
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #3 bars or less	#3 ties
For larger bars	#3 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---

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Total steel area, A_s	9.68 in^2
Rho	1.01 %
Minimum clear spacing	2.95 in

4.4. Bars Provided

		Bars	Clear cover
			in
Top	6	#6	2
Bottom	6	#6	2
Left	5	#6	2
Right	5	#6	2

5. Loading

5.1. Load Cases

Case	Type	Sustained Load
		%
A	Dead	100
B	Live	0
C	Wind	0
D	EQ	0
E	Snow	0

5.2. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.500	0.000	1.600
U5	1.200	0.000	-0.500	0.000	1.600
U6	1.200	1.000	1.000	0.000	0.500
U7	1.200	1.000	-1.000	0.000	0.500
U8	1.200	1.000	0.000	1.000	0.200
U9	1.200	1.000	0.000	-1.000	0.200
U10	0.900	0.000	1.000	0.000	0.000
U11	0.900	0.000	-1.000	0.000	0.000
U12	0.900	0.000	0.000	1.000	0.000
U13	0.900	0.000	0.000	-1.000	0.000

5.3. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	58.00	24.00	0.00	0.00	0.00
1	Live	34.00	31.20	0.00	0.00	0.00
1	Wind	12.00	-14.70	24.00	0.00	0.00
1	EQ	0.60	-0.60	1.20	0.00	0.00
1	Snow	13.50	-12.30	0.00	0.00	0.00

6. Slenderness

6.1. Sway Criteria

X-Axis	Non-sway column

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Y-Axis	Non-sway column

6.2. Columns

Column	Axis	Height	Width	Depth/Dia.	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	X	2	24	40	128000	4	3605
Design	Y	2	24	40	46080	4	3605
Above	X	(no column specified...)					
Above	Y	(no column specified...)					
Below	X	(no column specified...)					
Below	Y	(no column specified...)					

6.3. X - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

6.4. Y - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults
Stiffness reduction factor, ϕ_K	0.75
Cracked section coefficients, cI(beams)	0.35
Cracked section coefficients, cI(columns)	0.7
$0.2\ E_c\ I_g + E_s\ I_{se}$ (X-axis)	1.46e+008 $kip\text{-}in^2$
$0.2\ E_c\ I_g + E_s\ I_{se}$ (Y-axis)	5.03e+007 $kip\text{-}in^2$
Minimum eccentricity, $e_{x\ min}$	1.80 in
Minimum eccentricity, $e_{y\ min}$	1.32 in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
X	999.000	999.000	1.000	(N/A)	2.08
Y	999.000	999.000	1.000	(N/A)	3.46

7.3. Magnification Factors: X - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	81.20	(N/A)	1254322.38	1.000	(N/A)	(N/A)	*

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Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	130.75	(N/A)	1637161.38	0.532	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	125.20	(N/A)	1612332.13	0.556	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	97.20	(N/A)	1461872.13	0.716	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	85.20	(N/A)	1380726.88	0.817	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	122.35	(N/A)	1599024.13	0.569	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	98.35	(N/A)	1469039.63	0.708	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	106.90	(N/A)	1519400.00	0.651	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	105.70	(N/A)	1512628.25	0.658	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	64.20	(N/A)	1383634.00	0.813	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	40.20	(N/A)	1254322.38	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	52.80	(N/A)	1261489.88	0.989	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	51.60	(N/A)	1254322.38	1.000	(N/A)	(N/A)	*

7.4. Magnification Factors: Y - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	81.20	(N/A)	430905.75	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	130.75	(N/A)	562425.00	0.532	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	125.20	(N/A)	553895.25	0.556	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	97.20	(N/A)	502206.69	0.716	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	85.20	(N/A)	474330.34	0.817	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	122.35	(N/A)	549323.44	0.569	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	98.35	(N/A)	504669.03	0.708	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	106.90	(N/A)	521969.66	0.651	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	105.70	(N/A)	519643.31	0.658	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	64.20	(N/A)	475329.03	0.813	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	40.20	(N/A)	430905.75	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	52.80	(N/A)	433368.06	0.989	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	51.60	(N/A)	430905.75	1.000	(N/A)	(N/A)	*

8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. X - axis

Load Combo			1st Order				2nd Order			Ratio
			M_{ns}	M_s	M_u	M_{min}		M_i	M_c	2nd/1st
			k-ft	k-ft	k-ft	k-ft		k-ft	k-ft	
1	U1	Top	33.60	(N/A)	33.60	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Top	72.57	(N/A)	72.57	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Top	40.32	(N/A)	40.32	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Top	9.12	(N/A)	1.77	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	-12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	9.12	(N/A)	16.47	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	12.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Top	53.85	(N/A)	39.15	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	-24.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft	2nd Order	M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U7	Top	53.85	(N/A)	68.55	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	24.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Top	57.54	(N/A)	56.94	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	-1.20	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Top	57.54	(N/A)	58.14	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	1.20	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Top	21.60	(N/A)	6.90	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	-24.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	21.60	(N/A)	36.30	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	24.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Top	21.60	(N/A)	21.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	-1.20	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Top	21.60	(N/A)	22.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	1.20	(N/A)	M_1=	(N/A)	(N/A)	(N/A)

8.2. Y - axis

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft	2nd Order	M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

9. Control Points

About	Point	P kip	X-Moment k-ft	Y-Moment k-ft	NA Depth in	d_t Depth in	ε_t	ϕ
X	@ Max compression	2477.7	0.00	0.00	120.03	37.25	-0.00207	0.65000
X	@ Allowable comp.	1982.2	648.25	0.00	39.26	37.25	-0.00015	0.65000
X	@ f_s = 0.0	1877.9	755.92	0.00	37.25	37.25	0.00000	0.65000

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About Point	P	X-Moment	Y-Moment	NA Depth	d_t Depth	ε_t	ϕ
	kip	k-ft	k-ft	in	in		
X @ $f_s = 0.5\ f_y$	1357.6	1116.40	0.00	27.70	37.25	0.00103	0.65000
X @ Balanced point	1007.3	1227.51	0.00	22.05	37.25	0.00207	0.65000
X @ Tension control	752.7	1505.36	0.00	13.85	37.25	0.00507	0.90000
X @ Pure bending	0.0	769.12	0.00	4.80	37.25	0.02026	0.90000
X @ Max tension	-522.7	0.00	0.00	0.00	37.25	9.99999	0.90000
Y @ Max compression	2477.7	0.00	0.00	68.47	21.25	-0.00207	0.65000
Y @ Allowable comp.	1982.2	0.00	382.82	23.48	21.25	-0.00029	0.65000
Y @ $f_s = 0.0$	1788.6	0.00	495.57	21.25	21.25	0.00000	0.65000
Y @ $f_s = 0.5\ f_y$	1284.6	0.00	673.26	15.80	21.25	0.00103	0.65000
Y @ Balanced point	943.4	0.00	725.39	12.58	21.25	0.00207	0.65000
Y @ Tension control	698.8	0.00	865.00	7.90	21.25	0.00507	0.90000
Y @ Pure bending	0.0	0.00	441.46	3.14	21.25	0.01731	0.90000
Y @ Max tension	-522.7	0.00	0.00	0.00	21.25	9.99999	0.90000
-X @ Max compression	2477.7	0.00	0.00	120.03	37.25	-0.00207	0.65000
-X @ Allowable comp.	1982.2	-648.25	0.00	39.26	37.25	-0.00015	0.65000
-X @ $f_s = 0.0$	1877.9	-755.92	0.00	37.25	37.25	0.00000	0.65000
-X @ $f_s = 0.5\ f_y$	1357.6	-1116.40	0.00	27.70	37.25	0.00103	0.65000
-X @ Balanced point	1007.3	-1227.51	0.00	22.05	37.25	0.00207	0.65000
-X @ Tension control	752.7	-1505.36	0.00	13.85	37.25	0.00507	0.90000
-X @ Pure bending	0.0	-769.12	0.00	4.80	37.25	0.02026	0.90000
-X @ Max tension	-522.7	0.00	0.00	0.00	37.25	9.99999	0.90000
-Y @ Max compression	2477.7	0.00	0.00	68.47	21.25	-0.00207	0.65000
-Y @ Allowable comp.	1982.2	0.00	-382.82	23.48	21.25	-0.00029	0.65000
-Y @ $f_s = 0.0$	1788.6	0.00	-495.57	21.25	21.25	0.00000	0.65000
-Y @ $f_s = 0.5\ f_y$	1284.6	0.00	-673.26	15.80	21.25	0.00103	0.65000
-Y @ Balanced point	943.4	0.00	-725.39	12.58	21.25	0.00207	0.65000
-Y @ Tension control	698.8	0.00	-865.00	7.90	21.25	0.00507	0.90000
-Y @ Pure bending	0.0	0.00	-441.46	3.14	21.25	0.01731	0.90000
-Y @ Max tension	-522.7	0.00	0.00	0.00	21.25	9.99999	0.90000

10. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand P_u	Demand M_{ux}	Demand M_{uy}	Capacity ϕP_n	Capacity ϕM_{nx}	Capacity ϕM_{ny}	Parameters at Capacity NA Depth	Parameters at Capacity ε_t	Parameters at Capacity ϕ	Capacity Ratio
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
1	1	U1	Top	81.20	33.60	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.51
2	1	U1	Bot	81.20	0.00	0.00	50.57	-834.53	0.00	5.33	0.01799	0.900	0.44
3	1	U2	Top	130.75	72.57	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.53
4	1	U2	Bot	130.75	0.00	0.00	50.57	-834.53	0.00	5.33	0.01799	0.900	0.44
5	1	U3	Top	125.20	40.32	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.51
6	1	U3	Bot	125.20	0.00	0.00	50.57	-834.53	0.00	5.33	0.01799	0.900	0.44
7	1	U4	Top	97.20	1.77	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.49
8	1	U4	Bot	97.20	-12.00	0.00	0.00	-769.12	0.00	4.80	0.02026	0.900	0.49
9	1	U5	Top	85.20	16.47	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.50
10	1	U5	Bot	85.20	12.00	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.49
11	1	U6	Top	122.35	39.15	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.51
12	1	U6	Bot	122.35	-24.00	0.00	0.00	-769.12	0.00	4.80	0.02026	0.900	0.50
13	1	U7	Top	98.35	68.55	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.53
14	1	U7	Bot	98.35	24.00	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.50
15	1	U8	Top	106.90	56.94	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.52
16	1	U8	Bot	106.90	-1.20	0.00	0.00	-769.12	0.00	4.80	0.02026	0.900	0.49

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No.	Load Combo			Demand P_u kip	M_{ux} k-ft	M_{uy} k-ft	Capacity ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Parameters at Capacity NA Depth in	ε_t	ϕ	Capacity Ratio
17	1	U9	Top	105.70	58.14	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.52
18	1	U9	Bot	105.70	1.20	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.49
19	1	U10	Top	64.20	6.90	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.49
20	1	U10	Bot	64.20	-24.00	0.00	0.00	-769.12	0.00	4.80	0.02026	0.900	0.50
21	1	U11	Top	40.20	36.30	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.51
22	1	U11	Bot	40.20	24.00	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.50
23	1	U12	Top	52.80	21.00	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.50
24	1	U12	Bot	52.80	-1.20	0.00	0.00	-769.12	0.00	4.80	0.02026	0.900	0.49
25	1	U13	Top	51.60	22.20	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.50
26	1	U13	Bot	51.60	1.20	0.00	0.00	769.12	0.00	4.80	0.02026	0.900	0.49

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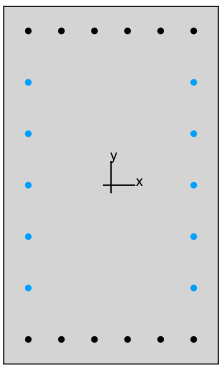
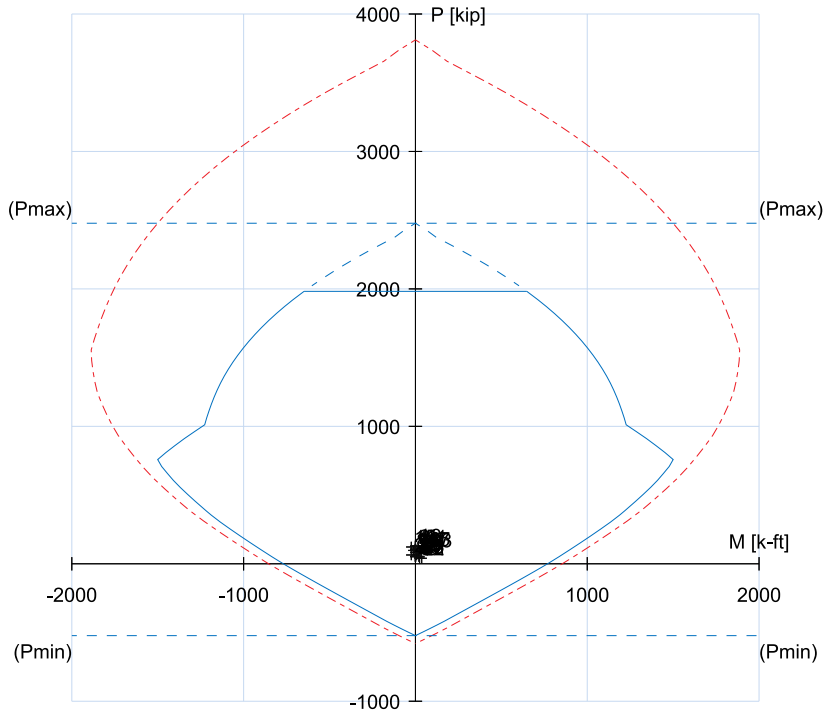
11. Diagrams

11.1. PM at θ=0 [deg]



24 x 40 in



PM at 0.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	24 in
Depth	40 in
A_g	960 in^2
I_x	128000 in^4
I_y	46080 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	9.68 in^2
Rho	1.01 %
Min. clear spacing	2.95 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
3	1	U2	Top	130.8	72.6	0.0	0.00	769.12	0.00	0.53
13	1	U7	Top	98.4	68.5	0.0	0.00	769.12	0.00	0.53
15	1	U8	Top	106.9	56.9	0.0	0.00	769.12	0.00	0.52
17	1	U9	Top	105.7	58.1	0.0	0.00	769.12	0.00	0.52
1	1	U1	Top	81.2	33.6	0.0	0.00	769.12	0.00	0.51
5	1	U3	Top	125.2	40.3	0.0	0.00	769.12	0.00	0.51
11	1	U6	Top	122.4	39.1	0.0	0.00	769.12	0.00	0.51
21	1	U11	Top	40.2	36.3	0.0	0.00	769.12	0.00	0.51
9	1	U5	Top	85.2	16.5	0.0	0.00	769.12	0.00	0.50
12	1	U6	Bot	122.4	-24.0	0.0	0.00	-769.12	0.00	0.50
14	1	U7	Bot	98.4	24.0	0.0	0.00	769.12	0.00	0.50
20	1	U10	Bot	64.2	-24.0	0.0	0.00	-769.12	0.00	0.50
22	1	U11	Bot	40.2	24.0	0.0	0.00	769.12	0.00	0.50
23	1	U12	Top	52.8	21.0	0.0	0.00	769.12	0.00	0.50
25	1	U13	Top	51.6	22.2	0.0	0.00	769.12	0.00	0.50

Only 15 points out of 26 are listed.

Max. Capacity Ratio: 0.53

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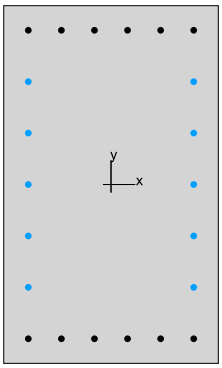
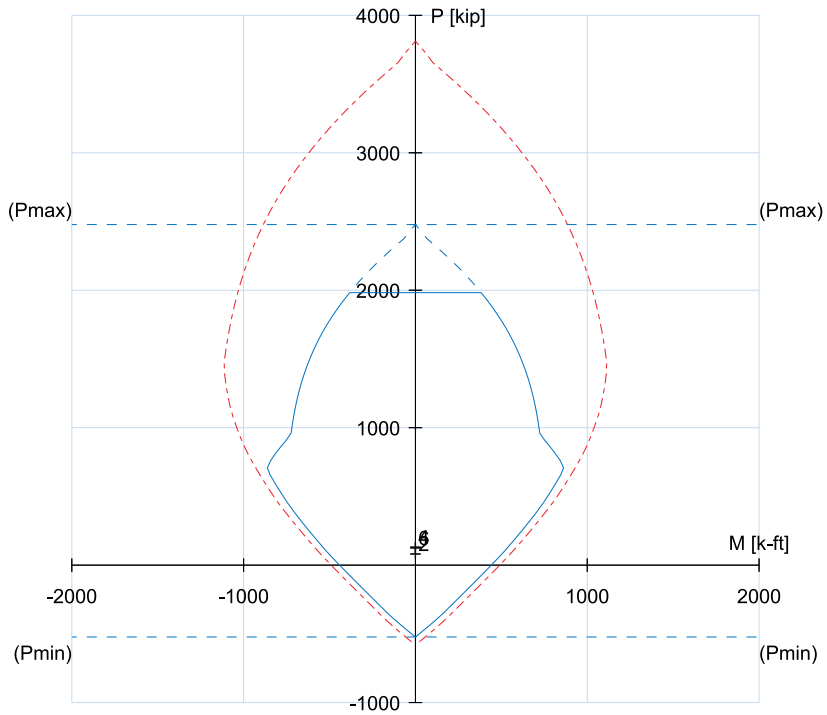
11.2. PM at θ=90 [deg]



24 x 40 in



PM at 90.0 [deg]

General Information	
Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials	
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	24 in
Depth	40 in
A_g	960 in^2
I_x	128000 in^4
I_y	46080 in^4

Reinforcement	
Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	9.68 in^2
Rho	1.01 %
Min. clear spacing	2.95 in

No.	Load Combo			P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	Capacity
				kip	k-ft	k-ft	kip	k-ft	k-ft	Ratio
2	1	U1	Bot	81.2	0.0	0.0	50.57	-834.53	0.00	0.44
4	1	U2	Bot	130.8	0.0	0.0	50.57	-834.53	0.00	0.44
6	1	U3	Bot	125.2	0.0	0.0	50.57	-834.53	0.00	0.44

Max. Capacity Ratio: 0.53

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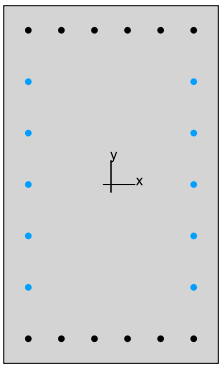
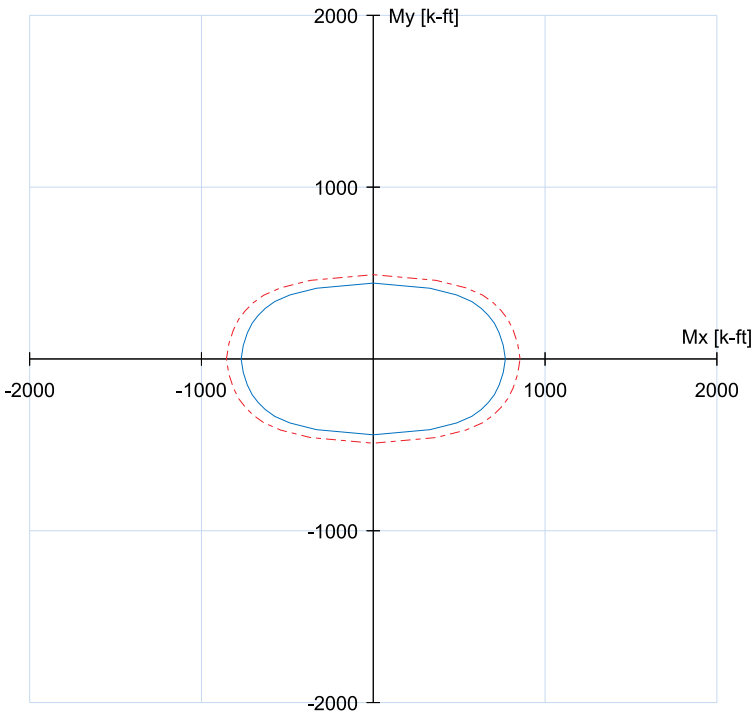
11.3. MM at P=0 [kip]



24 x 40 in



MM at P=0.0 [kip]

General Information	
Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials	
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	24 in
Depth	40 in
A_g	960 in^2
I_x	128000 in^4
I_y	46080 in^4

Reinforcement	
Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	9.68 in^2
Rho	1.01 %
Min. clear spacing	2.95 in

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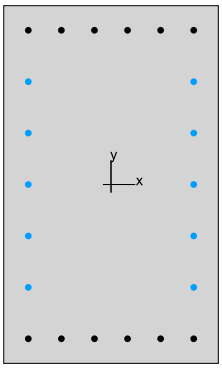
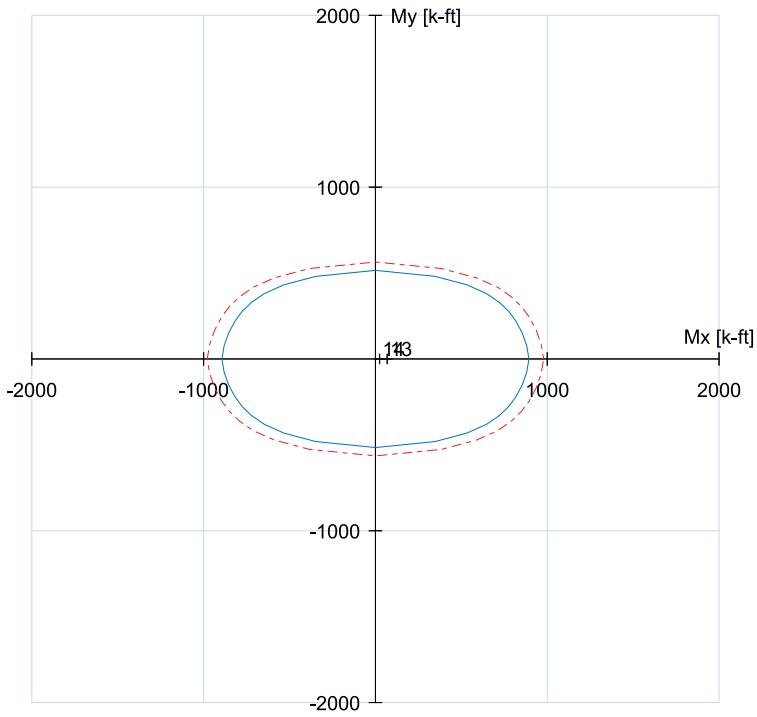
11.4. MM at P=98 [kip]



24 x 40 in



MM at P=98.0 [kip]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Structural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	24 in
Depth	40 in
A_g	960 in^2
I_x	128000 in^4
I_y	46080 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	9.68 in^2
Rho	1.01 %
Min. clear spacing	2.95 in

No.	Load Combo			P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	Capacity
				kip	k-ft	k-ft	kip	k-ft	k-ft	Ratio
13	1	U7	Top	98.4	68.5	0.0	0.00	769.12	0.00	0.53
14	1	U7	Bot	98.4	24.0	0.0	0.00	769.12	0.00	0.50

Max. Capacity Ratio: 0.53

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Computer program for the Strength Design of Reinforced Concrete Sections
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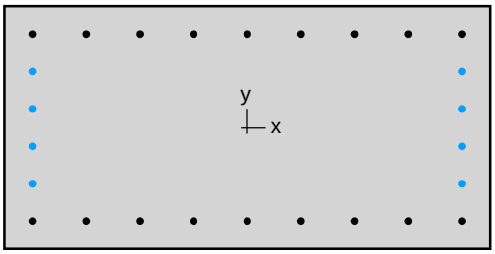

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Figure 1: Column section 4

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1. General Information

File Name	...\P-10 Pier on Grid 1&B (Mezz Brace Frame).colx
Project	CCHS Field Hous
Column	CP-1 - Typical Pier on Grids A/I in Field House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	4	ksi
E_c	3605	ksi
f_c	3.4	ksi
ε_u	0.003	in/in
β_1	0.85	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{ty}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	48	in
Depth	24	in
A_g	1152	in^2
I_x	55296	in^4
I_y	221184	in^4
r_x	6.9282	in
r_y	13.8564	in
X_o	0	in
Y_o	0	in

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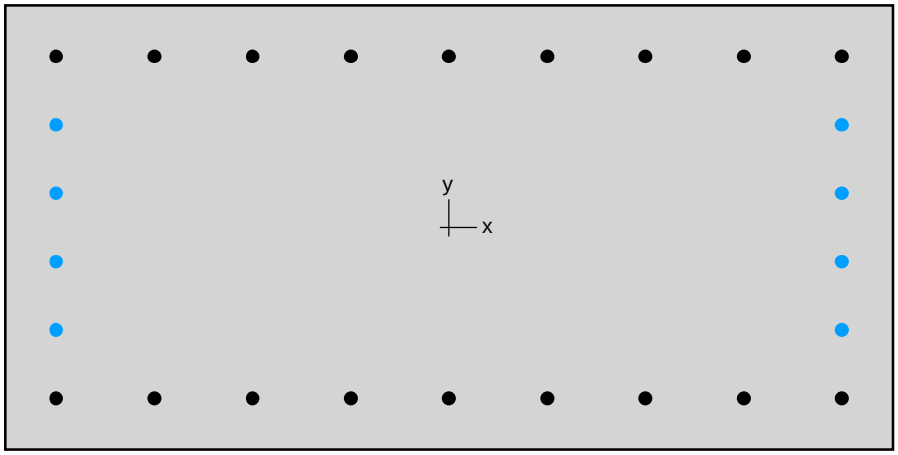
3.2. Section Figure



Rectangular 48 x 24 in 0.99% reinf.

Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter in	Area in^2	Bar	Diameter in	Area in^2	Bar	Diameter in	Area in^2
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #3 bars or less	#3 ties
For larger bars	#3 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Total steel area, A_s	11.44 in^2
Rho	0.99 %
Minimum clear spacing	2.95 in

(Note: Rho < 1.0%)

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4.4. Bars Provided

		Bars	Clear cover in
Top	9	#6	2
Bottom	9	#6	2
Left	4	#6	2
Right	4	#6	2

5. Loading

5.1. Load Cases

Case	Type	Sustained Load %
A	Dead	100
B	Live	0
C	Wind	0
D	EQ	0
E	Snow	0

5.2. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.500	0.000	1.600
U5	1.200	0.000	-0.500	0.000	1.600
U6	1.200	1.000	1.000	0.000	0.500
U7	1.200	1.000	-1.000	0.000	0.500
U8	1.200	1.000	0.000	1.000	0.200
U9	1.200	1.000	0.000	-1.000	0.200
U10	0.900	0.000	1.000	0.000	0.000
U11	0.900	0.000	-1.000	0.000	0.000
U12	0.900	0.000	0.000	1.000	0.000
U13	0.900	0.000	0.000	-1.000	0.000

5.3. Service Loads

No.	Load Case	Axial Load kip	Mx @ Top k-ft	Mx @ Bottom k-ft	My @ Top k-ft	My @ Bottom k-ft
1	Dead	49.00	0.00	0.00	-10.00	0.00
1	Live	50.00	0.00	0.00	-30.00	0.00
1	Wind	16.00	0.00	24.00	9.30	0.00
1	EQ	0.60	0.00	1.20	0.40	0.00
1	Snow	13.40	0.00	0.00	7.80	0.00
2	Dead	49.00	0.00	0.00	-10.00	0.00
2	Live	50.00	0.00	0.00	-30.00	0.00
2	Wind	0.00	0.00	0.00	0.00	0.00
2	EQ	92.00	0.00	0.00	-54.00	-130.00
2	Snow	13.40	0.00	0.00	7.80	0.00

6. Slenderness

6.1. Sway Criteria

X-Axis	Non-sway column

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Y-Axis	Non-sway column

6.2. Columns

Column	Axis	Height	Width	Depth/Dia.	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	X	2	48	24	55296	4	3605
Design	Y	2	48	24	221184	4	3605
Above	X	(no column specified...)					
Above	Y	(no column specified...)					
Below	X	(no column specified...)					
Below	Y	(no column specified...)					

6.3. X - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

6.4. Y - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults
Stiffness reduction factor, ϕ_K	0.75
Cracked section coefficients, cI(beams)	0.35
Cracked section coefficients, cI(columns)	0.7
$0.2\ E_c\ I_g + E_s\ I_{se}$ (X-axis)	6.13e+007 $kip\text{-}in^2$
$0.2\ E_c\ I_g + E_s\ I_{se}$ (Y-axis)	2.49e+008 $kip\text{-}in^2$
Minimum eccentricity, $e_{x\,min}$	1.32 in
Minimum eccentricity, $e_{y\,min}$	2.04 in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
X	999.000	999.000	1.000	(N/A)	3.46
Y	999.000	999.000	1.000	(N/A)	1.73

7.3. Magnification Factors: X - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	68.60	(N/A)	525324.81	1.000	(N/A)	(N/A)	*

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Load Combo		At Ends					Along Length						
		$\sum P_u$ kip	P_c kip	$\sum P_c$ kip	β_{ds}	δ_s	P_u kip	$k'l_u/r$	P_c kip	β_{dns}	C_m	δ	
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	145.50	(N/A)	748260.00	0.404	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	130.24	(N/A)	723850.06	0.451	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	88.24	(N/A)	630504.13	0.666	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	72.24	(N/A)	579204.31	0.814	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	131.50	(N/A)	726013.81	0.447	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	99.50	(N/A)	660389.44	0.591	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	112.08	(N/A)	689119.94	0.525	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	110.88	(N/A)	686563.19	0.530	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	60.10	(N/A)	605988.88	0.734	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	28.10	(N/A)	525324.81	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	44.70	(N/A)	528874.31	0.987	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	43.50	(N/A)	525324.81	1.000	(N/A)	(N/A)	*
2	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	68.60	(N/A)	525324.81	1.000	(N/A)	(N/A)	*
2	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	145.50	(N/A)	748260.00	0.404	(N/A)	(N/A)	*
2	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	130.24	(N/A)	723850.06	0.451	(N/A)	(N/A)	*
2	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	80.24	(N/A)	606330.06	0.733	(N/A)	(N/A)	*
2	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	80.24	(N/A)	606330.06	0.733	(N/A)	(N/A)	*
2	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	115.50	(N/A)	696213.63	0.509	(N/A)	(N/A)	*
2	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	115.50	(N/A)	696213.63	0.509	(N/A)	(N/A)	*
2	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	203.48	(N/A)	815106.75	0.289	(N/A)	(N/A)	*
2	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.48	(N/A)	525324.81	1.000	(N/A)	(N/A)	*
2	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	44.10	(N/A)	525324.81	1.000	(N/A)	(N/A)	*
2	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	44.10	(N/A)	525324.81	1.000	(N/A)	(N/A)	*
2	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	136.10	(N/A)	793526.19	0.324	(N/A)	(N/A)	*
2	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-47.90	(N/A)	1050649.63	0.000	(N/A)	(N/A)	*

7.4. Magnification Factors: Y - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$ kip	P_c kip	$\sum P_c$ kip	β_{ds}	δ_s	P_u kip	$k'l_u/r$	P_c kip	β_{dns}	C_m	δ	
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	68.60	(N/A)	2133150.00	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	145.50	(N/A)	3038407.50	0.404	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	130.24	(N/A)	2939287.75	0.451	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	88.24	(N/A)	2560244.25	0.666	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	72.24	(N/A)	2351934.75	0.814	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	131.50	(N/A)	2948074.00	0.447	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	99.50	(N/A)	2681597.50	0.591	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	112.08	(N/A)	2798261.50	0.525	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	110.88	(N/A)	2787879.50	0.530	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	60.10	(N/A)	2460697.00	0.734	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	28.10	(N/A)	2133150.00	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	44.70	(N/A)	2147563.25	0.987	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	43.50	(N/A)	2133150.00	1.000	(N/A)	(N/A)	*
2	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	68.60	(N/A)	2133150.00	1.000	(N/A)	(N/A)	*
2	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	145.50	(N/A)	3038407.50	0.404	(N/A)	(N/A)	*
2	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	130.24	(N/A)	2939287.75	0.451	(N/A)	(N/A)	*
2	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	80.24	(N/A)	2462082.50	0.733	(N/A)	(N/A)	*
2	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	80.24	(N/A)	2462082.50	0.733	(N/A)	(N/A)	*
2	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	115.50	(N/A)	2827066.25	0.509	(N/A)	(N/A)	*
2	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	115.50	(N/A)	2827066.25	0.509	(N/A)	(N/A)	*
2	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	203.48	(N/A)	3309847.50	0.289	(N/A)	(N/A)	*
2	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.48	(N/A)	2133150.00	1.000	(N/A)	(N/A)	*

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Load Combo		At Ends					Along Length						
		$\sum P_u$ kip	P_c kip	$\sum P_c$ kip	β_{ds}	δ_s	P_u kip	$k'l_u/r$	P_c kip	β_{dns}	C_m	δ	
2	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	44.10	(N/A)	2133150.00	1.000	(N/A)	(N/A)	*
2	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	44.10	(N/A)	2133150.00	1.000	(N/A)	(N/A)	*
2	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	136.10	(N/A)	3222216.50	0.324	(N/A)	(N/A)	*
2	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-47.90	(N/A)	4266300.00	0.000	(N/A)	(N/A)	*

8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. X - axis

Load Combo			1st Order					2nd Order		Ratio
			M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		M_i k-ft	M_c k-ft	2nd/1st
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	-12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	-24.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	24.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	-1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	-24.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	24.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	-1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
2	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

8.2. Y - axis

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U1	Top	-14.00	(N/A)	-14.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Top	-56.10	(N/A)	-56.10	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Top	-29.52	(N/A)	-29.52	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.48	(N/A)	5.13	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.48	(N/A)	-4.17	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Top	-38.10	(N/A)	-28.80	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Top	-38.10	(N/A)	-47.40	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Top	-40.44	(N/A)	-40.04	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Top	-40.44	(N/A)	-40.84	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Top	-9.00	(N/A)	0.30	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Top	-9.00	(N/A)	-18.30	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Top	-9.00	(N/A)	-8.60	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Top	-9.00	(N/A)	-9.40	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U1	Top	-14.00	(N/A)	-14.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U2	Top	-56.10	(N/A)	-56.10	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U3	Top	-29.52	(N/A)	-29.52	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U4	Top	0.48	(N/A)	0.48	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U5	Top	0.48	(N/A)	0.48	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft	2nd Order	M_i k-ft	M_c k-ft	Ratio 2nd/1st
2	U6	Top	-38.10	(N/A)	-38.10	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U7	Top	-38.10	(N/A)	-38.10	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U8	Top	-40.44	(N/A)	-94.44	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U8	Bot	0.00	(N/A)	130.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U9	Top	-40.44	(N/A)	13.56	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U9	Bot	0.00	(N/A)	-130.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U10	Top	-9.00	(N/A)	-9.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U11	Top	-9.00	(N/A)	-9.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U12	Top	-9.00	(N/A)	-63.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U12	Bot	0.00	(N/A)	130.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U13	Top	-9.00	(N/A)	45.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U13	Bot	0.00	(N/A)	-130.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

9. Control Points

About	Point	P kip	X-Moment k-ft	Y-Moment k-ft	NA Depth in	d_t Depth in	ε_t	ϕ
X	@ Max compression	2949.3	0.00	0.00	68.47	21.25	-0.00207	0.65000
X	@ Allowable comp.	2359.4	459.78	0.00	23.50	21.25	-0.00029	0.65000
X	@ f_s = 0.0	2127.0	596.24	0.00	21.25	21.25	0.00000	0.65000
X	@ f_s = 0.5 f_y	1527.3	811.66	0.00	15.80	21.25	0.00103	0.65000
X	@ Balanced point	1122.6	877.25	0.00	12.58	21.25	0.00207	0.65000
X	@ Tension control	851.0	1047.64	0.00	7.90	21.25	0.00507	0.90000
X	@ Pure bending	0.0	521.96	0.00	3.03	21.25	0.01805	0.90000
X	@ Max tension	-617.8	0.00	0.00	0.00	21.25	9.99999	0.90000
Y	@ Max compression	2949.3	0.00	0.00	145.81	45.25	-0.00207	0.65000
Y	@ Allowable comp.	2359.4	0.00	922.31	47.08	45.25	-0.00012	0.65000
Y	@ f_s = 0.0	2267.6	0.00	1037.52	45.25	45.25	0.00000	0.65000
Y	@ f_s = 0.5 f_y	1640.7	0.00	1568.39	33.65	45.25	0.00103	0.65000
Y	@ Balanced point	1223.0	0.00	1731.67	26.78	45.25	0.00207	0.65000
Y	@ Tension control	899.9	0.00	2132.06	16.82	45.25	0.00507	0.90000
Y	@ Pure bending	0.0	0.00	1094.44	5.74	45.25	0.02064	0.90000
Y	@ Max tension	-617.8	0.00	0.00	0.00	45.25	9.99999	0.90000
-X	@ Max compression	2949.3	0.00	0.00	68.47	21.25	-0.00207	0.65000
-X	@ Allowable comp.	2359.4	-459.78	0.00	23.50	21.25	-0.00029	0.65000
-X	@ f_s = 0.0	2127.0	-596.24	0.00	21.25	21.25	0.00000	0.65000
-X	@ f_s = 0.5 f_y	1527.3	-811.66	0.00	15.80	21.25	0.00103	0.65000
-X	@ Balanced point	1122.6	-877.25	0.00	12.58	21.25	0.00207	0.65000
-X	@ Tension control	851.0	-1047.64	0.00	7.90	21.25	0.00507	0.90000
-X	@ Pure bending	0.0	-521.96	0.00	3.03	21.25	0.01805	0.90000
-X	@ Max tension	-617.8	0.00	0.00	0.00	21.25	9.99999	0.90000
-Y	@ Max compression	2949.3	0.00	0.00	145.81	45.25	-0.00207	0.65000
-Y	@ Allowable comp.	2359.4	0.00	-922.31	47.08	45.25	-0.00012	0.65000
-Y	@ f_s = 0.0	2267.6	0.00	-1037.52	45.25	45.25	0.00000	0.65000
-Y	@ f_s = 0.5 f_y	1640.7	0.00	-1568.39	33.65	45.25	0.00103	0.65000
-Y	@ Balanced point	1223.0	0.00	-1731.67	26.78	45.25	0.00207	0.65000
-Y	@ Tension control	899.9	0.00	-2132.06	16.82	45.25	0.00507	0.90000
-Y	@ Pure bending	0.0	0.00	-1094.44	5.74	45.25	0.02064	0.90000
-Y	@ Max tension	-617.8	0.00	0.00	0.00	45.25	9.99999	0.90000

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10. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand P_u	M_{ux}	M_{uy}	Capacity ϕP_n	ϕM_{nx}	ϕM_{ny}	Parameters at Capacity NA Depth	ε_t	ϕ	Capacity Ratio
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
1	1	U1	Top	68.60	0.00	-14.00	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.49
2	1	U1	Bot	68.60	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
3	1	U2	Top	145.50	0.00	-56.10	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.51
4	1	U2	Bot	145.50	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.45
5	1	U3	Top	130.24	0.00	-29.52	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.50
6	1	U3	Bot	130.24	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.45
7	1	U4	Top	88.24	0.00	5.13	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
8	1	U4	Bot	88.24	-12.00	0.00	0.00	-521.96	0.00	3.03	0.01805	0.900	0.51
9	1	U5	Top	72.24	0.00	-4.17	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.49
10	1	U5	Bot	72.24	12.00	0.00	0.00	521.96	0.00	3.03	0.01805	0.900	0.51
11	1	U6	Top	131.50	0.00	-28.80	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.50
12	1	U6	Bot	131.50	-24.00	0.00	0.00	-521.96	0.00	3.03	0.01805	0.900	0.52
13	1	U7	Top	99.50	0.00	-47.40	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.51
14	1	U7	Bot	99.50	24.00	0.00	0.00	521.96	0.00	3.03	0.01805	0.900	0.52
15	1	U8	Top	112.08	0.00	-40.04	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.50
16	1	U8	Bot	112.08	-1.20	0.00	0.00	-521.96	0.00	3.03	0.01805	0.900	0.50
17	1	U9	Top	110.88	0.00	-40.84	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.50
18	1	U9	Bot	110.88	1.20	0.00	0.00	521.96	0.00	3.03	0.01805	0.900	0.50
19	1	U10	Top	60.10	0.00	0.30	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
20	1	U10	Bot	60.10	-24.00	0.00	0.00	-521.96	0.00	3.03	0.01805	0.900	0.52
21	1	U11	Top	28.10	0.00	-18.30	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.49
22	1	U11	Bot	28.10	24.00	0.00	0.00	521.96	0.00	3.03	0.01805	0.900	0.52
23	1	U12	Top	44.70	0.00	-8.60	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.49
24	1	U12	Bot	44.70	-1.20	0.00	0.00	-521.96	0.00	3.03	0.01805	0.900	0.50
25	1	U13	Top	43.50	0.00	-9.40	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.49
26	1	U13	Bot	43.50	1.20	0.00	0.00	521.96	0.00	3.03	0.01805	0.900	0.50
27	2	U1	Top	68.60	0.00	-14.00	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.49
28	2	U1	Bot	68.60	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
29	2	U2	Top	145.50	0.00	-56.10	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.51
30	2	U2	Bot	145.50	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.45
31	2	U3	Top	130.24	0.00	-29.52	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.50
32	2	U3	Bot	130.24	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.45
33	2	U4	Top	80.24	0.00	0.48	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
34	2	U4	Bot	80.24	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
35	2	U5	Top	80.24	0.00	0.48	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
36	2	U5	Bot	80.24	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
37	2	U6	Top	115.50	0.00	-38.10	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.50
38	2	U6	Bot	115.50	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.45
39	2	U7	Top	115.50	0.00	-38.10	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.50
40	2	U7	Bot	115.50	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.45
41	2	U8	Top	203.48	0.00	-94.44	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.52
42	2	U8	Bot	203.48	0.00	130.00	0.00	0.00	1094.44	5.74	0.02064	0.900	0.54
43	2	U9	Top	19.48	0.00	13.56	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
44	2	U9	Bot	19.48	0.00	-130.00	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.55
45	2	U10	Top	44.10	0.00	-9.00	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.49
46	2	U10	Bot	44.10	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
47	2	U11	Top	44.10	0.00	-9.00	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.49
48	2	U11	Bot	44.10	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46

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No.	Load Combo			Demand			Capacity			Parameters at Capacity			Capacity Ratio
				P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
49	2	U12	Top	136.10	0.00	-63.00	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.51
50	2	U12	Bot	136.10	0.00	130.00	0.00	0.00	1094.44	5.74	0.02064	0.900	0.54
51	2	U13	Top	-47.90	0.00	45.00	-162.38	0.00	827.81	4.09	0.03022	0.900	0.59
52	2	U13	Bot	-47.90	0.00	-130.00	-151.57	0.00	-846.53	4.20	0.02932	0.900	0.62

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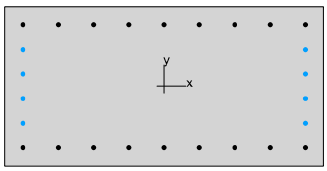
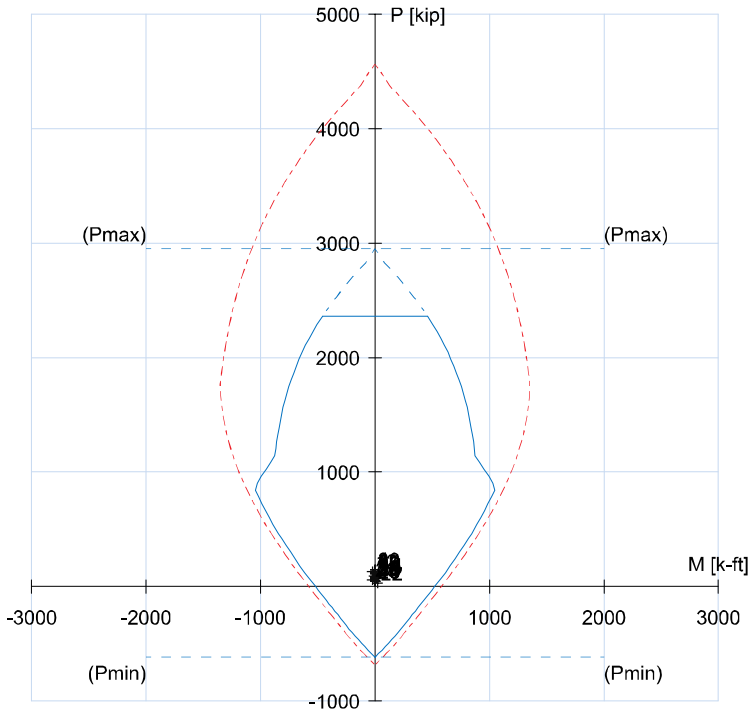
11. Diagrams

11.1. PM at θ=0 [deg]



48 x 24 in



PM at 0.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	48 in
Depth	24 in
A_g	1152 in^2
I_x	55296 in^4
I_y	221184 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	11.44 in^2
Rho	0.99 %
Min. clear spacing	2.95 in

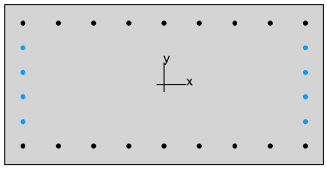
No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
12	1	U6	Bot	131.5	-24.0	0.0	0.00	-521.96	0.00	0.52
14	1	U7	Bot	99.5	24.0	0.0	0.00	521.96	0.00	0.52
20	1	U10	Bot	60.1	-24.0	0.0	0.00	-521.96	0.00	0.52
22	1	U11	Bot	28.1	24.0	0.0	0.00	521.96	0.00	0.52
8	1	U4	Bot	88.2	-12.0	0.0	0.00	-521.96	0.00	0.51
10	1	U5	Bot	72.2	12.0	0.0	0.00	521.96	0.00	0.51
16	1	U8	Bot	112.1	-1.2	0.0	0.00	-521.96	0.00	0.50
18	1	U9	Bot	110.9	1.2	0.0	0.00	521.96	0.00	0.50
24	1	U12	Bot	44.7	-1.2	0.0	0.00	-521.96	0.00	0.50
26	1	U13	Bot	43.5	1.2	0.0	0.00	521.96	0.00	0.50
2	1	U1	Bot	68.6	0.0	0.0	60.19	-568.50	0.00	0.46
28	2	U1	Bot	68.6	0.0	0.0	60.19	-568.50	0.00	0.46
34	2	U4	Bot	80.2	0.0	0.0	60.19	-568.50	0.00	0.46
36	2	U5	Bot	80.2	0.0	0.0	60.19	-568.50	0.00	0.46
46	2	U10	Bot	44.1	0.0	0.0	60.19	-568.50	0.00	0.46

Only 15 points out of 22 are listed.

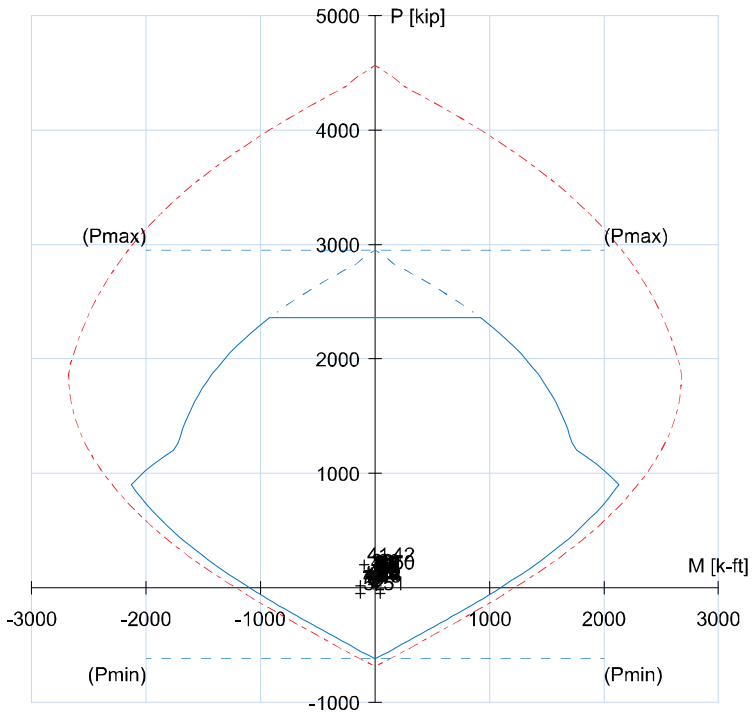
Max. Capacity Ratio: 0.62

P-10

11.2. PM at θ=90 [deg]



48 x 24 in



PM at 90.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	48 in
Depth	24 in
A_g	1152 in²
I_x	55296 in⁴
I_y	221184 in⁴

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	11.44 in²
Rho	0.99 %
Min. clear spacing	2.95 in

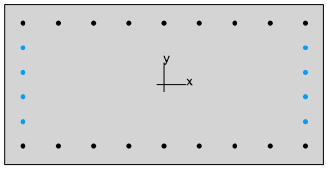
No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
52	2	U13	Bot	-47.9	0.0	-130.0	-151.57	0.00	-846.53	0.62
51	2	U13	Top	-47.9	0.0	45.0	-162.38	0.00	827.81	0.59
44	2	U9	Bot	19.5	0.0	-130.0	0.00	0.00	-1094.44	0.55
42	2	U8	Bot	203.5	0.0	130.0	0.00	0.00	1094.44	0.54
50	2	U12	Bot	136.1	0.0	130.0	0.00	0.00	1094.44	0.54
41	2	U8	Top	203.5	0.0	-94.4	0.00	0.00	-1094.44	0.52
3	1	U2	Top	145.5	0.0	-56.1	0.00	0.00	-1094.44	0.51
13	1	U7	Top	99.5	0.0	-47.4	0.00	0.00	-1094.44	0.51
29	2	U2	Top	145.5	0.0	-56.1	0.00	0.00	-1094.44	0.51
49	2	U12	Top	136.1	0.0	-63.0	0.00	0.00	-1094.44	0.51
5	1	U3	Top	130.2	0.0	-29.5	0.00	0.00	-1094.44	0.50
11	1	U6	Top	131.5	0.0	-28.8	0.00	0.00	-1094.44	0.50
15	1	U8	Top	112.1	0.0	-40.0	0.00	0.00	-1094.44	0.50
17	1	U9	Top	110.9	0.0	-40.8	0.00	0.00	-1094.44	0.50
31	2	U3	Top	130.2	0.0	-29.5	0.00	0.00	-1094.44	0.50

Only 15 points out of 42 are listed.

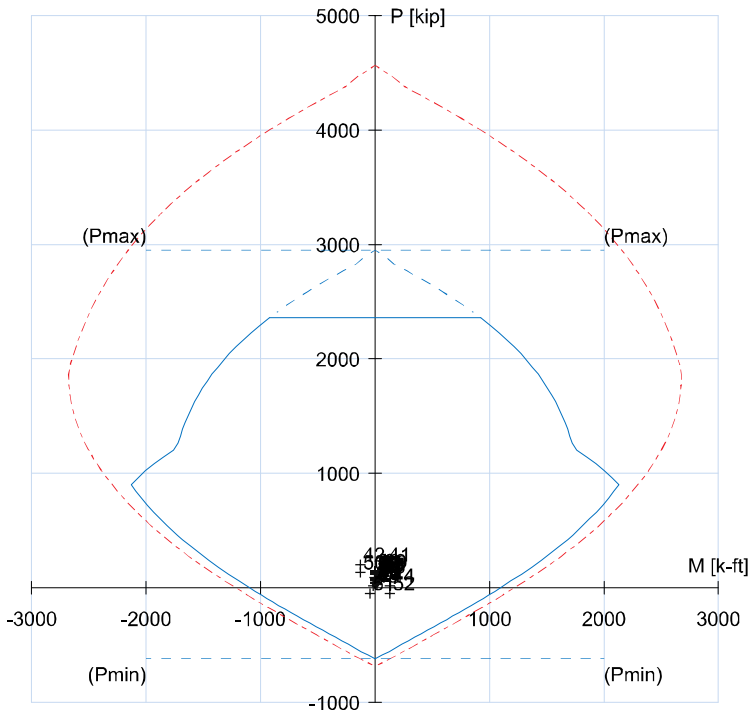
Max. Capacity Ratio: 0.62

P-10

11.3. PM at θ=270 [deg]



48 x 24 in



PM at 270.0 [deg]

General Information	
Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials	
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	48 in
Depth	24 in
A_g	1152 in²
I_x	55296 in⁴
I_y	221184 in⁴

Reinforcement	
Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	11.44 in²
Rho	0.99 %
Min. clear spacing	2.95 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
52	2	U13	Bot	-47.9	0.0	-130.0	-151.57	0.00	-846.53	0.62
51	2	U13	Top	-47.9	0.0	45.0	-162.38	0.00	827.81	0.59
44	2	U9	Bot	19.5	0.0	-130.0	0.00	0.00	-1094.44	0.55
42	2	U8	Bot	203.5	0.0	130.0	0.00	0.00	1094.44	0.54
50	2	U12	Bot	136.1	0.0	130.0	0.00	0.00	1094.44	0.54
41	2	U8	Top	203.5	0.0	-94.4	0.00	0.00	-1094.44	0.52
3	1	U2	Top	145.5	0.0	-56.1	0.00	0.00	-1094.44	0.51
13	1	U7	Top	99.5	0.0	-47.4	0.00	0.00	-1094.44	0.51
29	2	U2	Top	145.5	0.0	-56.1	0.00	0.00	-1094.44	0.51
49	2	U12	Top	136.1	0.0	-63.0	0.00	0.00	-1094.44	0.51
5	1	U3	Top	130.2	0.0	-29.5	0.00	0.00	-1094.44	0.50
11	1	U6	Top	131.5	0.0	-28.8	0.00	0.00	-1094.44	0.50
15	1	U8	Top	112.1	0.0	-40.0	0.00	0.00	-1094.44	0.50
17	1	U9	Top	110.9	0.0	-40.8	0.00	0.00	-1094.44	0.50
31	2	U3	Top	130.2	0.0	-29.5	0.00	0.00	-1094.44	0.50

Only 15 points out of 42 are listed.

Max. Capacity Ratio: 0.62

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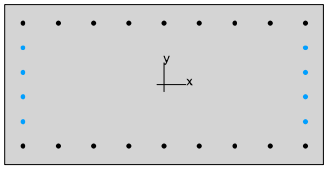
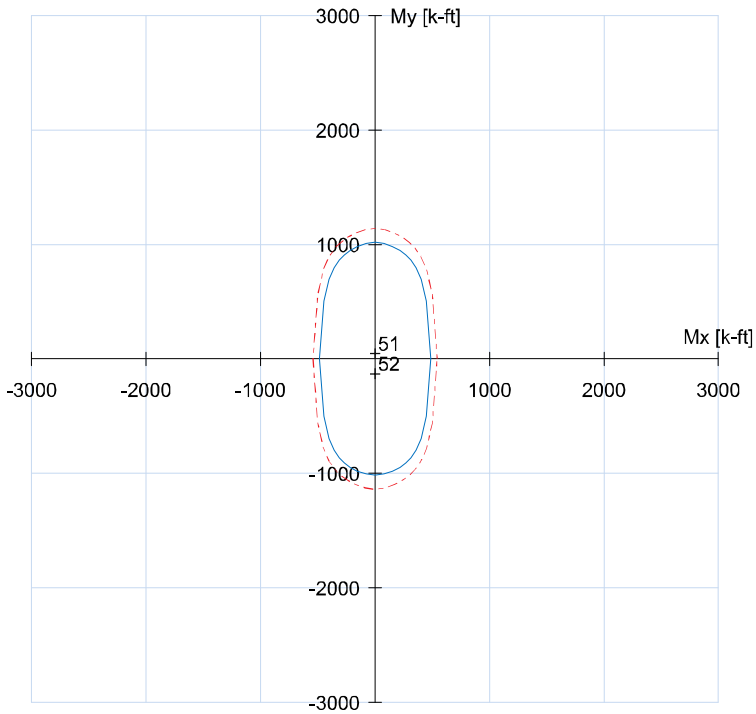
11.4. MM at P=-48 [kip]



48 x 24 in



MM at P=-48.0 [kip]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	48 in
Depth	24 in
A_g	1152 in^2
I_x	55296 in^4
I_y	221184 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	11.44 in^2
Rho	0.99 %
Min. clear spacing	2.95 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
52	2	U13	Bot	-47.9	0.0	-130.0	-151.57	0.00	-846.53	0.62
51	2	U13	Top	-47.9	0.0	45.0	-162.38	0.00	827.81	0.59

Max. Capacity Ratio: 0.62

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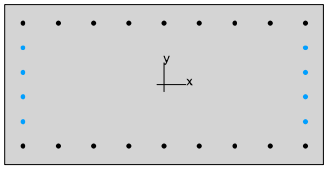
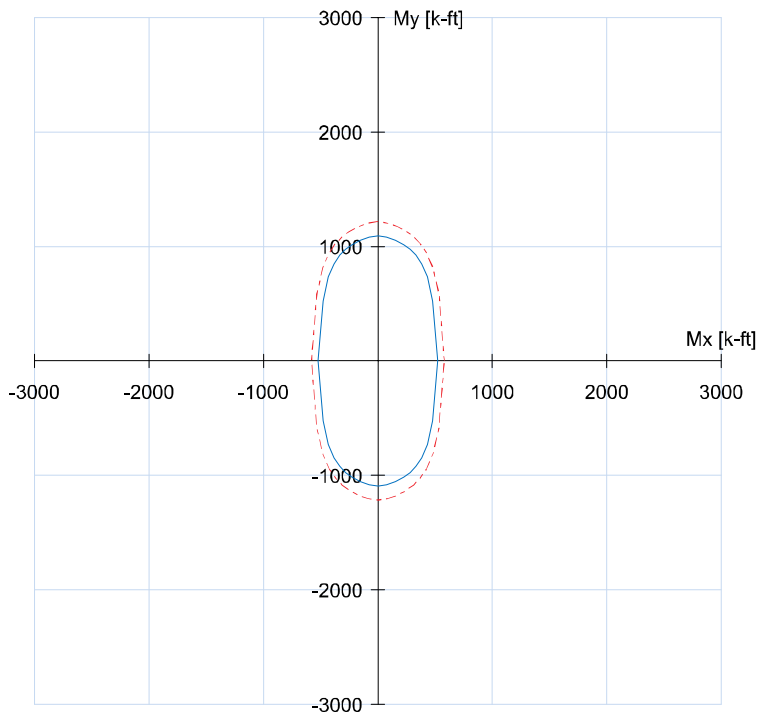
11.5. MM at P=0 [kip]



48 x 24 in



MM at P=0.0 [kip]

General Information	
Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials	
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	48 in
Depth	24 in
A_g	1152 in^2
I_x	55296 in^4
I_y	221184 in^4

Reinforcement	
Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	11.44 in^2
Rho	0.99 %
Min. clear spacing	2.95 in

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spColumn v10.00 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections
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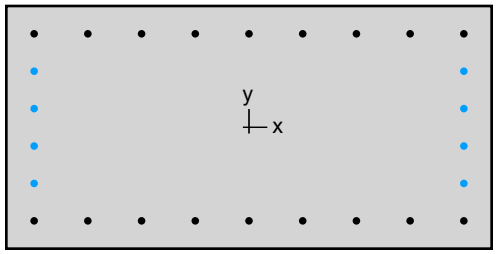

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Figure 1: Column section 4

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1. General Information

File Name	...\P-11 Pier on Grid 1&A (Mezz Brace Frame Co...
Project	CCHS Field Hous
Column	CP-1 - Typical Pier on Grids A/I in Field House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	4	ksi
E_c	3605	ksi
f_c	3.4	ksi
ε_u	0.003	in/in
β_1	0.85	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{ty}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	48	in
Depth	24	in
A_g	1152	in^2
I_x	55296	in^4
I_y	221184	in^4
r_x	6.9282	in
r_y	13.8564	in
X_o	0	in
Y_o	0	in

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3.2. Section Figure

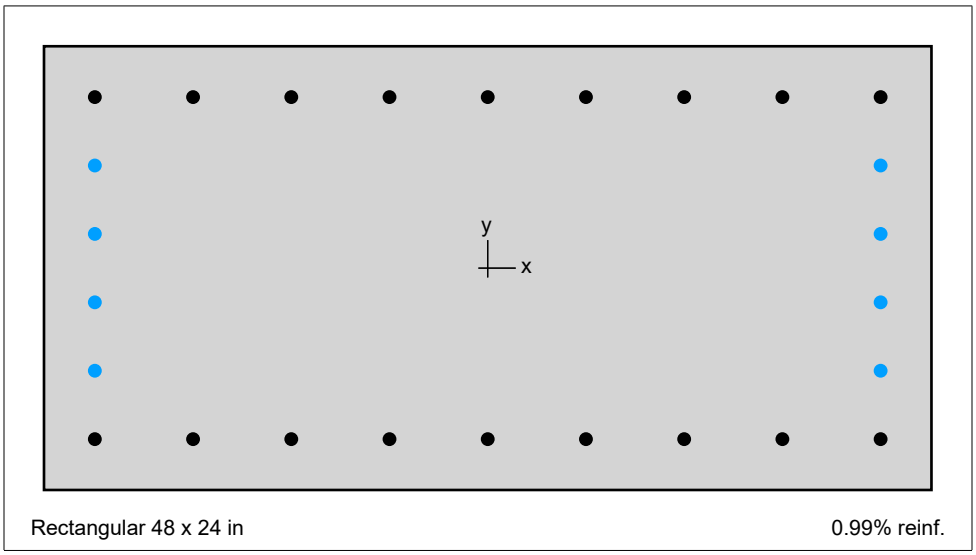

Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter in	Area in²	Bar	Diameter in	Area in²	Bar	Diameter in	Area in²
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #3 bars or less	#3 ties
For larger bars	#3 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Total steel area, A_s	11.44 in²
Rho	0.99 %
Minimum clear spacing	2.95 in

(Note: Rho < 1.0%)

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4.4. Bars Provided

		Bars	Clear cover
			in
Top	9	#6	2
Bottom	9	#6	2
Left	4	#6	2
Right	4	#6	2

5. Loading

5.1. Load Cases

Case	Type	Sustained Load
		%
A	Dead	100
B	Live	0
C	Wind	0
D	EQ	0
E	Snow	0

5.2. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.500	0.000	1.600
U5	1.200	0.000	-0.500	0.000	1.600
U6	1.200	1.000	1.000	0.000	0.500
U7	1.200	1.000	-1.000	0.000	0.500
U8	1.200	1.000	0.000	1.000	0.200
U9	1.200	1.000	0.000	-1.000	0.200
U10	0.900	0.000	1.000	0.000	0.000
U11	0.900	0.000	-1.000	0.000	0.000
U12	0.900	0.000	0.000	1.000	0.000
U13	0.900	0.000	0.000	-1.000	0.000

5.3. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	23.00	0.00	0.00	4.10	0.00
1	Live	22.00	0.00	0.00	13.00	0.00
1	Wind	8.00	0.00	12.00	-4.70	0.00
1	EQ	0.30	0.00	0.60	-0.20	0.00
1	Snow	6.70	0.00	0.00	-3.90	0.00
2	Dead	23.00	0.00	0.00	4.10	0.00
2	Live	22.00	0.00	0.00	13.00	0.00
2	Wind	0.00	0.00	0.00	0.00	0.00
2	EQ	92.00	0.00	0.00	54.00	130.00
2	Snow	6.70	0.00	0.00	-3.90	0.00

6. Slenderness

6.1. Sway Criteria

X-Axis	Non-sway column

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Y-Axis	Non-sway column

6.2. Columns

Column	Axis	Height	Width	Depth/Dia.	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	X	2	48	24	55296	4	3605
Design	Y	2	48	24	221184	4	3605
Above	X	(no column specified...)					
Above	Y	(no column specified...)					
Below	X	(no column specified...)					
Below	Y	(no column specified...)					

6.3. X - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

6.4. Y - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults
Stiffness reduction factor, ϕ_K	0.75
Cracked section coefficients, cI(beams)	0.35
Cracked section coefficients, cI(columns)	0.7
$0.2\ E_c\ I_g + E_s\ I_{se}$ (X-axis)	6.13e+007 kip-in^2
$0.2\ E_c\ I_g + E_s\ I_{se}$ (Y-axis)	2.49e+008 kip-in^2
Minimum eccentricity, $e_{x\ min}$	1.32 in
Minimum eccentricity, $e_{y\ min}$	2.04 in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
X	999.000	999.000	1.000	(N/A)	3.46
Y	999.000	999.000	1.000	(N/A)	1.73

7.3. Magnification Factors: X - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	32.20	(N/A)	525324.81	1.000	(N/A)	(N/A)	*

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Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	66.15	(N/A)	741338.44	0.417	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	60.32	(N/A)	720827.88	0.458	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	42.32	(N/A)	635919.50	0.652	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	34.32	(N/A)	582336.81	0.804	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	60.95	(N/A)	723174.44	0.453	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	44.95	(N/A)	650953.88	0.614	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	51.24	(N/A)	682842.31	0.539	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	50.64	(N/A)	680021.75	0.545	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	28.70	(N/A)	610397.69	0.721	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	12.70	(N/A)	525324.81	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	21.00	(N/A)	529104.19	0.986	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	20.40	(N/A)	525324.81	1.000	(N/A)	(N/A)	*
2	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	32.20	(N/A)	525324.81	1.000	(N/A)	(N/A)	*
2	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	66.15	(N/A)	741338.44	0.417	(N/A)	(N/A)	*
2	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	60.32	(N/A)	720827.88	0.458	(N/A)	(N/A)	*
2	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	38.32	(N/A)	610753.81	0.720	(N/A)	(N/A)	*
2	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	38.32	(N/A)	610753.81	0.720	(N/A)	(N/A)	*
2	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	52.95	(N/A)	690650.56	0.521	(N/A)	(N/A)	*
2	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	52.95	(N/A)	690650.56	0.521	(N/A)	(N/A)	*
2	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	142.94	(N/A)	880613.75	0.193	(N/A)	(N/A)	*
2	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-41.06	(N/A)	1050649.63	0.000	(N/A)	(N/A)	*
2	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	20.70	(N/A)	525324.81	1.000	(N/A)	(N/A)	*
2	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	20.70	(N/A)	525324.81	1.000	(N/A)	(N/A)	*
2	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	112.70	(N/A)	887617.75	0.184	(N/A)	(N/A)	*
2	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-71.30	(N/A)	1050649.63	0.000	(N/A)	(N/A)	*

7.4. Magnification Factors: Y - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	32.20	(N/A)	2133150.00	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	66.15	(N/A)	3010301.50	0.417	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	60.32	(N/A)	2927015.75	0.458	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	42.32	(N/A)	2582234.25	0.652	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	34.32	(N/A)	2364654.75	0.804	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	60.95	(N/A)	2936544.25	0.453	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	44.95	(N/A)	2643283.00	0.614	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	51.24	(N/A)	2772770.50	0.539	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	50.64	(N/A)	2761317.00	0.545	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	28.70	(N/A)	2478599.50	0.721	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	12.70	(N/A)	2133150.00	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	21.00	(N/A)	2148496.50	0.986	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	20.40	(N/A)	2133150.00	1.000	(N/A)	(N/A)	*
2	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	32.20	(N/A)	2133150.00	1.000	(N/A)	(N/A)	*
2	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	66.15	(N/A)	3010301.50	0.417	(N/A)	(N/A)	*
2	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	60.32	(N/A)	2927015.75	0.458	(N/A)	(N/A)	*
2	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	38.32	(N/A)	2480045.75	0.720	(N/A)	(N/A)	*
2	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	38.32	(N/A)	2480045.75	0.720	(N/A)	(N/A)	*
2	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	52.95	(N/A)	2804476.75	0.521	(N/A)	(N/A)	*
2	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	52.95	(N/A)	2804476.75	0.521	(N/A)	(N/A)	*
2	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	142.94	(N/A)	3575847.00	0.193	(N/A)	(N/A)	*
2	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-41.06	(N/A)	4266300.00	0.000	(N/A)	(N/A)	*

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Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
2	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	20.70	(N/A)	2133150.00	1.000	(N/A)	(N/A)	*
2	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	20.70	(N/A)	2133150.00	1.000	(N/A)	(N/A)	*
2	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	112.70	(N/A)	3604287.75	0.184	(N/A)	(N/A)	*
2	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-71.30	(N/A)	4266300.00	0.000	(N/A)	(N/A)	*

8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. X - axis

Load Combo			1st Order				2nd Order			Ratio
			M_{ns}	M_s	M_u	M_{min}		M_i	M_c	2nd/1st
			k-ft	k-ft	k-ft	k-ft		k-ft	k-ft	
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	-6.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	6.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	-12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	-0.60	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.60	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	-12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	12.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	-0.60	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.60	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
2	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

8.2. Y - axis

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U1	Top	5.74	(N/A)	5.74	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Top	23.77	(N/A)	23.77	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Top	11.68	(N/A)	11.68	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Top	-1.32	(N/A)	-3.67	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Top	-1.32	(N/A)	1.03	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Top	15.97	(N/A)	11.27	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Top	15.97	(N/A)	20.67	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Top	17.14	(N/A)	16.94	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Top	17.14	(N/A)	17.34	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Top	3.69	(N/A)	-1.01	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Top	3.69	(N/A)	8.39	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Top	3.69	(N/A)	3.49	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Top	3.69	(N/A)	3.89	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U1	Top	5.74	(N/A)	5.74	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U2	Top	23.77	(N/A)	23.77	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U3	Top	11.68	(N/A)	11.68	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U4	Top	-1.32	(N/A)	-1.32	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U5	Top	-1.32	(N/A)	-1.32	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
2	U6	Top	15.97	(N/A)	15.97	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U7	Top	15.97	(N/A)	15.97	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U8	Top	17.14	(N/A)	71.14	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U8	Bot	0.00	(N/A)	-130.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U9	Top	17.14	(N/A)	-36.86	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U9	Bot	0.00	(N/A)	130.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U10	Top	3.69	(N/A)	3.69	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U11	Top	3.69	(N/A)	3.69	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U12	Top	3.69	(N/A)	57.69	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U12	Bot	0.00	(N/A)	-130.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
2	U13	Top	3.69	(N/A)	-50.31	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
2	U13	Bot	0.00	(N/A)	130.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

9. Control Points

About	Point	P kip	X-Moment k-ft	Y-Moment k-ft	NA Depth in	d_t Depth in	ε_t	ϕ
X	@ Max compression	2949.3	0.00	0.00	68.47	21.25	-0.00207	0.65000
X	@ Allowable comp.	2359.4	459.78	0.00	23.50	21.25	-0.00029	0.65000
X	@ f_s = 0.0	2127.0	596.24	0.00	21.25	21.25	0.00000	0.65000
X	@ f_s = 0.5 f_y	1527.3	811.66	0.00	15.80	21.25	0.00103	0.65000
X	@ Balanced point	1122.6	877.25	0.00	12.58	21.25	0.00207	0.65000
X	@ Tension control	851.0	1047.64	0.00	7.90	21.25	0.00507	0.90000
X	@ Pure bending	0.0	521.96	0.00	3.03	21.25	0.01805	0.90000
X	@ Max tension	-617.8	0.00	0.00	0.00	21.25	9.99999	0.90000
Y	@ Max compression	2949.3	0.00	0.00	145.81	45.25	-0.00207	0.65000
Y	@ Allowable comp.	2359.4	0.00	922.31	47.08	45.25	-0.00012	0.65000
Y	@ f_s = 0.0	2267.6	0.00	1037.52	45.25	45.25	0.00000	0.65000
Y	@ f_s = 0.5 f_y	1640.7	0.00	1568.39	33.65	45.25	0.00103	0.65000
Y	@ Balanced point	1223.0	0.00	1731.67	26.78	45.25	0.00207	0.65000
Y	@ Tension control	899.9	0.00	2132.06	16.82	45.25	0.00507	0.90000
Y	@ Pure bending	0.0	0.00	1094.44	5.74	45.25	0.02064	0.90000
Y	@ Max tension	-617.8	0.00	0.00	0.00	45.25	9.99999	0.90000
-X	@ Max compression	2949.3	0.00	0.00	68.47	21.25	-0.00207	0.65000
-X	@ Allowable comp.	2359.4	-459.78	0.00	23.50	21.25	-0.00029	0.65000
-X	@ f_s = 0.0	2127.0	-596.24	0.00	21.25	21.25	0.00000	0.65000
-X	@ f_s = 0.5 f_y	1527.3	-811.66	0.00	15.80	21.25	0.00103	0.65000
-X	@ Balanced point	1122.6	-877.25	0.00	12.58	21.25	0.00207	0.65000
-X	@ Tension control	851.0	-1047.64	0.00	7.90	21.25	0.00507	0.90000
-X	@ Pure bending	0.0	-521.96	0.00	3.03	21.25	0.01805	0.90000
-X	@ Max tension	-617.8	0.00	0.00	0.00	21.25	9.99999	0.90000
-Y	@ Max compression	2949.3	0.00	0.00	145.81	45.25	-0.00207	0.65000
-Y	@ Allowable comp.	2359.4	0.00	-922.31	47.08	45.25	-0.00012	0.65000
-Y	@ f_s = 0.0	2267.6	0.00	-1037.52	45.25	45.25	0.00000	0.65000
-Y	@ f_s = 0.5 f_y	1640.7	0.00	-1568.39	33.65	45.25	0.00103	0.65000
-Y	@ Balanced point	1223.0	0.00	-1731.67	26.78	45.25	0.00207	0.65000
-Y	@ Tension control	899.9	0.00	-2132.06	16.82	45.25	0.00507	0.90000
-Y	@ Pure bending	0.0	0.00	-1094.44	5.74	45.25	0.02064	0.90000
-Y	@ Max tension	-617.8	0.00	0.00	0.00	45.25	9.99999	0.90000

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10. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand			Capacity			Parameters at Capacity			Capacity Ratio
				P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
1	1	U1	Top	32.20	0.00	5.74	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
2	1	U1	Bot	32.20	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
3	1	U2	Top	66.15	0.00	23.77	0.00	0.00	1094.44	5.74	0.02064	0.900	0.50
4	1	U2	Bot	66.15	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
5	1	U3	Top	60.32	0.00	11.68	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
6	1	U3	Bot	60.32	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
7	1	U4	Top	42.32	0.00	-3.67	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.49
8	1	U4	Bot	42.32	-6.00	0.00	0.00	-521.96	0.00	3.03	0.01805	0.900	0.51
9	1	U5	Top	34.32	0.00	1.03	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
10	1	U5	Bot	34.32	6.00	0.00	0.00	521.96	0.00	3.03	0.01805	0.900	0.51
11	1	U6	Top	60.95	0.00	11.27	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
12	1	U6	Bot	60.95	-12.00	0.00	0.00	-521.96	0.00	3.03	0.01805	0.900	0.51
13	1	U7	Top	44.95	0.00	20.67	0.00	0.00	1094.44	5.74	0.02064	0.900	0.50
14	1	U7	Bot	44.95	12.00	0.00	0.00	521.96	0.00	3.03	0.01805	0.900	0.51
15	1	U8	Top	51.24	0.00	16.94	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
16	1	U8	Bot	51.24	-0.60	0.00	0.00	-521.96	0.00	3.03	0.01805	0.900	0.50
17	1	U9	Top	50.64	0.00	17.34	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
18	1	U9	Bot	50.64	0.60	0.00	0.00	521.96	0.00	3.03	0.01805	0.900	0.50
19	1	U10	Top	28.70	0.00	-1.01	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.49
20	1	U10	Bot	28.70	-12.00	0.00	0.00	-521.96	0.00	3.03	0.01805	0.900	0.51
21	1	U11	Top	12.70	0.00	8.39	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
22	1	U11	Bot	12.70	12.00	0.00	0.00	521.96	0.00	3.03	0.01805	0.900	0.51
23	1	U12	Top	21.00	0.00	3.49	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
24	1	U12	Bot	21.00	-0.60	0.00	0.00	-521.96	0.00	3.03	0.01805	0.900	0.50
25	1	U13	Top	20.40	0.00	3.89	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
26	1	U13	Bot	20.40	0.60	0.00	0.00	521.96	0.00	3.03	0.01805	0.900	0.50
27	2	U1	Top	32.20	0.00	5.74	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
28	2	U1	Bot	32.20	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
29	2	U2	Top	66.15	0.00	23.77	0.00	0.00	1094.44	5.74	0.02064	0.900	0.50
30	2	U2	Bot	66.15	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
31	2	U3	Top	60.32	0.00	11.68	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
32	2	U3	Bot	60.32	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
33	2	U4	Top	38.32	0.00	-1.32	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.49
34	2	U4	Bot	38.32	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
35	2	U5	Top	38.32	0.00	-1.32	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.49
36	2	U5	Bot	38.32	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
37	2	U6	Top	52.95	0.00	15.97	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
38	2	U6	Bot	52.95	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
39	2	U7	Top	52.95	0.00	15.97	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
40	2	U7	Bot	52.95	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
41	2	U8	Top	142.94	0.00	71.14	0.00	0.00	1094.44	5.74	0.02064	0.900	0.52
42	2	U8	Bot	142.94	0.00	-130.00	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.54
43	2	U9	Top	-41.06	0.00	-36.86	-157.87	0.00	-835.64	4.13	0.02984	0.900	0.58
44	2	U9	Bot	-41.06	0.00	130.00	-146.09	0.00	855.95	4.26	0.02888	0.900	0.62
45	2	U10	Top	20.70	0.00	3.69	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
46	2	U10	Bot	20.70	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46
47	2	U11	Top	20.70	0.00	3.69	0.00	0.00	1094.44	5.74	0.02064	0.900	0.49
48	2	U11	Bot	20.70	0.00	0.00	60.19	-568.50	0.00	3.38	0.01588	0.900	0.46

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No.	Load Combo			Demand P_u	M_{ux}	M_{uy}	Capacity ϕP_n	ϕM_{nx}	ϕM_{ny}	Parameters at Capacity NA Depth	ε_t	ϕ	Capacity Ratio
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
49	2	U12	Top	112.70	0.00	57.69	0.00	0.00	1094.44	5.74	0.02064	0.900	0.51
50	2	U12	Bot	112.70	0.00	-130.00	0.00	0.00	-1094.44	5.74	0.02064	0.900	0.54
51	2	U13	Top	-71.30	0.00	-50.31	-180.42	0.00	-796.48	3.90	0.03179	0.900	0.61
52	2	U13	Bot	-71.30	0.00	130.00	-171.13	0.00	812.62	4.00	0.03097	0.900	0.64

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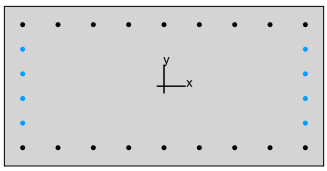
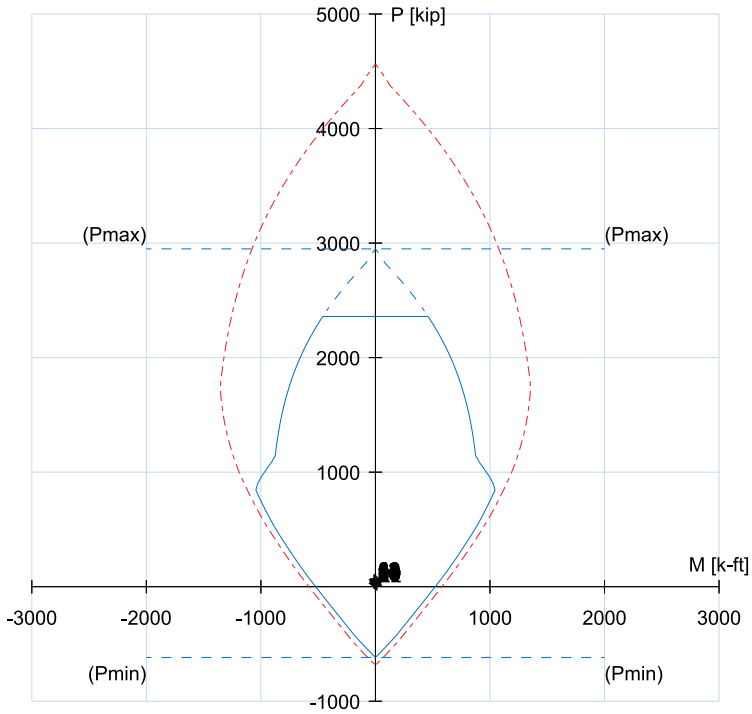
11. Diagrams

11.1. PM at θ=0 [deg]



48 x 24 in



PM at 0.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	48 in
Depth	24 in
A_g	1152 in^2
I_x	55296 in^4
I_y	221184 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	11.44 in^2
Rho	0.99 %
Min. clear spacing	2.95 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
8	1	U4	Bot	42.3	-6.0	0.0	0.00	-521.96	0.00	0.51
10	1	U5	Bot	34.3	6.0	0.0	0.00	521.96	0.00	0.51
12	1	U6	Bot	60.9	-12.0	0.0	0.00	-521.96	0.00	0.51
14	1	U7	Bot	44.9	12.0	0.0	0.00	521.96	0.00	0.51
20	1	U10	Bot	28.7	-12.0	0.0	0.00	-521.96	0.00	0.51
22	1	U11	Bot	12.7	12.0	0.0	0.00	521.96	0.00	0.51
16	1	U8	Bot	51.2	-0.6	0.0	0.00	-521.96	0.00	0.50
18	1	U9	Bot	50.6	0.6	0.0	0.00	521.96	0.00	0.50
24	1	U12	Bot	21.0	-0.6	0.0	0.00	-521.96	0.00	0.50
26	1	U13	Bot	20.4	0.6	0.0	0.00	521.96	0.00	0.50
2	1	U1	Bot	32.2	0.0	0.0	60.19	-568.50	0.00	0.46
4	1	U2	Bot	66.2	0.0	0.0	60.19	-568.50	0.00	0.46
6	1	U3	Bot	60.3	0.0	0.0	60.19	-568.50	0.00	0.46
28	2	U1	Bot	32.2	0.0	0.0	60.19	-568.50	0.00	0.46
30	2	U2	Bot	66.2	0.0	0.0	60.19	-568.50	0.00	0.46

Only 15 points out of 22 are listed.

Max. Capacity Ratio: 0.64

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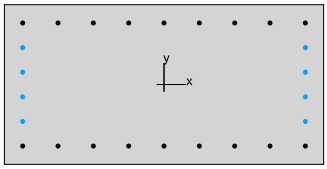
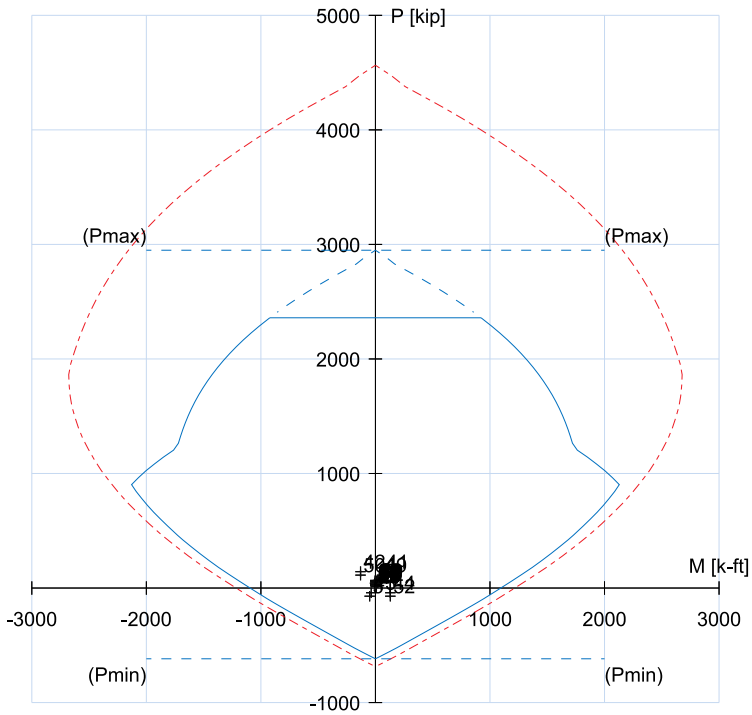
11.2. PM at θ=90 [deg]



48 x 24 in



PM at 90.0 [deg]

General Information	
Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials	
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	48 in
Depth	24 in
A_g	1152 in^2
I_x	55296 in^4
I_y	221184 in^4

Reinforcement	
Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	11.44 in^2
Rho	0.99 %
Min. clear spacing	2.95 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
52	2	U13	Bot	-71.3	0.0	130.0	-171.13	0.00	812.62	0.64
44	2	U9	Bot	-41.1	0.0	130.0	-146.09	0.00	855.95	0.62
51	2	U13	Top	-71.3	0.0	-50.3	-180.42	0.00	-796.48	0.61
43	2	U9	Top	-41.1	0.0	-36.9	-157.87	0.00	-835.64	0.58
42	2	U8	Bot	142.9	0.0	-130.0	0.00	0.00	-1094.44	0.54
50	2	U12	Bot	112.7	0.0	-130.0	0.00	0.00	-1094.44	0.54
41	2	U8	Top	142.9	0.0	71.1	0.00	0.00	1094.44	0.52
49	2	U12	Top	112.7	0.0	57.7	0.00	0.00	1094.44	0.51
3	1	U2	Top	66.2	0.0	23.8	0.00	0.00	1094.44	0.50
13	1	U7	Top	44.9	0.0	20.7	0.00	0.00	1094.44	0.50
29	2	U2	Top	66.2	0.0	23.8	0.00	0.00	1094.44	0.50
1	1	U1	Top	32.2	0.0	5.7	0.00	0.00	1094.44	0.49
5	1	U3	Top	60.3	0.0	11.7	0.00	0.00	1094.44	0.49
7	1	U4	Top	42.3	0.0	-3.7	0.00	0.00	-1094.44	0.49
9	1	U5	Top	34.3	0.0	1.0	0.00	0.00	1094.44	0.49

Only 15 points out of 42 are listed.

Max. Capacity Ratio: 0.64

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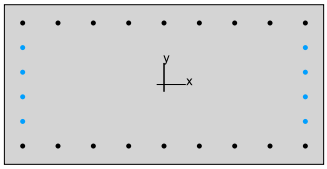
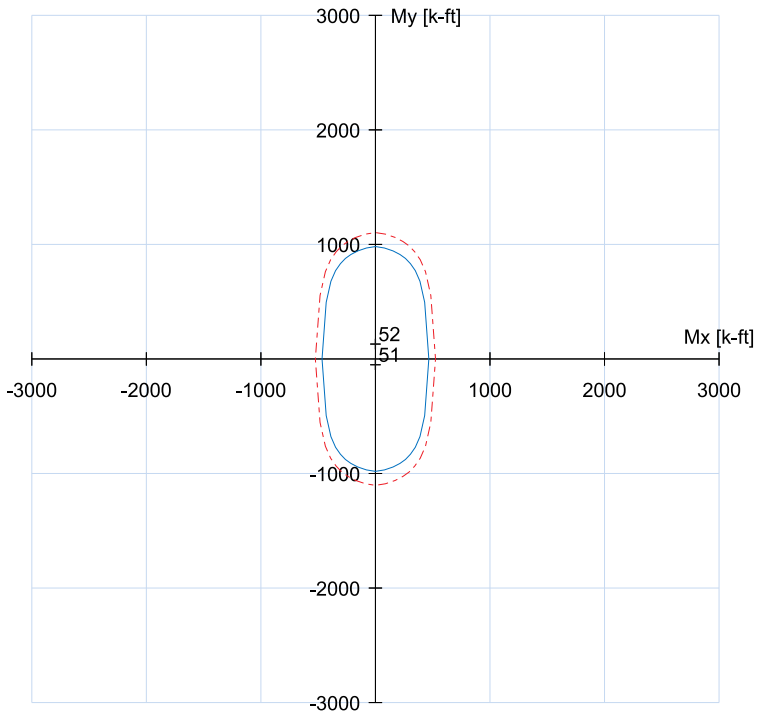
11.3. MM at P=-71 [kip]



48 x 24 in



MM at P=-71.0 [kip]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	48 in
Depth	24 in
A_g	1152 in^2
I_x	55296 in^4
I_y	221184 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	11.44 in^2
Rho	0.99 %
Min. clear spacing	2.95 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
52	2	U13	Bot	-71.3	0.0	130.0	-171.13	0.00	812.62	0.64
51	2	U13	Top	-71.3	0.0	-50.3	-180.42	0.00	-796.48	0.61

Max. Capacity Ratio: 0.64

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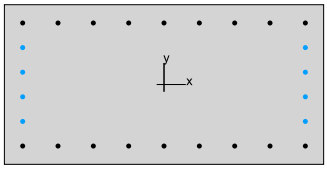
11.4. MM at P=0 [kip]



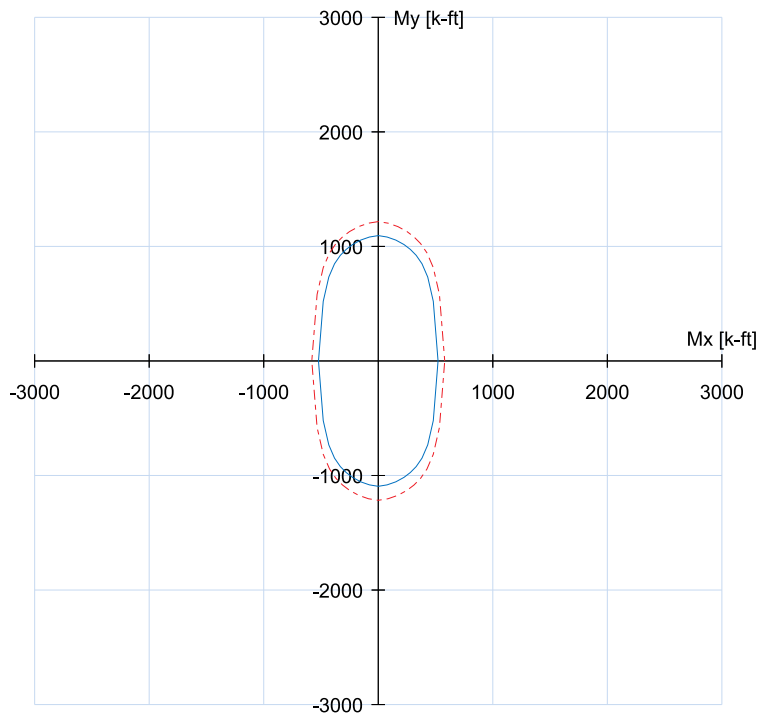
48 x 24 in

General Information	
Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials	
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	48 in
Depth	24 in
A_g	1152 in^2
I_x	55296 in^4
I_y	221184 in^4

Reinforcement	
Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	11.44 in^2
Rho	0.99 %
Min. clear spacing	2.95 in



MM at P=0.0 [kip]

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spColumn v10.00 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections
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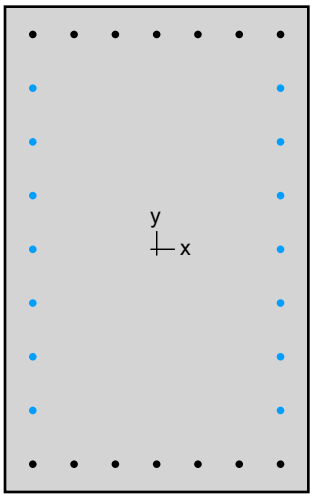

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Figure 1: Column section 4

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1. General Information

File Name	...\P-12 Pier on Grid A&3 (Mezz Brace Frame Lo...
Project	CCHS Field Hous
Column	CP-1 - Typical Pier on Grids A/I in Field House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	4	ksi
E_c	3605	ksi
f_c	3.4	ksi
ε_u	0.003	in/in
β_1	0.85	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{ty}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	30	in
Depth	48	in
A_g	1440	in^2
I_x	276480	in^4
I_y	108000	in^4
r_x	13.8564	in
r_y	8.66025	in
X_o	0	in
Y_o	0	in

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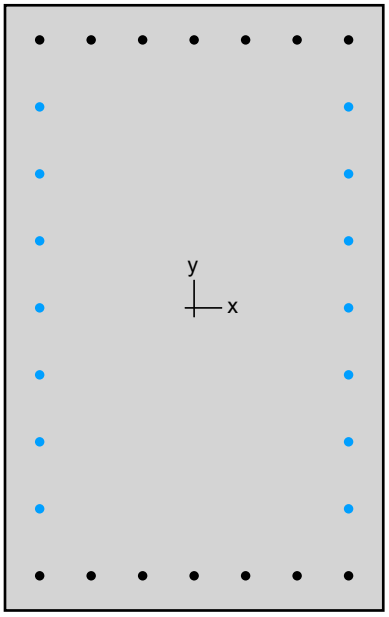
3.2. Section Figure



Rectangular 30 x 48 in 0.86% reinf.

Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter in	Area in^2	Bar	Diameter in	Area in^2	Bar	Diameter in	Area in^2
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #3 bars or less	#3 ties
For larger bars	#3 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---

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Total steel area, A_s	12.32 in^2
Rho	0.86 %
Minimum clear spacing	3.33 in

(Note: Rho < 1.0%)

4.4. Bars Provided

		Bars	Clear cover
			in
Top	7	#6	2
Bottom	7	#6	2
Left	7	#6	2
Right	7	#6	2

5. Loading

5.1. Load Cases

Case	Type	Sustained Load
		%
A	Dead	100
B	Live	0
C	Wind	0
D	EQ	0
E	Snow	0

5.2. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.500	0.000	1.600
U5	1.200	0.000	-0.500	0.000	1.600
U6	1.200	1.000	1.000	0.000	0.500
U7	1.200	1.000	-1.000	0.000	0.500
U8	1.200	1.000	0.000	1.000	0.200
U9	1.200	1.000	0.000	-1.000	0.200
U10	0.900	0.000	1.000	0.000	0.000
U11	0.900	0.000	-1.000	0.000	0.000
U12	0.900	0.000	0.000	1.000	0.000
U13	0.900	0.000	0.000	-1.000	0.000

5.3. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	22.00	0.00	0.00	18.30	0.00
1	Live	31.00	0.00	0.00	28.40	0.00
1	Wind	0.00	0.00	0.00	0.00	0.00
1	EQ	72.00	0.00	76.00	66.00	0.00
1	Snow	0.00	0.00	0.00	0.00	0.00

6. Slenderness

6.1. Sway Criteria

X-Axis	Non-sway column

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Y-Axis	Non-sway column

6.2. Columns

Column	Axis	Height	Width	Depth/Dia.	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	X	2	30	48	276480	4	3605
Design	Y	2	30	48	108000	4	3605
Above	X	(no column specified...)					
Above	Y	(no column specified...)					
Below	X	(no column specified...)					
Below	Y	(no column specified...)					

6.3. X - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

6.4. Y - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults
Stiffness reduction factor, ϕ_K	0.75
Cracked section coefficients, cI(beams)	0.35
Cracked section coefficients, cI(columns)	0.7
$0.2\ E_c\ I_g + E_s\ I_{se}$ (X-axis)	3.00e+008 kip-in^2
$0.2\ E_c\ I_g + E_s\ I_{se}$ (Y-axis)	1.17e+008 kip-in^2
Minimum eccentricity, $e_{x\ min}$	2.04 in
Minimum eccentricity, $e_{y\ min}$	1.50 in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
X	999.000	999.000	1.000	(N/A)	1.73
Y	999.000	999.000	1.000	(N/A)	2.77

7.3. Magnification Factors: X - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	30.80	(N/A)	2573804.00	1.000	(N/A)	(N/A)	*

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Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	76.00	(N/A)	3820490.00	0.347	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	57.40	(N/A)	3525927.25	0.460	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	26.40	(N/A)	2573804.00	1.000	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	26.40	(N/A)	2573804.00	1.000	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	57.40	(N/A)	3525927.25	0.460	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	57.40	(N/A)	3525927.25	0.460	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	129.40	(N/A)	4275356.00	0.204	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-14.60	(N/A)	5147608.00	0.000	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.80	(N/A)	2573804.00	1.000	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.80	(N/A)	2573804.00	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	91.80	(N/A)	4234322.50	0.216	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-52.20	(N/A)	5147608.00	0.000	(N/A)	(N/A)	*

7.4. Magnification Factors: Y - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	30.80	(N/A)	999674.81	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	76.00	(N/A)	1483892.25	0.347	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	57.40	(N/A)	1369483.00	0.460	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	26.40	(N/A)	999674.81	1.000	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	26.40	(N/A)	999674.81	1.000	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	57.40	(N/A)	1369483.00	0.460	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	57.40	(N/A)	1369483.00	0.460	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	129.40	(N/A)	1660563.75	0.204	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-14.60	(N/A)	1999349.63	0.000	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.80	(N/A)	999674.81	1.000	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.80	(N/A)	999674.81	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	91.80	(N/A)	1644626.25	0.216	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-52.20	(N/A)	1999349.63	0.000	(N/A)	(N/A)	*

8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. X - axis

Load Combo			1st Order					2nd Order		Ratio
			M_{ns}	M_s	M_u	M_{min}		M_i	M_c	2nd/1st
			k-ft	k-ft	k-ft	k-ft		k-ft	k-ft	
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft	2nd Order	M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	-76.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	76.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	-76.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	76.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

8.2. Y - axis

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft	2nd Order	M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U1	Top	25.62	(N/A)	25.62	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Top	67.40	(N/A)	67.40	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Top	50.36	(N/A)	50.36	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Top	21.96	(N/A)	21.96	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Top	21.96	(N/A)	21.96	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Top	50.36	(N/A)	50.36	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Top	50.36	(N/A)	50.36	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Top	50.36	(N/A)	116.36	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Top	50.36	(N/A)	-15.64	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Top	16.47	(N/A)	16.47	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Top	16.47	(N/A)	16.47	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Top	16.47	(N/A)	82.47	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Top	16.47	(N/A)	-49.53	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)

9. Control Points

About	Point	P kip	X-Moment k-ft	Y-Moment k-ft	NA Depth in	d_t Depth in	ε_t	ϕ
X	@ Max compression	3179.9	0.00	0.00	145.81	45.25	-0.00207	0.65000
X	@ Allowable comp.	2543.9	996.32	0.00	47.17	45.25	-0.00012	0.65000
X	@ f_s = 0.0	2439.6	1128.12	0.00	45.25	45.25	0.00000	0.65000

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About Point	P	X-Moment	Y-Moment	NA Depth	d_t Depth	ε_t	ϕ
	kip	k-ft	k-ft	in	in		
X @ f_s = 0.5 f_y	1764.1	1705.91	0.00	33.65	45.25	0.00103	0.65000
X @ Balanced point	1314.3	1887.71	0.00	26.78	45.25	0.00207	0.65000
X @ Tension control	978.7	2326.47	0.00	16.82	45.25	0.00507	0.90000
X @ Pure bending	0.0	1182.98	0.00	5.55	45.25	0.02146	0.90000
X @ Max tension	-665.3	0.00	0.00	0.00	45.25	9.99999	0.90000
Y @ Max compression	3179.9	0.00	0.00	87.81	27.25	-0.00207	0.65000
Y @ Allowable comp.	2543.9	0.00	621.75	29.46	27.25	-0.00023	0.65000
Y @ f_s = 0.0	2349.0	0.00	769.66	27.25	27.25	0.00000	0.65000
Y @ f_s = 0.5 f_y	1690.4	0.00	1091.85	20.26	27.25	0.00103	0.65000
Y @ Balanced point	1248.9	0.00	1191.81	16.13	27.25	0.00207	0.65000
Y @ Tension control	956.3	0.00	1448.76	10.13	27.25	0.00507	0.90000
Y @ Pure bending	0.0	0.00	718.14	3.63	27.25	0.01950	0.90000
Y @ Max tension	-665.3	0.00	0.00	0.00	27.25	9.99999	0.90000
-X @ Max compression	3179.9	0.00	0.00	145.81	45.25	-0.00207	0.65000
-X @ Allowable comp.	2543.9	-996.32	0.00	47.17	45.25	-0.00012	0.65000
-X @ f_s = 0.0	2439.6	-1128.12	0.00	45.25	45.25	0.00000	0.65000
-X @ f_s = 0.5 f_y	1764.1	-1705.91	0.00	33.65	45.25	0.00103	0.65000
-X @ Balanced point	1314.3	-1887.71	0.00	26.78	45.25	0.00207	0.65000
-X @ Tension control	978.7	-2326.47	0.00	16.82	45.25	0.00507	0.90000
-X @ Pure bending	0.0	-1182.98	0.00	5.55	45.25	0.02146	0.90000
-X @ Max tension	-665.3	0.00	0.00	0.00	45.25	9.99999	0.90000
-Y @ Max compression	3179.9	0.00	0.00	87.81	27.25	-0.00207	0.65000
-Y @ Allowable comp.	2543.9	0.00	-621.75	29.46	27.25	-0.00023	0.65000
-Y @ f_s = 0.0	2349.0	0.00	-769.66	27.25	27.25	0.00000	0.65000
-Y @ f_s = 0.5 f_y	1690.4	0.00	-1091.85	20.26	27.25	0.00103	0.65000
-Y @ Balanced point	1248.9	0.00	-1191.81	16.13	27.25	0.00207	0.65000
-Y @ Tension control	956.3	0.00	-1448.76	10.13	27.25	0.00507	0.90000
-Y @ Pure bending	0.0	0.00	-718.14	3.63	27.25	0.01950	0.90000
-Y @ Max tension	-665.3	0.00	0.00	0.00	27.25	9.99999	0.90000

10. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand P_u	M_{ux}	M_{uy}	Capacity ϕP_n	ϕM_{nx}	ϕM_{ny}	Parameters at Capacity NA Depth	ε_t	ϕ	Capacity Ratio
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
1	1	U1	Top	30.80	0.00	25.62	0.00	0.00	718.14	3.63	0.01950	0.900	0.52
2	1	U1	Bot	30.80	0.00	0.00	64.90	-1285.53	0.00	6.18	0.01895	0.900	0.45
3	1	U2	Top	76.00	0.00	67.40	0.00	0.00	718.14	3.63	0.01950	0.900	0.55
4	1	U2	Bot	76.00	0.00	0.00	64.90	-1285.53	0.00	6.18	0.01895	0.900	0.45
5	1	U3	Top	57.40	0.00	50.36	0.00	0.00	718.14	3.63	0.01950	0.900	0.53
6	1	U3	Bot	57.40	0.00	0.00	64.90	-1285.53	0.00	6.18	0.01895	0.900	0.45
7	1	U4	Top	26.40	0.00	21.96	0.00	0.00	718.14	3.63	0.01950	0.900	0.51
8	1	U4	Bot	26.40	0.00	0.00	64.90	-1285.53	0.00	6.18	0.01895	0.900	0.45
9	1	U5	Top	26.40	0.00	21.96	0.00	0.00	718.14	3.63	0.01950	0.900	0.51
10	1	U5	Bot	26.40	0.00	0.00	64.90	-1285.53	0.00	6.18	0.01895	0.900	0.45
11	1	U6	Top	57.40	0.00	50.36	0.00	0.00	718.14	3.63	0.01950	0.900	0.53
12	1	U6	Bot	57.40	0.00	0.00	64.90	-1285.53	0.00	6.18	0.01895	0.900	0.45
13	1	U7	Top	57.40	0.00	50.36	0.00	0.00	718.14	3.63	0.01950	0.900	0.53
14	1	U7	Bot	57.40	0.00	0.00	64.90	-1285.53	0.00	6.18	0.01895	0.900	0.45
15	1	U8	Top	129.40	0.00	116.36	0.00	0.00	718.14	3.63	0.01950	0.900	0.58
16	1	U8	Bot	129.40	-76.00	0.00	0.00	-1182.98	0.00	5.55	0.02146	0.900	0.52

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No.	Load Combo			Demand P_u	M_{ux}	M_{uy}	Capacity ϕP_n	ϕM_{nx}	ϕM_{ny}	Parameters at Capacity NA Depth	ε_t	ϕ	Capacity Ratio
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
17	1	U9	Top	-14.60	0.00	-15.64	-139.34	0.00	-575.88	2.83	0.02584	0.900	0.57
18	1	U9	Bot	-14.60	76.00	0.00	-139.08	954.09	0.00	4.25	0.02891	0.900	0.58
19	1	U10	Top	19.80	0.00	16.47	0.00	0.00	718.14	3.63	0.01950	0.900	0.51
20	1	U10	Bot	19.80	0.00	0.00	64.90	-1285.53	0.00	6.18	0.01895	0.900	0.45
21	1	U11	Top	19.80	0.00	16.47	0.00	0.00	718.14	3.63	0.01950	0.900	0.51
22	1	U11	Bot	19.80	0.00	0.00	64.90	-1285.53	0.00	6.18	0.01895	0.900	0.45
23	1	U12	Top	91.80	0.00	82.47	0.00	0.00	718.14	3.63	0.01950	0.900	0.56
24	1	U12	Bot	91.80	-76.00	0.00	0.00	-1182.98	0.00	5.55	0.02146	0.900	0.52
25	1	U13	Top	-52.20	0.00	-49.53	-163.76	0.00	-550.57	2.72	0.02703	0.900	0.61
26	1	U13	Bot	-52.20	76.00	0.00	-170.29	900.09	0.00	3.96	0.03127	0.900	0.60

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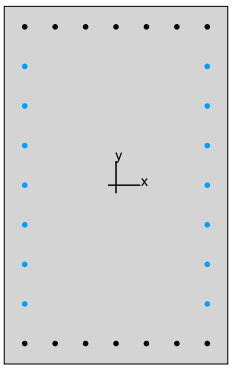
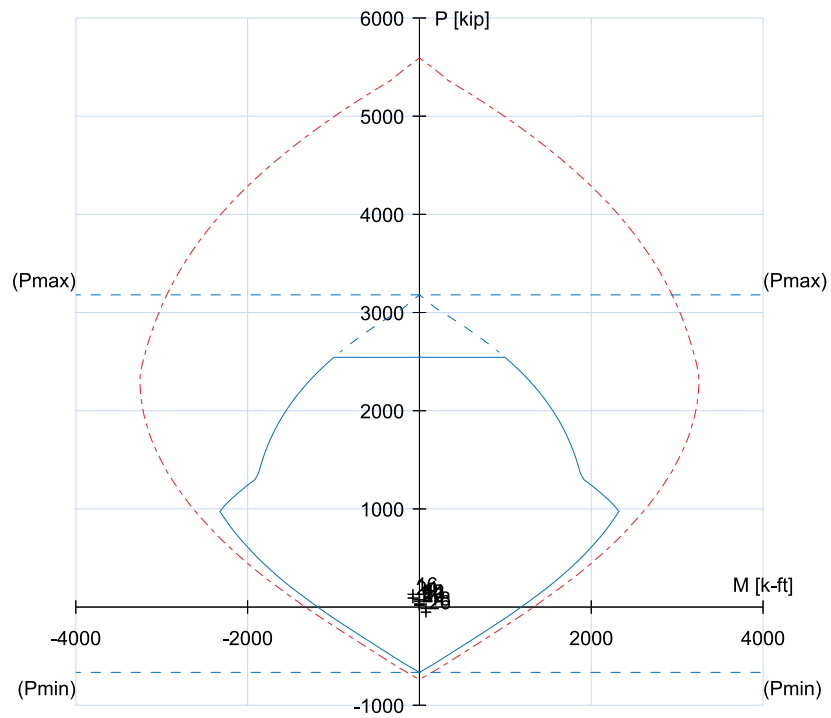
11. Diagrams

11.1. PM at θ=0 [deg]



30 x 48 in



PM at 0.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	30 in
Depth	48 in
A_g	1440 in^2
I_x	276480 in^4
I_y	108000 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	12.32 in^2
Rho	0.86 %
Min. clear spacing	3.33 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
26	1	U13	Bot	-52.2	76.0	0.0	-170.29	900.09	0.00	0.60
18	1	U9	Bot	-14.6	76.0	0.0	-139.08	954.09	0.00	0.58
16	1	U8	Bot	129.4	-76.0	0.0	0.00	-1182.98	0.00	0.52
24	1	U12	Bot	91.8	-76.0	0.0	0.00	-1182.98	0.00	0.52
2	1	U1	Bot	30.8	0.0	0.0	64.90	-1285.53	0.00	0.45
4	1	U2	Bot	76.0	0.0	0.0	64.90	-1285.53	0.00	0.45
6	1	U3	Bot	57.4	0.0	0.0	64.90	-1285.53	0.00	0.45
8	1	U4	Bot	26.4	0.0	0.0	64.90	-1285.53	0.00	0.45
10	1	U5	Bot	26.4	0.0	0.0	64.90	-1285.53	0.00	0.45
12	1	U6	Bot	57.4	0.0	0.0	64.90	-1285.53	0.00	0.45
14	1	U7	Bot	57.4	0.0	0.0	64.90	-1285.53	0.00	0.45
20	1	U10	Bot	19.8	0.0	0.0	64.90	-1285.53	0.00	0.45
22	1	U11	Bot	19.8	0.0	0.0	64.90	-1285.53	0.00	0.45

Max. Capacity Ratio: 0.61

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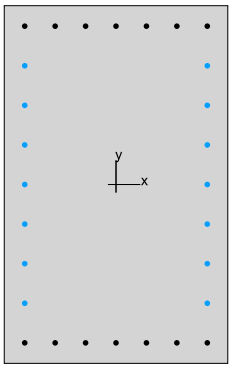
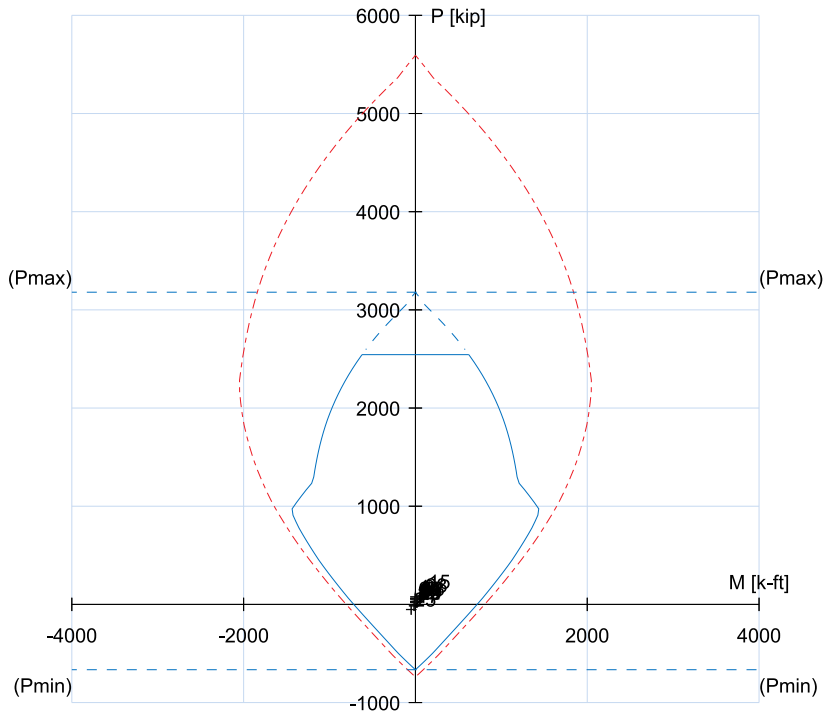
11.2. PM at θ=90 [deg]



30 x 48 in



PM at 90.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	30 in
Depth	48 in
A_g	1440 in^2
I_x	276480 in^4
I_y	108000 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	12.32 in^2
Rho	0.86 %
Min. clear spacing	3.33 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
25	1	U13	Top	-52.2	0.0	-49.5	-163.76	0.00	-550.57	0.61
15	1	U8	Top	129.4	0.0	116.4	0.00	0.00	718.14	0.58
17	1	U9	Top	-14.6	0.0	-15.6	-139.34	0.00	-575.88	0.57
23	1	U12	Top	91.8	0.0	82.5	0.00	0.00	718.14	0.56
3	1	U2	Top	76.0	0.0	67.4	0.00	0.00	718.14	0.55
5	1	U3	Top	57.4	0.0	50.4	0.00	0.00	718.14	0.53
11	1	U6	Top	57.4	0.0	50.4	0.00	0.00	718.14	0.53
13	1	U7	Top	57.4	0.0	50.4	0.00	0.00	718.14	0.53
1	1	U1	Top	30.8	0.0	25.6	0.00	0.00	718.14	0.52
7	1	U4	Top	26.4	0.0	22.0	0.00	0.00	718.14	0.51
9	1	U5	Top	26.4	0.0	22.0	0.00	0.00	718.14	0.51
19	1	U10	Top	19.8	0.0	16.5	0.00	0.00	718.14	0.51
21	1	U11	Top	19.8	0.0	16.5	0.00	0.00	718.14	0.51
2	1	U1	Bot	30.8	0.0	0.0	64.90	-1285.53	0.00	0.45
4	1	U2	Bot	76.0	0.0	0.0	64.90	-1285.53	0.00	0.45

Only 15 points out of 22 are listed.

Max. Capacity Ratio: 0.61

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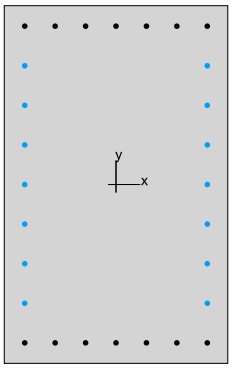
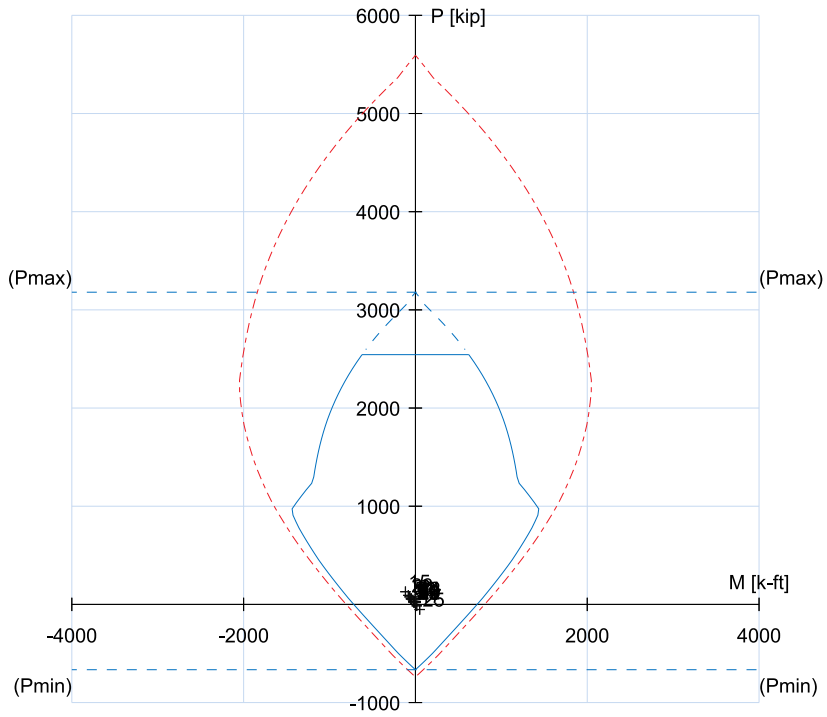
11.3. PM at θ=270 [deg]



30 x 48 in



PM at 270.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	30 in
Depth	48 in
A_g	1440 in^2
I_x	276480 in^4
I_y	108000 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	12.32 in^2
Rho	0.86 %
Min. clear spacing	3.33 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
25	1	U13	Top	-52.2	0.0	-49.5	-163.76	0.00	-550.57	0.61
15	1	U8	Top	129.4	0.0	116.4	0.00	0.00	718.14	0.58
17	1	U9	Top	-14.6	0.0	-15.6	-139.34	0.00	-575.88	0.57
23	1	U12	Top	91.8	0.0	82.5	0.00	0.00	718.14	0.56
3	1	U2	Top	76.0	0.0	67.4	0.00	0.00	718.14	0.55
5	1	U3	Top	57.4	0.0	50.4	0.00	0.00	718.14	0.53
11	1	U6	Top	57.4	0.0	50.4	0.00	0.00	718.14	0.53
13	1	U7	Top	57.4	0.0	50.4	0.00	0.00	718.14	0.53
1	1	U1	Top	30.8	0.0	25.6	0.00	0.00	718.14	0.52
7	1	U4	Top	26.4	0.0	22.0	0.00	0.00	718.14	0.51
9	1	U5	Top	26.4	0.0	22.0	0.00	0.00	718.14	0.51
19	1	U10	Top	19.8	0.0	16.5	0.00	0.00	718.14	0.51
21	1	U11	Top	19.8	0.0	16.5	0.00	0.00	718.14	0.51
2	1	U1	Bot	30.8	0.0	0.0	64.90	-1285.53	0.00	0.45
4	1	U2	Bot	76.0	0.0	0.0	64.90	-1285.53	0.00	0.45

Only 15 points out of 22 are listed.

Max. Capacity Ratio: 0.61

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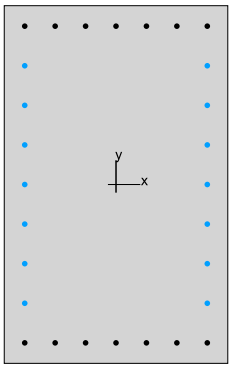
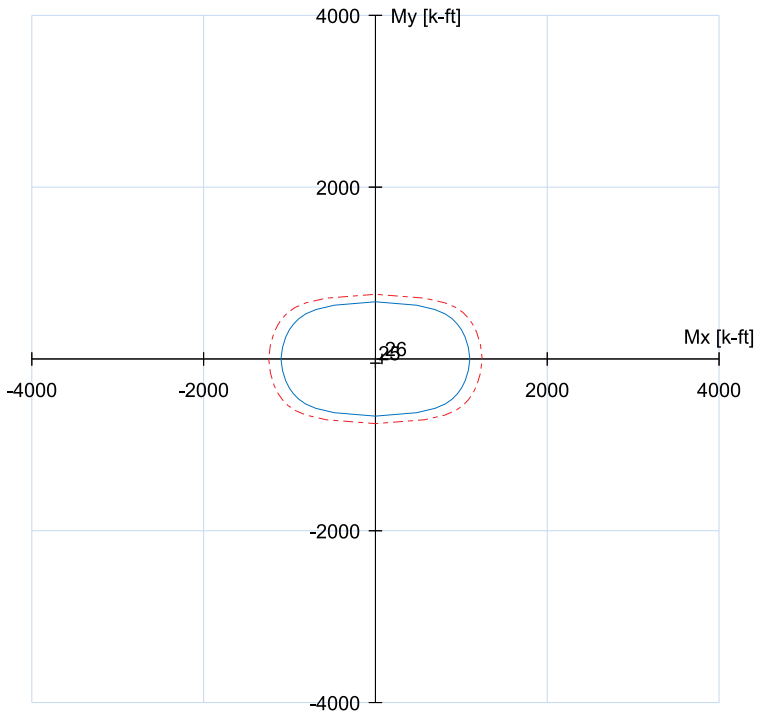
11.4. MM at P=-52 [kip]



30 x 48 in



MM at P=-52.0 [kip]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	30 in
Depth	48 in
A_g	1440 in^2
I_x	276480 in^4
I_y	108000 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	12.32 in^2
Rho	0.86 %
Min. clear spacing	3.33 in

No.	Load Combo			P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	Capacity
				kip	k-ft	k-ft	kip	k-ft	k-ft	Ratio
25	1	U13	Top	-52.2	0.0	-49.5	-163.76	0.00	-550.57	0.61
26	1	U13	Bot	-52.2	76.0	0.0	-170.29	900.09	0.00	0.60

Max. Capacity Ratio: 0.61

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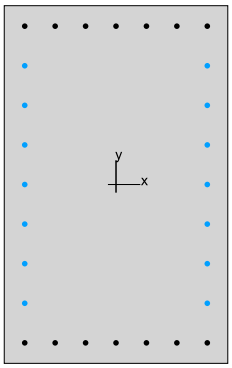
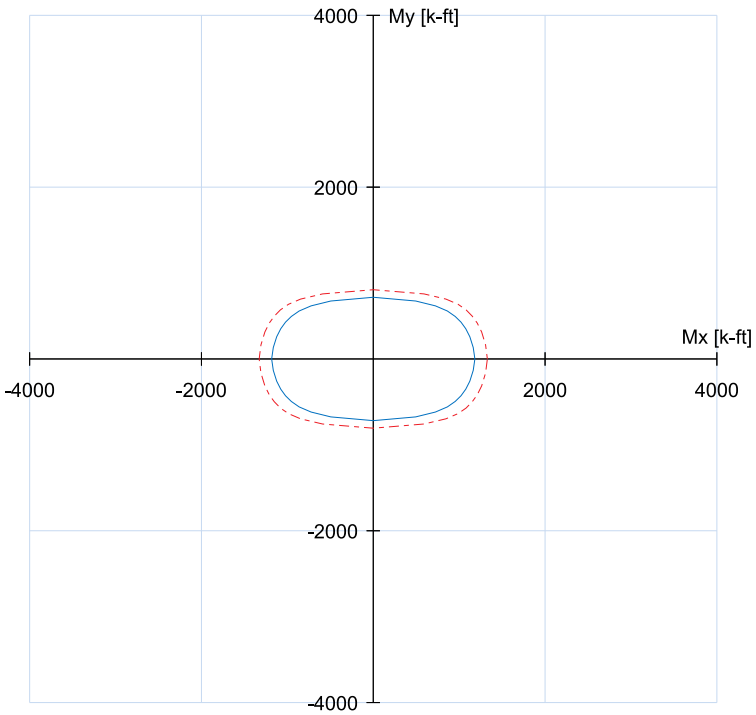
11.5. MM at P=0 [kip]



30 x 48 in



MM at P=0.0 [kip]

General Information	
Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials	
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	30 in
Depth	48 in
A_g	1440 in^2
I_x	276480 in^4
I_y	108000 in^4

Reinforcement	
Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	12.32 in^2
Rho	0.86 %
Min. clear spacing	3.33 in

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spColumn v10.00 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections
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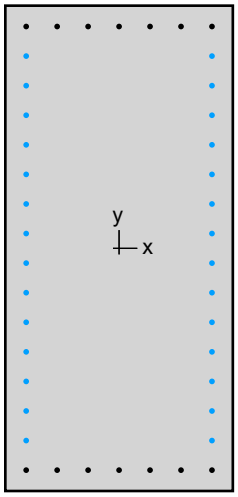

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Figure 1: Column section 4

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1. General Information

File Name	...\P-13 Pier on Grid A&4 (Mezz Brace Frame an...
Project	CCHS Field Hous
Column	CP-1 - Typical Pier on Grids A/I in Field House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	4	ksi
E_c	3605	ksi
f_c	3.4	ksi
ε_u	0.003	in/in
β_1	0.85	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{ty}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	30	in
Depth	64	in
A_g	1920	in^2
I_x	655360	in^4
I_y	144000	in^4
r_x	18.4752	in
r_y	8.66025	in
X_o	0	in
Y_o	0	in

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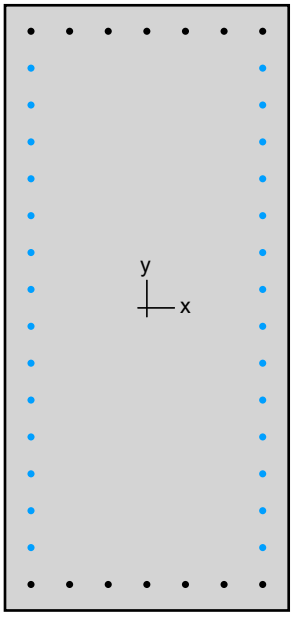
3.2. Section Figure



Rectangular 30 x 64 in 0.96% reinf.

Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter (in)	Area (in^2)	Bar	Diameter (in)	Area (in^2)	Bar	Diameter (in)	Area (in^2)
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #3 bars or less	#3 ties
For larger bars	#3 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---

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Total steel area, A_s	18.48 in^2
Rho	0.96 %
Minimum clear spacing	3.15 in

(Note: Rho < 1.0%)

4.4. Bars Provided

		Bars	Clear cover
			in
Top	7	#6	2
Bottom	7	#6	2
Left	14	#6	2
Right	14	#6	2

5. Loading

5.1. Load Cases

Case	Type	Sustained Load
		%
A	Dead	100
B	Live	0
C	Wind	0
D	EQ	0
E	Snow	0

5.2. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.500	0.000	1.600
U5	1.200	0.000	-0.500	0.000	1.600
U6	1.200	1.000	1.000	0.000	0.500
U7	1.200	1.000	-1.000	0.000	0.500
U8	1.200	1.000	0.000	1.000	0.200
U9	1.200	1.000	0.000	-1.000	0.200
U10	0.900	0.000	1.000	0.000	0.000
U11	0.900	0.000	-1.000	0.000	0.000
U12	0.900	0.000	0.000	1.000	0.000
U13	0.900	0.000	0.000	-1.000	0.000

5.3. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	27.00	-1.10	0.00	-7.10	0.00
1	Live	9.20	-16.10	0.00	7.00	0.00
1	Wind	42.50	21.30	70.00	-25.00	0.00
1	EQ	75.50	-124.50	92.50	52.10	0.00
1	Snow	34.00	17.00	0.00	-20.00	0.00

6. Slenderness

6.1. Sway Criteria

X-Axis	Non-sway column

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Y-Axis	Non-sway column

6.2. Columns

Column	Axis	Height	Width	Depth/Dia.	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	X	2	30	64	655360	4	3605
Design	Y	2	30	64	144000	4	3605
Above	X	(no column specified...)					
Above	Y	(no column specified...)					
Below	X	(no column specified...)					
Below	Y	(no column specified...)					

6.3. X - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

6.4. Y - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults
Stiffness reduction factor, ϕ_K	0.75
Cracked section coefficients, cI(beams)	0.35
Cracked section coefficients, cI(columns)	0.7
$0.2\ E_c\ I_g + E_s\ I_{se}$ (X-axis)	7.14e+008 kip-in^2
$0.2\ E_c\ I_g + E_s\ I_{se}$ (Y-axis)	1.69e+008 kip-in^2
Minimum eccentricity, $e_{x\ min}$	2.52 in
Minimum eccentricity, $e_{y\ min}$	1.50 in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
X	999.000	999.000	1.000	(N/A)	1.30
Y	999.000	999.000	1.000	(N/A)	2.77

7.3. Magnification Factors: X - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	37.80	(N/A)	6119133.50	1.000	(N/A)	(N/A)	*

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Load Combo		At Ends					Along Length						
		$\sum P_u$ kip	P_c kip	$\sum P_c$ kip	β_{ds}	δ_s	P_u kip	$k'l_u/r$	P_c kip	β_{dns}	C_m	δ	
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	64.12	(N/A)	8130104.50	0.505	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	96.00	(N/A)	9150106.00	0.338	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	108.05	(N/A)	9415057.00	0.300	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	65.55	(N/A)	8190081.00	0.494	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	101.10	(N/A)	9268082.00	0.320	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	16.10	(N/A)	6119133.50	1.000	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	123.90	(N/A)	9701352.00	0.262	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-27.10	(N/A)	12238267.00	0.000	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	66.80	(N/A)	8973834.00	0.364	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-18.20	(N/A)	12238267.00	0.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	99.80	(N/A)	9841894.00	0.243	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-51.20	(N/A)	12238267.00	0.000	(N/A)	(N/A)	*

7.4. Magnification Factors: Y - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$ kip	P_c kip	$\sum P_c$ kip	β_{ds}	δ_s	P_u kip	$k'l_u/r$	P_c kip	β_{dns}	C_m	δ	
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	37.80	(N/A)	1452082.75	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	64.12	(N/A)	1929290.13	0.505	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	96.00	(N/A)	2171338.75	0.338	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	108.05	(N/A)	2234212.00	0.300	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	65.55	(N/A)	1943522.75	0.494	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	101.10	(N/A)	2199334.50	0.320	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	16.10	(N/A)	1452082.75	1.000	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	123.90	(N/A)	2302150.50	0.262	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-27.10	(N/A)	2904165.50	0.000	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	66.80	(N/A)	2129509.00	0.364	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-18.20	(N/A)	2904165.50	0.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	99.80	(N/A)	2335501.25	0.243	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-51.20	(N/A)	2904165.50	0.000	(N/A)	(N/A)	*

8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. X - axis

Load Combo			1st Order					2nd Order		Ratio
			M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		M_i k-ft	M_c k-ft	2nd/1st
1	U1	Top	-1.54	(N/A)	-1.54	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Top	-18.58	(N/A)	-18.58	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Top	9.78	(N/A)	9.78	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Top	25.88	(N/A)	36.53	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	-35.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Top	25.88	(N/A)	15.23	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	35.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	-8.92	(N/A)	12.38	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	-70.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U7	Top	-8.92	(N/A)	-30.22	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	70.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	-14.02	(N/A)	-138.52	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	-92.50	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Top	-14.02	(N/A)	110.48	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	92.50	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Top	-0.99	(N/A)	20.31	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	-70.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	-0.99	(N/A)	-22.29	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	70.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	-0.99	(N/A)	-125.49	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	-92.50	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Top	-0.99	(N/A)	123.51	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	92.50	(N/A)	M_1=	(N/A)	(N/A)	(N/A)

8.2. Y - axis

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U1	Top	-9.94	(N/A)	-9.94	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Top	-7.32	(N/A)	-7.32	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Top	-33.52	(N/A)	-33.52	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Top	-40.52	(N/A)	-53.02	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Top	-40.52	(N/A)	-28.02	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Top	-11.52	(N/A)	-36.52	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Top	-11.52	(N/A)	13.48	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Top	-5.52	(N/A)	46.58	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Top	-5.52	(N/A)	-57.62	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Top	-6.39	(N/A)	-31.39	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Top	-6.39	(N/A)	18.61	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Top	-6.39	(N/A)	45.71	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Top	-6.39	(N/A)	-58.49	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)

9. Control Points

About	Point	P kip	X-Moment k-ft	Y-Moment k-ft	NA Depth in	d_t Depth in	ε_t	ϕ
X	@ Max compression	4765.5	0.00	0.00	197.36	61.25	-0.00207	0.65000
X	@ Allowable comp.	3812.4	1966.45	0.00	62.67	61.25	-0.00007	0.65000
X	@ f_s = 0.0	3723.8	2115.88	0.00	61.25	61.25	0.00000	0.65000

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About Point	P	X-Moment	Y-Moment	NA Depth	d_t Depth	ε_t	ϕ
	kip	k-ft	k-ft	in	in		
X @ f_s = 0.5 f_y	2701.3	3302.06	0.00	45.54	61.25	0.00103	0.65000
X @ Balanced point	2020.2	3653.27	0.00	36.25	61.25	0.00207	0.65000
X @ Tension control	1465.5	4538.22	0.00	22.77	61.25	0.00507	0.90000
X @ Pure bending	0.0	2364.96	0.00	8.00	61.25	0.01997	0.90000
X @ Max tension	-997.9	0.00	0.00	0.00	61.25	9.99999	0.90000
Y @ Max compression	4765.5	0.00	0.00	87.81	27.25	-0.00207	0.65000
Y @ Allowable comp.	3812.4	0.00	954.04	29.51	27.25	-0.00023	0.65000
Y @ f_s = 0.0	3513.4	0.00	1184.78	27.25	27.25	0.00000	0.65000
Y @ f_s = 0.5 f_y	2525.2	0.00	1684.91	20.26	27.25	0.00103	0.65000
Y @ Balanced point	1864.2	0.00	1852.38	16.13	27.25	0.00207	0.65000
Y @ Tension control	1488.0	0.00	2260.92	10.13	27.25	0.00507	0.90000
Y @ Pure bending	0.0	0.00	1078.01	3.36	27.25	0.02131	0.90000
Y @ Max tension	-997.9	0.00	0.00	0.00	27.25	9.99999	0.90000
-X @ Max compression	4765.5	0.00	0.00	197.36	61.25	-0.00207	0.65000
-X @ Allowable comp.	3812.4	-1966.45	0.00	62.67	61.25	-0.00007	0.65000
-X @ f_s = 0.0	3723.8	-2115.88	0.00	61.25	61.25	0.00000	0.65000
-X @ f_s = 0.5 f_y	2701.3	-3302.06	0.00	45.54	61.25	0.00103	0.65000
-X @ Balanced point	2020.2	-3653.27	0.00	36.25	61.25	0.00207	0.65000
-X @ Tension control	1465.5	-4538.22	0.00	22.77	61.25	0.00507	0.90000
-X @ Pure bending	0.0	-2364.96	0.00	8.00	61.25	0.01997	0.90000
-X @ Max tension	-997.9	0.00	0.00	0.00	61.25	9.99999	0.90000
-Y @ Max compression	4765.5	0.00	0.00	87.81	27.25	-0.00207	0.65000
-Y @ Allowable comp.	3812.4	0.00	-954.04	29.51	27.25	-0.00023	0.65000
-Y @ f_s = 0.0	3513.4	0.00	-1184.78	27.25	27.25	0.00000	0.65000
-Y @ f_s = 0.5 f_y	2525.2	0.00	-1684.91	20.26	27.25	0.00103	0.65000
-Y @ Balanced point	1864.2	0.00	-1852.38	16.13	27.25	0.00207	0.65000
-Y @ Tension control	1488.0	0.00	-2260.92	10.13	27.25	0.00507	0.90000
-Y @ Pure bending	0.0	0.00	-1078.01	3.36	27.25	0.02131	0.90000
-Y @ Max tension	-997.9	0.00	0.00	0.00	27.25	9.99999	0.90000

10. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand			Capacity			Parameters at Capacity			Capacity Ratio
				P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
1	1	U1	Top	37.80	-1.54	-9.94	0.00	-165.27	-1066.74	4.22	0.01954	0.900	0.50
2	1	U1	Bot	37.80	0.00	0.00	97.25	-2563.82	0.00	8.92	0.01760	0.900	0.43
3	1	U2	Top	64.12	-18.58	-7.32	0.00	-1897.89	-747.72	15.85	0.00785	0.900	0.32
4	1	U2	Bot	64.12	0.00	0.00	97.25	-2563.82	0.00	8.92	0.01760	0.900	0.43
5	1	U3	Top	96.00	9.78	-33.52	0.00	308.39	-1056.98	4.96	0.01800	0.900	0.49
6	1	U3	Bot	96.00	0.00	0.00	97.25	-2563.82	0.00	8.92	0.01760	0.900	0.43
7	1	U4	Top	108.05	36.53	-53.02	0.00	709.40	-1029.62	7.03	0.01370	0.900	0.45
8	1	U4	Bot	108.05	-35.00	0.00	0.00	-2364.96	0.00	8.00	0.01997	0.900	0.49
9	1	U5	Top	65.55	15.23	-28.02	0.00	565.00	-1039.47	6.29	0.01525	0.900	0.45
10	1	U5	Bot	65.55	35.00	0.00	0.00	2364.96	0.00	8.00	0.01997	0.900	0.49
11	1	U6	Top	101.10	12.38	-36.52	0.00	357.18	-1053.65	5.21	0.01748	0.900	0.48
12	1	U6	Bot	101.10	-70.00	0.00	0.00	-2364.96	0.00	8.00	0.01997	0.900	0.49
13	1	U7	Top	16.10	-30.22	13.48	0.00	-1808.16	806.55	15.22	0.00766	0.900	0.31
14	1	U7	Bot	16.10	70.00	0.00	0.00	2364.96	0.00	8.00	0.01997	0.900	0.49
15	1	U8	Top	123.90	-138.52	46.58	0.00	-2000.21	672.61	16.40	0.00818	0.900	0.36
16	1	U8	Bot	123.90	-92.50	0.00	0.00	-2364.96	0.00	8.00	0.01997	0.900	0.50

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No.	Load Combo			Demand			Capacity			Parameters at Capacity			Capacity Ratio
				P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
17	1	U9	Top	-27.10	110.48	-57.62	-316.45	1231.78	-642.43	10.66	0.01043	0.900	0.45
18	1	U9	Bot	-27.10	92.50	0.00	-223.43	1882.85	0.00	5.97	0.02780	0.900	0.56
19	1	U10	Top	66.80	20.31	-31.39	0.00	668.02	-1032.45	6.82	0.01414	0.900	0.44
20	1	U10	Bot	66.80	-70.00	0.00	0.00	-2364.96	0.00	8.00	0.01997	0.900	0.49
21	1	U11	Top	-18.20	-22.29	18.61	-304.84	-860.06	718.07	6.87	0.01424	0.900	0.46
22	1	U11	Bot	-18.20	70.00	0.00	-218.27	1894.51	0.00	6.01	0.02755	0.900	0.55
23	1	U12	Top	99.80	-125.49	45.71	0.00	-1952.54	711.22	16.23	0.00798	0.900	0.36
24	1	U12	Bot	99.80	-92.50	0.00	0.00	-2364.96	0.00	8.00	0.01997	0.900	0.50
25	1	U13	Top	-51.20	123.51	-58.49	-335.07	1269.96	-601.41	11.40	0.01058	0.900	0.46
26	1	U13	Bot	-51.20	92.50	0.00	-242.74	1839.17	0.00	5.79	0.02876	0.900	0.57

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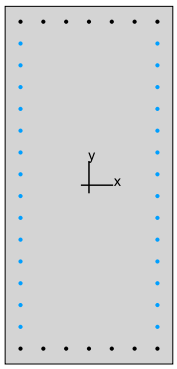
11. Diagrams

11.1. PM at θ=0 [deg]



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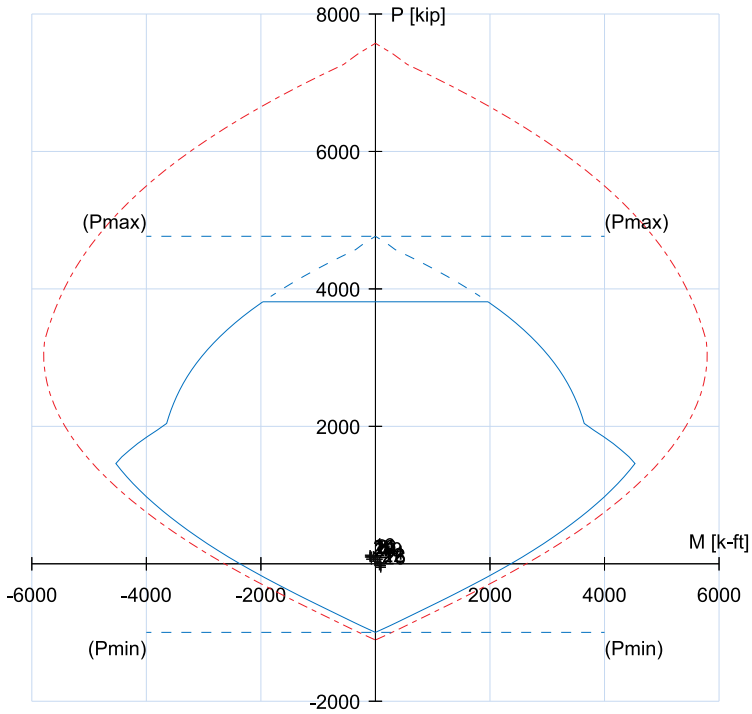

PM at 0.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	30 in
Depth	64 in
A_g	1920 in^2
I_x	655360 in^4
I_y	144000 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	18.48 in^2
Rho	0.96 %
Min. clear spacing	3.15 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
26	1	U13	Bot	-51.2	92.5	0.0	-242.74	1839.17	0.00	0.57
18	1	U9	Bot	-27.1	92.5	0.0	-223.43	1882.85	0.00	0.56
22	1	U11	Bot	-18.2	70.0	0.0	-218.27	1894.51	0.00	0.55
16	1	U8	Bot	123.9	-92.5	0.0	0.00	-2364.96	0.00	0.50
24	1	U12	Bot	99.8	-92.5	0.0	0.00	-2364.96	0.00	0.50
8	1	U4	Bot	108.1	-35.0	0.0	0.00	-2364.96	0.00	0.49
10	1	U5	Bot	65.6	35.0	0.0	0.00	2364.96	0.00	0.49
12	1	U6	Bot	101.1	-70.0	0.0	0.00	-2364.96	0.00	0.49
14	1	U7	Bot	16.1	70.0	0.0	0.00	2364.96	0.00	0.49
20	1	U10	Bot	66.8	-70.0	0.0	0.00	-2364.96	0.00	0.49
2	1	U1	Bot	37.8	0.0	0.0	97.25	-2563.82	0.00	0.43
4	1	U2	Bot	64.1	0.0	0.0	97.25	-2563.82	0.00	0.43
6	1	U3	Bot	96.0	0.0	0.0	97.25	-2563.82	0.00	0.43

Max. Capacity Ratio: 0.57

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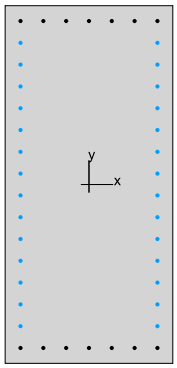
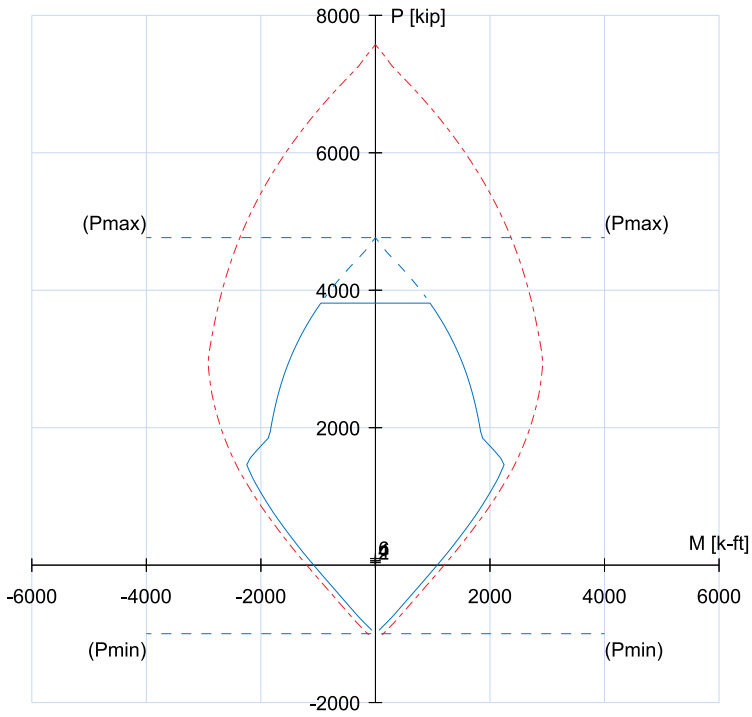
11.2. PM at θ=90 [deg]



30 x 64 in



PM at 90.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	30 in
Depth	64 in
A_g	1920 in^2
I_x	655360 in^4
I_y	144000 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	18.48 in^2
Rho	0.96 %
Min. clear spacing	3.15 in

No.	Load Combo			P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	Capacity
				kip	k-ft	k-ft	kip	k-ft	k-ft	Ratio
2	1	U1	Bot	37.8	0.0	0.0	97.25	-2563.82	0.00	0.43
4	1	U2	Bot	64.1	0.0	0.0	97.25	-2563.82	0.00	0.43
6	1	U3	Bot	96.0	0.0	0.0	97.25	-2563.82	0.00	0.43

Max. Capacity Ratio: 0.57

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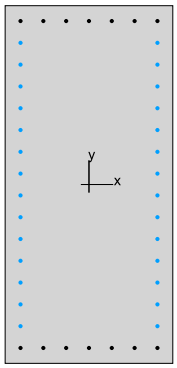
11.3. MM at P=-51 [kip]



30 x 64 in

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

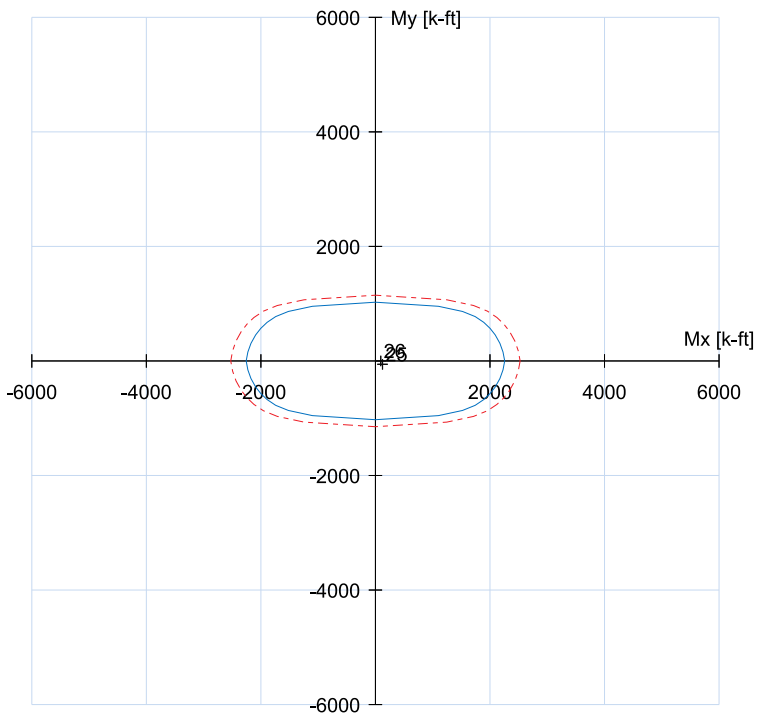
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	30 in
Depth	64 in
A_g	1920 in^2
I_x	655360 in^4
I_y	144000 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	18.48 in^2
Rho	0.96 %
Min. clear spacing	3.15 in



MM at P=-51.0 [kip]

No.	Load Combo			P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	Capacity
				kip	k-ft	k-ft	kip	k-ft	k-ft	Ratio
26	1	U13	Bot	-51.2	92.5	0.0	-242.74	1839.17	0.00	0.57
25	1	U13	Top	-51.2	123.5	-58.5	-335.07	1269.96	-601.41	0.46

Max. Capacity Ratio: 0.57

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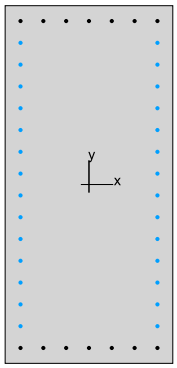
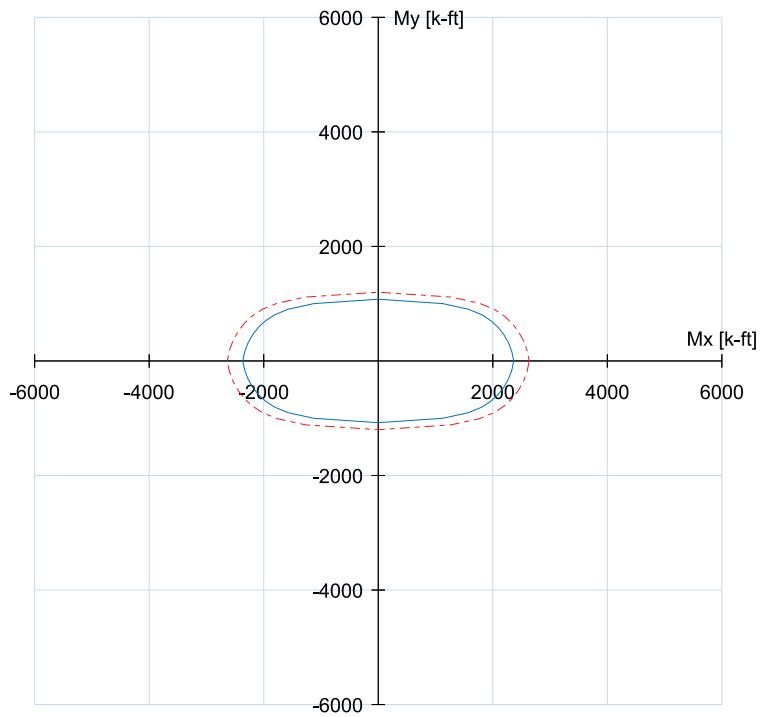
11.4. MM at P=0 [kip]



30 x 64 in



MM at P=0.0 [kip]

General Information	
Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials	
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	30 in
Depth	64 in
A_g	1920 in^2
I_x	655360 in^4
I_y	144000 in^4

Reinforcement	
Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	18.48 in^2
Rho	0.96 %
Min. clear spacing	3.15 in

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spColumn v10.00 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections
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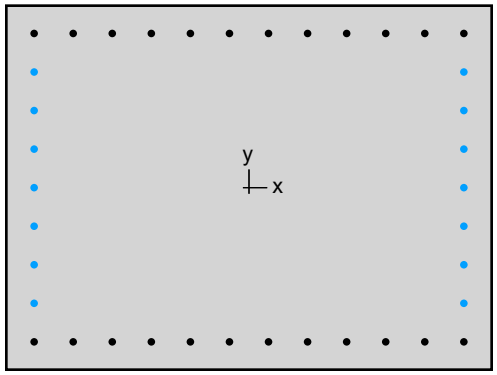

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Figure 1: Column section 4

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1. General Information

File Name	...\P-14 Pier for Interior Mezz Brace Frames.colx
Project	CCHS Field Hous
Column	CP-1 - Typical Pier on Grids A/I in Field House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	4	ksi
E_c	3605	ksi
f_c	3.4	ksi
ε_u	0.003	in/in
β_1	0.85	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{ty}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	48	in
Depth	36	in
A_g	1728	in^2
I_x	186624	in^4
I_y	331776	in^4
r_x	10.3923	in
r_y	13.8564	in
X_o	0	in
Y_o	0	in

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3.2. Section Figure

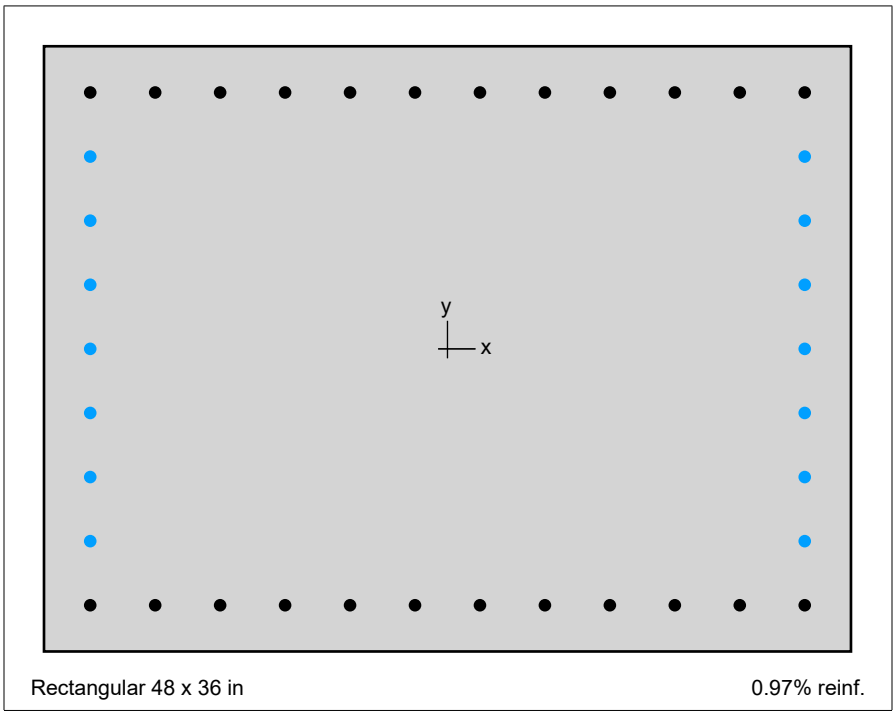

Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter in	Area in²	Bar	Diameter in	Area in²	Bar	Diameter in	Area in²
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #3 bars or less	#3 ties
For larger bars	#3 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---

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Total steel area, A_s	16.72 in^2
Rho	0.97 %
Minimum clear spacing	3.06 in

(Note: Rho < 1.0%)

4.4. Bars Provided

		Bars	Clear cover
			in
Top	12	#6	2
Bottom	12	#6	2
Left	7	#6	2
Right	7	#6	2

5. Loading

5.1. Load Cases

Case	Type	Sustained Load
		%
A	Dead	100
B	Live	0
C	Wind	0
D	EQ	0
E	Snow	0

5.2. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.500	0.000	1.600
U5	1.200	0.000	-0.500	0.000	1.600
U6	1.200	1.000	1.000	0.000	0.500
U7	1.200	1.000	-1.000	0.000	0.500
U8	1.200	1.000	0.000	1.000	0.200
U9	1.200	1.000	0.000	-1.000	0.200
U10	0.900	0.000	1.000	0.000	0.000
U11	0.900	0.000	-1.000	0.000	0.000
U12	0.900	0.000	0.000	1.000	0.000
U13	0.900	0.000	0.000	-1.000	0.000

5.3. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	8.00	0.00	0.00	3.70	0.00
1	Live	10.00	0.00	0.00	4.60	0.00
1	Wind	0.00	0.00	0.00	0.00	0.00
1	EQ	126.00	0.00	0.00	116.00	127.00
1	Snow	0.00	0.00	0.00	0.00	0.00

6. Slenderness

6.1. Sway Criteria

X-Axis	Non-sway column

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Y-Axis	Non-sway column

6.2. Columns

Column	Axis	Height	Width	Depth/Dia.	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	X	2	48	36	186624	4	3605
Design	Y	2	48	36	331776	4	3605
Above	X	(no column specified...)					
Above	Y	(no column specified...)					
Below	X	(no column specified...)					
Below	Y	(no column specified...)					

6.3. X - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

6.4. Y - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults
Stiffness reduction factor, ϕ_K	0.75
Cracked section coefficients, cI(beams)	0.35
Cracked section coefficients, cI(columns)	0.7
$0.2\ E_c\ I_g + E_s\ I_{se}$ (X-axis)	2.16e+008 $kip\text{-}in^2$
$0.2\ E_c\ I_g + E_s\ I_{se}$ (Y-axis)	3.74e+008 $kip\text{-}in^2$
Minimum eccentricity, $e_{x\ min}$	1.68 in
Minimum eccentricity, $e_{y\ min}$	2.04 in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
X	999.000	999.000	1.000	(N/A)	2.31
Y	999.000	999.000	1.000	(N/A)	1.73

7.3. Magnification Factors: X - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	11.20	(N/A)	1853442.00	1.000	(N/A)	(N/A)	*

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Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	25.60	(N/A)	2695915.75	0.375	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.60	(N/A)	2488182.50	0.490	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	9.60	(N/A)	1853442.00	1.000	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	9.60	(N/A)	1853442.00	1.000	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.60	(N/A)	2488182.50	0.490	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.60	(N/A)	2488182.50	0.490	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	145.60	(N/A)	3477592.50	0.066	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-106.40	(N/A)	3706884.00	0.000	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	7.20	(N/A)	1853442.00	1.000	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	7.20	(N/A)	1853442.00	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	133.20	(N/A)	3516787.50	0.054	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-118.80	(N/A)	3706884.00	0.000	(N/A)	(N/A)	*

7.4. Magnification Factors: Y - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	11.20	(N/A)	3209830.50	1.000	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	25.60	(N/A)	4668844.50	0.375	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.60	(N/A)	4309087.50	0.490	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	9.60	(N/A)	3209830.50	1.000	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	9.60	(N/A)	3209830.50	1.000	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.60	(N/A)	4309087.50	0.490	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	19.60	(N/A)	4309087.50	0.490	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	145.60	(N/A)	6022568.50	0.066	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-106.40	(N/A)	6419661.00	0.000	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	7.20	(N/A)	3209830.50	1.000	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	7.20	(N/A)	3209830.50	1.000	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	133.20	(N/A)	6090448.00	0.054	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	-118.80	(N/A)	6419661.00	0.000	(N/A)	(N/A)	*

8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. X - axis

Load Combo			1st Order					2nd Order		Ratio
			M_{ns}	M_s	M_u	M_{min}		M_i	M_c	2nd/1st
			k-ft	k-ft	k-ft	k-ft		k-ft	k-ft	
1	U1	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

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Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft	2nd Order	M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U7	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

8.2. Y - axis

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft	2nd Order	M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U1	Top	5.18	(N/A)	5.18	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Top	11.80	(N/A)	11.80	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Top	9.04	(N/A)	9.04	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Top	4.44	(N/A)	4.44	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Top	4.44	(N/A)	4.44	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Top	9.04	(N/A)	9.04	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Top	9.04	(N/A)	9.04	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Top	9.04	(N/A)	125.04	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	-127.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Top	9.04	(N/A)	-106.96	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	127.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Top	3.33	(N/A)	3.33	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Top	3.33	(N/A)	3.33	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Top	3.33	(N/A)	119.33	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	-127.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Top	3.33	(N/A)	-112.67	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	127.00	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

9. Control Points

About	Point	P kip	X-Moment k-ft	Y-Moment k-ft	NA Depth in	d_t Depth in	ε_t	ϕ
X	@ Max compression	4311.4	0.00	0.00	107.14	33.25	-0.00207	0.65000
X	@ Allowable comp.	3449.2	1027.83	0.00	35.38	33.25	-0.00018	0.65000
X	@ f_s = 0.0	3237.7	1225.65	0.00	33.25	33.25	0.00000	0.65000

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About Point	P	X-Moment	Y-Moment	NA Depth	d_t Depth	ε_t	ϕ
	kip	k-ft	k-ft	in	in		
X @ f_s = 0.5 f_y	2333.1	1786.91	0.00	24.72	33.25	0.00103	0.65000
X @ Balanced point	1729.1	1969.35	0.00	19.68	33.25	0.00207	0.65000
X @ Tension control	1331.1	2411.29	0.00	12.36	33.25	0.00507	0.90000
X @ Pure bending	0.0	1187.31	0.00	4.08	33.25	0.02143	0.90000
X @ Max tension	-902.9	0.00	0.00	0.00	33.25	9.99999	0.90000
Y @ Max compression	4311.4	0.00	0.00	145.81	45.25	-0.00207	0.65000
Y @ Allowable comp.	3449.2	0.00	1354.39	47.09	45.25	-0.00012	0.65000
Y @ f_s = 0.0	3310.7	0.00	1528.43	45.25	45.25	0.00000	0.65000
Y @ f_s = 0.5 f_y	2395.5	0.00	2310.48	33.65	45.25	0.00103	0.65000
Y @ Balanced point	1782.4	0.00	2552.44	26.78	45.25	0.00207	0.65000
Y @ Tension control	1330.2	0.00	3150.73	16.82	45.25	0.00507	0.90000
Y @ Pure bending	0.0	0.00	1603.08	5.61	45.25	0.02121	0.90000
Y @ Max tension	-902.9	0.00	0.00	0.00	45.25	9.99999	0.90000
-X @ Max compression	4311.4	0.00	0.00	107.14	33.25	-0.00207	0.65000
-X @ Allowable comp.	3449.2	-1027.83	0.00	35.38	33.25	-0.00018	0.65000
-X @ f_s = 0.0	3237.7	-1225.65	0.00	33.25	33.25	0.00000	0.65000
-X @ f_s = 0.5 f_y	2333.1	-1786.91	0.00	24.72	33.25	0.00103	0.65000
-X @ Balanced point	1729.1	-1969.35	0.00	19.68	33.25	0.00207	0.65000
-X @ Tension control	1331.1	-2411.29	0.00	12.36	33.25	0.00507	0.90000
-X @ Pure bending	0.0	-1187.31	0.00	4.08	33.25	0.02143	0.90000
-X @ Max tension	-902.9	0.00	0.00	0.00	33.25	9.99999	0.90000
-Y @ Max compression	4311.4	0.00	0.00	145.81	45.25	-0.00207	0.65000
-Y @ Allowable comp.	3449.2	0.00	-1354.39	47.09	45.25	-0.00012	0.65000
-Y @ f_s = 0.0	3310.7	0.00	-1528.43	45.25	45.25	0.00000	0.65000
-Y @ f_s = 0.5 f_y	2395.5	0.00	-2310.48	33.65	45.25	0.00103	0.65000
-Y @ Balanced point	1782.4	0.00	-2552.44	26.78	45.25	0.00207	0.65000
-Y @ Tension control	1330.2	0.00	-3150.73	16.82	45.25	0.00507	0.90000
-Y @ Pure bending	0.0	0.00	-1603.08	5.61	45.25	0.02121	0.90000
-Y @ Max tension	-902.9	0.00	0.00	0.00	45.25	9.99999	0.90000

10. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Critical Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand P_u	M_{ux}	M_{uy}	Capacity ϕP_n	ϕM_{nx}	ϕM_{ny}	Parameters at Capacity NA Depth	ε_t	ϕ	Capacity Ratio
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
1	1	U1	Top	11.20	0.00	5.18	0.00	0.00	1603.08	5.61	0.02121	0.900	0.49
2	1	U1	Bot	11.20	0.00	0.00	87.99	-1291.97	0.00	4.51	0.01913	0.900	0.46
3	1	U2	Top	25.60	0.00	11.80	0.00	0.00	1603.08	5.61	0.02121	0.900	0.49
4	1	U2	Bot	25.60	0.00	0.00	87.99	-1291.97	0.00	4.51	0.01913	0.900	0.46
5	1	U3	Top	19.60	0.00	9.04	0.00	0.00	1603.08	5.61	0.02121	0.900	0.49
6	1	U3	Bot	19.60	0.00	0.00	87.99	-1291.97	0.00	4.51	0.01913	0.900	0.46
7	1	U4	Top	9.60	0.00	4.44	0.00	0.00	1603.08	5.61	0.02121	0.900	0.49
8	1	U4	Bot	9.60	0.00	0.00	87.99	-1291.97	0.00	4.51	0.01913	0.900	0.46
9	1	U5	Top	9.60	0.00	4.44	0.00	0.00	1603.08	5.61	0.02121	0.900	0.49
10	1	U5	Bot	9.60	0.00	0.00	87.99	-1291.97	0.00	4.51	0.01913	0.900	0.46
11	1	U6	Top	19.60	0.00	9.04	0.00	0.00	1603.08	5.61	0.02121	0.900	0.49
12	1	U6	Bot	19.60	0.00	0.00	87.99	-1291.97	0.00	4.51	0.01913	0.900	0.46
13	1	U7	Top	19.60	0.00	9.04	0.00	0.00	1603.08	5.61	0.02121	0.900	0.49
14	1	U7	Bot	19.60	0.00	0.00	87.99	-1291.97	0.00	4.51	0.01913	0.900	0.46
15	1	U8	Top	145.60	0.00	125.04	0.00	0.00	1603.08	5.61	0.02121	0.900	0.53
16	1	U8	Bot	145.60	0.00	-127.00	0.00	0.00	-1603.08	5.61	0.02121	0.900	0.53

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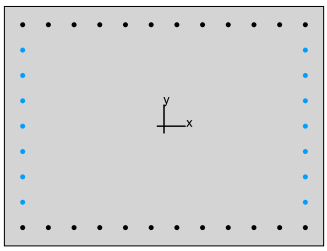
No.	Load Combo			Demand			Capacity			Parameters at Capacity			Capacity Ratio
				P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
				kip	k-ft	k-ft	kip	k-ft	k-ft	in			
17	1	U9	Top	-106.40	0.00	-106.96	-257.04	0.00	-1175.40	3.90	0.03185	0.900	0.62
18	1	U9	Bot	-106.40	0.00	127.00	-254.76	0.00	1179.29	3.91	0.03171	0.900	0.63
19	1	U10	Top	7.20	0.00	3.33	0.00	0.00	1603.08	5.61	0.02121	0.900	0.49
20	1	U10	Bot	7.20	0.00	0.00	87.99	-1291.97	0.00	4.51	0.01913	0.900	0.46
21	1	U11	Top	7.20	0.00	3.33	0.00	0.00	1603.08	5.61	0.02121	0.900	0.49
22	1	U11	Bot	7.20	0.00	0.00	87.99	-1291.97	0.00	4.51	0.01913	0.900	0.46
23	1	U12	Top	133.20	0.00	119.33	0.00	0.00	1603.08	5.61	0.02121	0.900	0.53
24	1	U12	Bot	133.20	0.00	-127.00	0.00	0.00	-1603.08	5.61	0.02121	0.900	0.53
25	1	U13	Top	-118.80	0.00	-112.67	-266.38	0.00	-1159.44	3.83	0.03242	0.900	0.63
26	1	U13	Bot	-118.80	0.00	127.00	-264.75	0.00	1162.22	3.84	0.03232	0.900	0.63

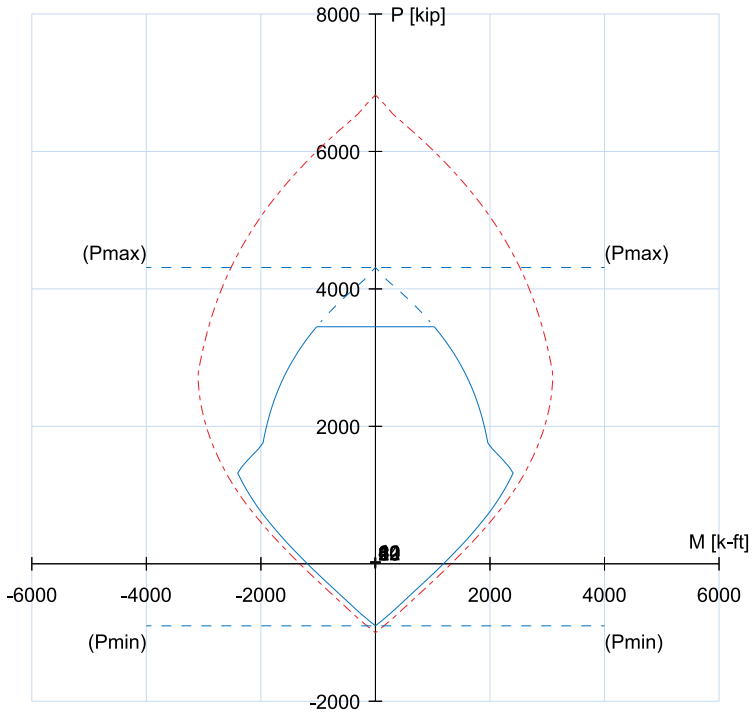
P-14

11. Diagrams

11.1. PM at θ=0 [deg]



48 x 36 in



PM at 0.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	48 in
Depth	36 in
A_g	1728 in^2
I_x	186624 in^4
I_y	331776 in^4

Reinforcement

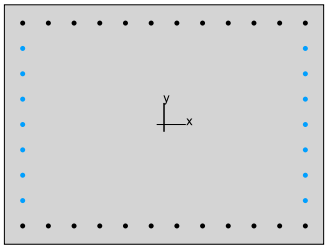
Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	16.72 in^2
Rho	0.97 %
Min. clear spacing	3.06 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
2	1	U1	Bot	11.2	0.0	0.0	87.99	-1291.97	0.00	0.46
4	1	U2	Bot	25.6	0.0	0.0	87.99	-1291.97	0.00	0.46
6	1	U3	Bot	19.6	0.0	0.0	87.99	-1291.97	0.00	0.46
8	1	U4	Bot	9.6	0.0	0.0	87.99	-1291.97	0.00	0.46
10	1	U5	Bot	9.6	0.0	0.0	87.99	-1291.97	0.00	0.46
12	1	U6	Bot	19.6	0.0	0.0	87.99	-1291.97	0.00	0.46
14	1	U7	Bot	19.6	0.0	0.0	87.99	-1291.97	0.00	0.46
20	1	U10	Bot	7.2	0.0	0.0	87.99	-1291.97	0.00	0.46
22	1	U11	Bot	7.2	0.0	0.0	87.99	-1291.97	0.00	0.46

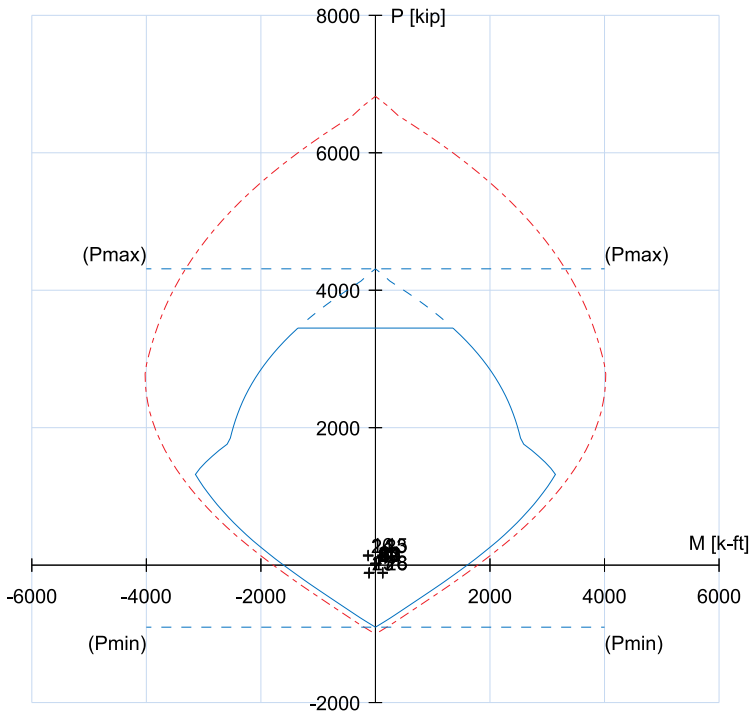
Max. Capacity Ratio: 0.63

P-14

11.2. PM at θ=90 [deg]



48 x 36 in



PM at 90.0 [deg]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	48 in
Depth	36 in
A_g	1728 in^2
I_x	186624 in^4
I_y	331776 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	16.72 in^2
Rho	0.97 %
Min. clear spacing	3.06 in

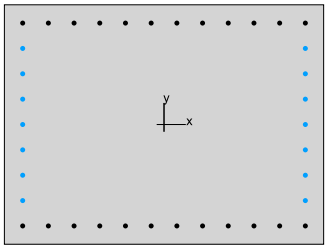
No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
18	1	U9	Bot	-106.4	0.0	127.0	-254.76	0.00	1179.29	0.63
25	1	U13	Top	-118.8	0.0	-112.7	-266.38	0.00	-1159.44	0.63
26	1	U13	Bot	-118.8	0.0	127.0	-264.75	0.00	1162.22	0.63
17	1	U9	Top	-106.4	0.0	-107.0	-257.04	0.00	-1175.40	0.62
15	1	U8	Top	145.6	0.0	125.0	0.00	0.00	1603.08	0.53
16	1	U8	Bot	145.6	0.0	-127.0	0.00	0.00	-1603.08	0.53
23	1	U12	Top	133.2	0.0	119.3	0.00	0.00	1603.08	0.53
24	1	U12	Bot	133.2	0.0	-127.0	0.00	0.00	-1603.08	0.53
1	1	U1	Top	11.2	0.0	5.2	0.00	0.00	1603.08	0.49
3	1	U2	Top	25.6	0.0	11.8	0.00	0.00	1603.08	0.49
5	1	U3	Top	19.6	0.0	9.0	0.00	0.00	1603.08	0.49
7	1	U4	Top	9.6	0.0	4.4	0.00	0.00	1603.08	0.49
9	1	U5	Top	9.6	0.0	4.4	0.00	0.00	1603.08	0.49
11	1	U6	Top	19.6	0.0	9.0	0.00	0.00	1603.08	0.49
13	1	U7	Top	19.6	0.0	9.0	0.00	0.00	1603.08	0.49

Only 15 points out of 26 are listed.

Max. Capacity Ratio: 0.63

P-14

11.3. PM at θ=270 [deg]



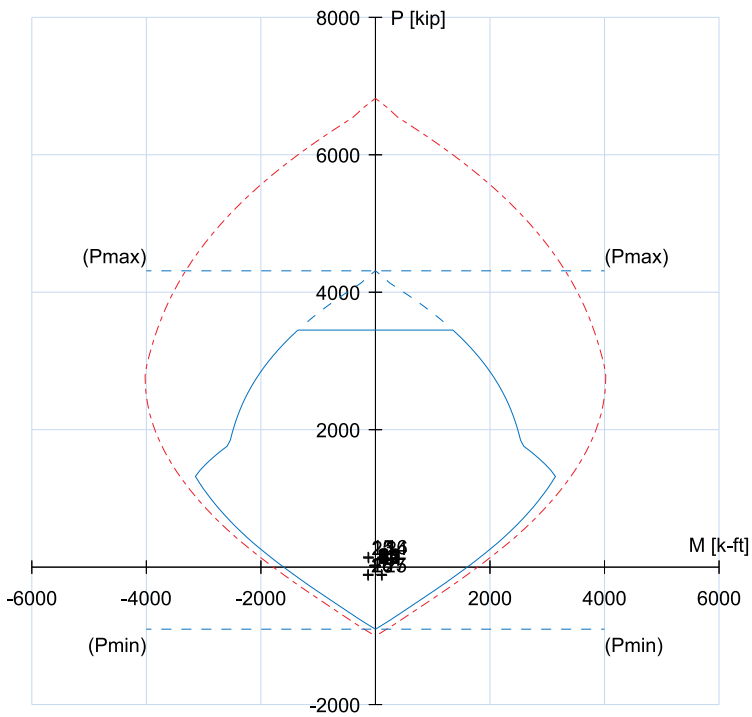
48 x 36 in

General Information	
Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials	
f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	48 in
Depth	36 in
A_g	1728 in^2
I_x	186624 in^4
I_y	331776 in^4

Reinforcement	
Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	16.72 in^2
Rho	0.97 %
Min. clear spacing	3.06 in



PM at 270.0 [deg]

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
18	1	U9	Bot	-106.4	0.0	127.0	-254.76	0.00	1179.29	0.63
25	1	U13	Top	-118.8	0.0	-112.7	-266.38	0.00	-1159.44	0.63
26	1	U13	Bot	-118.8	0.0	127.0	-264.75	0.00	1162.22	0.63
17	1	U9	Top	-106.4	0.0	-107.0	-257.04	0.00	-1175.40	0.62
15	1	U8	Top	145.6	0.0	125.0	0.00	0.00	1603.08	0.53
16	1	U8	Bot	145.6	0.0	-127.0	0.00	0.00	-1603.08	0.53
23	1	U12	Top	133.2	0.0	119.3	0.00	0.00	1603.08	0.53
24	1	U12	Bot	133.2	0.0	-127.0	0.00	0.00	-1603.08	0.53
1	1	U1	Top	11.2	0.0	5.2	0.00	0.00	1603.08	0.49
3	1	U2	Top	25.6	0.0	11.8	0.00	0.00	1603.08	0.49
5	1	U3	Top	19.6	0.0	9.0	0.00	0.00	1603.08	0.49
7	1	U4	Top	9.6	0.0	4.4	0.00	0.00	1603.08	0.49
9	1	U5	Top	9.6	0.0	4.4	0.00	0.00	1603.08	0.49
11	1	U6	Top	19.6	0.0	9.0	0.00	0.00	1603.08	0.49
13	1	U7	Top	19.6	0.0	9.0	0.00	0.00	1603.08	0.49

Only 15 points out of 26 are listed.

Max. Capacity Ratio: 0.63

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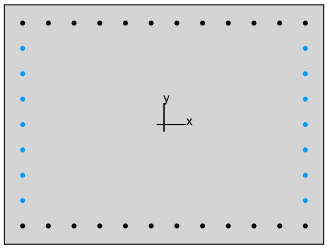
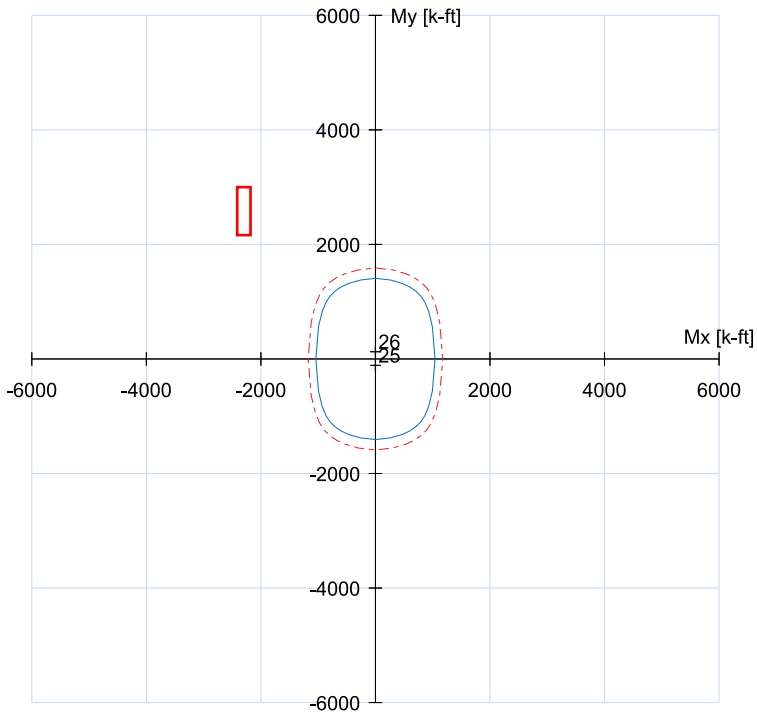
11.4. MM at P=-119 [kip]



48 x 36 in



MM at P=-119.0 [kip]

General Information

Project	CCHS Field Hous
Column	CP-1 - Typ...ield House
Engineer	MDK
Code	ACI 318-19
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Considered
Column Type	Architectural
Capacity Method	Critical capacity

Materials

f'_c	4 ksi
E_c	3605 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Rectangular
Width	48 in
Depth	36 in
A_g	1728 in^2
I_x	186624 in^4
I_y	331776 in^4

Reinforcement

Pattern	Sides different
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	16.72 in^2
Rho	0.97 %
Min. clear spacing	3.06 in

No.	Load Combo			P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
25	1	U13	Top	-118.8	0.0	-112.7	-266.38	0.00	-1159.44	0.63
26	1	U13	Bot	-118.8	0.0	127.0	-264.75	0.00	1162.22	0.63

Max. Capacity Ratio: 0.63

SECTION BREAK

Lateral Design

SUBSECTION BREAK

PEMB Moment Frame Analysis

DESCRIPTION/NOTES:

Description details.

Design Criteria

$D_{L.Roof} := 15\ psf$

$L_{L.Roof} := 20\ psf$

$S_L := 25\ psf$

$D_{L.Wall} := 10\ psf$

$D_{L.Veneer} := 55\ psf$

$Trib := \frac{24.5\ ft + 24.375\ ft}{2} = 24.4\ ft$ Worst Case Trib, Second frame from outside

Main Building Dimensions

$h_{wall} := \frac{37.33\ ft + 35.5\ ft}{2} = 36.4\ ft$

$L_{total} := 218\ ft$

$W_{bldg} := 172\ ft$

$L_{FH} := 168\ ft$

Side Building Dimensions

$h_{wall.side} := \frac{31.33\ ft + 30.33\ ft}{2} = 30.8\ ft$

$L_{roof.side} := 50\ ft$

Seismic Design Criteria

$S_{DS} := 0.992$

$I_e := 1.25$

$R := 3.5$

$C_d := 3$ Ordinary Moment Frame Assumed

$\Omega_o := 3$

$C_s := \frac{S_{DS}}{\left(\frac{R}{I_e}\right)} = 0.4$

Note: These Values and the results found in Risa are Preliminary expected values for the PEMB Building.

Main Moment Frame Design

Dead Load

$w_{DL} := D_{L.Roof} \mid Trib = 0.367\ klf$

Live Load

$w_{LL} := L_{L.Roof} \mid Trib = 0.489\ klf$

Snow Load

$w_{SL} := S_L \mid Trib = 0.611\ klf$

Veneer Load

$w_{veneer} := D_{L.Veneer} \mid Trib = 1.344\ klf$

Wind Load

Can be found on Wind Analysis Calc

Seismic Load

Main Building

$W_{wall} := Trib \mid \frac{h_{wall}}{2} \mid D_{L.Wall} = 4.45\ kip$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

$W_{roof} := L_{FH} \cdot Trib \cdot D_{L.Roof} = 61.58\ kip$

$W_{eq.total} := W_{wall} + W_{roof} = 66.03\ kip$

$V_{EQ} := W_{eq.total} \cdot C_s = 23.39\ kip$

Side Building

$W_{wall} := Trib \cdot \frac{h_{wall.side}}{2} \cdot D_{L.Wall} = 3.77\ kip$

$W_{roof} := L_{roof.side} \cdot Trib \cdot D_{L.Roof} = 18.33\ kip$

$W_{eq.total} := W_{wall} + W_{roof} = 22.10\ kip$

$V_{EQ} := W_{eq.total} \cdot C_s = 7.83\ kip$

Max Deflection

Max Seismic Horizontal Deflection

$\Theta_{max} := \frac{0.015\ h_{wall} \cdot 0.7 \cdot I_e}{C_d} = 1.912\ in$

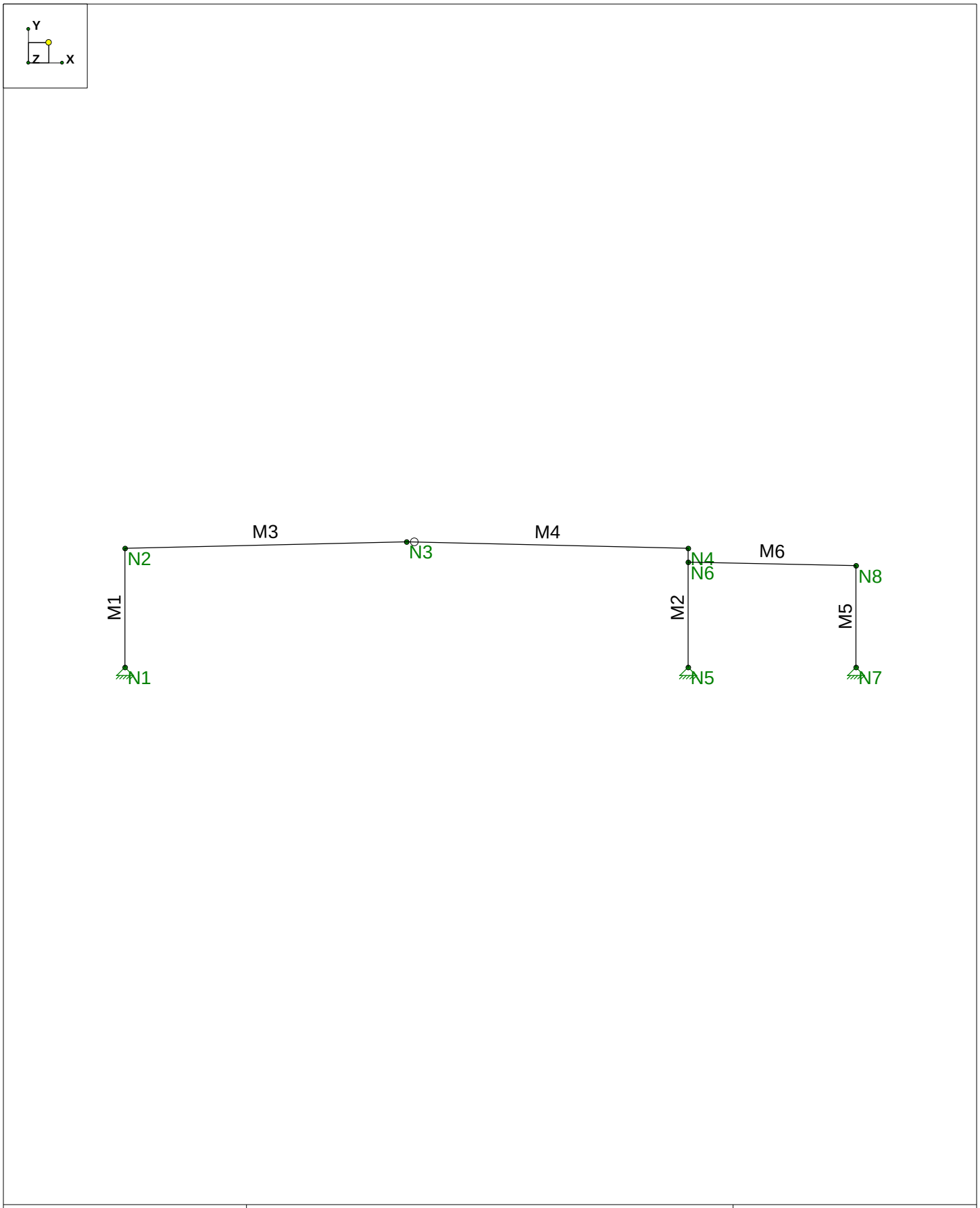
Max Vertical Deflection

$\Theta_{max} := \frac{L_{FH}}{240} = 8.400\ in$

Max Wind Horizontal Deflection

$\Theta_{max} := \frac{h_{wall}}{500} = 0.874\ in$

Created with PTC Mathcad Express. See www.mathcad.com for more information.



Calder Richards	CCHS Prelim Moment Frame (West Loading)	SK - 2
MDK		Aug 30, 2024 at 8:33 AM
24047		CCHS Moment Frame West Loading...

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Temp [F]
1	N1	0	0	0
2	N2	0	35.5	0
3	N3	84	37.33	0
4	N4	168	35.5	0
5	N5	168	0	0
6	N6	168	31.33	0
7	N7	218	0	0
8	N8	218	30.33	0

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Rotation[k-ft/rad]
1	N1	Reaction	Reaction	
2	N5	Reaction	Reaction	
3	N7	Reaction	Reaction	

Joint Loads and Enforced Displacements (BLC 5 : Earthquake Loads - Horizontal)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*...	Inactive
1	N2	L	X	12	
2	N4	L	X	12	
3	N6	L	X	4	
4	N8	L	X	4	

Member Distributed Loads (BLC 1 : Dead Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M3	Y	-0.36	-0.36	0	%100	
2	M4	Y	-0.36	-0.36	0	%100	
3	M6	Y	-0.36	-0.36	0	%100	
4	M1	Y	-1.32	-1.32	0	6	
5	M5	Y	-1.32	-1.32	0	6	

Member Distributed Loads (BLC 2 : Roof Live Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M3	Y	-0.48	-0.48	0	%100	
2	M4	Y	-0.48	-0.48	0	%100	
3	M6	Y	-0.48	-0.48	0	%100	

Member Distributed Loads (BLC 3 : Snow Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M3	Y	-0.6	-0.6	0	%100	
2	M4	Y	-0.6	-0.6	0	%100	
3	M6	Y	-0.6	-0.6	0	%100	

Member Distributed Loads (BLC 4 : Wind Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M1	X	0.58	0.58	0	%100	

Member Distributed Loads (BLC 4 : Wind Loads) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
2	M3	X	0.29	0.29	0	%100	
3	M3	Y	0.71	0.71	0	%100	
4	M4	Y	0.42	0.42	0	%100	
5	M6	Y	0.42	0.42	0	%100	

Load Combinations

	Description	Solve	PD...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4D	Yes	Y		DL	1.4																		
2	1.2D+1.6L+0.5Lr	Yes	Y		DL	1.2	LL	1.6	RLL	0.5														
3	1.2D+1.6L+0.5S	Yes	Y		DL	1.2	LL	1.6			SL	0.5												
4	1.2D+1.6L+0.5R	Yes	Y		DL	1.2	LL	1.6					RL	0.5										
5	1.2D+1.6Lr+L	Yes	Y		DL	1.2	LL	1	RLL	1.6														
6	1.2D+1.6S+L	Yes	Y		DL	1.2	LL	1			SL	1.6												
7	1.2D+1.6R+L	Yes	Y		DL	1.2	LL	1					RL	1.6										
8	1.2D+1.6Lr+0.5W	Yes	Y		DL	1.2			RLL	1.6					W...	0.5								
9	1.2D+1.6S+0.5W	Yes	Y		DL	1.2					SL	1.6			W...	0.5								
10	1.2D+1.6R+0.5W	Yes	Y		DL	1.2							RL	1.6	W...	0.5								
11	1.2D+1.6Lr-0.5W	Yes	Y		DL	1.2			RLL	1.6					W...	-0.5								
12	1.2D+1.6S-0.5W	Yes	Y		DL	1.2					SL	1.6			W...	-0.5								
13	1.2D+1.6R-0.5W	Yes	Y		DL	1.2							RL	1.6	W...	-0.5								
14	1.2D+1.0W+L+0.5Lr	Yes	Y		DL	1.2	LL	1	RLL	0.5					W...	1								
15	1.2D+1.0W+L+0.5S	Yes	Y		DL	1.2	LL	1			SL	0.5			W...	1								
16	1.2D+1.0W+L+0.5R	Yes	Y		DL	1.2	LL	1					RL	0.5	W...	1								
17	1.2D-1.0W+L+0.5Lr	Yes	Y		DL	1.2	LL	1	RLL	0.5					W...	-1								
18	1.2D-1.0W+L+0.5S	Yes	Y		DL	1.2	LL	1			SL	0.5			W...	-1								
19	1.2D-1.0W+L+0.5R	Yes	Y		DL	1.2	LL	1					RL	0.5	W...	-1								
20	0.9D+1.0W	Yes	Y		DL	0.9									W...	1								
21	0.9D-1.0W	Yes	Y		DL	0.9									W...	-1								
22	1.2D+Ev+Eh+L+0.2S	Yes	Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	1				
23	1.2D+Ev-Eh+L+0.2S	Yes	Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	-1				
24	0.9D-Ev+Eh	Yes	Y		DL	0.9											E...	-1	E...	1				
25	0.9D-Ev-Eh	Yes	Y		DL	0.9											E...	-1	E...	1				
26	DEAD		Y		DL	1																		
27	ROOF LIVE		Y						RLL	1														
28	SNOW		Y								SL	1												
29	WIND (Positive)		Y												W...	1								
30	WIND (Negative)		Y												W...	-1								
31	Seismic (Positive)		Y																E...	1				
32	Seismic (Negative)		Y																E...	-1				
33																								
34	1.4D		Y		DL	1.4																		
35	1.2D+1.6L+0.5Lr		Y		DL	1.2	LL	1.6	RLL	0.5														
36	1.2D+1.6L+0.5S		Y		DL	1.2	LL	1.6			SL	0.5												
37	1.2D+1.6L+0.5R		Y		DL	1.2	LL	1.6					RL	0.5										
38	1.2D+1.6Lr+L		Y		DL	1.2	LL	1	RLL	1.6														
39	1.2D+1.6S+L		Y		DL	1.2	LL	1			SL	1.6												
40	1.2D+1.6R+L		Y		DL	1.2	LL	1					RL	1.6										
41	1.2D+1.6Lr+0.5W		Y		DL	1.2			RLL	1.6					W...	0.5								
42	1.2D+1.6S+0.5W		Y		DL	1.2					SL	1.6			W...	0.5								
43	1.2D+1.6R+0.5W		Y		DL	1.2							RL	1.6	W...	0.5								

Load Combinations (Continued)

	Description	Solve	PD...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
44	1.2D+1.6Lr-0.5W		Y		DL	1.2			RLL	1.6					W...	-0.5								
45	1.2D+1.6S-0.5W		Y		DL	1.2					SL	1.6			W...	-0.5								
46	1.2D+1.6R-0.5W		Y		DL	1.2							RL	1.6	W...	-0.5								
47	1.2D+1.0W+L+0.5Lr		Y		DL	1.2	LL	1	RLL	0.5					W...	1								
48	1.2D+1.0W+L+0.5S		Y		DL	1.2	LL	1			SL	0.5			W...	1								
49	1.2D+1.0W+L+0.5R		Y		DL	1.2	LL	1					RL	0.5	W...	1								
50	1.2D-1.0W+L+0.5Lr		Y		DL	1.2	LL	1	RLL	0.5					W...	-1								
51	1.2D-1.0W+L+0.5S		Y		DL	1.2	LL	1			SL	0.5			W...	-1								
52	1.2D-1.0W+L+0.5R		Y		DL	1.2	LL	1					RL	0.5	W...	-1								
53	0.9D+1.0W		Y		DL	0.9									W...	1								
54	0.9D-1.0W		Y		DL	0.9									W...	-1								
55	1.2D+Ev+Ehx+L+0.2S		Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	3				
56	1.2D+Ev-Ehx+L+0.2S		Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	-3				
57	1.2D+Ev+Ehz+L+0.2S		Y		DL	1.2	LL	1			SL	0.2					E...	1						
58	1.2D+Ev-Ehz+L+0.2S		Y		DL	1.2	LL	1			SL	0.2					E...	1						
59	0.9D-Ev+Ehx		Y		DL	0.9											E...	-1	E...	3				
60	0.9D-Ev-Ehx		Y		DL	0.9											E...	-1	E...	-3				
61	0.9D-Ev+Ehz		Y		DL	0.9											E...	-1						
62	0.9D-Ev-Ehz		Y		DL	0.9											E...	-1						

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Moment [k-ft]	LC
1	N1	max	174.547	12	155.521	12	0	25
2		min	-50.329	20	-26.406	20	0	1
3	N5	max	5.411	20	180.282	12	0	25
4		min	-145.553	12	-10.243	20	0	1
5	N7	max	-0.038	20	44.703	12	0	25
6		min	-6.516	12	5.607	20	0	1
7	Totals:	max	44.956	21	380.507	12		
8		min	-44.956	15	-31.043	20		

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Temp [F]
1	N1	0	0	0
2	N2	0	35.5	0
3	N3	84	37.33	0
4	N4	168	35.5	0
5	N5	168	0	0
6	N6	168	31.33	0
7	N7	218	0	0
8	N8	218	30.33	0

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Rotation[k-ft/rad]
1	N1	Reaction	Reaction	
2	N5	Reaction	Reaction	
3	N7	Reaction	Reaction	

Member Distributed Loads (BLC 1 : Dead Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M3	Y	-0.36	-0.36	0	%100	
2	M4	Y	-0.36	-0.36	0	%100	
3	M6	Y	-0.36	-0.36	0	%100	
4	M1	Y	-1.32	-1.32	0	6	
5	M5	Y	-1.32	-1.32	0	6	

Member Distributed Loads (BLC 2 : Roof Live Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M3	Y	-0.48	-0.48	0	%100	
2	M4	Y	-0.48	-0.48	0	%100	
3	M6	Y	-0.48	-0.48	0	%100	

Member Distributed Loads (BLC 3 : Snow Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M3	Y	-0.6	-0.6	0	%100	
2	M4	Y	-0.6	-0.6	0	%100	
3	M6	Y	-0.6	-0.6	0	%100	

Member Distributed Loads (BLC 4 : Wind Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M1	X	0.58	0.58	0	%100	
2	M3	X	0.29	0.29	0	%100	
3	M3	Y	0.71	0.71	0	%100	
4	M4	Y	0.42	0.42	0	%100	
5	M6	Y	0.42	0.42	0	%100	

Joint Loads and Enforced Displacements (BLC 5 : Earthquake Loads - Horizontal)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*...	Inactive
1	N2	L	X	12	
2	N4	L	X	12	
3	N6	L	X	4	
4	N8	L	X	4	

Load Combinations

	Description	Solve	PD...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4D		Y		DL	1.4																		
2	1.2D+1.6L+0.5Lr		Y		DL	1.2	LL	1.6	RLL	0.5														
3	1.2D+1.6L+0.5S		Y		DL	1.2	LL	1.6			SL	0.5												
4	1.2D+1.6L+0.5R		Y		DL	1.2	LL	1.6					RL	0.5										
5	1.2D+1.6Lr+L		Y		DL	1.2	LL	1	RLL	1.6														
6	1.2D+1.6S+L		Y		DL	1.2	LL	1			SL	1.6												
7	1.2D+1.6R+L		Y		DL	1.2	LL	1					RL	1.6										
8	1.2D+1.6Lr+0.5W		Y		DL	1.2			RLL	1.6					W...	0.5								
9	1.2D+1.6S+0.5W		Y		DL	1.2					SL	1.6			W...	0.5								
10	1.2D+1.6R+0.5W		Y		DL	1.2							RL	1.6	W...	0.5								
11	1.2D+1.6Lr-0.5W		Y		DL	1.2			RLL	1.6					W...	-0.5								
12	1.2D+1.6S-0.5W		Y		DL	1.2					SL	1.6			W...	-0.5								
13	1.2D+1.6R-0.5W		Y		DL	1.2							RL	1.6	W...	-0.5								
14	1.2D+1.0W+L+0.5Lr		Y		DL	1.2	LL	1	RLL	0.5					W...	1								
15	1.2D+1.0W+L+0.5S		Y		DL	1.2	LL	1			SL	0.5			W...	1								
16	1.2D+1.0W+L+0.5R		Y		DL	1.2	LL	1					RL	0.5	W...	1								
17	1.2D-1.0W+L+0.5Lr		Y		DL	1.2	LL	1	RLL	0.5					W...	-1								
18	1.2D-1.0W+L+0.5S		Y		DL	1.2	LL	1			SL	0.5			W...	-1								
19	1.2D-1.0W+L+0.5R		Y		DL	1.2	LL	1					RL	0.5	W...	-1								
20	0.9D+1.0W		Y		DL	0.9									W...	1								
21	0.9D-1.0W		Y		DL	0.9									W...	-1								
22	1.2D+Ev+Eh+L+0.2S		Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	1				
23	1.2D+Ev-Eh+L+0.2S		Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	-1				
24	0.9D-Ev+Eh		Y		DL	0.9											E...	-1	E...	1				
25	0.9D-Ev-Eh		Y		DL	0.9											E...	-1	E...	1				
26	DEAD		Y		DL	1																		
27	ROOF LIVE		Y						RLL	1														
28	SNOW		Y								SL	1												
29	WIND (Positive)		Y												W...	1								
30	WIND (Negative)		Y												W...	-1								
31	Seismic (Positive)		Y																E...	1				
32	Seismic (Negative)		Y																E...	-1				
33																								
34	1.4D	Yes	Y		DL	1.4																		
35	1.2D+1.6L+0.5Lr	Yes	Y		DL	1.2	LL	1.6	RLL	0.5														
36	1.2D+1.6L+0.5S	Yes	Y		DL	1.2	LL	1.6			SL	0.5												
37	1.2D+1.6L+0.5R	Yes	Y		DL	1.2	LL	1.6					RL	0.5										
38	1.2D+1.6Lr+L	Yes	Y		DL	1.2	LL	1	RLL	1.6														
39	1.2D+1.6S+L	Yes	Y		DL	1.2	LL	1			SL	1.6												
40	1.2D+1.6R+L	Yes	Y		DL	1.2	LL	1					RL	1.6										
41	1.2D+1.6Lr+0.5W	Yes	Y		DL	1.2			RLL	1.6					W...	0.5								
42	1.2D+1.6S+0.5W	Yes	Y		DL	1.2					SL	1.6			W...	0.5								

Load Combinations (Continued)

	Description	Solve	PD...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
43	1.2D+1.6R+0.5W	Yes	Y		DL	1.2							RL	1.6	W...	0.5								
44	1.2D+1.6Lr-0.5W	Yes	Y		DL	1.2			RLL	1.6					W...	-0.5								
45	1.2D+1.6S-0.5W	Yes	Y		DL	1.2					SL	1.6			W...	-0.5								
46	1.2D+1.6R-0.5W	Yes	Y		DL	1.2							RL	1.6	W...	-0.5								
47	1.2D+1.0W+L+0.5Lr	Yes	Y		DL	1.2	LL	1	RLL	0.5					W...	1								
48	1.2D+1.0W+L+0.5S	Yes	Y		DL	1.2	LL	1			SL	0.5			W...	1								
49	1.2D+1.0W+L+0.5R	Yes	Y		DL	1.2	LL	1					RL	0.5	W...	1								
50	1.2D-1.0W+L+0.5Lr	Yes	Y		DL	1.2	LL	1	RLL	0.5					W...	-1								
51	1.2D-1.0W+L+0.5S	Yes	Y		DL	1.2	LL	1			SL	0.5			W...	-1								
52	1.2D-1.0W+L+0.5R	Yes	Y		DL	1.2	LL	1					RL	0.5	W...	-1								
53	0.9D+1.0W	Yes	Y		DL	0.9									W...	1								
54	0.9D-1.0W	Yes	Y		DL	0.9									W...	-1								
55	1.2D+Ev+Ehx+L+0.2S	Yes	Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	3				
56	1.2D+Ev-Ehx+L+0.2S	Yes	Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	-3				
57	1.2D+Ev+Ehz+L+0.2S	Yes	Y		DL	1.2	LL	1			SL	0.2					E...	1						
58	1.2D+Ev-Ehz+L+0.2S	Yes	Y		DL	1.2	LL	1			SL	0.2					E...	1						
59	0.9D-Ev+Ehx	Yes	Y		DL	0.9											E...	-1	E...	3				
60	0.9D-Ev-Ehx	Yes	Y		DL	0.9											E...	-1	E...	-3				
61	0.9D-Ev+Ehz	Yes	Y		DL	0.9											E...	-1						
62	0.9D-Ev-Ehz	Yes	Y		DL	0.9											E...	-1						

Envelope Node Reactions

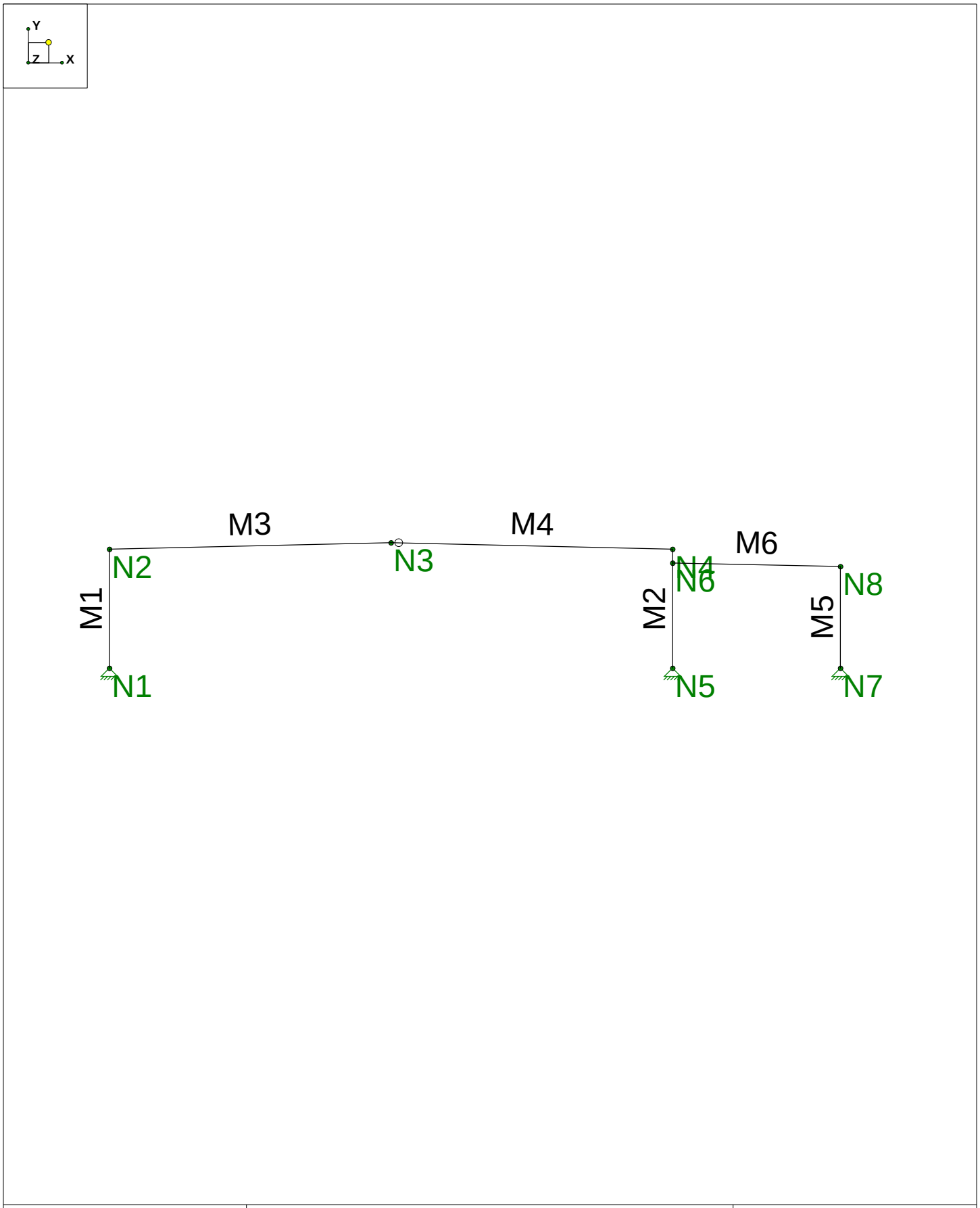
	Node Label		X [k]	LC	Y [k]	LC	Moment [k-ft]	LC
1	N1	max	174.547	45	155.521	45	0	62
2		min	-50.329	53	-26.406	53	0	34
3	N5	max	20.906	60	180.282	45	0	62
4		min	-145.553	45	-10.243	53	0	34
5	N7	max	-0.038	53	44.703	45	0	62
6		min	-6.516	45	5.607	53	0	34
7	Totals:	max	96	60	380.507	45		
8		min	-96	55	-31.043	53		

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Moment [k-ft]	LC
1	N1	max	80.867	30	60.495	30	0	30
2		min	-79.924	29	-60.476	29	0	29
3	N5	max	33.648	29	46.75	30	0	30
4		min	-34.573	30	-46.756	29	0	29
5	N7	max	1.32	29	8.702	30	0	30
6		min	-1.338	30	-8.715	29	0	29
7	Totals:	max	44.956	30	115.947	30		
8		min	-44.956	29	-115.947	29		

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Moment [k-ft]	LC
1	N1	max	15.025	32	6.421	32	0	32
2		min	-15.047	31	-6.421	31	0	31
3	N5	max	16.572	32	6.021	31	0	32
4		min	-16.551	31	-6.021	32	0	31
5	N7	max	0.403	32	0.4	31	0	32
6		min	-0.402	31	-0.4	32	0	31
7	Totals:	max	32	32	0	31		
8		min	-32	31	0	32		



Calder Richards	CCHS Prelim Moment Frame (East Loading)	SK - 1
MDK		Aug 30, 2024 at 8:52 AM
24047		CCHS Moment Frame East Loading ...

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Temp [F]
1	N1	0	0	0
2	N2	0	35.5	0
3	N3	84	37.33	0
4	N4	168	35.5	0
5	N5	168	0	0
6	N6	168	31.33	0
7	N7	218	0	0
8	N8	218	30.33	0

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Rotation[k-ft/rad]
1	N1	Reaction	Reaction	
2	N5	Reaction	Reaction	
3	N7	Reaction	Reaction	

Joint Loads and Enforced Displacements (BLC 5 : Earthquake Loads - Horizontal)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*...	Inactive
1	N2	L	X	-12	
2	N4	L	X	-12	
3	N6	L	X	-4	
4	N8	L	X	-4	

Member Distributed Loads (BLC 1 : Dead Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M3	Y	-0.36	-0.36	0	%100	
2	M4	Y	-0.36	-0.36	0	%100	
3	M6	Y	-0.36	-0.36	0	%100	
4	M1	Y	-1.32	-1.32	0	6	
5	M5	Y	-1.32	-1.32	0	6	

Member Distributed Loads (BLC 2 : Roof Live Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M3	Y	-0.48	-0.48	0	%100	
2	M4	Y	-0.48	-0.48	0	%100	
3	M6	Y	-0.48	-0.48	0	%100	

Member Distributed Loads (BLC 3 : Snow Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M3	Y	-0.6	-0.6	0	%100	
2	M4	Y	-0.6	-0.6	0	%100	
3	M6	Y	-0.6	-0.6	0	%100	

Member Distributed Loads (BLC 4 : Wind Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M5	X	-0.58	-0.58	0	%100	

Member Distributed Loads (BLC 4 : Wind Loads) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
2	M4	X	-0.29	-0.29	0	%100	
3	M6	Y	0.71	0.71	0	%100	
4	M4	Y	0.71	0.71	0	%100	
5	M3	Y	0.42	0.42	0	%100	
6	M2	X	-0.58	-0.58	31.33	35.5	

Load Combinations

	Description	Solve	PD...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4D	Yes	Y		DL	1.4																		
2	1.2D+1.6L+0.5Lr	Yes	Y		DL	1.2	LL	1.6	RLL	0.5														
3	1.2D+1.6L+0.5S	Yes	Y		DL	1.2	LL	1.6			SL	0.5												
4	1.2D+1.6L+0.5R	Yes	Y		DL	1.2	LL	1.6					RL	0.5										
5	1.2D+1.6Lr+L	Yes	Y		DL	1.2	LL	1	RLL	1.6														
6	1.2D+1.6S+L	Yes	Y		DL	1.2	LL	1			SL	1.6												
7	1.2D+1.6R+L	Yes	Y		DL	1.2	LL	1					RL	1.6										
8	1.2D+1.6Lr+0.5W	Yes	Y		DL	1.2			RLL	1.6					W...	0.5								
9	1.2D+1.6S+0.5W	Yes	Y		DL	1.2					SL	1.6			W...	0.5								
10	1.2D+1.6R+0.5W	Yes	Y		DL	1.2							RL	1.6	W...	0.5								
11	1.2D+1.6Lr-0.5W	Yes	Y		DL	1.2			RLL	1.6					W...	-0.5								
12	1.2D+1.6S-0.5W	Yes	Y		DL	1.2					SL	1.6			W...	-0.5								
13	1.2D+1.6R-0.5W	Yes	Y		DL	1.2							RL	1.6	W...	-0.5								
14	1.2D+1.0W+L+0.5Lr	Yes	Y		DL	1.2	LL	1	RLL	0.5					W...	1								
15	1.2D+1.0W+L+0.5S	Yes	Y		DL	1.2	LL	1			SL	0.5			W...	1								
16	1.2D+1.0W+L+0.5R	Yes	Y		DL	1.2	LL	1					RL	0.5	W...	1								
17	1.2D-1.0W+L+0.5Lr	Yes	Y		DL	1.2	LL	1	RLL	0.5					W...	-1								
18	1.2D-1.0W+L+0.5S	Yes	Y		DL	1.2	LL	1			SL	0.5			W...	-1								
19	1.2D-1.0W+L+0.5R	Yes	Y		DL	1.2	LL	1					RL	0.5	W...	-1								
20	0.9D+1.0W	Yes	Y		DL	0.9									W...	1								
21	0.9D-1.0W	Yes	Y		DL	0.9									W...	-1								
22	1.2D+Ev+Eh+L+0.2S	Yes	Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	1				
23	1.2D+Ev-Eh+L+0.2S	Yes	Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	-1				
24	0.9D-Ev+Eh	Yes	Y		DL	0.9											E...	-1	E...	1				
25	0.9D-Ev-Eh	Yes	Y		DL	0.9											E...	-1	E...	1				
26	DEAD		Y		DL	1																		
27	ROOD LIVE		Y						RLL	1														
28	SNOW		Y								SL	1												
29	WIND (Positive)		Y												W...	1								
30	WIND (Negative)		Y												W...	-1								
31	SEISMIC (Positive)		Y																E...	1				
32	SEISMIC (Negative)		Y																E...	-1				
33																								
34	1.4D		Y		DL	1.4																		
35	1.2D+1.6L+0.5Lr		Y		DL	1.2	LL	1.6	RLL	0.5														
36	1.2D+1.6L+0.5S		Y		DL	1.2	LL	1.6			SL	0.5												
37	1.2D+1.6L+0.5R		Y		DL	1.2	LL	1.6					RL	0.5										
38	1.2D+1.6Lr+L		Y		DL	1.2	LL	1	RLL	1.6														
39	1.2D+1.6S+L		Y		DL	1.2	LL	1			SL	1.6												
40	1.2D+1.6R+L		Y		DL	1.2	LL	1					RL	1.6										
41	1.2D+1.6Lr+0.5W		Y		DL	1.2			RLL	1.6					W...	0.5								
42	1.2D+1.6S+0.5W		Y		DL	1.2					SL	1.6			W...	0.5								

Load Combinations (Continued)

	Description	Solve	PD...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
43	1.2D+1.6R+0.5W		Y		DL	1.2							RL	1.6	W...	0.5								
44	1.2D+1.6Lr-0.5W		Y		DL	1.2			RLL	1.6					W...	-0.5								
45	1.2D+1.6S-0.5W		Y		DL	1.2					SL	1.6			W...	-0.5								
46	1.2D+1.6R-0.5W		Y		DL	1.2							RL	1.6	W...	-0.5								
47	1.2D+1.0W+L+0.5Lr		Y		DL	1.2	LL	1	RLL	0.5					W...	1								
48	1.2D+1.0W+L+0.5S		Y		DL	1.2	LL	1			SL	0.5			W...	1								
49	1.2D+1.0W+L+0.5R		Y		DL	1.2	LL	1					RL	0.5	W...	1								
50	1.2D-1.0W+L+0.5Lr		Y		DL	1.2	LL	1	RLL	0.5					W...	-1								
51	1.2D-1.0W+L+0.5S		Y		DL	1.2	LL	1			SL	0.5			W...	-1								
52	1.2D-1.0W+L+0.5R		Y		DL	1.2	LL	1					RL	0.5	W...	-1								
53	0.9D+1.0W		Y		DL	0.9									W...	1								
54	0.9D-1.0W		Y		DL	0.9									W...	-1								
55	1.2D+Ev+Ehx+L+0.2S		Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	3				
56	1.2D+Ev-Ehx+L+0.2S		Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	-3				
57	1.2D+Ev+Ehz+L+0.2S		Y		DL	1.2	LL	1			SL	0.2					E...	1						
58	1.2D+Ev-Ehz+L+0.2S		Y		DL	1.2	LL	1			SL	0.2					E...	1						
59	0.9D-Ev+Ehx		Y		DL	0.9											E...	-1	E...	3				
60	0.9D-Ev-Ehx		Y		DL	0.9											E...	-1	E...	-3				
61	0.9D-Ev+Ehz		Y		DL	0.9											E...	-1						
62	0.9D-Ev-Ehz		Y		DL	0.9											E...	-1						

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Moment [k-ft]	LC
1	N1	max	151.836	12	141.871	12	0	25
2		min	-5.19	20	0.775	20	0	1
3	N5	max	39.632	20	197.882	12	0	25
4		min	-162.608	12	-45.348	20	0	1
5	N7	max	9.934	20	48.005	12	0	25
6		min	-14.271	18	-0.973	20	0	1
7	Totals:	max	44.376	20	387.758	12		
8		min	-44.376	18	-45.545	20		

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Temp [F]
1	N1	0	0	0
2	N2	0	35.5	0
3	N3	84	37.33	0
4	N4	168	35.5	0
5	N5	168	0	0
6	N6	168	31.33	0
7	N7	218	0	0
8	N8	218	30.33	0

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Rotation[k-ft/rad]
1	N1	Reaction	Reaction	
2	N5	Reaction	Reaction	
3	N7	Reaction	Reaction	

Joint Loads and Enforced Displacements (BLC 5 : Earthquake Loads - Horizontal)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/ft, k*...	Inactive
1	N2	L	X	-12	
2	N4	L	X	-12	
3	N6	L	X	-4	
4	N8	L	X	-4	

Member Distributed Loads (BLC 1 : Dead Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M3	Y	-0.36	-0.36	0	%100	
2	M4	Y	-0.36	-0.36	0	%100	
3	M6	Y	-0.36	-0.36	0	%100	
4	M1	Y	-1.32	-1.32	0	6	
5	M5	Y	-1.32	-1.32	0	6	

Member Distributed Loads (BLC 2 : Roof Live Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M3	Y	-0.48	-0.48	0	%100	
2	M4	Y	-0.48	-0.48	0	%100	
3	M6	Y	-0.48	-0.48	0	%100	

Member Distributed Loads (BLC 3 : Snow Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M3	Y	-0.6	-0.6	0	%100	
2	M4	Y	-0.6	-0.6	0	%100	
3	M6	Y	-0.6	-0.6	0	%100	

Member Distributed Loads (BLC 4 : Wind Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
1	M5	X	-0.58	-0.58	0	%100	

Member Distributed Loads (BLC 4 : Wind Loads) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k...	Start Location[ft,%]	End Location[ft,%]	Inactive
2	M4	X	-0.29	-0.29	0	%100	
3	M6	Y	0.71	0.71	0	%100	
4	M4	Y	0.71	0.71	0	%100	
5	M3	Y	0.42	0.42	0	%100	
6	M2	X	-0.58	-0.58	31.33	35.5	

Load Combinations

	Description	Solve	PD...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4D		Y		DL	1.4																		
2	1.2D+1.6L+0.5Lr		Y		DL	1.2	LL	1.6	RLL	0.5														
3	1.2D+1.6L+0.5S		Y		DL	1.2	LL	1.6			SL	0.5												
4	1.2D+1.6L+0.5R		Y		DL	1.2	LL	1.6					RL	0.5										
5	1.2D+1.6Lr+L		Y		DL	1.2	LL	1	RLL	1.6														
6	1.2D+1.6S+L		Y		DL	1.2	LL	1			SL	1.6												
7	1.2D+1.6R+L		Y		DL	1.2	LL	1					RL	1.6										
8	1.2D+1.6Lr+0.5W		Y		DL	1.2			RLL	1.6					W...	0.5								
9	1.2D+1.6S+0.5W		Y		DL	1.2					SL	1.6			W...	0.5								
10	1.2D+1.6R+0.5W		Y		DL	1.2							RL	1.6	W...	0.5								
11	1.2D+1.6Lr-0.5W		Y		DL	1.2			RLL	1.6					W...	-0.5								
12	1.2D+1.6S-0.5W		Y		DL	1.2					SL	1.6			W...	-0.5								
13	1.2D+1.6R-0.5W		Y		DL	1.2							RL	1.6	W...	-0.5								
14	1.2D+1.0W+L+0.5Lr		Y		DL	1.2	LL	1	RLL	0.5					W...	1								
15	1.2D+1.0W+L+0.5S		Y		DL	1.2	LL	1			SL	0.5			W...	1								
16	1.2D+1.0W+L+0.5R		Y		DL	1.2	LL	1					RL	0.5	W...	1								
17	1.2D-1.0W+L+0.5Lr		Y		DL	1.2	LL	1	RLL	0.5					W...	-1								
18	1.2D-1.0W+L+0.5S		Y		DL	1.2	LL	1			SL	0.5			W...	-1								
19	1.2D-1.0W+L+0.5R		Y		DL	1.2	LL	1					RL	0.5	W...	-1								
20	0.9D+1.0W		Y		DL	0.9									W...	1								
21	0.9D-1.0W		Y		DL	0.9									W...	-1								
22	1.2D+Ev+Eh+L+0.2S		Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	1				
23	1.2D+Ev-Eh+L+0.2S		Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	-1				
24	0.9D-Ev+Eh		Y		DL	0.9											E...	-1	E...	1				
25	0.9D-Ev-Eh		Y		DL	0.9											E...	-1	E...	1				
26	DEAD		Y		DL	1																		
27	ROOD LIVE		Y						RLL	1														
28	SNOW		Y								SL	1												
29	WIND (Positive)		Y												W...	1								
30	WIND (Negative)		Y												W...	-1								
31	SEISMIC (Positive)		Y																E...	1				
32	SEISMIC (Negative)		Y																E...	-1				
33																								
34	1.4D	Yes	Y		DL	1.4																		
35	1.2D+1.6L+0.5Lr	Yes	Y		DL	1.2	LL	1.6	RLL	0.5														
36	1.2D+1.6L+0.5S	Yes	Y		DL	1.2	LL	1.6			SL	0.5												
37	1.2D+1.6L+0.5R	Yes	Y		DL	1.2	LL	1.6					RL	0.5										
38	1.2D+1.6Lr+L	Yes	Y		DL	1.2	LL	1	RLL	1.6														
39	1.2D+1.6S+L	Yes	Y		DL	1.2	LL	1			SL	1.6												
40	1.2D+1.6R+L	Yes	Y		DL	1.2	LL	1					RL	1.6										
41	1.2D+1.6Lr+0.5W	Yes	Y		DL	1.2			RLL	1.6					W...	0.5								
42	1.2D+1.6S+0.5W	Yes	Y		DL	1.2					SL	1.6			W...	0.5								

Load Combinations (Continued)

	Description	Solve	PD...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
43	1.2D+1.6R+0.5W	Yes	Y		DL	1.2							RL	1.6	W...	0.5								
44	1.2D+1.6Lr-0.5W	Yes	Y		DL	1.2			RLL	1.6					W...	-0.5								
45	1.2D+1.6S-0.5W	Yes	Y		DL	1.2					SL	1.6			W...	-0.5								
46	1.2D+1.6R-0.5W	Yes	Y		DL	1.2							RL	1.6	W...	-0.5								
47	1.2D+1.0W+L+0.5Lr	Yes	Y		DL	1.2	LL	1	RLL	0.5					W...	1								
48	1.2D+1.0W+L+0.5S	Yes	Y		DL	1.2	LL	1			SL	0.5			W...	1								
49	1.2D+1.0W+L+0.5R	Yes	Y		DL	1.2	LL	1					RL	0.5	W...	1								
50	1.2D-1.0W+L+0.5Lr	Yes	Y		DL	1.2	LL	1	RLL	0.5					W...	-1								
51	1.2D-1.0W+L+0.5S	Yes	Y		DL	1.2	LL	1			SL	0.5			W...	-1								
52	1.2D-1.0W+L+0.5R	Yes	Y		DL	1.2	LL	1					RL	0.5	W...	-1								
53	0.9D+1.0W	Yes	Y		DL	0.9									W...	1								
54	0.9D-1.0W	Yes	Y		DL	0.9									W...	-1								
55	1.2D+Ev+Ehx+L+0.2S	Yes	Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	3				
56	1.2D+Ev-Ehx+L+0.2S	Yes	Y		DL	1.2	LL	1			SL	0.2					E...	1	E...	-3				
57	1.2D+Ev+Ehz+L+0.2S	Yes	Y		DL	1.2	LL	1			SL	0.2					E...	1						
58	1.2D+Ev-Ehz+L+0.2S	Yes	Y		DL	1.2	LL	1			SL	0.2					E...	1						
59	0.9D-Ev+Ehx	Yes	Y		DL	0.9											E...	-1	E...	3				
60	0.9D-Ev-Ehx	Yes	Y		DL	0.9											E...	-1	E...	-3				
61	0.9D-Ev+Ehz	Yes	Y		DL	0.9											E...	-1						
62	0.9D-Ev-Ehz	Yes	Y		DL	0.9											E...	-1						

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Moment [k-ft]	LC
1	N1	max	151.836	45	141.871	45	0	62
2		min	-15.085	60	0.775	53	0	34
3	N5	max	39.632	53	197.882	45	0	62
4		min	-162.608	45	-45.348	53	0	34
5	N7	max	9.934	53	48.005	45	0	62
6		min	-14.271	51	-0.973	53	0	34
7	Totals:	max	96	59	387.758	45		
8		min	-96	56	-45.545	53		

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Moment [k-ft]	LC
1	N1	max	35.639	30	33.272	30	0	30
2		min	-34.821	29	-33.32	29	0	29
3	N5	max	67.862	29	81.886	30	0	30
4		min	-68.757	30	-81.838	29	0	29
5	N7	max	11.335	29	15.291	30	0	30
6		min	-11.258	30	-15.291	29	0	29
7	Totals:	max	44.376	29	130.45	30		
8		min	-44.376	30	-130.45	29		

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Moment [k-ft]	LC
1	N1	max	15.025	31	6.421	31	0	32
2		min	-15.047	32	-6.421	32	0	31
3	N5	max	16.572	31	6.021	32	0	32
4		min	-16.551	32	-6.021	31	0	31
5	N7	max	0.403	31	0.4	32	0	32
6		min	-0.402	32	-0.4	31	0	31
7	Totals:	max	32	31	0	32		
8		min	-32	32	0	31		

SECTION BREAK

Lateral Design

SUBSECTION BREAK

PEMB Brace Frame Analysis

DESCRIPTION/NOTES:

Description details.

CALDER RICHARDS CONSULTING ENGINEERS

JOB TITLE: CCHS Field House **BY:** MDK **DATE:** 09/10/2024

SUBJECT: PEMB Brace Frame Forces **CHECKED:** **SHEET:**

Design Criteria

$D_{L.Roof} := 15$ psf

$L_{L.Roof} := 20$ psf

$S_L := 25$ psf

$D_{L.Wall} := 10$ psf

$L := 218$ ft

$W := 172$ ft

Note: These Values are Preliminary expected values for the PEMB Building.

Seismic Design Criteria

$S_{DS} := 0.992$

$I_e := 1.25$

$R := 3.25$

$C_d := 3.25$ Ordinary Braced Frame Assumed

$\Omega_o := 2$

$$C_s := \frac{S_{DS}}{\left(\frac{R}{I_e}\right)} = 0.4$$

Grid 1 Brace Frame Forces (BT Grid D and F)

$L := 24.33$ ft Length of Brace Frame Column to Column

$h_{wall} := 30.33$ ft

$$Trib := \frac{51\ ft}{2} = 25.5\ ft$$

$$W_{roof} := Trib \cdot W \cdot D_{L.Roof} = 65.8\ kip$$

$$W_{wall} := 2 \cdot Trib \cdot \frac{h_{wall}}{2} \cdot D_{L.Wall} = 7.7\ kip$$

$$W_{eq.total} := W_{wall} + W_{roof} = 73.52\ kip$$

$n_{frames} := 2$ Number of Frames on Grid

$$V_{EQ} := \frac{W_{eq.total} \cdot C_s}{n_{frames}} = 14.03\ kip$$ Shear per Frame (Strength Level)

$$V_{EQ\_overstrength} := V_{EQ} \cdot \Omega_o = 28.1\ kip$$ Shear per Frame (Factored with overstrength)

$$M_{frame} := V_{EQ} \cdot h_{wall} = 425.4\ kip \cdot ft$$ Moment per Frame (Strength Level)

$$T_{frame} := \frac{M_{frame}}{L} = 17.5\ kip$$ Tension/Compression @ Columns per Frame (Strength Level)

$$T_{EQ\_overstrength} := T_{frame} \cdot \Omega_o = 35.0\ kip$$ Tension/Compression @ Columns per Frame (overstrength)

Wind Load Can be found on Wind Analysis Calc

$$W_{bldg} := 28.2\ psf \cdot Trib \cdot \frac{h_{wall}}{2} = 10.9\ kip$$

$n_{frames} := 2$ Number of Frames on Grid

$$V_{frame} := \frac{W_{bldg}}{n_{frames}} = 5.5\ kip$$ Shear per Frame (Strength Level)

$$M_{frame} := V_{frame} \cdot h_{wall} = 165.4\ kip \cdot ft$$ Moment per Frame (Strength Level)

$$R_{frame} := \frac{M_{frame}}{L} = 6.8\ kip$$ Tension/Compression @ Columns per Frame (Strength Level)

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Grid 4 Brace Frame Forces (BT Grid F and G)

$L := 24.33\ ft$ Length of Brace Frame Column to Column

$h_{wall.west} := 30.33\ ft$

$h_{wall.east} := 36.5\ ft$ $Trib_{east} := \frac{166\ ft}{2} = 83.0\ ft$ $Trib_{west} := \frac{51\ ft}{2} = 25.5\ ft$

$W_{roof} := (Trib_{west} + Trib_{east}) \cdot W \cdot D_{L.Roof} = 279.9\ kip$

$W_{wall} := 2 \cdot (Trib_{west} + Trib_{east}) \cdot \frac{h_{wall}}{2} \cdot D_{L.Wall} = 32.9\ kip$

$W_{wall} := \left(2 \cdot Trib_{west} \cdot \frac{h_{wall.west}}{2} + 2 \cdot Trib_{east} \cdot \frac{h_{wall.east}}{2}\right) \cdot D_{L.Wall} = 38.0\ kip$

$W_{eq.total} := W_{wall} + W_{roof} = 317.96\ kip$

$n_{frames} := 2$ Number of Frames on Grid

$V_{EQ} := \frac{W_{eq.total} \cdot C_s}{2} = 60.66\ kip$ Shear per Frame (Strength Level)

$V_{EQ\_overstrength} := V_{EQ} \cdot \Omega_o = 121.3\ kip$ Shear per Frame (Factored with overstrength)

$M_{frame} := V_{EQ} \cdot h_{wall.west} = 1839.7\ kip \cdot ft$ Moment per Frame (Strength Level)

$T_{frame} := \frac{M_{frame}}{L} = 75.6\ kip$ Tension/Compression @ Columns per Frame (Strength Level)

$T_{EQ\_overstrength} := T_{frame} \cdot \Omega_o = 151.2\ kip$ Tension/Compression @ Columns per Frame (overstrength)

Wind Load Can be found on Wind Analysis Calc

$W_{bldg.west} := 14.7\ psf \cdot Trib_{west} \cdot \frac{h_{wall.west}}{2} = 5.7\ kip$

$W_{bldg.east} := 14.7\ psf \cdot Trib_{east} \cdot \frac{h_{wall.east}}{2} = 22.3\ kip$

$n_{frames} := 2$ Number of Frames on Grid

$V_{frame} := \frac{W_{bldg.west} + W_{bldg.east}}{n_{frames}} = 14.0\ kip$ Shear per Frame (Strength Level)

$M_{frame} := V_{frame} \cdot h_{wall.west} = 423.9\ kip \cdot ft$ Moment per Frame (Strength Level)

$R_{frame} := \frac{M_{frame}}{L} = 17.4\ kip$ Tension/Compression @ Columns per Frame (Strength Level)

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Grid 10 Brace Frame Forces (BT Grid C and D)

$L := 24.33\ ft$ Length of Brace Frame Column to Column

$Trib := \frac{166\ ft}{2} = 83.0\ ft$

$h_{wall} := 36.5\ ft$

$W_{roof} := (Trib) \cdot W \cdot D_{L.Roof} = 214.1\ kip$

$W_{wall} := 2 \cdot Trib \cdot \frac{h_{wall}}{2} \cdot D_{L.Wall} = 30.3\ kip$

$W_{eq.total} := W_{wall} + W_{roof} = 244.44\ kip$

$n_{frames} := 2$ Number of Frames on Grid

$V_{EQ} := \frac{W_{eq.total} \cdot C_s}{2} = 46.63\ kip$ Shear per Frame (Strength Level)

$V_{EQ\_overstrength} := V_{EQ} \cdot \Omega_o = 93.3\ kip$ Shear per Frame (Factored with overstrength)

$M_{frame} := V_{EQ} \cdot 34.75\ ft = 1620.4\ kip \cdot ft$ Moment per Frame (Strength Level)

$T_{frame} := \frac{M_{frame}}{L} = 66.6\ kip$ Tension/Compression @ Columns per Frame (Strength Level)

$T_{EQ\_overstrength} := T_{frame} \cdot \Omega_o = 133.2\ kip$ Tension/Compression @ Columns per Frame (overstrength)

Wind Load

Can be found on Wind Analysis Calc

$W_{bldg} := (28.2\ psf \cdot 30\ ft + 14.7\ psf \cdot (Trib - 30\ ft)) \cdot \frac{h_{wall}}{2} = 29.7\ kip$

$n_{frames} := 2$ Number of Frames on Grid

$V_{frame} := \frac{W_{bldg}}{n_{frames}} = 14.8\ kip$ Shear per Frame (Strength Level)

$M_{frame} := V_{frame} \cdot 34.75\ ft = 515.3\ kip \cdot ft$ Moment per Frame (Strength Level)

$R_{frame} := \frac{M_{frame}}{L} = 21.2\ kip$ Tension/Compression @ Columns per Frame (Strength Level)

Created with PTC Mathcad Express. See www.mathcad.com for more information.

SECTION BREAK

Lateral Design

SUBSECTION BREAK

Mezzanine 3D Modeling Analysis

DESCRIPTION/NOTES:

Description details.

SECTION BREAK

Lateral Design

SUBSECTION BREAK

Phase 1 Model Results

DESCRIPTION/NOTES:

Description details.

Loads and Applied Forces

LOAD CASE: Seismic

Seismic ASCE 7-16 Equivalent Lateral Force
Importance Factor: 1.25 TL: 8.00 s
Site Class D: Stiff Soil, Default
Ss: 1.488 g S1: 0.551 g
Use Specified: SDs: 0.992 g SD1: 0.643 g
Risk Category: III Seismic Design Category: D
Provisions for: Force
Ground Level: Base

Dir	Eccent	R	Ta Equation	Building Period-T
X	+ And -	3.25	Std,Ct=0.030,x=0.75	Calculated
Y	+ And -	3.25	Std,Ct=0.030,x=0.75	Calculated

Dir	Ta	Cu	T	T - used	Cs Eq12.8-2	Cs - used	k
X	0.232	1.400	0.097	0.097	0.382	0.382	1.000

Dir	Ta	Cu	T	T - used	Cs Eq12.8-2	Cs - used	k
Y	0.232	1.400	0.138	0.138	0.382	0.382	1.000

Exception 2 per Section 11.4.8 is applied for site class D with S1 > 0.2

Total Building Weight (kips) = 163.23

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_X_+E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
First	1	15.33	62.28	0.00	20.06	26.56

APPLIED STORY FORCES

Type: EQ_ASCE716_X_+E_F

Level	Ht	Fx	Fy
	ft	kips	kips
First	15.33	62.28	0.00
		62.28	0.00

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_X_-E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
First	1	15.33	62.28	0.00	20.06	21.59

Loads and Applied Forces

APPLIED STORY FORCES

Type: EQ_ASCE716_X_-E_F

Level	Ht	Fx	Fy
	ft	kips	kips
First	15.33	62.28	0.00
		62.28	0.00

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_Y_+E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
First	1	15.33	0.00	62.28	22.24	24.08

APPLIED STORY FORCES

Type: EQ_ASCE716_Y_+E_F

Level	Ht	Fx	Fy
	ft	kips	kips
First	15.33	0.00	62.28
		0.00	62.28

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_Y_-E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
First	1	15.33	0.00	62.28	17.89	24.08

APPLIED STORY FORCES

Type: EQ_ASCE716_Y_-E_F

Level	Ht	Fx	Fy
	ft	kips	kips
First	15.33	0.00	62.28
		0.00	62.28

Frame Reaction Envelope

RAM Frame 24.00.00.160
CCHS Field House Mezz
DataBase: (9-10-24) CCHS Field House Mezz Phase 1
Building Code: IBC

10/04/24 09:10:08

CRITERIA:

Rigid End Zones:		Ignore Effects			
Member Force Output:		At Face of Joint			
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.60
		Scale Factor (Roof):	1.60	Scale Factor (Snow):	1.60
Ground Level:	Base				

Mesh Criteria :

Max. Distance Between Nodes on Mesh Line (ft) : 4.00
Merge Node Tolerance (in) : 0.0100
Geometry Tolerance (in) : 0.0050

Walls Out-of-plane Stiffness Not Included in Analysis.
Sign considered for Dynamic Load Case Results.
Rigid Links Included at Fixed Beam-to-Wall Locations
Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

REACTION MAXIMA AND MINIMA:

Frame #1:

Node		Rx	Ry	Rz	Mxx	Myy	Tzz
		kips	kips	kips	kip-ft	kip-ft	kip-ft
9	Max:	6.45	0.00	21.09	0.00	0.00	0.00
	LC:	Lp	E2	Lp	D	D	E4
	Min:	-16.61	-0.00	-23.76	0.00	0.00	-0.01
	LC:	E2	E4	E2	D	D	E2
14	Max:	1.56	0.00	50.63	0.00	0.00	0.00
	LC:	E4	E4	Lp	D	D	E4
	Min:	-16.61	-0.00	-2.24	0.00	0.00	-0.01
	LC:	E2	E2	E4	D	D	E2

Frame #2:

Node		Rx	Ry	Rz	Mxx	Myy	Tzz
		kips	kips	kips	kip-ft	kip-ft	kip-ft
16	Max:	0.00	2.84	10.25	0.00	0.00	0.00

	LC:	E4	Lp	Lp	D	D	E4
	Min:	-0.00	-16.29	-32.58	0.00	0.00	-0.01
	LC:	E2	E3	E3	D	D	E2
17	Max:	0.00	0.06	32.58	0.00	0.00	0.00
	LC:	E2	E1	E3	D	D	E4
	Min:	-0.00	-16.29	-0.12	0.00	0.00	-0.01
	LC:	E4	E3	E1	D	D	E2

Frame #3:

Node		**Rx**	**Ry**	**Rz**	**Mxx**	**Myy**	**Tzz**
		kips	**kips**	**kips**	**kip-ft**	**kip-ft**	**kip-ft**
13	Max:	8.48	0.00	32.28	0.00	0.00	0.00
	LC:	Lp	E2	Lp	D	D	E4
	Min:	-16.92	-0.00	-23.53	0.00	0.00	-0.00
	LC:	E1	E4	E1	D	D	E2
15	Max:	0.49	0.00	27.55	0.00	0.00	0.00
	LC:	E3	E4	Lp	D	D	E4
	Min:	-16.92	-0.00	-0.68	0.00	0.00	-0.00
	LC:	E1	E2	E3	D	D	E2

Frame #4:

Node		**Rx**	**Ry**	**Rz**	**Mxx**	**Myy**	**Tzz**
		kips	**kips**	**kips**	**kip-ft**	**kip-ft**	**kip-ft**
10	Max:	0.00	0.00	26.36	0.00	0.00	0.00
	LC:	E4	E3	Lp	D	D	E4
	Min:	-0.00	0.00	-16.02	0.00	0.00	-0.00
	LC:	E2	E1	E4	D	D	E2
11	Max:	0.00	2.83	3.14	0.00	0.00	0.00
	LC:	Lp	Lp	Lp	D	D	D
	Min:	-0.00	-14.85	-16.48	0.00	0.00	0.00
	LC:	E1	E4	E4	D	D	D
12	Max:	0.00	0.98	32.50	0.00	0.00	0.00
	LC:	E2	E2	E4	D	D	E4
	Min:	-0.00	-16.76	-1.90	0.00	0.00	-0.00
	LC:	E4	E4	E2	D	D	E2

Building Story Shears

CRITERIA:

Rigid End Zones:		Ignore Effects			
Member Force Output:		At Face of Joint			
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.60
		Scale Factor (Roof):	1.60	Scale Factor (Snow):	1.60
Ground Level:	Base				

Mesh Criteria :

Max. Distance Between Nodes on Mesh Line (ft) : 4.00
Merge Node Tolerance (in) : 0.0100
Geometry Tolerance (in) : 0.0050

Walls Out-of-plane Stiffness Not Included in Analysis.
Sign considered for Dynamic Load Case Results.
Rigid Links Included at Fixed Beam-to-Wall Locations
Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

Load Case: D DeadLoad RAMUSER

Level	Diaph. #	Shear-X kips	Shear-Y kips
First	1	0.01	-0.00

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
First	0.01	0.01	-0.00	-0.00

Load Case: Lp PosLiveLoad RAMUSER

Level	Diaph. #	Shear-X kips	Shear-Y kips
First	1	0.01	-0.01

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
First	0.01	0.01	-0.01	-0.01

Load Case: E1 Seismic EQ_ASCE716_X_+E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
First	1	62.38	0.00

Summary - Total Story Shears

Level	Shear-X	Change-X	Shear-Y	Change-Y

Building Story Shears

	kips	kips	kips	kips
First	62.38	62.38	0.00	0.00

Load Case: E2 Seismic EQ_ASCE716_X_-E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
First	1	62.38	-0.00

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
First	62.38	62.38	-0.00	-0.00

Load Case: E3 Seismic EQ_ASCE716_Y_+E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
First	1	0.00	62.48

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
First	0.00	0.00	62.48	62.48

Load Case: E4 Seismic EQ_ASCE716_Y_-E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
First	1	-0.00	62.48

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
First	-0.00	-0.00	62.48	62.48

Load Combinations

LOAD COMBINATION CRITERIA:

Roof Live Load:	Snow
Live Load factor f1 (0.5 or 1.0)	1.000
Sds (for Ev)	0.992
RhoX	1.300
RhoY	1.300

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

LOAD COMBINATIONS: IBC 2021 / ASCE 7-16 LRFD

1	*	1.400 D
2	*	1.200 D + 1.600 Lp
3	*	1.398 D + 1.000 Lp + 1.300 E1
4	*	1.398 D + 1.000 Lp + 1.300 E2
5	*	1.398 D + 1.000 Lp + 1.300 E3
6	*	1.398 D + 1.000 Lp + 1.300 E4
7	*	1.398 D + 1.000 Lp - 1.300 E1
8	*	1.398 D + 1.000 Lp - 1.300 E2
9	*	1.398 D + 1.000 Lp - 1.300 E3
10	*	1.398 D + 1.000 Lp - 1.300 E4
11	*	1.398 D + 1.300 E1
12	*	1.398 D + 1.300 E2
13	*	1.398 D + 1.300 E3
14	*	1.398 D + 1.300 E4
15	*	1.398 D - 1.300 E1
16	*	1.398 D - 1.300 E2
17	*	1.398 D - 1.300 E3
18	*	1.398 D - 1.300 E4
19	*	0.702 D + 1.300 E1
20	*	0.702 D + 1.300 E2
21	*	0.702 D + 1.300 E3
22	*	0.702 D + 1.300 E4
23	*	0.702 D - 1.300 E1
24	*	0.702 D - 1.300 E2

Load Combinations

25	*	0.702 D - 1.300 E3
26	*	0.702 D - 1.300 E4

* = Load combination currently selected to use

Steel Code Check Criteria

MEMBER CODE CHECK CRITERIA - GLOBAL:

B1 and B2 Criteria

B1 Factor Not Applied

B2 Factor Not Applied

K-Factor:	**Columns**	**Beams**	**Braces**
Kx:	1.000	1.000	1.000
Ky:	1.000	1.000	1.000

Compression Flange Bracing:

Columns:

Deck Braces Column

Knee Brace Does Not Brace Column

Max Angle for which Beam Braces Column: 60.00 deg

Beams / Horiz Braces:

Top Flange Not Continuously Braced

Bottom Flange Not Continuously Braced

Do Not Consider Point of Inflection as Brace Point

Column Design Moments:

Percent of Gravity Load Moments to include in design of steel columns:

Dead Load:	100.00 %
Live Load:	100.00 %
Roof Load:	100.00 %

Axial Slenderness Limits

Check KL/r exceeds 200 for Compression Members

Check L/r exceeds 300 for Tension Members (excludes rods)

MEMBER CODE CHECK CRITERIA - ASSIGNED

Frame #1:

Steel Code Check Criteria

Level: First

Steel Column:

#	K-Factor		Flange Bracing		Unbraced Length		
	Kx	Ky	Major	Minor	Lx	Ly	Lby
2	1.00	1.00	Global	Global	Global	Global	Global
10	1.00	1.00	Global	Global	Global	Global	Global

Steel Beam:

#	K-Factor		Flange Bracing		Unbraced Length			RBS
	Kx	Ky	Major	Minor	Lx	Ly	Lby	
1	1.00	1.00	Global	Global	Global	Global	Global	N

Steel Brace:

#	K-Factor		Unbraced Length		
	Kx	Ky	Lx	Ly	Lby
7	Global	Global	158.10	158.10	158.10
8	Global	Global	158.10	158.10	158.10

Frame #2:

Level: First

Steel Column:

#	K-Factor		Flange Bracing		Unbraced Length		
	Kx	Ky	Major	Minor	Lx	Ly	Lby
23	1.00	1.00	Global	Global	Global	Global	Global
24	1.00	1.00	Global	Global	Global	Global	Global

Steel Beam:

#	K-Factor		Flange Bracing		Unbraced Length			RBS
	Kx	Ky	Major	Minor	Lx	Ly	Lby	
30	1.00	1.00	Global	Global	Global	Global	Global	N

Steel Brace:

#	K-Factor		Unbraced Length		
	Kx	**Ky**	**Lx**	**Ly**	**Lby**
15	Global	Global	130.08	130.08	130.08
16	Global	Global	130.08	130.08	130.08

Frame #3:

Level: First

Steel Column:

#	K-Factor		Flange Bracing		Unbraced Length		
	Kx	**Ky**	**Major**	**Minor**	**Lx**	**Ly**	**Lby**
13	1.00	1.00	Global	Global	Global	Global	Global
14	1.00	1.00	Global	Global	Global	Global	Global

Steel Beam:

#	K-Factor		Flange Bracing		Unbraced Length			RBS
	Kx	**Ky**	**Major**	**Minor**	**Lx**	**Ly**	**Lby**	
5	1.00	1.00	Global	Global	Global	Global	Global	N

Steel Brace:

#	K-Factor		Unbraced Length		
	Kx	**Ky**	**Lx**	**Ly**	**Lby**
3	Global	Global	161.16	161.16	161.16
4	Global	Global	161.16	161.16	161.16

Frame #4:

Level: First

Steel Column:

#	K-Factor		Flange Bracing		Unbraced Length		
	Kx	**Ky**	**Major**	**Minor**	**Lx**	**Ly**	**Lby**
11	1.00	1.00	Global	Global	Global	Global	Global

12	1.00	1.00	Global	Global	Global	Global	Global

Steel Beam:

#	K-Factor		Flange Bracing		Unbraced Length			RBS
	Kx	**Ky**	**Major**	**Minor**	**Lx**	**Ly**	**Lby**	
3	1.00	1.00	Global	Global	Global	Global	Global	N

Steel Brace:

#	K-Factor		Unbraced Length		
	Kx	**Ky**	**Lx**	**Ly**	**Lby**
1	Global	Global	133.20	133.20	133.20
2	Global	Global	133.20	133.20	133.20

JOINT CODE CHECK CRITERIA

Material Properties

Web plate Fy (ksi):	36.00
Stiffener plate Fy (ksi):	36.00

Geometry

Maximum angle between a beam and column to assume the beam frames into column flange:	45.0
One diagonal stiffener designed if the difference in beam depths at a joint is less than (in):	4.00

Design Force

Use actual beam forces

Consider axial load in beam

Optimization

Stiffeners

Optimize each stiffener at joint

Minimum Thickness:	Per Code
Minimum Width:	Max Beam Flange Width at Joint

Thickness Increment (in):	0.125
Width Increment (in):	0.125
Clip (cope) dimension (in):	0.750
Web Plates	
Maximum Thickness:	Same as Column Web
Minimum Thickness (in):	0.250
Thickness Increment (in):	0.125

CJP groove weld plate to column.

No web plate plug weld.

Code Check Summary

CRITERIA:

Rigid End Zones:		Ignore Effects			
Member Force Output:		At Face of Joint			
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.60
		Scale Factor (Roof):	1.60	Scale Factor (Snow):	1.60
Ground Level:	Base				

Mesh Criteria :

Max. Distance Between Nodes on Mesh Line (ft) : 4.00
Merge Node Tolerance (in) : 0.0100
Geometry Tolerance (in) : 0.0050

Walls Out-of-plane Stiffness Not Included in Analysis.
Sign considered for Dynamic Load Case Results.
Rigid Links Included at Fixed Beam-to-Wall Locations
Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

LOAD COMBINATION CRITERIA:

Live Load factor f1 (0.5 or 1.0)	1.000
Sds (for Ev)	0.992
RhoX	1.300
RhoY	1.300

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

LOAD COMBINATIONS: IBC 2021 / ASCE 7-16 LRFD

1	*	1.400 D
2	*	1.200 D + 1.600 Lp
3	*	1.398 D + 1.000 Lp + 1.300 E1
4	*	1.398 D + 1.000 Lp + 1.300 E2
5	*	1.398 D + 1.000 Lp + 1.300 E3
6	*	1.398 D + 1.000 Lp + 1.300 E4
7	*	1.398 D + 1.000 Lp - 1.300 E1
8	*	1.398 D + 1.000 Lp - 1.300 E2
9	*	1.398 D + 1.000 Lp - 1.300 E3
10	*	1.398 D + 1.000 Lp - 1.300 E4
11	*	1.398 D + 1.300 E1

12	*	1.398 D + 1.300 E2
13	*	1.398 D + 1.300 E3
14	*	1.398 D + 1.300 E4
15	*	1.398 D - 1.300 E1
16	*	1.398 D - 1.300 E2
17	*	1.398 D - 1.300 E3
18	*	1.398 D - 1.300 E4
19	*	0.702 D + 1.300 E1
20	*	0.702 D + 1.300 E2
21	*	0.702 D + 1.300 E3
22	*	0.702 D + 1.300 E4
23	*	0.702 D - 1.300 E1
24	*	0.702 D - 1.300 E2
25	*	0.702 D - 1.300 E3
26	*	0.702 D - 1.300 E4

* = Load combination currently selected to use

Frame #1:

Level: First

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
2	108.04	0.00	-0.00	-0.00	0.00	2	0.49 H1-1a	50	HSS7X5X1/2
10	46.90	0.00	0.00	-0.00	-0.00	8	0.21 Axial	50	HSS7X5X1/2

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
1	0.00	25.62	0.00	-4.78	0.00	2	0.26 H1-1b	50	W16X36

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
7	43.75	0.00	0.00	0.00	0.00	4	0.21 Axial	50	HSS5X5X1/2
8	41.69	0.00	0.00	0.00	0.00	8	0.20 Axial	50	HSS5X5X1/2

Frame #2:

Level: First

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
23	35.33	0.00	0.00	0.00	-0.00	9	0.16 Axial	50	HSS7X5X1/2
24	58.07	0.00	0.00	-0.00	-0.00	5	0.26 H1-1a	50	HSS7X5X1/2

Beam	Pu	Mux	Muy	Vux	Vuy	LC	Interact.	Fy	Size

Code Check Summary

#	kip	kip-ft	kip-ft	kip	kip				ksi	
30	0.00	76.09	0.00	21.64	0.00	2	0.15	H1-1b	50	W24X55

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
15	34.82	0.00	0.00	0.00	0.00	5	0.29	Axial	50	HSS4X4X3/8
16	37.61	0.00	0.00	0.00	0.00	9	0.31	Axial	50	HSS4X4X3/8

Frame #3:

Level: First

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
13	65.66	0.00	0.00	-0.00	-0.00	7	0.39	H1-1a	50	HSS5X5X1/2
14	57.81	0.00	-0.00	-0.00	0.00	3	0.35	H1-1a	50	HSS5X5X1/2

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
5	0.00	593.08	0.00	70.37	0.00	2	0.38	H1-1b	50	W33X118

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
3	44.48	0.00	0.00	0.00	0.00	3	0.15	Axial	50	HSS6X6X1/2
4	46.50	0.00	0.00	0.00	0.00	7	0.16	Axial	50	HSS6X6X1/2

Frame #4:

Level: First

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
11	71.13	-0.00	0.00	0.00	-0.00	10	0.42	H1-1a	50	HSS5X5X1/2
12	32.46	0.00	0.00	-0.00	-0.00	6	0.19	Axial	50	HSS5X5X1/2

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
3	0.00	99.07	0.00	24.93	0.00	2	0.06	H1-1b	50	W33X118

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
1	40.32	0.00	0.00	0.00	0.00	6	0.34	Axial	50	HSS4X4X3/8
2	36.90	0.00	0.00	0.00	0.00	10	0.31	Axial	50	HSS4X4X3/8

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 1 Column Number= 2
Fy (ksi) = 50.00
Column Size = HSS7X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E2

Shear	Top	Vux (kip)	-0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	-0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	-0.00	0.90Vnx (kip)	=	140.74	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.200 D + 1.600 Lp

AXIAL CHECK:

Pu (kip)	=	108.04	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.367
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.485
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.485

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.200 D + 1.600 Lp

Axial		Load (kip)	108.04
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	-0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	108.04	0.90Pn (kip)	=	222.72
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	82.09
Muy(kip-ft)	=	-0.00	0.90Mny (kip-ft)	=	64.88
KL/Rx	=	73.75	KL/Ry	=	96.22
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.485
Eq H1-1a: 0.485 + 8/9(0.000 + 0.000) = 0.485

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 1 Column Number= 10
Fy (ksi) = 50.00
Column Size = HSS7X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E2

Shear	Top	Vux (kip)	-0.00
		Vuy (kip)	-0.00
Shear	Bot.	Vux (kip)	-0.00
		Vuy (kip)	-0.00

SHEAR CHECK:

Vux (kip)	=	-0.00	0.90Vnx (kip)	=	140.74	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	-0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E2

AXIAL CHECK:

Pu (kip)	=	46.90	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.159
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.211
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.211

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E1

Axial		Load (kip)	44.72
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	44.72	0.90Pn (kip)	=	222.72
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	82.09
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	64.88
KL/Rx	=	73.75	KL/Ry	=	96.22
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.201
Eq H1-1a: 0.201 + 8/9(0.000 + 0.000) = 0.201

Member Code Check

BEAM INFORMATION:

Story Level = First Frame Number = 1 Beam Number= 1
Fy (ksi) = 50.00
Beam Size = W16X36

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	21.44	21.44
Lu for Bending (ft)	21.44	21.44
K	1.00	1.00
Top Flange Continuously Braced	No	
Bottom Flange Continuously Braced	No	

CONTROLLING BEAM SEGMENT FORCES - SHEAR

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 0.00
j - end 21.44

SHEAR CHECK:

Vux (kip)	=	-4.78	1.00Vnx (kip)	=	140.71	Vux/1.00Vnx	=	0.034
Vuy (kip)	=	0.00	0.90Vny (kip)	=	162.31	Vuy/0.90Vny	=	0.000

CONTROLLING BEAM SEGMENT FORCES - AXIAL

Load Combination: 1.400 D

Segment distance (ft) i - end 0.00
j - end 21.44

AXIAL CHECK:

Pu (kip)	=	0.00	0.90Pnx (kip)	=	477.00	Pu/0.90Pnx	=	0.000
			0.90Pny (kip)	=	477.00	Pu/0.90Pny	=	0.000
			0.90Pn (kip)	=	477.00	Pu/0.90Pn	=	0.000

CONTROLLING BEAM SEGMENT FORCES - FLEXURE

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 0.00
j - end 21.44

CALCULATED PARAMETERS:

Pu (kip)	=	0.00	0.90Pn (kip)	=	477.00
Mux (kip-ft)	=	25.62	0.90Mnx (kip-ft)	=	97.63
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	40.50
Cbx	=	1.14			

INTERACTION EQUATION:

Pu/0.90*Pn=0.000
Mrx/Mcx = 0.262

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 1 Brace Number= 7
Fy (ksi) = 50.00
Brace Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	13.17	13.17
Lu for Bending (ft)	13.17	13.17
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E2

AXIAL CHECK:

Pu (kip)	=	43.75	0.90Pnx (kip)	=	203.79	Pu/0.90Pnx	=	0.215
			0.90Pny (kip)	=	203.79	Pu/0.90Pny	=	0.215
			0.90Pn (kip)	=	203.79	Pu/0.90Pn	=	0.215

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E2

Axial		Load (kip)	43.75
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	43.75	0.90Pn (kip)	=	203.79
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	87.04	KL/Ry	=	87.04
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.215
Pr/Pc = 0.215

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 1 Brace Number= 8
Fy (ksi) = 50.00
Brace Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	13.17	13.17
Lu for Bending (ft)	13.17	13.17
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E2

AXIAL CHECK:

Pu (kip)	=	41.69	0.90Pnx (kip)	=	203.79	Pu/0.90Pnx	=	0.205
			0.90Pny (kip)	=	203.79	Pu/0.90Pny	=	0.205
			0.90Pn (kip)	=	203.79	Pu/0.90Pn	=	0.205

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E2

Axial		Load (kip)	41.69
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	41.69	0.90Pn (kip)	=	203.79
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	87.04	KL/Ry	=	87.04
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.205
Pr/Pc = 0.205

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 2 Column Number= 23
Fy (ksi) = 50.00
Column Size = HSS7X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E2

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	-0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	-0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	140.74	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	-0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E3

AXIAL CHECK:

Pu (kip)	=	35.33	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.120
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.159
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.159

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E3

Axial		Load (kip)	35.33
Moment	Top	Mux (kip-ft)	-0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	35.33	0.90Pn (kip)	=	222.72
Mux (kip-ft)	=	-0.00	0.90Mnx (kip-ft)	=	82.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	64.88
KL/Rx	=	73.75	KL/Ry	=	96.22
Cbx	=	1.67			

INTERACTION EQUATION:

Pu/0.90*Pn=0.159
Eq H1-1b: 0.079 + 0.000 + 0.000 = 0.079

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 2 Column Number= 24
Fy (ksi) = 50.00
Column Size = HSS7X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E2

Shear	Top	Vux (kip)	-0.00
		Vuy (kip)	-0.00
Shear	Bot.	Vux (kip)	-0.00
		Vuy (kip)	-0.00

SHEAR CHECK:

Vux (kip)	=	-0.00	0.90Vnx (kip)	=	140.74	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	-0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

AXIAL CHECK:

Pu (kip)	=	58.07	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.197
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.261
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.261

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Axial		Load (kip)	58.07
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	58.07	0.90Pn (kip)	=	222.72
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	82.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	64.88
KL/Rx	=	73.75	KL/Ry	=	96.22
Cbx	=	1.67			

INTERACTION EQUATION:

Pu/0.90*Pn=0.261
Eq H1-1a: 0.261 + 8/9(0.000 + 0.000) = 0.261

Member Code Check

BEAM INFORMATION:

Story Level = First Frame Number = 2 Beam Number= 30
Fy (ksi) = 50.00
Beam Size = W24X55

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	6.71
Lu for Bending (ft)	15.33	6.71
K	1.00	1.00
Top Flange Continuously Braced	No	
Bottom Flange Continuously Braced	No	

CONTROLLING BEAM SEGMENT FORCES - SHEAR

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 0.00
j - end 1.91

SHEAR CHECK:

Vux (kip)	=	21.64	0.90Vnx (kip)	=	251.69	Vux/0.90Vnx	=	0.086
Vuy (kip)	=	0.00	0.90Vny (kip)	=	191.16	Vuy/0.90Vny	=	0.000

CONTROLLING BEAM SEGMENT FORCES - AXIAL

Load Combination: 1.400 D

Segment distance (ft) i - end 0.00
j - end 1.91

AXIAL CHECK:

Pu (kip)	=	0.00	0.90Pnx (kip)	=	729.00	Pu/0.90Pnx	=	0.000
			0.90Pny (kip)	=	729.00	Pu/0.90Pny	=	0.000
			0.90Pn (kip)	=	729.00	Pu/0.90Pn	=	0.000

CONTROLLING BEAM SEGMENT FORCES - FLEXURE

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 1.91
j - end 8.62

CALCULATED PARAMETERS:

Pu (kip)	=	0.00	0.90Pn (kip)	=	729.00
Mux (kip-ft)	=	76.09	0.90Mnx (kip-ft)	=	502.50
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.80
Cbx	=	1.22			

INTERACTION EQUATION:

Pu/0.90*Pn=0.000
Mrx/Mcx = 0.151

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 2 Brace Number= 15
Fy (ksi) = 50.00
Brace Size = HSS4X4X3/8

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	10.84	10.84
Lu for Bending (ft)	10.84	10.84
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	55.65	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	55.65	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

AXIAL CHECK:

Pu (kip)	=	34.82	0.90Pnx (kip)	=	121.14	Pu/0.90Pnx	=	0.287
			0.90Pny (kip)	=	121.14	Pu/0.90Pny	=	0.287
			0.90Pn (kip)	=	121.14	Pu/0.90Pn	=	0.287

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Axial		Load (kip)	34.82
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	34.82	0.90Pn (kip)	=	121.14
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	23.96
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	23.96
KL/Rx	=	88.61	KL/Ry	=	88.61
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.287
Pr/Pc = 0.287

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 2 Brace Number= 16
Fy (ksi) = 50.00
Brace Size = HSS4X4X3/8

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	10.84	10.84
Lu for Bending (ft)	10.84	10.84
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	55.65	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	55.65	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E3

AXIAL CHECK:

Pu (kip)	=	37.61	0.90Pnx (kip)	=	121.14	Pu/0.90Pnx	=	0.310
			0.90Pny (kip)	=	121.14	Pu/0.90Pny	=	0.310
			0.90Pn (kip)	=	121.14	Pu/0.90Pn	=	0.310

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E3

Axial		Load (kip)	37.61
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	37.61	0.90Pn (kip)	=	121.14
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	23.96
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	23.96
KL/Rx	=	88.61	KL/Ry	=	88.61
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.310
Pr/Pc = 0.310

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 3 Column Number= 13
Fy (ksi) = 50.00
Column Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E2

Shear	Top	Vux (kip)	-0.00
		Vuy (kip)	-0.00
Shear	Bot.	Vux (kip)	-0.00
		Vuy (kip)	-0.00

SHEAR CHECK:

Vux (kip)	=	-0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	-0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E1

AXIAL CHECK:

Pu (kip)	=	65.66	0.90Pnx (kip)	=	167.51	Pu/0.90Pnx	=	0.392
			0.90Pny (kip)	=	167.51	Pu/0.90Pny	=	0.392
			0.90Pn (kip)	=	167.51	Pu/0.90Pn	=	0.392

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E1

Axial		Load (kip)	65.66
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	65.66	0.90Pn (kip)	=	167.51
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	101.27	KL/Ry	=	101.27
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.392
Eq H1-1a: 0.392 + 8/9(0.000 + 0.000) = 0.392

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 3 Column Number= 14
Fy (ksi) = 50.00
Column Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E2

Shear	Top	Vux (kip)	-0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	-0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	-0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E1

AXIAL CHECK:

Pu (kip)	=	57.81	0.90Pnx (kip)	=	167.51	Pu/0.90Pnx	=	0.345
			0.90Pny (kip)	=	167.51	Pu/0.90Pny	=	0.345
			0.90Pn (kip)	=	167.51	Pu/0.90Pn	=	0.345

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E1

Axial		Load (kip)	57.81
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	-0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	57.81	0.90Pn (kip)	=	167.51
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	-0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	101.27	KL/Ry	=	101.27
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.345
Eq H1-1a: 0.345 + 8/9(0.000 + 0.000) = 0.345

Member Code Check

BEAM INFORMATION:

Story Level = First Frame Number = 3 Beam Number= 5
Fy (ksi) = 50.00
Beam Size = W33X118

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	22.05	8.88
Lu for Bending (ft)	22.05	8.88
K	1.00	1.00
Top Flange Continuously Braced	No	
Bottom Flange Continuously Braced	No	

CONTROLLING BEAM SEGMENT FORCES - SHEAR

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 0.00
j - end 8.88

SHEAR CHECK:

Vux (kip)	=	70.37	0.90Vnx (kip)	=	488.57	Vux/0.90Vnx	=	0.144
Vuy (kip)	=	0.00	0.90Vny (kip)	=	459.54	Vuy/0.90Vny	=	0.000

CONTROLLING BEAM SEGMENT FORCES - AXIAL

Load Combination: 1.400 D

Segment distance (ft) i - end 0.00
j - end 8.88

AXIAL CHECK:

Pu (kip)	=	0.00	0.90Pnx (kip)	=	1561.50	Pu/0.90Pnx	=	0.000
			0.90Pny (kip)	=	1561.50	Pu/0.90Pny	=	0.000
			0.90Pn (kip)	=	1561.50	Pu/0.90Pn	=	0.000

CONTROLLING BEAM SEGMENT FORCES - FLEXURE

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 0.00
j - end 8.88

CALCULATED PARAMETERS:

Pu (kip)	=	0.00	0.90Pn (kip)	=	1561.50
Mux (kip-ft)	=	593.08	0.90Mnx (kip-ft)	=	1556.25
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	192.38
Cbx	=	1.64			

INTERACTION EQUATION:

Pu/0.90*Pn=0.000
Mrx/Mcx = 0.381

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 3 Brace Number= 3
Fy (ksi) = 50.00
Brace Size = HSS6X6X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	13.43	13.43
Lu for Bending (ft)	13.43	13.43
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	115.63	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	115.63	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E1

AXIAL CHECK:

Pu (kip)	=	44.48	0.90Pnx (kip)	=	298.85	Pu/0.90Pnx	=	0.149
			0.90Pny (kip)	=	298.85	Pu/0.90Pny	=	0.149
			0.90Pn (kip)	=	298.85	Pu/0.90Pn	=	0.149

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E1

Axial		Load (kip)	44.48
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	44.48	0.90Pn (kip)	=	298.85
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	74.25
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	74.25
KL/Rx	=	72.37	KL/Ry	=	72.37
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.149
Pr/Pc = 0.149

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 3 Brace Number= 4
Fy (ksi) = 50.00
Brace Size = HSS6X6X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	13.43	13.43
Lu for Bending (ft)	13.43	13.43
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	115.63	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	115.63	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E1

AXIAL CHECK:

Pu (kip)	=	46.50	0.90Pnx (kip)	=	298.85	Pu/0.90Pnx	=	0.156
			0.90Pny (kip)	=	298.85	Pu/0.90Pny	=	0.156
			0.90Pn (kip)	=	298.85	Pu/0.90Pn	=	0.156

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E1

Axial		Load (kip)	46.50
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	46.50	0.90Pn (kip)	=	298.85
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	74.25
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	74.25
KL/Rx	=	72.37	KL/Ry	=	72.37
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.156
Pr/Pc = 0.156

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 4 Column Number= 11
Fy (ksi) = 50.00
Column Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E2

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	-0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	-0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	-0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E4

AXIAL CHECK:

Pu (kip)	=	71.13	0.90Pnx (kip)	=	167.51	Pu/0.90Pnx	=	0.425
			0.90Pny (kip)	=	167.51	Pu/0.90Pny	=	0.425
			0.90Pn (kip)	=	167.51	Pu/0.90Pn	=	0.425

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E4

Axial		Load (kip)	71.13
Moment	Top	Mux (kip-ft)	-0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	71.13	0.90Pn (kip)	=	167.51
Mux (kip-ft)	=	-0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	101.27	KL/Ry	=	101.27
Cbx	=	1.67			

INTERACTION EQUATION:

Pu/0.90*Pn=0.425
Eq H1-1a: 0.425 + 8/9(0.000 + 0.000) = 0.425

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 4 Column Number= 12
Fy (ksi) = 50.00
Column Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E2

Shear	Top	Vux (kip)	-0.00
		Vuy (kip)	-0.00
Shear	Bot.	Vux (kip)	-0.00
		Vuy (kip)	-0.00

SHEAR CHECK:

Vux (kip)	=	-0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	-0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E4

AXIAL CHECK:

Pu (kip)	=	32.46	0.90Pnx (kip)	=	167.51	Pu/0.90Pnx	=	0.194
			0.90Pny (kip)	=	167.51	Pu/0.90Pny	=	0.194
			0.90Pn (kip)	=	167.51	Pu/0.90Pn	=	0.194

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E4

Axial		Load (kip)	32.46
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	32.46	0.90Pn (kip)	=	167.51
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	101.27	KL/Ry	=	101.27
Cbx	=	1.67			

INTERACTION EQUATION:

Pu/0.90*Pn=0.194
Eq H1-1b: 0.097 + 0.000 + 0.000 = 0.097

Member Code Check

BEAM INFORMATION:

Story Level = First Frame Number = 4 Beam Number= 3
Fy (ksi) = 50.00
Beam Size = W33X118

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	16.04	6.71
Lu for Bending (ft)	16.04	6.71
K	1.00	1.00
Top Flange Continuously Braced	No	
Bottom Flange Continuously Braced	No	

CONTROLLING BEAM SEGMENT FORCES - SHEAR

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 0.00
j - end 2.62

SHEAR CHECK:

Vux (kip)	=	24.93	0.90Vnx (kip)	=	488.57	Vux/0.90Vnx	=	0.051
Vuy (kip)	=	0.00	0.90Vny (kip)	=	459.54	Vuy/0.90Vny	=	0.000

CONTROLLING BEAM SEGMENT FORCES - AXIAL

Load Combination: 1.400 D

Segment distance (ft) i - end 0.00
j - end 2.62

AXIAL CHECK:

Pu (kip)	=	0.00	0.90Pnx (kip)	=	1561.50	Pu/0.90Pnx	=	0.000
			0.90Pny (kip)	=	1561.50	Pu/0.90Pny	=	0.000
			0.90Pn (kip)	=	1561.50	Pu/0.90Pn	=	0.000

CONTROLLING BEAM SEGMENT FORCES - FLEXURE

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 2.62
j - end 9.33

CALCULATED PARAMETERS:

Pu (kip)	=	0.00	0.90Pn (kip)	=	1561.50
Mux (kip-ft)	=	99.07	0.90Mnx (kip-ft)	=	1556.25
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	192.38
Cbx	=	1.14			

INTERACTION EQUATION:

Pu/0.90*Pn=0.000
Mrx/Mcx = 0.064

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 4 Brace Number= 1
Fy (ksi) = 50.00
Brace Size = HSS4X4X3/8

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	11.10	11.10
Lu for Bending (ft)	11.10	11.10
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	55.65	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	55.65	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E4

AXIAL CHECK:

Pu (kip)	=	40.32	0.90Pnx (kip)	=	117.81	Pu/0.90Pnx	=	0.342
			0.90Pny (kip)	=	117.81	Pu/0.90Pny	=	0.342
			0.90Pn (kip)	=	117.81	Pu/0.90Pn	=	0.342

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E4

Axial		Load (kip)	40.32
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	40.32	0.90Pn (kip)	=	117.81
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	23.96
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	23.96
KL/Rx	=	90.74	KL/Ry	=	90.74
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.342
Pr/Pc = 0.342

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 4 Brace Number= 2
Fy (ksi) = 50.00
Brace Size = HSS4X4X3/8

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	11.10	11.10
Lu for Bending (ft)	11.10	11.10
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	55.65	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	55.65	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E4

AXIAL CHECK:

Pu (kip)	=	36.90	0.90Pnx (kip)	=	117.81	Pu/0.90Pnx	=	0.313
			0.90Pny (kip)	=	117.81	Pu/0.90Pny	=	0.313
			0.90Pn (kip)	=	117.81	Pu/0.90Pn	=	0.313

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E4

Axial		Load (kip)	36.90
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	36.90	0.90Pn (kip)	=	117.81
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	23.96
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	23.96
KL/Rx	=	90.74	KL/Ry	=	90.74
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.313
Pr/Pc = 0.313

Frame Reaction Envelope

CRITERIA:

Rigid End Zones:		Ignore Effects			
Member Force Output:		At Face of Joint			
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.60
		Scale Factor (Roof):	1.60	Scale Factor (Snow):	1.60
Ground Level:	Base				

Mesh Criteria :

Max. Distance Between Nodes on Mesh Line (ft) : 4.00

Merge Node Tolerance (in) : 0.0100

Geometry Tolerance (in) : 0.0050

Walls Out-of-plane Stiffness Not Included in Analysis.

Use Reduced Stiffness for Steel Members (AISC 360): $\tau b = 0.80$

Sign considered for Dynamic Load Case Results.

Rigid Links Included at Fixed Beam-to-Wall Locations

Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

LOAD COMBINATION CRITERIA:

Roof Live Load:	Snow
Live Load factor f1 (0.5 or 1.0)	1.000
Sds (for Ev)	0.992
RhoX	1.300
RhoY	1.300

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

LOAD COMBINATIONS: IBC 2021 / ASCE 7-16 LRFD

1	*	1.400 D
2	*	1.200 D + 1.600 Lp
3	*	1.398 D + 1.000 Lp + 1.300 E1
4	*	1.398 D + 1.000 Lp + 1.300 E2
5	*	1.398 D + 1.000 Lp + 1.300 E3
6	*	1.398 D + 1.000 Lp + 1.300 E4
7	*	1.398 D + 1.000 Lp - 1.300 E1
8	*	1.398 D + 1.000 Lp - 1.300 E2
9	*	1.398 D + 1.000 Lp - 1.300 E3

Frame Reaction Envelope

10	*	1.398 D + 1.000 Lp - 1.300 E4
11	*	1.398 D + 1.300 E1
12	*	1.398 D + 1.300 E2
13	*	1.398 D + 1.300 E3
14	*	1.398 D + 1.300 E4
15	*	1.398 D - 1.300 E1
16	*	1.398 D - 1.300 E2
17	*	1.398 D - 1.300 E3
18	*	1.398 D - 1.300 E4
19	*	0.702 D + 1.300 E1
20	*	0.702 D + 1.300 E2
21	*	0.702 D + 1.300 E3
22	*	0.702 D + 1.300 E4
23	*	0.702 D - 1.300 E1
24	*	0.702 D - 1.300 E2
25	*	0.702 D - 1.300 E3
26	*	0.702 D - 1.300 E4

* = Load combination currently selected to use

REACTION MAXIMA AND MINIMA:

Frame #1:

Node		Rx	Ry	Rz	Mxx	Myy	Tzz
		kips	kips	kips	kip-ft	kip-ft	kip-ft
9	Max:	33.92	0.00	71.16	0.00	0.00	0.01
	LC:	8	4	8	1	1	24
	Min:	-18.67	-0.00	-21.29	0.00	0.00	-0.03
	LC:	20	24	20	1	1	4
14	Max:	18.27	0.00	127.56	0.00	0.00	0.01
	LC:	24	24	4	1	1	24
	Min:	-35.60	-0.00	-7.81	0.00	0.00	-0.03
	LC:	4	4	24	1	1	4

Frame #2:

Node		Rx	Ry	Rz	Mxx	Myy	Tzz
		kips	kips	kips	kip-ft	kip-ft	kip-ft
16	Max:	0.00	26.61	61.95	0.00	0.00	0.01
	LC:	24	9	9	1	1	24
	Min:	-0.00	-19.90	-37.71	0.00	0.00	-0.03
	LC:	4	21	21	1	1	4

Frame Reaction Envelope

17	Max:	0.00	20.37	82.72	0.00	0.00	0.01
	LC:	4	25	5	1	1	24
	Min:	-0.00	-24.64	-32.75	0.00	0.00	-0.03
	LC:	24	5	25	1	1	4

Frame #3:

Node		**Rx**	**Ry**	**Rz**	**Mxx**	**Myy**	**Tzz**
		kips	**kips**	**kips**	**kip-ft**	**kip-ft**	**kip-ft**
13	Max:	38.19	0.00	92.21	0.00	0.00	0.00
	LC:	7	4	7	1	1	24
	Min:	-18.14	-0.00	-15.87	0.00	0.00	-0.01
	LC:	19	24	19	1	1	4
15	Max:	18.53	0.00	83.22	0.00	0.00	0.00
	LC:	23	24	3	1	1	24
	Min:	-36.53	-0.00	-18.02	0.00	0.00	-0.01
	LC:	3	4	23	1	1	4

Frame #4:

Node		**Rx**	**Ry**	**Rz**	**Mxx**	**Myy**	**Tzz**
		kips	**kips**	**kips**	**kip-ft**	**kip-ft**	**kip-ft**
10	Max:	0.00	0.00	71.15	0.00	0.00	0.00
	LC:	24	25	10	1	1	24
	Min:	-0.00	-0.00	-8.82	0.00	0.00	-0.01
	LC:	4	5	22	1	1	4
11	Max:	0.00	24.71	27.43	0.00	0.00	0.00
	LC:	7	10	10	1	1	1
	Min:	-0.00	-18.03	-20.01	0.00	0.00	0.00
	LC:	19	22	22	1	1	1
12	Max:	0.00	20.05	60.34	0.00	0.00	0.00
	LC:	4	26	6	1	1	24
	Min:	-0.00	-29.17	-37.96	0.00	0.00	-0.01
	LC:	24	6	26	1	1	4

Load Combinations

LOAD COMBINATION CRITERIA:

Roof Live Load:	Snow
Live Load factor f1 (0.5 or 1.0)	1.000
Sds (for Ev)	0.992
Omega_o	2.000

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

LOAD COMBINATIONS: IBC 2021 / ASCE 7-16 LRFD

1	*	1.398 D + 1.000 Lp + 2.000 E1
2	*	1.398 D + 1.000 Lp + 2.000 E2
3	*	1.398 D + 1.000 Lp + 2.000 E3
4	*	1.398 D + 1.000 Lp + 2.000 E4
5	*	1.398 D + 1.000 Lp - 2.000 E1
6	*	1.398 D + 1.000 Lp - 2.000 E2
7	*	1.398 D + 1.000 Lp - 2.000 E3
8	*	1.398 D + 1.000 Lp - 2.000 E4
9	*	1.398 D + 2.000 E1
10	*	1.398 D + 2.000 E2
11	*	1.398 D + 2.000 E3
12	*	1.398 D + 2.000 E4
13	*	1.398 D - 2.000 E1
14	*	1.398 D - 2.000 E2
15	*	1.398 D - 2.000 E3
16	*	1.398 D - 2.000 E4
17	*	0.702 D + 2.000 E1
18	*	0.702 D + 2.000 E2
19	*	0.702 D + 2.000 E3
20	*	0.702 D + 2.000 E4
21	*	0.702 D - 2.000 E1
22	*	0.702 D - 2.000 E2
23	*	0.702 D - 2.000 E3
24	*	0.702 D - 2.000 E4

* = Load combination currently selected to use

Load Combinations

Code checks requiring Ecl use (+ 1.000 Ecl) for LRFD and (+ 0.700 Ecl) for ASD in a set of generated load combinations independent of the combinations shown above.

Seismic Provisions Member Code Check Summary

Criteria

Cd/Ie = 4.0

BRBF and SCBF - Required Column Strength based on Larger of Strength and Capacity Limited Seismic Forces.

Frame #1:

Story:First Column: 2 Type: Ordinary Concentrically Braced Frame

Size:HSS7X5X1/2 Fy (ksi): 50.00

D1.4a Required Strength --- OK

D2.5b Column Splices - Required Strength

D2.5c Required Shear Strength

Story:First Column: 10 Type: Ordinary Concentrically Braced Frame

Size:HSS7X5X1/2 Fy (ksi): 50.00

D1.4a Required Strength --- OK

D2.5b Column Splices - Required Strength

D2.5c Required Shear Strength

Story:First Beam: 1 Type: Ordinary Concentrically Braced Frame

Size:W16X36 Fy (ksi): 50.00

No Special Seismic Provision Checks Required For This Member

Story:First Brace: 7 Type: Ordinary Concentrically Braced Frame

Size:HSS5X5X1/2 Fy (ksi): 50.00

F1.5a Basic Requirements (D1.1 Moderately Ductile) --- OK

Story:First Brace: 8 Type: Ordinary Concentrically Braced Frame

Size:HSS5X5X1/2 Fy (ksi): 50.00

F1.5a Basic Requirements (D1.1 Moderately Ductile) --- OK

SECTION BREAK

Lateral Design

SUBSECTION BREAK

Phase 2 Model Results

DESCRIPTION/NOTES:

Description details.

Loads and Applied Forces

LOAD CASE: Seismic

Seismic ASCE 7-16 Equivalent Lateral Force
Importance Factor: 1.25 TL: 8.00 s
Site Class D: Stiff Soil
Ss: 1.488 g S1: 0.551 g
Use Specified: SDs: 0.992 g SD1: 0.643 g
Risk Category: III Seismic Design Category: D
Provisions for: Force
Ground Level: Base

Dir	Eccent	R	Ta Equation	Building Period-T
X	+ And -	3.25	Std,Ct=0.030,x=0.75	Calculated
Y	+ And -	3.25	Std,Ct=0.030,x=0.75	Calculated

Dir	Ta	Cu	T	T - used	Cs Eq12.8-2	Cs - used	k
X	0.232	1.400	0.203	0.203	0.382	0.382	1.000

Dir	Ta	Cu	T	T - used	Cs Eq12.8-2	Cs - used	k
Y	0.232	1.400	0.208	0.208	0.382	0.382	1.000

Exception 2 per Section 11.4.8 is applied for site class D with S1 > 0.2

Total Building Weight (kips) = 651.88

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_X_+E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
First	1	15.33	248.72	0.00	85.70	26.13

APPLIED STORY FORCES

Type: EQ_ASCE716_X_+E_F

Level	Ht	Fx	Fy
	ft	kips	kips
First	15.33	248.72	0.00
		248.72	0.00

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_X_-E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
First	1	15.33	248.72	0.00	85.70	21.12

Loads and Applied Forces

APPLIED STORY FORCES

Type: EQ_ASCE716_X_-E_F

Level	Ht	Fx	Fy
	ft	kips	kips
First	15.33	248.72	0.00
		248.72	0.00

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_Y_+E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
First	1	15.33	0.00	248.72	94.25	23.63

APPLIED STORY FORCES

Type: EQ_ASCE716_Y_+E_F

Level	Ht	Fx	Fy
	ft	kips	kips
First	15.33	0.00	248.72
		0.00	248.72

APPLIED DIAPHRAGM FORCES

Type: EQ_ASCE716_Y_-E_F

Level	Diaph.#	Ht	Fx	Fy	X	Y
		ft	kips	kips	ft	ft
First	1	15.33	0.00	248.72	77.15	23.63

APPLIED STORY FORCES

Type: EQ_ASCE716_Y_-E_F

Level	Ht	Fx	Fy
	ft	kips	kips
First	15.33	0.00	248.72
		0.00	248.72

Criteria, Mass and Exposure Data

CRITERIA:

Rigid End Zones:		Ignore Effects			
Member Force Output:		At Face of Joint			
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.60
		Scale Factor (Roof):	1.60	Scale Factor (Snow):	1.60
Ground Level:	Base				

Mesh Criteria :

Max. Distance Between Nodes on Mesh Line (ft) : 4.00
Merge Node Tolerance (in) : 0.0100
Geometry Tolerance (in) : 0.0050

Walls Out-of-plane Stiffness Not Included in Analysis.
Sign considered for Dynamic Load Case Results.
Rigid Links Included at Fixed Beam-to-Wall Locations
Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

DIAPHRAGM DATA:

Story	Diaph #	Diaph Type
First	1	Rigid

Disconnect Internal Nodes of Beams: Yes
Disconnect Nodes outside Slab Boundary: Yes

STORY MASS DATA:

Includes Self Mass of:

Walls (Full mass of walls below only)

Calculated Values:

Story	Diaph #	Weight kips	Mass k-s2/ft	MMI ft-k-s2	Xm ft	Ym ft	EccX ft	EccY ft
First	1	651.88	20.24	53705	85.70	23.63	8.55	2.51

Story	Diaph #	Combine
First	1	None

WIND EXPOSURE DATA:

Calculated Values:

Story	Diaph #	Building Extents (ft) Min X	Max X	Min Y	Max Y	Expose	Parapet ft
First	1	-1.83	169.17	-0.97	49.15	Full	0.00

STORY GRAVITY LOADS DATA:

Includes Weight of:

Columns
Walls

Criteria, Mass and Exposure Data

Live Load Reduction (Calculated)

Reducible :	50.00 %
Storage :	0.00 %
Roof :	0.00 %

Calculated Values:

Story	Diaph #	Dead kips	Xc ft	Yc ft	Live kips	Xc ft	Yc ft
First	1	550.51	82.94	23.76	672.62	54.79	19.82
	None	0.22	152.84	48.81	0.00	0.00	0.00

Story	Diaph #	Roof kips	Xc ft	Yc ft	Combine
First	1	0.00	0.00	0.00	None
	None	0.00	0.00	0.00	1-First

User Specified Values:

Story	Diaph #	Dead kips	Xc ft	Yc ft	Live kips	Xc ft	Yc ft
First	1	550.74	82.96	23.77	672.62	54.79	19.82

Story	Diaph #	Roof kips	Xc ft	Yc ft
First	1	0.0	0.00	0.00

Frame Reaction Envelope

RAM Frame 24.00.00.160
CCHS Field House Mezz
DataBase: (9-10-24) CCHS Field House Mezz Phase 2
Building Code: IBC

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CRITERIA:

Rigid End Zones:		Ignore Effects			
Member Force Output:		At Face of Joint			
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.60
		Scale Factor (Roof):	1.60	Scale Factor (Snow):	1.60
Ground Level:	Base				

Mesh Criteria :

Max. Distance Between Nodes on Mesh Line (ft) : 4.00
Merge Node Tolerance (in) : 0.0100
Geometry Tolerance (in) : 0.0050

Walls Out-of-plane Stiffness Not Included in Analysis.
Sign considered for Dynamic Load Case Results.
Rigid Links Included at Fixed Beam-to-Wall Locations
Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

REACTION MAXIMA AND MINIMA:

Frame #1:

Node		Rx	Ry	Rz	Mxx	Myy	Tzz
		kips	kips	kips	kip-ft	kip-ft	kip-ft
11	Max:	8.02	0.00	23.42	0.00	0.00	0.00
	LC:	Lp	E3	Lp	D	D	E4
	Min:	-64.09	-0.00	-91.67	0.00	0.00	-0.01
	LC:	E2	E4	E2	D	D	E3
15	Max:	0.69	0.00	91.67	0.00	0.00	0.00
	LC:	E4	E4	E2	D	D	E4
	Min:	-64.09	-0.00	-0.99	0.00	0.00	-0.01
	LC:	E2	E3	E4	D	D	E3

Frame #2:

Node		Rx	Ry	Rz	Mxx	Myy	Tzz
		kips	kips	kips	kip-ft	kip-ft	kip-ft
17	Max:	0.00	6.19	23.94	0.00	0.00	0.00

	LC:	E4	Lp	Lp	D	D	E4
	Min:	-0.00	-37.00	-73.98	0.00	0.00	-0.01
	LC:	E3	E4	E4	D	D	E3
18	Max:	0.00	0.73	73.98	0.00	0.00	0.00
	LC:	E3	E2	E4	D	D	E4
	Min:	-0.00	-37.00	-1.47	0.00	0.00	-0.01
	LC:	E4	E4	E2	D	D	E3

Frame #3:

Node		**Rx**	**Ry**	**Rz**	**Mxx**	**Myy**	**Tzz**
		kips	**kips**	**kips**	**kip-ft**	**kip-ft**	**kip-ft**
14	Max:	5.57	0.00	29.17	0.00	0.00	0.00
	LC:	Lp	E3	Lp	D	D	E4
	Min:	-62.38	-0.00	-86.73	0.00	0.00	-0.01
	LC:	E1	E4	E1	D	D	E3
16	Max:	4.06	0.00	86.73	0.00	0.00	0.00
	LC:	E3	E4	E1	D	D	E4
	Min:	-62.38	-0.00	-5.65	0.00	0.00	-0.01
	LC:	E1	E3	E3	D	D	E3

Frame #4:

Node		**Rx**	**Ry**	**Rz**	**Mxx**	**Myy**	**Tzz**
		kips	**kips**	**kips**	**kip-ft**	**kip-ft**	**kip-ft**
12	Max:	0.00	2.38	28.07	0.00	0.00	0.00
	LC:	E4	Lp	Lp	D	D	E4
	Min:	-0.00	-37.60	-71.86	0.00	0.00	-0.01
	LC:	E3	E4	E4	D	D	E3
13	Max:	0.00	1.52	71.86	0.00	0.00	0.00
	LC:	E3	E2	E4	D	D	E4
	Min:	-0.00	-37.60	-2.90	0.00	0.00	-0.01
	LC:	E4	E4	E2	D	D	E3

Frame #5:

Node		**Rx**	**Ry**	**Rz**	**Mxx**	**Myy**	**Tzz**
		kips	**kips**	**kips**	**kip-ft**	**kip-ft**	**kip-ft**
19	Max:	0.00	2.20	11.73	0.00	0.00	0.00
	LC:	E4	Lp	Lp	D	D	E4
	Min:	-0.00	-63.34	-125.63	0.00	0.00	-0.01
	LC:	E3	E3	E3	D	D	E3

Frame Reaction Envelope

20	Max:	0.00	1.50	125.63	0.00	0.00	0.00
	LC:	E3	E1	E3	D	D	E4
	Min:	-0.00	-63.34	-2.98	0.00	0.00	-0.01
	LC:	E4	E3	E1	D	D	E3

Building Story Shears

RAM Frame 24.00.00.160
CCHS Field House Mezz
DataBase: (9-10-24) CCHS Field House Mezz Phase 2

10/04/24 10:32:29

CRITERIA:

Rigid End Zones:		Ignore Effects			
Member Force Output:		At Face of Joint			
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.60
		Scale Factor (Roof):	1.60	Scale Factor (Snow):	1.60
Ground Level:	Base				

Mesh Criteria :

Max. Distance Between Nodes on Mesh Line (ft) : 4.00
Merge Node Tolerance (in) : 0.0100
Geometry Tolerance (in) : 0.0050

Walls Out-of-plane Stiffness Not Included in Analysis.
Sign considered for Dynamic Load Case Results.
Rigid Links Included at Fixed Beam-to-Wall Locations
Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

Load Case: D DeadLoad RAMUSER

Level	Diaph. #	Shear-X kips	Shear-Y kips
First	1	0.02	-0.01

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
First	0.02	0.02	-0.01	-0.01

Load Case: Lp PosLiveLoad RAMUSER

Level	Diaph. #	Shear-X kips	Shear-Y kips
First	1	0.03	-0.01

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
First	0.03	0.03	-0.01	-0.01

Load Case: E1 Seismic EQ_ASCE716_X_+E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
First	1	250.16	-0.00

Summary - Total Story Shears

Level	Shear-X	Change-X	Shear-Y	Change-Y

	kips	kips	kips	kips
First	250.16	250.16	-0.00	-0.00

Load Case: E2 Seismic EQ_ASCE716_X_-E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
First	1	250.16	0.00

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
First	250.16	250.16	0.00	0.00

Load Case: E3 Seismic EQ_ASCE716_Y_+E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
First	1	0.00	250.25

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
First	0.00	0.00	250.25	250.25

Load Case: E4 Seismic EQ_ASCE716_Y_-E_F

Level	Diaph. #	Shear-X kips	Shear-Y kips
First	1	-0.00	250.23

Summary - Total Story Shears

Level	Shear-X kips	Change-X kips	Shear-Y kips	Change-Y kips
First	-0.00	-0.00	250.23	250.23

Steel Code Check Criteria

MEMBER CODE CHECK CRITERIA - GLOBAL:

B1 and B2 Criteria

B1 Factor Not Applied
B2 Factor Not Applied

K-Factor:	**Columns**	**Beams**	**Braces**
Kx:	1.000	1.000	1.000
Ky:	1.000	1.000	1.000

Compression Flange Bracing:

Columns:

Deck Braces Column
Knee Brace Does Not Brace Column
Max Angle for which Beam Braces Column: 60.00 deg

Beams / Horiz Braces:

Top Flange Not Continuously Braced
Bottom Flange Not Continuously Braced
Do Not Consider Point of Inflection as Brace Point

Column Design Moments:

Percent of Gravity Load Moments to include in design of steel columns:

Dead Load:	100.00 %
Live Load:	100.00 %
Roof Load:	100.00 %

Axial Slenderness Limits

Check KL/r exceeds 200 for Compression Members
Check L/r exceeds 300 for Tension Members (excludes rods)

MEMBER CODE CHECK CRITERIA - ASSIGNED

Frame #1:

Steel Code Check Criteria

Level: First

Steel Column:

#	K-Factor		Flange Bracing		Unbraced Length		
	Kx	Ky	Major	Minor	Lx	Ly	Lby
2	1.00	1.00	Global	Global	Global	Global	Global
10	1.00	1.00	Global	Global	Global	Global	Global

Steel Beam:

#	K-Factor		Flange Bracing		Unbraced Length			RBS
	Kx	Ky	Major	Minor	Lx	Ly	Lby	
1	1.00	1.00	Global	Global	Global	Global	Global	N

Steel Brace:

#	K-Factor		Unbraced Length		
	Kx	Ky	Lx	Ly	Lby
7	Global	Global	158.10	158.10	158.10
8	Global	Global	158.10	158.10	158.10

Frame #2:

Level: First

Steel Column:

#	K-Factor		Flange Bracing		Unbraced Length		
	Kx	Ky	Major	Minor	Lx	Ly	Lby
23	1.00	1.00	Global	Global	Global	Global	Global
24	1.00	1.00	Global	Global	Global	Global	Global

Steel Beam:

#	K-Factor		Flange Bracing		Unbraced Length			RBS
	Kx	Ky	Major	Minor	Lx	Ly	Lby	
30	1.00	1.00	Global	Global	Global	Global	Global	N

Steel Brace:

#	K-Factor		Unbraced Length		
	Kx	**Ky**	**Lx**	**Ly**	**Lby**
15	Global	Global	130.08	130.08	130.08
16	Global	Global	130.08	130.08	130.08

Frame #3:

Level: First

Steel Column:

#	K-Factor		Flange Bracing		Unbraced Length		
	Kx	**Ky**	**Major**	**Minor**	**Lx**	**Ly**	**Lby**
13	1.00	1.00	Global	Global	Global	Global	Global
14	1.00	1.00	Global	Global	Global	Global	Global

Steel Beam:

#	K-Factor		Flange Bracing		Unbraced Length			RBS
	Kx	**Ky**	**Major**	**Minor**	**Lx**	**Ly**	**Lby**	
5	1.00	1.00	Global	Global	Global	Global	Global	N

Steel Brace:

#	K-Factor		Unbraced Length		
	Kx	**Ky**	**Lx**	**Ly**	**Lby**
3	Global	Global	161.16	161.16	161.16
4	Global	Global	161.16	161.16	161.16

Frame #4:

Level: First

Steel Column:

#	K-Factor		Flange Bracing		Unbraced Length		
	Kx	**Ky**	**Major**	**Minor**	**Lx**	**Ly**	**Lby**
11	1.00	1.00	Global	Global	Global	Global	Global

12	1.00	1.00	Global	Global	Global	Global	Global

Steel Beam:

#	K-Factor		Flange Bracing		Unbraced Length			RBS
	Kx	Ky	Major	Minor	Lx	Ly	Lby	
3	1.00	1.00	Global	Global	Global	Global	Global	N

Steel Brace:

#	K-Factor		Unbraced Length		
	Kx	Ky	Lx	Ly	Lby
1	Global	Global	133.20	133.20	133.20
2	Global	Global	133.20	133.20	133.20

Frame #5:

Level: First

Steel Column:

#	K-Factor		Flange Bracing		Unbraced Length		
	Kx	Ky	Major	Minor	Lx	Ly	Lby
21	1.00	1.00	Global	Global	Global	Global	Global
22	1.00	1.00	Global	Global	Global	Global	Global

Steel Beam:

#	K-Factor		Flange Bracing		Unbraced Length			RBS
	Kx	Ky	Major	Minor	Lx	Ly	Lby	
22	1.00	1.00	Global	Global	Global	Global	Global	N

Steel Brace:

#	K-Factor		Unbraced Length		
	Kx	Ky	Lx	Ly	Lby
13	Global	Global	130.68	130.68	130.68
14	Global	Global	130.68	130.68	130.68

JOINT CODE CHECK CRITERIA

Material Properties

Web plate Fy (ksi):	36.00
Stiffener plate Fy (ksi):	36.00

Geometry

Maximum angle between a beam and column to assume the beam frames into column flange:	45.0
One diagonal stiffener designed if the difference in beam depths at a joint is less than (in):	4.00

Design Force

Use actual beam forces

Consider axial load in beam

Optimization

Stiffeners

Optimize each stiffener at joint

Minimum Thickness:	Per Code
Minimum Width:	Max Beam Flange Width at Joint
Thickness Increment (in):	0.125
Width Increment (in):	0.125
Clip (cope) dimension (in):	0.750

Web Plates

Maximum Thickness:	Same as Column Web
Minimum Thickness (in):	0.250
Thickness Increment (in):	0.125

CJP groove weld plate to column.

No web plate plug weld.

Load Combinations

LOAD COMBINATION CRITERIA:

Roof Live Load:	Unreducible
Live Load factor f1 (0.5 or 1.0)	1.000
Sds (for Ev)	0.992
RhoX	1.300
RhoY	1.300

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

LOAD COMBINATIONS: IBC 2021 / ASCE 7-16 LRFD

1	*	1.400 D
2	*	1.200 D + 1.600 Lp
3	*	1.398 D + 1.000 Lp + 1.300 E1
4	*	1.398 D + 1.000 Lp + 1.300 E2
5	*	1.398 D + 1.000 Lp + 1.300 E3
6	*	1.398 D + 1.000 Lp + 1.300 E4
7	*	1.398 D + 1.000 Lp - 1.300 E1
8	*	1.398 D + 1.000 Lp - 1.300 E2
9	*	1.398 D + 1.000 Lp - 1.300 E3
10	*	1.398 D + 1.000 Lp - 1.300 E4
11	*	1.398 D + 1.300 E1
12	*	1.398 D + 1.300 E2
13	*	1.398 D + 1.300 E3
14	*	1.398 D + 1.300 E4
15	*	1.398 D - 1.300 E1
16	*	1.398 D - 1.300 E2
17	*	1.398 D - 1.300 E3
18	*	1.398 D - 1.300 E4
19	*	0.702 D + 1.300 E1
20	*	0.702 D + 1.300 E2
21	*	0.702 D + 1.300 E3
22	*	0.702 D + 1.300 E4
23	*	0.702 D - 1.300 E1
24	*	0.702 D - 1.300 E2

Load Combinations

25	*	0.702 D - 1.300 E3
26	*	0.702 D - 1.300 E4

* = Load combination currently selected to use

Code Check Summary

CRITERIA:

Rigid End Zones:		Ignore Effects			
Member Force Output:		At Face of Joint			
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.60
		Scale Factor (Roof):	1.60	Scale Factor (Snow):	1.60
Ground Level:	Base				

Mesh Criteria :

Max. Distance Between Nodes on Mesh Line (ft) : 4.00
Merge Node Tolerance (in) : 0.0100
Geometry Tolerance (in) : 0.0050

Walls Out-of-plane Stiffness Not Included in Analysis.
Sign considered for Dynamic Load Case Results.
Rigid Links Included at Fixed Beam-to-Wall Locations
Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

LOAD COMBINATION CRITERIA:

Live Load factor f1 (0.5 or 1.0)	1.000
Sds (for Ev)	0.992
RhoX	1.300
RhoY	1.300

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

LOAD COMBINATIONS: IBC 2021 / ASCE 7-16 LRFD

1	*	1.400 D
2	*	1.200 D + 1.600 Lp
3	*	1.398 D + 1.000 Lp + 1.300 E1
4	*	1.398 D + 1.000 Lp + 1.300 E2
5	*	1.398 D + 1.000 Lp + 1.300 E3
6	*	1.398 D + 1.000 Lp + 1.300 E4
7	*	1.398 D + 1.000 Lp - 1.300 E1
8	*	1.398 D + 1.000 Lp - 1.300 E2
9	*	1.398 D + 1.000 Lp - 1.300 E3
10	*	1.398 D + 1.000 Lp - 1.300 E4
11	*	1.398 D + 1.300 E1

12	*	1.398 D + 1.300 E2
13	*	1.398 D + 1.300 E3
14	*	1.398 D + 1.300 E4
15	*	1.398 D - 1.300 E1
16	*	1.398 D - 1.300 E2
17	*	1.398 D - 1.300 E3
18	*	1.398 D - 1.300 E4
19	*	0.702 D + 1.300 E1
20	*	0.702 D + 1.300 E2
21	*	0.702 D + 1.300 E3
22	*	0.702 D + 1.300 E4
23	*	0.702 D - 1.300 E1
24	*	0.702 D - 1.300 E2
25	*	0.702 D - 1.300 E3
26	*	0.702 D - 1.300 E4

* = Load combination currently selected to use

Frame #1:

Level: First

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
2	144.54	0.00	0.00	-0.00	0.00	4	0.65 Axial	50	HSS7X5X1/2
10	93.90	0.00	0.00	-0.00	-0.00	8	0.42 Axial	50	HSS7X5X1/2

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
1	0.00	25.90	0.00	-4.83	0.00	2	0.27 H1-1b	50	W16X36

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
7	116.13	0.00	0.00	0.00	0.00	4	0.57 Axial	50	HSS5X5X1/2
8	121.39	0.00	0.00	0.00	0.00	8	0.60 Axial	50	HSS5X5X1/2

Frame #2:

Level: First

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.	Fy ksi	Size
23	82.55	0.00	0.00	0.00	-0.00	10	0.37 Axial	50	HSS7X5X1/2
24	110.40	0.00	0.00	-0.00	-0.00	6	0.50 Axial	50	HSS7X5X1/2

Beam	Pu	Mux	Muy	Vux	Vuy	LC	Interact.	Fy	Size

Code Check Summary

#	kip	kip-ft	kip-ft	kip	kip				ksi	
30	0.00	167.71	0.00	-54.32	0.00	2	0.33	H1-1b	50	W24X55

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
15	74.85	0.00	0.00	0.00	0.00	6	0.62	Axial	50	HSS4X4X3/8
16	84.92	0.00	0.00	0.00	0.00	10	0.70	Axial	50	HSS4X4X3/8

Frame #3:

Level: First

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
13	106.25	0.00	0.00	0.00	-0.00	7	0.63	H1-1a	50	HSS5X5X1/2
14	106.55	0.00	0.00	0.00	0.00	3	0.64	Axial	50	HSS5X5X1/2

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
5	0.00	579.97	0.00	68.91	0.00	2	0.37	H1-1b	50	W33X118

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
3	117.70	0.00	0.00	0.00	0.00	3	0.59	Axial	50	HSS5X5X1/2
4	112.43	0.00	0.00	0.00	0.00	7	0.56	Axial	50	HSS5X5X1/2

Frame #4:

Level: First

Col. #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
11	96.46	-0.00	0.00	0.00	0.00	10	0.58	H1-1a	50	HSS5X5X1/2
12	60.26	0.00	0.00	-0.00	0.00	6	0.36	Axial	50	HSS5X5X1/2

Beam #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
3	0.00	98.57	0.00	24.90	0.00	2	0.06	H1-1b	50	W33X118

Brace #	Pu kip	Mux kip-ft	Muy kip-ft	Vux kip	Vuy kip	LC	Interact.		Fy ksi	Size
1	79.54	0.00	0.00	0.00	0.00	6	0.68	Axial	50	HSS4X4X3/8
2	74.01	0.00	0.00	0.00	0.00	10	0.63	Axial	50	HSS4X4X3/8

Frame #5:

Level: First

Col.	Pu	Mux	Muy	Vux	Vuy	LC	Interact.		Fy	Size

Code Check Summary

#	kip	kip-ft	kip-ft	kip	kip				ksi	
21	98.70	0.00	0.00	0.00	0.00	9	0.59	H1-1a	50	HSS5X5X1/2
22	95.81	0.00	0.00	-0.00	0.00	5	0.57	H1-1a	50	HSS5X5X1/2

Beam	Pu	Mux	Muy	Vux	Vuy	LC	Interact.		Fy	Size
#	kip	kip-ft	kip-ft	kip	kip				ksi	
22	0.00	72.38	0.00	14.00	-0.00	2	0.05	H1-1b	50	W33X118

Brace	Pu	Mux	Muy	Vux	Vuy	LC	Interact.		Fy	Size
#	kip	kip-ft	kip-ft	kip	kip				ksi	
13	125.89	0.00	0.00	0.00	0.00	5	0.52	Axial	50	HSS5X5X1/2
14	121.51	0.00	0.00	0.00	0.00	9	0.50	Axial	50	HSS5X5X1/2

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 1 Column Number= 2
Fy (ksi) = 50.00
Column Size = HSS7X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Shear	Top	Vux (kip)	-0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	-0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	-0.00	0.90Vnx (kip)	=	140.74	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E2

AXIAL CHECK:

Pu (kip)	=	144.54	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.491
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.649
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.649

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Axial		Load (kip)	88.74
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	-0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	88.74	0.90Pn (kip)	=	222.72
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	82.09
Muy(kip-ft)	=	-0.00	0.90Mny (kip-ft)	=	64.88
KL/Rx	=	73.75	KL/Ry	=	96.22
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.398
Eq H1-1a: 0.398 + 8/9(0.000 + 0.000) = 0.398

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 1 Column Number= 10
Fy (ksi) = 50.00
Column Size = HSS7X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Shear	Top	Vux (kip)	-0.00
		Vuy (kip)	-0.00
Shear	Bot.	Vux (kip)	-0.00
		Vuy (kip)	-0.00

SHEAR CHECK:

Vux (kip)	=	-0.00	0.90Vnx (kip)	=	140.74	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	-0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E2

AXIAL CHECK:

Pu (kip)	=	93.90	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.319
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.422
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.422

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E3

Axial		Load (kip)	38.10
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	-0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	38.10	0.90Pn (kip)	=	222.72
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	82.09
Muy(kip-ft)	=	-0.00	0.90Mny (kip-ft)	=	64.88
KL/Rx	=	73.75	KL/Ry	=	96.22
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.171
Eq H1-1b: 0.086 + 0.000 + 0.000 = 0.086

Member Code Check

BEAM INFORMATION:

Story Level = First Frame Number = 1 Beam Number= 1
Fy (ksi) = 50.00
Beam Size = W16X36

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	21.44	21.44
Lu for Bending (ft)	21.44	21.44
K	1.00	1.00
Top Flange Continuously Braced	No	
Bottom Flange Continuously Braced	No	

CONTROLLING BEAM SEGMENT FORCES - SHEAR

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 0.00
j - end 21.44

SHEAR CHECK:

Vux (kip)	=	-4.83	1.00Vnx (kip)	=	140.71	Vux/1.00Vnx	=	0.034
Vuy (kip)	=	0.00	0.90Vny (kip)	=	162.31	Vuy/0.90Vny	=	0.000

CONTROLLING BEAM SEGMENT FORCES - AXIAL

Load Combination: 1.400 D

Segment distance (ft) i - end 0.00
j - end 21.44

AXIAL CHECK:

Pu (kip)	=	0.00	0.90Pnx (kip)	=	477.00	Pu/0.90Pnx	=	0.000
			0.90Pny (kip)	=	477.00	Pu/0.90Pny	=	0.000
			0.90Pn (kip)	=	477.00	Pu/0.90Pn	=	0.000

CONTROLLING BEAM SEGMENT FORCES - FLEXURE

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 0.00
j - end 21.44

CALCULATED PARAMETERS:

Pu (kip)	=	0.00	0.90Pn (kip)	=	477.00
Mux (kip-ft)	=	25.90	0.90Mnx (kip-ft)	=	97.63
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	40.50
Cbx	=	1.14			

INTERACTION EQUATION:

Pu/0.90*Pn=0.000
Mrx/Mcx = 0.265

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 1 Brace Number= 7
Fy (ksi) = 50.00
Brace Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	13.17	13.17
Lu for Bending (ft)	13.17	13.17
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E2

AXIAL CHECK:

Pu (kip)	=	116.13	0.90Pnx (kip)	=	203.79	Pu/0.90Pnx	=	0.570
			0.90Pny (kip)	=	203.79	Pu/0.90Pny	=	0.570
			0.90Pn (kip)	=	203.79	Pu/0.90Pn	=	0.570

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E2

Axial		Load (kip)	116.13
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	116.13	0.90Pn (kip)	=	203.79
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	87.04	KL/Ry	=	87.04
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.570
Pr/Pc = 0.570

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 1 Brace Number= 8
Fy (ksi) = 50.00
Brace Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	13.17	13.17
Lu for Bending (ft)	13.17	13.17
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E2

AXIAL CHECK:

Pu (kip)	=	121.39	0.90Pnx (kip)	=	203.79	Pu/0.90Pnx	=	0.596
			0.90Pny (kip)	=	203.79	Pu/0.90Pny	=	0.596
			0.90Pn (kip)	=	203.79	Pu/0.90Pn	=	0.596

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E2

Axial		Load (kip)	121.39
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	121.39	0.90Pn (kip)	=	203.79
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	87.04	KL/Ry	=	87.04
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.596
Pr/Pc = 0.596

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 2 Column Number= 23
Fy (ksi) = 50.00
Column Size = HSS7X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	-0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	-0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	140.74	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	-0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E4

AXIAL CHECK:

Pu (kip)	=	82.55	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.280
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.371
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.371

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E3

Axial		Load (kip)	77.12
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	77.12	0.90Pn (kip)	=	222.72
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	82.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	64.88
KL/Rx	=	73.75	KL/Ry	=	96.22
Cbx	=	1.67			

INTERACTION EQUATION:

Pu/0.90*Pn=0.346
Eq H1-1a: 0.346 + 8/9(0.000 + 0.000) = 0.346

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 2 Column Number= 24
Fy (ksi) = 50.00
Column Size = HSS7X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Shear	Top	Vux (kip)	-0.00
		Vuy (kip)	-0.00
Shear	Bot.	Vux (kip)	-0.00
		Vuy (kip)	-0.00

SHEAR CHECK:

Vux (kip)	=	-0.00	0.90Vnx (kip)	=	140.74	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	-0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E4

AXIAL CHECK:

Pu (kip)	=	110.40	0.90Pnx (kip)	=	294.48	Pu/0.90Pnx	=	0.375
			0.90Pny (kip)	=	222.72	Pu/0.90Pny	=	0.496
			0.90Pn (kip)	=	222.72	Pu/0.90Pn	=	0.496

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Axial		Load (kip)	104.97
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	104.97	0.90Pn (kip)	=	222.72
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	82.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	64.88
KL/Rx	=	73.75	KL/Ry	=	96.22
Cbx	=	1.67			

INTERACTION EQUATION:

Pu/0.90*Pn=0.471
Eq H1-1a: 0.471 + 8/9(0.000 + 0.000) = 0.471

Member Code Check

BEAM INFORMATION:

Story Level = First Frame Number = 2 Beam Number= 30
Fy (ksi) = 50.00
Beam Size = W24X55

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	6.71
Lu for Bending (ft)	15.33	6.71
K	1.00	1.00
Top Flange Continuously Braced	No	
Bottom Flange Continuously Braced	No	

CONTROLLING BEAM SEGMENT FORCES - SHEAR

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 15.24
j - end 15.33

SHEAR CHECK:

Vux (kip)	=	-54.32	0.90Vnx (kip)	=	251.69	Vux/0.90Vnx	=	0.216
Vuy (kip)	=	0.00	0.90Vny (kip)	=	191.16	Vuy/0.90Vny	=	0.000

CONTROLLING BEAM SEGMENT FORCES - AXIAL

Load Combination: 1.400 D

Segment distance (ft) i - end 0.00
j - end 1.82

AXIAL CHECK:

Pu (kip)	=	0.00	0.90Pnx (kip)	=	729.00	Pu/0.90Pnx	=	0.000
			0.90Pny (kip)	=	729.00	Pu/0.90Pny	=	0.000
			0.90Pn (kip)	=	729.00	Pu/0.90Pn	=	0.000

CONTROLLING BEAM SEGMENT FORCES - FLEXURE

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 1.82
j - end 8.53

CALCULATED PARAMETERS:

Pu (kip)	=	0.00	0.90Pn (kip)	=	729.00
Mux (kip-ft)	=	167.71	0.90Mnx (kip-ft)	=	502.50
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.80
Cbx	=	1.24			

INTERACTION EQUATION:

Pu/0.90*Pn=0.000
Mrx/Mcx = 0.334

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 2 Brace Number= 15
Fy (ksi) = 50.00
Brace Size = HSS4X4X3/8

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	10.84	10.84
Lu for Bending (ft)	10.84	10.84
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	55.65	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	55.65	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E4

AXIAL CHECK:

Pu (kip)	=	74.85	0.90Pnx (kip)	=	121.14	Pu/0.90Pnx	=	0.618
			0.90Pny (kip)	=	121.14	Pu/0.90Pny	=	0.618
			0.90Pn (kip)	=	121.14	Pu/0.90Pn	=	0.618

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E4

Axial		Load (kip)	74.85
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	74.85	0.90Pn (kip)	=	121.14
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	23.96
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	23.96
KL/Rx	=	88.61	KL/Ry	=	88.61
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.618
Pr/Pc = 0.618

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 2 Brace Number= 16
Fy (ksi) = 50.00
Brace Size = HSS4X4X3/8

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	10.84	10.84
Lu for Bending (ft)	10.84	10.84
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	55.65	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	55.65	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E4

AXIAL CHECK:

Pu (kip)	=	84.92	0.90Pnx (kip)	=	121.14	Pu/0.90Pnx	=	0.701
			0.90Pny (kip)	=	121.14	Pu/0.90Pny	=	0.701
			0.90Pn (kip)	=	121.14	Pu/0.90Pn	=	0.701

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E4

Axial		Load (kip)	84.92
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	84.92	0.90Pn (kip)	=	121.14
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	23.96
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	23.96
KL/Rx	=	88.61	KL/Ry	=	88.61
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.701
Pr/Pc = 0.701

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 3 Column Number= 13
Fy (ksi) = 50.00
Column Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	-0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	-0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	-0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E1

AXIAL CHECK:

Pu (kip)	=	106.25	0.90Pnx (kip)	=	167.51	Pu/0.90Pnx	=	0.634
			0.90Pny (kip)	=	167.51	Pu/0.90Pny	=	0.634
			0.90Pn (kip)	=	167.51	Pu/0.90Pn	=	0.634

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E1

Axial		Load (kip)	106.25
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	106.25	0.90Pn (kip)	=	167.51
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	101.27	KL/Ry	=	101.27
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.634
Eq H1-1a: 0.634 + 8/9(0.000 + 0.000) = 0.634

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 3 Column Number= 14
Fy (ksi) = 50.00
Column Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E1

AXIAL CHECK:

Pu (kip)	=	106.55	0.90Pnx (kip)	=	167.51	Pu/0.90Pnx	=	0.636
			0.90Pny (kip)	=	167.51	Pu/0.90Pny	=	0.636
			0.90Pn (kip)	=	167.51	Pu/0.90Pn	=	0.636

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E2

Axial		Load (kip)	105.29
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	-0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	105.29	0.90Pn (kip)	=	167.51
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	-0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	101.27	KL/Ry	=	101.27
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.629
Eq H1-1a: 0.629 + 8/9(0.000 + 0.000) = 0.629

Member Code Check

BEAM INFORMATION:

Story Level = First Frame Number = 3 Beam Number= 5
Fy (ksi) = 50.00
Beam Size = W33X118

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	22.05	8.88
Lu for Bending (ft)	22.05	8.88
K	1.00	1.00
Top Flange Continuously Braced	No	
Bottom Flange Continuously Braced	No	

CONTROLLING BEAM SEGMENT FORCES - SHEAR

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 0.00
j - end 8.88

SHEAR CHECK:

Vux (kip)	=	68.91	0.90Vnx (kip)	=	488.57	Vux/0.90Vnx	=	0.141
Vuy (kip)	=	0.00	0.90Vny (kip)	=	459.54	Vuy/0.90Vny	=	0.000

CONTROLLING BEAM SEGMENT FORCES - AXIAL

Load Combination: 1.400 D

Segment distance (ft) i - end 0.00
j - end 8.88

AXIAL CHECK:

Pu (kip)	=	0.00	0.90Pnx (kip)	=	1561.50	Pu/0.90Pnx	=	0.000
			0.90Pny (kip)	=	1561.50	Pu/0.90Pny	=	0.000
			0.90Pn (kip)	=	1561.50	Pu/0.90Pn	=	0.000

CONTROLLING BEAM SEGMENT FORCES - FLEXURE

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 0.00
j - end 8.88

CALCULATED PARAMETERS:

Pu (kip)	=	0.00	0.90Pn (kip)	=	1561.50
Mux (kip-ft)	=	579.97	0.90Mnx (kip-ft)	=	1556.25
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	192.38
Cbx	=	1.64			

INTERACTION EQUATION:

Pu/0.90*Pn=0.000
Mrx/Mcx = 0.373

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 3 Brace Number= 3
Fy (ksi) = 50.00
Brace Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	13.43	13.43
Lu for Bending (ft)	13.43	13.43
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E1

AXIAL CHECK:

Pu (kip)	=	117.70	0.90Pnx (kip)	=	199.42	Pu/0.90Pnx	=	0.590
			0.90Pny (kip)	=	199.42	Pu/0.90Pny	=	0.590
			0.90Pn (kip)	=	199.42	Pu/0.90Pn	=	0.590

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E1

Axial		Load (kip)	117.70
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	117.70	0.90Pn (kip)	=	199.42
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	88.72	KL/Ry	=	88.72
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.590
Pr/Pc = 0.590

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 3 Brace Number= 4
Fy (ksi) = 50.00
Brace Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	13.43	13.43
Lu for Bending (ft)	13.43	13.43
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E1

AXIAL CHECK:

Pu (kip)	=	112.43	0.90Pnx (kip)	=	199.42	Pu/0.90Pnx	=	0.564
			0.90Pny (kip)	=	199.42	Pu/0.90Pny	=	0.564
			0.90Pn (kip)	=	199.42	Pu/0.90Pn	=	0.564

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E1

Axial		Load (kip)	112.43
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	112.43	0.90Pn (kip)	=	199.42
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	88.72	KL/Ry	=	88.72
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.564
Pr/Pc = 0.564

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 4 Column Number= 11
Fy (ksi) = 50.00
Column Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E4

AXIAL CHECK:

Pu (kip)	=	96.46	0.90Pnx (kip)	=	167.51	Pu/0.90Pnx	=	0.576
			0.90Pny (kip)	=	167.51	Pu/0.90Pny	=	0.576
			0.90Pn (kip)	=	167.51	Pu/0.90Pn	=	0.576

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E4

Axial		Load (kip)	96.46
Moment	Top	Mux (kip-ft)	-0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	96.46	0.90Pn (kip)	=	167.51
Mux (kip-ft)	=	-0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	101.27	KL/Ry	=	101.27
Cbx	=	1.67			

INTERACTION EQUATION:

Pu/0.90*Pn=0.576
Eq H1-1a: 0.576 + 8/9(0.000 + 0.000) = 0.576

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 4 Column Number= 12
Fy (ksi) = 50.00
Column Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Shear	Top	Vux (kip)	-0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	-0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	-0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E4

AXIAL CHECK:

Pu (kip)	=	60.26	0.90Pnx (kip)	=	167.51	Pu/0.90Pnx	=	0.360
			0.90Pny (kip)	=	167.51	Pu/0.90Pny	=	0.360
			0.90Pn (kip)	=	167.51	Pu/0.90Pn	=	0.360

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.300 E4

Axial		Load (kip)	53.45
Moment	Top	Mux (kip-ft)	-0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	53.45	0.90Pn (kip)	=	167.51
Mux (kip-ft)	=	-0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	101.27	KL/Ry	=	101.27
Cbx	=	1.67			

INTERACTION EQUATION:

Pu/0.90*Pn=0.319
Eq H1-1a: 0.319 + 8/9(0.000 + 0.000) = 0.319

Member Code Check

BEAM INFORMATION:

Story Level = First Frame Number = 4 Beam Number= 3
Fy (ksi) = 50.00
Beam Size = W33X118

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	16.04	6.71
Lu for Bending (ft)	16.04	6.71
K	1.00	1.00
Top Flange Continuously Braced	No	
Bottom Flange Continuously Braced	No	

CONTROLLING BEAM SEGMENT FORCES - SHEAR

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 0.00
j - end 2.62

SHEAR CHECK:

Vux (kip)	=	24.90	0.90Vnx (kip)	=	488.57	Vux/0.90Vnx	=	0.051
Vuy (kip)	=	0.00	0.90Vny (kip)	=	459.54	Vuy/0.90Vny	=	0.000

CONTROLLING BEAM SEGMENT FORCES - AXIAL

Load Combination: 1.400 D

Segment distance (ft) i - end 0.00
j - end 2.62

AXIAL CHECK:

Pu (kip)	=	0.00	0.90Pnx (kip)	=	1561.50	Pu/0.90Pnx	=	0.000
			0.90Pny (kip)	=	1561.50	Pu/0.90Pny	=	0.000
			0.90Pn (kip)	=	1561.50	Pu/0.90Pn	=	0.000

CONTROLLING BEAM SEGMENT FORCES - FLEXURE

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 2.62
j - end 9.33

CALCULATED PARAMETERS:

Pu (kip)	=	0.00	0.90Pn (kip)	=	1561.50
Mux (kip-ft)	=	98.57	0.90Mnx (kip-ft)	=	1556.25
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	192.38
Cbx	=	1.14			

INTERACTION EQUATION:

Pu/0.90*Pn=0.000
Mrx/Mcx = 0.063

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 4 Brace Number= 1
Fy (ksi) = 50.00
Brace Size = HSS4X4X3/8

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	11.10	11.10
Lu for Bending (ft)	11.10	11.10
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	55.65	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	55.65	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E4

AXIAL CHECK:

Pu (kip)	=	79.54	0.90Pnx (kip)	=	117.81	Pu/0.90Pnx	=	0.675
			0.90Pny (kip)	=	117.81	Pu/0.90Pny	=	0.675
			0.90Pn (kip)	=	117.81	Pu/0.90Pn	=	0.675

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E4

Axial		Load (kip)	79.54
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	79.54	0.90Pn (kip)	=	117.81
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	23.96
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	23.96
KL/Rx	=	90.74	KL/Ry	=	90.74
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.675
Pr/Pc = 0.675

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 4 Brace Number= 2
Fy (ksi) = 50.00
Brace Size = HSS4X4X3/8

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	11.10	11.10
Lu for Bending (ft)	11.10	11.10
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	55.65	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	55.65	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E4

AXIAL CHECK:

Pu (kip)	=	74.01	0.90Pnx (kip)	=	117.81	Pu/0.90Pnx	=	0.628
			0.90Pny (kip)	=	117.81	Pu/0.90Pny	=	0.628
			0.90Pn (kip)	=	117.81	Pu/0.90Pn	=	0.628

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E4

Axial		Load (kip)	74.01
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	74.01	0.90Pn (kip)	=	117.81
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	23.96
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	23.96
KL/Rx	=	90.74	KL/Ry	=	90.74
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.628
Pr/Pc = 0.628

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 5 Column Number= 21
Fy (ksi) = 50.00
Column Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E3

AXIAL CHECK:

Pu (kip)	=	98.70	0.90Pnx (kip)	=	167.51	Pu/0.90Pnx	=	0.589
			0.90Pny (kip)	=	167.51	Pu/0.90Pny	=	0.589
			0.90Pn (kip)	=	167.51	Pu/0.90Pn	=	0.589

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E3

Axial		Load (kip)	98.70
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	98.70	0.90Pn (kip)	=	167.51
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	101.27	KL/Ry	=	101.27
Cbx	=	1.67			

INTERACTION EQUATION:

Pu/0.90*Pn=0.589
Eq H1-1a: 0.589 + 8/9(0.000 + 0.000) = 0.589

Member Code Check

COLUMN INFORMATION:

Story Level = First Frame Number = 5 Column Number= 22
Fy (ksi) = 50.00
Column Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.33	15.33
Lu for Bending (ft)	15.33	15.33
K	1.00	1.00

CONTROLLING COLUMN FORCES - SHEAR

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Shear	Top	Vux (kip)	-0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	-0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	-0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING COLUMN FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

AXIAL CHECK:

Pu (kip)	=	95.81	0.90Pnx (kip)	=	167.51	Pu/0.90Pnx	=	0.572
			0.90Pny (kip)	=	167.51	Pu/0.90Pny	=	0.572
			0.90Pn (kip)	=	167.51	Pu/0.90Pn	=	0.572

CONTROLLING COLUMN FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Axial		Load (kip)	95.81
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	95.81	0.90Pn (kip)	=	167.51
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	101.27	KL/Ry	=	101.27
Cbx	=	1.67			

INTERACTION EQUATION:

Pu/0.90*Pn=0.572
Eq H1-1a: 0.572 + 8/9(0.000 + 0.000) = 0.572

Member Code Check

BEAM INFORMATION:

Story Level = First Frame Number = 5 Beam Number= 22
Fy (ksi) = 50.00
Beam Size = W33X118

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	15.46	0.36
Lu for Bending (ft)	15.46	0.36
K	1.00	1.00
Top Flange Continuously Braced	No	
Bottom Flange Continuously Braced	No	

CONTROLLING BEAM SEGMENT FORCES - SHEAR

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 0.00
j - end 4.87

SHEAR CHECK:

Vux (kip)	=	14.00	0.90Vnx (kip)	=	488.57	Vux/0.90Vnx	=	0.029
Vuy (kip)	=	-0.00	0.90Vny (kip)	=	459.54	Vuy/0.90Vny	=	0.000

CONTROLLING BEAM SEGMENT FORCES - AXIAL

Load Combination: 1.400 D

Segment distance (ft) i - end 0.00
j - end 4.87

AXIAL CHECK:

Pu (kip)	=	0.00	0.90Pnx (kip)	=	1561.50	Pu/0.90Pnx	=	0.000
			0.90Pny (kip)	=	1561.50	Pu/0.90Pny	=	0.000
			0.90Pn (kip)	=	1561.50	Pu/0.90Pn	=	0.000

CONTROLLING BEAM SEGMENT FORCES - FLEXURE

Load Combination: 1.200 D + 1.600 Lp

Segment distance (ft) i - end 4.87
j - end 5.23

CALCULATED PARAMETERS:

Pu (kip)	=	0.00	0.90Pn (kip)	=	1561.50
Mux (kip-ft)	=	72.38	0.90Mnx (kip-ft)	=	1556.25
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	192.38
Cbx	=	1.02			

INTERACTION EQUATION:

Pu/0.90*Pn=0.000
Mrx/Mcx = 0.047

Member Code Check

BRACE INFORMATION:

Story Level = First Frame Number = 5 Brace Number= 13
Fy (ksi) = 50.00
Brace Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	10.89	10.89
Lu for Bending (ft)	10.89	10.89
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

AXIAL CHECK:

Pu (kip)	=	125.89	0.90Pnx (kip)	=	242.88	Pu/0.90Pnx	=	0.518
			0.90Pny (kip)	=	242.88	Pu/0.90Pny	=	0.518
			0.90Pn (kip)	=	242.88	Pu/0.90Pn	=	0.518

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp + 1.300 E3

Axial		Load (kip)	125.89
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	125.89	0.90Pn (kip)	=	242.88
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	71.94	KL/Ry	=	71.94
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.518
Pr/Pc = 0.518

BRACE INFORMATION:

Story Level = First Frame Number = 5 Brace Number= 14
Fy (ksi) = 50.00
Brace Size = HSS5X5X1/2

INPUT DESIGN PARAMETERS:

	X-Axis	Y-Axis
Lu for Axial (ft)	10.89	10.89
Lu for Bending (ft)	10.89	10.89
K	1.00	1.00

CONTROLLING BRACE FORCES - SHEAR

Load Combination: 1.400 D

Shear	Top	Vux (kip)	0.00
		Vuy (kip)	0.00
Shear	Bot.	Vux (kip)	0.00
		Vuy (kip)	0.00

SHEAR CHECK:

Vux (kip)	=	0.00	0.90Vnx (kip)	=	90.52	Vux/0.90Vnx	=	0.000
Vuy (kip)	=	0.00	0.90Vny (kip)	=	90.52	Vuy/0.90Vny	=	0.000

CONTROLLING BRACE FORCES - AXIAL

Load Combination: 1.398 D + 1.000 Lp - 1.300 E3

AXIAL CHECK:

Pu (kip)	=	121.51	0.90Pnx (kip)	=	242.88	Pu/0.90Pnx	=	0.500
			0.90Pny (kip)	=	242.88	Pu/0.90Pny	=	0.500
			0.90Pn (kip)	=	242.88	Pu/0.90Pn	=	0.500

CONTROLLING BRACE FORCES - FLEXURE

Load Combination: 1.398 D + 1.000 Lp - 1.300 E3

Axial		Load (kip)	121.51
Moment	Top	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00
Moment	Bot.	Mux (kip-ft)	0.00
		Muy (kip-ft)	0.00

CALCULATED PARAMETERS:

Pu (kip)	=	121.51	0.90Pn (kip)	=	242.88
Mux (kip-ft)	=	0.00	0.90Mnx (kip-ft)	=	49.13
Muy(kip-ft)	=	0.00	0.90Mny (kip-ft)	=	49.13
KL/Rx	=	71.94	KL/Ry	=	71.94
Cbx	=	1.00			

INTERACTION EQUATION:

Pu/0.90*Pn=0.500
Pr/Pc = 0.500

Frame Reaction Envelope

CRITERIA:

Rigid End Zones:		Ignore Effects			
Member Force Output:		At Face of Joint			
P-Delta:	Yes	Scale Factor (DL):	1.20	Scale Factor (LL):	1.60
		Scale Factor (Roof):	1.60	Scale Factor (Snow):	1.60
Ground Level:	Base				

Mesh Criteria :

Max. Distance Between Nodes on Mesh Line (ft) : 4.00
Merge Node Tolerance (in) : 0.0100
Geometry Tolerance (in) : 0.0050

Walls Out-of-plane Stiffness Not Included in Analysis.
Sign considered for Dynamic Load Case Results.
Rigid Links Included at Fixed Beam-to-Wall Locations
Eigenvalue Analysis : Eigen Vectors (Subspace Iteration)

LOAD COMBINATION CRITERIA:

Roof Live Load:	Unreducible
Live Load factor f1 (0.5 or 1.0)	1.000
Sds (for Ev)	0.992
RhoX	1.300
RhoY	1.300

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

LOAD COMBINATIONS: IBC 2021 / ASCE 7-16 LRFD

1	*	1.400 D
2	*	1.200 D + 1.600 Lp
3	*	1.398 D + 1.000 Lp + 1.300 E1
4	*	1.398 D + 1.000 Lp + 1.300 E2
5	*	1.398 D + 1.000 Lp + 1.300 E3
6	*	1.398 D + 1.000 Lp + 1.300 E4
7	*	1.398 D + 1.000 Lp - 1.300 E1
8	*	1.398 D + 1.000 Lp - 1.300 E2
9	*	1.398 D + 1.000 Lp - 1.300 E3
10	*	1.398 D + 1.000 Lp - 1.300 E4

11	*	1.398 D + 1.300 E1
12	*	1.398 D + 1.300 E2
13	*	1.398 D + 1.300 E3
14	*	1.398 D + 1.300 E4
15	*	1.398 D - 1.300 E1
16	*	1.398 D - 1.300 E2
17	*	1.398 D - 1.300 E3
18	*	1.398 D - 1.300 E4
19	*	0.702 D + 1.300 E1
20	*	0.702 D + 1.300 E2
21	*	0.702 D + 1.300 E3
22	*	0.702 D + 1.300 E4
23	*	0.702 D - 1.300 E1
24	*	0.702 D - 1.300 E2
25	*	0.702 D - 1.300 E3
26	*	0.702 D - 1.300 E4

* = Load combination currently selected to use

REACTION MAXIMA AND MINIMA:

Frame #1:

Node		Rx kips	Ry kips	Rz kips	Mxx kip-ft	Myy kip-ft	Tzz kip-ft
11	Max:	98.74	0.00	164.51	0.00	0.00	0.02
	LC:	8	5	8	1	1	25
	Min:	-79.61	-0.00	-108.17	0.00	0.00	-0.02
	LC:	20	25	20	1	1	5
15	Max:	80.61	0.00	212.09	0.00	0.00	0.02
	LC:	24	25	4	1	1	25
	Min:	-94.46	-0.00	-96.71	0.00	0.00	-0.02
	LC:	4	5	24	1	1	5

Frame #2:

Node		Rx kips	Ry kips	Rz kips	Mxx kip-ft	Myy kip-ft	Tzz kip-ft
17	Max:	0.00	60.05	142.59	0.00	0.00	0.02
	LC:	25	10	10	1	1	25
	Min:	-0.00	-45.20	-84.90	0.00	0.00	-0.02
	LC:	5	22	22	1	1	5
18	Max:	0.00	46.91	163.32	0.00	0.00	0.02

	LC:	5	26	6	1	1	25
	Min:	-0.00	-52.93	-79.84	0.00	0.00	-0.02
	LC:	25	6	26	1	1	5

Frame #3:

Node		**Rx**	**Ry**	**Rz**	**Mxx**	**Myy**	**Tzz**
		kips	**kips**	**kips**	**kip-ft**	**kip-ft**	**kip-ft**
14	Max:	92.31	0.00	170.42	0.00	0.00	0.01
	LC:	7	5	7	1	1	25
	Min:	-78.26	-0.00	-98.45	0.00	0.00	-0.01
	LC:	19	25	19	1	1	5
16	Max:	77.26	0.00	173.74	0.00	0.00	0.01
	LC:	23	25	3	1	1	25
	Min:	-96.65	-0.00	-97.46	0.00	0.00	-0.01
	LC:	3	5	23	1	1	5

Frame #4:

Node		**Rx**	**Ry**	**Rz**	**Mxx**	**Myy**	**Tzz**
		kips	**kips**	**kips**	**kip-ft**	**kip-ft**	**kip-ft**
12	Max:	0.00	53.51	147.59	0.00	0.00	0.01
	LC:	25	10	10	1	1	25
	Min:	-0.00	-47.75	-80.33	0.00	0.00	-0.01
	LC:	5	22	22	1	1	5
13	Max:	0.00	46.79	115.21	0.00	0.00	0.01
	LC:	5	26	6	1	1	25
	Min:	-0.00	-57.50	-88.04	0.00	0.00	-0.01
	LC:	25	6	26	1	1	5

Frame #5:

Node		**Rx**	**Ry**	**Rz**	**Mxx**	**Myy**	**Tzz**
		kips	**kips**	**kips**	**kip-ft**	**kip-ft**	**kip-ft**
19	Max:	0.00	86.27	184.27	0.00	0.00	0.01
	LC:	25	9	9	1	1	25
	Min:	-0.00	-81.47	-158.70	0.00	0.00	-0.01
	LC:	5	21	21	1	1	5
20	Max:	0.00	80.74	184.46	0.00	0.00	0.01
	LC:	5	25	5	1	1	25
	Min:	-0.00	-89.39	-158.48	0.00	0.00	-0.01
	LC:	25	5	25	1	1	5

Load Combinations

LOAD COMBINATION CRITERIA:

Roof Live Load:	Unreducible
Live Load factor f1 (0.5 or 1.0)	1.000
Sds (for Ev)	0.992
Omega_o	2.000

LOAD CASE DEFINITIONS:

D	DeadLoad	RAMUSER
Lp	PosLiveLoad	RAMUSER
E1	Seismic	EQ_ASCE716_X_+E_F
E2	Seismic	EQ_ASCE716_X_-E_F
E3	Seismic	EQ_ASCE716_Y_+E_F
E4	Seismic	EQ_ASCE716_Y_-E_F

LOAD COMBINATIONS: IBC 2021 / ASCE 7-16 LRFD

1	*	1.398 D + 1.000 Lp + 2.000 E1
2	*	1.398 D + 1.000 Lp + 2.000 E2
3	*	1.398 D + 1.000 Lp + 2.000 E3
4	*	1.398 D + 1.000 Lp + 2.000 E4
5	*	1.398 D + 1.000 Lp - 2.000 E1
6	*	1.398 D + 1.000 Lp - 2.000 E2
7	*	1.398 D + 1.000 Lp - 2.000 E3
8	*	1.398 D + 1.000 Lp - 2.000 E4
9	*	1.398 D + 2.000 E1
10	*	1.398 D + 2.000 E2
11	*	1.398 D + 2.000 E3
12	*	1.398 D + 2.000 E4
13	*	1.398 D - 2.000 E1
14	*	1.398 D - 2.000 E2
15	*	1.398 D - 2.000 E3
16	*	1.398 D - 2.000 E4
17	*	0.702 D + 2.000 E1
18	*	0.702 D + 2.000 E2
19	*	0.702 D + 2.000 E3
20	*	0.702 D + 2.000 E4
21	*	0.702 D - 2.000 E1
22	*	0.702 D - 2.000 E2
23	*	0.702 D - 2.000 E3
24	*	0.702 D - 2.000 E4

* = Load combination currently selected to use

Load Combinations

Code checks requiring Ecl use (+ 1.000 Ecl) for LRFD and (+ 0.700 Ecl) for ASD in a set of generated load combinations independent of the combinations shown above.

Seismic Provisions Member Code Check Summary

Criteria

Cd/Ie = 4.0

BRBF and SCBF - Required Column Strength based on Larger of Strength and Capacity Limited Seismic Forces.

Frame #1:

Story:First Column: 2 Type: Ordinary Concentrically Braced Frame

Size:HSS7X5X1/2 Fy (ksi): 50.00

D1.4a Required Strength --- OK

D2.5b Column Splices - Required Strength

D2.5c Required Shear Strength

Story:First Column: 10 Type: Ordinary Concentrically Braced Frame

Size:HSS7X5X1/2 Fy (ksi): 50.00

D1.4a Required Strength --- OK

D2.5b Column Splices - Required Strength

D2.5c Required Shear Strength

Story:First Beam: 1 Type: Ordinary Concentrically Braced Frame

Size:W16X36 Fy (ksi): 50.00

No Special Seismic Provision Checks Required For This Member

Story:First Brace: 7 Type: Ordinary Concentrically Braced Frame

Size:HSS5X5X1/2 Fy (ksi): 50.00

F1.5a Basic Requirements (D1.1 Moderately Ductile) --- OK

Story:First Brace: 8 Type: Ordinary Concentrically Braced Frame

Size:HSS5X5X1/2 Fy (ksi): 50.00

F1.5a Basic Requirements (D1.1 Moderately Ductile) --- OK

SECTION BREAK

Lateral Design

SUBSECTION BREAK

Mezzanine Brace Frame Design

DESCRIPTION/NOTES:

Description details.

Gusset Plate For HSS5x5x1/2

$T_{max.\Omega} := 177\ kip$ (LRFD) (Maximum axial load with Overstrength)
$C_{max.\Omega} := 188\ kip$ (LRFD)

$P_\Omega := \max(T_{max.\Omega}, C_{max.\Omega}) = 188.0\ kip$
$t_p := 0.75\ in$ (thickness of gusset plate)
$D := 5$ (# of sixteenths of weld)
$F_{yg} := 36\ ksi$ (yield strength of plate)
$F_{ug} := 58\ ksi$ (ultimate strength of plate)

$l_{weld} := \dfrac{P_\Omega}{4 \cdot \left(1.392 \dfrac{kip}{in}\right) \cdot D} = 6.8\ in$ (calculated length of weld) AISC 8-2a

$l_{weld} := 8\ in$ (selected weld length in 4 locations)

$l_w := 7\ in + 2 \cdot (l_{weld}) \cdot \tan(30°) = 16.2\ in$ (Whitmore length)

<u>Check Yielding</u> Try HSS 5x5x1/2 $\Theta_{t.y} := 0.9$ $\Theta_{t.r} := 0.75$

$A_g := 7.88\ in^2$ $t_{hss} := 0.465\ in$ $H := 5\ in$ $B := 5\ in$

$R_{n.\Theta} := \Theta_{t.y} \cdot F_{yg} \cdot t_p \cdot l_w = 394.6\ kip > P_\Omega$ λ OK (Plate acceptable in yielding)

$x_{bar} := \dfrac{B^2 + 2 \cdot B \cdot H}{4 \cdot (B + H)} = 1.9\ in$

$U := 1 - \dfrac{x_{bar}}{l_{weld}} = 0.766$ (Shear Lag AISC Spec D3)

$R_{n.\Theta} := \Theta_{t.r} \cdot F_{ug} \cdot U \cdot t_p \cdot l_w = 405.6\ kip > P_\Omega$ λ OK (Plate acceptable in rupture)

$F_{ub} := 62\ ksi$ (ultimate strength of A500 Gr C)

$A_n := A_g - \left(2 \cdot t_p + \dfrac{1}{16} \cdot in\right) \cdot t_{hss} = 7.153\ in^2$ $A_e := A_n \cdot U$

$P_{n.\Theta} := F_{ub} \cdot A_e \cdot \Theta_{t.r} = 254.7\ kip$

$\text{if}(P_{n.\Theta} > P_\Omega, \text{"ok"}, \text{"No Good"}) = \text{"ok"}$ λ OK (Brace okay in rupture)

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Check Block Shear Strength $\Theta_{t.r} := 0.75$

$U_{bs} := 1$ (Uniform tension stress)
$A_{nv} := 2 \cdot l_{weld} \cdot t_p = 12.0\ in^2$ (Net shear area)
$A_{nt} := B \cdot t_p = 3.8\ in^2$ (Net tension area)

$R_{n1} := 0.6 \cdot F_{ug} \cdot A_{nv} + U_{bs} \cdot F_{ug} \cdot A_{nt} = 635.1\ kip$

$R_{n2} := 0.6 \cdot F_{yg} \cdot A_{nv} + U_{bs} \cdot F_{ug} \cdot A_{nt} = 476.7\ kip$ (governs)

$R_{n.\Theta} := \Theta_{t.r} \cdot R_{n2} = 357.5\ kip$

$\text{if}\left(P_{n.\Theta} > P_{\Omega}, \text{"ok"}, \text{"No Good"}\right) = \text{"ok"}$ (plate okay in block shear strength)

Gusset Buckling $\Theta_c := 0.9$

$KL := 1.0 \cdot 18\ in$ $r := \frac{t_p}{\sqrt{12}} = 0.217\ in$ (See Gusset geometry for L)

$\frac{KL}{r} = 83.1$

$F_e := \frac{\Delta^2 \cdot 29000\ ksi}{\left(\frac{KL}{r}\right)^2} = 41.4\ ksi$ (E3-4)

$F_{cr.allow} := 0.658^{\frac{F_{yg}}{F_e}} \cdot F_{yg} = 25.0\ ksi$ (E3-2)

$P_{n.\Theta} := \Theta_c \cdot F_{cr.allow} \cdot l_w \cdot t_p = 274.2\ kip$

(E3-1)

$\text{if}\left(P_{n.\Theta} > P_{\Omega}, \text{"ok"}, \text{"No Good"}\right) = \text{"ok"}$ (plate okay for buckling)

Gusset Connection to Framing

$F_{vert} := P_{\Omega} \cdot \cos(55.5°) = 106.5\ kip$

$l_{minvert} := \frac{F_{vert}}{5 \cdot 1.392 \cdot \left(\frac{kip}{in}\right) \cdot 2} = 7.6\ in$ (length of 5/16" weld to column)

$F_{horiz} := P_{\Omega} \cdot \sin(44°) = 130.6\ kip$

$l_{minhoriz} := \frac{F_{horiz}}{5 \cdot 1.392 \cdot \left(\frac{kip}{in}\right) \cdot 2} = 9.4\ in$ (length of 5/16" weld to beam)

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Gusset Plate For HSS4x4x3/8

$T_{max.\Omega} := 102\ kip$ (LRFD) (Maximum axial load with Overstrength)
$C_{max.\Omega} := 122\ kip$ (LRFD)

$P_\Omega := \max(T_{max.\Omega}, C_{max.\Omega}) = 122.0\ kip$
$t_p := 0.75\ in$ (thickness of gusset plate)
$D := 5$ (# of sixteenths of weld)
$F_{yg} := 36\ ksi$ (yield strength of plate)
$F_{ug} := 58\ ksi$ (ultimate strength of plate)

$l_{weld} := \dfrac{P_\Omega}{4 \cdot \left(1.392 \dfrac{kip}{in}\right) \cdot D} = 4.4\ in$ (calculated length of weld) AISC 8-2a

$l_{weld} := 8\ in$ (selected weld length in 4 locations)

$l_w := 7\ in + 2 \cdot (l_{weld}) \cdot \tan(30°) = 16.2\ in$ (Whitmore length)

<u>Check Yielding</u> Try HSS 4x4x3/8 $\Theta_{t.y} := 0.9$ $\Theta_{t.r} := 0.75$

$A_g := 4.78\ in^2$ $t_{hss} := 0.349\ in$ $H := 4\ in$ $B := 4\ in$

$R_{n.\Theta} := \Theta_{t.y} \cdot F_{yg} \cdot t_p \cdot l_w = 394.6\ kip > P_\Omega$ λ OK (Plate acceptable in yielding)

$x_{bar} := \dfrac{B^2 + 2 \cdot B \cdot H}{4 \cdot (B + H)} = 1.5\ in$

$U := 1 - \dfrac{x_{bar}}{l_{weld}} = 0.813$ (Shear Lag AISC Spec D3)

$R_{n.\Theta} := \Theta_{t.r} \cdot F_{ug} \cdot U \cdot t_p \cdot l_w = 430.4\ kip > P_\Omega$ λ OK (Plate acceptable in rupture)

$F_{ub} := 62\ ksi$ (ultimate strength of A500 Gr C)

$A_n := A_g - \left(2 \cdot t_p + \dfrac{1}{16} \cdot in\right) \cdot t_{hss} = 4.235\ in^2$ $A_e := A_n \cdot U$

$P_{n.\Theta} := F_{ub} \cdot A_e \cdot \Theta_{t.r} = 160.0\ kip$

$\text{if}(P_{n.\Theta} > P_\Omega, \text{"ok"}, \text{"No Good"}) = \text{"ok"}$ λ OK (Brace okay in rupture)

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Check Block Shear Strength $\Theta_{t.r} := 0.75$

$U_{bs} := 1$ (Uniform tension stress)

$A_{nv} := 2 \cdot l_{weld} \cdot t_p = 12.0\ in^2$ (Net shear area)

$A_{nt} := B \cdot t_p = 3.0\ in^2$ (Net tension area)

$R_{n1} := 0.6 \cdot F_{ug} \cdot A_{nv} + U_{bs} \cdot F_{ug} \cdot A_{nt} = 591.6\ kip$

$R_{n2} := 0.6 \cdot F_{yg} \cdot A_{nv} + U_{bs} \cdot F_{ug} \cdot A_{nt} = 433.2\ kip$ (governs)

$R_{n.\Theta} := \Theta_{t.r} \cdot R_{n2} = 324.9\ kip$

$\text{if}\left(P_{n.\Theta} > P_{\Omega}, \text{"ok"}, \text{"No Good"}\right) = \text{"ok"}$ (plate okay in block shear strength)

Gusset Buckling $\Theta_c := 0.9$

$KL := 1.0 \cdot 18\ in$ $r := \frac{t_p}{\sqrt{12}} = 0.217\ in$ (See Gusset geometry for L)

$\frac{KL}{r} = 83.1$

$F_e := \frac{\Delta^2 \cdot 29000\ ksi}{\left(\frac{KL}{r}\right)^2} = 41.4\ ksi$ (E3-4)

$F_{cr.allow} := 0.658^{\frac{F_{yg}}{F_e}} \cdot F_{yg} = 25.0\ ksi$ (E3-2)

$P_{n.\Theta} := \Theta_c \cdot F_{cr.allow} \cdot l_w \cdot t_p = 274.2\ kip$

(E3-1)

$\text{if}\left(P_{n.\Theta} > P_{\Omega}, \text{"ok"}, \text{"No Good"}\right) = \text{"ok"}$ (plate okay for buckling)

Gusset Connection to Framing

$F_{vert} := P_{\Omega} \cdot \cos(55.5°) = 69.1\ kip$

$l_{minvert} := \frac{F_{vert}}{5 \cdot 1.392 \cdot \left(\frac{kip}{in}\right) \cdot 2} = 5.0\ in$ (length of 5/16" weld to column)

$F_{horiz} := P_{\Omega} \cdot \sin(44°) = 84.7\ kip$

$l_{minhoriz} := \frac{F_{horiz}}{5 \cdot 1.392 \cdot \left(\frac{kip}{in}\right) \cdot 2} = 6.1\ in$ (length of 5/16" weld to beam)

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Ordinary Concentrically Braced Frames (OCBF): AISC 341-16

$L_{c.5x5} := 26\ ft$ Maximum brace effective HSS 5x5 length
$L_{c.4x4} := 20\ ft$ Maximum brace effective HSS 4x4 length
$r_{5x5} := 1.82\ in$ HSS 5x5x1/2 radius of gyration
$r_{4x4} := 1.47\ in$ HSS 4x4x3/8 radius of gyration
$E := 29000\ ksi$ Modulus of Elasticity
$F_y := 50\ ksi$ Yield Stress of Steel (A500 Gr C)

$K_x := 0.5$
$K_y := 1$

$\frac{K_x / L_{c.5x5}}{r_{5x5}} = 85.7$ $\frac{K_y / L_{c.5x5}}{r_{5x5}} = 171.4$ $\frac{K_x / L_{c.4x4}}{r_{4x4}} = 81.6$ $\frac{K_y / L_{c.4x4}}{r_{4x4}} = 163.3$

Therefore braces meet recommendations of user note in AISC Specification E2.

Moderately Ductile Members: Table D1.1
HSS members verified by Table 1-5b

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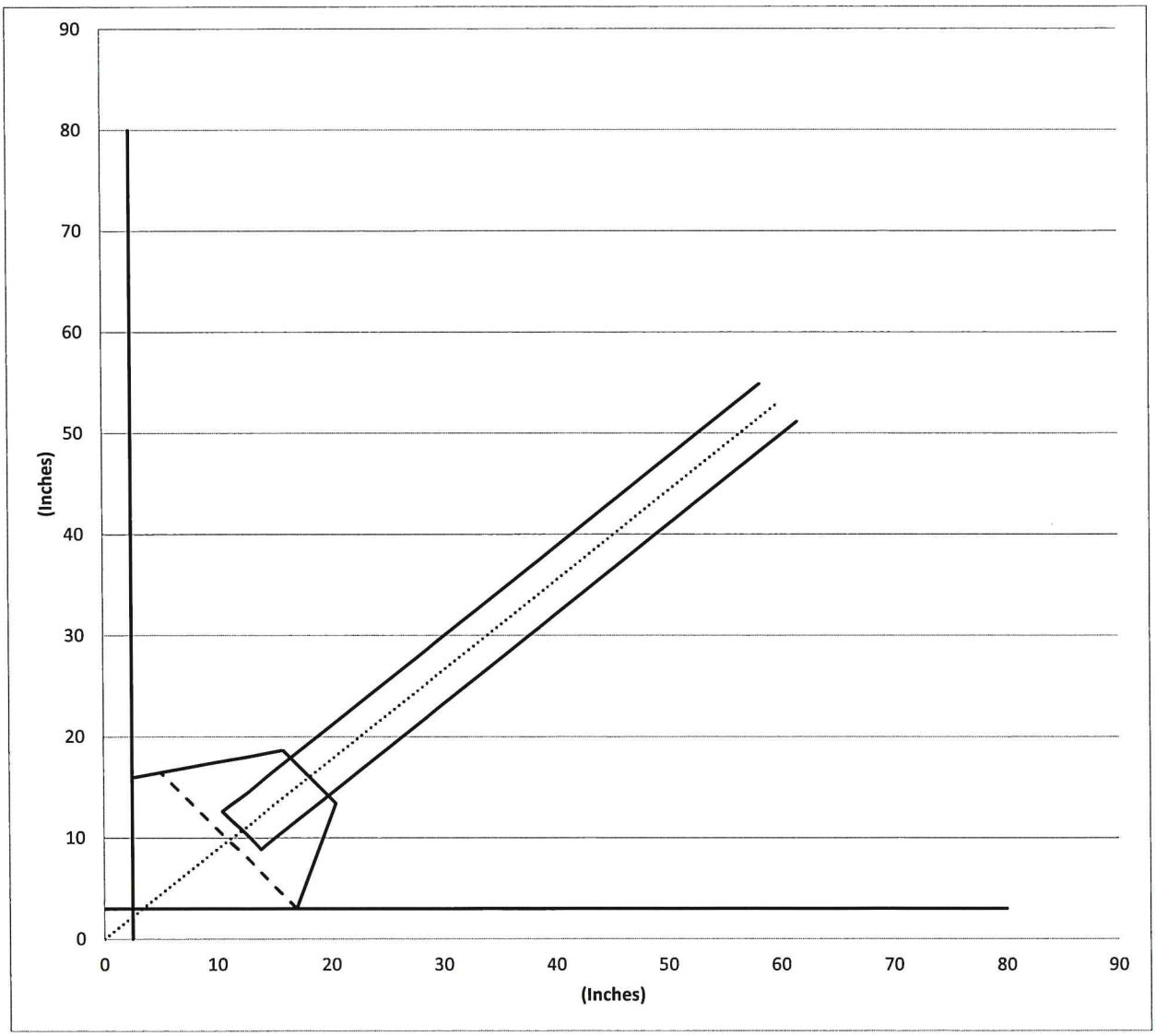
Brace Frame Gusset Plate Orientation

Design per AISCE 341 and IBC 2018

Project:	CCHS Field House
Gusset Location:	BF-1
Date:	6/26/2024

e_c (in)	2.50	(Column Eccentricity)	Fold Line Intersection:		Beam/Baseplate
e_b (in)	3.00	(Base Eccentricity)	a (in)	8.98	(Fold Line Interesction to CL of Brace)
θ (deg)	49	(Brace Angle from Vertical)	L (in)	14.68	(Length from WP to End of Brace)
B (in)	5.00	(Brace width)	c (in)	5.85	(Fold Line Intersection to Corner of Brace)
d (in)	7.00	(Gusset width at brace)	2t (in)	1.5	(2x Gusset Thickness)
l_w (in)	8.00	(Brace attachment length)	L_A (in)	14.45	(Gusset Intersection @ Base)
t (in)	0.750	(Gusset plate thickness)	L_B (in)	12.94	(Gusset Intersection @ Column)
ϕ (deg)	30	(Gusset angle at brace)	l_{bu} (in)	11.66	(Buckling Length)
			l_{wh} (in)	16.24	(Whitmore Section Length)



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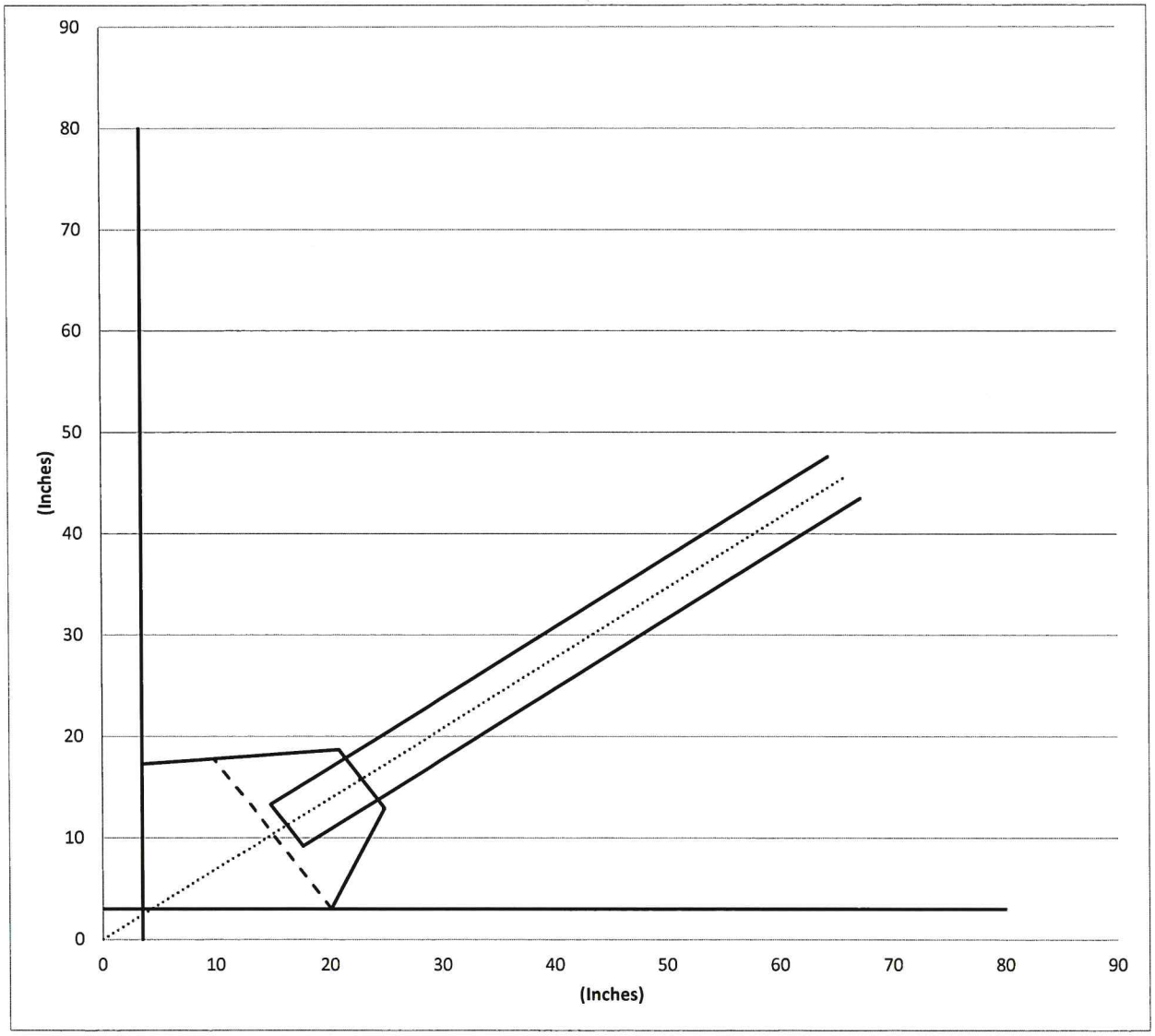
Brace Frame Gusset Plate Orientation

Design per AISCE 341 and IBC 2018

Project:	CCHS Field House
Gusset Location:	BF-2
Date:	6/26/2024

e_c (in)	3.50	(Column Eccentricity)	Fold Line Intersection:		Beam/Baseplate
e_b (in)	3.00	(Base Eccentricity)	a (in)	8.98	(Fold Line Interesction to CL of Brace)
θ (deg)	55	(Brace Angle from Vertical)	L (in)	18.25	(Length from WP to End of Brace)
B (in)	5.00	(Brace width)	c (in)	6.19	(Fold Line Intersection to Corner of Brace)
d (in)	7.00	(Gusset width at brace)	2t (in)	1.5	(2x Gusset Thickness)
l_w (in)	8.00	(Brace attachment length)	L_A (in)	16.62	(Gusset Intersection @ Base)
t (in)	0.750	(Gusset plate thickness)	L_B (in)	14.25	(Gusset Intersection @ Column)
ϕ (deg)	30	(Gusset angle at brace)	l_{bu} (in)	14.48	(Buckling Length)
			l_{wh} (in)	16.24	(Whitmore Section Length)



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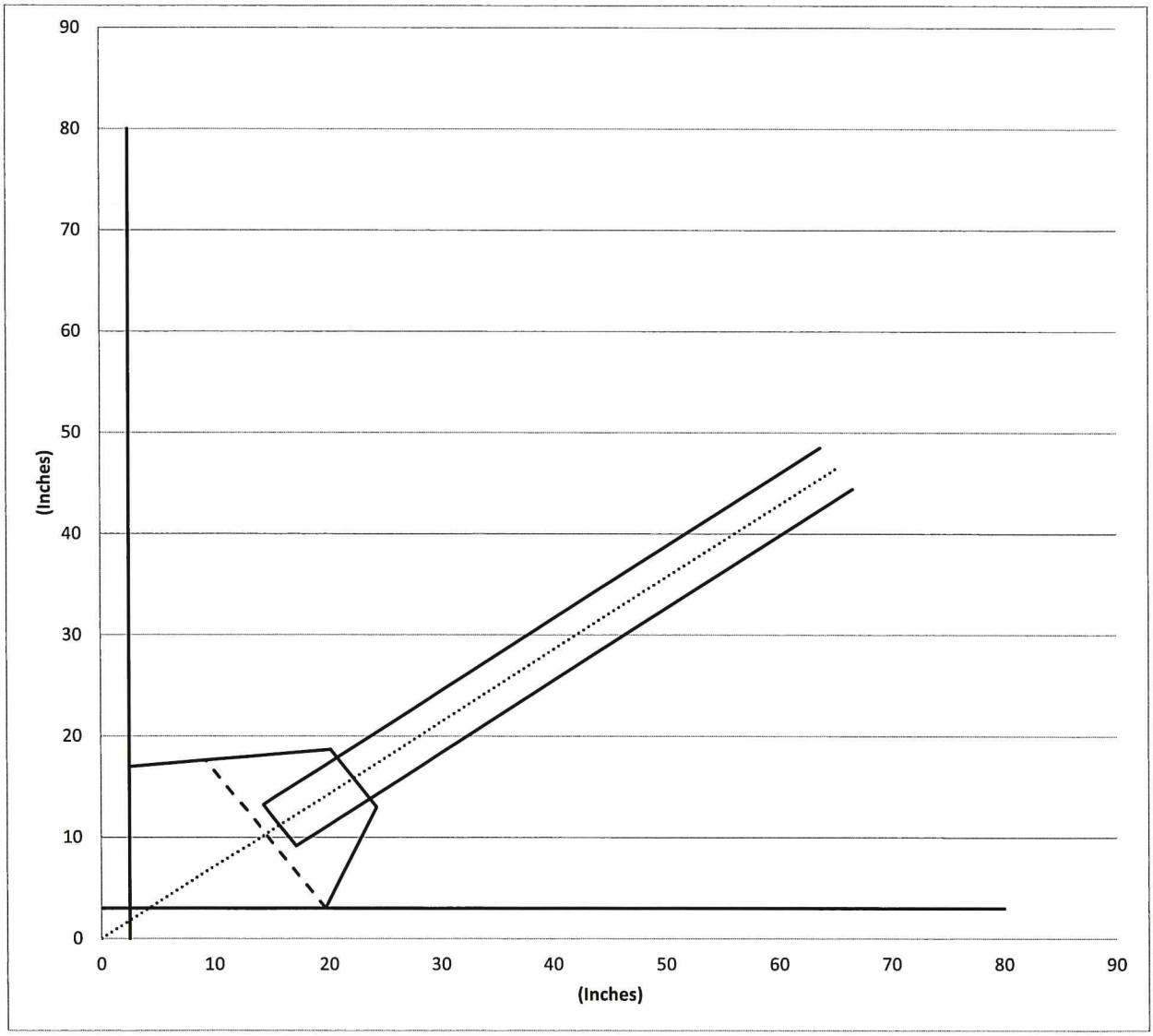
Brace Frame Gusset Plate Orientation

Design per AISCE 341 and IBC 2018

Project:	CCHS Field House
Gusset Location:	BF-3
Date:	6/26/2024

e_c (in)	2.50	(Column Eccentricity)	Fold Line Intersection:		Beam/Baseplate
e_b (in)	3.00	(Base Eccentricity)	a (in)	8.98	(Fold Line Interesction to CL of Brace)
θ (deg)	55	(Brace Angle from Vertical)	L (in)	17.76	(Length from WP to End of Brace)
B (in)	5.00	(Brace width)	c (in)	6.15	(Fold Line Intersection to Corner of Brace)
d (in)	7.00	(Gusset width at brace)	2t (in)	1.5	(2x Gusset Thickness)
l_w (in)	8.00	(Brace attachment length)	L_A (in)	17.18	(Gusset Intersection @ Base)
t (in)	0.750	(Gusset plate thickness)	L_B (in)	13.98	(Gusset Intersection @ Column)
ϕ (deg)	30	(Gusset angle at brace)	l_{bu} (in)	14.10	(Buckling Length)
			l_{wh} (in)	16.24	(Whitmore Section Length)



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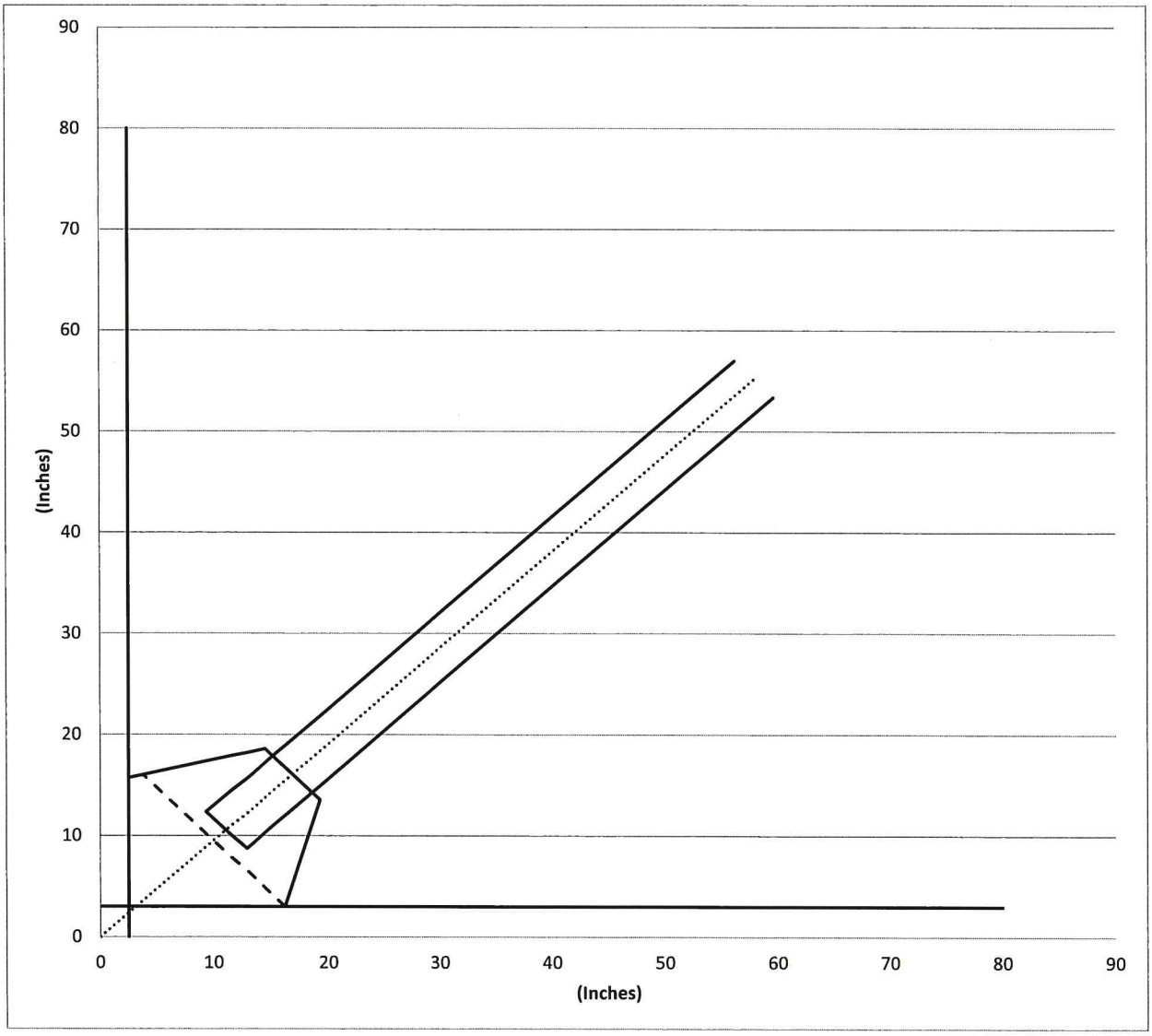
Brace Frame Gusset Plate Orientation

Design per AISCE 341 and IBC 2018

Project:	CCHS Field House
Gusset Location:	BF-4
Date:	6/26/2024

e_c (in)	2.50	(Column Eccentricity)	Fold Line Intersection:		Beam/Baseplate
e_b (in)	3.00	(Base Eccentricity)	a (in)	8.98	(Fold Line Interesction to CL of Brace)
θ (deg)	46	(Brace Angle from Vertical)	L (in)	13.79	(Length from WP to End of Brace)
B (in)	5.00	(Brace width)	c (in)	5.73	(Fold Line Intersection to Corner of Brace)
d (in)	7.00	(Gusset width at brace)	2t (in)	1.5	(2x Gusset Thickness)
l_w (in)	8.00	(Brace attachment length)	L_A (in)	13.68	(Gusset Intersection @ Base)
t (in)	0.750	(Gusset plate thickness)	L_B (in)	12.70	(Gusset Intersection @ Column)
ϕ (deg)	30	(Gusset angle at brace)	l_{bu} (in)	10.93	(Buckling Length)
			l_{wh} (in)	16.24	(Whitmore Section Length)



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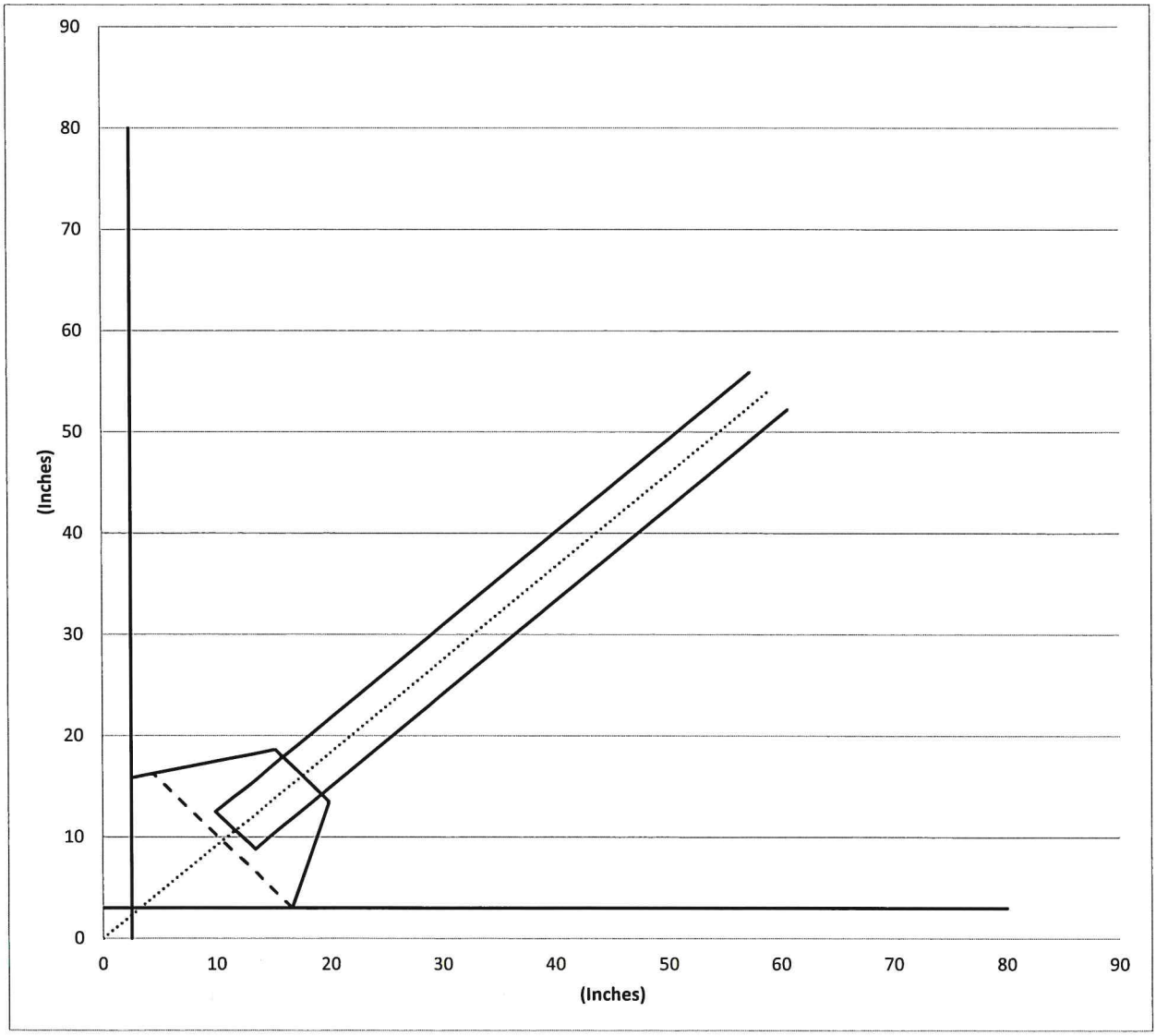
Brace Frame Gusset Plate Orientation

Design per AISCE 341 and IBC 2018

Project:	CCHS Field House
Gusset Location:	BF-5
Date:	6/26/2024

e_c (in)	2.50	(Column Eccentricity)
e_b (in)	3.00	(Base Eccentricity)
θ (deg)	48	(Brace Angle from Vertical)
B (in)	5.00	(Brace width)
d (in)	7.00	(Gusset width at brace)
l_w (in)	8.00	(Brace attachment length)
t (in)	0.750	(Gusset plate thickness)
ϕ (deg)	30	(Gusset angle at brace)

Fold Line Intersection:		Beam/Baseplate
a (in)	8.98	(Fold Line Interesction to CL of Brace)
L (in)	14.25	(Length from WP to End of Brace)
c (in)	5.79	(Fold Line Intersection to Corner of Brace)
2t (in)	1.5	(2x Gusset Thickness)
L_A (in)	14.07	(Gusset Intersection @ Base)
L_B (in)	12.82	(Gusset Intersection @ Column)
l_{bu} (in)	11.31	(Buckling Length)
l_{wh} (in)	16.24	(Whitmore Section Length)



Wind Force on Wall

$K_z := 0.85$ .. Table 26.10-1, Exposure - C, Height above ground level, z = 0-15'

$K_d := 0.85$ .. Table 26.6-1, Buildings - Components & Claddings

$K_{zt} := 1.0$ .. Section 26.8.2, flat site, Kzt = 1.0

$K_e := 1.0$ .. Table 26.9-1, using worst case Ke = 1.0

$V := 109\ mph$

$$q_h := 0.00256\ K_z \cdot K_{zt} \cdot K_d \cdot \frac{V^2}{mph^2} \cdot psf = 22.0\ psf$$

$L_{sign} := 4\ ft$ (Length of Sign)

$H_{sign} := 8\ ft$ (Height of Sign)

$T_{sign} := 1\ in$ (Thickness of Sign)

$D_{embed} := 6\ in$ (Depth of Embed into Concrete)

$H_{concete} := 6\ ft$ (Height of Sign)

$H := H_{sign} - D_{embed} = 90.0\ in$ (Height of Sign - Depth of Embed)

$G := 0.85$ .. Section 26.11, Guest Effect Factor

$$C_f := \frac{1.3 - 1.35}{10 - 5} \cdot (6.56 - 5) + 1.35 = 1.334$$ .. Figure 29.3-1, Net Force Coefficient

$F_h := q_h \cdot G \cdot C_f \cdot 1\ ft = 24.93\ plf$ (EQ 29.3-1 wind force)

Seismic Force on Wall

Site Wall Factor

$S_{DS} := 0.992$

$R := 1.25$

$I_e := 1.25$

$$EQ_{factor} := \frac{S_{DS}}{R \div I_e} = 0.9920$$

Non Site Wall Factor

$$EQ_{factor} := 0.4 \cdot S_{DS} \cdot I_e = 0.4960$$

Results

Wind

Stem 8" CMU #5 @ 48" Center
Foundation 8" Concrete #5 @ 16" Center
Footing Width=3' Thickness= 12" #5 @ 12"

Site Wall Seismic

Stem 8" CMU #5 @ 32" Center
Foundation 8" Concrete #5 @ 16" Center
Footing Width=4' Thickness= 12" #5 @ 12"

Non- Site Wall Seismic

Stem 8" CMU #5 @ 48" Center
Foundation 8" Concrete #5 @ 16" Center
Footing Width=3' Thickness= 12" #5 @ 12"

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Roof Hatch Access:

Try HSS 5x5x1/4

$h := 16\ ft$

$E := 29000\ ksi$ $r := 1.93\ in$

$I := 16\ in^4$ $K := 1.0$

$P := 5000\ lbf$

$$M := \frac{1000\ lbf \cdot h}{4} = 4.0\ kip \cdot ft$$

$$\Delta_{max} := \frac{1000\ lbf \cdot h^3}{48 \cdot E \cdot I} = 0.3\ in \qquad \frac{h}{360} = 0.5\ in$$

$$\frac{K \cdot h}{r} = 99.5$$ <200 OK

$P_{n.\Omega} := 60.9\ kip$

$M_{n.\Omega} := 17.5\ kip \cdot ft$

$$\frac{M}{M_{n.\Omega}} = 0.23$$

$$\frac{P}{P_{n.\Omega}} = 0.082$$ <0.2 Use H1-1b

$$\frac{P}{2 \cdot P_{n.\Omega}} + \frac{M}{M_{n.\Omega}} = 0.27$$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Seismic Provisions Member Code Check

Column Parameters

Story: First Frame No: 1 Member No: 2
Fy (ksi): 50.00 Size: HSS7X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 179.50 --- Combination: 1.398 D + 1.000 Lp + 2.000 E2

Max Pu/φPn = 0.81 OK

Tension: Max Pu (kip) = 70.76 --- Combination: 0.702 D - 2.000 E2

Max Pu/φPn = 0.16 OK

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	Minor
Mpc (kip-ft)	91.25	72.08

Column Splice Shear Force Required Mpc / H
Where Mpc is the lesser nominal plastic flexural strength of the column sections.
See code for more information on the Required Shear Strength

Seismic Provisions Member Code Check

Column Parameters

Story: First Frame No: 1 Member No: 10
Fy (ksi): 50.00 Size: HSS7X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 116.14 --- Combination: 1.398 D + 1.000 Lp - 2.000 E2

Max Pu/φPn = 0.52 OK

Tension: Max Pu (kip) = 74.43 --- Combination: 0.702 D + 2.000 E2

Max Pu/φPn = 0.17 OK

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	Minor
Mpc (kip-ft)	91.25	72.08

Column Splice Shear Force Required Mpc / H
Where Mpc is the lesser nominal plastic flexural strength of the column sections.
See code for more information on the Required Shear Strength

Beam Parameters

Story: First — Frame No: 1 — Member No: 1
Fy (ksi): 50.00 — Size: W16X36
Frame Type: Ordinary Concentrically Braced Frame

No Special Seismic Provision Checks Required For This Member

Brace Parameters

Story: First — Frame No: 1 — Member No: 7
Fy (ksi): 50.00 — Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

F1.5a Basic Requirements (D1.1 Moderately Ductile) --- OK

Flange b/tf =	7.75	Limit =	15.47	OK
Web h/tw =	7.75	Limit =	15.47	OK

F1.6a Diagonal Brace Connections

Maximum Compression force (kip) = 156.95 Seismic Load Combo: 1.398 D + 1.000 Lp + 2.000 E2
Expected Compression force (kip) = 289.63
Maximum Tension force (kip) = 138.28 Seismic Load Combo: 0.702 D - 2.000 E2
Expected Tension force (kip) = 551.60
Bolt Slip Compression (kip) = 107.27 Standard Load Combo: 1.398 D + 1.000 Lp + 1.300 E2
Bolt Slip Tension (kip) = 88.61 Standard Load Combo: 0.702 D - 1.300 E2

Brace Parameters

Story: First — Frame No: 1 — Member No: 8
Fy (ksi): 50.00 — Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

F1.5a Basic Requirements (D1.1 Moderately Ductile) --- OK

Flange b/tf =	7.75	Limit =	15.47	OK
Web h/tw =	7.75	Limit =	15.47	OK

F1.6a Diagonal Brace Connections

Maximum Compression force (kip) = 172.73 Seismic Load Combo: 1.398 D + 1.000 Lp - 2.000 E2
Expected Compression force (kip) = 289.63
Maximum Tension force (kip) = 154.63 Seismic Load Combo: 0.702 D + 2.000 E2
Expected Tension force (kip) = 551.60
Bolt Slip Compression (kip) = 117.37 Standard Load Combo: 1.398 D + 1.000 Lp - 1.300 E2
Bolt Slip Tension (kip) = 99.28 Standard Load Combo: 0.702 D + 1.300 E2

Column Parameters

Story: First — Frame No: 2 — Member No: 23
Fy (ksi): 50.00 — Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 138.03 --- Combination: 1.398 D + 1.000 Lp - 2.000 E4

Max Pu/φPn = 0.82 OK

Tension: Max Pu (kip) = 100.35 --- Combination: 0.702 D + 2.000 E4

Max Pu/φPn = 0.28 OK

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	Minor
Mpc (kip-ft)	54.58	54.58

Column Splice Shear Force Required Mpc / H
Where Mpc is the lesser nominal plastic flexural strength of the column sections.
See code for more information on the Required Shear Strength

Column Parameters

Story: First Frame No: 2 Member No: 24
Fy (ksi): 50.00 Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 167.50 --- Combination: 1.398 D + 1.000 Lp + 2.000 E4

Max Pu/φPn = 1.00 OK

Tension: Max Pu (kip) = 92.86 --- Combination: 0.702 D - 2.000 E4

Max Pu/φPn = 0.26 OK

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	Minor
Mpc (kip-ft)	54.58	54.58

Column Splice Shear Force Required Mpc / H
Where Mpc is the lesser nominal plastic flexural strength of the column sections.
See code for more information on the Required Shear Strength

Beam Parameters

Story: First Frame No: 2 Member No: 30
Fy (ksi): 50.00 Size: W24X55
Frame Type: Ordinary Concentrically Braced Frame

No Special Seismic Provision Checks Required For This Member

Brace Parameters

Story: First Frame No: 2 Member No: 15
Fy (ksi): 50.00 Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

F1.5a Basic Requirements (D1.1 Moderately Ductile) --- OK

Flange b/tf =	7.75	Limit =	15.47	OK
Web h/tw =	7.75	Limit =	15.47	OK

F1.6a Diagonal Brace Connections

Maximum Compression force (kip) = 170.33 Seismic Load Combo: 1.398 D + 1.000 Lp + 2.000 E4
Expected Compression force (kip) = 372.08
Maximum Tension force (kip) = 148.38 Seismic Load Combo: 0.702 D - 2.000 E4
Expected Tension force (kip) = 551.60
Bolt Slip Compression (kip) = 116.90 Standard Load Combo: 1.398 D + 1.000 Lp + 1.300 E4
Bolt Slip Tension (kip) = 94.95 Standard Load Combo: 0.702 D - 1.300 E4

Brace Parameters

Story: First Frame No: 2 Member No: 16
Fy (ksi): 50.00 Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

F1.5a Basic Requirements (D1.1 Moderately Ductile) --- OK

Flange b/tf =	7.75	Limit =	15.47	OK
Web h/tw =	7.75	Limit =	15.47	OK

F1.6a Diagonal Brace Connections

Maximum Compression force (kip) = 177.88 Seismic Load Combo: 1.398 D + 1.000 Lp - 2.000 E4
Expected Compression force (kip) = 372.08
Maximum Tension force (kip) = 146.17 Seismic Load Combo: 0.702 D + 2.000 E4
Expected Tension force (kip) = 551.60
Bolt Slip Compression (kip) = 124.56 Standard Load Combo: 1.398 D + 1.000 Lp - 1.300 E4
Bolt Slip Tension (kip) = 92.85 Standard Load Combo: 0.702 D + 1.300 E4

Column Parameters

Story: First Frame No: 3 Member No: 13
Fy (ksi): 50.00 Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 139.37 --- Combination: 1.398 D + 1.000 Lp - 2.000 E1

Max Pu/φPn = 0.83 OK

Tension: Max Pu (kip) = 74.43 --- Combination: 0.702 D + 2.000 E1

Max Pu/φPn = 0.21 OK

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	Minor
Mpc (kip-ft)	54.58	54.58

Column Splice Shear Force Required Mpc / H
Where Mpc is the lesser nominal plastic flexural strength of the column sections.
See code for more information on the Required Shear Strength

Column Parameters

Story: First Frame No: 3 Member No: 14
Fy (ksi): 50.00 Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 138.04 --- Combination: 1.398 D + 1.000 Lp + 2.000 E1

Max Pu/φPn = 0.82 OK

Tension: Max Pu (kip) = 76.80 --- Combination: 0.702 D - 2.000 E1

Max Pu/φPn = 0.22 OK

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	Minor
Mpc (kip-ft)	54.58	54.58

Column Splice Shear Force Required Mpc / H
Where Mpc is the lesser nominal plastic flexural strength of the column sections.
See code for more information on the Required Shear Strength

Beam Parameters

Story: First Frame No: 3 Member No: 5
Fy (ksi): 50.00 Size: W33X118
Frame Type: Ordinary Concentrically Braced Frame

No Special Seismic Provision Checks Required For This Member

Brace Parameters

Story: First Frame No: 3 Member No: 3
Fy (ksi): 50.00 Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

F1.5a Basic Requirements (D1.1 Moderately Ductile) --- OK

Flange b/tf =	7.75	Limit =	15.47	OK
Web h/tw =	7.75	Limit =	15.47	OK

F1.6a Diagonal Brace Connections

Maximum Compression force (kip) = 168.83 Seismic Load Combo: 1.398 D + 1.000 Lp + 2.000 E1
Expected Compression force (kip) = 280.98
Maximum Tension force (kip) = 149.61 Seismic Load Combo: 0.702 D - 2.000 E1
Expected Tension force (kip) = 551.60
Bolt Slip Compression (kip) = 115.13 Standard Load Combo: 1.398 D + 1.000 Lp + 1.300 E1
Bolt Slip Tension (kip) = 95.90 Standard Load Combo: 0.702 D - 1.300 E1

Brace Parameters

Story: First — Frame No: 3 — Member No: 4
Fy (ksi): 50.00 — Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

F1.5a Basic Requirements (D1.1 Moderately Ductile) --- OK

Flange b/tf =	7.75	Limit =	15.47	OK
Web h/tw =	7.75	Limit =	15.47	OK

F1.6a Diagonal Brace Connections

Maximum Compression force (kip) = 171.94 Seismic Load Combo: 1.398 D + 1.000 Lp - 2.000 E1
Expected Compression force (kip) = 280.98
Maximum Tension force (kip) = 152.30 Seismic Load Combo: 0.702 D + 2.000 E1
Expected Tension force (kip) = 551.60
Bolt Slip Compression (kip) = 117.26 Standard Load Combo: 1.398 D + 1.000 Lp - 1.300 E1
Bolt Slip Tension (kip) = 97.62 Standard Load Combo: 0.702 D + 1.300 E1

Column Parameters

Story: First — Frame No: 4 — Member No: 11
Fy (ksi): 50.00 — Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 102.71 --- Combination: 1.398 D + 1.000 Lp - 2.000 E4

Max Pu/φPn = 0.61 OK

Tension: Max Pu (kip) = 44.64 --- Combination: 0.702 D + 2.000 E4

Max Pu/φPn = 0.13 OK

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	Minor
Mpc (kip-ft)	54.58	54.58

Column Splice Shear Force Required Mpc / H
Where Mpc is the lesser nominal plastic flexural strength of the column sections.
See code for more information on the Required Shear Strength

Column Parameters

Story: First Frame No: 4 Member No: 12
Fy (ksi): 50.00 Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 64.97 --- Combination: 1.398 D + 1.000 Lp + 2.000 E4

Max Pu/φPn = 0.39 OK

Tension: Max Pu (kip) = 51.62 --- Combination: 0.702 D - 2.000 E4

Max Pu/φPn = 0.15 OK

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	Minor
Mpc (kip-ft)	54.58	54.58

Column Splice Shear Force Required Mpc / H
Where Mpc is the lesser nominal plastic flexural strength of the column sections.
See code for more information on the Required Shear Strength

Beam Parameters

Story: First Frame No: 4 Member No: 3
Fy (ksi): 50.00 Size: W33X118
Frame Type: Ordinary Concentrically Braced Frame

No Special Seismic Provision Checks Required For This Member

Brace Parameters

Story: First Frame No: 4 Member No: 1
Fy (ksi): 50.00 Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

F1.5a Basic Requirements (D1.1 Moderately Ductile) --- OK

Flange b/tf =	7.75	Limit =	15.47	OK
Web h/tw =	7.75	Limit =	15.47	OK

F1.6a Diagonal Brace Connections

Maximum Compression force (kip) = 97.31 Seismic Load Combo: 1.398 D + 1.000 Lp + 2.000 E4
Expected Compression force (kip) = 362.72
Maximum Tension force (kip) = 77.12 Seismic Load Combo: 0.702 D - 2.000 E4
Expected Tension force (kip) = 551.60
Bolt Slip Compression (kip) = 68.93 Standard Load Combo: 1.398 D + 1.000 Lp + 1.300 E4
Bolt Slip Tension (kip) = 48.75 Standard Load Combo: 0.702 D - 1.300 E4

Brace Parameters

Story: First Frame No: 4 Member No: 2
Fy (ksi): 50.00 Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

F1.5a Basic Requirements (D1.1 Moderately Ductile) --- OK

Flange b/tf =	7.75	Limit =	15.47	OK
Web h/tw =	7.75	Limit =	15.47	OK

F1.6a Diagonal Brace Connections

Maximum Compression force (kip) = 89.00 Seismic Load Combo: 1.398 D + 1.000 Lp - 2.000 E4
Expected Compression force (kip) = 362.72
Maximum Tension force (kip) = 76.10 Seismic Load Combo: 0.702 D + 2.000 E4
Expected Tension force (kip) = 551.60
Bolt Slip Compression (kip) = 61.48 Standard Load Combo: 1.398 D + 1.000 Lp - 1.300 E4
Bolt Slip Tension (kip) = 48.58 Standard Load Combo: 0.702 D + 1.300 E4

Column Parameters

Story: First — Frame No: 5 — Member No: 21
Fy (ksi): 50.00 — Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 127.90 --- Combination: 1.398 D + 1.000 Lp - 2.000 E3

Max Pu/φPn = 0.76 OK

Tension: Max Pu (kip) = 105.84 --- Combination: 0.702 D + 2.000 E3

Max Pu/φPn = 0.30 OK

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	Minor
Mpc (kip-ft)	54.58	54.58

Column Splice Shear Force Required Mpc / H
Where Mpc is the lesser nominal plastic flexural strength of the column sections.
See code for more information on the Required Shear Strength

Column Parameters

Story: First — Frame No: 5 — Member No: 22
Fy (ksi): 50.00 — Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

D1.4a Required Strength --- OK

Compression: Max Pu (kip) = 119.83 --- Combination: 1.398 D + 1.000 Lp + 2.000 E3

Max Pu/φPn = 0.72 OK

Tension: Max Pu (kip) = 103.36 --- Combination: 0.702 D - 2.000 E3

Max Pu/φPn = 0.29 OK

D2.5b Column Splices - Required Strength

Design strength of column splices must meet or exceed the following forces:
Required tension and compression strength from D1.4a.
Required shear for column splice is max result from D2.5b and D2.5c
Refer to AISC 341 section D2.5b for additional detailing requirements.

D2.5c Required Shear Strength

	Major	Minor
Mpc (kip-ft)	54.58	54.58

Column Splice Shear Force Required Mpc / H
Where Mpc is the lesser nominal plastic flexural strength of the column sections.
See code for more information on the Required Shear Strength

Beam Parameters

Story: First — Frame No: 5 — Member No: 22
Fy (ksi): 50.00 — Size: W33X118
Frame Type: Ordinary Concentrically Braced Frame

No Special Seismic Provision Checks Required For This Member

Brace Parameters

Story: First — Frame No: 5 — Member No: 13
Fy (ksi): 50.00 — Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

F1.5a Basic Requirements (D1.1 Moderately Ductile) --- OK

Flange b/tf =	7.75	Limit =	15.47	OK
Web h/tw =	7.75	Limit =	15.47	OK

F1.6a Diagonal Brace Connections

Maximum Compression force (kip) = 164.41 Seismic Load Combo: 1.398 D + 1.000 Lp + 2.000 E3
Expected Compression force (kip) = 370.28
Maximum Tension force (kip) = 153.98 Seismic Load Combo: 0.702 D - 2.000 E3
Expected Tension force (kip) = 551.60
Bolt Slip Compression (kip) = 109.84 Standard Load Combo: 1.398 D + 1.000 Lp + 1.300 E3
Bolt Slip Tension (kip) = 99.42 Standard Load Combo: 0.702 D - 1.300 E3

Seismic Provisions Member Code Check

Brace Parameters

Story: First Frame No: 5 Member No: 14
Fy (ksi): 50.00 Size: HSS5X5X1/2
Frame Type: Ordinary Concentrically Braced Frame

F1.5a Basic Requirements (D1.1 Moderately Ductile) --- OK

Flange b/tf =	7.75	Limit =	15.47	OK
Web h/tw =	7.75	Limit =	15.47	OK

F1.6a Diagonal Brace Connections

Maximum Compression force (kip) = 157.67 Seismic Load Combo: 1.398 D + 1.000 Lp - 2.000 E3
Expected Compression force (kip) = 370.28
Maximum Tension force (kip) = 149.59 Seismic Load Combo: 0.702 D + 2.000 E3
Expected Tension force (kip) = 551.60
Bolt Slip Compression (kip) = 104.79 Standard Load Combo: 1.398 D + 1.000 Lp - 1.300 E3
Bolt Slip Tension (kip) = 96.72 Standard Load Combo: 0.702 D + 1.300 E3

Brace Frame Beam Check

Brace Frame Beam Forces With RHO (No Overstrength)

$V_{frame.1} := 100\ kip$
$V_{frame.2} := 171\ kip$
$V_{frame.3} := 167\ kip$
$V_{frame.4} := 104\ kip$
$V_{frame.5} := 169\ kip$

Frame Lengths

$L_{frame.1} := 16\ ft$
$L_{frame.2} := 21.5\ ft$
$L_{frame.3} := 20\ ft$
$L_{frame.4} := 15.33\ ft$
$L_{frame.5} := 15.5\ ft$

BF-1 W33X118

$D_L := 65\ psf \cdot \left(\frac{23.5\ ft}{2}\right) = 0.8\ klf$

$L_L := 100\ psf \cdot \left(\frac{23.5\ ft}{2}\right) = 1.2\ klf$

$EQ := \left(\frac{V_{frame.1}}{L_{frame.1}}\right) = 6.3\ klf$

No Extra Bracing needed

BF-2 W16X36

$D_L := 65\ psf \cdot \left(\frac{2\ ft}{2}\right) = 0.1\ klf$

$L_L := 100\ psf \cdot \left(\frac{2\ ft}{2}\right) = 0.1\ klf$

$EQ := \left(\frac{V_{frame.2}}{L_{frame.2}}\right) = 8.0\ klf$

No Extra Bracing needed

BF-3 W33X118

$D_L := 65\ psf \cdot \left(\frac{6.75\ ft}{2}\right) = 0.2\ klf$

$L_L := 100\ psf \cdot \left(\frac{6.75\ ft}{2}\right) = 0.3\ klf$

$EQ := \left(\frac{V_{frame.3}}{L_{frame.3}}\right) = 8.4\ klf$

No Extra Bracing needed

Created with PTC Mathcad Express. See www.mathcad.com for more information.

BF-4 W24X55

$D_L := 65\ psf \cdot \frac{45.25\ ft}{2} = 1.5\ klf$

$L_L := 100\ psf \cdot \frac{45.25\ ft}{2} = 2.3\ klf$

$EQ := \frac{V_{frame.4}}{L_{frame.4}} = 6.8\ klf$

No Extra Bracing needed

BF-5 W33X118

$D_L := 65\ psf \cdot \frac{24\ ft}{2} = 0.8\ klf$

$L_L := 100\ psf \cdot \frac{24\ ft}{2} = 1.2\ klf$

$EQ := \frac{V_{frame.5}}{L_{frame.5}} = 10.9\ klf$

No Extra Bracing needed

Brace Frame Collector Beam Check

Collector/Diaghragm Forces Without Rho $\Omega := 2$

$V_{frame.1} := 80\ kip \cdot \Omega = 160.0\ kip$
$V_{frame.2} := 133\ kip \cdot \Omega = 266.0\ kip$
$V_{frame.3} := 130\ kip \cdot \Omega = 260.0\ kip$
$V_{frame.4} := 78\ kip \cdot \Omega = 156.0\ kip$
$V_{frame.5} := 130\ kip \cdot \Omega = 260.0\ kip$

BF-1 W33X118 Collector

$L_1 := 32.75\ ft$

$D_L := 65\ psf \cdot \frac{23.5\ ft}{2} = 0.8\ klf$

$L_L := 100\ psf \cdot \frac{23.5\ ft}{2} = 1.2\ klf$

$EQ := \frac{V_{frame.1}}{L_1} = 4.9\ klf$

No Extra Bracing needed

BF-2 W16X26 Collector

$L_2 := 21.67\ ft$

$D_L := 65\ psf \cdot \frac{8.5\ ft}{2} = 0.3\ klf$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

$L_L := 100\ psf \cdot \frac{8.5\ ft}{2} = 0.4\ klf$

$EQ := \frac{V_{frame.2}}{L_2} = 12.3\ klf$

Kicker Required @3' OC

BF-3 W24X55 Collector

$L := 149\ ft$ $l_{beam} := 14.33\ ft$

$l_{3L} := 10\ ft$

$l_{3R} := 113.67\ ft$

$D_L := 65\ psf \cdot \frac{7\ ft}{2} = 0.2\ klf$

$L_L := 100\ psf \cdot \frac{7\ ft}{2} = 0.4\ klf$

$EQ := \left(\frac{V_{frame.3}}{L} - l_{3R}\right) \div l_{beam} = 13.8\ klf$

No Extra Bracing needed

BF-4 W24X55 Collector

$L := 47\ ft$ Total Length (Collectors + BF Beam)

$l_1 := 24.33\ ft$ Length of Collector on the East Side

$l_2 := 2.33\ ft$

$V_{frame.4} = 156.0\ kip$

$v_1 := \left(V_{frame.4} \cdot \frac{41.25\ ft}{161.75\ ft} - \frac{24.25\ ft}{L}\right) \div L = 0.4\ klf$

$v_2 := \left(V_{frame.4} \cdot \frac{120\ ft}{161.75\ ft} + V_{frame.4} \cdot \frac{41.25\ ft}{161.75\ ft} - \frac{22.75\ ft}{L}\right) \div L = 2.9\ klf$

$P_1 := v_1 \cdot l_1 = 10.6\ kip$ W24x55 LFRD

$P_2 := v_2 \cdot \Omega \cdot l_2 = 13.4\ kip$ W16x26 LFRD

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	16	0	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N1	Reaction	Reaction	Reaction
2	N2	Reaction	Reaction	Reaction

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	HR1	W33X118	Beam	Wide Flange	A992	Typical	34.7	187	5900	5.3

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N2	HR1	Beam	Wide Flange	A992	Typical

Member Distributed Loads (BLC 1 : Dead Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.8	-0.764	0	%100

Member Distributed Loads (BLC 2 : Live Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-1.2	-1.2	0	%100

Member Distributed Loads (BLC 3 : Earthquake Loads (X Direction))

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	6.3	6.3	0	%100

Basic Load Cases

	BLC Description	Category	Distributed
1	Dead Loads	DL	1
2	Live Loads	LL	1
3	Earthquake Loads (X Direction)	ELX	1

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4D	Yes	Y	DL	1.4						
2	1.2D+1.6L+0.5S	Yes	Y	DL	1.2	LL	1.6				
3	1.2D+Ev+Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	1
4	1.2D+Ev-Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	-1
5	0.9D-Ev+Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	1
6	0.9D-Ev-Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	-1

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	50.4	6	22.925	2	0	6	LOCKED		0	6	0	6
2		min	-50.4	3	5.674	5	0	1	LOCKED		0	1	0	1
3	N2	max	50.4	6	22.81	2	0	6	0	6	0	6	0	6
4		min	-50.4	3	5.587	5	0	1	0	1	0	1	0	1
5	Totals:	max	100.8	6	45.734	2	0	6						
6		min	-100.8	3	11.261	5	0	1						

Envelope Maximum Member Section Forces

	Member		Axial[k]	Loc[ft]	LC	y Shear[k]	Loc[ft]	LC	z Shear[k]	Loc[ft]	LC	Torque[k-ft]	Loc[ft]	LC	y-y Moment[k-ft]	Loc[ft]	LC	z-z Moment[k-ft]	Loc[ft]	LC
1	M1	max	50.4	16	5	22.925	0	2	0	16	6	0	16	6	0	16	6	0	16	6
2		min	-50.4	0	3	-22.81	16	2	0	0	1	0	0	1	0	0	1	-91.469	8	2

Envelope Member Section Deflections - Strength

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [rad]	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC
1	M1	1	max	0	6	0	6	0	6	0	6	NC	6	NC	6
2			min	0	1	0	1	0	1	0	1	NC	1	NC	1
3		2	max	0	6	-0.005	6	0	6	0	6	NC	6	NC	6
4			min	0	1	-0.022	2	0	1	0	1	8748.367	2	NC	1
5		3	max	0	6	-0.008	6	0	6	0	6	NC	6	NC	6
6			min	0	1	-0.031	2	0	1	0	1	6235.277	2	NC	1
7		4	max	0	6	-0.005	6	0	6	0	6	NC	6	NC	6
8			min	0	1	-0.022	2	0	1	0	1	8754.168	2	NC	1
9		5	max	0	6	0	6	0	6	0	6	NC	6	NC	6
10			min	0	1	0	1	0	1	0	1	NC	1	NC	1

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M1	W33X118	0.059	8	2	0.047	0	y	2	895.004	1561.5	192.375	1556.25	1	H1-1b

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	32.75	0	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N1	Reaction	Reaction	Reaction
2	N2	Reaction	Reaction	Reaction

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	HR1	W33X118	Beam	Wide Flange	A992	Typical	34.7	187	5900	5.3

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N2	HR1	Beam	Wide Flange	A992	Typical

Member Distributed Loads (BLC 1 : Dead Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.8	-0.764	0	%100

Member Distributed Loads (BLC 2 : Live Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-1.2	-1.2	0	%100

Member Distributed Loads (BLC 3 : Earthquake Loads (X Direction))

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	4.9	4.9	0	%100

Basic Load Cases

	BLC Description	Category	Distributed
1	Dead Loads	DL	1
2	Live Loads	LL	1
3	Earthquake Loads (X Direction)	ELX	1

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4D	Yes	Y	DL	1.4						
2	1.2D+1.6L+0.5S	Yes	Y	DL	1.2	LL	1.6				
3	1.2D+Ev+Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	1
4	1.2D+Ev-Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	-1
5	0.9D-Ev+Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	1
6	0.9D-Ev-Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	-1

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	80.238	6	46.924	2	0	6	LOCKED		0	6	0	6
2		min	-80.238	3	11.613	5	0	1	LOCKED		0	1	0	1
3	N2	max	80.238	6	46.688	2	0	6	0	6	0	6	0	6
4		min	-80.238	3	11.436	5	0	1	0	1	0	1	0	1
5	Totals:	max	160.475	6	93.613	2	0	6						
6		min	-160.475	3	23.049	5	0	1						

Envelope Maximum Member Section Forces

	Member		Axial[k]	Loc[ft]	LC	y Shear[k]	Loc[ft]	LC	z Shear[k]	Loc[ft]	LC	Torque[k-ft]	Loc[ft]	LC	y-y Moment[k-ft]	Loc[ft]	LC	z-z Moment[k-ft]	Loc[ft]	LC
1	M1	max	80.238	32.75	5	46.924	0	2	0	32.75	6	0	32.75	6	0	32.75	6	0	32.75	6
2		min	-80.238	0	3	-46.688	32.75	2	0	0	1	0	0	1	0	0	1	-383.227	16.375	2

Envelope Member Section Deflections - Strength

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [rad]	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC
1	M1	1	max	0	6	0	6	0	6	0	6	NC	6	NC	6
2			min	0	1	0	1	0	1	0	1	NC	1	NC	1
3		2	max	0	6	-0.095	6	0	6	0	6	4140.306	6	NC	6
4			min	0	1	-0.385	2	0	1	0	1	1020.124	2	NC	1
5		3	max	0	6	-0.133	6	0	6	0	6	2952.946	6	NC	6
6			min	0	1	-0.541	2	0	1	0	1	727.079	2	NC	1
7		4	max	0	6	-0.095	6	0	6	0	6	4148.674	6	NC	6
8			min	0	1	-0.385	2	0	1	0	1	1020.801	2	NC	1
9		5	max	0	6	0	6	0	6	0	6	NC	6	NC	6
10			min	0	1	0	1	0	1	0	1	NC	1	NC	1

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M1	W33X118	0.295	1.706	4	0.096	0	y	2	273.525	1561.5	192.375	1556.25	1	H1-1a

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	21.5	0	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N1	Reaction	Reaction	Reaction
2	N2	Reaction	Reaction	Reaction

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	HR1	W16X36	Beam	Wide Flange	A992	Typical	10.6	24.5	448	0.545

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N2	HR1	Beam	Wide Flange	A992	Typical

Member Distributed Loads (BLC 1 : Dead Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.1	-0.1	0	%100

Member Distributed Loads (BLC 2 : Live Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.1	-0.1	0	%100

Member Distributed Loads (BLC 3 : Earthquake Loads (X Direction))

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	8	8	0	%100

Basic Load Cases

	BLC Description	Category	Distributed
1	Dead Loads	DL	1
2	Live Loads	LL	1
3	Earthquake Loads (X Direction)	ELX	1

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4D	Yes	Y	DL	1.4						
2	1.2D+1.6L+0.5S	Yes	Y	DL	1.2	LL	1.6				
3	1.2D+Ev+Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	1
4	1.2D+Ev-Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	-1
5	0.9D-Ev+Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	1
6	0.9D-Ev-Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	-1

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	86	6	3.01	2	0	6	LOCKED		0	6	0	6
2		min	-86	3	0.968	5	0	1	LOCKED		0	1	0	1
3	N2	max	86	6	3.01	2	0	6	0	6	0	6	0	6
4		min	-86	3	0.968	5	0	1	0	1	0	1	0	1
5	Totals:	max	172	6	6.02	2	0	6						
6		min	-172	3	1.935	5	0	1						

Envelope Maximum Member Section Forces

	Member		Axial[k]	Loc[ft]	LC	y Shear[k]	Loc[ft]	LC	z Shear[k]	Loc[ft]	LC	Torque[k-ft]	Loc[ft]	LC	y-y Moment[k-ft]	Loc[ft]	LC	z-z Moment[k-ft]	Loc[ft]	LC
1	M1	max	86	0	6	3.01	0	2	0	21.5	6	0	21.5	6	0	21.5	6	0	21.5	6
2		min	-86	0	3	-3.01	21.5	2	0	0	1	0	0	1	0	0	1	-16.179	10.75	2

Envelope Member Section Deflections - Strength

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [rad]	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC
1	M1	1	max	0	6	0	6	0	6	0	6	NC	6	NC	6
2			min	0	1	0	1	0	1	0	1	NC	1	NC	1
3		2	max	0	6	-0.03	6	0	6	0	6	8698.051	6	NC	6
4			min	0	1	-0.092	2	0	1	0	1	2795.802	2	NC	1
5		3	max	0	6	-0.042	6	0	6	0	6	6197.362	6	NC	6
6			min	0	1	-0.13	2	0	1	0	1	1992.009	2	NC	1
7		4	max	0	6	-0.03	6	0	6	0	6	8698.051	6	NC	6
8			min	0	1	-0.092	2	0	1	0	1	2795.802	2	NC	1
9		5	max	0	6	0	6	0	6	0	6	NC	6	NC	6
10			min	0	1	0	1	0	1	0	1	NC	1	NC	1

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M1	W16X36	0.401	0	6	0.021	21.5	y	2	214.281	477	40.5	240	1	H1-1a*

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	21.67	0	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N1	Reaction	Reaction	Reaction
2	N2	Reaction	Reaction	Reaction

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	HR1	W16X31	Beam	Wide Flange	A992	Typical	9.13	12.4	375	0.461

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N2	HR1	Beam	Wide Flange	A992	Typical

Member Distributed Loads (BLC 1 : Dead Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.3	-0.3	0	%100

Member Distributed Loads (BLC 2 : Live Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.4	-0.4	0	%100

Member Distributed Loads (BLC 3 : Earthquake Loads (X Direction))

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	12.3	12.3	0	%100

Basic Load Cases

	BLC Description	Category	Distributed
1	Dead Loads	DL	1
2	Live Loads	LL	1
3	Earthquake Loads (X Direction)	ELX	1

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4D	Yes	Y	DL	1.4						
2	1.2D+1.6L+0.5S	Yes	Y	DL	1.2	LL	1.6				
3	1.2D+Ev+Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	1
4	1.2D+Ev-Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	-1
5	0.9D-Ev+Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	1
6	0.9D-Ev-Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	-1

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	133.271	6	10.835	2	0	6	LOCKED		0	6	0	6
2		min	-133.271	3	2.925	5	0	1	LOCKED		0	1	0	1
3	N2	max	133.271	6	10.835	2	0	6	0	6	0	6	0	6
4		min	-133.271	3	2.925	5	0	1	0	1	0	1	0	1
5	Totals:	max	266.541	6	21.67	2	0	6						
6		min	-266.541	3	5.851	5	0	1						

Envelope Maximum Member Section Forces

	Member		Axial[k]	Loc[ft]	LC	y Shear[k]	Loc[ft]	LC	z Shear[k]	Loc[ft]	LC	Torque[k-ft]	Loc[ft]	LC	y-y Moment[k-ft]	Loc[ft]	LC	z-z Moment[k-ft]	Loc[ft]	LC
1	M1	max	133.271	21.67	5	10.835	0	2	0	21.67	6	0	21.67	6	0	21.67	6	0	21.67	6
2		min	-133.271	21.67	4	-10.835	21.67	2	0	0	1	0	0	1	0	0	1	-58.699	10.835	2

Envelope Member Section Deflections - Strength

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [rad]	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC
1	M1	1	max	0	6	0	6	0	6	0	6	NC	6	NC	6
2			min	0	1	0	1	0	1	0	1	NC	1	NC	1
3		2	max	0	6	-0.11	6	0	6	0	6	2370.242	6	NC	6
4			min	0	1	-0.406	2	0	1	0	1	639.965	2	NC	1
5		3	max	0	6	-0.154	6	0	6	0	6	1688.797	6	NC	6
6			min	0	1	-0.57	2	0	1	0	1	455.975	2	NC	1
7		4	max	0	6	-0.11	6	0	6	0	6	2370.242	6	NC	6
8			min	0	1	-0.406	2	0	1	0	1	639.965	2	NC	1
9		5	max	0	6	0	6	0	6	0	6	NC	6	NC	6
10			min	0	1	0	1	0	1	0	1	NC	1	NC	1

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M1	W16X31	0.866	21.67	5	0.083	21.67	y	2	153.836	410.85	26.363	202.5	1	H1-1a*

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	20	0	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N1	Reaction	Reaction	Reaction
2	N2	Reaction	Reaction	Reaction

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	HR1	W33X118	Beam	Wide Flange	A992	Typical	34.7	187	5900	5.3

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N2	HR1	Beam	Wide Flange	A992	Typical

Member Distributed Loads (BLC 1 : Dead Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.2	-0.2	0	%100

Member Distributed Loads (BLC 2 : Live Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.3	-0.3	0	%100

Member Distributed Loads (BLC 3 : Earthquake Loads (X Direction))

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	8.4	8.4	0	%100

Basic Load Cases

	BLC Description	Category	Distributed
1	Dead Loads	DL	1
2	Live Loads	LL	1
3	Earthquake Loads (X Direction)	ELX	1

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4D	Yes	Y	DL	1.4						
2	1.2D+1.6L+0.5S	Yes	Y	DL	1.2	LL	1.6				
3	1.2D+Ev+Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	1
4	1.2D+Ev-Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	-1
5	0.9D-Ev+Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	1
6	0.9D-Ev-Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	-1

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	84	6	7.2	2	0	6	LOCKED		0	6	0	6
2		min	-84	3	1.8	5	0	1	LOCKED		0	1	0	1
3	N2	max	84	6	7.2	2	0	6	0	6	0	6	0	6
4		min	-84	3	1.8	5	0	1	0	1	0	1	0	1
5	Totals:	max	168	6	14.4	2	0	6						
6		min	-168	3	3.6	5	0	1						

Envelope Maximum Member Section Forces

	Member		Axial[k]	Loc[ft]	LC	y Shear[k]	Loc[ft]	LC	z Shear[k]	Loc[ft]	LC	Torque[k-ft]	Loc[ft]	LC	y-y Moment[k-ft]	Loc[ft]	LC	z-z Moment[k-ft]	Loc[ft]	LC
1	M1	max	84	0	6	7.2	0	2	0	20	6	0	20	6	0	20	6	0	20	6
2		min	-84	0	3	-7.2	20	2	0	0	1	0	0	1	0	0	1	-36	10	2

Envelope Member Section Deflections - Strength

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [rad]	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC
1	M1	1	max	0	6	0	6	0	6	0	6	NC	6	NC	6
2			min	0	1	0	1	0	1	0	1	NC	1	NC	1
3		2	max	0	6	-0.003	6	0	6	0	6	NC	6	NC	6
4			min	0	1	-0.013	2	0	1	0	1	NC	1	NC	1
5		3	max	0	6	-0.005	6	0	6	0	6	NC	6	NC	6
6			min	0	1	-0.019	2	0	1	0	1	NC	1	NC	1
7		4	max	0	6	-0.003	6	0	6	0	6	NC	6	NC	6
8			min	0	1	-0.013	2	0	1	0	1	NC	1	NC	1
9		5	max	0	6	0	6	0	6	0	6	NC	6	NC	6
10			min	0	1	0	1	0	1	0	1	NC	1	NC	1

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M1	W33X118	0.088	0	6	0.015	20	y	2	952.116	1561.5	192.375	1556.25	1	H1-1b*

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	14.33	0	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N1	Reaction	Reaction	Reaction
2	N2	Reaction	Reaction	Reaction

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	HR1	W24X55	Beam	Wide Flange	A992	Typical	16.2	29.1	1350	1.18

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N2	HR1	Beam	Wide Flange	A992	Typical

Member Distributed Loads (BLC 1 : Dead Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.2	-0.2	0	%100

Member Distributed Loads (BLC 2 : Live Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.4	-0.4	0	%100

Member Distributed Loads (BLC 3 : Earthquake Loads (X Direction))

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	13.8	13.8	0	%100

Basic Load Cases

	BLC Description	Category	Distributed
1	Dead Loads	DL	1
2	Live Loads	LL	1
3	Earthquake Loads (X Direction)	ELX	1

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4D	Yes	Y	DL	1.4						
2	1.2D+1.6L+0.5S	Yes	Y	DL	1.2	LL	1.6				
3	1.2D+Ev+Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	1
4	1.2D+Ev-Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	-1
5	0.9D-Ev+Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	1
6	0.9D-Ev-Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	-1

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	98.877	6	6.305	2	0	6	LOCKED		0	6	0	6
2		min	-98.877	3	1.29	5	0	1	LOCKED		0	1	0	1
3	N2	max	98.877	6	6.305	2	0	6	0	6	0	6	0	6
4		min	-98.877	3	1.29	5	0	1	0	1	0	1	0	1
5	Totals:	max	197.754	6	12.61	2	0	6						
6		min	-197.754	3	2.579	5	0	1						

Envelope Maximum Member Section Forces

	Member		Axial[k]	Loc[ft]	LC	y Shear[k]	Loc[ft]	LC	z Shear[k]	Loc[ft]	LC	Torque[k-ft]	Loc[ft]	LC	y-y Moment[k-ft]	Loc[ft]	LC	z-z Moment[k-ft]	Loc[ft]	LC
1	M1	max	98.877	0	6	6.305	0	2	0	14.33	6	0	14.33	6	0	14.33	6	0	14.33	6
2		min	-98.877	0	3	-6.305	14.33	2	0	0	1	0	0	1	0	0	1	-22.588	7.165	2

Envelope Member Section Deflections - Strength

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [rad]	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC
1	M1	1	max	0	6	0	6	0	6	0	6	NC	6	NC	6
2			min	0	1	0	1	0	1	0	1	NC	1	NC	1
3		2	max	0	6	-0.004	6	0	6	0	6	NC	6	NC	6
4			min	0	1	-0.019	2	0	1	0	1	9053.455	2	NC	1
5		3	max	0	6	-0.005	6	0	6	0	6	NC	6	NC	6
6			min	0	1	-0.027	2	0	1	0	1	6450.587	2	NC	1
7		4	max	0	6	-0.004	6	0	6	0	6	NC	6	NC	6
8			min	0	1	-0.019	2	0	1	0	1	9053.455	2	NC	1
9		5	max	0	6	0	6	0	6	0	6	NC	6	NC	6
10			min	0	1	0	1	0	1	0	1	NC	1	NC	1

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M1	W24X55	0.252	0	6	0.025	14.33	y	2	392.146	729	49.815	502.5	1	H1-1a*

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	15.33	0	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N1	Reaction	Reaction	Reaction
2	N2	Reaction	Reaction	Reaction

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	HR1	W24X55	Beam	Wide Flange	A992	Typical	16.2	29.1	1350	1.18

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N2	HR1	Beam	Wide Flange	A992	Typical

Member Distributed Loads (BLC 1 : Dead Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-1.5	-0.22	0	%100

Member Distributed Loads (BLC 2 : Live Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-2.3	-0.34	0	%100

Member Distributed Loads (BLC 3 : Earthquake Loads (X Direction))

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	6.8	6.8	0	%100

Basic Load Cases

	BLC Description	Category	Distributed
1	Dead Loads	DL	1
2	Live Loads	LL	1
3	Earthquake Loads (X Direction)	ELX	1

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4D	Yes	Y	DL	1.4						
2	1.2D+1.6L+0.5S	Yes	Y	DL	1.2	LL	1.6				
3	1.2D+Ev+Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	1
4	1.2D+Ev-Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	-1
5	0.9D-Ev+Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	1
6	0.9D-Ev-Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	-1

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	52.122	6	30.067	2	0	6	LOCKED		0	6	0	6
2		min	-52.122	3	7.404	5	0	1	LOCKED		0	1	0	1
3	N2	max	52.122	6	18.13	2	0	6	0	6	0	6	0	6
4		min	-52.122	3	4.461	5	0	1	0	1	0	1	0	1
5	Totals:	max	104.244	6	48.198	2	0	6						
6		min	-104.244	3	11.865	5	0	1						

Envelope Maximum Member Section Forces

	Member		Axial[k]	Loc[ft]	LC	y Shear[k]	Loc[ft]	LC	z Shear[k]	Loc[ft]	LC	Torque[k-ft]	Loc[ft]	LC	y-y Moment[k-ft]	Loc[ft]	LC	z-z Moment[k-ft]	Loc[ft]	LC
1	M1	max	52.122	0	6	30.067	0	2	0	15.33	6	0	15.33	6	0	15.33	6	0	15.33	6
2		min	-52.122	0	3	-18.13	15.33	2	0	0	1	0	0	1	0	0	1	-93.73	6.707	2

Envelope Member Section Deflections - Strength

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [rad]	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC
1	M1	1	max	0	6	0	6	0	6	0	6	NC	6	NC	6
2			min	0	1	0	1	0	1	0	1	NC	1	NC	1
3		2	max	0	6	-0.023	6	0	6	0	6	8141.78	6	NC	6
4			min	0	1	-0.092	2	0	1	0	1	2004.47	2	NC	1
5		3	max	0	6	-0.031	6	0	6	0	6	5990.362	6	NC	6
6			min	0	1	-0.125	2	0	1	0	1	1474.726	2	NC	1
7		4	max	0	6	-0.021	6	0	6	0	6	8691.204	6	NC	6
8			min	0	1	-0.086	2	0	1	0	1	2139.514	2	NC	1
9		5	max	0	6	0	6	0	6	0	6	NC	6	NC	6
10			min	0	1	0	1	0	1	0	1	NC	1	NC	1

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M1	W24X55	0.27	0.639	4	0.119	0	y	2	194.261	729	49.815	502.5	1	H1-1a

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	15.33	0	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N1	Reaction	Reaction	Reaction
2	N2	Reaction	Reaction	Reaction

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	HR1	W24X55	Beam	Wide Flange	A992	Typical	16.2	29.1	1350	1.18

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N2	HR1	Beam	Wide Flange	A992	Typical

Member Distributed Loads (BLC 1 : Dead Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-1.5	-0.22	0	%100

Member Distributed Loads (BLC 2 : Live Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-2.3	-0.34	0	%100

Member Distributed Loads (BLC 3 : Earthquake Loads (X Direction))

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	6.8	6.8	0	%100

Basic Load Cases

	BLC Description	Category	Distributed
1	Dead Loads	DL	1
2	Live Loads	LL	1
3	Earthquake Loads (X Direction)	ELX	1

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4D	Yes	Y	DL	1.4						
2	1.2D+1.6L+0.5S	Yes	Y	DL	1.2	LL	1.6				
3	1.2D+Ev+Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	1
4	1.2D+Ev-Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	-1
5	0.9D-Ev+Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	1
6	0.9D-Ev-Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	-1

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	52.122	6	30.067	2	0	6	LOCKED		0	6	0	6
2		min	-52.122	3	7.404	5	0	1	LOCKED		0	1	0	1
3	N2	max	52.122	6	18.13	2	0	6	0	6	0	6	0	6
4		min	-52.122	3	4.461	5	0	1	0	1	0	1	0	1
5	Totals:	max	104.244	6	48.198	2	0	6						
6		min	-104.244	3	11.865	5	0	1						

Envelope Maximum Member Section Forces

	Member		Axial[k]	Loc[ft]	LC	y Shear[k]	Loc[ft]	LC	z Shear[k]	Loc[ft]	LC	Torque[k-ft]	Loc[ft]	LC	y-y Moment[k-ft]	Loc[ft]	LC	z-z Moment[k-ft]	Loc[ft]	LC
1	M1	max	52.122	0	6	30.067	0	2	0	15.33	6	0	15.33	6	0	15.33	6	0	15.33	6
2		min	-52.122	0	3	-18.13	15.33	2	0	0	1	0	0	1	0	0	1	-93.73	6.707	2

Envelope Member Section Deflections - Strength

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [rad]	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC
1	M1	1	max	0	6	0	6	0	6	0	6	NC	6	NC	6
2			min	0	1	0	1	0	1	0	1	NC	1	NC	1
3		2	max	0	6	-0.023	6	0	6	0	6	8141.78	6	NC	6
4			min	0	1	-0.092	2	0	1	0	1	2004.47	2	NC	1
5		3	max	0	6	-0.031	6	0	6	0	6	5990.362	6	NC	6
6			min	0	1	-0.125	2	0	1	0	1	1474.726	2	NC	1
7		4	max	0	6	-0.021	6	0	6	0	6	8691.204	6	NC	6
8			min	0	1	-0.086	2	0	1	0	1	2139.514	2	NC	1
9		5	max	0	6	0	6	0	6	0	6	NC	6	NC	6
10			min	0	1	0	1	0	1	0	1	NC	1	NC	1

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M1	W24X55	0.27	0.639	4	0.119	0	y	2	194.261	729	49.815	502.5	1	H1-1a

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	15.33	0	0	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N1	Reaction	Reaction	Reaction
2	N2	Reaction	Reaction	Reaction

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	HR1	W33X118	Beam	Wide Flange	A992	Typical	34.7	187	5900	5.3

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N2	HR1	Beam	Wide Flange	A992	Typical

Member Distributed Loads (BLC 1 : Dead Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.8	-0.22	0	%100

Member Distributed Loads (BLC 2 : Live Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-1.2	-0.34	0	%100

Member Distributed Loads (BLC 3 : Earthquake Loads (X Direction))

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	10.9	10.9	0	%100

Basic Load Cases

	BLC Description	Category	Distributed
1	Dead Loads	DL	1
2	Live Loads	LL	1
3	Earthquake Loads (X Direction)	ELX	1

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4D	Yes	Y	DL	1.4						
2	1.2D+1.6L+0.5S	Yes	Y	DL	1.2	LL	1.6				
3	1.2D+Ev+Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	1
4	1.2D+Ev-Ehx+L+0.2S	Yes	Y	DL	1.2	LL	1	ELY	1	ELX	-1
5	0.9D-Ev+Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	1
6	0.9D-Ev-Ehx	Yes	Y	DL	0.9			ELY	-1	ELX	-1

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	83.549	6	16.781	2	0	6	LOCKED		0	6	0	6
2		min	-83.549	3	4.185	5	0	1	LOCKED		0	1	0	1
3	N2	max	83.549	6	11.487	2	0	6	0	6	0	6	0	6
4		min	-83.549	3	2.851	5	0	1	0	1	0	1	0	1
5	Totals:	max	167.097	6	28.269	2	0	6						
6		min	-167.097	3	7.036	5	0	1						

Envelope Maximum Member Section Forces

	Member		Axial[k]	Loc[ft]	LC	y Shear[k]	Loc[ft]	LC	z Shear[k]	Loc[ft]	LC	Torque[k-ft]	Loc[ft]	LC	y-y Moment[k-ft]	Loc[ft]	LC	z-z Moment[k-ft]	Loc[ft]	LC
1	M1	max	83.549	0	6	16.781	0	2	0	15.33	6	0	15.33	6	0	15.33	6	0	15.33	6
2		min	-83.549	0	3	-11.487	15.33	2	0	0	1	0	0	1	0	0	1	-54.633	7.026	2

Envelope Member Section Deflections - Strength

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [rad]	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC
1	M1	1	max	0	6	0	6	0	6	0	6	NC	6	NC	6
2			min	0	1	0	1	0	1	0	1	NC	1	NC	1
3		2	max	0	6	-0.003	6	0	6	0	6	NC	6	NC	6
4			min	0	1	-0.012	2	0	1	0	1	NC	1	NC	1
5		3	max	0	6	-0.004	6	0	6	0	6	NC	6	NC	6
6			min	0	1	-0.017	2	0	1	0	1	NC	1	NC	1
7		4	max	0	6	-0.003	6	0	6	0	6	NC	6	NC	6
8			min	0	1	-0.012	2	0	1	0	1	NC	1	NC	1
9		5	max	0	6	0	6	0	6	0	6	NC	6	NC	6
10			min	0	1	0	1	0	1	0	1	NC	1	NC	1

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M1	W33X118	0.09	0	6	0.034	0	y	2	926.091	1561.5	192.375	1452.316	1.144	H1-1b*

SECTION BREAK

Lateral Design

SUBSECTION BREAK

Diaphragm Shear Capacities

DESCRIPTION/NOTES:

Description details.

20 ga W2-36 FormLok® Grade 50 Composite Deck-Slab (LRFD)

5 in. Total Slab Depth, f'c = 4000 psi, 150 pcf NWC

3/4" Visible Dia. Arc Spot Weld Connections to Supports
36 / 4 Perpendicular Connection Pattern to Supports
Button Punch Sidelap Connections

A992 GR50 Support member or equivalent
0.25 ≤ Support Thickness (in.)

Design Diaphragm Shear Strength ΦSn, plf

Sidelap Connection Spacing (in.)	Span								
	6'-0"	6'-8"	7'-4"	8'-0"	8'-8"	9'-4"	10'-0"	10'-8"	11'-4"
4	4078	4050	4021	3996	3975	3957	3941	3928	3916
6	4028	3998	3966	3946	3923	3903	3891	3876	3863
8	4003	3975	3946	3921	3900	3882	3866	3853	3841
12	3978	3945	3918	3896	3871	3855	3841	3825	3814
18	3962	3930	3898	3877	3854	3839	3822	3811	3797
24	3953	3923	3891	3871	3848	3829	3817	3801	3788
36	3945	3915	3884	3858	3837	3823	3807	3792	3779

Dipahragm Shear Stifness, G', kip/in.

Sidelap Connection Spacing (in.)	Span								
	6'-0"	6'-8"	7'-4"	8'-0"	8'-8"	9'-4"	10'-0"	10'-8"	11'-4"
4	3765	3763	3761	3758	3756	3754	3752	3751	3749
6	3756	3753	3749	3747	3744	3741	3739	3737	3734
8	3751	3748	3744	3740	3737	3734	3731	3728	3726
12	3744	3740	3736	3732	3727	3724	3721	3716	3714
18	3740	3735	3729	3725	3719	3716	3711	3709	3704
24	3737	3733	3726	3723	3717	3711	3709	3704	3699
36	3734	3730	3723	3717	3711	3708	3703	3698	3693

Average Connection Spacing to Supports at all Parallel and Perpendicular Chords & Collectors (in.)

Sidelap Connection Spacing (in.)	Span								
	6'-0"	6'-8"	7'-4"	8'-0"	8'-8"	9'-4"	10'-0"	10'-8"	11'-4"
4	4	4	4	4	4	4	4	5	5
6	4	4	4	4	5	5	5	5	5
8	4	4	4	5	5	5	5	5	5
12	4	4	5	5	5	5	5	5	5
18	4	5	5	5	5	5	5	5	5
24	4	5	5	5	5	5	5	5	5
36	4	5	5	5	5	5	5	5	5

Tables generated using calculator V2.1 based on AISI S310-16. Date: 9/3/2024

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DESIGN CRITERIA

DIAPHRAGM DEMAND

Mezzanine Siemic Base Shear

$V_{BS} := 250\ kip$

$L_{EW} := 49\ ft$

$L_{NS} := 167\ ft$

Design Diaphragm Shear Strength ΦSn, plf

Sidelap Connection Spacing (in.)	Span 6'-0"	6'-8"	7'-4"	8'-0"	8'-8"	9'-4"	10'-0"	10'-8"	11'-4"
4	4078	4050	4021	3996	3975	3957	3941	3928	3916
6	4028	3998	3966	3946	3923	3903	3891	3876	3863
8	4003	3975	3946	3921	3900	3882	3866	3853	3841
12	3978	3945	3918	3896	3871	3855	3841	3825	3814
18	3962	3930	3898	3877	3854	3839	3822	3811	3797
24	3953	3923	3891	3871	3848	3829	3817	3801	3788
36	3945	3915	3884	3858	3837	3823	3807	3792	3779

$V_{Cap} := 3.92\ klf$ Diaphragm Shear Strength

Diaphragm Check in North/South Direction (Frames 2 and 3)

$W_{BS.NS} := V_{BS} \div L_{EW} = 5.1\ klf$ Uniform Shear in N/S Direction

$V_{2\_3} := \dfrac{W_{BS.NS} / L_{EW}}{2 / L_{NS}} = 0.7\ klf$ Shear for Frames 2 and 3

$\text{if}\left(V_{Cap} > V_{2\_3}, \text{"Okay"}, \text{"No Good"}\right) = \text{"Okay"}$

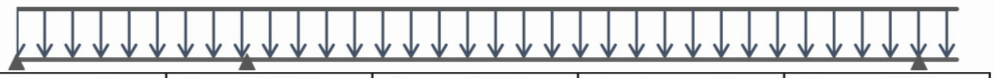
$M := \dfrac{W_{BS.NS} / L_{EW}^2}{8} = 1531.3\ kip / ft$ Moment Along E/W Plane

$T_C := M \div L_{NS} = 9.2\ kip$ Tension/Compression in Chords

Created with PTC Mathcad Express. See www.mathcad.com for more information.

Diaphragm Check in East/West Direction (Frames 1, 4, and 5)

$W_{BS.EW} := V_{BS} \div L_{NS} = 1.5\ klf$ Uniform Shear in E/W Direction



L_{cant1}:	ft	L_{span1}:	41.33 ft	L_{span2}:	120.5 ft	L_{span3}:	ft	L_{cant2}:	6.75 ft

	Uniform		Distributed				Point					Triangular				
	1	2	1	2	3	4	1	2	3	4	5	1	2	3	4	
Slope	0 /12	0 /12	0 /12	0 /12	0 /12	0 /12	0 /12	0 /12	0 /12	0 /12	0 /12	0 /12	0 /12	0 /12	0 /12	
trib	1.0															ft
a																ft
b																ft
D	1500															psf/lbf
D_{adj}	1500															psf/lbf
L																psf/lbf
L_r																psf/lbf
S																psf/lbf
W_v																psf/lbf
E_v																psf/lbf

UNFACTORED REACTIONS (kip)									FACTORED SHEAR/MOMENT (kip/kip-ft)						
	D	L	L_r	S	W_v	E_v	Total	Connection		V_{max}	LC	M_{max}	LC	M_{min}	LC
R1	-19.72						-19.72	0	Cant1						
R2	189.21						189.21	0	Span1	81.63	1		1	2091.27	1
R3	83.39						83.39	0	Span2	107.48	1	1760.21	1	2091.27	1
R4								0	Span3						
TOTAL	252.87						252.87		Cant2	10.11	1	7.53	1	26.58	1

$V_{EW.1} := 82\ kip \div L_{EW} = 1.7\ klf$ Shear for Frame 1

$\text{if}\left(V_{Cap} > V_{EW.1}, \text{"Okay"}, \text{"No Good"}\right) = \text{"Okay"}$

$V_{EW.4} := 107.5\ kip \div L_{EW} = 2.2\ klf$ Shear for Frame 4

$\text{if}\left(V_{Cap} > V_{EW.4}, \text{"Okay"}, \text{"No Good"}\right) = \text{"Okay"}$

$V_{EW.5} := 10.2\ kip \div L_{EW} = 0.2\ klf$ Shear for Frame 5

$\text{if}\left(V_{Cap} > V_{EW.5}, \text{"Okay"}, \text{"No Good"}\right) = \text{"Okay"}$

$M := 2092\ kip/ft$ Moment Along N/S Plane

$T_C := M \div L_{EW} = 42.7\ kip$ Tension/Compression in Chords

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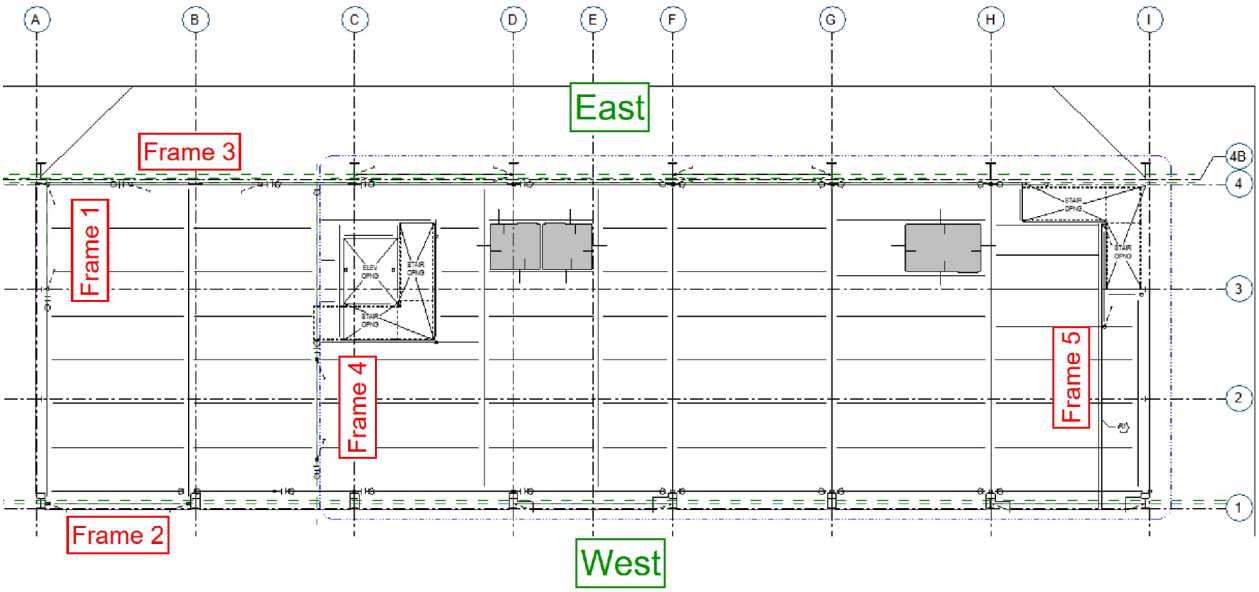
Frame Check



Frame Lengths

$L_{frame.1} := 16\ ft$
$L_{frame.2} := 21.5\ ft$
$L_{frame.3} := 20\ ft$
$L_{frame.4} := 15.33\ ft$
$L_{frame.5} := 15.5\ ft$

Frame Forces (View Ram Results)

$V_{frame.1} := 58\ kip$
$V_{frame.2} := 121\ kip$
$V_{frame.3} := 128.25\ kip$
$V_{frame.4} := 109\ kip$
$V_{frame.5} := 82.2\ kip$

DIAPHRAGM CAPACITY CHECK

$\text{if}\left(V_{frame.1} \div L_{frame.1} > V_{Cap}, \text{"Need Collector"}, \text{"Okay"}\right) = \text{"Okay"}$
$\text{if}\left(V_{frame.2} \div L_{frame.2} > V_{Cap}, \text{"Need Collector"}, \text{"Okay"}\right) = \text{"Need Collector"}$
$\text{if}\left(V_{frame.3} \div L_{frame.3} > V_{Cap}, \text{"Need Collector"}, \text{"Okay"}\right) = \text{"Need Collector"}$
$\text{if}\left(V_{frame.4} \div L_{frame.4} > V_{Cap}, \text{"Need Collector"}, \text{"Okay"}\right) = \text{"Need Collector"}$
$\text{if}\left(V_{frame.5} \div L_{frame.5} > V_{Cap}, \text{"Need Collector"}, \text{"Okay"}\right) = \text{"Need Collector"}$

DIAPHRAGM CAPACITY ACCOUNTING STEEL Typical 5.0" concrete floor

Concrete Shear Strength:

$t_{conc} := 3\ in$	Thickness of concrete above steel deck
$f'_c := 4000\ psi$	Concrete compressive strength
$f_{y.t} := 60\ ksi$	Steel reinforcing yield strength
$\Omega := 1.0$	Normal-weight concrete
$\Theta := 0.75$	Stength reduction factor (ACI 318-19 Table 21.2.1)
$A_{s.t} := 0.058\ \frac{in^2}{ft}$	Area of steel reinforcing (6x6-W2.9xW2.9 WWF)

Created with PTC Mathcad Express. See www.mathcad.com for more information.

$A_{cv} := t_{conc} = 3.0\ \text{in}$

$\lambda_t := \frac{A_{s.t}}{A_{cv}} = 0.00161$

$V := A_{cv} \cdot \min\left(2\ \Omega \cdot \sqrt{f'_c \cdot \text{psi}}, 8 \cdot \sqrt{f'_c \cdot \text{psi}}\right) = 4.6\ \text{klf}$

$V_{n.dia} := A_{cv} \cdot \min\left(2\ \Omega \cdot \sqrt{f'_c \cdot \text{psi}} + \lambda_t \cdot f_{y.t}, 8 \cdot \sqrt{f'_c \cdot \text{psi}}\right) = 8033.7\ \text{plf}$ ACI 318-19 12.5.3 & 12.5.4

concrete diaphragm strength $\Theta v_{dia} := \Theta \cdot V_{n.dia} = 6.0\ \text{klf}$ $V_{n.\Delta} := \frac{V_{n.dia}}{2} = 4.0\ \text{klf}$

$\text{if}\left(V_{frame.1} \div L_{EW} > V_{n.\Delta}, \text{"No Good"}, \text{"Okay"}\right) = \text{"Okay"}$
$\text{if}\left(V_{frame.2} \div L_{NS} > V_{n.\Delta}, \text{"No Good"}, \text{"Okay"}\right) = \text{"Okay"}$
$\text{if}\left(V_{frame.3} \div L_{NS} > V_{n.\Delta}, \text{"No Good"}, \text{"Okay"}\right) = \text{"Okay"}$
$\text{if}\left(V_{frame.4} \div L_{EW} > V_{n.\Delta}, \text{"No Good"}, \text{"Okay"}\right) = \text{"Okay"}$
$\text{if}\left(V_{frame.5} \div 41\ \text{ft} > V_{n.\Delta}, \text{"No Good"}, \text{"Okay"}\right) = \text{"Okay"}$

DIAPHRAGM CONNECTION CAPACITY

3/4" Θ PUDDLE WELD 12" OC

Table 2: Allowable Shear Strength (lbs/connection) for Arc Spot Welds, Arc Seam Welds, Hilti Fasteners, Pneutek Fasteners, and SDI Recognized Screws for Verco Deck Support Connections[11,12]

Deck Gage	Profile[1]	BMT[2]	ARC SPOT WELD[3,4]	ARC SEAM WELD[3,4]	HILTI[5] X-EDNK22 or X-HSN 24	HILTI[5] X-ENP-19	PNEUTEK[6] SDK61	PNEUTEK[6] SDK63	PNEUTEK[6] K64	PNEUTEK[6] K66	SDI RECOGNIZED SCREWS[7,8,9,10]
		(in.)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)
22	B, N & W3	0.0299	783	1231	603	650	618	691	694	736	561
	W2	0.0300	788	1236	605	652	620	693	697	739	563
21	W2 & W3	0.0330	936	1365	664	715	678	744	797	822	619
20	B, N & W3	0.0359	1091	1491	720	775	733	791	886	903	673
	W2	0.0360	1096	1495	722	777	735	792	889	906	675
19	B, N, W2 & W3	0.0420	1455	1758	837	901	846	884	1057	1079	788
18	W2	0.0470	1793	1981	932	1003	937	956	1184	1228	881
	B, N & W3	0.0478	1850	2017	947	1020	951	967	1204	1253	896
16	W2	0.0590	2280	2527	1155	1244	1145	1115	1457	1604	1106
	B, N & W3	0.0598	2309	2564	1169	1259	1158	1125	1474	1630	1121

$V_{PW\_ult} := 0.75 \cdot \frac{1096\ \text{lbf} \cdot 2}{1\ \text{ft}} = 1644.0\ \text{plf}$

DIAPHRAGM CONNECTION CHECK

$\text{if}\left(V_{frame.1} \div L_{frame.1} > V_{PW\_ult}, \text{"HSA's Needed"}, \text{"Okay"}\right) = \text{"HSA's Needed"}$
$\text{if}\left(V_{frame.2} \div L_{frame.2} > V_{PW\_ult}, \text{"HSA's Needed"}, \text{"Okay"}\right) = \text{"HSA's Needed"}$
$\text{if}\left(V_{frame.3} \div L_{frame.3} > V_{PW\_ult}, \text{"HSA's Needed"}, \text{"Okay"}\right) = \text{"HSA's Needed"}$
$\text{if}\left(V_{frame.4} \div L_{frame.4} > V_{PW\_ult}, \text{"HSA's Needed"}, \text{"Okay"}\right) = \text{"HSA's Needed"}$
$\text{if}\left(V_{frame.5} \div L_{frame.5} > V_{PW\_ult}, \text{"HSA's Needed"}, \text{"Okay"}\right) = \text{"HSA's Needed"}$

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DIAPHRAGM CONNECTION WITH HSA @ 12" OC)

TABLE 3-21

$Q_N := 17.2\ kip$

$s := 12\ in$

$\Omega := 0.75$

$\Omega v_{connect} := \frac{\Omega \cdot Q_N}{s} = 12.90\ klf$

$\text{if}\left(V_{frame.1} \div L_{frame.1} > \Omega v_{connect}, \text{"No Good"}, \text{"Okay"}\right) = \text{"Okay"}$

$\text{if}\left(V_{frame.2} \div L_{frame.2} > \Omega v_{connect}, \text{"No Good"}, \text{"Okay"}\right) = \text{"Okay"}$

$\text{if}\left(V_{frame.3} \div L_{frame.3} > \Omega v_{connect}, \text{"No Good"}, \text{"Okay"}\right) = \text{"Okay"}$

$\text{if}\left(V_{frame.4} \div L_{frame.4} > \Omega v_{connect}, \text{"No Good"}, \text{"Okay"}\right) = \text{"Okay"}$

$\text{if}\left(V_{frame.5} \div L_{frame.5} > \Omega v_{connect}, \text{"No Good"}, \text{"Okay"}\right) = \text{"Okay"}$

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SECTION BREAK

Lateral Design

SUBSECTION BREAK

Collector Connections

DESCRIPTION/NOTES:

Description details.

Collection Connection Design:

Design Criteria

W16x26 Collector Beam

$F_{y.beam} := 50$ ksi
$F_{u.beam} := 65$ ksi
$t_w := 0.25$ in
$d_{beam} := 15.7$ in

Shear Plate

$F_{y.plate} := 50$ ksi
$F_{u.plate} := 65$ ksi

Seismic Criteria

$S_{DS} := 0.992$
$\Omega_0 := 2.0$

Loading @ Connection (Worst Case)

$V_{DL} := 25$ kip
$V_{LL} := 37.7$ kip
$P_{Qe.\Omega} := 42.7 \text{ kip} \cdot \Omega_0 = 85.4$ kip Found in Diaphragm Calcs

$R_{uv} := (1.2 + 0.2\ S_{DS}) \cdot V_{DL} + 0.5\ V_{LL} = 53.8$ kip ASCE 7-16 12.4.3.2

$R_{ua} := P_{Qe.\Omega} = 85.4$ kip ASCE 7-16 12.3.3.4 Exception

$R_u := \sqrt{R_{uv}^2 + R_{ua}^2} = 100.9$ kip

$\Theta := \operatorname{atan}\left(\frac{R_{ua}}{R_{uv}}\right) = 57.8\ °$

- Shear Strength of Bolt Group (AISC Manual Part 7)

Use (3) vertical rows of 7/8" dia. A325 bolts with std holes, 3" spacing

$n_{bolts.row} := 4$ $l_{edge.plate.horz} := 2.0$ in $\lambda r_n := 24.3$ kip AISC Manual Table 7-1
$s := 3$ in $l_{edge.plate.vert} := 1.5$ in $C := 8.63$ AISC Manual Table 7-10 60°
$n_{rows} := 3$ $l_{edge.beam} := 2.0$ in $e := 5$ in

$\lambda R_n := C \cdot \lambda r_n = 209.7$ kip $Unity := R_u \div \lambda R_n = 0.5$

$\text{if}(\lambda R_n > R_u, \text{"Okay"}, \text{"NO GOOD"}) = \text{"Okay"}$

- Bearing/Tearout on the Plate (AISC 360-10 J3-10)

$t_{plate} := \frac{1}{2}$ in $d_{bolt} := \frac{7}{8}$ in $d_{hole} := d_{bolt} + \frac{1}{16}$ in $+ \frac{1}{16}$ in $= 1.0$ in

$l_c := \min(l_{edge.plate.horz}, l_{edge.plate.vert}) - 0.5\ d_{hole} = 1.00$ in

$\lambda r_n := 0.75 \min(1.2\ (l_c) \cdot t_{plate} \cdot F_{u.plate}, 2.4\ d_{bolt} \cdot t_{plate} \cdot F_{u.plate}) = 29.3$ kip

$\lambda R_n := C \cdot \lambda r_n = 252.4$ kip $Unity := R_u \div \lambda R_n = 0.4$

$\text{if}(\lambda R_n > R_u, \text{"Okay"}, \text{"NO GOOD"}) = \text{"Okay"}$

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- Bearing/Tearout on the Beam Web (AISC 360-10 J3-10)

$l_c := l_{edge.beam} - 0.5\ d_{hole} = 1.50\ \text{in}$

$\lambda r_n := 0.75\ \min\left(1.2\ (l_c) \cdot t_w \cdot F_{u.beam},\ 2.4\ d_{bolt} \cdot t_w \cdot F_{u.beam}\right) = 21.9\ \text{kip}$

$\lambda R_n := C \cdot \lambda r_n = 189.3\ \text{kip}$ $\quad$ $Unity := R_u \div \lambda R_n = 0.5$

$\text{if}\left(\lambda R_n > R_u, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$

- Maximum Plate Thickness (AISC Manual Part 10)

$A_b := \cancel{\Delta \cdot d_{bolt}}^2 \cdot \cancel{0.25} = 0.60\ \text{in}^2$ $\quad$ $C' := 44.7\ \text{in}$ $\quad$ AISC Manual Table 7-10

$d := n_{bolts.row} \cdot s = 12.0\ \text{in}$ $\quad$ $F_{nv} := 54\ \text{ksi}$ $\quad$ AISC 360 Table J3.2

$M_{max} := \frac{F_{nv}}{0.90} \cdot A_b \cdot C' = 1612.7\ \text{kip} \cdot \text{in}$ $\quad$ AISC 360 Eq 10-4

$t_{max} := \sqrt{\frac{6\ M_{max}}{F_{y.plate} \cdot d^2}} = 1.344\ \text{in}$ $\quad$ $Unity := t_{plate} \div t_{max} = 0.4$ $\quad$ AISC 360 Eq 10-3

$\text{if}\left(t_{max} > t_{plate}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$

- Plate Yielding under Combined Shear and Tension (AISC 360 J4)

$\lambda_{shear.yield} := 1.0$ $\quad$ $\lambda_{tension.yield} := 0.9$

$t_{pv.min} := \frac{R_{uv}}{\lambda_{shear.yield} \cdot \cancel{0.6} \cdot \cancel{F_{y.plate}} \cdot \cancel{d}} = 0.149\ \text{in}$

$t_{pa.min} := \frac{R_{ua}}{\lambda_{tension.yield} \cdot \cancel{F_{y.plate}} \cdot \cancel{d}} = 0.158\ \text{in}$

$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.218\ \text{in}$ $\quad$ $Unity := t_{p.min} \div t_{plate} = 0.4$

$\text{if}\left(t_{plate} > t_{p.min}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$

- Plate Net Section Rupture under Combined Shear and Tension (AISC 360 J4)

$\lambda_{shear.rupture} := 0.75$

$L_{net} := d - n_{bolts.row} \cdot \left(d_{hole} + \frac{1}{16}\ \text{in}\right) = 7.8\ \text{in}$

$t_{pv.min} := \frac{R_{uv}}{\lambda_{shear.rupture} \cdot \cancel{0.6} \cdot \cancel{F_{u.plate}} \cdot \cancel{L_{net}}} = 0.237\ \text{in}$

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$$t_{pa.min} := \frac{R_{ua}}{\lambda_{shear.rupture} \cdot F_{u.plate} \cdot L_{net}} = 0.226\ in$$

$$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.328\ in \qquad Unity := t_{p.min} \div t_{plate} = 0.7$$

$$\text{if}\left(t_{plate} > t_{p.min}, \text{“Okay”}, \text{“NO GOOD”}\right) = \text{“Okay”}$$

- Plate Block Shear under Combined Shear and Tension (AISC 360 J4)

  - Configuration A

    Shear Force:

$$A_{gt.v} := \left(l_{edge.plate.horz} + s \cdot \left(n_{rows} - 1\right)\right) \cdot t_{plate} = 4.000\ in^2 \qquad U_{bs} := 1.0$$

$$A_{nt.v} := A_{gt.v} - 0.5\left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 3.734\ in^2$$

$$A_{gv.v} := \left(d - l_{edge.plate.vert}\right) \cdot t_{plate} = 5.250\ in^2$$

$$A_{nv.v} := A_{gv.v} - \left(n_{bolts.row} - 0.5\right) \cdot \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 3.391\ in^2$$

$$\lambda R_{n1} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{u.plate} \cdot A_{nv.v} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.v}\right) = 281.2\ kip$$

$$\lambda R_{n2} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{y.plate} \cdot A_{gv.v} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.v}\right) = 300.2\ kip$$

$$\lambda R_n := \min\left(\lambda R_{n1}, \lambda R_{n2}\right) = 281.2\ kip$$

$$t_{pv.min} := \frac{R_{uv}}{\lambda R_n \cdot t_{plate}} = 0.0957\ in$$

    Axial Force:

$$A_{gt.a} := A_{gv.v} = 5.250\ in^2 \qquad A_{gv.a} := A_{gt.v} = 4.000\ in^2$$

$$A_{nt.a} := A_{nv.v} = 3.391\ in^2 \qquad A_{nv.a} := A_{nt.v} = 3.734\ in^2$$

$$\lambda R_{n1} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{u.plate} \cdot A_{nv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 274.5\ kip$$

$$\lambda R_{n2} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{y.plate} \cdot A_{gv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 255.3\ kip$$

$$\lambda R_n := \min\left(\lambda R_{n1}, \lambda R_{n2}\right) = 255.3\ kip$$

$$t_{pa.min} := \frac{R_{ua}}{\lambda R_n \cdot t_{plate}} = 0.1673\ in$$

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$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.193\ in$ $\quad$ $Unity := t_{p.min} \div t_{plate} = 0.4$

$\text{if}\left(t_{plate} > t_{p.min}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$

- Configuration B

Shear Force:

Use same as configuration A (conservative)

Axial Force:

$A_{gt.a} := \left(d - 2\ l_{edge.plate.vert}\right) \cdot t_{plate} = 4.500\ in^2$

$A_{nt.a} := A_{gt.a} - \left(n_{bolts.row} - 1\right) \cdot \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 2.906\ in^2$

$A_{gv.a} := 2\ \left(l_{edge.plate.horz} + s \cdot \left(n_{rows} - 1\right)\right) \cdot t_{plate} = 8.000\ in^2$

$A_{nv.a} := A_{gv.a} - \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 7.469\ in^2$

$\lambda R_{n1} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{u.plate} \cdot A_{nv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 360.1\ kip$

$\lambda R_{n2} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{y.plate} \cdot A_{gv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 321.7\ kip$

$\lambda R_n := \min\left(\lambda R_{n1}, \lambda R_{n2}\right) = 321.7\ kip$

$t_{pa.min} := \frac{R_{ua}}{\lambda R_n \cdot t_{plate}} = 0.1327\ in$

$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.164\ in$ $\quad$ $Unity := t_{p.min} \div t_{plate} = 0.3$

$\text{if}\left(t_{plate} > t_{p.min}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$

- Beam Web Block Shear under Combined Shear and Tension (AISC 360-10 J4)
  - Configuration B

Shear Force:

$d_{net} := d_{beam} - n_{bolts.row} \cdot \left(d_{hole} + \frac{1}{16}\ in\right) = 11.5\ in$

$\lambda R_n := \lambda_{shear.rupture} \cdot 0.6 \cdot F_{u.beam} \cdot d_{net} \cdot t_w = 83.7\ kip$

$t_{wv.min} := \frac{R_{uv}}{\lambda R_n \cdot t_w} = 0.1607\ in$

Axial Force:

$A_{gt.a} := \left(n_{bolts.row} - 1\right) \cdot s \cdot t_w = 2.250\ in^2$

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$$A_{nt.a} := A_{gt.a} - (n_{bolts.row} - 1) \cdot \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_w = 1.453\ in^2$$

$$A_{gv.a} := 2\ \left(l_{edge.beam} + s \cdot (n_{rows} - 1) - 0.25\ in\right) \cdot t_w = 3.875\ in^2$$

$$A_{nv.a} := A_{gv.a} - \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_w = 3.609\ in^2$$

$$\Omega R_{n1} := \Omega_{shear.rupture} \cdot \left(0.6 \cdot F_{u.beam} \cdot A_{nv.a} + U_{bs} \cdot F_{u.beam} \cdot A_{nt.a}\right) = 176.4\ kip$$

$$\Omega R_{n2} := \Omega_{shear.rupture} \cdot \left(0.6 \cdot F_{y.beam} \cdot A_{gv.a} + U_{bs} \cdot F_{u.beam} \cdot A_{nt.a}\right) = 158.0\ kip$$

$$\Omega R_n := \min\left(\Omega R_{n1}, \Omega R_{n2}\right) = 158.0\ kip$$

$$t_{wa.min} := \frac{R_{ua}}{\Omega R_n \cdot t_w} = 0.1351\ in$$

$$t_{w.min} := \sqrt{t_{wv.min}^2 + t_{wa.min}^2} = 0.210\ in \qquad Unity := t_{w.min} \div t_w = 0.8$$

$$\text{if}\left(t_w > t_{w.min}, \text{“Okay”}, \text{“NO GOOD”}\right) = \text{“Okay”}$$

- Plate Flexure (AISC Manual Part 9)

$$M_u := R_{uv} \cdot e = 269.1\ kip \cdot in \qquad \Omega_b := 0.9 \qquad \Theta := 1.0$$

$$f_v := \frac{R_{uv}}{d \cdot t_{plate}} = 9.0\ ksi \qquad f_t := \frac{R_{ua}}{d \cdot t_{plate}} = 14.2\ ksi$$

$$F_{cr} := \sqrt{F_{y.plate}^2 - 3\ \Theta \cdot f_v^2} - \Theta \cdot f_t = 33.3\ ksi$$

$$Z := \frac{t_{plate} \cdot d^2}{4} = 18.0\ in^3$$

$$\Omega M_n := \Omega_b \cdot F_{cr} \cdot Z = 539.3\ kip \cdot in \qquad Unity := M_u \div \Omega M_n = 0.5$$

$$\text{if}\left(\Omega M_n > M_u, \text{“Okay”}, \text{“NO GOOD”}\right) = \text{“Okay”}$$

- Plate Weld (AISC Manual Part 10)

$$t_{weld} := \frac{5}{8} \cdot t_{plate} = 0.313\ in$$

λ Use 3/8 fillet

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Collection Connection Design:

Design Criteria

W18x40 Collector Beam

$F_{y.beam} := 50\ ksi$
$F_{u.beam} := 65\ ksi$
$t_w := 0.315\ in$
$d_{beam} := 17.9\ in$

Shear Plate

$F_{y.plate} := 50\ ksi$
$F_{u.plate} := 65\ ksi$

Seismic Criteria

$S_{DS} := 0.992$
$\Omega_0 := 2.0$

Loading @ Connection (Worst Case)

$V_{DL} := 14\ kip$
$V_{LL} := 26.25\ kip$
$P_{Qe.\Omega} := 42.7\ kip \cdot \Omega_0 = 85.4\ kip$ Found in Diaphragm Calcs

$R_{uv} := (1.2 + 0.2\ S_{DS}) \cdot V_{DL} + 0.5\ V_{LL} = 32.7\ kip$ ASCE 7-16 12.4.3.2

$R_{ua} := P_{Qe.\Omega} = 85.4\ kip$ ASCE 7-16 12.3.3.4 Exception

$R_u := \sqrt{R_{uv}^2 + R_{ua}^2} = 91.4\ kip$

$\Theta := \operatorname{atan}\left(\frac{R_{ua}}{R_{uv}}\right) = 69.0\ °$

- Shear Strength of Bolt Group (AISC Manual Part 7)

Use (3) vertical rows of 7/8" dia. A325 bolts with std holes, 3" spacing

$n_{bolts.row} := 4$ $l_{edge.plate.horz} := 2.0\ in$ $\lambda r_n := 24.3\ kip$ AISC Manual Table 7-1
$s := 3\ in$ $l_{edge.plate.vert} := 1.5\ in$ $C := 9.6$ AISC Manual Table 7-10 60°&
$n_{rows} := 3$ $l_{edge.beam} := 2.0\ in$ $e := 5\ in$ 75° Interpolate

$\lambda R_n := C \cdot \lambda r_n = 233.3\ kip$ $Unity := R_u \div \lambda R_n = 0.4$

$\text{if}(\lambda R_n > R_u, \text{"Okay"}, \text{"NO GOOD"}) = \text{"Okay"}$

- Bearing/Tearout on the Plate (AISC 360-10 J3-10)

$t_{plate} := \frac{1}{2}\ in$ $d_{bolt} := \frac{7}{8}\ in$ $d_{hole} := d_{bolt} + \frac{1}{16}\ in + \frac{1}{16}\ in = 1.0\ in$

$l_c := \min(l_{edge.plate.horz}, l_{edge.plate.vert}) - 0.5\ d_{hole} = 1.00\ in$

$\lambda r_n := 0.75 \min(1.2\ (l_c) \cdot t_{plate} \cdot F_{u.plate}, 2.4\ d_{bolt} \cdot t_{plate} \cdot F_{u.plate}) = 29.3\ kip$

$\lambda R_n := C \cdot \lambda r_n = 280.8\ kip$ $Unity := R_u \div \lambda R_n = 0.3$

$\text{if}(\lambda R_n > R_u, \text{"Okay"}, \text{"NO GOOD"}) = \text{"Okay"}$

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- Bearing/Tearout on the Beam Web (AISC 360-10 J3-10)

$l_c := l_{edge.beam} - 0.5\ d_{hole} = 1.50\ \text{in}$

$\lambda r_n := 0.75\ \min\left(1.2\ (l_c) \cdot t_w \cdot F_{u.beam}, 2.4\ d_{bolt} \cdot t_w \cdot F_{u.beam}\right) = 27.6\ \text{kip}$

$\lambda R_n := C \cdot \lambda r_n = 265.4\ \text{kip}$ $\quad$ $Unity := R_u \div \lambda R_n = 0.3$

$\text{if}\left(\lambda R_n > R_u, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$

- Maximum Plate Thickness (AISC Manual Part 10)

$A_b := \Delta \cdot d_{bolt}^2 - 0.25 = 0.60\ \text{in}^2$ $\quad$ $C' := 44.7\ \text{in}$ $\quad$ AISC Manual Table 7-10

$d := n_{bolts.row} \cdot s = 12.0\ \text{in}$ $\quad$ $F_{nv} := 54\ \text{ksi}$ $\quad$ AISC 360 Table J3.2

$M_{max} := \frac{F_{nv}}{0.90} \cdot A_b \cdot C' = 1612.7\ \text{kip} \cdot \text{in}$ $\quad$ AISC 360 Eq 10-4

$t_{max} := \frac{6 \cdot M_{max}}{F_{y.plate} \cdot d^2} = 1.344\ \text{in}$ $\quad$ $Unity := t_{plate} \div t_{max} = 0.4$ $\quad$ AISC 360 Eq 10-3

$\text{if}\left(t_{max} > t_{plate}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$

- Plate Yielding under Combined Shear and Tension (AISC 360 J4)

$\lambda_{shear.yield} := 1.0$ $\quad$ $\lambda_{tension.yield} := 0.9$

$t_{pv.min} := \frac{R_{uv}}{\lambda_{shear.yield} \cdot 0.6 \cdot F_{y.plate} \cdot d} = 0.091\ \text{in}$

$t_{pa.min} := \frac{R_{ua}}{\lambda_{tension.yield} \cdot F_{y.plate} \cdot d} = 0.158\ \text{in}$

$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.182\ \text{in}$ $\quad$ $Unity := t_{p.min} \div t_{plate} = 0.4$

$\text{if}\left(t_{plate} > t_{p.min}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$

- Plate Net Section Rupture under Combined Shear and Tension (AISC 360 J4)

$\lambda_{shear.rupture} := 0.75$

$L_{net} := d - n_{bolts.row} \cdot \left(d_{hole} + \frac{1}{16}\ \text{in}\right) = 7.8\ \text{in}$

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$$t_{pv.min} := \frac{R_{uv}}{\lambda_{shear.rupture} \cdot 0.6 \cdot F_{u.plate} \cdot L_{net}} = 0.144\ in$$

$$t_{pa.min} := \frac{R_{ua}}{\lambda_{shear.rupture} \cdot F_{u.plate} \cdot L_{net}} = 0.226\ in$$

$$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.268\ in \qquad Unity := t_{p.min} \div t_{plate} = 0.5$$

$$\text{if}\left(t_{plate} > t_{p.min}, \text{“Okay”}, \text{“NO GOOD”}\right) = \text{“Okay”}$$

- Plate Block Shear under Combined Shear and Tension (AISC 360 J4)

  - Configuration A

    Shear Force:

$$A_{gt.v} := \left(l_{edge.plate.horz} + s \cdot \left(n_{rows} - 1\right)\right) \cdot t_{plate} = 4.000\ in^2 \qquad U_{bs} := 1.0$$

$$A_{nt.v} := A_{gt.v} - 0.5\left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 3.734\ in^2$$

$$A_{gv.v} := \left(d - l_{edge.plate.vert}\right) \cdot t_{plate} = 5.250\ in^2$$

$$A_{nv.v} := A_{gv.v} - \left(n_{bolts.row} - 0.5\right) \cdot \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 3.391\ in^2$$

$$\lambda R_{n1} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{u.plate} \cdot A_{nv.v} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.v}\right) = 281.2\ kip$$

$$\lambda R_{n2} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{y.plate} \cdot A_{gv.v} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.v}\right) = 300.2\ kip$$

$$\lambda R_n := \min\left(\lambda R_{n1}, \lambda R_{n2}\right) = 281.2\ kip$$

$$t_{pv.min} := \frac{R_{uv}}{\lambda R_n \cdot t_{plate}} = 0.0581\ in$$

    Axial Force:

$$A_{gt.a} := A_{gv.v} = 5.250\ in^2 \qquad A_{gv.a} := A_{gt.v} = 4.000\ in^2$$

$$A_{nt.a} := A_{nv.v} = 3.391\ in^2 \qquad A_{nv.a} := A_{nt.v} = 3.734\ in^2$$

$$\lambda R_{n1} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{u.plate} \cdot A_{nv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 274.5\ kip$$

$$\lambda R_{n2} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{y.plate} \cdot A_{gv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 255.3\ kip$$

$$\lambda R_n := \min\left(\lambda R_{n1}, \lambda R_{n2}\right) = 255.3\ kip$$

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$$t_{pa.min} := \left(\frac{R_{ua}}{\lambda R_n}\right) \cdot t_{plate} = 0.1673\ in$$

$$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.177\ in \qquad Unity := t_{p.min} \div t_{plate} = 0.4$$

$$\text{if}\left(t_{plate} > t_{p.min}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$$

- Configuration B

Shear Force:

Use same as configuration A (conservative)

Axial Force:

$$A_{gt.a} := \left(d - 2\ l_{edge.plate.vert}\right) \cdot t_{plate} = 4.500\ in^2$$

$$A_{nt.a} := A_{gt.a} - \left(n_{bolts.row} - 1\right) \cdot \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 2.906\ in^2$$

$$A_{gv.a} := 2\ \left(l_{edge.plate.horz} + s \cdot \left(n_{rows} - 1\right)\right) \cdot t_{plate} = 8.000\ in^2$$

$$A_{nv.a} := A_{gv.a} - \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 7.469\ in^2$$

$$\lambda R_{n1} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{u.plate} \cdot A_{nv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 360.1\ kip$$

$$\lambda R_{n2} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{y.plate} \cdot A_{gv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 321.7\ kip$$

$$\lambda R_n := \min\left(\lambda R_{n1}, \lambda R_{n2}\right) = 321.7\ kip$$

$$t_{pa.min} := \left(\frac{R_{ua}}{\lambda R_n}\right) \cdot t_{plate} = 0.1327\ in$$

$$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.145\ in \qquad Unity := t_{p.min} \div t_{plate} = 0.3$$

$$\text{if}\left(t_{plate} > t_{p.min}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$$

- Beam Web Block Shear under Combined Shear and Tension (AISC 360-10 J4)
  - Configuration B

Shear Force:

$$d_{net} := d_{beam} - n_{bolts.row} \cdot \left(d_{hole} + \frac{1}{16}\ in\right) = 13.7\ in$$

$$\lambda R_n := \lambda_{shear.rupture} \cdot 0.6 \cdot F_{u.beam} \cdot d_{net} \cdot t_w = 125.8\ kip \quad t_{wv.min} := \left(\frac{R_{uv}}{\lambda R_n}\right) \cdot t_w = 0.0819\ in$$

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Axial Force:

$A_{gt.a} := (n_{bolts.row} - 1) \cdot s \cdot t_w = 2.835\ in^2$

$A_{nt.a} := A_{gt.a} - (n_{bolts.row} - 1) \cdot \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_w = 1.831\ in^2$

$A_{gv.a} := 2\ (l_{edge.beam} + s \cdot (n_{rows} - 1) - 0.25\ in) \cdot t_w = 4.883\ in^2$

$A_{nv.a} := A_{gv.a} - \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_w = 4.548\ in^2$

$\Omega R_{n1} := \Omega_{shear.rupture} \cdot (0.6 \cdot F_{u.beam} \cdot A_{nv.a} + U_{bs} \cdot F_{u.beam} \cdot A_{nt.a}) = 222.3\ kip$

$\Omega R_{n2} := \Omega_{shear.rupture} \cdot (0.6 \cdot F_{y.beam} \cdot A_{gv.a} + U_{bs} \cdot F_{u.beam} \cdot A_{nt.a}) = 199.1\ kip$

$\Omega R_n := \min(\Omega R_{n1}, \Omega R_{n2}) = 199.1\ kip$

$t_{wa.min} := \frac{R_{ua}}{\Omega R_n \cdot t_w} = 0.1351\ in$

$t_{w.min} := \sqrt{t_{wv.min}^2 + t_{wa.min}^2} = 0.158\ in$ $\quad$ $Unity := t_{w.min} \div t_w = 0.5$

$\text{if}\ (t_w > t_{w.min}, \text{“Okay”}, \text{“NO GOOD”}) = \text{“Okay”}$

- Plate Flexure (AISC Manual Part 9)

$M_u := R_{uv} \cdot e = 163.5\ kip \cdot in$ $\quad$ $\Omega_b := 0.9$ $\quad$ $\Theta := 1.0$

$f_v := \frac{R_{uv}}{d \cdot t_{plate}} = 5.5\ ksi$ $\quad$ $f_t := \frac{R_{ua}}{d \cdot t_{plate}} = 14.2\ ksi$

$F_{cr} := \sqrt{F_{y.plate}^2 - 3\ \Theta \cdot f_v^2} - \Theta \cdot f_t = 34.9\ ksi$

$Z := \frac{t_{plate} \cdot d^2}{4} = 18.0\ in^3$

$\Omega M_n := \Omega_b \cdot F_{cr} \cdot Z = 564.9\ kip \cdot in$ $\quad$ $Unity := M_u \div \Omega M_n = 0.3$

$\text{if}\ (\Omega M_n > M_u, \text{“Okay”}, \text{“NO GOOD”}) = \text{“Okay”}$

- Plate Weld (AISC Manual Part 10)

$t_{weld} := \frac{5}{8} \cdot t_{plate} = 0.313\ in$ $\quad$ λ Use 3/8 fillet

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Collection Connection Design:

Design Criteria

W24X55 Collector Beam

$F_{y.beam} := 50\ ksi$
$F_{u.beam} := 65\ ksi$
$t_w := 0.395\ in$
$d_{beam} := 23.6\ in$

Shear Plate

$F_{y.plate} := 50\ ksi$
$F_{u.plate} := 65\ ksi$

Seismic Criteria

$S_{DS} := 0.992$
$\Omega_0 := 2.0$

Loading @ Connection (Worst Case)

$V_{DL} := 8.5\ kip$
$V_{LL} := 7\ kip$
$P_{Qe.\Omega} := 42.7\ kip \cdot \Omega_0 = 85.4\ kip$ Found in Diaphragm Calcs

$R_{uv} := (1.2 + 0.2\ S_{DS}) \cdot V_{DL} + 0.5\ V_{LL} = 15.4\ kip$ ASCE 7-16 12.4.3.2

$R_{ua} := P_{Qe.\Omega} = 85.4\ kip$ ASCE 7-16 12.3.3.4 Exception

$R_u := \sqrt{R_{uv}^2 + R_{ua}^2} = 86.8\ kip$

$\Theta := \operatorname{atan}\left(\frac{R_{ua}}{R_{uv}}\right) = 79.8\ °$

- Shear Strength of Bolt Group (AISC Manual Part 7)

Use (3) vertical rows of 7/8" dia. A325 bolts with std holes, 3" spacing

$n_{bolts.row} := 5$ $l_{edge.plate.horz} := 2.0\ in$ $\lambda r_n := 24.3\ kip$ AISC Manual Table 7-1
$s := 3\ in$ $l_{edge.plate.vert} := 1.5\ in$ $C := 13.312$ AISC Manual Table 7-10 60° & 75° Interpolate
$n_{rows} := 3$ $l_{edge.beam} := 2.0\ in$ $e := 5\ in$

$\lambda R_n := C \cdot \lambda r_n = 323.5\ kip$ $Unity := R_u \div \lambda R_n = 0.3$

$\text{if}(\lambda R_n > R_u, \text{"Okay"}, \text{"NO GOOD"}) = \text{"Okay"}$

- Bearing/Tearout on the Plate (AISC 360-10 J3-10)

$t_{plate} := \frac{1}{2}\ in$ $d_{bolt} := \frac{7}{8}\ in$ $d_{hole} := d_{bolt} + \frac{1}{16}\ in + \frac{1}{16}\ in = 1.0\ in$

$l_c := \min(l_{edge.plate.horz}, l_{edge.plate.vert}) - 0.5\ d_{hole} = 1.00\ in$

$\lambda r_n := 0.75 \min(1.2\ (l_c) \cdot t_{plate} \cdot F_{u.plate}, 2.4\ d_{bolt} \cdot t_{plate} \cdot F_{u.plate}) = 29.3\ kip$

$\lambda R_n := C \cdot \lambda r_n = 389.4\ kip$ $Unity := R_u \div \lambda R_n = 0.2$

$\text{if}(\lambda R_n > R_u, \text{"Okay"}, \text{"NO GOOD"}) = \text{"Okay"}$

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- Bearing/Tearout on the Beam Web (AISC 360-10 J3-10)

$l_c := l_{edge.beam} - 0.5\ d_{hole} = 1.50\ \text{in}$

$\lambda r_n := 0.75\ \min\left(1.2\ (l_c) \cdot t_w \cdot F_{u.beam},\ 2.4\ d_{bolt} \cdot t_w \cdot F_{u.beam}\right) = 34.7\ \text{kip}$

$\lambda R_n := C \cdot \lambda r_n = 461.4\ \text{kip}$ $\quad$ $Unity := R_u \div \lambda R_n = 0.2$

$\text{if}\left(\lambda R_n > R_u, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$

- Maximum Plate Thickness (AISC Manual Part 10)

$A_b := \cancel{\Delta\ d_{bolt}}^2\ \cancel{0.25} = 0.60\ \text{in}^2$ $\quad$ $C' := 64.3\ \text{in}$ $\quad$ AISC Manual Table 7-10

$d := n_{bolts.row} \cdot s = 15.0\ \text{in}$ $\quad$ $F_{nv} := 54\ \text{ksi}$ $\quad$ AISC 360 Table J3.2

$M_{max} := \frac{F_{nv}}{0.90} \cdot A_b \cdot C' = 2319.9\ \text{kip} \cdot \text{in}$ $\quad$ AISC 360 Eq 10-4

$t_{max} := \frac{6 \cdot M_{max}}{F_{y.plate} \cdot d^2} = 1.237\ \text{in}$ $\quad$ $Unity := t_{plate} \div t_{max} = 0.4$ $\quad$ AISC 360 Eq 10-3

$\text{if}\left(t_{max} > t_{plate}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$

- Plate Yielding under Combined Shear and Tension (AISC 360 J4)

$\lambda_{shear.yield} := 1.0$ $\quad$ $\lambda_{tension.yield} := 0.9$

$t_{pv.min} := \frac{R_{uv}}{\lambda_{shear.yield} \cdot \cancel{0.6} \cdot \cancel{F_{y.plate}} \cdot \cancel{d}} = 0.034\ \text{in}$

$t_{pa.min} := \frac{R_{ua}}{\lambda_{tension.yield} \cdot \cancel{F_{y.plate}} \cdot \cancel{d}} = 0.127\ \text{in}$

$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.131\ \text{in}$ $\quad$ $Unity := t_{p.min} \div t_{plate} = 0.3$

$\text{if}\left(t_{plate} > t_{p.min}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$

- Plate Net Section Rupture under Combined Shear and Tension (AISC 360 J4)

$\lambda_{shear.rupture} := 0.75$

$L_{net} := d - n_{bolts.row} \cdot \left(d_{hole} + \frac{1}{16}\ \text{in}\right) = 9.7\ \text{in}$

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$$t_{pv.min} := \frac{R_{uv}}{\lambda_{shear.rupture} \cdot 0.6 \cdot F_{u.plate} \cdot L_{net}} = 0.054\ in$$

$$t_{pa.min} := \frac{R_{ua}}{\lambda_{shear.rupture} \cdot F_{u.plate} \cdot L_{net}} = 0.181\ in$$

$$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.189\ in \qquad Unity := t_{p.min} \div t_{plate} = 0.4$$

$$\text{if}\left(t_{plate} > t_{p.min}, \text{“Okay”}, \text{“NO GOOD”}\right) = \text{“Okay”}$$

- Plate Block Shear under Combined Shear and Tension (AISC 360 J4)

- Configuration A

Shear Force:

$$A_{gt.v} := \left(l_{edge.plate.horz} + s \cdot \left(n_{rows} - 1\right)\right) \cdot t_{plate} = 4.000\ in^2 \qquad U_{bs} := 1.0$$

$$A_{nt.v} := A_{gt.v} - 0.5\left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 3.734\ in^2$$

$$A_{gv.v} := \left(d - l_{edge.plate.vert}\right) \cdot t_{plate} = 6.750\ in^2$$

$$A_{nv.v} := A_{gv.v} - \left(n_{bolts.row} - 0.5\right) \cdot \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 4.359\ in^2$$

$$\lambda R_{n1} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{u.plate} \cdot A_{nv.v} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.v}\right) = 309.6\ kip$$

$$\lambda R_{n2} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{y.plate} \cdot A_{gv.v} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.v}\right) = 333.9\ kip$$

$$\lambda R_n := \min\left(\lambda R_{n1}, \lambda R_{n2}\right) = 309.6\ kip$$

$$t_{pv.min} := \frac{R_{uv}}{\lambda R_n \cdot t_{plate}} = 0.0249\ in$$

Axial Force:

$$A_{gt.a} := A_{gv.v} = 6.750\ in^2 \qquad A_{gv.a} := A_{gt.v} = 4.000\ in^2$$

$$A_{nt.a} := A_{nv.v} = 4.359\ in^2 \qquad A_{nv.a} := A_{nt.v} = 3.734\ in^2$$

$$\lambda R_{n1} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{u.plate} \cdot A_{nv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 321.8\ kip$$

$$\lambda R_{n2} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{y.plate} \cdot A_{gv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 302.5\ kip$$

$$\lambda R_n := \min\left(\lambda R_{n1}, \lambda R_{n2}\right) = 302.5\ kip$$

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$$t_{pa.min} := \left(\frac{R_{ua}}{\lambda R_n}\right) \cdot t_{plate} = 0.1411\ in$$

$$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.143\ in \qquad Unity := t_{p.min} \div t_{plate} = 0.3$$

$$\text{if}\left(t_{plate} > t_{p.min}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$$

- Configuration B

Shear Force:

Use same as configuration A (conservative)

Axial Force:

$$A_{gt.a} := \left(d - 2\ l_{edge.plate.vert}\right) \cdot t_{plate} = 6.000\ in^2$$

$$A_{nt.a} := A_{gt.a} - \left(n_{bolts.row} - 1\right) \cdot \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 3.875\ in^2$$

$$A_{gv.a} := 2\ \left(l_{edge.plate.horz} + s \cdot \left(n_{rows} - 1\right)\right) \cdot t_{plate} = 8.000\ in^2$$

$$A_{nv.a} := A_{gv.a} - \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 7.469\ in^2$$

$$\lambda R_{n1} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{u.plate} \cdot A_{nv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 407.4\ kip$$

$$\lambda R_{n2} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{y.plate} \cdot A_{gv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 368.9\ kip$$

$$\lambda R_n := \min\left(\lambda R_{n1}, \lambda R_{n2}\right) = 368.9\ kip$$

$$t_{pa.min} := \left(\frac{R_{ua}}{\lambda R_n}\right) \cdot t_{plate} = 0.1157\ in$$

$$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.118\ in \qquad Unity := t_{p.min} \div t_{plate} = 0.2$$

$$\text{if}\left(t_{plate} > t_{p.min}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$$

- Beam Web Block Shear under Combined Shear and Tension (AISC 360-10 J4)
  - Configuration B

Shear Force:

$$d_{net} := d_{beam} - n_{bolts.row} \cdot \left(d_{hole} + \frac{1}{16}\ in\right) = 18.3\ in$$

$$\lambda R_n := \lambda_{shear.rupture} \cdot 0.6 \cdot F_{u.beam} \cdot d_{net} \cdot t_w = 211.3\ kip \quad t_{wv.min} := \left(\frac{R_{uv}}{\lambda R_n}\right) \cdot t_w = 0.0288\ in$$

Axial Force:

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$A_{gt.a} := (n_{bolts.row} - 1) \cdot s \cdot t_w = 4.740\ in^2$

$A_{nt.a} := A_{gt.a} - (n_{bolts.row} - 1) \cdot \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_w = 3.061\ in^2$

$A_{gv.a} := 2\ (l_{edge.beam} + s \cdot (n_{rows} - 1) - 0.25\ in) \cdot t_w = 6.123\ in^2$

$A_{nv.a} := A_{gv.a} - \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_w = 5.703\ in^2$

$\Omega R_{n1} := \Omega_{shear.rupture} \cdot (0.6 \cdot F_{u.beam} \cdot A_{nv.a} + U_{bs} \cdot F_{u.beam} \cdot A_{nt.a}) = 316.0\ kip$

$\Omega R_{n2} := \Omega_{shear.rupture} \cdot (0.6 \cdot F_{y.beam} \cdot A_{gv.a} + U_{bs} \cdot F_{u.beam} \cdot A_{nt.a}) = 287.0\ kip$

$\Omega R_n := \min(\Omega R_{n1}, \Omega R_{n2}) = 287.0\ kip$

$t_{wa.min} := \frac{R_{ua}}{\Omega R_n \cdot t_w} = 0.1175\ in$

$t_{w.min} := \sqrt{t_{wv.min}^2 + t_{wa.min}^2} = 0.121\ in$ $\quad$ $Unity := t_{w.min} \div t_w = 0.3$

$\text{if}\ (t_w > t_{w.min}, \text{“Okay”}, \text{“NO GOOD”}) = \text{“Okay”}$

- Plate Flexure (AISC Manual Part 9)

$M_u := R_{uv} \cdot e = 76.9\ kip \cdot in$ $\quad$ $\Omega_b := 0.9$ $\quad$ $\Theta := 1.0$

$f_v := \frac{R_{uv}}{d \cdot t_{plate}} = 2.1\ ksi$ $\quad$ $f_t := \frac{R_{ua}}{d \cdot t_{plate}} = 11.4\ ksi$

$F_{cr} := \sqrt{F_{y.plate}^2 - 3\ \Theta \cdot f_v^2 - \Theta \cdot f_t} = 38.5\ ksi$

$Z := \frac{t_{plate} \cdot d^2}{4} = 28.1\ in^3$

$\Omega M_n := \Omega_b \cdot F_{cr} \cdot Z = 974.2\ kip \cdot in$ $\quad$ $Unity := M_u \div \Omega M_n = 0.1$

$\text{if}\ (\Omega M_n > M_u, \text{“Okay”}, \text{“NO GOOD”}) = \text{“Okay”}$

- Plate Weld (AISC Manual Part 10)

$t_{weld} := \frac{5}{8} \cdot t_{plate} = 0.313\ in$ $\quad$ λ Use 3/8 fillet

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Collection Connection Design:

Design Criteria

W33X118 Collector Beam

$F_{y.beam} := 50\ ksi$
$F_{u.beam} := 65\ ksi$
$t_w := 0.55\ in$
$d_{beam} := 32.9\ in$

Shear Plate

$F_{y.plate} := 50\ ksi$
$F_{u.plate} := 65\ ksi$

Seismic Criteria

$S_{DS} := 0.992$
$\Omega_0 := 2.0$

Loading @ Connection (Worst Case)

$V_{DL} := 25\ kip$
$V_{LL} := 37.75\ kip$
$P_{Qe.\Omega} := 42.7\ kip \cdot \Omega_0 = 85.4\ kip$ Found in Diaphragm Calcs

$R_{uv} := (1.2 + 0.2\ S_{DS}) \cdot V_{DL} + 0.5\ V_{LL} = 53.8\ kip$ ASCE 7-16 12.4.3.2

$R_{ua} := P_{Qe.\Omega} = 85.4\ kip$ ASCE 7-16 12.3.3.4 Exception

$R_u := \sqrt{R_{uv}^2 + R_{ua}^2} = 101.0\ kip$

$\Theta := \operatorname{atan}\left(\frac{R_{ua}}{R_{uv}}\right) = 57.8\ °$

- Shear Strength of Bolt Group (AISC Manual Part 7)

Use (3) vertical rows of 7/8" dia. A325 bolts with std holes, 3" spacing

$n_{bolts.row} := 6$ $l_{edge.plate.horz} := 2.0\ in$ $\lambda r_n := 24.3\ kip$ AISC Manual Table 7-1
$s := 3\ in$ $l_{edge.plate.vert} := 1.5\ in$ $C := 13.9$ AISC Manual Table 7-10 60°
$n_{rows} := 3$ $l_{edge.beam} := 2.0\ in$ $e := 5\ in$

$\lambda R_n := C \cdot \lambda r_n = 337.8\ kip$ $Unity := R_u \div \lambda R_n = 0.3$

$\text{if}(\lambda R_n > R_u, \text{"Okay"}, \text{"NO GOOD"}) = \text{"Okay"}$

- Bearing/Tearout on the Plate (AISC 360-10 J3-10)

$t_{plate} := \frac{1}{2}\ in$ $d_{bolt} := \frac{7}{8}\ in$ $d_{hole} := d_{bolt} + \frac{1}{16}\ in + \frac{1}{16}\ in = 1.0\ in$

$l_c := \min(l_{edge.plate.horz}, l_{edge.plate.vert}) - 0.5\ d_{hole} = 1.00\ in$

$\lambda r_n := 0.75 \min(1.2\ (l_c) \cdot t_{plate} \cdot F_{u.plate}, 2.4\ d_{bolt} \cdot t_{plate} \cdot F_{u.plate}) = 29.3\ kip$

$\lambda R_n := C \cdot \lambda r_n = 406.6\ kip$ $Unity := R_u \div \lambda R_n = 0.2$

$\text{if}(\lambda R_n > R_u, \text{"Okay"}, \text{"NO GOOD"}) = \text{"Okay"}$

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- Bearing/Tearout on the Beam Web (AISC 360-10 J3-10)

$l_c := l_{edge.beam} - 0.5\ d_{hole} = 1.50\ \text{in}$

$\lambda r_n := 0.75\ \min\left(1.2\ (l_c) \cdot t_w \cdot F_{u.beam}, 2.4\ d_{bolt} \cdot t_w \cdot F_{u.beam}\right) = 48.3\ \text{kip}$

$\lambda R_n := C \cdot \lambda r_n = 670.8\ \text{kip}$ $\quad$ $Unity := R_u \div \lambda R_n = 0.2$

$\text{if}\left(\lambda R_n > R_u, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$

- Maximum Plate Thickness (AISC Manual Part 10)

$A_b := \Delta \cdot d_{bolt}^2 - 0.25 = 0.60\ \text{in}^2$ $\quad$ $C' := 88.5\ \text{in}$ $\quad$ AISC Manual Table 7-10

$d := n_{bolts.row} \cdot s = 18.0\ \text{in}$ $\quad$ $F_{nv} := 54\ \text{ksi}$ $\quad$ AISC 360 Table J3.2

$M_{max} := \frac{F_{nv}}{0.90} \cdot A_b \cdot C' = 3193.0\ \text{kip} \cdot \text{in}$ $\quad$ AISC 360 Eq 10-4

$t_{max} := \frac{6 \cdot M_{max}}{F_{y.plate} \cdot d^2} = 1.183\ \text{in}$ $\quad$ $Unity := t_{plate} \div t_{max} = 0.4$ $\quad$ AISC 360 Eq 10-3

$\text{if}\left(t_{max} > t_{plate}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$

- Plate Yielding under Combined Shear and Tension (AISC 360 J4)

$\lambda_{shear.yield} := 1.0$ $\quad$ $\lambda_{tension.yield} := 0.9$

$t_{pv.min} := \frac{R_{uv}}{\lambda_{shear.yield} \cdot 0.6 \cdot F_{y.plate} \cdot d} = 0.100\ \text{in}$

$t_{pa.min} := \frac{R_{ua}}{\lambda_{tension.yield} \cdot F_{y.plate} \cdot d} = 0.105\ \text{in}$

$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.145\ \text{in}$ $\quad$ $Unity := t_{p.min} \div t_{plate} = 0.3$

$\text{if}\left(t_{plate} > t_{p.min}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$

- Plate Net Section Rupture under Combined Shear and Tension (AISC 360 J4)

$\lambda_{shear.rupture} := 0.75$

$L_{net} := d - n_{bolts.row} \cdot \left(d_{hole} + \frac{1}{16}\ \text{in}\right) = 11.6\ \text{in}$

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$$t_{pv.min} := \frac{R_{uv}}{\lambda_{shear.rupture} \cdot 0.6 \cdot F_{u.plate} \cdot L_{net}} = 0.158\ in$$

$$t_{pa.min} := \frac{R_{ua}}{\lambda_{shear.rupture} \cdot F_{u.plate} \cdot L_{net}} = 0.151\ in$$

$$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.219\ in \qquad Unity := t_{p.min} \div t_{plate} = 0.4$$

$$\text{if}\left(t_{plate} > t_{p.min}, \text{“Okay”}, \text{“NO GOOD”}\right) = \text{“Okay”}$$

- Plate Block Shear under Combined Shear and Tension (AISC 360 J4)

  - Configuration A

    Shear Force:

$$A_{gt.v} := \left(l_{edge.plate.horz} + s \cdot \left(n_{rows} - 1\right)\right) \cdot t_{plate} = 4.000\ in^2 \qquad U_{bs} := 1.0$$

$$A_{nt.v} := A_{gt.v} - 0.5\left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 3.734\ in^2$$

$$A_{gv.v} := \left(d - l_{edge.plate.vert}\right) \cdot t_{plate} = 8.250\ in^2$$

$$A_{nv.v} := A_{gv.v} - \left(n_{bolts.row} - 0.5\right) \cdot \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 5.328\ in^2$$

$$\lambda R_{n1} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{u.plate} \cdot A_{nv.v} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.v}\right) = 337.9\ kip$$

$$\lambda R_{n2} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{y.plate} \cdot A_{gv.v} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.v}\right) = 367.7\ kip$$

$$\lambda R_n := \min\left(\lambda R_{n1}, \lambda R_{n2}\right) = 337.9\ kip$$

$$t_{pv.min} := \frac{R_{uv}}{\lambda R_n \cdot t_{plate}} = 0.0797\ in$$

    Axial Force:

$$A_{gt.a} := A_{gv.v} = 8.250\ in^2 \qquad A_{gv.a} := A_{gt.v} = 4.000\ in^2$$

$$A_{nt.a} := A_{nv.v} = 5.328\ in^2 \qquad A_{nv.a} := A_{nt.v} = 3.734\ in^2$$

$$\lambda R_{n1} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{u.plate} \cdot A_{nv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 369.0\ kip$$

$$\lambda R_{n2} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{y.plate} \cdot A_{gv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 349.7\ kip$$

$$\lambda R_n := \min\left(\lambda R_{n1}, \lambda R_{n2}\right) = 349.7\ kip$$

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$$t_{pa.min} := \left(\frac{R_{ua}}{\lambda R_n}\right) \cdot \frac{1}{t_{plate}} = 0.1221\ in$$

$$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.146\ in \qquad Unity := t_{p.min} \div t_{plate} = 0.3$$

$$\text{if}\left(t_{plate} > t_{p.min}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$$

- Configuration B

Shear Force:

Use same as configuration A (conservative)

Axial Force:

$$A_{gt.a} := \left(d - 2\ l_{edge.plate.vert}\right) \cdot t_{plate} = 7.500\ in^2$$

$$A_{nt.a} := A_{gt.a} - \left(n_{bolts.row} - 1\right) \cdot \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 4.844\ in^2$$

$$A_{gv.a} := 2\ \left(l_{edge.plate.horz} + s \cdot \left(n_{rows} - 1\right)\right) \cdot t_{plate} = 8.000\ in^2$$

$$A_{nv.a} := A_{gv.a} - \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_{plate} = 7.469\ in^2$$

$$\lambda R_{n1} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{u.plate} \cdot A_{nv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 454.6\ kip$$

$$\lambda R_{n2} := \lambda_{shear.rupture} \cdot \left(0.6 \cdot F_{y.plate} \cdot A_{gv.a} + U_{bs} \cdot F_{u.plate} \cdot A_{nt.a}\right) = 416.1\ kip$$

$$\lambda R_n := \min\left(\lambda R_{n1}, \lambda R_{n2}\right) = 416.1\ kip$$

$$t_{pa.min} := \left(\frac{R_{ua}}{\lambda R_n}\right) \cdot \frac{1}{t_{plate}} = 0.1026\ in$$

$$t_{p.min} := \sqrt{t_{pv.min}^2 + t_{pa.min}^2} = 0.130\ in \qquad Unity := t_{p.min} \div t_{plate} = 0.3$$

$$\text{if}\left(t_{plate} > t_{p.min}, \text{"Okay"}, \text{"NO GOOD"}\right) = \text{"Okay"}$$

- Beam Web Block Shear under Combined Shear and Tension (AISC 360-10 J4)
  - Configuration B

Shear Force:

$$d_{net} := d_{beam} - n_{bolts.row} \cdot \left(d_{hole} + \frac{1}{16}\ in\right) = 26.5\ in$$

$$\lambda R_n := \lambda_{shear.rupture} \cdot 0.6 \cdot F_{u.beam} \cdot d_{net} \cdot t_w = 426.7\ kip \quad t_{wv.min} := \left(\frac{R_{uv}}{\lambda R_n}\right) \cdot \frac{1}{t_w} = 0.0694\ in$$

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Axial Force:

$A_{gt.a} := (n_{bolts.row} - 1) \cdot s \cdot t_w = 8.250\ in^2$

$A_{nt.a} := A_{gt.a} - (n_{bolts.row} - 1) \cdot \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_w = 5.328\ in^2$

$A_{gv.a} := 2\ (l_{edge.beam} + s \cdot (n_{rows} - 1) - 0.25\ in) \cdot t_w = 8.525\ in^2$

$A_{nv.a} := A_{gv.a} - \left(d_{hole} + \frac{1}{16}\ in\right) \cdot t_w = 7.941\ in^2$

$\Omega R_{n1} := \Omega_{shear.rupture} \cdot (0.6 \cdot F_{u.beam} \cdot A_{nv.a} + U_{bs} \cdot F_{u.beam} \cdot A_{nt.a}) = 492.0\ kip$

$\Omega R_{n2} := \Omega_{shear.rupture} \cdot (0.6 \cdot F_{y.beam} \cdot A_{gv.a} + U_{bs} \cdot F_{u.beam} \cdot A_{nt.a}) = 451.6\ kip$

$\Omega R_n := \min(\Omega R_{n1}, \Omega R_{n2}) = 451.6\ kip$

$t_{wa.min} := \frac{R_{ua}}{\Omega R_n \cdot t_w} = 0.1040\ in$

$t_{w.min} := \sqrt{t_{wv.min}^2 + t_{wa.min}^2} = 0.125\ in$ $\quad$ $Unity := t_{w.min} \div t_w = 0.2$

$\text{if}\ (t_w > t_{w.min}, \text{“Okay”}, \text{“NO GOOD”}) = \text{“Okay”}$

- Plate Flexure (AISC Manual Part 9)

$M_u := R_{uv} \cdot e = 269.2\ kip \cdot in$ $\quad$ $\Omega_b := 0.9$ $\quad$ $\Theta := 1.0$

$f_v := \frac{R_{uv}}{d \cdot t_{plate}} = 6.0\ ksi$ $\quad$ $f_t := \frac{R_{ua}}{d \cdot t_{plate}} = 9.5\ ksi$

$F_{cr} := \sqrt{F_{y.plate}^2 - 3\ \Theta \cdot f_v^2} - \Theta \cdot f_t = 39.4\ ksi$

$Z := \frac{t_{plate} \cdot d^2}{4} = 40.5\ in^3$

$\Omega M_n := \Omega_b \cdot F_{cr} \cdot Z = 1437.1\ kip \cdot in$ $\quad$ $Unity := M_u \div \Omega M_n = 0.2$

$\text{if}\ (\Omega M_n > M_u, \text{“Okay”}, \text{“NO GOOD”}) = \text{“Okay”}$

- Plate Weld (AISC Manual Part 10)

$t_{weld} := \frac{5}{8} \cdot t_{plate} = 0.313\ in$ $\quad$ λ Use 3/8 fillet

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SECTION BREAK

Lateral Design

SUBSECTION BREAK

Drift Separation

DESCRIPTION/NOTES:

Description details.

Seismic Drift Separation:

$h := 15.333\ ft$ (Mezz. Ht.)

$C_d := 3.25$

$I_e := 1.25$

$\Omega_a := 0.015 \cdot h = 2.8\ in$

$\Omega := \frac{\Omega_a \cdot I_e}{C_d} = 1.06\ in$ Elastic Drift Limit of Mezz. at Mezz. Height

$\Omega := \Omega_a = 2.8\ in$ Inelastic Drift Limit at Mezz. Height. Assuming PEMB Drifts to max. allowable code limit.

$\Omega_{mezz} := \frac{0.1671\ in \cdot C_d}{I_e} = 0.434\ in$ Inelastic Drift of Mezz. per RAM

$\Theta_{separation} := \sqrt{\Omega^2 + \Omega_{mezz}^2} = 2.79\ in$ Maintain 3" CLR from Metal Building.

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SECTION BREAK

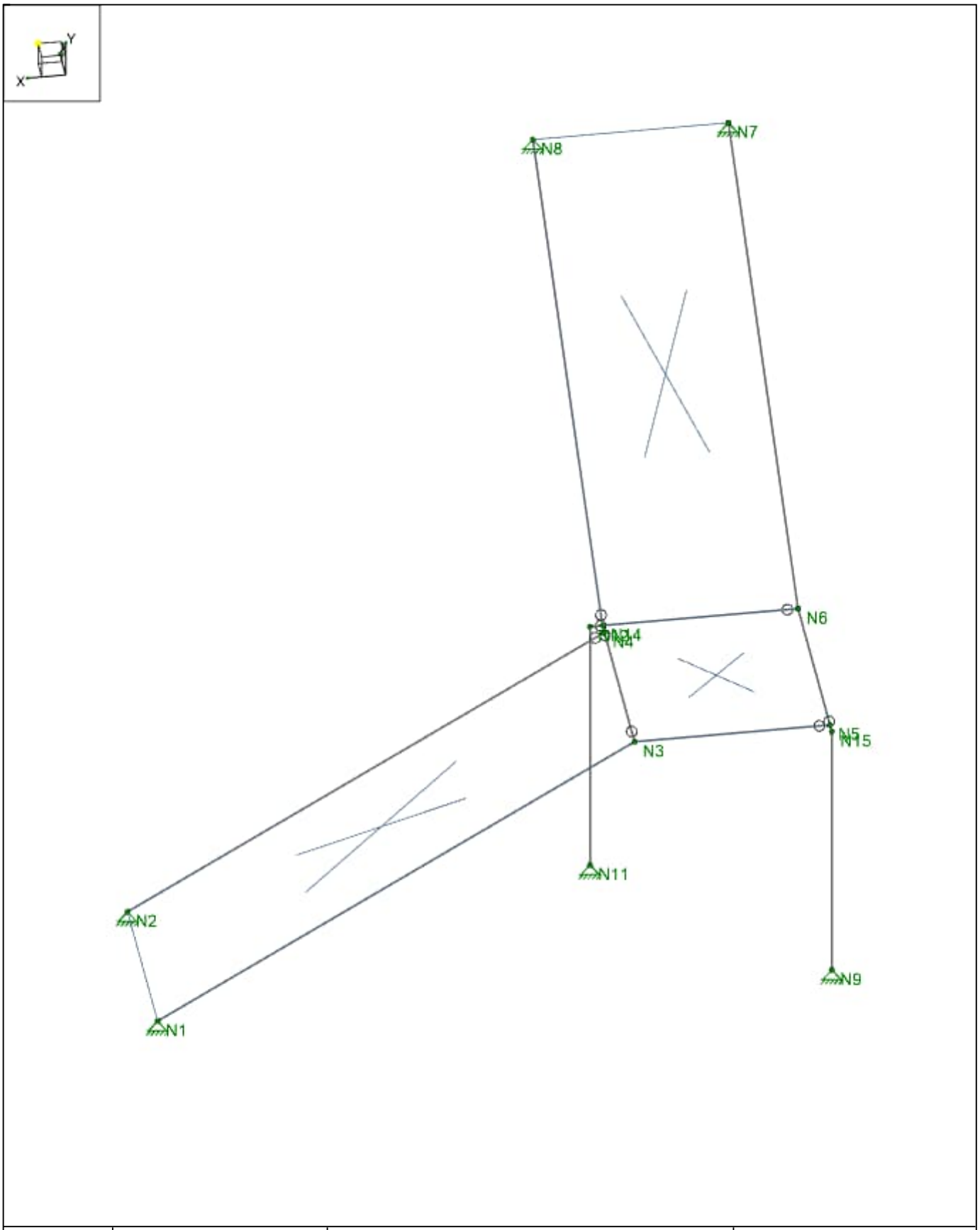
Misc Design

SUBSECTION BREAK

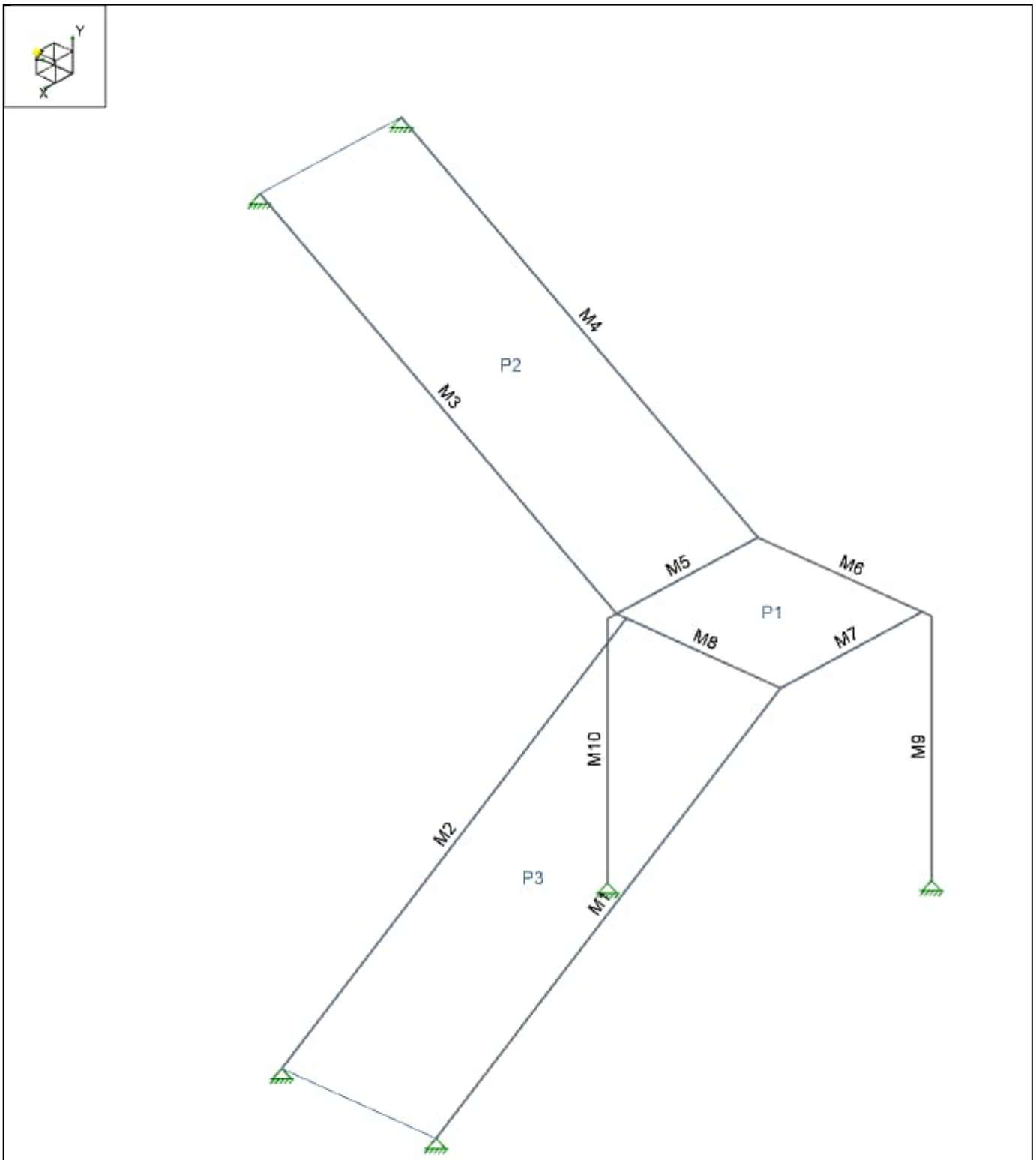
Phase 2 Stair Design

DESCRIPTION/NOTES:

Description details.



CALDER RICHARDS STRUCTURAL ENGINEERS	Calder Richards	CCHS	SK-1
	MDK		Oct 04, 2024 at 11:11 AM
	24047		Mezz Phase 2 Middle Stair …



CALDER RICHARDS STRUCTURAL ENGINEERS	Calder Richards	CCHS	SK-2
	MDK		Oct 04, 2024 at 11:11 AM
	24047		Mezz Phase 2 Middle Stair …

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	18.33	0	0	
2	N2	18.33	0	5.33	
3	N3	5.33	7.75	0	
4	N4	5.33	7.75	5.33	
5	N5	0	7.75	0	
6	N6	0	7.75	5.67	
7	N7	0	15.33	18	
8	N8	5.33	15.33	18	
9	N9	0	0	-0.33	
10	N11	5.67	0	5.67	
11	N12	5.67	7.75	5.67	
12	N14	5.33	7.75	5.67	
13	N15	0	7.75	-0.33	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N2	Reaction	Reaction	Reaction
2	N1	Reaction	Reaction	Reaction
3	N7	Reaction	Reaction	Reaction
4	N8	Reaction	Reaction	Reaction
5	N9	Reaction	Reaction	Reaction
6	N11	Reaction	Reaction	Reaction

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Stringer	HSS12X2X5	Beam	Tube	A500 Gr.C RECT	Typical	7.59	5.1	104	17.6
2	Landing Beam	MC10X22	Beam	Channel	A500 Gr.C RECT	Typical	6.45	6.4	102	0.51
3	Column	HSS4X4X4	Column	Tube	A500 Gr.C RECT	Typical	3.37	7.8	7.8	12.8

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N3		Stringer	Beam	Tube	A500 Gr.C RECT	Typical
2	M2	N2	N4	180	Stringer	Beam	Tube	A500 Gr.C RECT	Typical
3	M3	N14	N8	180	Stringer	Beam	Tube	A500 Gr.C RECT	Typical
4	M4	N7	N6	180	Stringer	Beam	Tube	A500 Gr.C RECT	Typical
5	M5	N12	N6	180	Landing Beam	Beam	Channel	A500 Gr.C RECT	Typical
6	M6	N6	N15	180	Stringer	Beam	Tube	A500 Gr.C RECT	Typical
7	M7	N5	N3	180	Stringer	Beam	Tube	A500 Gr.C RECT	Typical
8	M8	N3	N14	180	Landing Beam	Beam	Channel	A500 Gr.C RECT	Typical
9	M9	N9	N15		Column	Column	Tube	A500 Gr.C RECT	Typical
10	M10	N11	N12		Column	Column	Tube	A500 Gr.C RECT	Typical

Member Advanced Data

	Label	I Release	J Release	Col-Wall Vert Release	Physical	Deflection Ratio Options	Seismic DR
1	M1				Yes	Default	None
2	M2		BenPIN		Yes	Default	None
3	M3	BenPIN			Yes	Default	None
4	M4				Yes	Default	None
5	M5	BenPIN	BenPIN		Yes	Default	None

Member Advanced Data (Continued)

	Label	I Release	J Release	Col-Wall Vert Release	Physical	Deflection Ratio Options	Seismic DR
6	M6		BenPIN		Yes	Default	None
7	M7	BenPIN			Yes	Default	None
8	M8	BenPIN	BenPIN		Yes	Default	None
9	M9				Yes	** NA **	None
10	M10				Yes	** NA **	None

Plate Primary Data

	Label	A Node	B Node	C Node	D Node	Material	Thickness [in]
1	P1	N3	N14	N6	N5	gen_Steel	1
2	P2	N8	N7	N6	N14	gen_Steel	1
3	P3	N4	N3	N1	N2	gen_Steel	1

Basic Load Cases

	BLC Description	Category	Y Gravity	Distributed	Area(Member)
1	Dead	DL	-1	4	1
2	Live	LL		4	1
3	EQ X	ELX		2	
4	EQ Z	ELZ		2	
5	BLC 1 Transient Area Loads	None		3	
6	BLC 2 Transient Area Loads	None		3	

Member Distributed Loads (BLC 1 : Dead)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.175	-0.175	0	%100
2	M2	Y	-0.175	-0.175	0	%100
3	M3	Y	-0.175	-0.175	0	%100
4	M4	Y	-0.175	-0.175	0	%100

Member Distributed Loads (BLC 2 : Live)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.27	-0.27	0	%100
2	M2	Y	-0.27	-0.27	0	%100
3	M3	Y	-0.27	-0.27	0	%100
4	M4	Y	-0.27	-0.27	0	%100

Member Distributed Loads (BLC 3 : EQ X)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M6	X	0.06	0.06	0	%100
2	M4	X	0.06	0.06	0	%100

Member Distributed Loads (BLC 4 : EQ Z)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M7	Z	0.06	0.06	0	%100
2	M1	Z	0.06	0.06	0	%100

Member Distributed Loads (BLC 5 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M6	Y	-0.011	-0.011	0	5.67
2	M7	Y	-0.011	-0.011	0	5.33
3	M8	Y	-0.018	-0.018	0	5.33

Member Distributed Loads (BLC 6 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M6	Y	-0.017	-0.017	0	5.67
2	M7	Y	-0.017	-0.017	0	5.33
3	M8	Y	-0.028	-0.028	0	5.33

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	D	Yes	Y	DL	1										
2	L		Y			LL	1								
3	D+L	Yes	Y	DL	1	LL	1								
4	1.0D+0.7Ev+0.7Ehx	Yes	Y	DL	1					ELY	0.7	ELX	0.7		
5	1.0D+0.7Ev-0.7Ehx	Yes	Y	DL	1					ELY	0.7	ELX	-0.7		
6	1.0D+0.7Ev+0.7Ehz	Yes	Y	DL	1					ELY	0.7			ELZ	0.7
7	1.0D+0.7Ev-0.7Ehz	Yes	Y	DL	1					ELY	0.7			ELZ	-0.7
8	1.0D+0.525Ev+0.525Ehx+0.75L+0.75S	Yes	Y	DL	1	LL	0.75	SL	0.75	ELY	0.525	ELX	0.525		
9	1.0D+0.525Ev-0.525Ehx+0.75L+0.75S	Yes	Y	DL	1	LL	0.75	SL	0.75	ELY	0.525	ELX	-0.525		
10	1.0D+0.525Ev+0.525Ehz+0.75L+0.75S	Yes	Y	DL	1	LL	0.75	SL	0.75	ELY	0.525			ELZ	0.525
11	1.0D+0.525Ev-0.525Ehz+0.75L+0.75S	Yes	Y	DL	1	LL	0.75	SL	0.75	ELY	0.525			ELZ	-0.525
12	0.6D-0.7Ev+0.7Ehx	Yes	Y	DL	0.6					ELY	-0.7	ELX	0.7		
13	0.6D-0.7Ev-0.7Ehx	Yes	Y	DL	0.6					ELY	-0.7	ELX	-0.7		
14	0.6D-0.7Ev+0.7Ehz	Yes	Y	DL	0.6					ELY	-0.7			ELZ	0.7
15	0.6D-0.7Ev-0.7Ehz	Yes	Y	DL	0.6					ELY	-0.7			ELZ	-0.7

Envelope Plate Forces (per ft)

	Plate		Qx [k]	LC	Qy [k]	LC	Mx [k-ft]	LC	My [k-ft]	LC	Mxy [k-ft]	LC	Fx [k]	LC	Fy [k]	LC	Fxy [k]	LC
1	P1	max	0.234	9	0.332	11	0.007	3	0.116	3	0.214	3	-0.045	13	0.766	3	0.293	3
2		min	-0.018	12	-0.003	14	-0.007	4	0.018	15	0.065	15	-0.244	3	0.218	14	0.067	14
3	P2	max	0.019	4	-0.006	14	0.004	12	-0.016	15	-0.015	15	0.016	14	1.863	3	-0.303	12
4		min	-0.019	13	-0.146	3	-0.017	9	-0.072	3	-0.048	3	-0.048	11	0.61	13	-1.271	3
5	P3	max	0.149	3	-0.033	15	0.011	11	-0.03	15	0.047	3	-0.006	15	-0.351	14	-0.526	15
6		min	0.028	14	-0.087	3	-0.003	14	-0.111	3	0.014	15	-0.055	3	-1.36	3	-1.89	3

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N2	max	-10.37	15	24.322	3	-1.846	15	0	15	0	15	0	15
2		min	-34.006	3	7.491	15	-6.472	3	0	1	0	1	0	1
3	N1	max	26.892	3	-2.93	15	-0.729	15	0	15	0	15	0	15
4		min	7.852	15	-10.639	3	-3.694	10	0	1	0	1	0	1
5	N7	max	2.013	3	-0.243	12	-3.174	12	0	15	0	15	0	15
6		min	0.142	12	-3.154	3	-13.588	3	0	1	0	1	0	1
7	N8	max	4.759	3	17.685	3	23.713	3	0	15	0	15	0	15
8		min	1.236	12	5.106	12	6.642	12	0	1	0	1	0	1
9	N9	max	0.343	3	5.466	3	0.015	3	0	15	0	15	0	15
10		min	0.11	15	1.946	15	0.002	15	0	1	0	1	0	1

Envelope Node Reactions (Continued)

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
11	N11	max	0	12	3.313	3	0.002	10	0	15	0	15	0	15
12		min	0	3	1.032	12	-0.005	7	0	1	0	1	0	1
13	N15	max	NC		NC		NC		NC		LOCKED		NC	
14		min	NC		NC		NC		NC		LOCKED		NC	
15	N12	max	NC		NC		NC		NC		LOCKED		NC	
16		min	NC		NC		NC		NC		LOCKED		NC	
17	Totals:	max	0.86	13	36.994	3	0.86	7						
18		min	-0.86	12	12.405	12	-0.86	14						

Envelope Node Displacements

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
1	N1	max	0	15	0	3	0	10	2.7e-3	6	5.192e-3	10	7.174e-3	3
2		min	0	3	0	15	0	15	-1.72e-3	15	-2.734e-3	15	2.126e-3	15
3	N2	max	0	3	0	15	0	3	3.667e-4	3	-2.633e-5	15	3.363e-3	3
4		min	0	15	0	3	0	15	7.646e-5	15	-1.554e-4	3	8.709e-4	12
5	N3	max	-0.052	15	-0.086	15	0.01	3	-1.95e-3	15	1.119e-4	15	-1.026e-3	15
6		min	-0.17	3	-0.282	3	0.003	15	-7.671e-3	3	-2.825e-3	10	-3.553e-3	3
7	N4	max	-0.005	15	-0.01	15	0.01	3	-9.288e-4	15	2.071e-3	3	-7.266e-4	14
8		min	-0.017	3	-0.034	3	0.003	15	-3.264e-3	3	4.987e-4	15	-2.94e-3	3
9	N5	max	-0.052	15	-0.008	15	0.165	3	4.212e-3	3	2.115e-3	3	-1.409e-3	15
10		min	-0.171	3	-0.023	3	0.05	15	1.311e-3	15	5.838e-4	12	-4.508e-3	3
11	N6	max	-0.002	12	-0.081	15	0.165	3	2.901e-3	3	2.749e-3	8	3.589e-3	3
12		min	-0.006	3	-0.267	3	0.05	15	8.241e-4	15	2.78e-4	13	1.044e-3	12
13	N7	max	0	12	0	3	0	3	-1.912e-3	15	3.034e-3	5	1.974e-3	4
14		min	0	3	0	12	0	12	-6.497e-3	3	-2.994e-3	12	-1.685e-3	13
15	N8	max	0	12	0	12	0	12	2.683e-4	7	-1.962e-5	12	-4.922e-5	12
16		min	0	3	0	3	0	3	-4.484e-4	10	-1.527e-4	3	-3.127e-4	3
17	N9	max	0	15	0	15	0	15	1.773e-3	3	0	15	4.766e-3	3
18		min	0	3	0	3	0	3	5.367e-4	15	0	1	1.465e-3	15
19	N11	max	0	3	0	12	0	7	5.106e-5	4	0	15	6.315e-5	3
20		min	0	12	0	3	0	10	-1.371e-5	13	0	1	1.7e-5	12
21	N12	max	-0.002	12	-0.001	12	0.003	4	4.436e-5	10	0	15	6.315e-5	3
22		min	-0.006	3	-0.004	3	-0.002	13	-7.743e-5	7	0	1	1.7e-5	12
23	N14	max	-0.002	12	-0.007	15	0.01	3	1.886e-4	10	2.412e-3	9	4.082e-3	3
24		min	-0.006	3	-0.021	3	0.003	15	-4.234e-4	7	1.417e-4	12	1.24e-3	15
25	N15	max	-0.054	15	-0.002	15	0.165	3	1.773e-3	3	0	15	-1.2e-3	15
26		min	-0.179	3	-0.006	3	0.05	15	5.367e-4	15	0	1	-3.833e-3	3

Envelope AISC 15TH (360-16): ASD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/om [k-ft]	Mnzz/om [k-ft]	Cb	Eqn
1	M1	HSS12X2X5	0.31	7.725	10	0.052	15.135	z	11	23.24	227.246	11.888	61.037	1.095	H1-1b
2	M2	HSS12X2X5	0.25	6.937	3	0.049	0	y	3	23.24	227.246	11.888	61.128	1.145	H1-1b
3	M3	HSS12X2X5	0.17	14.474	3	0.058	14.474	y	3	25.412	227.246	11.888	61.128	1.884	H1-1b
4	M4	HSS12X2X5	0.254	7.237	8	0.047	0	y	3	25.412	227.246	11.888	61.128	1.095	H1-1b
5	M5	MC10X22	0.069	0.354	8	0.069	0	y	11	137.297	193.114	10.965	59.631	1.534	H1-1b
6	M6	HSS12X2X5	0.09	0	8	0.206	6	y	3	129.274	227.246	11.888	61.128	1.047	H1-1b
7	M7	HSS12X2X5	0.27	5.33	10	0.211	5.33	z	3	145.602	227.246	11.888	61.128	1.589	H1-1b
8	M8	MC10X22	0.247	5.375	3	0.735	5.67	z	3	137.297	193.114	10.965	59.631	1.673	H1-1b
9	M9	HSS4X4X4	0.273	7.75	3	0.013	7.75	y	3	76.776	100.898	11.702	11.702	1.667	H1-1b
10	M10	HSS4X4X4	0.043	0	3	0	7.75	z	7	76.776	100.898	11.702	11.702	1	H1-1b*

SECTION BREAK

Misc Design

SUBSECTION BREAK

Roof Hatch Ladder

DESCRIPTION/NOTES:

Description details.

Roof Hatch Access:

Try HSS 5x5x1/4 $h := 16\ ft$ $E := 29000\ ksi$ $r := 1.93\ in$

$I := 16\ in^4$ $K := 1.0$

$P := 5000\ lbf$ $M := \frac{1000\ lbf / h}{4} = 4.0\ kip / ft$

$\Omega_{max} := \frac{1000\ lbf / h^3}{48 / E / I} = 0.3\ in$ $\frac{h}{240} = 0.8\ in$

$\frac{K / h}{r} = 99.5$ <200 OK

$P_{n.\Theta} := 60.9\ kip$

$M_{n.\Theta} := 17.5\ kip / ft$

$\frac{M}{M_{n.\Theta}} = 0.23$

$\frac{P}{P_{n.\Theta}} = 0.082$ <0.2 Use H1-1b

$\frac{P}{2 / P_{n.\Theta}} + \frac{M}{M_{n.\Theta}} = 0.27$

Created with PTC Mathcad Express. See www.mathcad.com for more information.

SECTION BREAK

Appendix 1

SUBSECTION BREAK

Soil Report

DESCRIPTION/NOTES:

Description details.

AGEC
Applied GeoTech

GEOTECHNICAL INVESTIGATION

PROPOSED FIELDHOUSE

CORNER CANYON HIGH SCHOOL

12943 SOUTH 700 EAST

DRAPER, UTAH

PREPARED FOR:

CANYONS SCHOOL DISTRICT
9100 SOUTH 500 WEST
SANDY, UT 84070

ATTENTION: LUKE BUTTERFIELD

PROJECT NO. 1240393 **JULY 30, 2024**

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CPT RESULTS

EXECUTIVE SUMMARY

1. Approximately 1 to 2 feet of fill was encountered in all but Borings B-7 and B-10, which encountered fill to depths of approximately 13 and 6 feet, respectively. Lean clay was encountered below the fill. The clay generally extends to the maximum depth of the borings, approximately 10½ to 20½ feet. The clay between depths of approximately 12 and 15½ feet in Boring B-10 has significant silt layers.

   Cone Penetration Test CPT-1 was conducted near Boring B-4 and encountered predominantly clay to a depth of approximately 33 feet overlying predominantly sand to a depth of approximately 40 feet. Clay, silt and sand layers were encountered from a depth of approximately 40 feet to the maximum depth of the CPT, approximately 50 feet.

2. Subsurface water was measured in the borings at depths of approximately 3.5 to 6.2 feet except in Boring B-7. Boring B-7 is higher in elevation than the other borings and the subsurface water was measured in this boring at a depth of approximately 15.5 feet. The water levels were measured on July 18, 2024.

3. With the proposed construction and the subsurface conditions encountered, the proposed building may be supported on spread footings bearing on the undisturbed natural soil or on compacted structural fill extending down to the undisturbed natural soil. Spread footings bearing on the undisturbed natural soil or on compacted structural fill may be designed using an allowable net bearing pressure of 1,500 psf. Footings bearing on at least 2 feet of compacted structural fill may be designed for an allowable net bearing pressure of 2,500 psf.

4. Approximately 1 to 13 feet of fill was encountered in the borings. Unsuitable fill, topsoil, debris and other deleterious materials should be removed from below areas of proposed buildings, turf fields, exterior slabs and other improvements sensitive to differential settlement.

5. The upper soil has a high clay content and will be easily disturbed by construction equipment traffic when it is very moist to wet. Placement of approximately 1 to 2 feet of granular borrow consisting predominantly of gravel with less than 15 percent passing the No. 200 sieve may be needed to provide limited access for rubber-tired equipment and to facilitate placement and compaction of structural fill and site grading fill when the subgrade is very moist to wet.

6. Geotechnical information relating to foundations, subgrade preparation and materials is included in the report

SCOPE

This report presents the results of a geotechnical investigation for the proposed fieldhouse and turf soccer field at Corner Canyon High School at 12943 South 700 East in Draper, Utah. The report presents the subsurface conditions encountered, laboratory test results and recommendations for foundations. The study was conducted in general accordance with our proposal dated May 21, 2024.

Field exploration was conducted to obtain information on the subsurface conditions at the site. Samples obtained from the field investigation were tested in the laboratory to determine physical and engineering characteristics of the on-site soil. Information obtained from the field and laboratory investigations was used to define conditions at the site and to develop recommendations for the proposed foundations.

This report has been prepared to summarize the data obtained during the study and to present our conclusions and recommendations based on the proposed construction and the subsurface conditions encountered. Design parameters and a discussion of geotechnical engineering considerations relating to construction are included in the report.

SITE CONDITIONS

The site consists of grass fields south of the Corner Canyon High School football field. The site topography, proposed fieldhouse and turf soccer field locations are shown on Figure 1.

The area of the proposed fieldhouse building is in the northeastern portion of the site. This area is relatively flat with a gentle slope down to the west.

The area of the proposed turf soccer field is in the southeastern portion of the site. The northern portion of this area is relatively flat with a gentle slope down to the west. The southern portion of this area has a fill, approximately 9 feet higher than the adjacent areas as indicated on Figure 1.

The western portion of the site is several feet lower in elevation than the eastern portion and slopes down to the south. This area appears to form a runoff basin.

The site is generally covered with sod.

The surrounding areas include a football field to the north, baseball field to the south and school and parking lot to the west. There is a trail and canal to the east. Residences and undeveloped areas are to the east of the canal.

FIELD STUDY

The field study was conducted on July 3, 8 and 9, 2024. Ten borings were drilled at the approximate locations indicated on Figure 1 using direct push for Borings B-7 and B-10 and 8-inch-diameter hollow-stem auger for the other borings. The borings were logged and soil samples obtained by representatives of AGEC. Logs of the subsurface conditions encountered in the borings are graphically shown on Figures 2 and 3 with legend and notes on Figure 4.

Cone penetration test (CPT) soundings were taken at the approximate location indicated on Figure 1 on July 3, 2024. The CPT results are included in the appendix.

DOUBLE RING INFILTROMETER TESTS

Double ring infiltrometer tests were conducted near Borings B-8 and B-9 in the lean clay at a depth of approximately 2 feet below the ground surface. The test depth was approximately 1½ to 2 feet above the measured subsurface water level.

An infiltration rate of 0.01 centimeters per hour was measured for both tests.

Test pits were excavated with a rubber-tired backhoe to facilitate the testing. The test pits were backfilled without significant compaction. The test pit backfill should be removed and replaced with properly compacted backfill where it will support proposed improvements.

SUBSURFACE CONDITIONS

Approximately 1 to 2 feet of fill was encountered in all but Borings B-7 and B-10, which encountered fill to depths of approximately 13 and 6 feet, respectively. Lean clay was encountered below the fill. The clay generally extends to the maximum depth of the borings, approximately 10½ to 20½ feet. The clay between depths of approximately 12 and 15½ feet in Boring B-10 has significant silt layers.

Cone Penetration Test CPT-1 was conducted near Boring B-4 and encountered predominantly clay to a depth of approximately 33 feet overlying predominantly sand to a depth of approximately 40 feet. Clay, silt and sand layers were encountered from a depth of approximately 40 feet to the maximum depth of the CPT, approximately 50 feet.

A description of the various soils encountered in the borings follows:

> Clay Fill - The fill consists of lean clay to sandy lean clay. It is slightly moist to moist, brown to gray and contains roots near the ground surface.

Laboratory tests conducted on a sample of the fill indicate it has a moisture content of 18 percent and a dry density of 103 pounds per cubic foot (pcf).

Gravel Fill - The fill below a depth of approximately 1 foot in Boring B-10 consists of poorly graded gravel. It is moist to wet and brown. A geotextile fabric was encountered at the top of this fill.

Lean Clay - The clay contains small to moderate amounts of sand and occasional silt and silty sand layers. It is soft to stiff, moist to wet and brown to gray with iron oxide staining.

Laboratory tests conducted on samples of the clay indicate it has natural moisture contents ranging from 26 to 34 percent and natural dry densities ranging from 84 to 101 pcf.

A sample of the clay tested in the laboratory was found to have an unconfined compressive strength of 2,490 pounds per square foot (psf).

Consolidation tests conducted on samples of the clay indicate that the soil will compress a small to moderate amount with the addition of light to moderate loads. Results of the consolidation tests are presented on Figures 5, 6 and 7.

Silt and Lean Clay - The silt and clay are interlayered. The interlayered soil is stiff, wet and grayish brown.

Results of the laboratory tests are summarized on Table I and are included on the logs of the borings.

SUBSURFACE WATER

Subsurface water was measured in the borings at depths of approximately 3.5 to 6.2 feet except in Boring B-7. Boring B-7 is higher in elevation than the other borings and the subsurface water was measured in this boring at a depth of approximately 15.5 feet. The water levels were measured on July 18, 2024.

Slotted PVC pipe was installed in the borings to facilitate future measurement of the free-water level. Fluctuations in the water level will occur over time. An evaluation of such fluctuations is beyond the scope of this report.

PROPOSED CONSTRUCTION

We understand that the proposed fieldhouse will be a prefabricated metal building with a slab-on-grade floor. Based on an estimate provided by the structural engineer, column loads are anticipated to not exceed 225 kips and wall loads to not exceed 1 kip per foot.

A turf soccer field is planned south of the fieldhouse. Details of the proposed construction were not provided at the time of this study. We anticipate that the field will be supported on compacted granular fill.

If the proposed construction or building loads are significantly different from those described above, we should be notified to reevaluate the recommendations given.

RECOMMENDATIONS

Based on the subsurface conditions encountered, laboratory test results and our understanding of the proposed construction, the following recommendations are given:

A. Site Grading

We anticipate that the main floor elevation of the field house will be within approximately 3 feet of existing grade. Site grading fill for the proposed building should be placed as soon as possible prior to constructing elements of the building that are sensitive to differential settlement. If the grade of the proposed building area is raised more than about 3 feet above existing grade, the fill should be placed well in advance to building construction so that the significant portion of the settlement due to the load of the fill occurs prior to construction.

1. <u>Subgrade Preparation</u>

   Approximately 1 to 13 feet of fill was encountered in the borings. Unsuitable fill, topsoil, debris and other deleterious materials should be removed from below areas of proposed buildings, turf fields, exterior slabs and other improvements sensitive to differential settlement.

   The upper soil has a high clay content and will be easily disturbed by construction equipment traffic when it is very moist to wet. Placement of approximately 1 to 2 feet of granular borrow consisting predominantly of gravel with less than 15 percent passing the No. 200 sieve may be needed to provide limited access for rubber-tired equipment and to facilitate placement and compaction of structural fill and site grading fill when the subgrade is very moist to wet. Consideration may be given to placing a support fabric between the natural soil and granular borrow.

2. Excavation

We anticipate that excavation at the site can be accomplished with typical excavation equipment. Excavation equipment with a flat cutting edge should be used when excavating for building foundations to minimize disturbance of the bearing soil.

Temporary excavations may be sloped at 1½ horizontal to 1 vertical or flatter. The temporary excavation slopes indicated assume that the excavation is dewatered. Flatter slopes may be needed if there is water seepage into the excavation.

Excavations that extend below the water level should be dewatered. The water level should be maintained below the base of the excavation during initial fill and concrete placement. Free-draining gravel with less than 5 percent passing the No. 200 sieve should be used for fill or backfill below the original water level. A filter fabric should be placed between the natural soil and free-draining gravel.

3. Materials

Listed below are recommendations for imported structural fill.

Fill to Support	Recommendations
Footings	Non-expansive granular soil Passing No. 200 Sieve < 35% Liquid Limit < 30% Maximum size 4 inches
Floor Slab (Upper 4 inches)	Sand and/or Gravel Passing No. 200 Sieve < 5% Maximum size 2 inches
Slab Support	Non-expansive granular soil Passing No. 200 Sieve < 50% Liquid Limit < 30% Maximum size 6 inches

Materials placed as fill to support structures should be non-expansive granular soil. The existing fill and natural soil consist predominantly of clay and are not recommended for us as structural fill within proposed building areas. The on-site soils may be considered for use as site grading fill, utility trench and wall backfill outside of building areas if the topsoil, organics, debris and other deleterious are removed or they may be used in landscape areas.

The on-site soil may require moisture conditioning (wetting or drying) prior to use as fill. Drying of the soil may not be practical during cold or wet periods of the year.

Free-draining gravel with less than 5 percent passing the No. 200 sieve should be used as fill below the original free water level.

4. Compaction

Compaction of materials placed at the site should equal or exceed the minimum densities as indicated below when compared to the maximum dry density as determined by ASTM D 1557.

Fill To Support	Compaction
Foundations	≥ 95%
Concrete Flatwork and Turf Field	≥ 90%
Pavement	
Base Course	≥ 95%
Fill Placed Below Base Course	≥ 90%
Landscaping	≥ 85%
Retaining Wall Backfill	85 - 90%

To facilitate the compaction process, fill should be compacted at a moisture content within 2 percent of the optimum moisture content.

The fill should be placed and compacted in thin enough lifts to allow for proper compaction. Fill placed for the project should be frequently tested for compaction during construction.

5. Drainage

The ground surface surrounding the proposed building and turf soccer field should be sloped away from the building and field in all directions. Roof downspouts and drains should discharge beyond the limits of backfill.

B. Foundations

1. Bearing Material

With the proposed construction and the subsurface conditions encountered, the proposed building may be supported on spread footings bearing on the undisturbed natural soil or on compacted structural fill extending down to the undisturbed natural soil.

Structural fill placed below footings should extend down to the undisturbed natural soil and out away from the edge of footings at least a distance equal to the depth of fill beneath footings.

Topsoil, organics, unsuitable fill and other deleterious materials should be removed from below proposed foundation areas.

2. Bearing Pressure

Spread footings bearing on the undisturbed natural soil or on compacted structural fill may be designed using an allowable net bearing pressure of 1,500 psf. Footings bearing on at least 2 feet of compacted structural fill may be designed for an allowable net bearing pressure of 2,500 psf.

3. Settlement

We estimate that total settlement for foundations designed as indicated above will be less than 1 inch. Differential settlement is estimated to be less than ¾ inch.

4. Temporary Loading Conditions

The allowable bearing pressure may be increased by one-half for temporary loading conditions such as wind or seismic loads.

5. Frost Depth

Exterior footings and footings beneath unheated areas should be placed at least 30 inches below grade for frost protection.

6. Foundation Base

The base of foundation excavations should be cleared of loose or deleterious material prior to structural fill or concrete placement.

7. Construction Observation

A representative of the geotechnical engineer should observe footing excavations prior to structural fill or concrete placement.

C. Concrete Slab-on-Grade

1. Slab Support

Concrete slabs may be supported on the undisturbed natural soil or on compacted structural fill extending down to the undisturbed natural soil.

Topsoil, organics, debris, unsuitable fill and other deleterious materials should be removed from below proposed floor slab areas.

2. Underslab Sand and/or Gravel

A 4-inch layer of free draining sand and/or gravel (less than 5 percent passing the No. 200 sieve) should be placed below the concrete slabs for ease of construction and to promote even curing of the slab concrete.

3. Vapor Barrier

A vapor barrier should be placed under the concrete floor if the floor will receive an impermeable floor covering. The barrier will reduce the amount of water vapor passing from below the slab to the floor covering.

D. Lateral Earth Pressure

1. Lateral Resistance for Footings

Lateral resistance for spread footings placed the natural soil or on compacted structural fill is controlled by sliding resistance between the footing and the structural fill or natural soil. A friction value of 0.35 may be used in design for ultimate lateral resistance. The passive resistance of the soil adjacent foundations may be used in design

2. Subgrade Walls and Retaining Structures

The following equivalent fluid weights are given for the design of subgrade walls and retaining structures. The active condition is where the wall moves away from the soil. The passive condition is where the wall moves into the soil and the at-rest condition is where the wall does not move. The values listed below assume a horizontal surface adjacent the wall.

Soil Type	Active	At-Rest	Passive
Clay & Silt	50 pcf	65 pcf	250 pcf
Sand & Gravel	40 pcf	55 pcf	300 pcf

3. Seismic Conditions

Under seismic conditions, the equivalent fluid weight should be increased by 45 and 30 pcf for active and at-rest conditions, respectively, and decreased by 45 pcf for the passive condition. This assumes a peak horizontal ground acceleration of 0.75g which represents a 2 percent probability of exceedance in a 50-year period.

4. Safety Factors

The values recommended above assume mobilization of the soil to achieve the soil strength under active and passive conditions. Conventional safety factors used for structural analysis for such items as overturning and sliding resistance should be used in design.

E. Seismicity, Faulting and Liquefaction

1. Seismicity

Listed below is a summary of the site parameters that may be used with the 2021 International Building Code.

Description	Value[1]
Site Class	D[2]
S_s - MCE_R ground motion (period = 0.2s)	1.49g
S_1 - MCE_R ground motion (period = 1.0s)	0.55g
F_a - Site amplification factor at 0.2s	1.0
F_v - Site amplification factor at 1.0s	1.75
PGA - MCE_G peak ground acceleration	0.68g
PGA_M - Site modified peak ground acceleration	0.75g

[1] *Values obtained from information provided by the Applied Technology Council at https://hazards.atcouncil.org*

[2] *Site Class D was selected based on the subsurface conditions to the depth investigated and our understanding of the geology of the area.*

2. Faulting

There are no mapped active faults extending through the project site. The closest mapped fault, which is considered active, is the Wasatch Fault, which has mapped traces extending approximately 1.5 miles east of the site (Utah Geological Survey, 2024).

3. Liquefaction

The site is located in an area mapped as having a "moderate" liquefaction potential (Salt Lake County, 2002). The soil type most susceptible to liquefaction during a large magnitude earthquake is loose, clean sand. The liquefaction potential tends to decrease with an increase in fines content and density.

Based on subsurface conditions encountered, liquefaction is not considered to be a significant hazard at this site. There are some thin layers that may be susceptible to liquefaction. Our analysis indicates that liquefaction-induced settlement is expected to be less than ½ inch and no lateral spread is anticipated.

F. Water Soluble Sulfates

One sample of the natural soil was tested in the laboratory for water soluble sulfate content. The test results indicate there is less than 0.1 percent water soluble sulfate in the sample tested. Based on the results of the test and published literature, the soil possesses a negligible sulfate attack potential on concrete. No special cement type is required for concrete placed in contact with the soil.

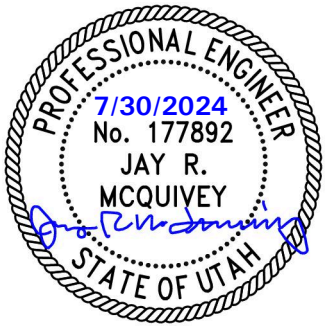
G. Preconstruction Meeting

A preconstruction meeting should be held with representatives of the owner, project architect, geotechnical engineer, general contractor, earthwork contractor and other design team members to review construction plans, specifications, methods and schedule.

LIMITATIONS

This report has been prepared in accordance with generally accepted soil and foundation engineering practices in the area for the use of the client for design purposes. The conclusions and recommendations included within the report are based on the information obtained from the borings drilled and CPT soundings at the approximate locations indicated on Figure 1, the results of laboratory tests and our experience in the area. Variations in the subsurface conditions may not become evident until additional exploration or excavation is conducted. If the subsurface conditions, proposed construction or groundwater level is found to be significantly different from what is described above, we should be notified to reevaluate the recommendations given.

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.



Jay R. McQuivey, P.E.

Reviewed by Douglas R. Hawkes, P.E., P.G.

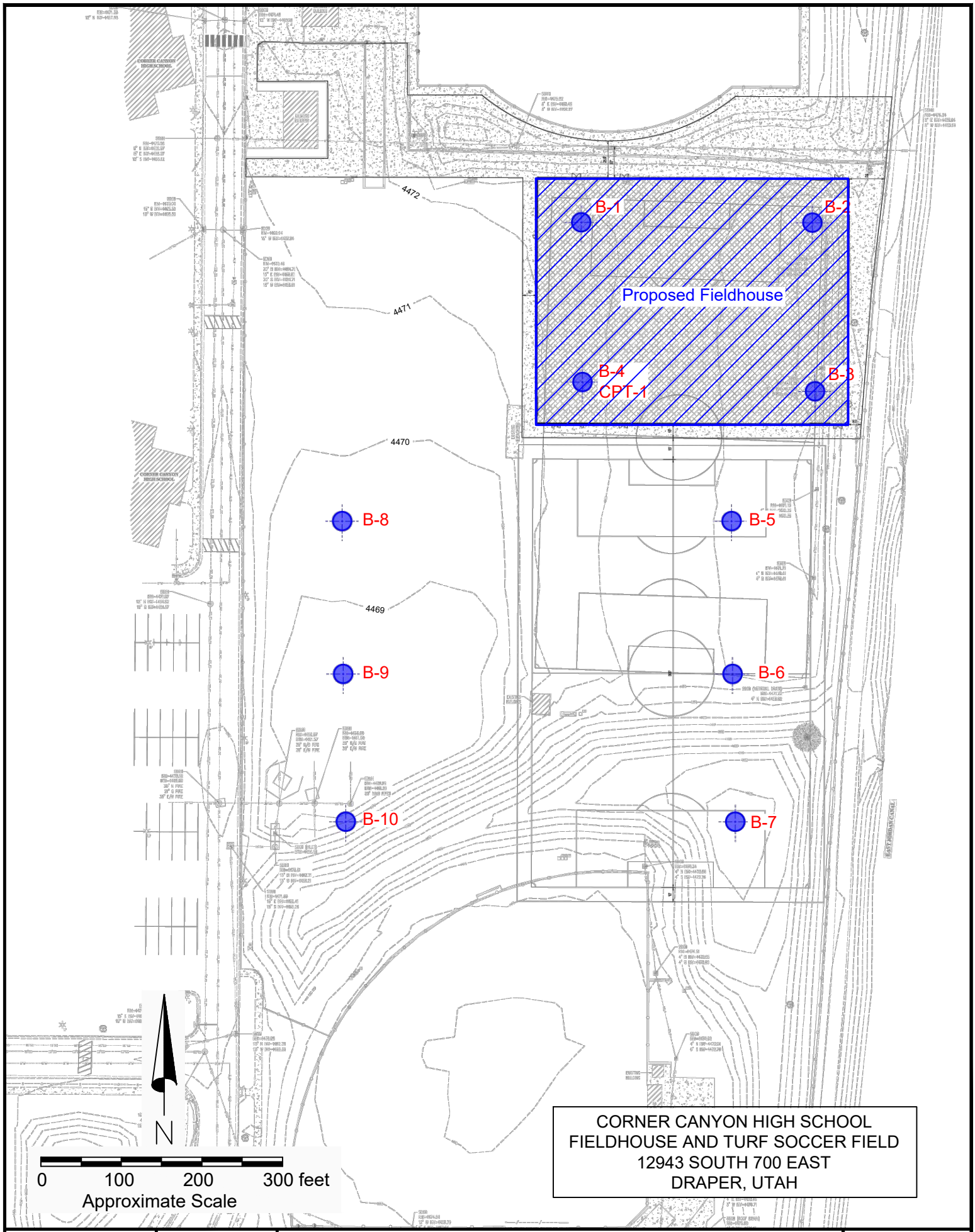
JRM/bw

REFERENCES

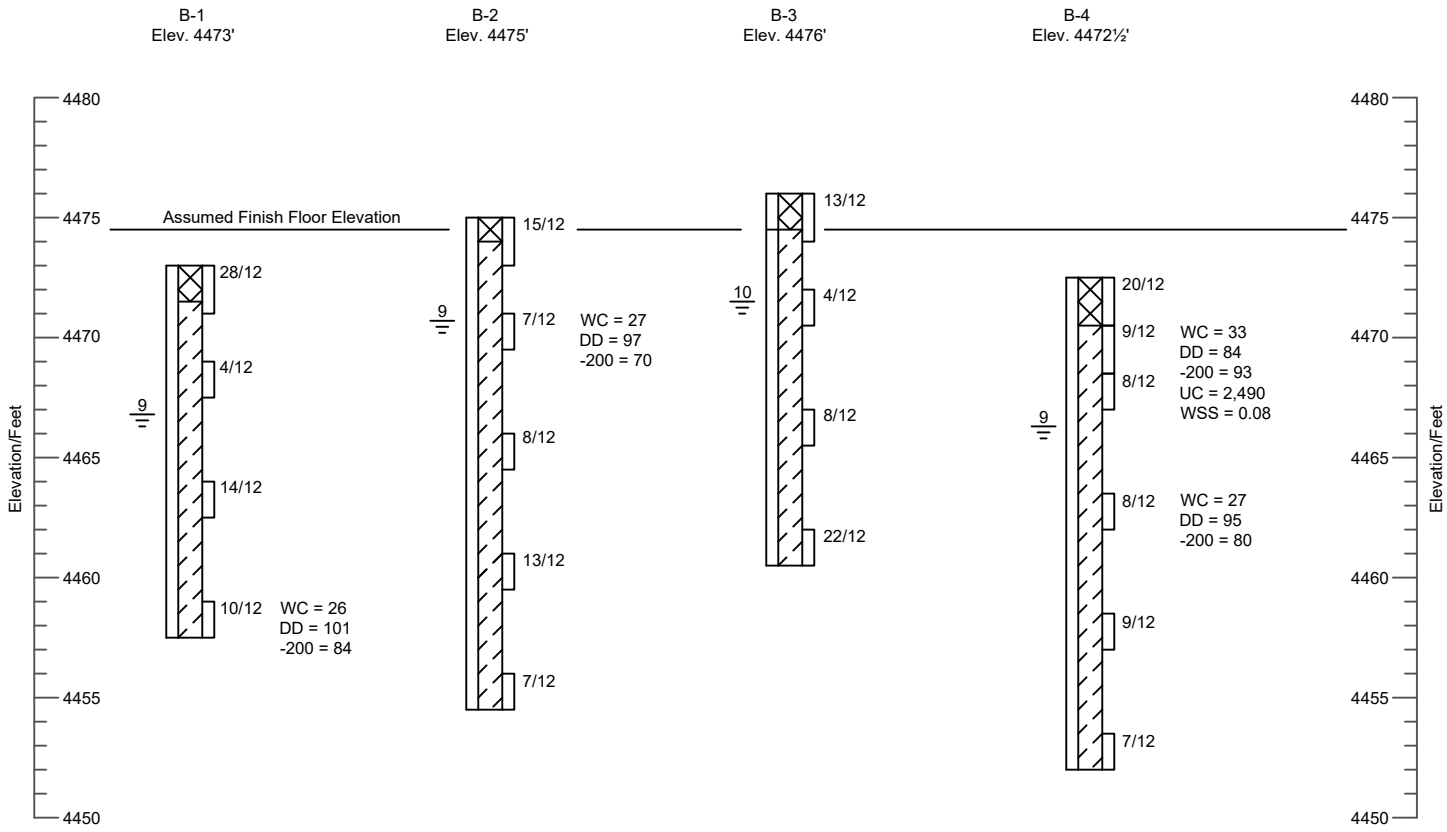
International Code Council, 2020; 2021 International Building Code, Falls Church, Virginia. City, Utah.

Salt Lake County, 2002; Surface Rupture and Liquefaction Potential Special Study Areas Map, Salt Lake County, Utah, adopted March 31, 1989, updated March 2002, Salt Lake County Public Works - Planning Division, 2001 South State Street, Salt Lake City, Utah.

Utah Geological Survey, 2024; Utah Geological Hazard Portal accessed July 11, 2024 at https://geology.utah.gov/apps/hazards/.



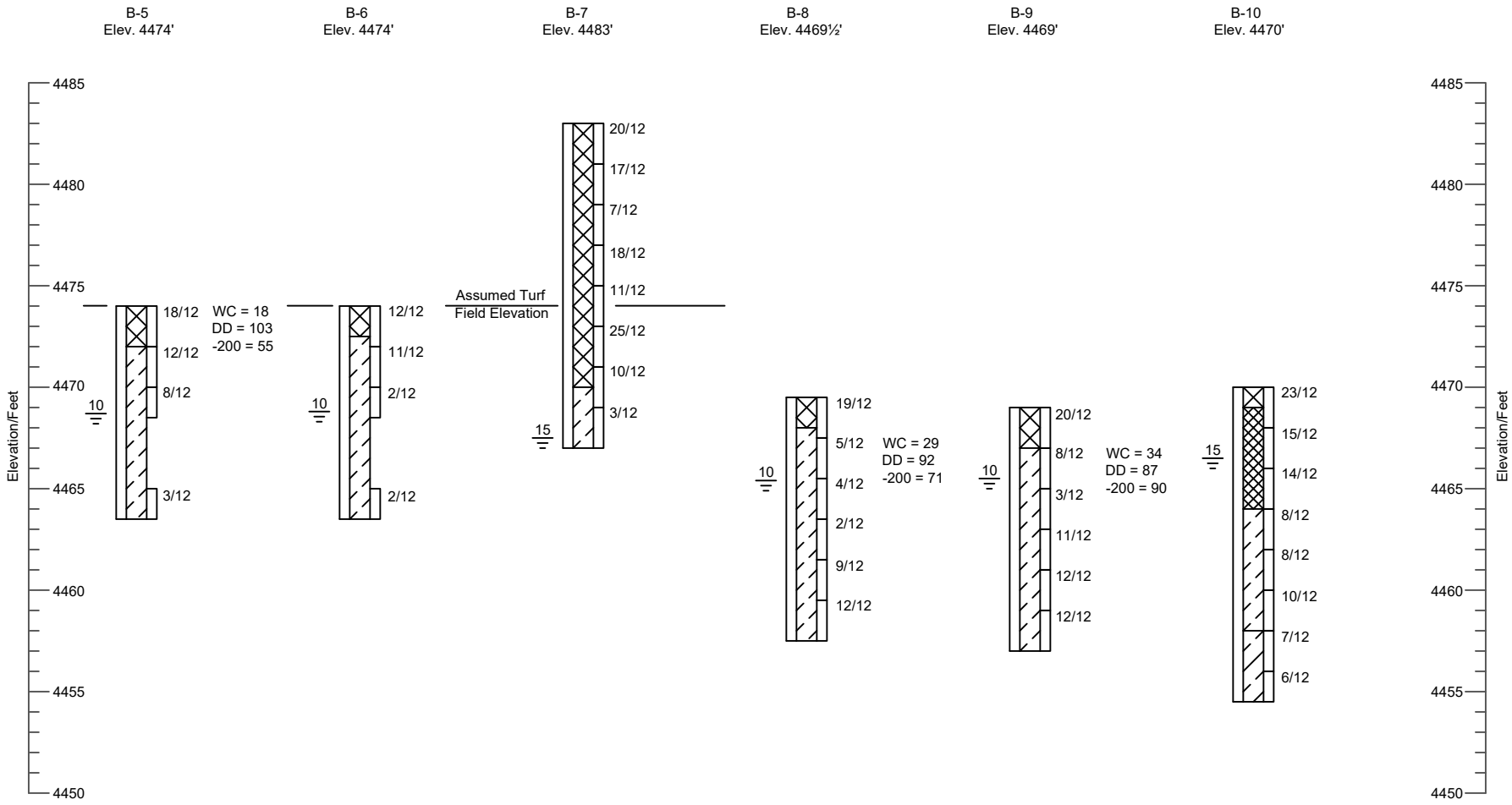
1240393	AGEC	Exploratory Boring and CPT Locations	Figure 1



Approximate Vertical Scale 1" = 8'

See Figure 4 for Legend and Notes

1240393	AGEC	Exploratory Boring Logs	Figure 2



Approximate Vertical Scale 1" = 8'

See Figure 4 for Legend and Notes

1240393	AGEC	Exploratory Boring Logs	Figure 3

LEGEND:

Fill; lean clay to sandy lean clay, slightly moist to moist, brown to gray, roots near surface.

Fill; poorly graded gravel, moist to wet, brown, geotextile fabric at top.

Lean Clay (CL); small to moderate amount of sand, occasional silt and silty sand layers, soft to stiff, moist to wet, brown to gray, iron oxide staining.

Silt and Lean Clay (CL/ML); interlayered, stiff, wet, grayish brown.

10/12 California Drive sample taken. The symbol 10/12 indicates that 10 blows from a 140-pound automatic hammer falling 30 inches were required to drive the sampler 12 inches.

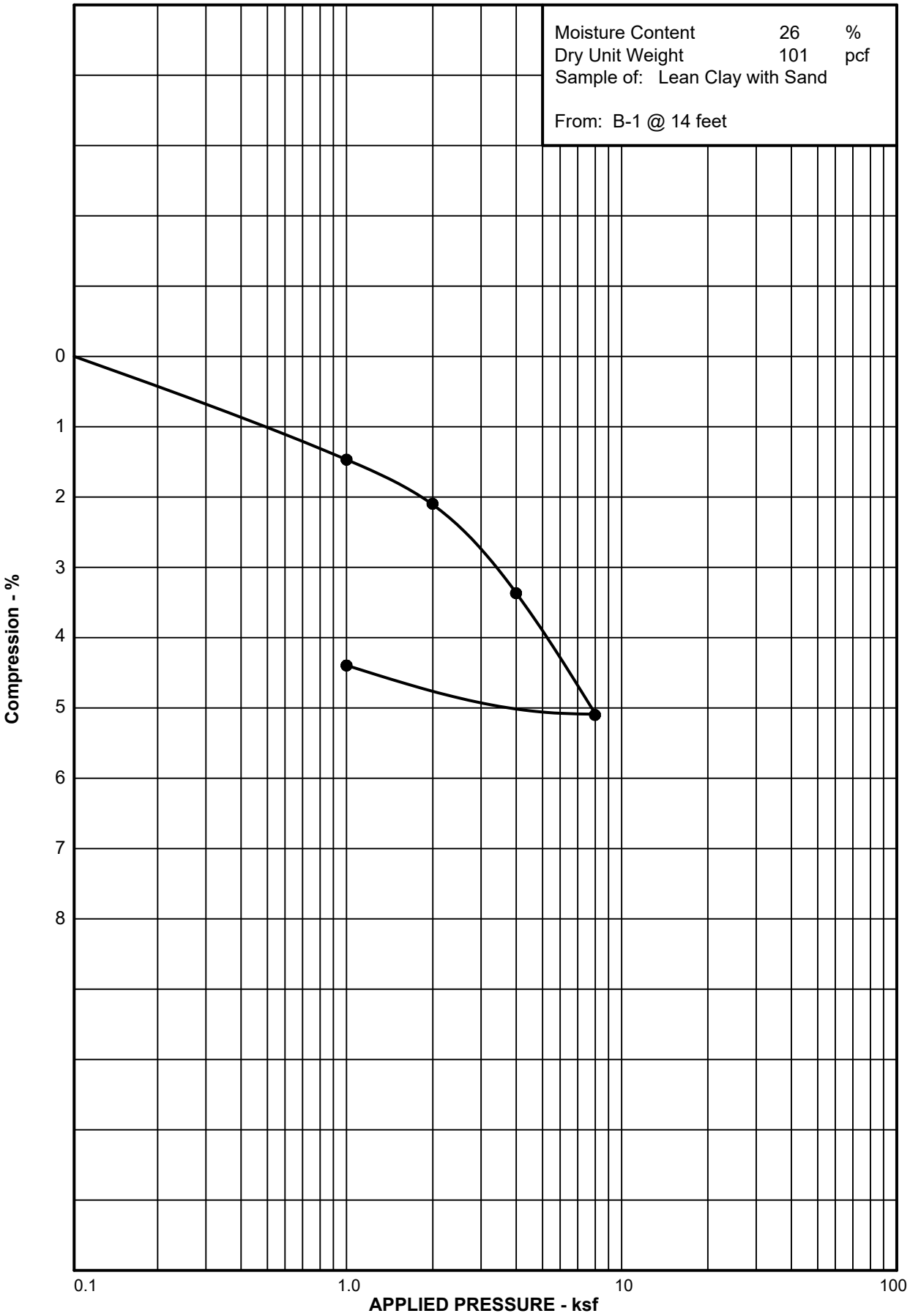
Indicates slotted 1½-inch PVC pipe installed in the boring to the depth shown.

9 Indicates the depth to free water and number of days after drilling the measurement was taken.

NOTES:

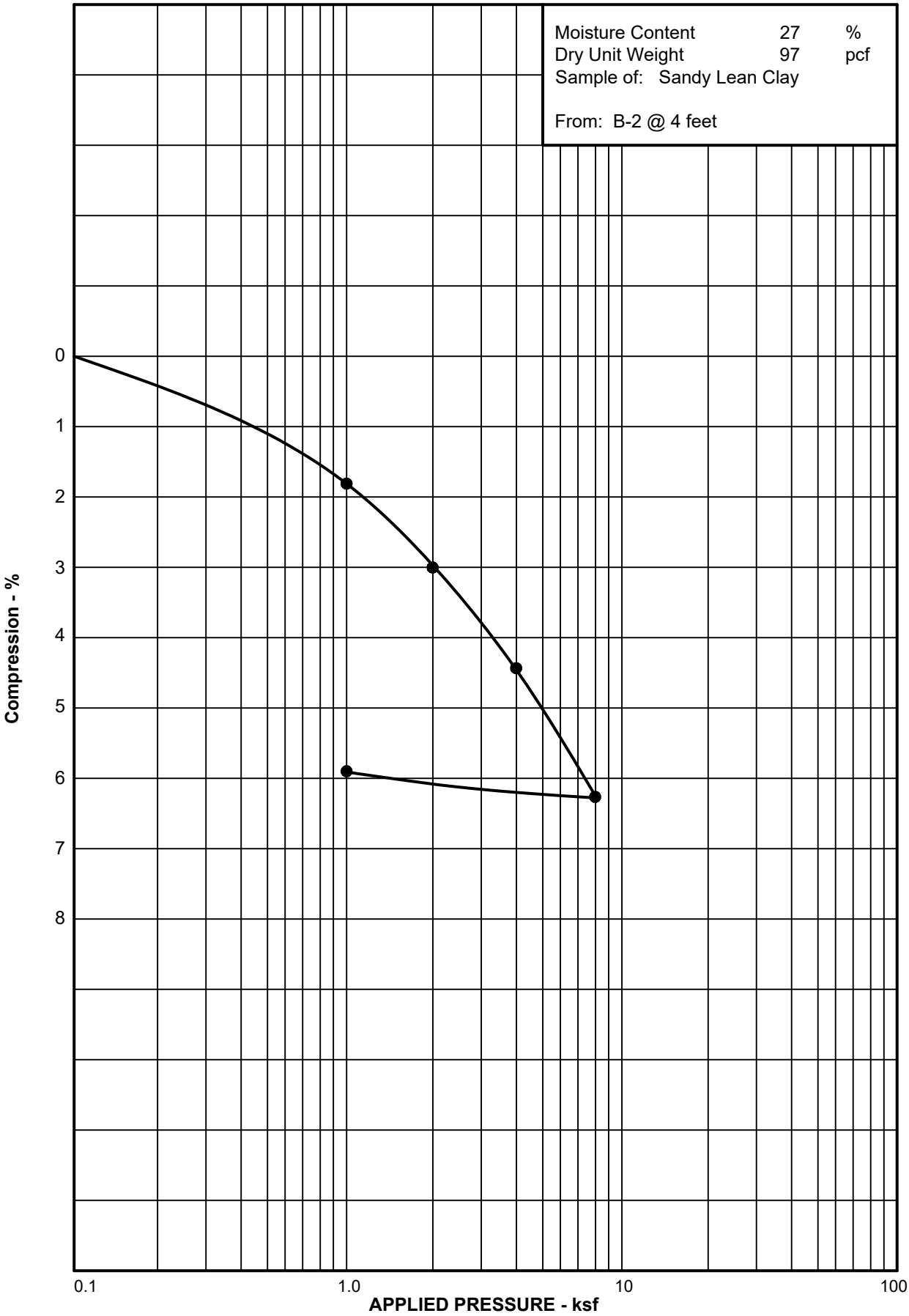
1. Borings B-7 and B-10 were drilled on July 3, 2024 using direct push. The other borings were drilled on July 8 and 9, 2024 with 8-inch-diameter hollow-stem auger.
2. The location of the borings were measured approximately by pacing from features shown on the site plan provided.
3. The elevations of the borings were determined by interpolating between contours shown on Figure 1.
4. The boring locations and elevations should be considered accurate only to the degree implied by the method used.
5. The lines between materials shown on the boring logs represent the approximate boundaries between material types and the transitions may be gradual.
6. The water level readings shown on the logs was made at the time and under the conditions indicated. Fluctuations in the water level will occur with time.
7. WC = Water Content (%);
   DD = Dry Density (pcf);
   -200 = Percent Passing the No. 200 Sieve;
   UC = Unconfined Compressive Strength (psf);
   WSS = Water Soluble Sulfates (%).

Applied Geotechnical Engineering Consultants, Inc.



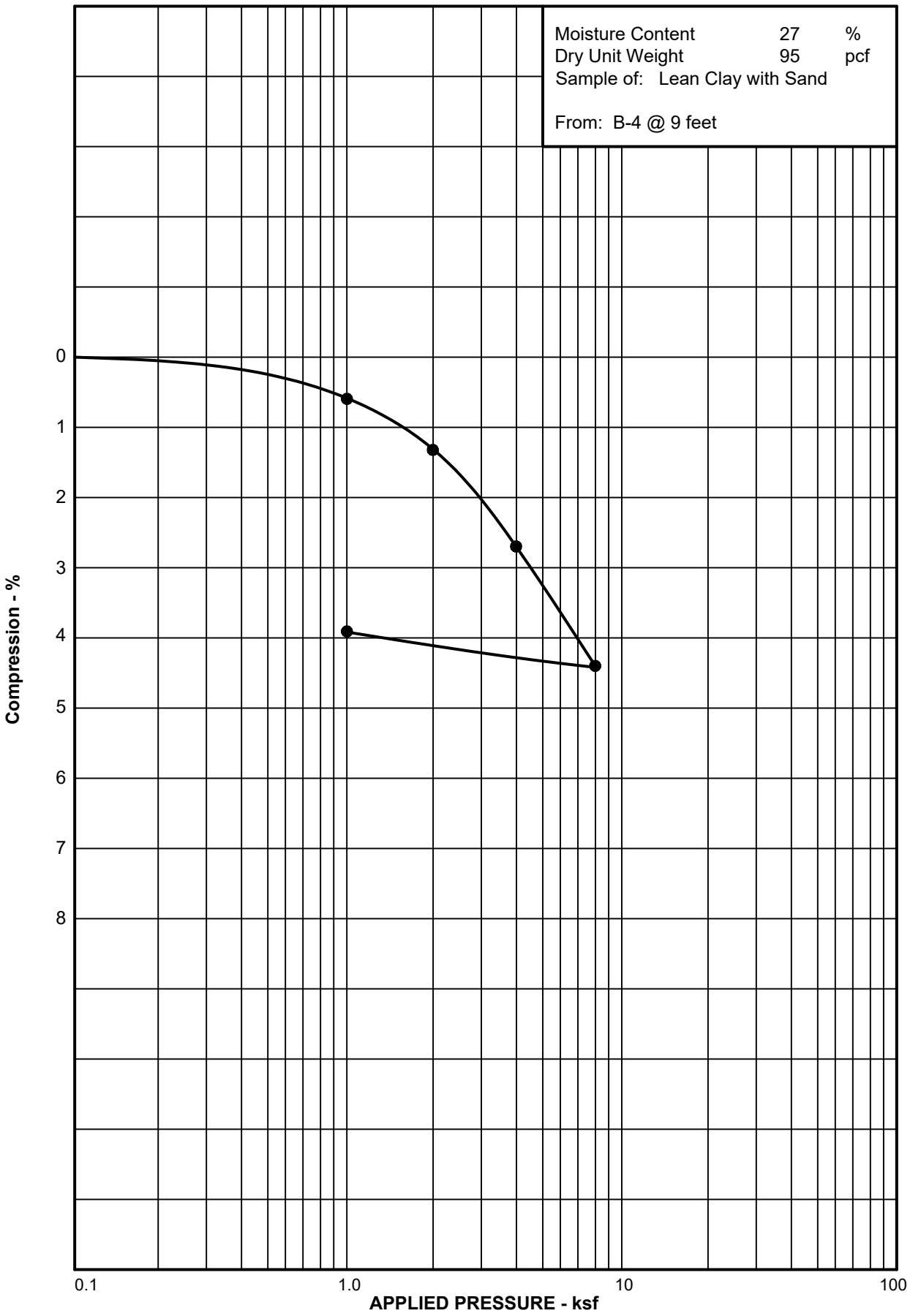
Project No. 1240393 **CONSOLIDATION TEST RESULTS** **Figure 5**

Applied Geotechnical Engineering Consultants, Inc.



Project No. 1240393 **CONSOLIDATION TEST RESULTS** **Figure 6**

Applied Geotechnical Engineering Consultants, Inc.



Project No. 1240393 **CONSOLIDATION TEST RESULTS** **Figure 7**

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

TABLE I
SUMMARY OF LABORATORY TEST RESULTS

PROJECT NUMBER: 1240393

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (PCF)	GRADATION			ATTERBERG LIMITS		UNCONFINED COMPRESSIVE STRENGTH (PSF)	WATER SOLUBLE SULFATE (%)	SAMPLE CLASSIFICATION
BORING	DEPTH (FEET)			GRAVEL (%)	SAND (%)	SILT/ CLAY (%)	LIQUID LIMIT (%)	PLASTICITY INDEX			
B-1	14	26	101			84					Lean Clay with Sand
B-2	4	27	97			70					Sandy Lean Clay
B-4	2	33	84			93			2,490	0.08	Lean Clay
	9	27	95			80					Lean Clay with Sand
B-5	0	18	103			55					Fill; Sandy Lean Clay
B-8	2	29	92			71					Lean Clay with Sand
B-9	2	34	87			90					Lean Clay

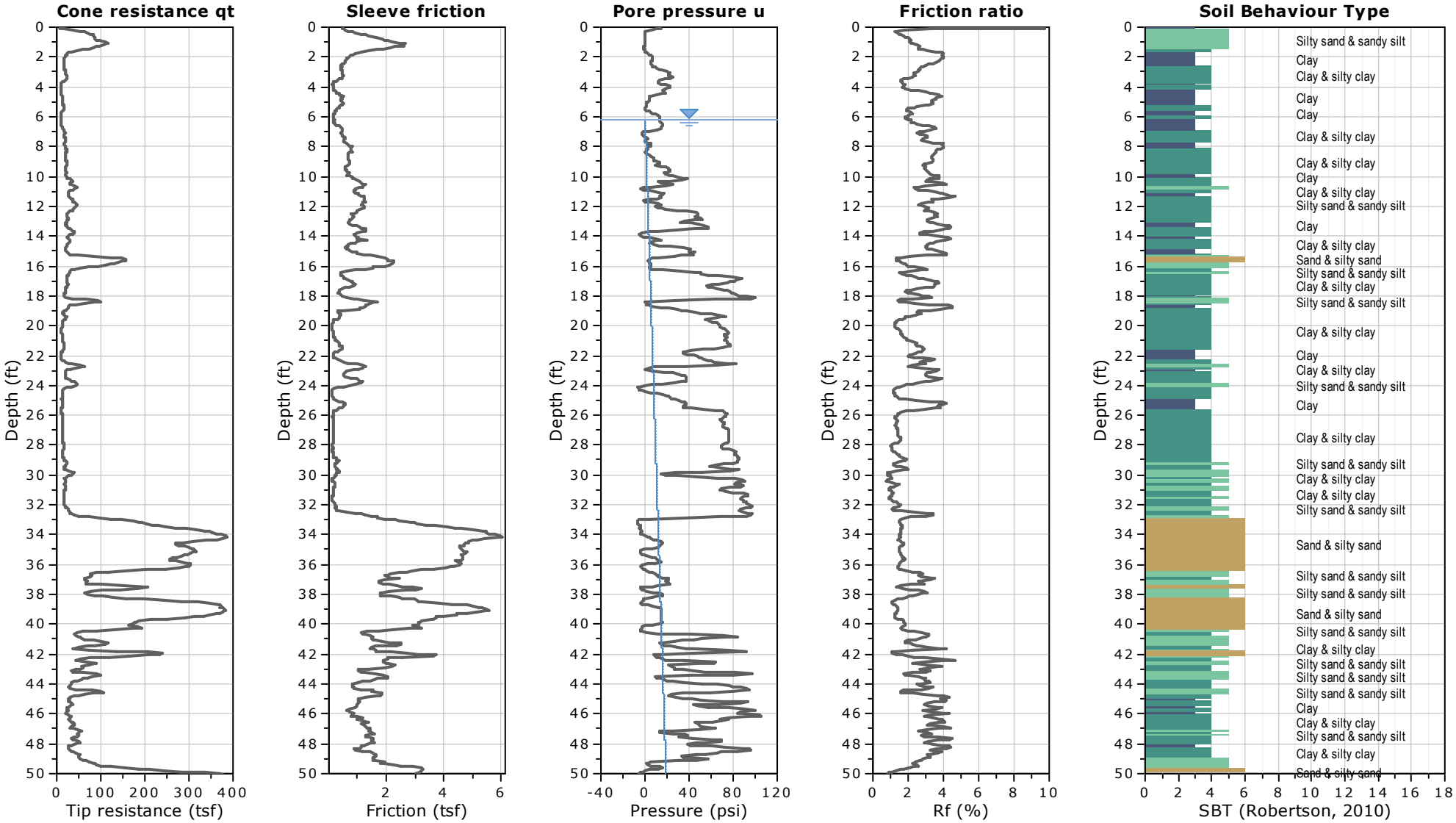
APPENDIX

CPT RESULTS

600 W. Sandy Parkway
Sandy, UT 84070

CPT: CPT-1
Total depth: 50.07 ft, Date: 7/3/2024
Surface Elevation: 4472.50 ft
Coords: X:0.00, Y:0.00
Cone Type: Nova
Cone Operator: Nathan Salazar and Jason Staker

Project: 1240393
Location: Corner Canyon High School Fieldhouse



STRUCTURAL DESIGN CRITERIA

Risk Category: III

Mezzanine(s):
- Dead Load: DL = 65 PSF
- Live Load(s):
  - Corridors & Lobbies: LL = 80 PSF
  - Restrooms: LL = 60 PSF +15 PSF Partitions
  - Office: LL = 50 PSF +15 PSF Partitions
  - Light Storage: LL = 125 PSF
  - Assembly: LL = 100 PSF

Roof:
- Dead Load: DL = 5 PSF (Assumed & to be Verified by PEMB Designer)
  Collateral = 10 PSF
- Ground Snow Load: Pg = 32 PSF
- Flat Roof Snow Load: Pf = 25 PSF
- Snow Exposure Factor: Ce = 1.0
- Snow Importance Factor: I = 1.1
- Thermal Factor: Ct = 1.0
- Rain Intensity: i = 1.74 In/hr (9 PSF)

Wind:
- Basic Wind Speed: V = 109 MPH (3 Sec Gust)
- Importance Factor: I = 1.0
- Wind Exposure: "C"
- Internal Pressure Coeff: GCpi = 0.18(±)
- Component and Cladding Pressure: P = See Table Below

Components And Cladding Wind Pressures (PSF) Ultimate Design Loads

Tributary Area	Typical Conditions Positive Pressure	Typical Conditions Negative Pressure	Corner Conditions Positive Pressure	Corner Conditions Negative Pressure
10 SF	+27 PSF	-29 PSF	+27 PSF	-36 PSF
50 SF	+24 PSF	-26 PSF	+24 PSF	-30 PSF
100 SF	+23 PSF	-25 PSF	+23 PSF	-28 PSF
500 SF	+20 PSF	-22 PSF	+20 PSF	-22 PSF

Seismic:
- Procedure: Equivalent Lateral Force
- Site Class: D
- Importance Factor: I = 1.25
- Seismic Design Category: D
- Spectral Response Accelerations: Ss = 1.49, S1 = 0.55
- Spectral Response Coeff: SDS = 0.99, SD1 = 0.64
- Basic Seismic-Force-Resisting System:
- Pre-Engineered Metal Building:
  - PEMB Design By Others
  - Steel Ordinary Moment Frames
  - R=3.5, Omega=3.0, Cd=3.0, Cs=0.354
  - Steel Ordinary Concentrically Braced Frames
  - R=3.25, Omega=2.0, Cd=3.25, Cs=0.381
- Mezzanine:
  - Steel Ordinary Concentrically Braced Frames
  - R=3.25, Omega=2.00, Cd=3.25, Cs=0.381
  - Seismic Base Shear = 249 KIPS

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PERMITTED STORY DRIFTS OF PEMB STRUCTURE

Level	Story Height	Elastic	Inelastic
MEZZANINE	15' - 4"	1.06"	2.76"
LOW ROOF	18' - 8"	1.29"	3.36"
HIGH ROOF	39' - 0"	2.70"	7.02"

Soils:
Net Allowable Soil Pressure = 1500 PSF, per Soils Report by AGEC, Project Number 1240393, Dated July 30, 2024.

GENERAL
1. All details, sections, and notes shown on the drawings are intended to be typical and shall apply to similar situations elsewhere unless noted or shown otherwise. Notes and details on drawings shall take precedence over these General Notes. General Notes shall take precedence over the Specifications.
2. Refer to the Specifications for information not covered by these General Notes or the Structural Drawings.
3. See the Architectural Drawings for dimensions, doors, windows, non-bearing interior and exterior walls, elevations, slopes, stairs, curbs, drains, recesses, depressions, railings, waterproofing, finishes, chamfers, kerfs, etc.
4. All design, construction, and inspection shall be in conformance with the 2021 International Building Code (IBC) including all referenced standards therein.
5. The Contractor shall verify all dimensions and conditions at the site.
6. All omissions or conflicts between the various elements of the working drawings and/or Specifications shall be brought to the attention of the Architect and/or Structural Engineer before proceeding with any work involved.
7. The Structural Drawings shall be used in conjunction with the entire set of Construction Drawings. This means that detailing and shop drawing production for structural elements will require information that is contained on the Architectural and/or other consultants' drawings. The Structural Drawings may not show all dimensions, slopes, elevations, depressions, mechanical housekeeping pads, etc. The Contractor shall verify all dimensions that are shown on the Structural Drawings with the Architectural and/or other consultants' drawings. Any discrepancies shall be brought to the attention of the Architect and/or Structural Engineer before proceeding with any work involved.
8. Drawings indicate the finished product. They do not indicate a method of construction. Contractor shall take all precautions necessary to protect the structure during construction. Such precautions shall include, but not be limited to, bracing, shoring for construction equipment, etc.
9. The Contractor shall be responsible for compensating the Owner for any changes made as a result of a deviation from the Contract Documents, deviation from the Specifications, faulty materials, or faulty workmanship.
10. Options are for the Contractor's convenience. The Contractor shall be responsible for coordinating all required design changes. Cost associated with any design work initiated by the option shall be borne by the Contractor.
11. Contractor shall be responsible for safety and protection within and adjacent to the job site.
12. Temporary shoring and bracing shall be provided wherever necessary to support all loads to which the structure may be subjected including wind and soil loads. Such bracing shall be left in place as long as may be required for safety or until all structural elements are complete.
13. During and after construction the Contractor and/or Owner shall keep loads on the structure within the limits of the design loads.
14. Observation visits to the job site by field representatives of Calder Richards Consulting Engineers shall neither be construed as inspection nor approval of construction.
15. Sizes, locations, and anchorages of equipment shall be verified in the field with equipment manufacturers (suppliers) prior to placing concrete or fabricating steel.
16. Thermal or moisture protection, furnishings, doors, windows, equipment, mechanical, electrical, finishes, siding, paneling, and veneers are not part of the responsibility of the Structural Engineer.

STRUCTURAL DEFERRED SUBMITTALS

Contractor shall submit Drawings and Calculations for the following items bearing the seal of a Professional Engineer Licensed in the State of the project to Architect/Engineer before submitting to jurisdiction for review and permitting.

Items:
1. Design-Build Stairs, Ladders, and Railings
2. Attachment of Mechanical Unit to Support
3. Cold Formed Metal Studs
4. Pre-Engineered Metal Building

SHOP DRAWING SUBMITTALS
1. Contractor shall review and verify all Shop Drawings to ensure they comply with the requirements of the Contract Documents. Engineer will review the Shop Drawings for general conformance with the design concept. This review by the Engineer shall not be construed as approval. The Contractor shall verify all shop drawing dimensions with Structural and Architectural plans and details.
2. Provide Shop Drawings to the Engineer for review for the following, but not limited to:
   A. Concrete Foundation Reinforcement
   B. Wall Reinforcement
   C. Deck Reinforcement
   D. Steel Decking
   E. Concrete Mix Design
   F. Structural Masonry Elements
   G. Structural Steel
   H. Pre-Engineered Metal Building
   I. Design-Build Stairs, Ladders, and Railings
3. Refer to the Architectural Drawings for Shop Drawing submittals required for non-structural elements.

STRUCTURAL OBSERVATION

Calder Richards Consulting Engineers shall be notified by the Contractor 5 business days before the completion of the items listed in this section so that Structural Observation may be scheduled and performed in accordance with IBC Section 1704.6. The observations will be performed at the discretion of Calder Richards Consulting Engineers.

1. After forms, reinforcement, anchor bolts, and embeds in place for footings (before pouring).
2. After forms, reinforcement, anchor bolts, and embeds in place for foundation walls (before pouring).
3. After foundation walls poured and before placing masonry.
4. After masonry block and reinforcement in place for first lift (before grouting).
5. After steel floor framing and decking in place (before covering and pouring concrete over decking).
6. After steel roof framing and decking in place (before covering).
7. Steel connections of the lateral-force-resisting system.

FOOTINGS
1. All footings shall bear on original undisturbed earth or on engineered fill down to undisturbed earth compacted to 95% of maximum relative density based on ASTM D1557. Such fill shall be placed in layers not to exceed 6" in depth after compaction and shall extend down to in-situ granular soils. Unless noted otherwise, follow all recommendations in the soils report.
2. Footing elevations shown on plan are top of footings and are minimum depth. Different or unusual conditions shall be reported to the Architect and/or Engineer before proceeding.
3. Exterior wall footings shall bear at a minimum depth of *2'-6"* below finished exterior grade to achieve frost depth requirements.
4. NO footings shall be placed in water or on frozen ground.
5. Any soil condition encountered during excavation that is contrary to the conditions used for design of footings as outlined in the referenced Soils Report or on the drawings shall be brought to the attention of the Architect before proceeding.
6. DO NOT back fill behind foundation walls until top and bottom decks have been completed and attained their design strengths.
7. Back fill both sides of foundation walls at same time to prevent overturning.
8. Wall footings, where not shown otherwise, shall be 12" thick with an 8" spread each side of wall and provided with (1) #5 x continuous at bottom for each 8" of footing width.
9. Where a pipe passes through an interior or exterior foundation wall, step the footing down to pass below pipe and then step back up to indicated elevation. Provide pipe sleeve through foundation wall.
10. All footing excavations shall be examined by a Geotechnical Engineer for verification of adequate bearing conditions before placing concrete.

REINFORCING STEEL
1. All reinforcement shall be detailed and placed in accordance with ACI Detailing Manual 315R (Current Version) and ACI Standard 318 (Current Version).
2. Reinforcing steel shall be ASTM A615 Grade 60.
3. Welded wire fabric shall conform to ASTM A185. Lap one mesh tie.
4. All reinforcement shall be securely tied and held in place.
5. Provide accessories recommended by the CRSI necessary to properly support reinforcing at positions shown on plans.
6. Reinforcing bars that are to be welded, including Deformed Bar Anchors (DBA) shall comply with ASTM A706 or another weldable grade and shall be welded in accordance with the AWS recommendations.
7. All continuous reinforcement shall terminate with a 90 degree turn or a separate corner bar. All splices shall have a minimum lap or embedment per Reinforcing Schedule.
8. Where the length of a bar is given and it is to be hooked, the hook shall be in addition to the length given, unless shown otherwise.
9. Cover to main reinforcement from adjacent surfaces shall be as follows unless shown otherwise:
   A. Cast against and permanently in contact with ground .... 3"
   B. Exposed to weather or in contact with ground (#6 and larger) .... 2"
   C. Exposed to weather or in contact with ground (#5 and smaller) .... 1-1/2"
   D. Not exposed to weather or in contact with ground (slabs, joists, and walls #11 and smaller) .... 3/4"
   E. Not exposed to weather or in contact with ground (beams, columns, pedestals and tension ties)........ 1-1/2"
   F. In all cases minimum cover shall not be less than the diameter of adjacent bars.
10. Prior to fabrication and placement, Shop Drawings for all reinforcing steel shall be reviewed by the Structural Engineer.

CONCRETE
1. Concrete shall attain the following minimum compressive strengths at 28 days:
   - Footings .... 3500 PSI
   - Foundation Walls .... 4000 PSI
   - Interior Slabs on Grade .... 4000 PSI
   - Suspended Slabs .... 4000 PSI
2. The various concrete items are assigned to the following Exposure Categories and Classes per Section 19.3 of ACI 318 (Current Version):
   - Footings F1, S0, W0, C1
   - Foundation Walls F1, S0, W0, C1
   - Interior Slabs on Grade F0, S0, W0, C1
   - Suspended Slabs F0, S0, W0, C1

   See Table 19.3.1.1 of ACI 318 (Current Version) for explanations of Categories and Classes listed above.
3. A Statement of Mix Design for all concrete shall be submitted to and reviewed by the Structural Engineer prior to commencing work. All mix designs shall incorporate requirements and restrictions found in Section 19.3 & Tables 19.3.1.1, 19.3.2.1, and 19.3.3.1 of ACI 318 (Current Version). If two or more requirements are in conflict, the more restrictive requirement shall be followed.
4. All concrete work shall be placed, cured, stripped, and protected as directed by the specifications and ACI Standards and Practices.
5. Before concrete is poured, check with all trades to ensure proper placement of all openings, sleeves, curbs, conduits, bolts, inserts, etc, relative to work. NO aluminum conduit nor product containing aluminum nor any other material injurious to concrete shall be embedded in concrete.
6. Continuous top and bottom bars in walls over openings shall be spliced as follows:
   A. Top bars - At mid-span
   B. Bottom bars - Over support
7. Where openings larger than 16" in any direction occur in walls or slabs, provide same size additional, full length reinforcing at each side of opening equal to 1/2 the number of bars interrupted by the opening. Space additional bars at 4 x bar diameter.
8. Construction Joints and Control Joints:
   A. Refer to drawings for typical construction joint details.
   B. Provide a continuous tool-roughened surface at top of all walls and footings, unless noted otherwise.
   C. All horizontal and vertical construction joints shall have a continuous 2"x4" keyway along the joint, unless noted otherwise, see details.
   D. Provide reinforcing dowels to match the member reinforcing at the joint, unless noted otherwise.
   E. Slabs and beams shall not have joints in horizontal plane.
   F. Construction joints for slabs on steel deck shall not exceed a distance of 80'-0" in any direction.
   G. Control joints shall be complete within 12 hours of concrete placement.
9. All slabs on grade shall be placed in alternate panels with a maximum width of 90 times the slab thickness in any direction. Construction joints shall not exceed 125'-0" OC in any direction; refer to typical details on drawings. Unless otherwise noted, slabs on grade shall be 4" thick and shall be reinforced with 6x6-W1.4xW1.4 welded wire fabric, centered in slab.
10. Provide a #3 nosing bar in all stair treads.
11. Forms, screeds, and beams supporting suspended concrete shall be cambered 1/4 inch per 10 feet of span to compensate for Dead Load deflections.
12. Where exterior slabs on grade abut walls or columns, provide 3/8" pre-formed expansion joint with sealant.
13. Where interior masonry walls do not bear on a footing provide a typical thickened slab (12" thick x 16" wide) under wall. Reinforce with (2) #4 x continuous. Dowel wall reinforcing to slab.
14. Admixtures:
    A. Air-entraining admixtures (when used), shall comply with ASTM C260.
    B. Calcium chloride shall not be added to concrete mix.

MASONRY (CMU)
1. Concrete masonry units shall be mediumweight (105 PCF - 125 PCF), Grade N units conforming to ASTM Designation C90 and shall have a minimum compressive strength of 2000 PSI on the net section (Design strength, f'm = 2000 PSI).
2. Mortar shall conform to ASTM C270, Type "S" (Section 2103.2 of the International Building Code). Use Portland Cement, Type I or II. Follow the proportion method of ASTM C270.
3. All masonry shall be reinforced with both horizontal and vertical reinforcement. All grouted block cells or brick cavities with reinforcement shall be grouted full using *2500* PSI grout. Grout shall conform to the requirements of ASTM C476. Cells shall be aligned to preserve unobstructed vertical cavities of 2"x3" minimum. **DO NOT SOLID GROUT WALLS UNLESS SPECIFICALLY NOTED ON THE PLANS.**
4. Grout shall have 3/8" maximum size coarse aggregate with a slump between 8 and 11 inches so the concrete will flow into the block cells without leaving voids.
5. All horizontal reinforcing at ends of walls shall terminate with a hook around vertical reinforcing.
6. Reinforcement Protection (Cover):
   A. Joint reinforcement shall have not less than 5/8" mortar coverage from the exposed face.
   B. Other reinforcement shall have a minimum coverage between the face shell and the bar of one bar diameter over all the bars, but not less than 3/4" when masonry is exposed to weather or soil. Minimum coverage shall be 2" from the outside face of masonry.
7. Continue vertical reinforcing bars in masonry columns through foundation wall into footings with matching bars and dowels. Enclose these bars with same size ties at same spacing as in masonry column. Provide matching dowels for vertical bars in masonry walls to structure below.
8. Continue horizontal reinforcement in walls through masonry columns and pilasters. This reinforcement shall have matching dowels, corner bars, at corners and at intersections of the walls with required lap lengths.
9. Unless noted otherwise, hollow cells at all four (4) sides of openings in walls shall be grouted and reinforced with (2) #5, minimum, with 2'-10" projection beyond edges of openings at each end.
10. Horizontal bars shall be placed in bond beams filled with grout at the top of all walls and at 48" OC maximum between top of wall and foundation. Bond beam units and reinforcing shall continue uninterrupted around all corners and wall intersections. Where structural steel columns or beams interrupt the continuity of a bond beam, dowels matching bond beam reinforcement shall be welded to the structural steel to provide continuity.
11. In addition ladder-type reinforcing consisting of #9 wire for each face shell of each wythe shall be used at 16" OC horizontally in all masonry walls. Reinforcement shall be for total width of cavity walls.
12. All vertical reinforcing bars shall lap with bars of the same size and spacing that extend down to structure below. Place all bars securely prior to grouting.
13. Stop grout pours 1/2" below top of block units between grout lifts.
14. All anchor bolts must be placed in grouted cells.
15. Where beams bear on concrete block walls, block cells shall be filled with grout 1'-4" wide to foundation and reinforced with a #5 each cell, unless otherwise shown.
16. An additional vertical bar (matching wall reinforcement) shall be placed at each corner, end of wall, and jamb of all openings.
17. All steel joist, joist girder, and steel beam pockets in masonry shall be grouted solid unless otherwise indicated on the drawings.
18. No masonry shall be laid when the temperature of the outside air is below 40 degrees Fahrenheit, unless approved methods are used during construction to prevent damage to the masonry. Such methods shall include protection of the masonry for a period of at least 48 hours.
19. All reinforcing shall be in place prior to grouting. Vertical reinforcing bars shall be held in position at the top, bottom and at intervals not farther apart than 200 bar diameters. Provide wire ties at all lap splices.
20. All masonry walls shall have vertical control joints at: Major changes in wall height, at changes in wall thickness, and at building construction joints. Provide matching control joints for brick veneer. Consult Architectural Drawings for locations. Where joint locations are not shown on the drawings the Contractor shall submit proposed locations to Architect / Engineer for review.

STRUCTURAL STEEL
1. All structural steel and structural steel work shall comply with the AISC "Steel Construction Manual" (Current Version) containing the specifications for the design, fabrication and erection of structural steel buildings, including the "Code of Standard Practices".
2. All wide flange structural steel shall be ASTM A992 and all miscellaneous shapes shall be ASTM A36, unless noted otherwise.
3. Structural steel tubing shall conform to ASTM A500 Grade C; Yield Stress = 50 KSI.
4. Structural steel pipe columns shall conform to ASTM A53, Grade B; Yield Stress = 35 KSI.
5. Use A325 Bolts for steel-to-steel connections, F1554 GR36 for Anchor Bolts, and A307 Bolts for all other connections (unless specified otherwise on drawings). Use 3/4" diameter minimum.
6. All welds shall be made with E70XX electrodes and by welders certified by AWS Standards within the past 12 months; provide written certification if requested. All welds shall have a minimum Charpy V-Notch toughness of 20 foot-pound at 0° F, unless noted otherwise on the plans.
7. All high-strength bolts shall be tightened to the appropriate minimum bolt tension in accordance with AISC "Specifications for Structural Joints using ASTM A325 or A490 Bolts." The preferred method of tightening is by use of "Twist off type tension control bolt assemblies." "Direct Tension Indicator" and the Turn-of-Nut method may also be used.
8. Connections indicated as slip critical shall comply with AISC "Specification for Structural Joints using ASTM A325 or A490 Bolts." Bolts in a slip critical connection shall be pre-tensioned to at least the minimum tension in this specification. Contact surface of bolted parts shall be a minimum of Class A.
9. All moment connections (shown on plans by a solid triangle at the end of the beam) shall conform to the IBC Requirements for Special Moment Resisting Space Frames (SMRSF).
10. All beam connections, not shown to be moment connections and not detailed otherwise shall be made using AISC Steel Construction Manual "Single Plate Connections" Table with the maximum number of rows shown for that beam.
11. Unless noted otherwise, composite beams longer than 30'-0" supporting floor systems shall be cambered 1/4 inch per 10 feet of span.
12. Unless shown otherwise provide 3/4" x 7 1/2" x 12" Bearing Plates on 1" grout with (2) 3/4" diameter Anchor Bolts under all steel beams that bear on masonry walls.
13. All Headed Stud Anchors (HSA) shall comply with ASTM A108 and be welded with automatically timed stud welding equipment with arc shields per AWS D1.1, Section 7. **FILLET WELDING OF HEADED STUDS IS NOT PERMITTED.**
14. Where steel deck is perpendicular to beams, studs shall be welded through deck to beam.
15. Numbers that are shown in parentheses at beams are the number of headed stud connectors that are to be spaced equally between intersection beams or lines shown on plan. Where deck is perpendicular to beams, studs shall not be spaced closer than 12" OC. When number of studs exceeds length of beam in feet, one half of additional studs shall be placed with (2) per row beginning at each end of beam. Where beams are parallel to deck, studs shall not be spaced closer than 6" OC. Provide (2) rows of studs beginning at each end where required to maintain the 6" minimum spacing.
16. Mechanical roof top units shall be placed over additional or special joists as shown on drawings. The weight, size and location of all proposed units and curbs shall be submitted to the Architect / Engineer for verification before fabrication of steel.
17. Frames for roof openings and supports for roof mounted mechanical equipment are indicated on drawings for bid purposes only. Upon receipt of mechanical submittals, the contractor shall furnish steel supplier supplementary drawings or other information necessary to layout and detail this portion of the work. Other steel work shall not be delayed by this portion of the work. Shop drawings shall be submitted to engineer for review.

COMPOSITE METAL FLOOR DECK
1. Steel floor deck shall comply with the latest requirements of the Steel Deck Institute, SDI. Submit Evaluation Report with shop drawings.
2. Steel floor deck shall be 2" deep x 20 gage minimum Galvanized (G60, where indicated) composite Type "W" deck with interlocking side seams. The following minimum properties must be satisfied:
   - Fy = 50 KSI
   - I = 0.422 in^4/ft
   - Sp = 0.323 in^3/ft
   - Sn = 0.333 in^3/ft
3. The typical floor slab is 3" thick (5" overall) normalweight concrete. Reinforce slab with 6x6-W2.9xW2.9 welded wire fabric minimum, unless noted otherwise. Provide chairs to ensure indicated placement of welded wire fabric above deck. Place welded wire fabric 1" below top of concrete, unless noted otherwise.
4. Attach deck to supporting framing members with 3/4" diameter puddle welds spaced as follows:
   - 12" OC to supports perpendicular to deck corrugations (4 welds per sheet).
   - 12" OC to all supports parallel to deck corrugations.
5. Headed stud welds may take the place of puddle welds where studs are welded through the deck to the top flange of beams.
6. Attach interlocking seams with button punch at 36" OC between adjacent pieces of deck.
7. Where possible, all deck shall be (3) span continuous minimum. In areas where (3) span conditions are not possible, the deck shall meet the loading criteria for the span condition. The Contractor shall provide heavier gage deck and/or shoring as required.
8. Deck shall have a minimum bearing length of 2".
9. Conduits are permitted in deck slabs provided they do not hinder any required fire rating and comply with the following requirements per the SDI Floor Deck Design Manual:
   - Conduit shall not exceed 1" diameter, or 1/3 the concrete thickness over the top of the deck flutes.
   - Conduit shall not be placed within the ribs of the composite deck or within 6" of headed stud anchors.
   - No crossovers are allowed.
   - Conduit spacing shall be at least 18" apart with 3/4" minimum cover above and below.
   - Conduit shall not be made of or coated with aluminum.

LIGHT GAGE METAL FRAMING
1. Design, fabrication, and erection of light-gage metal framing shall comply with requirements of: AISC "Manual of Steel Construction", AWS "Structural Welding Code", AISI "Specification for the Design of Cold Formed Steel Structural Members", and ICC-ES Report ESR-3064P.
2. Framing shown on plans are minimum sizes and conditions. Substitution of framing members shall be approved by Architect and Engineer. They shall have capacity for gravity loads and lateral loads equal to or better than specified framing members and shall be ICC-ES approved.
3. All components shall be galvanized according to requirements of ASTM A-653 for minimum G-60 coating.
4. All 16 and 18 gage studs, and all track, bridging, end closures and accessories shall be formed from steel that corresponds to the minimum requirements of ASTM A-653, with a minimum yield of 33 KSI for 18 gage and 50 KSI for 16 gage, for studs and 33 KSI for runners, bridging, end closures and accessories.
5. All welds shall be accomplished using 1/8" AWS Type 6013 or 7014 rod with a welding heat of 60 to 110 amperes depending on the gage of material and the fit of the parts. Wire tying of framing components is not permitted.
6. Adequate lateral bracing must be provided during construction.
7. Unless noted otherwise, metal framing members at load bearing, shear walls and exterior walls shall be 18 gage for studs, 16 gage for top and bottom runner. 16 gage for studs at holdowns.
8. Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs. Unless indicated otherwise, secure tracks as recommended by stud manufacturer for type of construction involved, except do not exceed 24" OC spacing for nail or powder-driven fasteners, or 16" OC for other types of attachment. Provide fasteners at corners and ends of track.
9. Fastenings: Fastening of components shall be with self-drilling screws or by welding. Screws and welds shall be of sufficient size to ensure the strength of the connection. Wire tying of components shall not be permitted. All welds shall be touched up with a zinc-rich paint. Fastening of plywood diaphragms and sill plates shall be as indicated in structural notes and details.
10. Stud sections used as rafters or joists shall be unpunched.
11. All non-load bearing walls shall be erected so as to allow for proper deflection of structure above. The tops of all such walls shall be horizontally braced to the structure above at a maximum of 8'-0" OC.

PRE-ENGINEERED METAL BUILDING FRAME
1. The complete design of Pre-Engineered Metal Building (PEMB) including all components shown or not shown on the drawings shall be accomplished by the Building Manufacturer.
2. The design shall be made by a Professional Engineer registered in the State where the project is constructed and they shall affix their Registration Number and Seal to all shop drawings and calculations. They shall submit shop drawings and calculations to Architect / Engineer for review. Calculations shall include all building reactions on the foundations. These reactions shall be reviewed for compliance with the foundation design. Design of the building shall be in accordance with the Recommended Design Practices Manual of the Metal Building Manufacturers Association (MBMA) and in accordance with MBMA Specifications.
3. The building and all of its components shall be designed for the following Dead and Live Loads:
   A. Actual weight of steel structure.
   B. 10 PSF Dead Load (Collateral Load) in addition to actual weight.
   C. Roof Snow Load indicated in the Design Criteria Section + Drift on the Low Roof and other applicable areas and/or unbalanced loading as per IBC.
   D. Any additional loads and reactions that are shown or noted on the drawings, see Plan Notes.
   E. Wind Loads as required by the IBC and per the stated Design Criteria.
   F. Seismic Loads as required by the IBC and per the stated Design Criteria.
   G. Thru-wall fan and other equipment, see MEP Drawings and Details.
   H. Suspended unit heaters and other equipment, see MEP Drawings and Details.
4. See plan for additional design notes (i.e. future expansion loads, suspended loads, etc.).
5. Provide braced bays only where indicated. Submit proposed locations to Architect for approval before fabrications. Rigid frame column bases shall be designed for a pinned base condition unless noted otherwise. No diagonal bracing shall be used at endwalls unless indicated. Provide portal frames as required. Provide turnbuckles on all rod "X" bracing.
6. Where rigid frames are indicated at endwalls, design frames for clear span condition with no intermediate supports. Interior endwall columns shall be for lateral load only.
7. No live load reduction shall be taken for the design of the rigid frames.
8. Where member sizes and gages are shown they shall be considered a minimum size. The manufacturer shall not use smaller or lighter gages, or omit framing where indicated. They shall use only larger size and heavier gages if their design indicates these are required to meet the loading criteria.
9. The vertical deflection of girts and purlins shall be limited to 1/240 of the span. Deflection of rigid frames shall be limited to 1/360 of the span. Deflections shall be based on Total Load (Dead Load plus Live Load). Horizontal drift deflections due to wind and seismic loading shall be limited as per the IBC.

PRE-ENGINEERED STEEL STAIRS
1. All steel stairs are Design-Build unless specifically designed and detailed on the Structural Drawings. The notes below apply to pre-engineered steel stairs only.
2. Design stairs, including framing members, connections (including those to building structure), treads, handrails, and landings, and provide for lateral restraint complying with the Contract Documents and Governing Code. The building lateral resisting system may be utilized for stair lateral restraint provided load paths to the building lateral resisting system are indicated in the calculations and connections shown on the shop drawings.
3. At connections to the structure, provide stabilizing elements such as braces and stiffener plates. Do not impose eccentric loading, twisting, or warping to the structural members. Provide material and install stabilizing elements at no additional cost to the owner.
4. Submit shop drawings and structural calculations stamped and signed by a Professional Engineer registered in the State where the project is constructed for review by the project Architect, Engineer and Building Official.

MASONRY VENEER ANCHORAGE
1. Brick veneer shall be anchored to the structural wall by one of the following anchors:
   A. Corrugated sheet metal anchors shall be at least 7/8" wide, have a base metal thickness of at least 0.03", and shall have corrugations with a wavelength of 0.3" to 0.5" and an amplitude of 0.06" to 0.10".
   B. Sheet metal anchors shall be at least 7/8" wide, have a base metal thickness of at least 0.06" and shall have corrugations of corrugated sheet metal anchors or be bent, notched, or punched to provide equivalent performance in pull-out and push-through.
   C. Wire anchors shall be at least wire size W1.7 and have ends bent to form an extension from the bend at least 2" long.
   D. Adjustable anchors shall consist of sheet metal anchors and/or wire components as listed above and shall have a maximum of 1/16" clearance between connected parts, detailed to prevent disengagement, and where pintle anchors are used the legs shall have a minimum wire size of W2.8 with no more than a 1 1/4" offset.
2. Embed anchors in the mortar joint or grout and extend into the veneer a minimum of 1.5", with at least 5/8" mortar cover to the outside face.
3. Space anchors as follows: Provide at least one corrugated anchor, wire, or adjustable two-piece for each 2 sq ft of veneer and for other anchors provide one anchor for each 2.63 sq ft. Space anchors at a maximum of 32" OC horizontally and 18" OC vertically. Provide additional anchors around all openings larger than 16". Space anchors around perimeter of opening at a maximum of 36" OC. Place anchors within 12" of openings.
4. Provide continuous single-wire horizontal joint reinforcement of W1.7 wire (minimum) at 18" on center maximum. Provide wire reinforcing at each anchor bed joint.
5. Mortar bed joint thickness shall be at least twice the thickness of the embedded anchor.
6. All veneer ties and joint reinforcement must be hot dip galvanized.
7. Attach each anchor to wood framing with a corrosion-resistant 8d common nail or alternate fastener with equivalent or greater pullout strength. For corrugated sheet metal anchors, locate the nail or fastener within 1/2" of the 90 degree bend in the anchor. Maintain a maximum distance between the inside face of the veneer and the outside face of the solid sheathing of 1" when corrugated anchors are used. Maintain a maximum distance between the inside face of the veneer and the wood stud or wood framing of 4.5" when other anchors are used. Maintain a 1" minimum air space.
8. Attach each anchor to steel framing with Hohmann & Barnard, Inc (HB) HB-213 SI Connector with (2) screws to metal studs at 16" OC each way. Pintle section shall be as noted above. HB-213 seismic pintle may be substituted for the wire pintle at the contractor's option.
9. Attach each anchor to masonry backup with HB 220 Ladder Mesh Reinforcement Adjustable Wall Tie Assembly by Hohmann & Barnard, Inc with 9 GA joint reinforcement in mortar joint of CMU and a HB-213 SIS pintle section with Seismic Clip in brick mortar joint spaced 16" OC horizontally.
10. Attach each anchor to concrete backup with HB-213 SIS with (2) screws spaced 16" OC each way, pintle section shall be as noted above.

DRILL & EPOXY ANCHORS
1. Use HILTI HIT-HY 200 adhesive system or approved equivalent for concrete and solid grouted masonry connections.
2. Use HILTI HIT-HY 270 adhesive system or approved equivalent for all hollow unit CMU connections and unreinforced masonry walls, including multi-wythe walls.
3. Anchor rods shall be ASTM F1554 Grade 36 (unless noted otherwise in drawings) with diameter indicated, threaded and galvanized.
4. Provide screen tubes for ungrouted masonry units or unreinforced masonry walls.
5. Anchor capacity is dependent upon spacing between adjacent anchors and proximity of anchors to edge of concrete. Install anchors in accordance with spacing and edge clearances indicated on the drawings.
6. Substitution requests for alternate products must be approved in writing by the Structural Engineer prior to use. The contractor shall provide calculations demonstrating the substituted product is capable of achieving the performance values of the specified product. Substitutions will be evaluated by the product having an ICC-ES report showing compliance with the relevant building code for seismic uses, load resistance, installation category, and availability of comprehensive installation instructions.
7. The contractor shall arrange for an anchor manufacturer's representative to provide onsite installation training for all of their anchoring products specified. The contractor shall provide the engineer with documentation showing their personnel have received training prior to commencement of work.
8. Ten percent of all anchors placed shall be randomly tested to 100% of manufacturer's specified allowable load. If any anchor fails it shall be replaced and retested at no additional cost to the owner. If an anchor fails, 100% of all other anchors installed by that same crew shall be tested at no additional cost to the owner.

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PROFESSIONAL STRUCTURAL ENGINEER
10-9-2024
HENNING T. UNGERMAN
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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
1	Addendum 4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	23-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

STRUCTURAL NOTES PART 1

SHEET NUMBER

S001

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Special Inspection - Steel Construction (IBC 1705.2)

Item	C/P ◄(A)
INSPECTION TASKS PRIOR TO WELDING (AISC 360-16, TABLE N5.4-1; AISC 341-16, TABLE J6.1)	
Welder qualification records and continuity records	C
Welding procedure specifications (WPSs) available	C
Manufacturer's certification for welding consumables available	C
Material identification (Type / Grade)	P
Welder identification system ◄(B)	P
Fit-up of groove welds (including joint geometry)	P
Fit-up of CJP groove welds of HSS, T-, Y-, and K- joints	C
Configuration and finish of access holes	P
Fit-up of fillet welds	P
Checking welding equipment	P
INSPECTION TASKS DURING WELDING (AISC 360-16, TABLE N5.4-2; AISC 341-16, TABLE J6.2)	
Control and handling of welding consumables	P
No welding over cracked tack welds	P
Environmental conditions	P
Welding procedure specification followed	P
Welding techniques	P
Placement and installation of HSAs	C
INSPECTION TASKS AFTER WELDING (AISC 360-16, TABLE N5.4-3; AISC 341-16, TABLE J6.3)	
Welds cleaned	P
Size, length, and location of welds	C
Welds must meet visual acceptance criteria	C
Arc strikes	C
k-Area ◄(C)	C
Weld access holes in rolled heavy shapes and built-up heavy shapes ◄(D)	C
Backing removed and weld tabs removed (if required)	C
Repair activities	C
Document acceptance or rejection of welded joint or member	C
No prohibited welds have been added without approval of the EOR	P
INSPECTION TASKS PRIOR TO BOLTING (AISC 360-16, TABLE N5.6-1; AISC 341-16, TABLE J7.1)	
Manufacturer's certifications available for fastener materials	C
Fasteners marked in accordance with ASTM requirements	P
Correct fasteners selected for the joint detail (Grade / Type / Bolt Length / If threads are to be excluded from shear plane)	P
Correct bolting procedure selected for joint detail	P
Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements	P
Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used	P
Protected storage provided for bolts, nuts, washers, and other fastener components	P
INSPECTION TASKS DURING BOLTING (AISC 360-16, TABLE N5.6-2; AISC 341-16, TABLE J7.2)	
Fastener assemblies, placed in all holes and washers and nuts are positioned as required	P
Joint brought to the snug-tight conditions prior to the pre-tensioning operations	P
Fastener component not turned by the wrench prevented from rotating	P
Fasteners are pre-tensioned in accordance with the RCSC specification, progressing systematically from the most rigid point toward free edges	P
INSPECTION TASKS AFTER BOLTING (AISC 360-16, TABLE N5.6-3; AISC 341-16, TABLE J7.3)	
Document acceptance or rejection of bolted connection	C

Special Inspection - Steel Construction (IBC 1705.2)

Item	C/P ◄(A)
INSPECTION OF STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL (IBC 1705.2.2 - 1705.2.4, AND TABLE 1705.2.3)	
Cold-formed steel deck:	
- A. Special inspections and qualifications of welding special inspections for cold-formed steel floor and roof deck shall be in accordance with the quality assurance inspection requirements of SDI QA/QC	C
Installation of open-web steel joists and girders:	
- A. End connections - Welding or bolted	P
- B. Bridging-horizontal or diagonal:	
- 1) Standard bridging	P
- 2) Bridging that differs from SJI specifications listed in section 2207.1 of IBC	P
NON-DESTRUCTIVE TESTING OF WELDS (AISC 360-16, SECTION N5.5)	
Ultrasonic testing (UT), magnetic particle testing (MT), penetrant testing (PT), and radiographic testing (RT), where required shall be performed by QA in accordance with AWS D1.1	-
CJP welds (Risk Category II)	P
CJP welds (Risk Category III or IV)	C
Welded joints subject to fatigue	C
OTHER STEEL INSPECTIONS (AISC 360-16, SECTION N5.7 AND N5.8)	
Inspect galvanized structural steel main members for cracks subsequent to galvanizing	P
Structural steel details	P
Anchor rods and other embedments supporting structural steel	P
TABLE NOTES:	
▶ (A) Continuous or periodic (C/P) refers to the frequency of inspection, which may be continuous during the task listed or periodically during the listed task, as defined in the table.	
▶ (B) The fabricator or erector, as applicable, shall maintain a system by which a welder who has welded a joint or member can be identified. Stamps, if used, shall be low-stress type.	
▶ (C) When welding of doubler plates, continuity plates or stiffeners has been performed in the k-Area, visually inspect the web k-Area for cracks within 3" of the weld.	
▶ (D) After heavy shapes are welded, visually inspect the weld access hole for cracks.	

Special Inspection - Masonry Construction (IBC 1705.4, TMS402, 602)

Item	R/C/P ◄(A) Level 2
QUALITY ASSURANCE (TMS 602-16, TABLE 3, TABLE 4)	
MINIMUM VERIFICATION	
Prior to construction, verification of compliance of submittals.	R
Prior to construction, verification of f'm and f'AAC, except where specifically exempted by the Code.	R
During construction, verification of slump flow and Visual Stability Index (VSI) when self consolidating grout is delivered to the project site.	R
MINIMUM INSPECTION	
As masonry construction begins, verify that the following are in compliance:	
- A. Proportions of site-prepared mortar	P
- B. Grade and size of prestressing tendons and anchorages	P
- C. Grade, type, and size of reinforcement, connectors, anchor bolts, and prestressing tendons and anchorages	P
- D. Prestressing technique	P
- E. Properties of thin-bed mortar for AAC masonry	C ◄(B) / P ◄(C)
- F. Sample panel construction	P
Prior to grouting, verify that the following are in compliance:	
- A. Grout space	P
- B. Placement of prestressing tendons and anchorages	P
- C. Placement of reinforcement, connectors, and anchor bolts	P
- D. Proportions of site-prepared grout and prestressing grout for bonded tendons	P
Verify compliance of the following during construction:	
- A. Materials and procedures with the approved submittals	P
- B. Placement of masonry units and mortar joint construction	P
- C. Size and location of structural members	P
- D. Type, size, and location of anchors, including other details of anchorage of masonry to structural members, frames, or other constructions	P
- E. Welding of reinforcement	C
- F. Preparation, construction, and protection of masonry during cold weather (temperature below 40°F (4.4°C)) or hot weather (temperature above 90°F (32.2°C))	P
- G. Application and measurement of prestressing force	C
- H. Placement of grout and prestressing grout for bonded tendons is in compliance	C
- I. Placement of AAC masonry units and construction of thin-bed mortar joints	C ◄(B) / P ◄(C)
Observe preparation of grout specimens, mortar specimens, and/or prisms	P
TABLE NOTES:	
▶ (A) R denotes required. Continuous or periodic (C/P) refers to the frequency of inspection, which may be continuous during the task listed or periodically during the listed task, as defined in the table.	
▶ (B) Continuous inspection is required for the first 5,000 sq ft of AAC masonry.	
▶ (C) Periodic inspection is required after the first 5,000 sq ft of AAC masonry.	

TERMS AND ABBREVIATIONS

ABBRV	TERM
(#)	Numerical quantities when enclosed in parentheses
A/E	Architect / Engineer
AB	Anchor Bolt
ABV	Above
ADDM	Addendum
AFF	Above Finished Floor
ALUM	Aluminum
APPROX	Approximately
ARCH	Architect (Architectural)*
ASTM	American Society for Testing and Materials
B PL	Base Plate
B/B	Back to Back
bf	Beam Flange Width
BLKG	Blocking
BLW	Below
BM	Beam
BOS	Bottom of Steel
BOT	Bottom
BRG	Bearing
BTWN	Between
C TO C	Center to Center
CD	Contract Documents
CIP	Cast-In-Place
CJ	Construction Joint (Control Joint)*
CL	Centerline
CMU	Concrete Masonry Unit
COL	Column
CONC	Concrete
CONN	Connection
CONT	Continuous (Continue)*
CONTR	Contractor
COORD	Coordinate
CTR	Center
D	Depth
d	Pennyweight Nail
DB	Deck Bearing
DBA	Deformed Bar Anchor
DBL	Double
DFS	Douglas Fir - South
DIA	Diameter
DIAG	Diagonal
DIM	Dimension
DL	Dead Load
DTL	Detail
DWG	Drawing

TERMS AND ABBREVIATIONS

ABBRV	TERM
(E)	Existing
E	Modulus of Elasticity
EA	Each
EJ	Expansion Joint
EL	Elevation
ELEV	Elevator
ENGR	Engineer
EQ	Equal
EQL SP	Equally Spaced (Equal Spaces)*
EQUIP	Equipment
EQUIV	Equivalent
EST	Estimate
ETC	And so forth
EW	Each Way
EXCL	Exclude
EXP	Expansion
EXT	Exterior
(F)	Future
FDTN	Foundation
FFE	Finished Floor Elevation
FIN	Finish (Finished)*
FLR	Floor
FRMG	Framing
FSE	Finished Slab Elevation
FTG	Footing
FV	Field Verify
GA	Gage / Gauge
GALV	Galvanized
GLB	Glued Laminated Wood Beam
HGR	Hanger
HORIZ	Horizontal (Horizontally)*
HSA	Headed Stud Anchor
HSS	Hollow Structural Section
I	Moment of Inertia
ID	Inside Diameter
INT	Interior
JST	Joist
KIP (K)	Thousand Pounds
KIP FT	Thousand Foot/Pounds
KLF	KIPs per Lineal Foot

TERMS AND ABBREVIATIONS

ABBRV	TERM
LB	Pound
LHS	Left Hand Shoe
LL	Live Load
LLH	Long Leg Horizontal
LLV	Long Leg Vertical
LONG	Longitudinal
LSL	Laminated Strand Lumber
LTWT	Lightweight
LVL	Laminated Veneer Lumber
MAX	Maximum
MECH	Mechanical
MFR	Manufacturer
MIN	Minimum
MISC	Miscellaneous
N/A	Not Applicable
NTS	Not to Scale
OC	On Center
OD	Outside Diameter
OPNG	Opening
OPP	Opposite
OPT	Optional
OSB	Oriented Strand Board
P/T	Pressure Treated
PEMB	Pre-Engineered Metal Building
PERP	Perpendicular
PLF	Pounds per Lineal Foot
PSL	Parallel Strand Lumber
PT	Post Tensioned
QA	Quality Assurance
QC	Quality Control
(RE)	Remove Existing
REINF	Reinforce (Reinforced, Reinforcing)*
REQD	Required
RFI	Request for Information
RS	Rough Sawn
RTU	Roof Top Unit

TERMS AND ABBREVIATIONS

ABBRV	TERM
SCHED	Schedule
SECT	Section
SF	Square Foot (Feet)*
SGL	Single
SHTHG	Sheathing
SIM	Similar
SL	Snow Load
SOG	Slab on Grade
SPCL	Special
SPEC	Specification
SQ	Square
SSH	Short Slotted Holes
STD	Standard
STIF	Stiffener
STRUCT	Structure (Structural)*
SYMM	Symmetrical
T&B	Top & Bottom
T&G	Tongue and Groove
THRU	Through
TO FDTN	Top of Foundation
TOB	Top of Beam
TOC	Top of Concrete
TOF	Top of Footing
TOJ	Top of Joist
TOM	Top of Masonry
TOP	Top of Parapet
TOS	Top of Steel
TOW	Top of Wall
TWS	Threaded Welded Stud
TYP	Typical
UNO	Unless Noted Otherwise
VERT	Vertical (Vertically)*
W/	With
W/O	Without
WL	Wind Load
WLD	Weld (Welded)*
WWF	Welded Wire Fabric
XS	Extra Strong
XXS	Double Extra Strong

NOTES

1. * CONTEXT INDICATES WHICH ABBREVIATION TERM IS IMPLIED. CONTACT ENGINEER IF MEANING IS NOT OBVIOUS.
2. NOT ALL ABBREVIATIONS ARE USED.
3. MANY ABBREVIATIONS MAY BE MADE PLURAL BY ADDING AN S SUFFIX.
4. FOR ABBREVIATIONS NOT LISTED, REFER TO **US NATIONAL CAD STANDARD, VERSION 3.1, TERMS AND ABBREVIATIONS SECTION**, OR CONTACT ENGINEER.

A5 **TERMS & ABBREVIATIONS**
NO SCALE
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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	23-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

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SHEET TITLE

STRUCTURAL NOTES PART 2

SHEET NUMBER

S002

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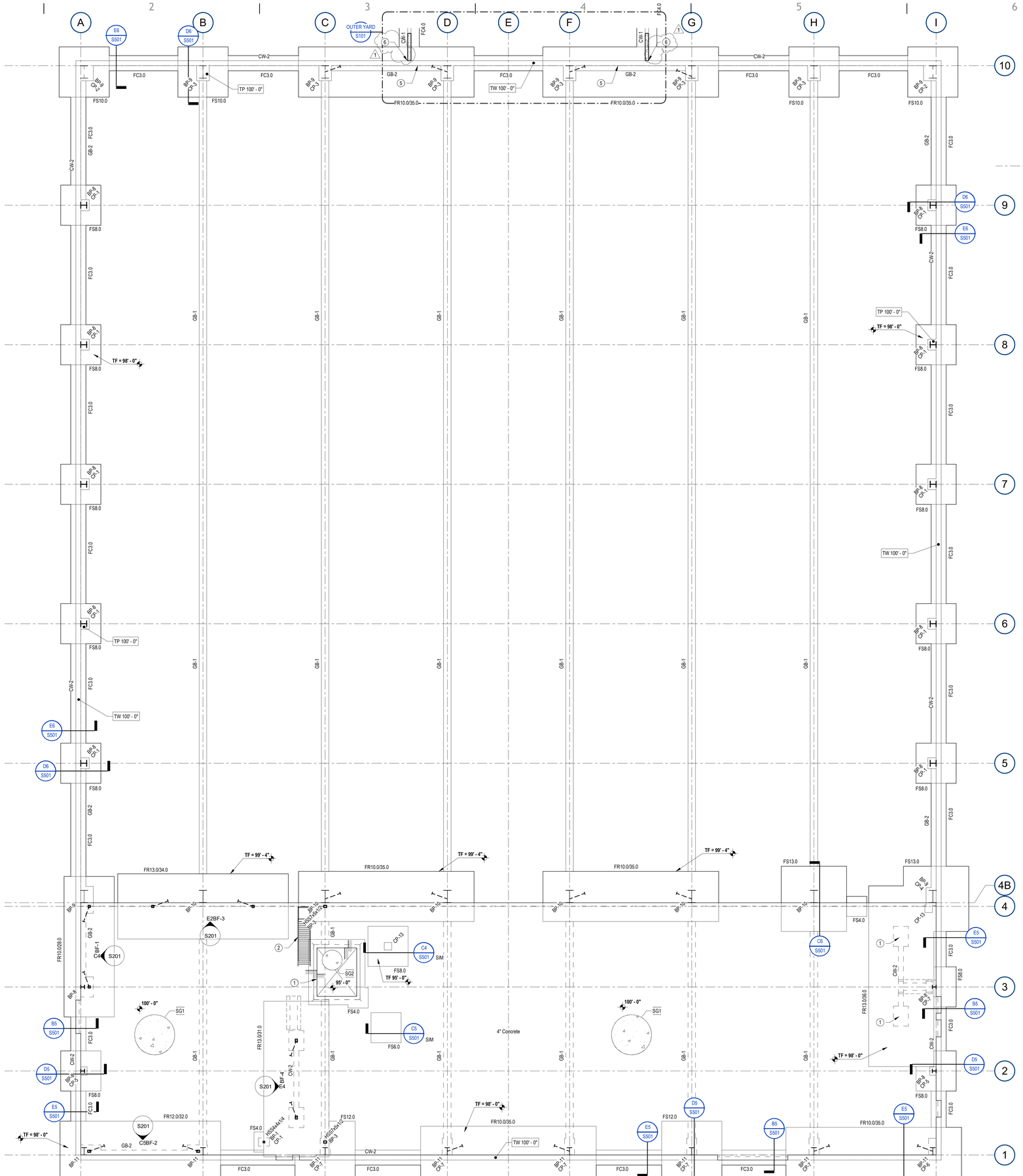
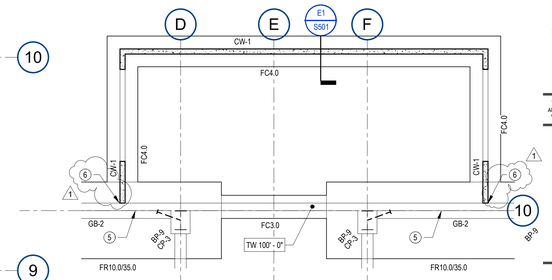


Footing & Foundation Plan

1/8" = 1'-0"



Footing & Foundation Plan - Outer Yard

1/8" = 1'-0"

NOTE: FOOTING & FOUNDATION DESIGN IS BASED ON INITIAL ESTIMATES OF PEMB COLUMN REACTIONS. STRUCTURAL FOOTINGS & FOUNDATION TO BE VERIFIED AND FINALIZED UPON COMPLETION OF PEMB DESIGN.

PLAN NOTES - FOOTING & FDTN

- # NUMBERED NOTES BELOW ARE KEYED ON PLAN.
- R# DENOTES REINFORCING KEYED ON PLAN.
- SG# DENOTES SLAB TYPES KEYED ON PLAN, SEE SCHEDULE B4/S602.
- * SEE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS, TYPICAL.
- ** NOT ALL NOTES MAY APPLY TO AREA SHOWN ON SHEET.
- A SEE STRUCTURAL NOTES ON SHEETS S001 & S002 FOR ADDITIONAL INFORMATION.
- B TOP OF CONCRETE SLAB ELEVATION = 100'-0", UNLESS NOTED THUS: xxx'-x" SLOPE UNIFORMLY TO FLOOR DRAINS.
- C PLACE CONTROL JOINTS AND CONSTRUCTION JOINTS IN SLAB PER STRUCTURAL NOTES. SEE DETAIL A6/S501.
- D CENTER FOOTINGS ON WALLS AND COLUMNS UNLESS DIMENSIONED OTHERWISE ON PLANS.
- E SEE STRUCTURAL NOTES ON SHEET S001 FOR MINIMUM FROST COVER FOR ALL EXTERIOR FOOTINGS.
- F FOOTING ELEVATIONS SHOWN ARE BASED ON A UNIFORM GRADE 6" BELOW SLAB PLUS 2'-6" FROST COVER. COORDINATE ELEVATIONS SHOWN WITH CIVIL AND SITE PLANS FOR ANY ADDITIONAL DEPTH THAT MAY BE REQUIRED TO MAINTAIN MINIMUM FROST COVER OVER FOOTINGS.
- G SEE PLAN AND SECTIONS FOR TOP OF FOUNDATION WALL ELEVATIONS.
- H SEE DETAIL A5/S501 AN A3/S501 FOR TYPICAL CONCRETE AND MASONRY WALL REINFORCEMENT AT CORNERS AND INTERSECTIONS.
- J DO NOT PLACE BACKFILL AGAINST FOUNDATION WALLS UNTIL BRACING FLOOR IS IN PLACE OR ADEQUATE SHORING IS INSTALLED.
- K SEE DETAIL B3/S501 FOR CONTROL JOINTS IN MASONRY. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS.

PLAN NOTES - FOOTING & FDTN

- L SEE ARCHITECTURAL / SITE DRAWINGS FOR INFORMATION AND LOCATION OF SITE WALLS, STEPS, PLANTERS, RAMPS, ETC.
- M COORDINATE FOOTING W/ MECHANICAL AND ELECTRICAL DRAWINGS FOR ALL PENETRATIONS NEAR FOOTINGS. SEE A1/S501 FOR ADDITIONAL INFORMATION.
- N PROVIDE HOUSEKEEPING PADS FOR MECHANICAL/ELECTRICAL UNITS AS REQUIRED BY THE MECHANICAL/ELECTRICAL DRAWINGS. PADS TO BE POURED MONOLITHICALLY WITH THE SLAB ON GRADE OR ANCHORED WITH REBAR PER DETAIL C2/S501.
- P SEE SHEET S901 FOR BID ALTERNATE INFORMATION.
- 1 CONTRACTOR TO PROTECT AND COVER ELEVATOR PIT AND BRACED FRAME ANCHORAGE BETWEEN BASE BID AND BID ALT PHASES OF CONSTRUCTION.
- 2 SEE ARCHITECTURAL DRAWINGS FOR DETAILED ELEVATIONS AND CONFIGURATIONS OF LANDINGS AND STAIRS. AT STAIR LANDINGS, USE TYPE SL SLABS AND DL DECK, TYPICAL. SEE DETAIL D4/S511 FOR TYPICAL FRAMING SIZES & REQUIREMENTS.
- 3 ELEVATOR RAIL SUPPORT COLUMNS SHOWN FOR BID PURPOSES ONLY. COORDINATE REQUIREMENTS WITH ELEVATOR MANUFACTURER / SUPPLIER. SEE DETAIL C1/S501 FOR TYPICAL FRAMING REQUIREMENTS.
- 4 CONTRACTOR OPTION TO POST-INSTALL GRAVITY COLUMNS. SUBMIT RFI FOR POST-INSTALLATION OPTIONS. MAY ONLY UTILIZE FOR MEZZANINE COLUMNS NOT CONNECTED TO BRACED FRAMES.
- 5 DO NOT ROUTE MECHANICAL / ELECTRICAL DISTRIBUTION LINES BELOW OR THROUGH FOUNDATION WALLS WITH GRADE BEAMS.
- 6 PROVIDE 3" SEPARATION BETWEEN YARD WALL AND PEMB WITH COMPRESSIBLE MATERIAL.

FTG/FDTN PLAN LEGEND

FCx.x, FSx.x, FRx.x	CONTINUOUS FOOTING, SPOT FOOTING, RECTANGULAR FOOTING TYPES RESPECTIVELY, SEE SCHEDULE **A3/S601**	FCx.x	CONCRETE FOOTING, SEE SCHEDULE **A3/S601**
	CHANGE IN ELEVATION	CW-#	CONCRETE FDTN WALL TYPE, SEE SCHEDULE **A5/S601**
xxx'-xx"	TOP OF CONCRETE SLAB ELEVATION	CP-#	RECESS IN CONCRETE FDTN WALL
TW xxx'-xx"	TOP OF WALL ELEVATION		CONCRETE PIER IN WALL, SEE SCHEDULE **B4/S601**
TP xxx'-xx"	TOP OF PIER ELEVATION		SITE WALL, COORD W/ ARCH / CIVIL DWGS
TF xx'-xx"	TOP OF FTG ELEVATION		STEEL STUD WALL
SG#	CONCRETE SLAB ON GRADE, SEE SCHEDULE **B4/S602**	BP-#	STEEL COLUMNS: WIDE FLANGE, HSS, BASE PLATE TYPE, SEE SCHEDULE **B1/S601**

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BID SET

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SHEET TITLE

FOOTING AND FOUNDATION

SHEET NUMBER

S101

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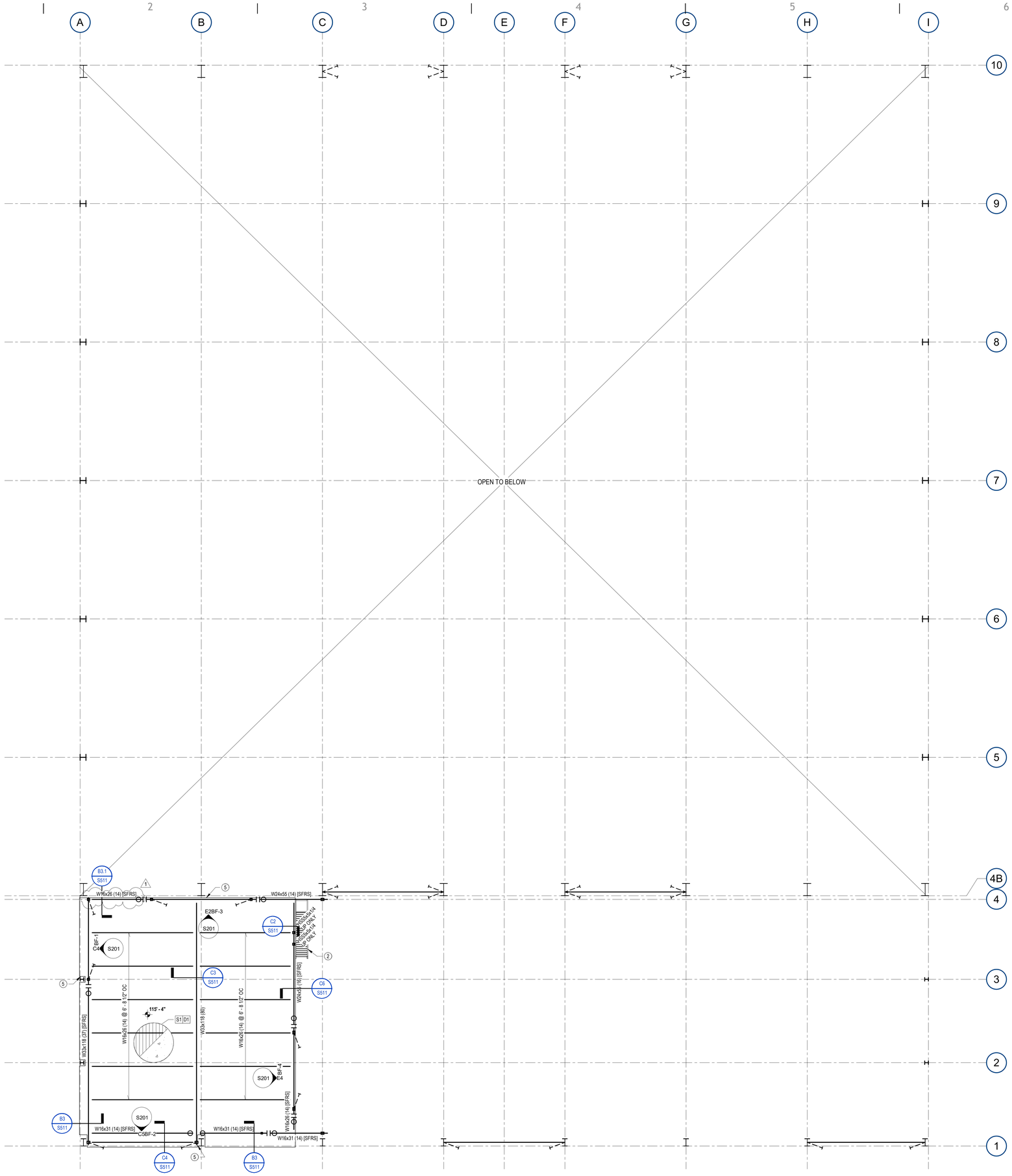

PLAN NOTES - FLOOR FRAMING

- # NUMBERED NOTES BELOW ARE KEYED ON PLAN.
- D# DENOTES DECK TYPES KEYED ON PLAN, SEE SCHEDULE B2/602.
- S# DENOTES SLAB TYPES KEYED ON PLAN, SEE SCHEDULE B4/S602.
- * SEE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS, TYPICAL.
- ** NOT ALL NOTES MAY APPLY TO AREA SHOWN ON SHEET.
- A SEE STRUCTURAL NOTES ON SHEETS S001 & S002 FOR ADDITIONAL INFORMATION.
- B TOP OF CONCRETE SLAB ELEVATION = 115'-4", UNLESS NOTED THUS: xxx'-x"
- C SEE DETAIL A3/S602 FOR TYPICAL BEAM TO BEAM CONNECTIONS.
- D COORDINATE OPENINGS THROUGH FLOOR DECK WITH MECHANICAL DRAWINGS. FLOOR PENERATIONS SHALL HAVE ANGLE FRAMING PER DETAIL A2/S511.
- E ALL CONTINUOUS DECK ANGLES TO BE SPLICED PER DETAIL B4/S511.
- F SEE ARCHITECTURAL DRAWINGS FOR TOP OF CMU WALL ELEVATIONS.
- G SEE DETAIL B3/S501 FOR CONTROL JOINTS IN MASONRY. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS.
- H SEE STEEL ANGLE LINTEL SCHEDULE D5/S602 FOR BRICK VENEER SUPPORT OVER OPENINGS, TYP, UNO.

PLAN NOTES - FLOOR FRAMING

- J (#) FOLLOWING STEEL BEAM CALLOUT DENOTES HEADED STUD ANCHOR QUANTITY FOR COMPOSITE BEAM, SEE DETAIL A3/S511 FOR SIZE AND SPACING REQUIREMENTS.
- K SEE SHEET S901 FOR BID ALTERNATE INFORMATION.
- L PROVIDE 3" SEPARATION BETWEEN PEMB AND ALL MEZZANINE COMPONENTS AND FILL GAP WITH COMPRESSIBLE MATERIAL.
- 1 STEP IN SLAB, SEE DETAILS B5/S511 & B6/S511. SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF STEPS.
- 2 SEE ARCHITECTURAL DRAWINGS FOR DETAILED ELEVATIONS AND CONFIGURATIONS OF LANDINGS AND STAIRS. AT STAIR LANDINGS, USE TYPE SL SLABS AND DL DECK, TYPICAL. SEE DETAIL D4/S511 FOR TYPICAL FRAMING SIZES & REQUIREMENTS.
- 3 ELEVATOR RAIL SUPPORT COLUMNS (ABOVE & BELOW) SHOWN FOR BID PURPOSES ONLY, COORDINATE REQUIREMENTS WITH ELEVATOR MANUFACTURER / SUPPLIER. SEE DETAIL D3/S511 & D2/S511 FOR TYPICAL FRAMING REQUIREMENTS.
- 4 PROVIDE SHORING BELOW SINGLE SPAN DECKING PRIOR TO POURING CONCRETE.
- 5 PROVIDE 3" EXPANSION GAP BETWEEN PEMB AND MEZZANINE STRUCTURE, TYPICAL.

FLOOR FRMG PLAN LEGEND

xxx'-xx"	TOP OF CONCRETE SLAB ELEVATION		MASONRY WALL
	CHANGE IN ELEVATION		STEEL STUD WALL
S# D#	CONCRETE SLAB ON STEEL DECK W/ SPAN DIRECTION INDICATED, SEE SCHEDULES **B4/S602** & **B2/S602** RESPECTIVELY		BEAM SPLICE, SEE DETAIL **A5/S511**
	STEEL COLUMNS: WIDE FLANGE, TUBE, PIPE		COLLECTOR BEAM CONNECTION, SEE SCHEDULE **E3/S602**
	DEPRESSED SLAB AREAS, COORD W/ ARCHITECTURAL DRAWINGS		COLLECTOR BEAM SPLICE, SEE SCHEDULE **E3/S602**
		[SFRS]	SEISMIC FORCE RESISTING SYSTEM
		xxK	ADDITIONAL POINT LOAD

Level 2 Framing Plan

1/8" = 1'-0"

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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
1	Addendum 4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	23-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

LEVEL 2 FRAMING PLAN

SHEET NUMBER

S102

Autodesk Docs://24-013 CCHS Fieldhouse & Soccer Field/CCHS Fieldhouse & Soccer Field - S23.rvt
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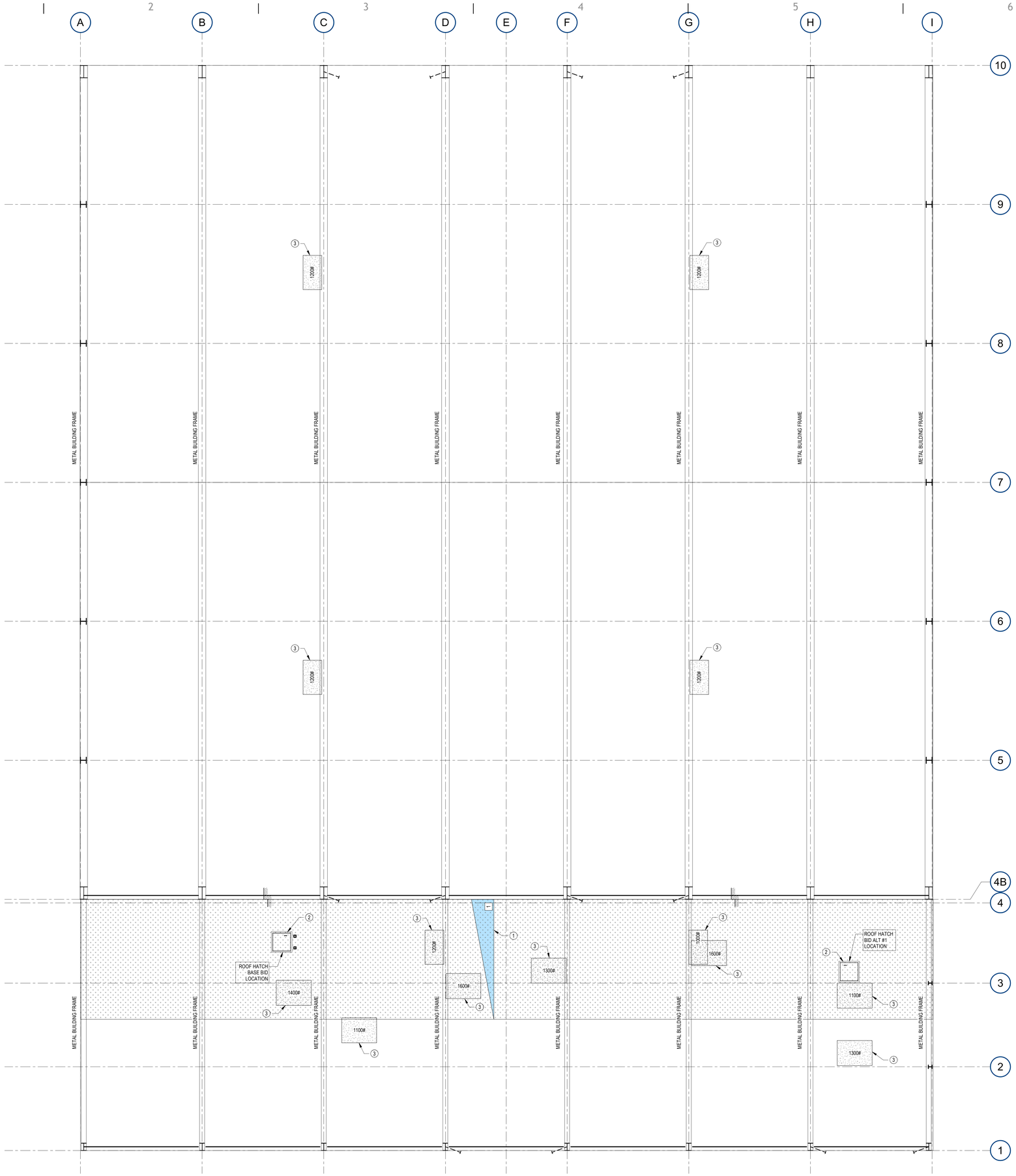


PLAN NOTES - ROOF FRAMING

- # NUMBERED NOTES BELOW ARE KEYED ON PLAN.
- * SEE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS, TYPICAL.
- ** NOT ALL NOTES MAY APPLY TO AREA SHOWN ON SHEET.
- A SEE STRUCTURAL NOTES ON SHEETS S001 & S002 FOR ADDITIONAL INFORMATION.
- B SEE ARCHITECTURAL DRAWINGS FOR TOP OF CMU WALL ELEVATIONS.
- C SEE DETAIL B3/S501 FOR CONTROL JOINTS IN MASONRY. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS.
- D PEMB DESIGNER TO PROVIDE SUPPORT FOR ALL OPENINGS IN ROOF DECK, INCLUDING HATCHES, SKYLIGHTS, ETC.
- E PEMB DESIGNER TO PROVIDE SUPPORT FOR ALL WALLS, PARAPETS, CLADDING, SIGNS, ETC.

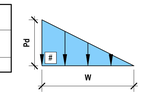
PLAN NOTES - ROOF FRAMING

- F PEMB DESIGNER TO COORDINATE WITH ARCHITECTURAL DRAWINGS AND PROVIDE SUPPORT FOR ALL ELEMENTS TO HANG FROM ROOF STRUCTURE, SUCH AS NETTING WALLS.
- 1 SNOW DRIFT LOAD DIAGRAM. DESIGN JOISTS FOR SNOW DRIFT LOAD IN ADDITION TO UNIFORM AND MECHANICAL LOADS.
- 2 ROOF HATCH OPENING, COORDINATE WITH ARCHITECTURAL DRAWINGS.
- 3 MECHANICAL ROOFTOP UNIT (SHOWN SCHEMATICALLY ONLY). DUCT PENETRATIONS BELOW UNITS NOT SHOWN. ROOF JOISTS / PURLINS AND GIRDERS SUPPORTING MECHANICAL UNITS SHALL BE DESIGNED FOR ADDITIONAL LOADS OF THE UNITS. COORDINATE WEIGHTS, SIZES AND LOCATIONS WITH MECHANICAL DRAWINGS. PEMB DESIGNER TO PROVIDE FRAMES TO SUPPORT EQUIPMENT.

ROOF FRMG PLAN LEGEND

- CHANGE IN ELEVATION
- ADDITIONAL POINT LOAD
- SNOW DRIFT AREA
- SNOW DRIFT DIAGRAM, SEE SCHEDULE **THIS SHEET**
- STEEL STUD WALL
- STEEL COLUMNS: WIDE FLANGE, TUBE, PIPE

SNOW DRIFT			
Mark	Pd - (PSF)	W - (Feet)	Notes
1	54	24	-



NOTES

1. ALL DRIFT LOADS TO RUN FULL LENGTH ALONG A WALL LINE, UNO.
2. DRIFT LOADS ON JOISTS THAT OCCUR 90° TO EACH OTHER SHALL BE APPLIED CONCURRENTLY EXCEPT THE TWO LOADS NEED NOT BE SUPERIMPOSED (REFER TO FIGURE 7.7-3 OF ASCE 7-16).
3. DRIFT LOAD IS IN ADDITION TO BASE REQUIRED SNOW LOAD.
4. THE DRIFT LENGTH **W** SHALL BE THE LESSER OF THAT SHOWN IN THE SCHEDULE AND THE ACTUAL LENGTH OF THE ROOF. IN EITHER CASE, THE MAGNITUDE SHALL TAPER TO 0 PSF AT THE END OF THE DRIFT LENGTH.

A6 SNOW LOAD
NO SCALE
1777_01

Roof Framing Plan
1/8" = 1'-0"

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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	23-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

ROOF FRAMING PLAN

SHEET NUMBER

S103

Autodesk Docs://24-013 CCHS Fieldhouse & Soccer Field/CCHS Fieldhouse & Soccer Field - S23.rvt
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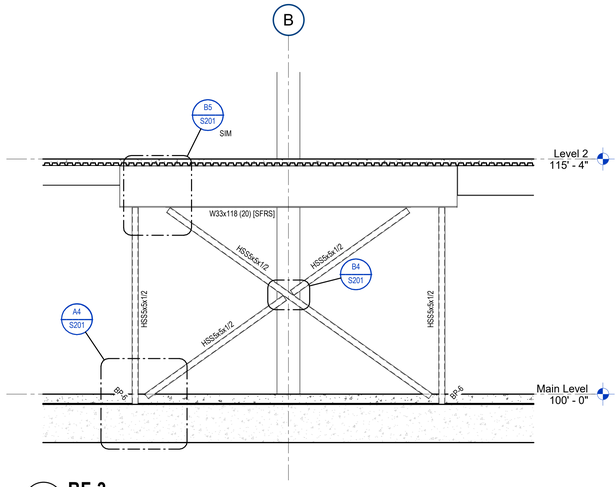
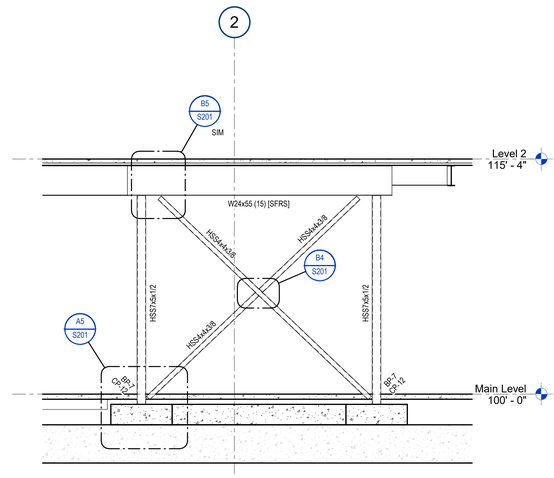
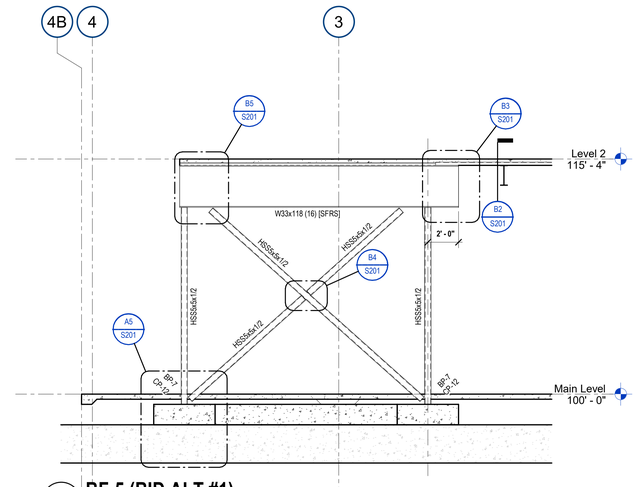


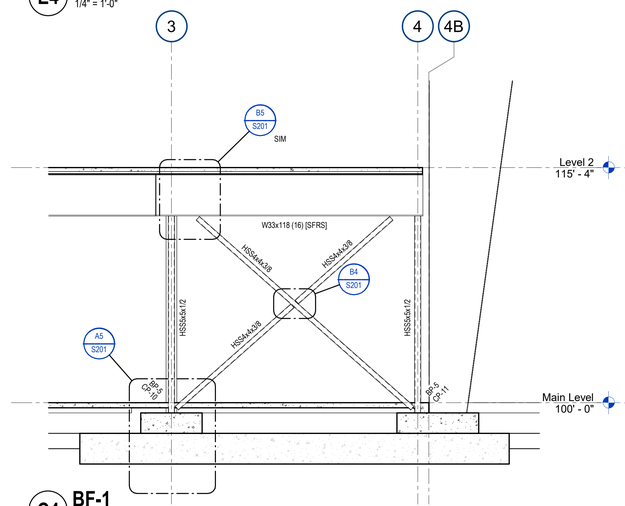
E2 **BF-3**
1/4" = 1'-0"



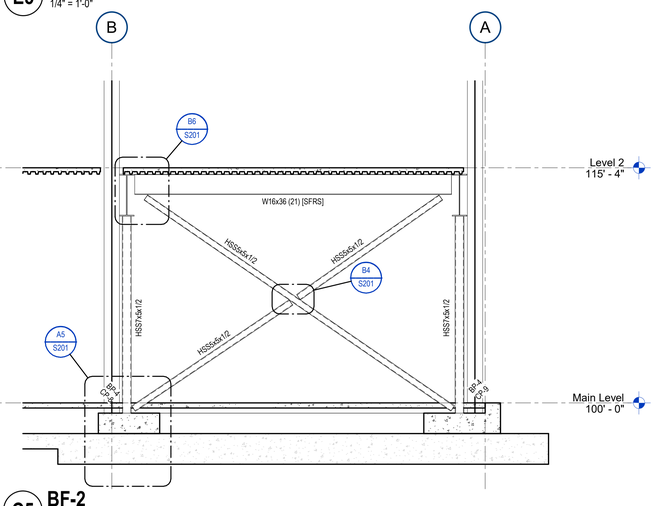
E4 **BF-4**
1/4" = 1'-0"



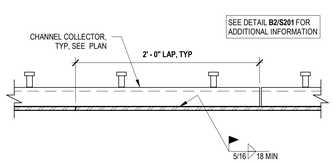
E5 **BF-5 (BID ALT #1)**
1/4" = 1'-0"



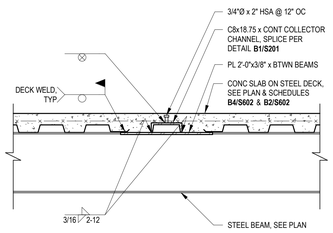
C4 **BF-1**
1/4" = 1'-0"



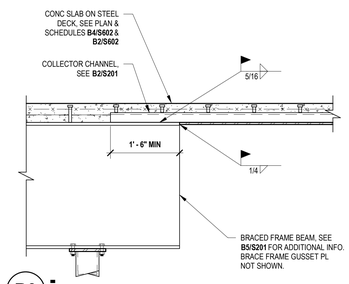
C5 **BF-2**
1/4" = 1'-0"



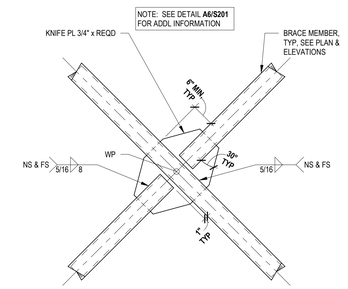
B1 **-**
1 1/2" = 1'-0"



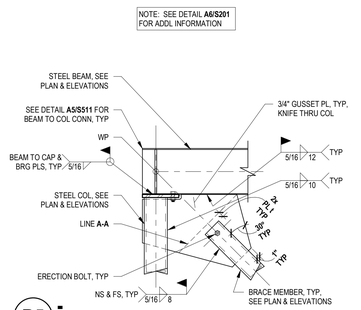
B2 **-**
3/4" = 1'-0"
SC4436_S



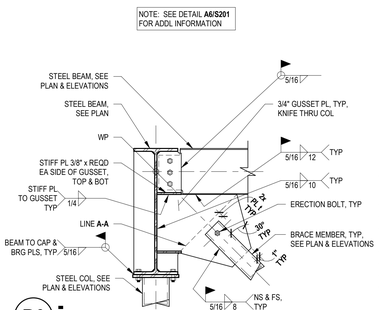
B3 **-**
3/4" = 1'-0"
SC4436_S



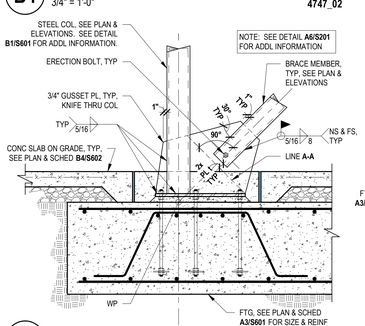
B4 **-**
3/4" = 1'-0"
4747_02



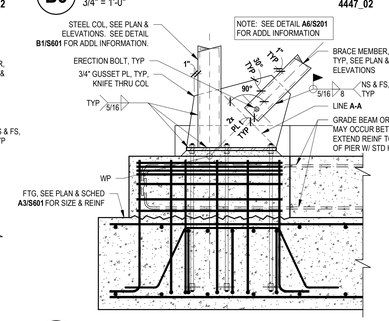
B5 **-**
3/4" = 1'-0"
4447_02



B6 **-**
3/4" = 1'-0"
4447_02



A4 **-**
3/4" = 1'-0"
3147_02



A5 **-**
3/4" = 1'-0"
3147_01

A6 **-**
3/4" = 1'-0"

NOTES:

1. GUSSET PLATE DIMENSIONS MAY BE INCREASED WITH ENGINEER'S APPROVAL WHERE REQD DUE TO CONNECTION GEOMETRY AND TO ACHIEVE WELD LENGTH SPECIFIED.
2. WHERE MEMBER SIZE ALLOWS FOR ADDITIONAL WELD LENGTH, PROVIDE FULL WELDING OF ALL CONNECTIONS.
3. WELD LENGTH SHOWN IS MINIMUM REQUIRED. BEAMS, BRACES AND GUSSET PLATES SHALL BE CENTERED ON COLUMNS.
4. TUBE TO GUSSET WELDS OCCUR ON EACH SIDE OF EACH SLOT (4 PLACES).
5. ALL FIELD WELDS TO BE SPECIAL INSPECTED.
6. LINE **A-A** TO BE PERPENDICULAR TO BRACE CENTER LINE & OFFSET AS SHOWN. LINE **A-A** SHALL INTERSECT POINT OF GUSSET/ CONCRETE INTERSECTION OR GUSSET/BEAM INTERSECTION. LINE **A-A** SHALL BE SHOWN ON THE SUBMITTED SHOP DWGs.

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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	23-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

BRACE FRAME ELEVATIONS AND DETAILS

SHEET NUMBER

S201

Autodesk Docs://24013 CCHS Fieldhouse & Soccer Field/CCHS Fieldhouse & Soccer Field - S23.rvt
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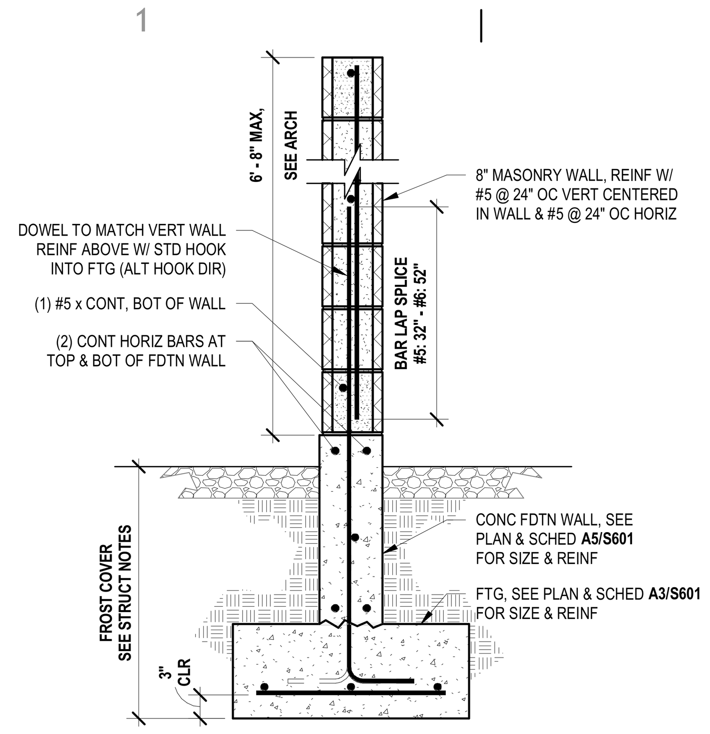
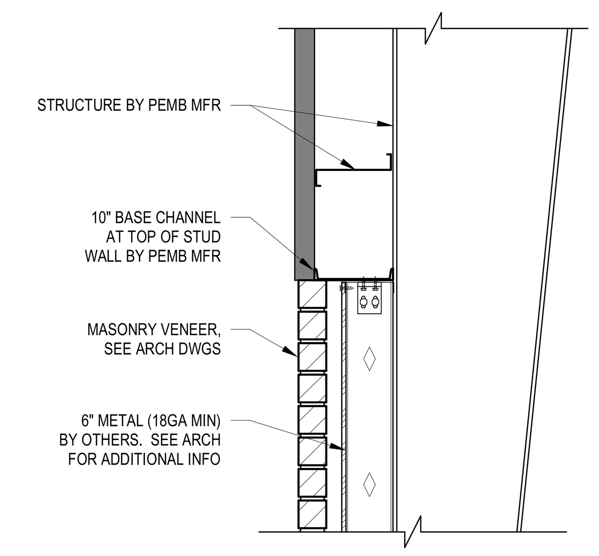
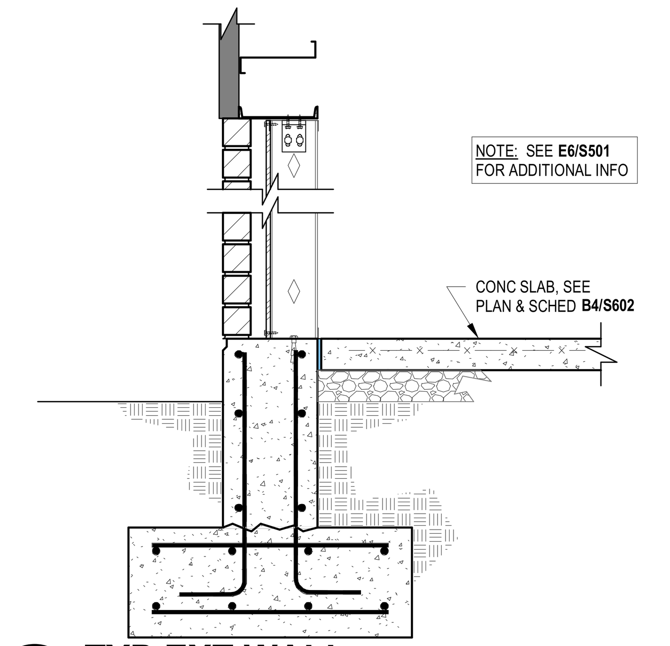


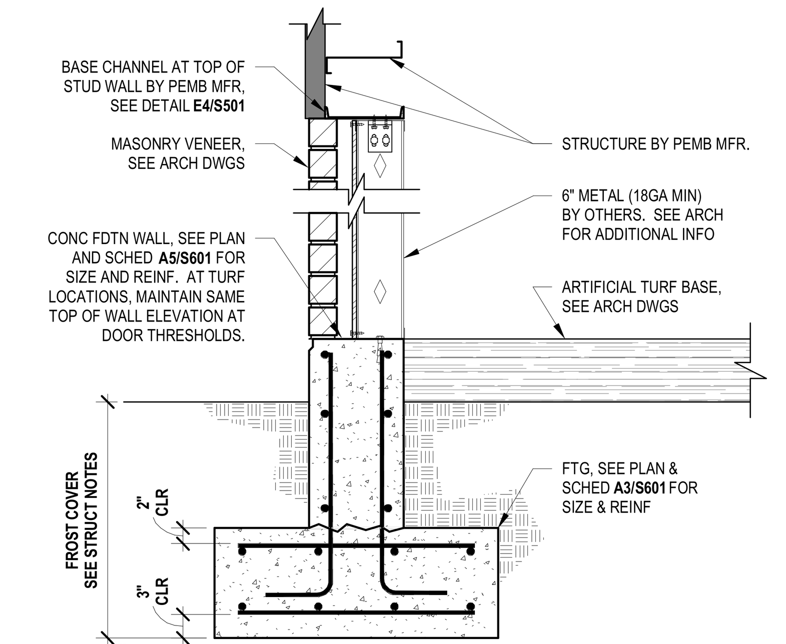
E1 SCREEN WALL
3/4" = 1'-0" 3152_01



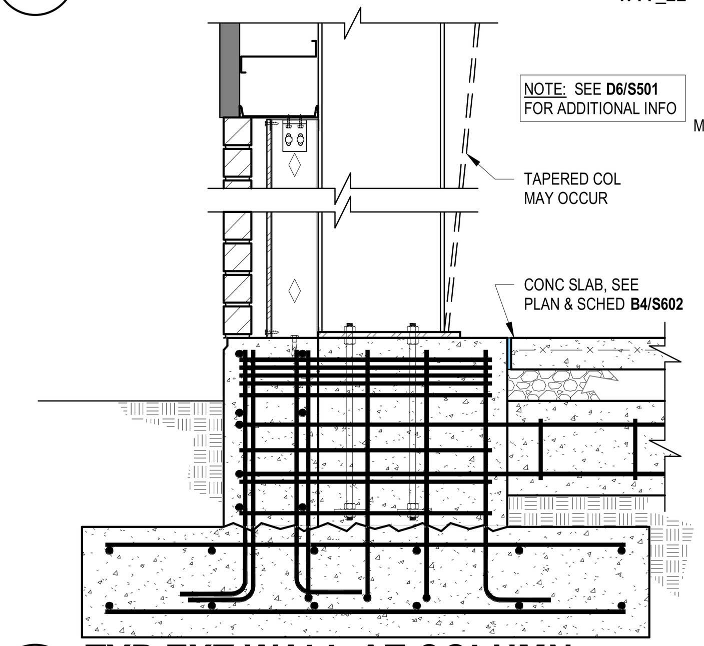
E4 TYP EXT WALL
3/4" = 1'-0"



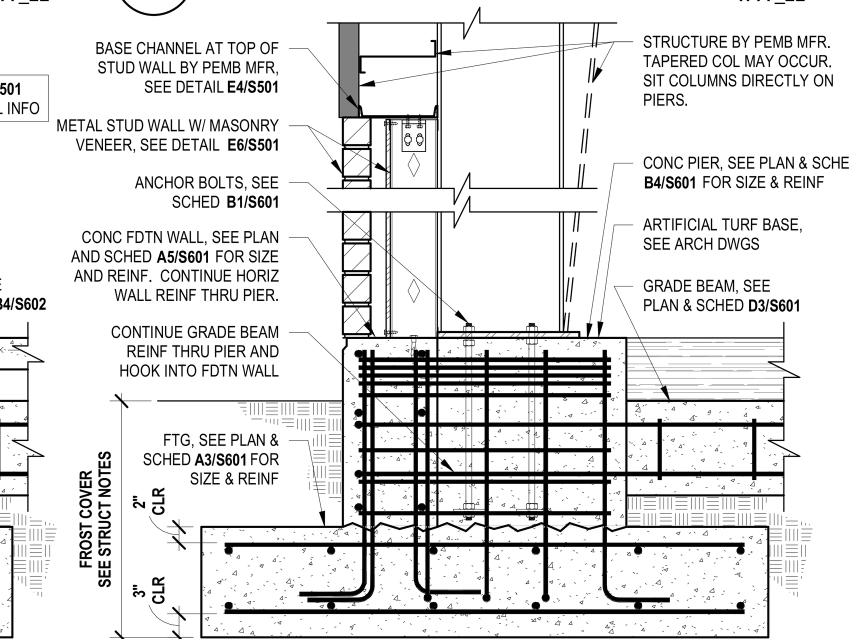
E5 TYP EXT WALL
3/4" = 1'-0" 4777_22



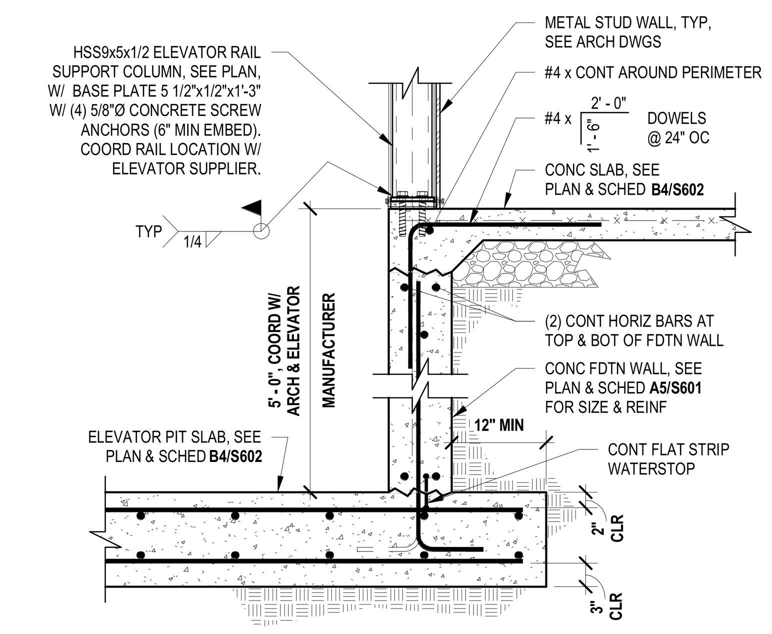
E6 TYP EXT WALL
3/4" = 1'-0" 4777_22



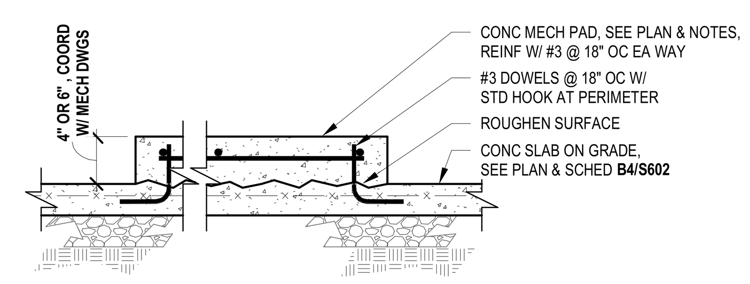
D5 TYP EXT WALL AT COLUMN
3/4" = 1'-0" 4777_22



D6 TYP EXT WALL AT COLUMN
3/4" = 1'-0" 4777_22

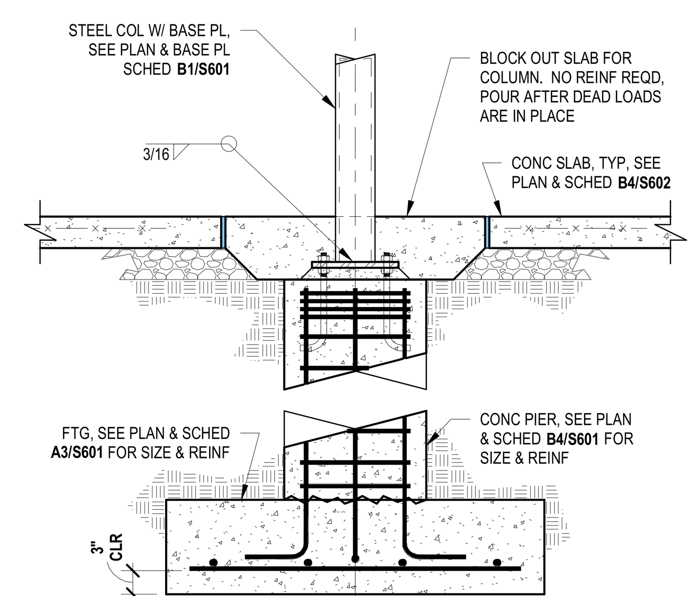


C1 ELEVATOR PIT DETAIL
3/4" = 1'-0" MPB1S300

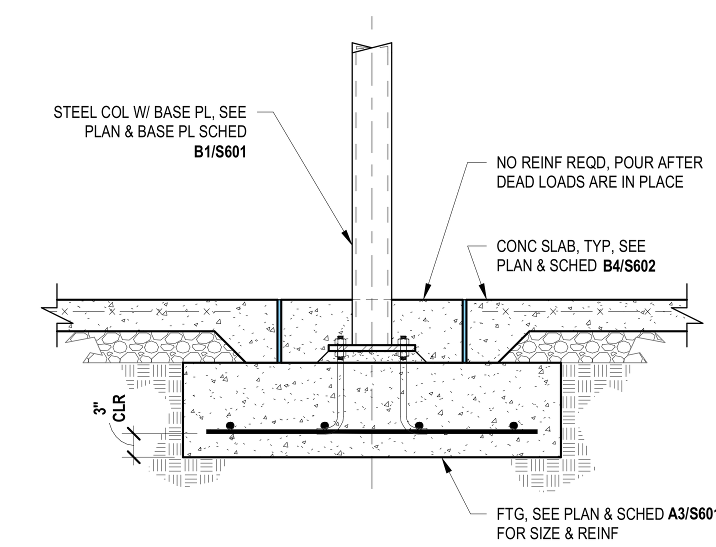


SLAB ON GRADE CONDITION

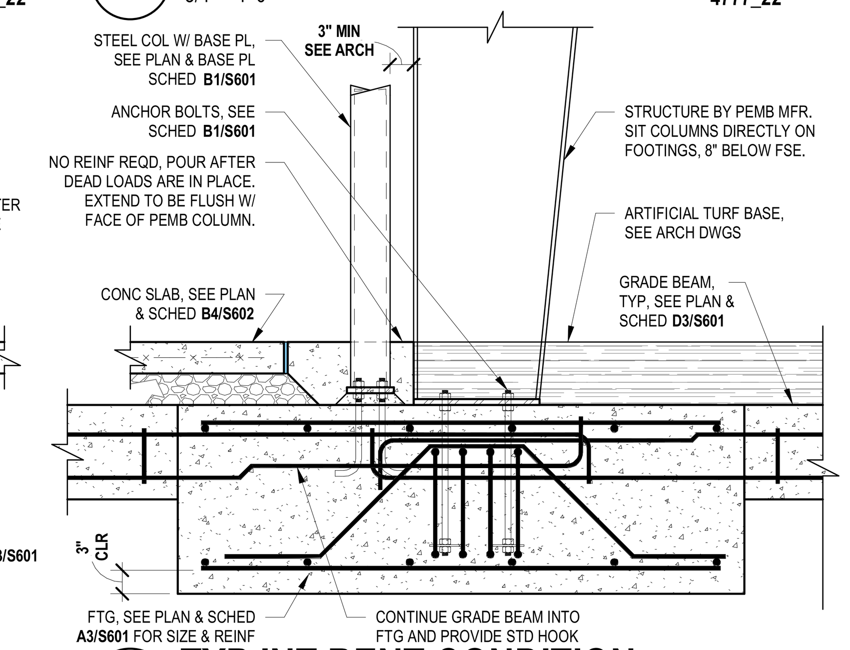
C2 MECH PAD DETAIL
3/4" = 1'-0" SC3636_E



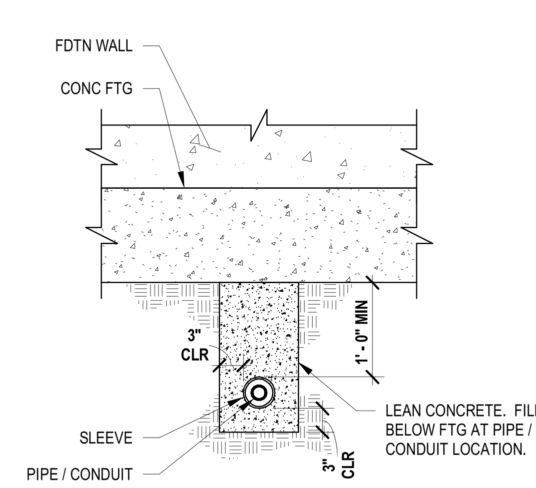
C4 -
3/4" = 1'-0" 3143_01



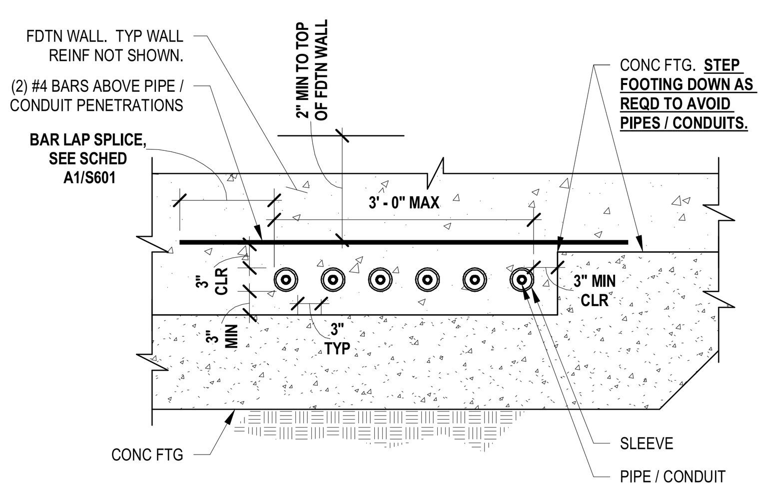
C5 TYP MEZZANINE COLUMN
3/4" = 1'-0" 3143_05A



C6 TYP INT BENT CONDITION
3/4" = 1'-0" 4777_22

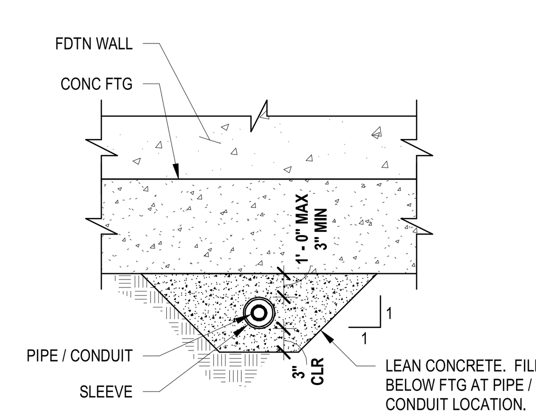


DEEP SINGLE PIPE / CONDUIT BELOW FTG

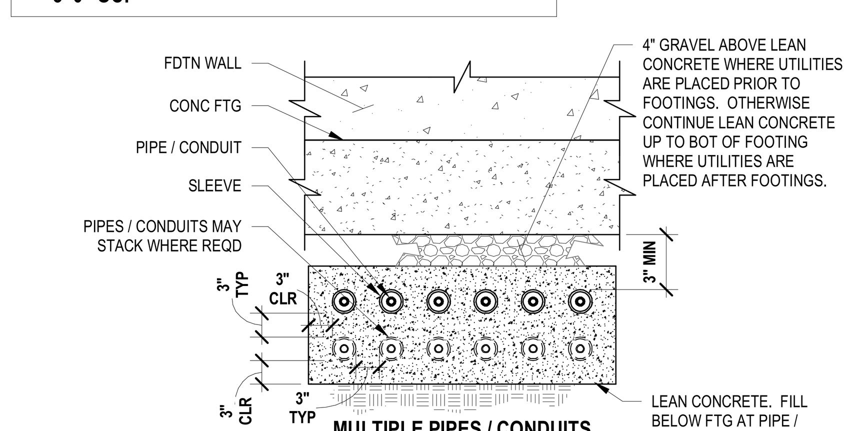


MULTIPLE PIPES / CONDUITS THRU FDTN WALL

NOTES:
1. NO UTILITIES SHALL RUN THROUGH FOOTINGS.
2. NO UTILITIES SHALL RUN BELOW SPOT FOOTINGS.
3. SLEEVE INSIDE DIAMETER SHALL BE AT LEAST 1 1/2" GREATER THAN PIPE / CONDUIT OUTSIDE DIAMETER.
4. SINGLE PIPES MUST BE SPACED AT A MINIMUM OF 3'-0" OC.

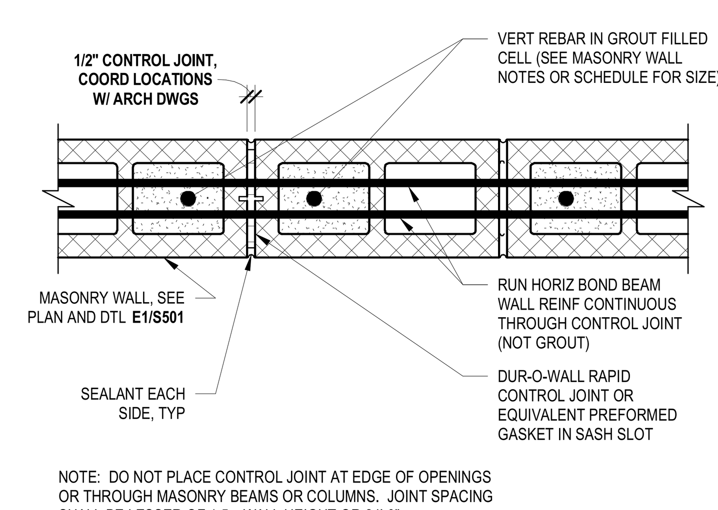


SHALLOW SINGLE PIPE / CONDUIT BELOW & NEAR BOTTOM OF FTG



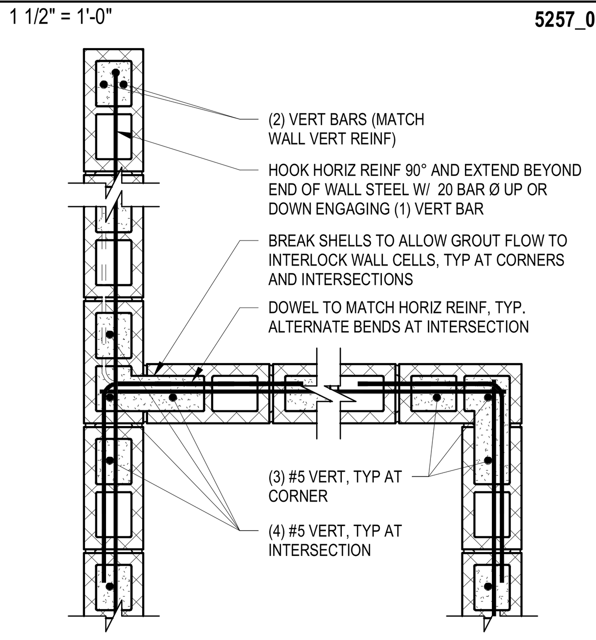
MULTIPLE PIPES / CONDUITS BELOW BOTTOM OF FTG

A1 PLUMBING / CONDUIT PENETRATIONS NEAR FTGS
3/4" = 1'-0" 3117_02

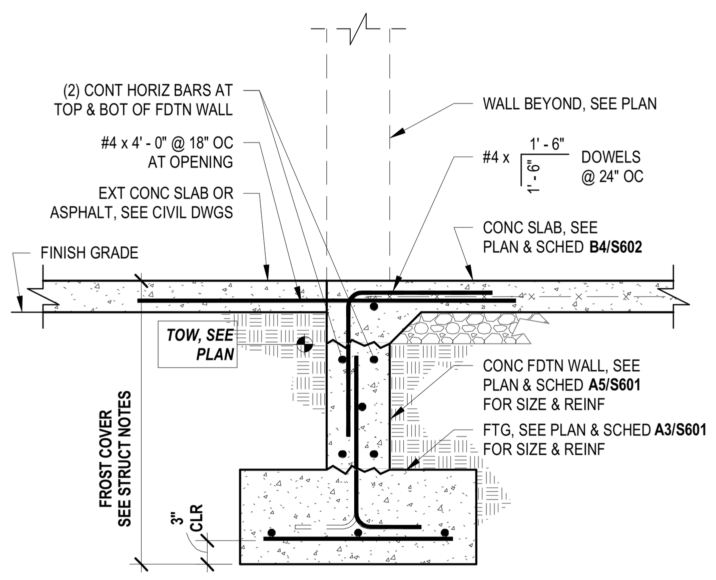


NOTE: DO NOT PLACE CONTROL JOINT AT EDGE OF OPENINGS OR THROUGH MASONRY BEAMS OR COLUMNS. JOINT SPACING SHALL BE LESSER OF 1.5 x WALL HEIGHT OR 24'-0".

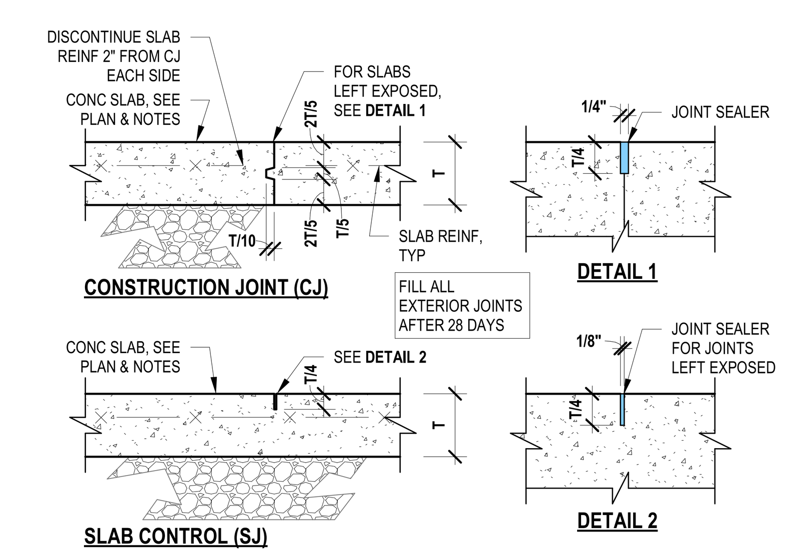
B3 TYP MASONRY CONTROL JT
1 1/2" = 1'-0" 5257_01



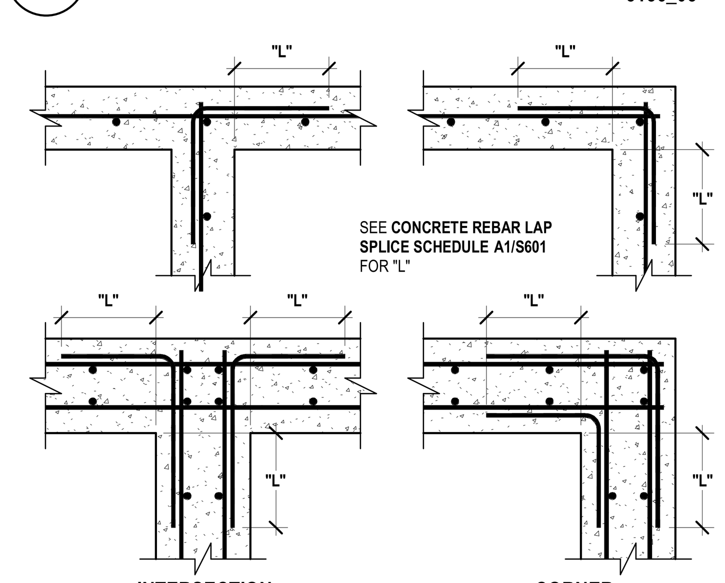
A3 MASONRY WALL DOWELS
3/4" = 1'-0" 5252_03



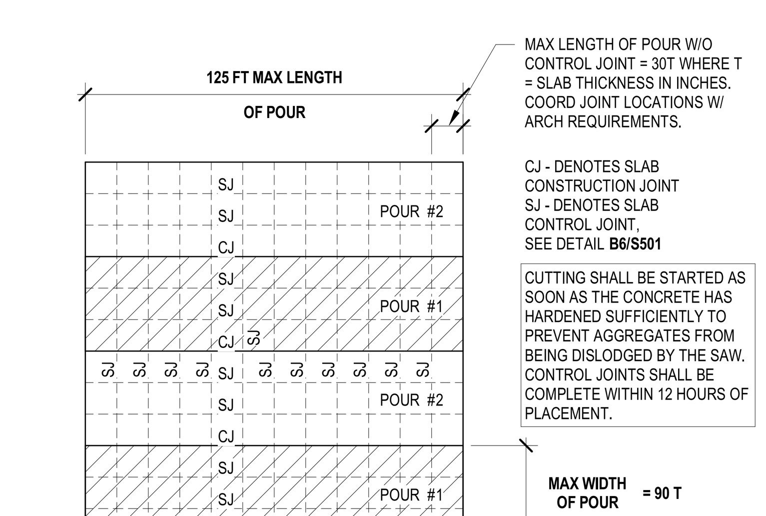
B5 EXT DOOR OPENING DETAIL
3/4" = 1'-0" 3136_03



B6 TYPICAL SLAB JOINT DETAILS
NO SCALE 3677_02



A5 CONCRETE WALL DOWELS
NO SCALE 3232_01



A6 SLAB CONTROL JOINT CRITERIA
NO SCALE 3677_01

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PROFESSIONAL STAMP

PROFESSIONAL STRUCTURAL ENGINEER 10-9-2024 HENNING T. UNGERMAN #7801713 STATE OF UTAH

CONSULTANT INFORMATION

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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	23-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

STRUCTURAL DETAILS

SHEET NUMBER

S501

Autodesk Docs://24-013 CCHS Fieldhouse & Soccer Field/CCHS Fieldhouse & Soccer Field - S23.rvt
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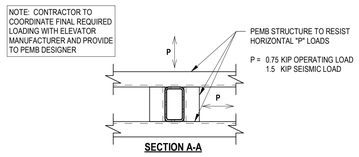
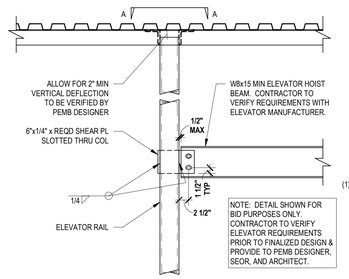
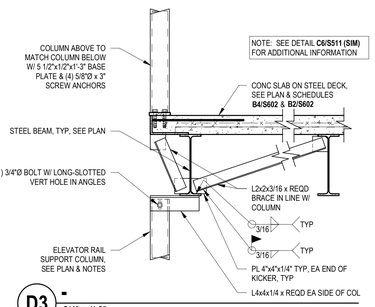




D2 ELEVATOR RAIL SUPPORT
3/4" = 1'-0"
SC4436_N



D3 -
3/4" = 1'-0"
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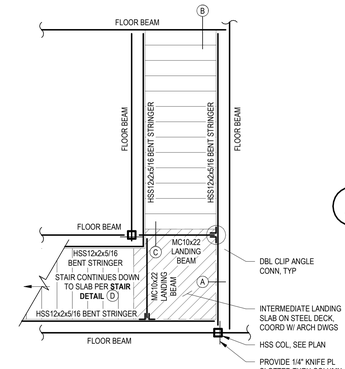
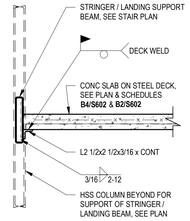


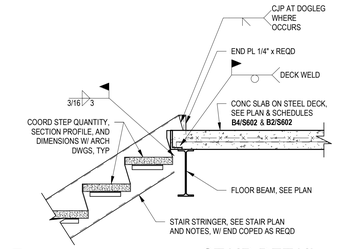
NOTES
1. SCHEMATIC STAIR PLAN DEPICTS TYPICAL MEMBER SIZES AND CONNECTIONS REQUIRED.
2. SEE ARCH PLANS AND SECTIONS FOR ALL SPECIFIC STAIR DIMENSIONS, LAYOUT, UP/DOWN RUN DIRECTIONS, AND OTHER GEOMETRY.
3. SEE STRUCTURAL FRAMING PLANS FOR FLOOR BEAM SIZES.
4. STRINGERS SHALL BE HSS12x2x5/16, UNO.
5. AT CONTRACTOR'S OPTIONS, SHOP DRAWINGS MAY BE PROVIDED SHOWING A DIFFERENT TYPE OF STAIR LAYOUT FOR REVIEW.

SCHEMATIC STAIR PLAN

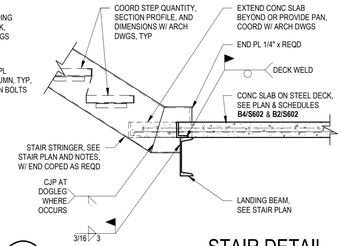
D4 SCHEMATIC STAIR FRAMING AND DETAILS
NO SCALE
4444_02



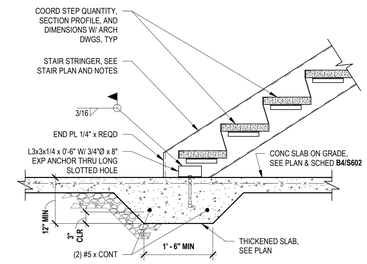
A LANDING SUPPORT DETAIL



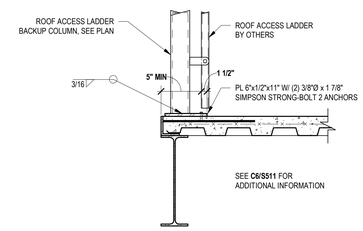
B STAIR DETAIL



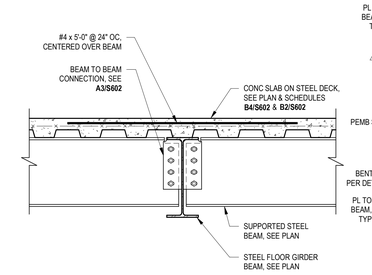
C STAIR DETAIL



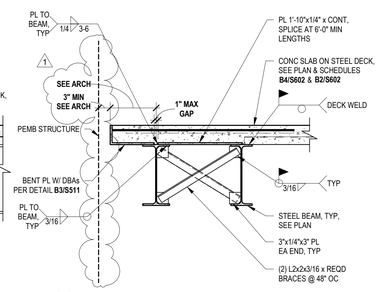
D STAIR DETAIL



C2 -
3/4" = 1'-0"



C3 -
3/4" = 1'-0"
SC4436_S



C4 -
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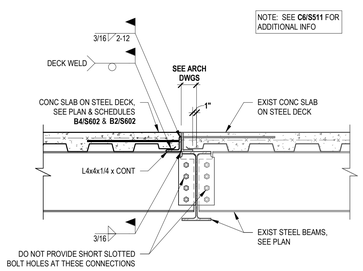
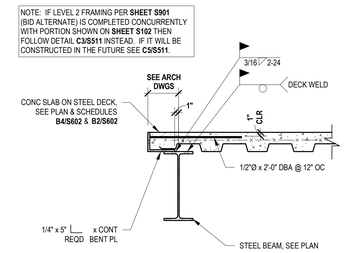
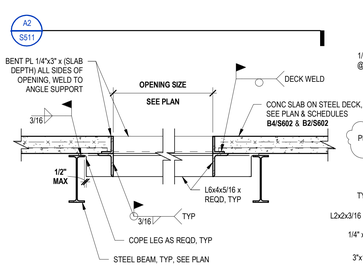
SC4436_T



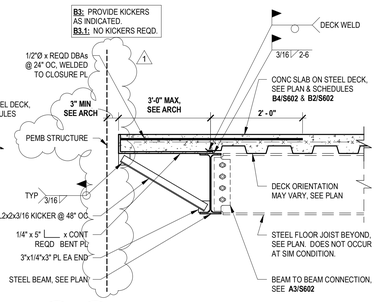
C5 SLAB EDGE DETAIL (FUTURE FRAMING COND)
3/4" = 1'-0"
SC4436_G



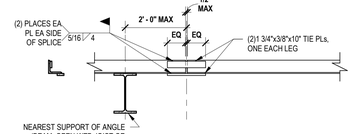
C6 SLAB EDGE DETAIL
3/4" = 1'-0"
SC4436_G



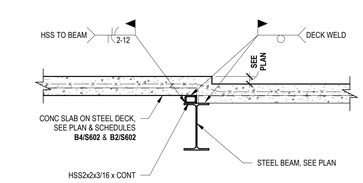
B2 -
NO SCALE
4546_01



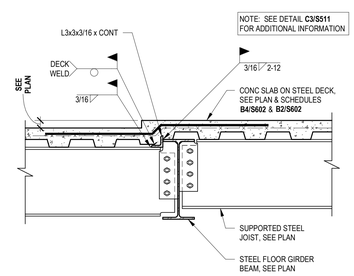
B3 B3.1 -
3/4" = 1'-0"
SC4436_T



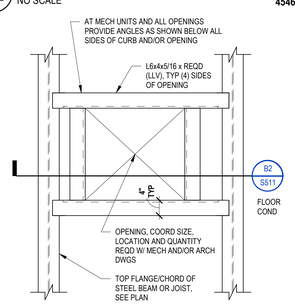
B4 LEDGER ANGLE SPLICE
NO SCALE
4646_01



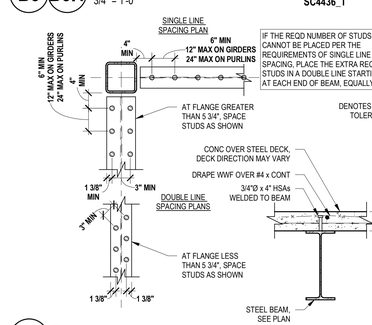
B5 -
3/4" = 1'-0"
SC4436_D



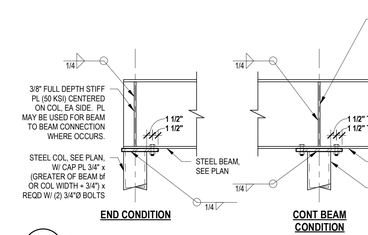
B6 -
3/4" = 1'-0"
SC4436_R



A2 -
NO SCALE
4546_03



A3 -
NO SCALE
4436_01 COMPBM1



A5 -
NO SCALE
4344_05

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PROFESSIONAL STRUCTURAL ENGINEER
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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
1	Addendum 4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	23-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

STRUCTURAL DETAILS

SHEET NUMBER

S511

Autodesk Docs://24-013 CCHS Fieldhouse & Soccer Field/CCHS Fieldhouse & Soccer Field - S23.rvt
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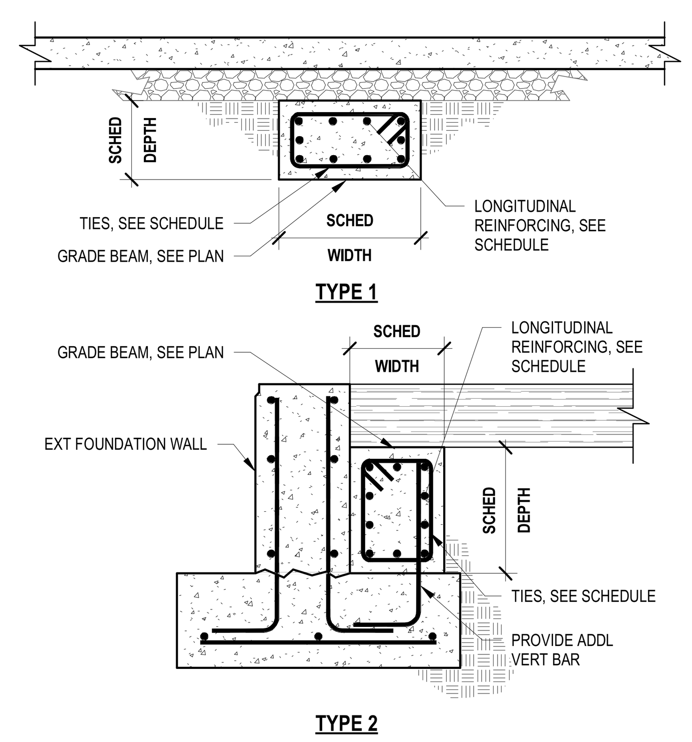
SCHEDULE - CONCRETE GRADE BEAMS							

Mark	Depth	Width	Longitudinal Reinf	Ties	Configuration
GB-1	1' - 6"	1' - 6"	(10) #6 x Cont	#3 ⊏ @ 9" OC	Type 1
GB-2	1' - 4"	1' - 0"	(6) #5 x Cont	#3 ⊏ @ 8" OC	Type 2

GRADE BEAM NOTES:
1. REINFORCING SHALL BE CONTINUOUS THROUGH ANY INTERSECTION WALL OR FOOTING.
2. GRADE BEAMS SHALL BE IN PLACE PRIOR TO METAL BUILDING ERECTION.
3. SEE CONCRETE REINFORCING LAP LENGTH SPLICE SCHEDULE THIS SHEET FOR BAR LAP REQUIREMENTS.

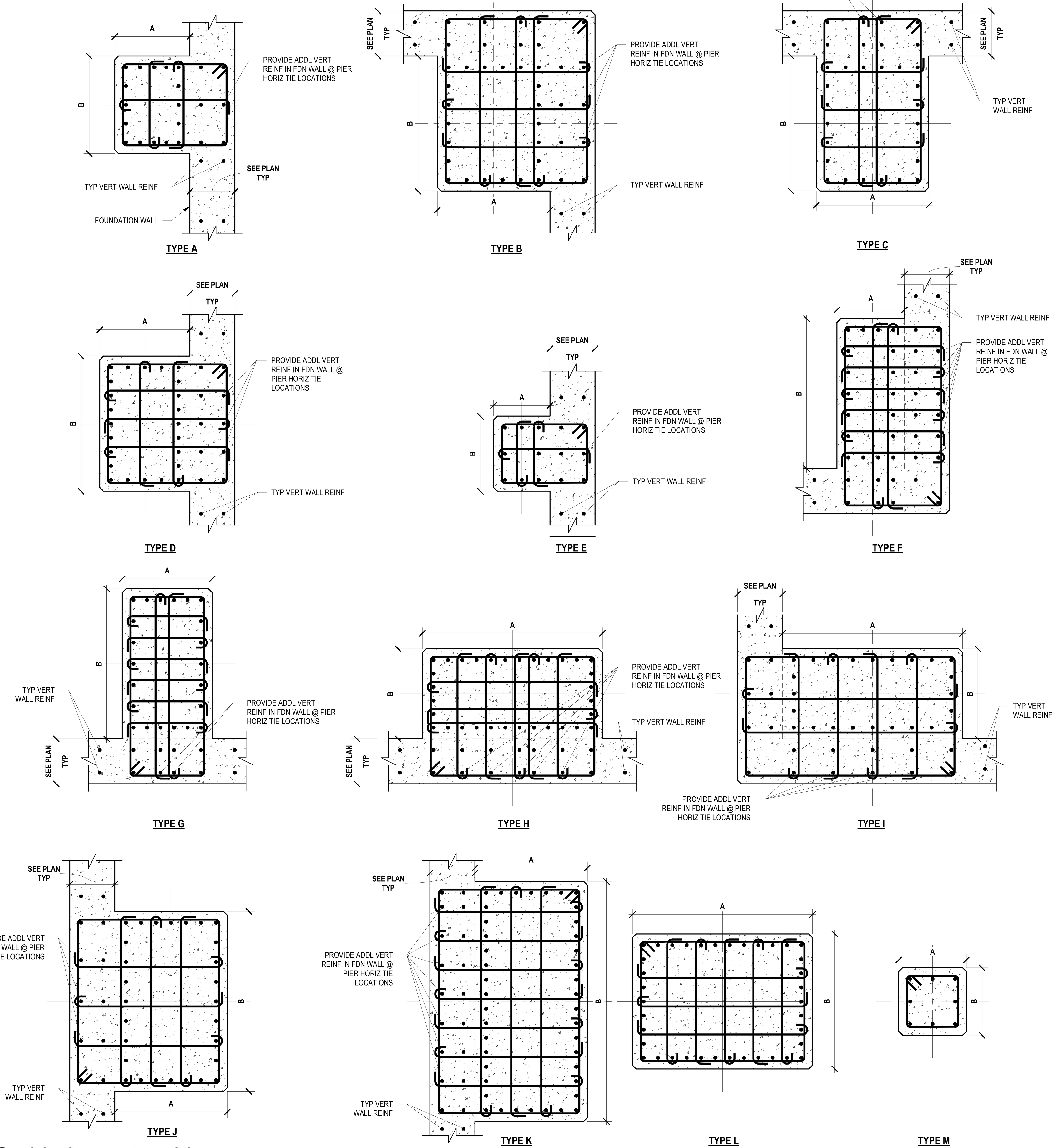


D3 CONCRETE GRADE BEAM SCHEDULE
3/4" = 1'-0"
4777_27

SCHEDULE - CONCRETE PIERS

Mark	Size A	Size B	Size C	Size D	Reinforcing Vertical	Reinforcing Ties	Configuration	Comments
CP-1	1'-8"	2'-2"	-	-	(16) #5	#3 @ 4" OC	Type A	
CP-2	2'-6"	3'-0"	-	-	(22) #6	#3 @ 4" OC	Type B	
CP-3	2'-6"	3'-0"	-	-	(22) #6	#3 @ 4" OC	Type C	
CP-4	2'-0"	3'-6"	-	-	(24) #6	#3 @ 4" OC	Type D	
CP-5	1'-3"	1'-8"	-	-	(8) #5	#3 @ 4" OC	Type E	
CP-6	1'-6"	3'-4"	-	-	(16) #6	#3 @ 4" OC	Type F	
CP-7	2'-0"	3'-4"	-	-	(22) #6	#3 @ 4" OC	Type G	
CP-8	4'-0"	2'-0"	-	-	(26) #6	#3 @ 4" OC	Type H	
CP-9	4'-0"	2'-0"	-	-	(26) #6	#3 @ 4" OC	Type I	
CP-10	2'-6"	4'-0"	-	-	(28) #6	#3 @ 4" OC	Type J	
CP-11	2'-6"	5'-4"	-	-	(42) #6	#3 @ 4" OC	Type K	
CP-12	4'-0"	3'-0"	-	-	(38) #6	#3 @ 4" OC	Type L	
CP-13	1'-6"	1'-6"	-	-	(8) #6	#3 @ 4" OC	Type M	

NOTES:
1. PROVIDE (4) SETS OF TIES IN TOP 5" OF PIER IN ADDITION TO TIE SPACING SHOWN.
2. EMBED COLUMN ANCHOR BOLTS PER ANCHOR BOLT OR BASE PLATE SCHEDULE.
3. NOT ALL BAR CONFIGURATIONS ARE SHOWN. PROVIDE CROSS TIES WHERE VERT REINF IS SPACED MORE THAN 6" APART OR AT EVERY OTHER VERT BAR.
4. CROSS TIES SHALL HAVE ONE END WITH A 90° HOOK AND ONE END WITH A 135° HOOK. ALTERNATE ENDS OF HOOKS ALONG VERT BARS.
5. TOP OF PIER AND TOP OF WALL MAY BE AT DIFFERENT ELEVATIONS. COORDINATE ELEVATIONS WITH PLANS AND DETAILS.

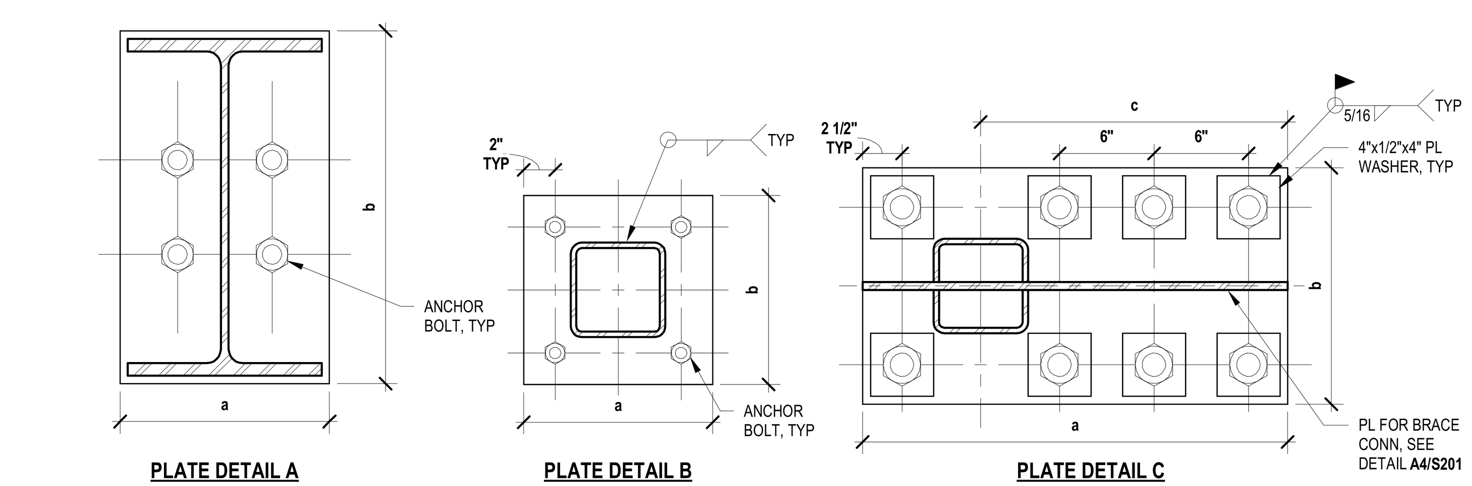


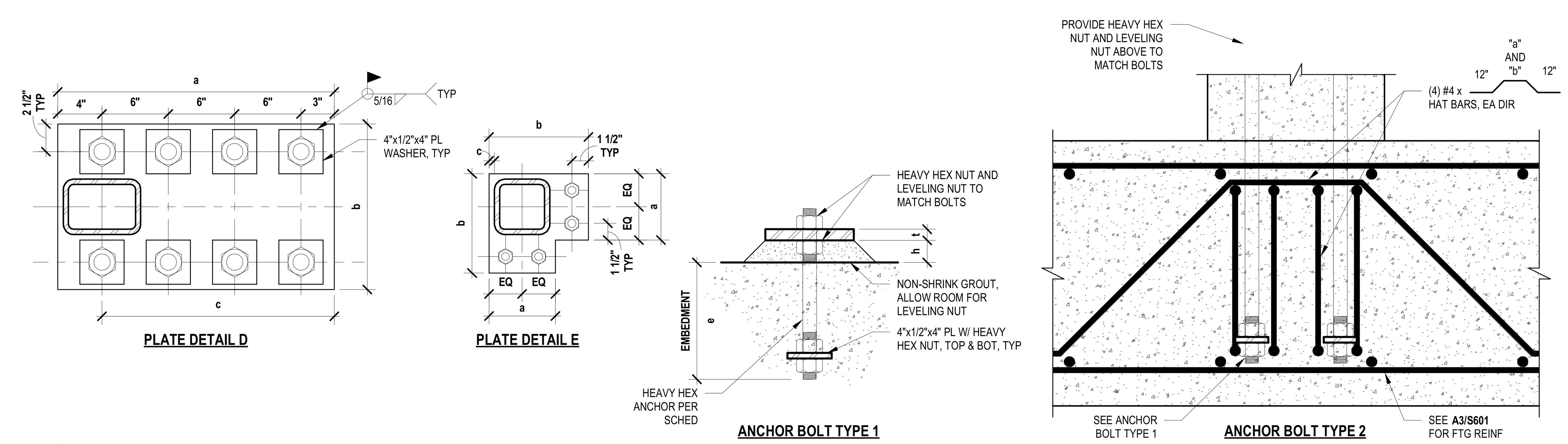
B4 CONCRETE PIER SCHEDULE
NO SCALE
3733_02

SCHEDULE - BASE PLATE

Mark	Plate Detail	Plate Dimensions "t"	"a"	"b"	"c"	Anchor Bolts Number	Diameter	Embed "e"	Type	Grade	Grout Depth "h"	Notes
BP-1	B	3/4"	10"	10"	-	(4)	3/4"	8 1/2"	1	F1554 GR36	1 1/2"	
BP-2	B	3/4"	11"	11"	-	(4)	3/4"	8 1/2"	1	F1554 GR36	1 1/2"	
BP-3	B	7/8"	13"	11"	-	(4)	3/4"	8 1/2"	1	F1554 GR36	1 1/2"	
BP-4	D	1"	25"	16"	21"	(8)	1 1/2"	44"	2	F1554 GR55	2 1/2"	
BP-5	C	1"	24"	14"	18"	(8)	1 1/4"	44"	2	F1554 GR55	2"	
BP-6	C	1"	28"	14"	20"	(8)	1 1/2"	26"	2	F1554 GR55	2 1/2"	
BP-7	C	1"	26"	14"	19"	(8)	1 1/2"	44"	2	F1554 GR55	2 1/2"	
BP-8	A	-	-	-	-	(4)	1"	18"	-	F1554 GR36	-	SEE NOTES 9 & 10
BP-9	A	-	-	-	-	(10)	1 1/4"	44"	-	F1554 GR55	-	SEE NOTES 9 & 10
BP-10	A	-	-	-	-	(10)	1"	20"	-	F1554 GR55	-	SEE NOTES 9 & 10
BP-11	A	-	-	-	-	(4)	1"	44"	-	F1554 GR36	-	SEE NOTES 9 & 10
BP-12	E	3/4"	6"	12"	1/2"	(4)	3/4"	8 1/2"	1	F1554 GR36	1 1/2"	

BASE PLATE NOTES:
1. ALL PLATES ARE A36 STEEL, UNO.
2. NON-SHRINK GROUT SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 4,000 PSI.
3. ALL BOLTS SHALL BE THREADED FOR FULL HEIGHT ABOVE TOP OF CONCRETE AND HAVE DOUBLE NUTS WITH WASHERS AT BOTTOM.
4. CENTER ALL COLUMNS ON PLATES, UNO.
5. ALL COLUMNS SHALL BE WELDED TO BASE PLATES WITH FILLET WELDS, UNO. ALL FILLET WELDS SHALL BE AS PER AISC TABLE J2.4, 3/16" MINIMUM.
6. ALL ANCHOR BOLTS ARE 3/4"Ø, TYPE 1, UNO.
7. COLUMN SHAPES SHOWN ON DETAILS MAY NOT CORRESPOND WITH ACTUAL COLUMN SHAPE. SEE STRUCTURAL PLANS FOR COLUMN TYPE.
8. SEE PLAN AND DETAILS FOR SPECIAL BASE PLATE CONDITIONS, WHERE OCCUR.
9. PEMB MANUFACTURER TO PROVIDE BASE PLATE SIZES, THICKNESSES AND LAYOUTS.
10. ANCHORAGE IS BASED OFF OF ASSUMPTIONS MADE PRIOR TO COMPLETION OF PEMB DESIGN. ANCHOR BOLT SIZING, SPACING, AND CONFIGURATION SUBJECT TO CHANGE.





B1 BASE PL SCHEDULE
NO SCALE

SCHEDULE - REINFORCING SPLICE LAP LENGTHS - f'c 3000 - 5000 PSI

Bar Size	f'c = 3000psi Regular Class A	Regular Class B	Top Class A	Top Class B	f'c = 4000psi Regular Class A	Regular Class B	Top Class A	Top Class B	f'c = 5000psi Regular Class A	Regular Class B	Top Class A	Top Class B
#3	17"	22"	22"	28"	15"	19"	19"	24"	13"	17"	17"	22"
#4	22"	29"	29"	38"	18"	25"	26"	33"	17"	22"	23"	30"
#5	28"	36"	37"	48"	24"	31"	32"	42"	21"	28"	24"	37"
#6	33"	43"	45"	58"	29"	37"	39"	50"	26"	33"	35"	45"
#7	48"	63"	63"	82"	42"	55"	55"	71"	37"	48"	48"	62"
#8	55"	72"	72"	93"	48"	63"	63"	81"	42"	55"	55"	71"
#9	62"	81"	81"	105"	54"	71"	71"	92"	48"	62"	62"	80"
#10	70"	91"	91"	118"	61"	79"	79"	103"	54"	70"	70"	90"
#11	78"	101"	101"	131"	68"	88"	88"	114"	60"	77"	77"	100"

NOTES:
1. THE SCHEDULE SHOWN APPLIES TO REGULAR WEIGHT CONCRETE WITH 60ksi GRADE REINFORCING BARS.
2. TOP BARS ARE HORIZONTAL BARS WITH 12" OR MORE OF FRESH CONCRETE CAST BELOW THE BARS.
3. CLASS "A" SPLICES SHALL BE USED WHEN 50% (OR LESS) OF BARS SPLICED WITHIN LAP.
4. CLASS "B" SPLICES SHALL BE USED FOR ALL ELSE, TYPICALLY WITH SHEARWALLS, COLUMNS, BEAMS AND SLABS.
5. FOR EPOXY COATED BARS, INCREASE LAP LENGTHS AS FOLLOWS:
   TOP BARS: Ld x 1.7
   REGULAR BARS: Ld x 1.5
6. FOR BUNDLED BARS, INCREASE LAP LENGTHS AS FOLLOWS:
   BUNDLED BARS, THREE OR LESS: Ld x 1.2
   BUNDLED BARS, FOUR OR MORE: Ld x 1.33
   INDIVIDUAL BAR SPLICES WITHIN A BUNDLE SHALL NOT OVERLAP.
7. LAP SPLICES ARE NOT ALLOWED FOR TIES AND STIRRUPS.

A1 -
NO SCALE
3747_01

SCHEDULE - FOOTINGS

Mark	Width	Length	Thickness	Crosswise Reinforcing	Crosswise Spacing	Lengthwise Reinforcing	Lengthwise Spacing	Notes
FC3.0	3' - 0"	CONT	12"	-	-	(4) #5 x CONT	EQ	
FC4.0	4' - 0"	CONT	12"	-	-	(5) #5 x CONT	EQ	
FR10.0/28.0	10' - 0"	28' - 0"	24"	(25) #7 x 9' - 6"	EQ	(10) #7 x 27' - 6"	EQ	TOP & BOTTOM
FR10.0/35.0	10' - 0"	35' - 0"	24"	(31) #7 x 9' - 6"	EQ	(10) #7 x 34' - 6"	EQ	TOP & BOTTOM
FR12.0/32.0	12' - 0"	32' - 0"	24"	(28) #7 x 11' - 6"	EQ	(12) #7 x 31' - 6"	EQ	TOP & BOTTOM
FR13.0/31.0	13' - 0"	31' - 0"	30"	(34) #7 x 12' - 6"	EQ	(16) #7 x 30' - 6"	EQ	TOP & BOTTOM
FR13.0/34.0	13' - 0"	34' - 0"	30"	(37) #7 x 12' - 6"	EQ	(16) #7 x 34' - 6"	EQ	TOP & BOTTOM
FR13.0/36.0	13' - 0"	36' - 0"	30"	(40) #7 x 12' - 6"	EQ	(16) #7 x 35' - 6"	EQ	TOP & BOTTOM
FS4.0	4' - 0"	4' - 0"	12"	(4) #5 x 3' - 6"	EQ	(4) #5 x 3' - 6"	EQ	
FS6.0	6' - 0"	6' - 0"	12"	(4) #6 x 5' - 6"	EQ	(4) #6 x 5' - 6"	EQ	
FS8.0	8' - 0"	8' - 0"	16"	(5) #7 x 7' - 6"	EQ	(5) #7 x 7' - 6"	EQ	TOP & BOTTOM
FS10.0	10' - 0"	10' - 0"	24"	(9) #7 x 9' - 6"	EQ	(9) #7 x 9' - 6"	EQ	TOP & BOTTOM
FS12.0	12' - 0"	12' - 0"	24"	(11) #7 x 11' - 6"	EQ	(11) #7 x 11' - 6"	EQ	TOP & BOTTOM
FS13.0	13' - 0"	13' - 0"	30"	(14) #7 x 12' - 6"	EQ	(14) #7 x 12' - 6"	EQ	TOP & BOTTOM

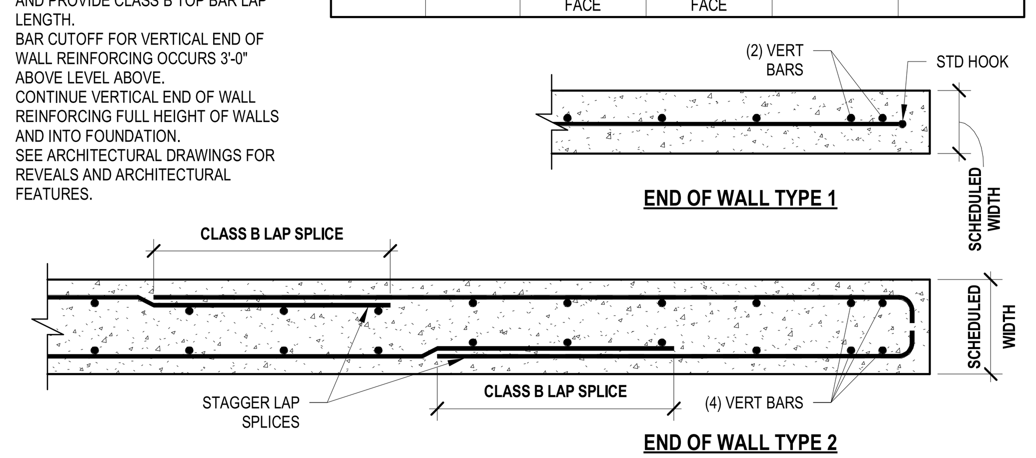
FOOTING NOTES:
1. PLACE CROSSWISE REINFORCING 3" CLEAR FROM GRADE.
2. WHERE TOP REINFORCING IS INDICATED, PLACE TOP CROSSWISE REINFORCING 2" CLEAR FROM TOP OF FOOTING AND LENGTHWISE REINFORCING UNDER CROSSWISE REINFORCING.
3. REINFORCE FOOTINGS MARKED WITH AN ASTERISK (*) EQUALLY, TOP & BOTTOM.
4. REINFORCE FOOTINGS MARKED WITH A PLUS SIGN (+), W/ #4 @ 12" OC, EACH WAY AT TOP MAT AND BOTTOM MAT AS SCHEDULED.
5. ALL CONTINUOUS FOOTINGS SHALL BE FC2.0, AND SQUARE FOOTINGS SHALL BE FS3.0, MINIMUM, UNLESS NOTED OTHERWISE ON PLANS.

A3 FOOTING SCHEDULE
NO SCALE
3731_01

NOTES:
1. LOCATE VERTICAL REINFORCING EACH SIDE OF ALL OPENINGS, EACH SIDE OF CONTROL JOINTS AND AT ALL ENDS AND CORNERS IN ADDITION TO SCHEDULED SPACING. SEE PLAN WHERE SPECIAL COLUMNS OCCUR AT JAMBS. DOWEL VERTICAL REINFORCING TO FOOTING OR THICKENED SLAB WHERE OCCURS W/ STD HOOK.
2. PLACE HORIZONTAL REINFORCING AT ALL SUSPENDED LEVELS. SEE PLANS, SECTIONS AND SCHEDULES FOR SPECIAL HORIZONTAL REINFORCING AT ROOFS AND OVER OPENINGS. SEE **A5/S501** FOR CORNER BAR DETAILS AND AT INTERSECTING WALLS.
3. WHERE NO MARK IS SHOWN ON PLANS, USE TYPE CW-1 FOR 8" CONC WALLS, AND TYPE CW-2 FOR 12" WALLS.
4. WHERE ONLY ONE (1) VERTICAL REINFORCING BAR IS SCHEDULED, THE BAR SHALL BE CENTERED IN THE WALL. WHERE TWO (2) BARS ARE SCHEDULED, LOCATE FACE OF REBAR AT 3**A1/S601**M EACH FACE. SEE SCHEDULE FOR BAR LAP REQUIREMENTS. MINIMUM COVER REQUIREMENTS ARE IN ADDITION TO ANY ARCHITECTURAL REVEALS OR FEATURES.
5. PROVIDE 90° HOOKS AT ALL HORIZONTAL REINFORCEMENT AND AT ALL WELD ENDS, CORNERS AND INTERSECTIONS. HOOKS SHALL ENGAGE VERTICAL REINFORCING.
6. STAGGER ALL SPLICES IN REINFORCING AND PROVIDE CLASS B TOP BAR LAP LENGTH.
7. BAR CUTOFF FOR VERTICAL END OF WALL REINFORCING OCCURS 3'-0" ABOVE LEVEL ABOVE.
8. CONTINUE VERTICAL END OF WALL REINFORCING FULL HEIGHT OF WALLS AND INTO FOUNDATION.
9. SEE ARCHITECTURAL DRAWINGS FOR REVEALS AND ARCHITECTURAL FEATURES.

SCHEDULE - CONCRETE WALLS

Mark	Thick	Reinforcing Horizontal	Reinforcing Vertical	End of Wall Reinf Type	Comments
CW-1	8"	#5 @ 15" OC	#5 @ 12" OC	1	
CW-2	12"	#5 @ 16" OC EA FACE	#5 @ 16" OC EA FACE	2	



A5 CONCRETE WALL SCHEDULE
NO SCALE
3732_01

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PROFESSIONAL STAMP

PROFESSIONAL STRUCTURAL ENGINEER 10-9-2024 HENNING T. UNGERMAN #7801713 STATE OF UTAH

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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	23-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

STRUCTURAL DETAILS AND SCHEDULES

SHEET NUMBER

S601

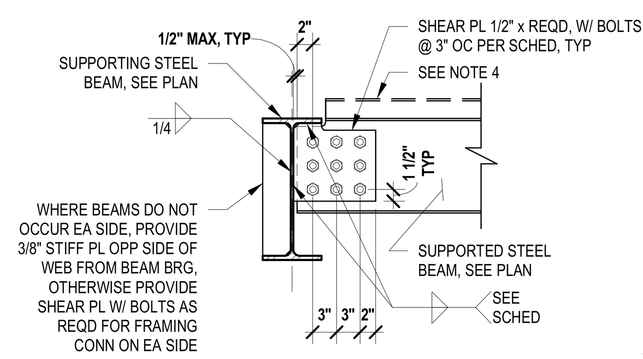
1 | 2 | 3 | 4 | 5 | 6 | 7

A B C D E

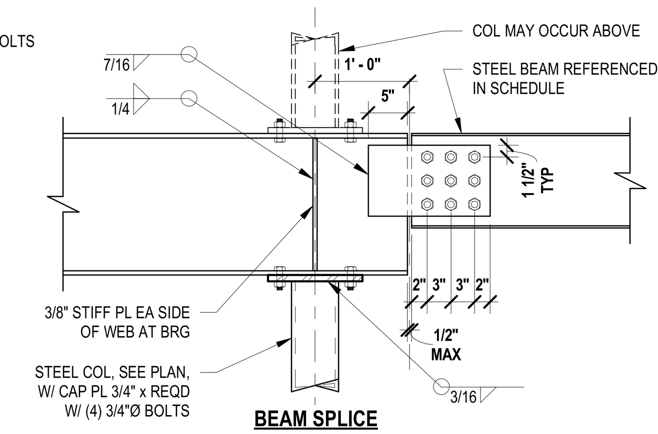
SCHEDULE - BOLTED COLLECTOR CONNECTIONS

Beam Size	Shear Bolts	Col x Row Bolt Layout	Weld Size
W16, W18	(12) 7/8"Ø	3x4	3/8"
W24	(15) 7/8"Ø	3x5	3/8"
W33	(18) 7/8"Ø	3x6	3/8"

NOTES:
1. SEE FRAMING PLANS FOR BEAM AND/OR COLUMN SIZES.
2. ALL BOLTS SHALL BE A325-N, TYP, UNO.
3. DECK AND JOISTS NOT SHOWN IN CONNECTION DETAILS BELOW.
4. BEAM MAY OCCUR HIGHER FOR DECK BEARING, COORD W/ PLAN.
5. COPE BEAM FLANGE AS REQD FOR CONNECTION.
6. ALL BOLTED CONNECTIONS SHALL USE STANDARD HOLES.
7. ALL SHEAR PLATES SHALL BE GRADE 50 STEEL (Fy = 50 KSI, Fu = ## KSI).
8. NOT ALL BEAM SIZES IN SCHEDULE ARE USED.



BEAM TO BEAM



BEAM SPLICE

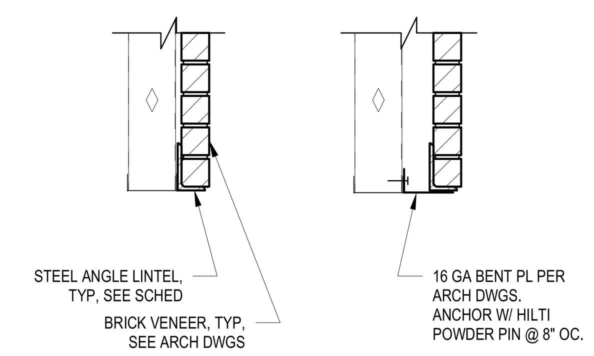
E3 COLLECTOR CONNECTIONS
NO SCALE

4744_03A

SCHEDULE - BRICK VENEER LOOSE STEEL ANGLE LINTEL

Rough Opening (RO) Width	Steel Angle Lintel Size
RO WIDTH <= 4'-0"	L3 1/2x3 1/2x1/4
4'-0" < RO WIDTH <= 6'-0"	L4x4x1/4
6'-0" < RO WIDTH <= 8'-0"	L6x4x5/16 (LLV)
8'-0" < RO WIDTH <= 10'-0"	L6x4x3/8 (LLV)
10'-0" < RO WIDTH	CONTACT STRUCTURAL ENGINEER

NOTES:
1. PROVIDE 6" MINIMUM BEARING AT EACH END.



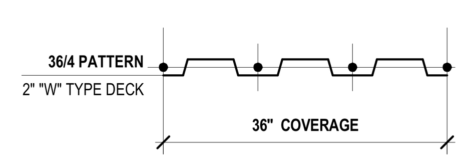
D5 STEEL ANGLE LINTEL SCHEDULE
NO SCALE

4757_01 - VENEER LINTEL ANGLE SCHEDULE

STEEL DECK SCHEDULE

MARK	PROFILE	DEPTH	MIN I (in^4/ft)	MIN S (in^3/ft)	SUPPORTS: PERPENDICULAR	SUPPORTS: PARALLEL	SIDE LAP: WELDED	SIDE LAP: MECHANICAL	MIN ALLOWABLE DIAPHRAGM SHEAR CAPACITY (ASD)	NOTES
D1	20 GA "W2"	2"	0.422	0.323	3/4"Ø PW @ 36/4	3/4"Ø PW @ 12" OC	-	BUTTON PUNCH @ 36" OC	2400 PLF @ 7'-0" SPAN	
DL	20 GA "W2"	2"	0.422	0.323	3/4"Ø PW @ 36/4	3/4"Ø PW @ 12" OC	-	BUTTON PUNCH @ 36" OC	2400 PLF @ 7'-0" SPAN	TYP STAIR LANDING DECK, SEE DETAIL D4/S511

NOTES:
1. SUPPORTS SHALL BE ANY STRUCTURAL STEEL ELEMENT IN CONTACT WITH STEEL DECK.
2. PW = PUDDLE WELD - 1/2" EFFECTIVE DIAMETER MINIMUM ARC SPOT WELD AT INTERIOR FLUTES, 1" x 3/8" EFFECTIVE ARC SEAM WELD AT SUPPORTS ADJACENT TO SIDELAP.
3. TSW = TOP SEAM WELD - 1 1/2" LONG TOP SEAM WELDS BETWEEN ADJACENT PIECES OF DECKING. CRIMP SIDE SEAMS BEFORE WELDING INTERLOCKING SEAMS.
4. BP = BUTTON PUNCH - 3/16" BUTTON PUNCH BETWEEN ADJACENT PIECES OF DECK. CRIMP SEAMS BEFORE BUTTON PUNCHING INTERLOCKING SEAMS.
5. PAF = POWDER ACTUATED FASTENER:
   - HILTI X-HSN 24 AT SUPPORTS 3/16" THROUGH 3/8" THICK
   - HILTI X-ENP-19 L15 AT SUPPORTS 1/4" THICK AND GREATER
   - PNEUTEK SDK61075 AT SUPPORTS 0.113" THROUGH 0.155" THICK
   - PNEUTEK SDK63075 AT SUPPORTS 0.155" THROUGH 0.250" THICK
   - PNEUTEK K64062 AT SUPPORTS 0.187" THROUGH 0.312" THICK
   - PNEUTEK K66062 OR K66075 AT SUPPORTS 0.281" THICK AND GREATER
6. SDS = SELF-DRILLING SCREW. WHERE SIDELAPS HAVE SCREWED CONNECTION, THE DECK PROVIDED SHALL HAVE A SCREWABLE SIDE SEAM, UNO.
7. PSC = PROPRIETARY SIDELAP CONNECTION - VERCO SIDELAP CONNECTION 2 FOR VERCO PUNCHLOK II SYSTEM, ASC DELTA GRIP FOR ASC DECKS.
8. SPACING AT SUPPORTS IS NOTED AS (DECK PANEL WIDTH)(ATTACHMENTS PER PANEL). FOR EXAMPLE: PW @ 36/4 INDICATES A 36" WIDE DECK SHEET WITH 4 PUDDLE WELDS AT EACH SUPPORT.
9. HEADED STUD ANCHORS WELDED THROUGH DECK WITH 1" MINIMUM COVER FROM EDGE OF DECK TO STUD CENTERLINE MAY BE SUBSTITUTED ONE FOR ONE FOR PW.
10. SEE PLANS FOR ADDITIONAL FASTENERS REQUIRED AT MEMBERS DENOTED AS SFRS. OMIT ATTACHMENTS WHERE DENOTED AS PROTECTED ZONES IN SFRS.
11. ALL WELDED SURFACES SHALL BE DRY BEFORE WELDING DECK OR STUDS TO SUPPORTS.
12. ALIGN AND SECURE DECK IN POSITION BEFORE WELDING OR INSTALLING FASTENERS OR STUDS.
13. ALTERNATE MEANS OF DECK ATTACHMENT ARE PERMITTED WITH APPROVAL OF THE ENGINEER. THE CONTRACTOR SHALL SUBMIT THE PROPOSED ATTACHMENT SYSTEM AND THE CODE EVALUATION REPORT DEMONSTRATING THE SYSTEM HAS THE STRENGTH TO MEET THE SPECIFIED DECK SHEAR. IF THE ALTERNATE METHOD IS APPROVED, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT THE DECK TYPE AND PROFILE IS COMPATIBLE WITH THE FASTENING SYSTEM.
14. STEEL DECK SHALL COMPLY WITH LATEST REQUIREMENTS OF THE STEEL DECK INSTITUTE (SDI).
15. SUBMIT CURRENT CODE EVALUATION REPORT (ICC OR IAPMO) WITH LOAD AND LATERAL SHEAR CAPACITIES WITH SHOP DRAWINGS.
16. ALL DECK SHALL BE 3-SPAN CONTINUOUS MINIMUM WHERE POSSIBLE. IN AREAS WHERE 3-SPAN CONDITIONS ARE NOT POSSIBLE THE CONTRACTOR SHALL VERIFY UN-SHORED DECK IS PERMITTED BY THE DECK MANUFACTURER FOR THE SPAN CONDITION, SPAN LENGTH, AND DECK GAUGE. WHERE DECK DOES NOT MEET THE REQUIREMENTS FOR UN-SHORED DECK, THE CONTRACTOR SHALL EITHER PROVIDE HEAVIER GAUGE DECK TO ALLOW FOR UN-SHORED DECK OR PROVIDE SHORING.
17. STEEL DECK WITHOUT CONCRETE FILL SHALL NOT BE USED TO SUPPORT LOADS FROM PLUMBING, HVAC DUCTS, LIGHT FIXTURES, ARCHITECTURAL ELEMENTS OR EQUIPMENT OF ANY KIND, UNLESS SPECIFICALLY NOTED OTHERWISE. LIGHTWEIGHT SUSPENDED ACOUSTICAL CEILINGS WITH A TOTAL WEIGHT PER WIRE NOT EXCEEDING 50# MAY BE HUNG FROM THE STEEL ROOF DECK. THE HANGERS SHOULD BE STAGGERED TO DISTRIBUTE THE LOAD OVER MULTIPLE DECK FLUTES.
18. DECK SHALL HAVE 2" MINIMUM BEARING ON ALL SUPPORTING MEMBERS (MEMBERS PERPENDICULAR TO DECK), UNO. DECKS SHALL HAVE 1 1/2" MINIMUM BEARING AT PARALLEL MEMBERS.
19. SEE TYPICAL DETAILS FOR SUPPORT STEEL REQUIRED AT OPENINGS THROUGH STEEL DECK. OPENING SUPPORT STEEL SHALL BE INSTALLED PRIOR TO SAW CUTTING OPENINGS.
20. ROOF DECKS TO BE GALVANIZED. FLOOR DECKS TO BE PHOSPHATIZED / PAINTED, EXCEPT ABOVE AND BELOW RESTROOMS, LOCKER ROOMS, AND MECHANICAL ROOMS, PROVIDE GALVANIZED DECK.



3/4"Ø PUDDLE WELD LAYOUT

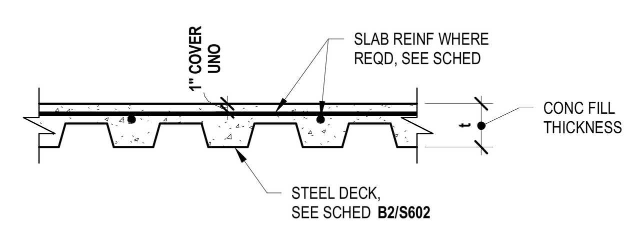
B2 STEEL DECK SCHEDULE
NO SCALE

4677_03

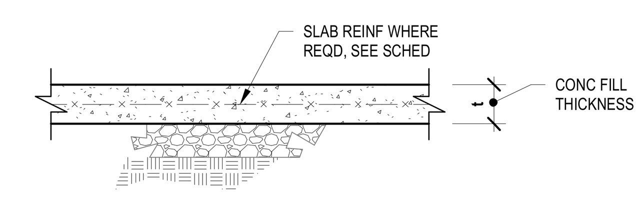
CONCRETE SLAB SCHEDULE

MARK	THICKNESS (t)	TYPE	REINFORCEMENT	FIRE RATING	NOTES
S1	5"	NORMAL WEIGHT	6x6 - W2.9xW2.9 WWF	1 HR	
SG1	4"	NORMAL WEIGHT	6x6 - W1.4xW1.4 WWF	-	
SG2	12"	NORMAL WEIGHT	#5 @ 12" OC EACH WAY, TOP & BOT	-	ELEVATOR PIT SLAB
SL	4"	LIGHTWEIGHT	6x6 - W1.4xW1.4 WWF	-	TYP STAIR LANDING SLAB, SEE DETAIL D4/S511

NOTES:
1. FIBER REINFORCEMENT, WHEN REQUIRED IN SCHEDULE, SHALL BE MACROSYNTHETIC FIBER REINFORCEMENT PER THE CONCRETE MATERIALS SECTION OF THE GENERAL STRUCTURAL NOTES.
2. DO NOT EMBED CONDUITS OR PIPES IN CONCRETE FILL OVER STEEL DECKS WITHOUT APPROVAL OF STRUCTURAL ENGINEER.
3. SEE PLANS AND DETAILS FOR LOCATIONS WHERE ADDITIONAL SLAB REINFORCEMENT IS REQUIRED.



CONCRETE SLAB OVER STEEL DECK PROFILE



CONVENTIONAL CONCRETE SLAB PROFILE

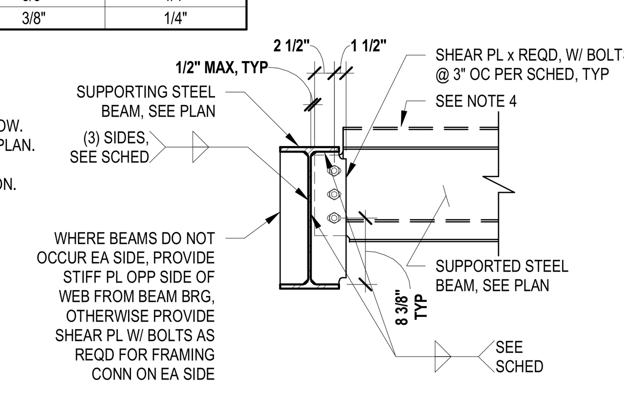
B4 CONCRETE SLAB SCHEDULE
NO SCALE

3677_06

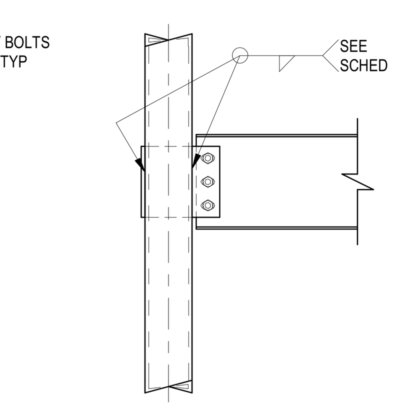
SCHEDULE - BOLTED CONNECTION

Beam Size	Shear Bolts	Shear Plate	Web Stiffener	Weld Size
W12	(3) 3/4"Ø	3/8"	3/8"	1/4"
W16	(4) 3/4"Ø	3/8"	3/8"	1/4"
W18	(5) 3/4"Ø	3/8"	3/8"	1/4"
W24	(6) 3/4"Ø	3/8"	3/8"	1/4"
W33	(9) 3/4"Ø	3/8"	3/8"	1/4"

NOTES:
1. SEE FRAMING PLANS FOR BEAM AND/OR COLUMN SIZES.
2. ALL BOLTS SHALL BE A325-N, TYP, UNO.
3. DECK AND JOIST NOT SHOWN IN CONNECTION DETAILS BELOW.
4. BEAM MAY OCCUR HIGHER FOR DECK BEARING, COORD W/ PLAN.
5. COPE BEAM FLANGE AS REQD FOR CONNECTION.
6. PROVIDE HORIZ SSHs IN SHEAR PL FOR BOLTED CONNECTION.
7. DIMENSIONS SHOWN ON BEAM TO BEAM ARE TO BE CONSIDERED TYPICAL FOR ALL CONDITIONS SHOWN.



BEAM TO BEAM



BEAM TO HSS COL

A3 TYPICAL BOLTED CONNECTIONS
NO SCALE

4744_03

Autodesk Docs://24-013 CCHS Fieldhouse & Soccer Field/CCHS Fieldhouse & Soccer Field - S23.rvt
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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	23-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

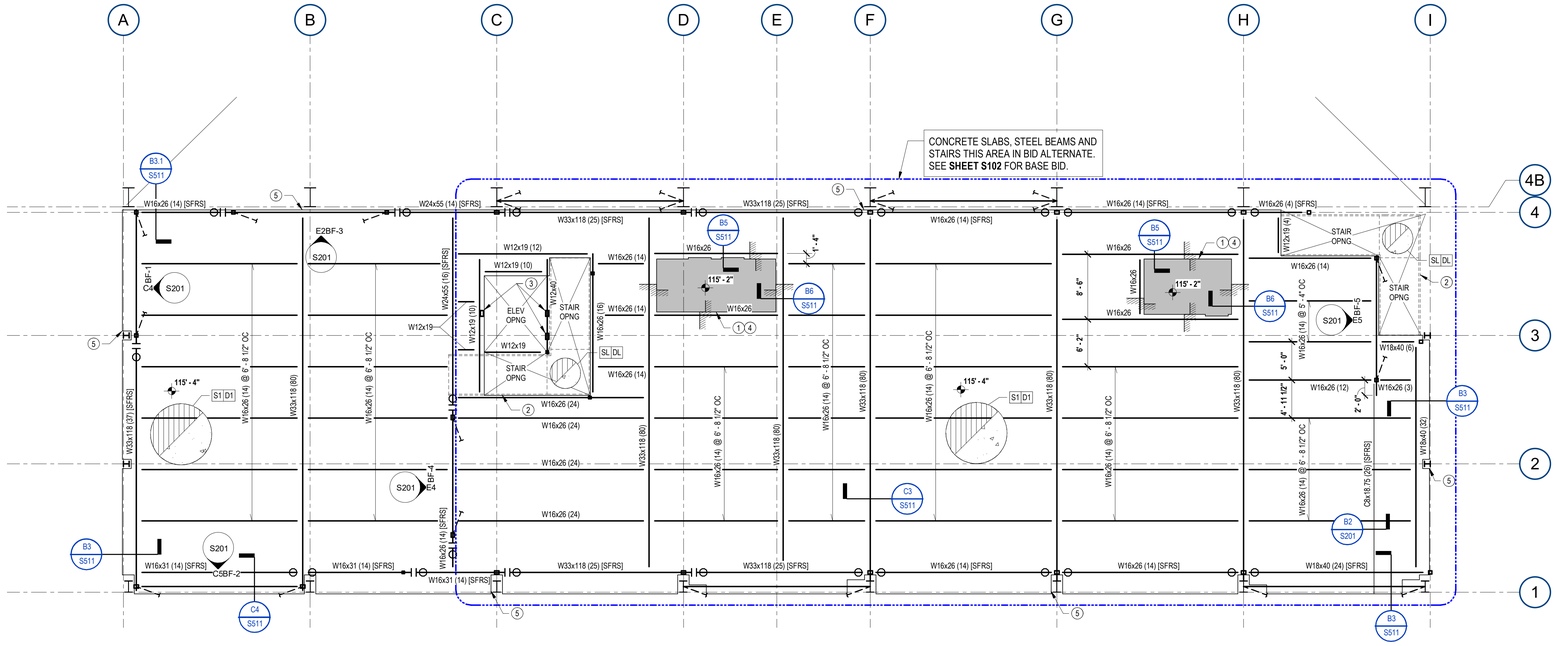
THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

STRUCTURAL DETAILS AND SCHEDULES

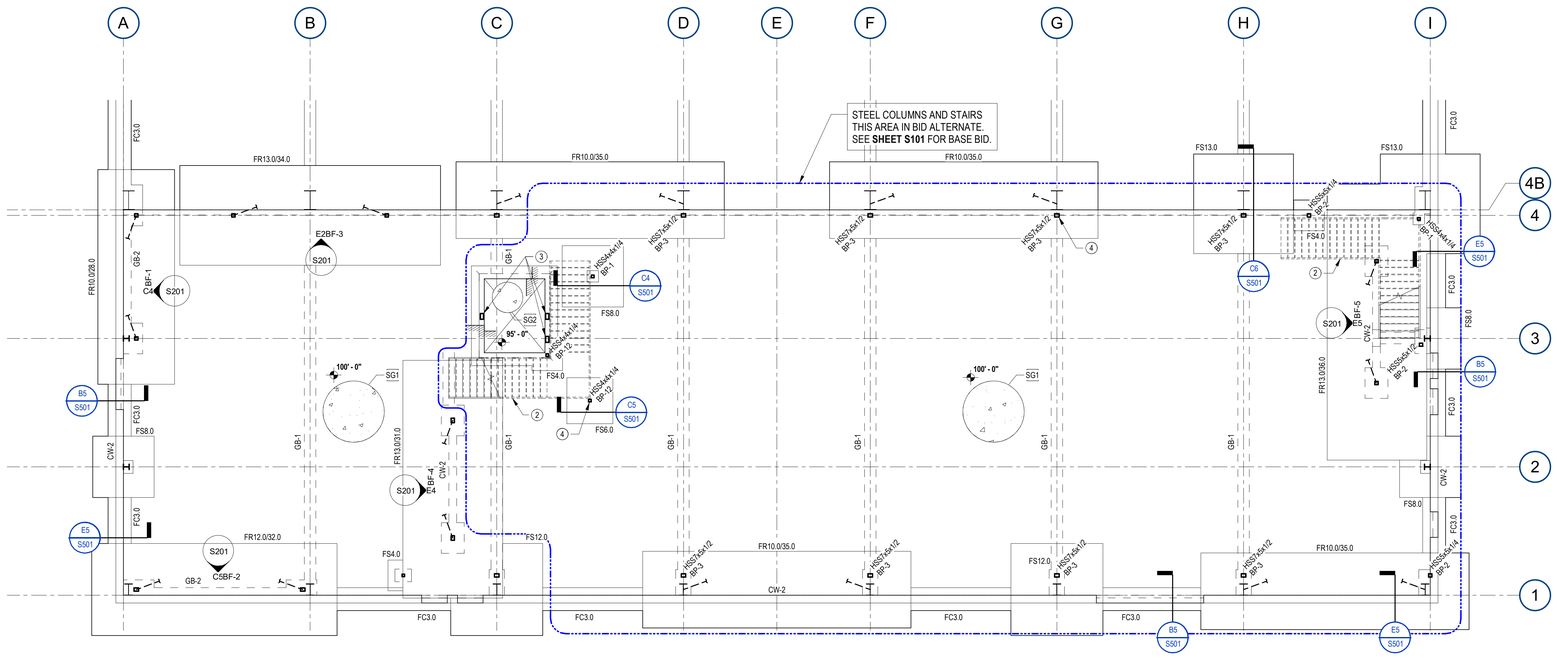
SHEET NUMBER

S602



Level 2 Framing Plan - Bid Alternate

1/8" = 1'-0"



Footing & Foundation Plan - Bid Alternate

1/8" = 1'-0"

PLAN NOTES - FLOOR FRAMING

- # NUMBERED NOTES BELOW ARE KEYED ON PLAN.
- D# DENOTES DECK TYPES KEYED ON PLAN, SEE SCHEDULE B2/602.
- S# DENOTES SLAB TYPES KEYED ON PLAN, SEE SCHEDULE B4/S602.
- * SEE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS, TYPICAL.
- ** NOT ALL NOTES MAY APPLY TO AREA SHOWN ON SHEET.
- A SEE STRUCTURAL NOTES ON SHEETS S001 & S002 FOR ADDITIONAL INFORMATION.
- B TOP OF CONCRETE SLAB ELEVATION = 115'-4", UNLESS NOTED THUS: xxx'-x"
- C SEE DETAIL A3/S602 FOR TYPICAL BEAM TO BEAM CONNECTIONS.
- D COORDINATE OPENINGS THROUGH FLOOR DECK WITH MECHANICAL DRAWINGS. FLOOR PENERATIONS SHALL HAVE ANGLE FRAMING PER DETAIL A2/S511.
- E ALL CONTINUOUS DECK ANGLES TO BE SPLICED PER DETAIL B4/S511.
- F SEE ARCHITECTURAL DRAWINGS FOR TOP OF CMU WALL ELEVATIONS.
- G SEE DETAIL B3/S501 FOR CONTROL JOINTS IN MASONRY. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS.
- H SEE STEEL ANGLE LINTEL SCHEDULE D5/S602 FOR BRICK VENEER SUPPORT OVER OPENINGS, TYP, UNO.

PLAN NOTES - FLOOR FRAMING

- J (#) FOLLOWING STEEL BEAM CALLOUT DENOTES HEADED STUD ANCHOR QUANTITY FOR COMPOSITE BEAM. SEE DETAIL A3/S511 FOR SIZE AND SPACING REQUIREMENTS.
- K SEE SHEET S901 FOR BID ALTERNATE INFORMATION.
- L PROVIDE 3" SEPARATION BETWEEN PEMB AND ALL MEZZANINE COMPONENTS AND FILL GAP WITH COMPRESSIBLE MATERIAL.
- 1 STEP IN SLAB, SEE DETAILS B5/S511 & B6/S511. SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF STEPS.
- 2 SEE ARCHITECTURAL DRAWINGS FOR DETAILED ELEVATIONS AND CONFIGURATIONS OF LANDINGS AND STAIRS. AT STAIR LANDINGS, USE TYPE SL SLABS AND DL DECK, TYPICAL. SEE DETAIL D4/S511 FOR TYPICAL FRAMING SIZES & REQUIREMENTS.
- 3 ELEVATOR RAIL SUPPORT COLUMNS (ABOVE & BELOW) SHOWN FOR BID PURPOSES ONLY, COORDINATE REQUIREMENTS WITH ELEVATOR MANUFACTURER / SUPPLIER. SEE DETAIL D3/S511 & D2/S511 FOR TYPICAL FRAMING REQUIREMENTS.
- 4 PROVIDE SHORING BELOW SINGLE SPAN DECKING PRIOR TO POURING CONCRETE.
- 5 PROVIDE 3" EXPANSION GAP BETWEEN PEMB AND MEZZANINE STRUCTURE, TYPICAL.

FLOOR FRMG PLAN LEGEND

- xxx'-xx" — TOP OF CONCRETE SLAB ELEVATION
- CHANGE IN ELEVATION
- S# D# — CONCRETE SLAB ON STEEL DECK W/ SPAN DIRECTION INDICATED, SEE SCHEDULES **B4/S602** & **B2/S602** RESPECTIVELY
- STEEL COLUMNS: WIDE FLANGE, TUBE, PIPE
- DEPRESSED SLAB AREAS, COORD W/ ARCHITECTURAL DRAWINGS
- MASONRY WALL
- STEEL STUD WALL
- BEAM SPLICE, SEE DETAIL **A3/S511**
- COLLECTOR BEAM CONNECTION, SEE SCHEDULE **E3/S602**
- COLLECTOR BEAM SPLICE, SEE SCHEDULE **E3/S602**
- [SFRS] — SEISMIC FORCE RESISTING SYSTEM
- xx K — ADDITIONAL POINT LOAD

PLAN NOTES - FOOTING & FDTN

- # NUMBERED NOTES BELOW ARE KEYED ON PLAN.
- R# DENOTES REINFORCING KEYED ON PLAN.
- SG# DENOTES SLAB TYPES KEYED ON PLAN, SEE SCHEDULE B4/S602.
- * SEE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS, TYPICAL.
- ** NOT ALL NOTES MAY APPLY TO AREA SHOWN ON SHEET.
- A SEE STRUCTURAL NOTES ON SHEETS S001 & S002 FOR ADDITIONAL INFORMATION.
- B TOP OF CONCRETE SLAB ELEVATION = 100'-0", UNLESS NOTED THUS: xxx'-x" SLOPE UNIFORMLY TO FLOOR DRAINS.
- C PLACE CONTROL JOINTS AND CONSTRUCTION JOINTS IN SLAB PER STRUCTURAL NOTES. SEE DETAIL A6/S501.
- D CENTER FOOTINGS ON WALLS AND COLUMNS UNLESS DIMENSIONED OTHERWISE ON PLANS.
- E SEE STRUCTURAL NOTES ON SHEET S001 FOR MINIMUM FROST COVER FOR ALL EXTERIOR FOOTINGS.
- F FOOTING ELEVATIONS SHOWN ARE BASED ON A UNIFORM GRADE 6" BELOW SLAB PLUS 2'-6" FROST COVER. COORDINATE ELEVATIONS SHOWN WITH CIVIL AND SITE PLANS FOR ANY ADDITIONAL DEPTH THAT MAY BE REQUIRED TO MAINTAIN MINIMUM FROST COVER OVER FOOTINGS.
- G SEE PLAN AND SECTIONS FOR TOP OF FOUNDATION WALL ELEVATIONS.
- H SEE DETAIL A5/S501 AN A3/S501 FOR TYPICAL CONCRETE AND MASONRY WALL REINFORCEMENT AT CORNERS AND INTERSECTIONS.
- J DO NOT PLACE BACKFILL AGAINST FOUNDATION WALLS UNTIL BRACING FLOOR IS IN PLACE OR ADEQUATE SHORING IS INSTALLED.
- K SEE DETAIL B3/S501 FOR CONTROL JOINTS IN MASONRY. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS.

PLAN NOTES - FOOTING & FDTN

- L SEE ARCHITECTURAL / SITE DRAWINGS FOR INFORMATION AND LOCATION OF SITE WALLS, STEPS, PLANTERS, RAMPS, ETC.
- M COORDINATE FOOTING W/ MECHANICAL AND ELECTRICAL DRAWINGS FOR ALL PENETRATIONS NEAR FOOTINGS. SEE A1/S501 FOR ADDITIONAL INFORMATION.
- N PROVIDE HOUSEKEEPING PADS FOR MECHANICAL/ELECTRICAL UNITS AS REQUIRED BY THE MECHANICAL/ELECTRICAL DRAWINGS. PADS TO BE POURED MONOLITHICALLY WITH THE SLAB ON GRADE OR ANCHORED WITH REBAR PER DETAIL C2/S501.
- P SEE SHEET S901 FOR BID ALTERNATE INFORMATION.
- 1 CONTRACTOR TO PROTECT AND COVER ELEVATOR PIT AND BRACED FRAME ANCHORAGE BETWEEN BASE BID AND BID ALT PHASES OF CONSTRUCTION.
- 2 SEE ARCHITECTURAL DRAWINGS FOR DETAILED ELEVATIONS AND CONFIGURATIONS OF LANDINGS AND STAIRS. AT STAIR LANDINGS, USE TYPE SL SLABS AND DL DECK, TYPICAL. SEE DETAIL D4/S511 FOR TYPICAL FRAMING SIZES & REQUIREMENTS.
- 3 ELEVATOR RAIL SUPPORT COLUMNS SHOWN FOR BID PURPOSES ONLY, COORDINATE REQUIREMENTS WITH ELEVATOR MANUFACTURER / SUPPLIER. SEE DETAIL C1/S501 FOR TYPICAL FRAMING REQUIREMENTS.
- 4 CONTRACTOR OPTION TO POST-INSTALL GRAVITY COLUMNS. SUBMIT RFI FOR POST-INSTALLATION OPTIONS. MAY ONLY UTILIZE FOR MEZZANINE COLUMNS NOT CONNECTED TO BRACED FRAMES.
- 5 DO NOT ROUTE MECHANICAL / ELECTRICAL DISTRIBUTION LINES BELOW OR THROUGH FOUNDATION WALLS WITH GRADE BEAMS.
- 6 PROVIDE 3" SEPARATION BETWEEN YARD WALL AND PEMB WITH COMPRESSIBLE MATERIAL.

FTG/FDTN PLAN LEGEND

- FCx.x, FSx.x, FRx.x — CONTINUOUS FOOTING, SPOT FOOTING, RECTANGULAR FOOTING TYPES RESPECTIVELY, SEE SCHEDULE **A3/S601**
- CHANGE IN ELEVATION
- xxx'-xx" — TOP OF CONCRETE SLAB ELEVATION
- TW xxx'-xx" — TOP OF WALL ELEVATION
- TP xxx'-xx" — TOP OF PIER ELEVATION
- TF xx'-xx" — TOP OF FTG ELEVATION
- SG# — CONCRETE SLAB ON GRADE, SEE SCHEDULE **B4/S602**
- FCx.x — CONCRETE FOOTING, SEE SCHEDULE **A3/S601**
- CW-# — CONCRETE FDTN WALL TYPE, SEE SCHEDULE **A5/S601**
- RECESS IN CONCRETE FDTN WALL
- CP-# — CONCRETE PIER IN WALL, SEE SCHEDULE **B4/S601**
- SITE WALL, COORD W/ ARCH / CIVIL DWGS
- STEEL STUD WALL
- BP-# — STEEL COLUMNS: WIDE FLANGE, HSS, BASE PLATE TYPE, SEE SCHEDULE **B1/S601**

CORE ARCHITECTURE
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PROFESSIONAL STAMP

PROFESSIONAL STRUCTURAL ENGINEER — 10-9-2024 — HENNING T. UNGERMAN — #7801713 — STATE OF UTAH

CONSULTANT INFORMATION

CALDER RICHARDS CONSULTING ENGINEERS
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ALL DRAWINGS, PLANS AND DETAILS ARE INSTRUMENTS OF SERVICE AND SHALL REMAIN THE PROPERTY OF CALDER RICHARDS CONSULTING ENGINEERS, AND ARE NOT SUITABLE FOR REUSE NOR INTENDED FOR ANY OTHER PROJECT.

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

△	DESCRIPTION	DATE
1	Addendum 4	10/09/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	23-013
PM / PA:	KJM
PIC:	CLL

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

BID ALT #1 - FOOTING & FOUNDATION & LEVEL 2 FRAMING PLANS

SHEET NUMBER

S901

Autodesk Docs://24-013 CCHS Fieldhouse & Soccer Field/CCHS Fieldhouse & Soccer Field - S23.rvt
10/9/2024 1:59:42 PM

COM*check* Software Version COMcheckWeb

Interior Lighting Compliance Certificate

Project Information

Energy Code: 2021 IECC
Project Title: CCHS Fieldhouse and Soccer Field - ALTERNATE BID
Project Type: New Construction

Construction Site:
12943 South 700 East
Draper, Utah 84020

Owner/Agent:

Designer/Contractor:

Additional Efficiency Package(s)

Credits: 10.0 Required 0.0 Proposed

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts
1-Common Space Types:Classroom/Lecture/Training	320	0.71	227
2-Common Space Types:Corridor/Transition <8 ft wide	2500	0.71	1775
3-Gymnasium/Fitness Center:Exercise Area	35000	0.90	31500
4-Common Space Types:Restrooms	1300	0.63	819
5-Common Space Types:Office - Enclosed	2800	0.74	2072
6-Common Space Types:Office - Open Plan	3700	0.61	2257
7-Common Space Types:Storage >=50 - <=1000 sq.ft.	800	0.38	304
		Total Allowed Watts =	38954

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
1-Common Space Types:Classroom/Lecture/Training				
LED: B33: LED Panel 19W:	1	6	31	186
2-Common Space Types:Corridor/Transition <8 ft wide				
LED 2X2 PANEL: B33: LED Panel 19W:	1	15	31	465
LED: A44: LED Panel 19W:	1	16	48	768
3-Gymnasium/Fitness Center:Exercise Area				
LED: HB1: LED Panel 19W:	1	63	271	17073
LED: SL2C: LED Linear 8W:	1	4	30	120
LED: A75: LED Panel 19W:	1	45	48	2160
4-Common Space Types:Restrooms				
LED STRIP, 8': L8H100: LED Linear 8W:	1	2	75	150
LED, STRIP 4': L4H100: LED Linear 8W:	1	14	38	532
LED DOWNLIGHT, WET RATED: S7R: LED A Lamp 2.5W:	1	2	14	28
LED: SL2C: LED Linear 8W:	1	3	30	90
5-Common Space Types:Office - Enclosed				
LED: A44: LED Panel 19W:	1	30	48	1440

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
LED: SL2: LED Linear 8W:	1	3	30	90
LED: L2RM: LED Linear 8W:	1	1	84	84
LED: D4A: LED A Lamp 2.5W:	1	15	10	150
6-Common Space Types:Office - Open Plan				
LED: LED Panel 19W:	1	42	31	1302
LED: LED A Lamp 2.5W:	1	30	10	300
LED: LED Linear 8W:	1	3	50	150
7-Common Space Types:Storage >=50 - <=1000 sq.ft.				
LED: SL2C: LED Linear 8W:	1	8	30	240
			Total Proposed Watts =	25328

Interior Lighting PASSES: Design 35% better than code

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2021 IECC requirements in COM*check* Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Name - Title _____ Signature _____ Date _____

COM*check* Software Version COMcheckWeb

Exterior Lighting Compliance Certificate

Project Information

Energy Code:	2021 IECC
Project Title:	CCHS Fieldhouse and Soccer Field - ALTERNATE BID
Project Type:	New Construction
Exterior Lighting Zone	3 (Other (LZ3))

Construction Site:
12943 South 700 East
Draper, Utah 84020

Owner/Agent:

Designer/Contractor:

Allowed Exterior Lighting Power

A Area/Surface Category	B Quantity	C Allowed Watts /	D Tradable Wattage	E Allowed Watts (B X C)
Walkway < 10 feet wide	825 ft of	0.6	Yes	495
			Total Tradable Watts (a) =	495
			Total Allowed Watts =	828
			Total Allowed Supplemental Watts (b) =	500

(a) Wattage tradeoffs are only allowed between tradable areas/surfaces.
(b) A supplemental allowance equal to 500 watts may be applied toward compliance of both non-tradable and tradable areas/surfaces.

Proposed Exterior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
Walkway < 10 feet wide (825 ft of walkway length): Tradable Wattage				
LED: OW1: WALL PACK: LED A Lamp 2.5W:	1	16	49	784
Emergency services, loading area (950 ft2): Non-tradable Wattage				
			Total Tradable Proposed Watts =	784

Exterior Lighting PASSES: Design 21% better than code

Exterior Lighting Compliance Statement

Compliance Statement: The proposed exterior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed exterior lighting systems have been designed to meet the 2021 IECC requirements in COM*check* Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Name - Title _____ Signature _____ Date _____

Inspection Checklist

Energy Code: 2021 IECC

Requirements: 38.0% were addressed directly in the COM*check* software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR4][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C103.2 [PR8][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the exterior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include exterior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C406 [PR9][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the additional energy efficiency package options.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.3.1 [EL22][1]	Spaces required to have light-reduction controls have a manual control that allows the occupant to reduce the connected lighting load in a reasonably uniform illumination pattern >= 50 percent.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.2.1, C405.2.1.1 [EL18][1]	Occupancy sensors installed in classrooms/lecture/training rooms, conference/meeting/multipurpose rooms, copy/print rooms, lounges/breakrooms, enclosed offices, open plan office areas, restrooms, storage rooms, locker rooms, corridors, warehouse storage areas, and other spaces <= 300 sqft that are enclosed by floor-to-ceiling height partitions. Reference section language C405.2.1.2 for control function in warehouses and section C405.2.1.3 for open plan office spaces.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.2.1.2 [EL19][1]	Occupancy sensors control function in warehouses: In warehouses, the lighting in aisleways and open areas is controlled with occupant sensors that automatically reduce lighting power by 50% or more within 20 minutes of when the areas are unoccupied. The occupant sensors control lighting in each aisleway independently and do not control lighting beyond the aisleway being controlled by the sensor. Lights not turned off by occupant sensors is done so by time-switch.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.2.1.3 [EL20][1]	Occupant sensor control function in open plan office areas: Occupant sensor controls in open office spaces >= 300 sq.ft. have controls 1) configured so that general lighting can be controlled separately in control zones with floor areas <= 600 sq.ft. within the space, 2) general lighting in each zone permitted to turn on upon occupancy in control zone, 3) automatically turn off general lighting in all control zones within 20 minutes after all occupants have left the space, 4) are configured so that general lighting power in each control zone is reduced by >= 80% of the full zone general lighting power within 20 minutes of all occupants leaving that control zone.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.2.2, C405.2.2.1 [EL21][2]	Each area not served by occupancy sensors (per C405.2.1.1) have time-switch controls and functions detailed in sections C405.2.2.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.4, C405.2.4.1, C405.2.4.2 [EL23][2]	Daylight zones provided with individual controls that control the lights independent of general area lighting. See code section C405.2.3 Daylight-responsive controls for applicable spaces, C405.2.3.1 Daylight responsive control function and section C405.2.3.2 Sidelit zone.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.2.5 [EL27][1]	Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.2.7 [EL28][1]	Automatic lighting controls for exterior lighting installed. Controls will be daylight controlled, set based on business operation time-of-day, or reduce connected lighting > 30%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.7 [EL26][2]	Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of Table C405.6.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.8 [EL27][2]	Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.9.1, C405.9.2 [EL28][2]	Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.10 [EL29][2]	Total voltage drop across the combination of feeders and branch circuits <= 5%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.1.1 [EL30][2]	At least 90% of dwelling unit permanently installed lighting shall have lamp efficacy >= 65 lm/W or luminaires with efficacy >= 45 lm/W or comply with C405.2.4 or C405.3.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.11, C405.11.1 [EL31][2]	50% of 15/20 amp receptacles installed in enclosed offices, conference rooms, copy rooms, break rooms, classrooms and workstations and > 25% of branch circuit feeders for modular furniture will have automatic receptacle control in accordance with C405.11.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.2 [FI17][3]	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.5.1 [FI19][1]	Exterior lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Exterior Lighting fixture schedule for values.*
C408.1.1 [FI57][1]	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.5 [FI16][3]	Furnished as-built drawings for electric power systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.3 [FI33][1]	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

COM*check* Software Version COMcheckWeb

Interior Lighting Compliance Certificate

Project Information

Energy Code:	2021 IECC
Project Title:	CCHS Fieldhouse and Soccer Field
Project Type:	New Construction

Construction Site:
12943 South 700 East
Draper, Utah 84020

Owner/Agent:

Designer/Contractor:

Additional Efficiency Package(s)

Credits: 10.0 Required 0.0 Proposed

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts
1-Gymnasium/Fitness Center:Exercise Area	35800	0.90	32220
2-Common Space Types:Corridor/Transition <8 ft wide	650	0.71	462
3-Common Space Types:Classroom/Lecture/Training	320	0.71	227
4-Common Space Types:Restrooms	1100	0.63	693
		Total Allowed Watts =	33602

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
1-Gymnasium/Fitness Center:Exercise Area				
LED: HB1: LED Panel 19W:	1	81	271	21951
LED: SL2C: LED Linear 8W:	1	4	30	120
2-Common Space Types:Corridor/Transition <8 ft wide				
LED 2X2 PANEL: B33: LED Panel 19W:	1	15	31	465
3-Common Space Types:Classroom/Lecture/Training				
LED: B33: LED Panel 19W:	1	6	31	186
4-Common Space Types:Restrooms				
LED STRIP, 8': L8H100: LED Linear 8W:	1	2	75	150
LED, STRIP 4': L4H100: LED Linear 8W:	1	11	38	418
LED DOWNLIGHT, WET RATED: S7R: LED A Lamp 2.5W:	1	1	14	14
LED: SL2C: LED Linear 8W:	1	3	30	90
			Total Proposed Watts =	23394

Interior Lighting PASSES: Design 30% better than code

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2021 IECC requirements in COM*check* Version COMcheckWeb and to comply with any applicable

mandatory requirements listed in the Inspection Checklist.

Name - Title	Signature	Date

COM*check* Software Version COMcheckWeb

Exterior Lighting Compliance Certificate

Project Information

Energy Code:	2021 IECC
Project Title:	CCHS Fieldhouse and Soccer Field
Project Type:	New Construction
Exterior Lighting Zone	3 (Other (LZ3))

Construction Site:
12943 South 700 East
Draper, Utah 84020

Owner/Agent:

Designer/Contractor:

Allowed Exterior Lighting Power

A Area/Surface Category	B Quantity	C Allowed Watts /	D Tradable Wattage	E Allowed Watts (B X C)
Exterior walls (Walkway < 10 feet wide)	825 ft of	0.6	Yes	495
			Total Tradable Watts (a) =	495
			Total Allowed Watts =	602
			Total Allowed Supplemental Watts (b) =	500

(a) Wattage tradeoffs are only allowed between tradable areas/surfaces.
(b) A supplemental allowance equal to 500 watts may be applied toward compliance of both non-tradable and tradable areas/surfaces.

Proposed Exterior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
Exterior walls (Walkway < 10 feet wide, 825 ft of walkway length): Tradable Wattage				
LED: OW1: WALL PACK: LED A Lamp 2.5W:	1	16	49	784
Illuminated area of facade wall or surface (950 ft2): Non-tradable Wattage				
			Total Tradable Proposed Watts =	784

Exterior Lighting PASSES: Design 21% better than code

Exterior Lighting Compliance Statement

Compliance Statement: The proposed exterior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed exterior lighting systems have been designed to meet the 2021 IECC requirements in COM*check* Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Name - Title _____ Signature _____ Date _____

COM*check* Software Version COMcheckWeb

Inspection Checklist

Energy Code: 2021 IECC

Requirements: 38.0% were addressed directly in the COM*check* software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR4][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C103.2 [PR8][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the exterior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include exterior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C406 [PR9][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the additional energy efficiency package options.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.3.1 [EL22][1]	Spaces required to have light-reduction controls have a manual control that allows the occupant to reduce the connected lighting load in a reasonably uniform illumination pattern >= 50 percent.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.2.1, C405.2.1.1 [EL18][1]	Occupancy sensors installed in classrooms/lecture/training rooms, conference/meeting/multipurpose rooms, copy/print rooms, lounges/breakrooms, enclosed offices, open plan office areas, restrooms, storage rooms, locker rooms, corridors, warehouse storage areas, and other spaces <= 300 sqft that are enclosed by floor-to-ceiling height partitions. Reference section language C405.2.1.2 for control function in warehouses and section C405.2.1.3 for open plan office spaces.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.2.1.2 [EL19][1]	Occupancy sensors control function in warehouses: In warehouses, the lighting in aisleways and open areas is controlled with occupant sensors that automatically reduce lighting power by 50% or more within 20 minutes of when the areas are unoccupied. The occupant sensors control lighting in each aisleway independently and do not control lighting beyond the aisleway being controlled by the sensor. Lights not turned off by occupant sensors is done so by time-switch.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.2.1.3 [EL20][1]	Occupant sensor control function in open plan office areas: Occupant sensor controls in open office spaces >= 300 sq.ft. have controls 1) configured so that general lighting can be controlled separately in control zones with floor areas <= 600 sq.ft. within the space, 2) general lighting in each zone permitted to turn on upon occupancy in control zone, 3) automatically turn off general lighting in all control zones within 20 minutes after all occupants have left the space, 4) are configured so that general lighting power in each control zone is reduced by >= 80% of the full zone general lighting power within 20 minutes of all occupants leaving that control zone.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.2.2, C405.2.2.1 [EL21][2]	Each area not served by occupancy sensors (per C405.2.1.1) have time-switch controls and functions detailed in sections C405.2.2.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.4, C405.2.4.1, C405.2.4.2 [EL23][2]	Daylight zones provided with individual controls that control the lights independent of general area lighting. See code section C405.2.3 Daylight-responsive controls for applicable spaces, C405.2.3.1 Daylight responsive control function and section C405.2.3.2 Sidelit zone.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.2.5 [EL27][1]	Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.2.7 [EL28][1]	Automatic lighting controls for exterior lighting installed. Controls will be daylight controlled, set based on business operation time-of-day, or reduce connected lighting > 30%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.7 [EL26][2]	Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of Table C405.6.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.8 [EL27][2]	Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.9.1, C405.9.2 [EL28][2]	Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.10 [EL29][2]	Total voltage drop across the combination of feeders and branch circuits <= 5%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.1.1 [EL30][2]	At least 90% of dwelling unit permanently installed lighting shall have lamp efficacy >= 65 lm/W or luminaires with efficacy >= 45 lm/W or comply with C405.2.4 or C405.3.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.11, C405.11.1 [EL31][2]	50% of 15/20 amp receptacles installed in enclosed offices, conference rooms, copy rooms, break rooms, classrooms and workstations and > 25% of branch circuit feeders for modular furniture will have automatic receptacle control in accordance with C405.11.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.2 [FI17][3]	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.5.1 [FI19][1]	Exterior lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Exterior Lighting fixture schedule for values.*
C408.1.1 [FI57][1]	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.5 [FI16][3]	Furnished as-built drawings for electric power systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.3 [FI33][1]	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Addendum #4

To: Kyle Mendoza, AIA
Core Architecture
233 South Pleasant Grove Blvd. Suite 105
CC: Nichole Luthi, PE
From: Jacob Booth, EIT

Date: 10/09/2024

Subject: Addendum #4
Project No. #23180 BP-3

Addendum #4
CS230 • Line and curve table data revised. • Site layout revised. CS231 • Site layout revised. • New gate callouts added. CU300 • Note 8 revised. CG400 • Callout revised. CG401 • 30” CB-6 structure rim revised. • 24” AD-1 structure rim revised. • Grading revised. CG402 • Overflow Box - 1 structure callout revised. CG450 • Note 5 added. • Spreadsheet revised. CG460 • Values revised.

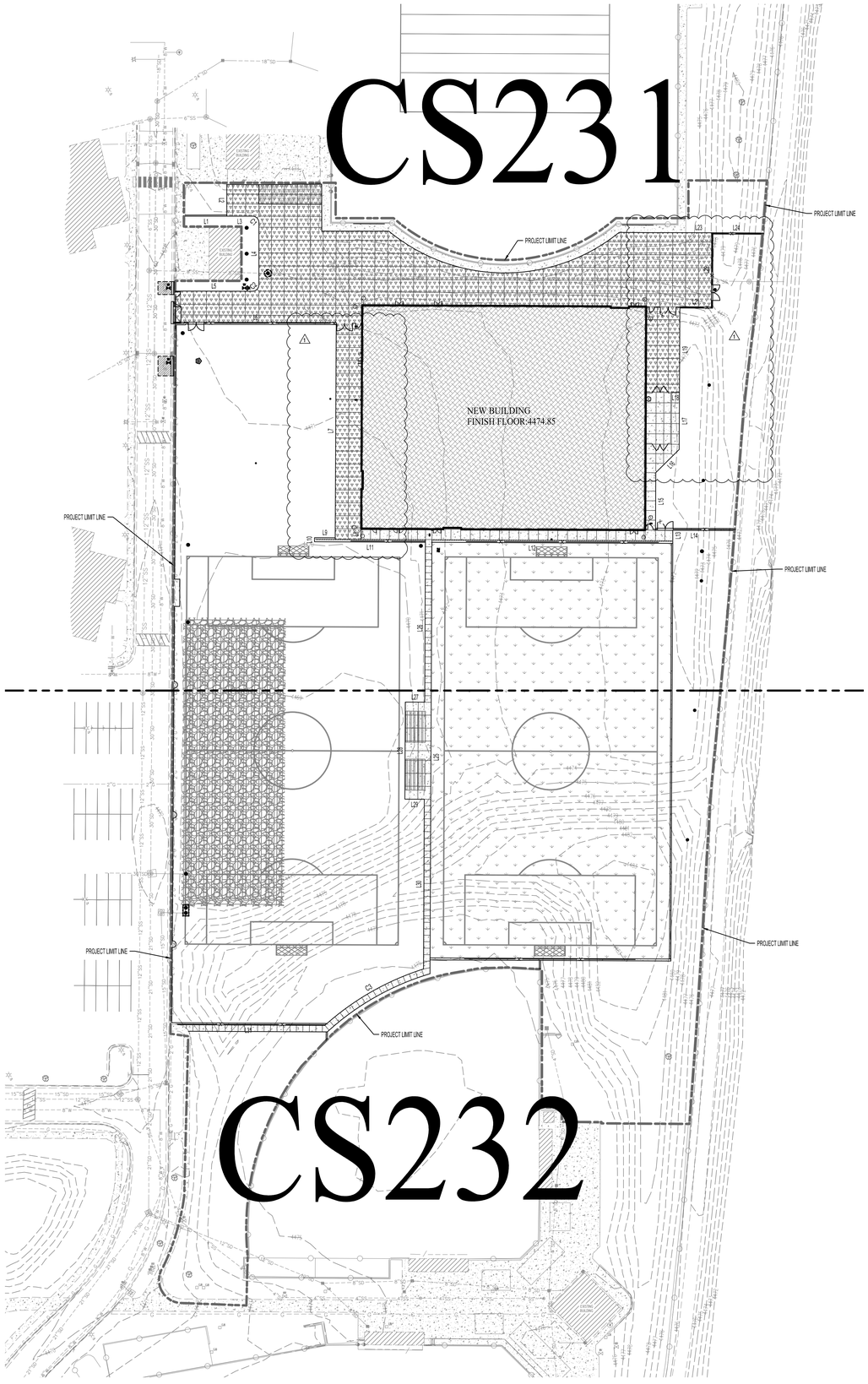
Meridian Engineering, Inc.
1628 West 11010 South, Suite 102 • South Jordan, Utah 84095
Phone: 801.569.1315 • Fax: 801.569.1319

Please see the attached civil drawings for the above mentioned revisions. Let us know if you have any questions or comments.

Thank you,

Jacob Booth

Meridian Engineering, Inc.
1628 West 11010 South, Suite 102 • South Jordan, Utah 84095
Phone: 801.569.1315 • Fax: 801.569.1319



GENERAL SITE LAYOUT NOTES:

1. REFER TO ELECTRICAL PLANS FOR TRANSFORMER LOCATIONS AND LIGHTING.
2. REFER TO LANDSCAPE PLANS FOR LAYOUT OF PLANTINGS.
3. VERIFY THE GRID DISTANCES SHOWN FOR BUILDING LOCATIONS WITH ARCH PLANS.
4. ALL PAVEMENT REPAIR TO MEET REQUIREMENT STANDARD DETAILS ON C100.
5. TRANSITION CURB FROM STANDARD CURB HEIGHT TO CURB TERMINATION OVER 8' MINIMUM AT ALL LOCATIONS.
6. REPAIR/CONSTRUCT DRIVE APPROACHES PER CITY STANDARDS.
7. CURVE AND LINE DATA IS BASED ON THE TOP BACK OF CURB AND FRONT OF SIDEWALK.
8. CURVE AND LINE DATA TABLES SHOWN ON THIS SHEET.

HATCH LEGEND

- NEW VEHICULAR CONCRETE — REFER TO DETAIL A ON SHEET C100
- NEW SIDEWALK — REFER TO DETAIL C ON SHEET C100
- NEW 6" CURB — REFER TO DETAIL D ON SHEET C100
- NEW 24" CURB AND GUTTER — REFER TO DETAIL E ON SHEET C100
- NEW INTEGRAL COLORED CONCRETE. BROOM FINISH. COLOR TO BE COORDINATED WITH OWNER.
- NEW BUILDING
- NEW UNDERGROUND DETENTION SYSTEM — REFER TO SHEETS C103 AND C0450
- NEW ARTIFICIAL TURF — REFER TO TURF FIELDS PLANS
- NEW SURFACE UTILITIES — REFER TO SHEET CU000
- NEW 8" CONCRETE WALL — REFER TO STRUCTURAL PLANS
- NEW 18" CURB WITH SPORTS NETTING — REFER TO LANDSCAPE PLANS

SCALE 1"=40'

1

L#	L	Bearing
L1	32.15	S89° 57' 00.21"W
L2	24.50	S0° 03' 05.43"E
L3	19.82	S89° 57' 00.21"W
L4	48.03	N0° 01' 09.67"E
L5	59.59	S89° 52' 37.97"E
L6	124.48	S89° 52' 30.71"E
L7	167.23	N0° 15' 37.59"E
L8	8.00	N0° 15' 37.59"E
L9	16.00	N89° 44' 22.41"W
L10	3.17	S0° 15' 37.59"W
L11	85.69	S89° 44' 22.41"E
L12	186.00	N89° 44' 22.35"W
L13	8.00	N0° 16' 41.02"E
L14	59.92	N89° 44' 22.41"W
L15	44.43	N0° 15' 37.59"E
L16	25.46	N45° 15' 42.59"E

L#	L	Bearing
L17	44.00	N0° 15' 37.59"E
L18	6.00	N89° 44' 22.41"W
L19	66.24	S0° 15' 37.59"W
L21	24.33	N89° 44' 22.41"W
L22	57.22	S0° 15' 37.59"W
L23	20.00	S89° 44' 22.41"E
L24	38.18	S89° 44' 22.41"E
L25	334.75	N0° 15' 37.59"E
L26	124.97	S0° 15' 37.59"W
L27	15.00	N89° 44' 22.41"W
L28	75.00	S0° 15' 37.59"W
L29	15.00	S89° 44' 22.41"E
L30	131.11	S0° 15' 37.59"W
L31	113.76	N89° 44' 23.10"W

C#	L	R	Δ	Chord Bearing	Chord L
C1	7.86	5.00	090°04'09"	N45° 00' 55"W	7.08
C2	7.86	5.00	090°06'12"	N45° 04' 16"E	7.08
C3	88.36	208.29	024°18'22"	S60° 14' 38"W	87.70

CORE ARCHITECTURE
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PROFESSIONAL STAMP

STATE OF UTAH — NICHOLE LEE LUTH — DATE ISSUED: 09/12/2024 — No. 8023335

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PHONE (801) 569-1919 FAX (801) 569-1919

OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD
BP-3

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

	DESCRIPTION	DATE
1	ADD-04	10/08/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	23-013
PM / PA:	NLL
PIC:	

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

OVERALL SITE LAYOUT PLAN

SHEET NUMBER

CS230

Autodesk Docs://24-013 CCHS Fieldhouse & Soccer Field/24-013 CCHS Fieldhouse & Soccer Field.rvt
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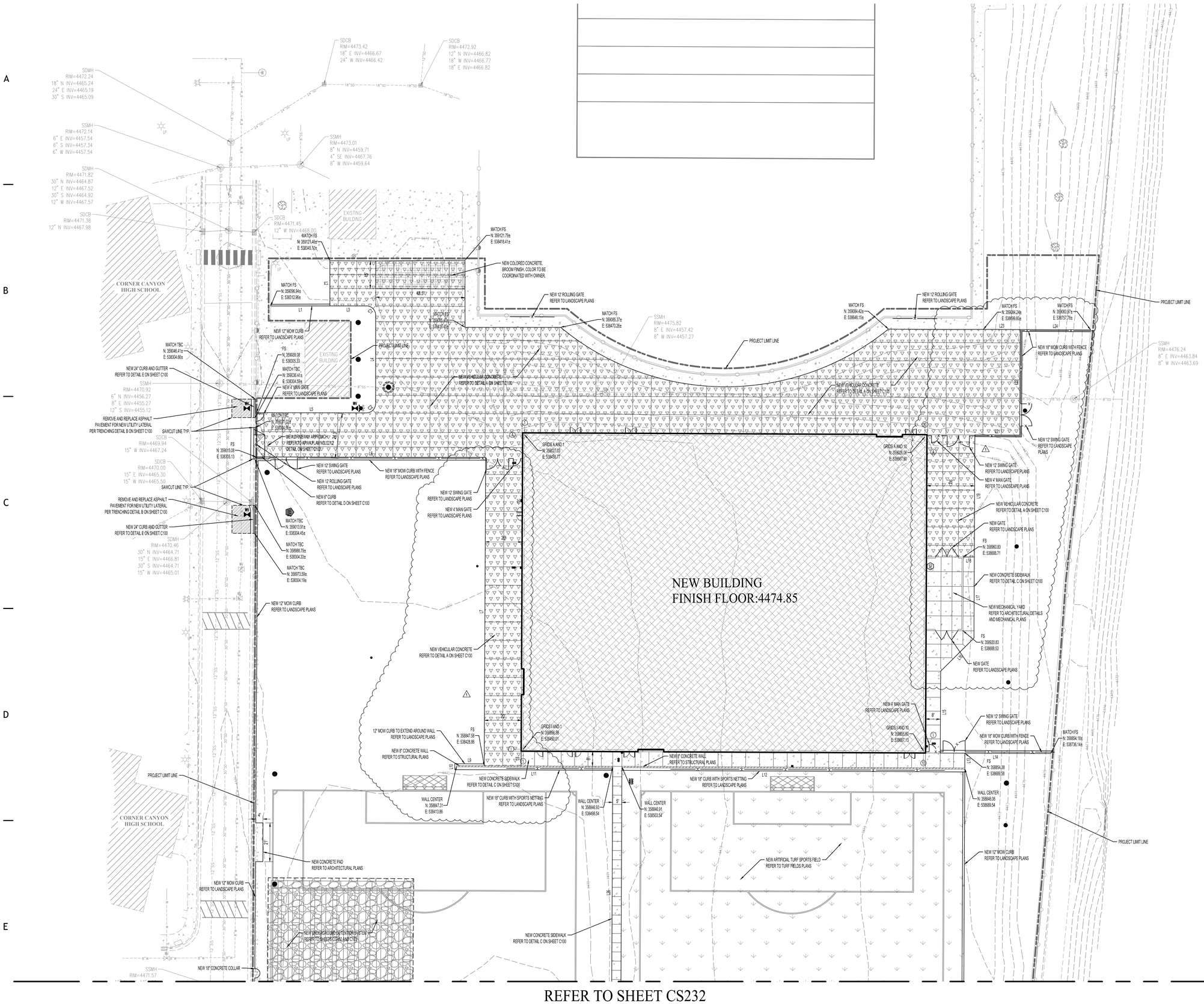

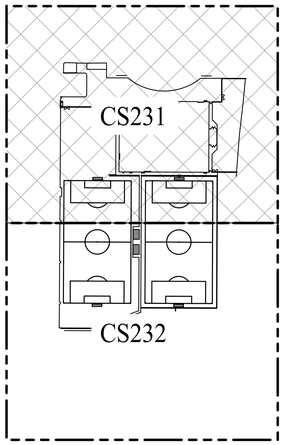

KEYMAP

SCALE 1"=20'

GENERAL SITE LAYOUT NOTES:

1. REFER TO SHEET CS230 FOR ALL SITE LAYOUT NOTES.

HATCH LEGEND

- NEW VEHICULAR CONCRETE REFER TO DETAIL A ON SHEET C100
- NEW SIDEWALK REFER TO DETAIL C ON SHEET C100
- NEW 6" CURB REFER TO DETAIL D ON SHEET C100
- NEW 24" CURB AND GUTTER REFER TO DETAIL E ON SHEET C100
- NEW INTEGRAL COLORED CONCRETE. BROOM FINISH . COLOR TO BE COORDINATED WITH OWNER.
- NEW BUILDING
- NEW UNDERGROUND DETENTION SYSTEM REFER TO SHEETS C103 AND CG450
- NEW ARTIFICIAL TURF REFER TO TURF FIELDS PLANS
- NEW SURFACE UTILITIES REFER TO SHEET CU300
- NEW 8" CONCRETE WALL REFER TO STRUCTURAL PLANS
- NEW 18" CURB WITH SPORTS NETTING REFER TO LANDSCAPE PLANS

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PROFESSIONAL STAMP

STATE OF UTAH — NICHOLE LEE LUTH — DATE ISSUED: 09/12/2024 — No. 8023335

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OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD BP-3

12943 SOUTH 700 EAST
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PIC:

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

ENLARGED SITE LAYOUT PLAN

SHEET NUMBER

CS231

Autodesk Docs://24-013 CCHS Fieldhouse & Soccer Field/24-013 CCHS Fieldhouse & Soccer Field.rvt
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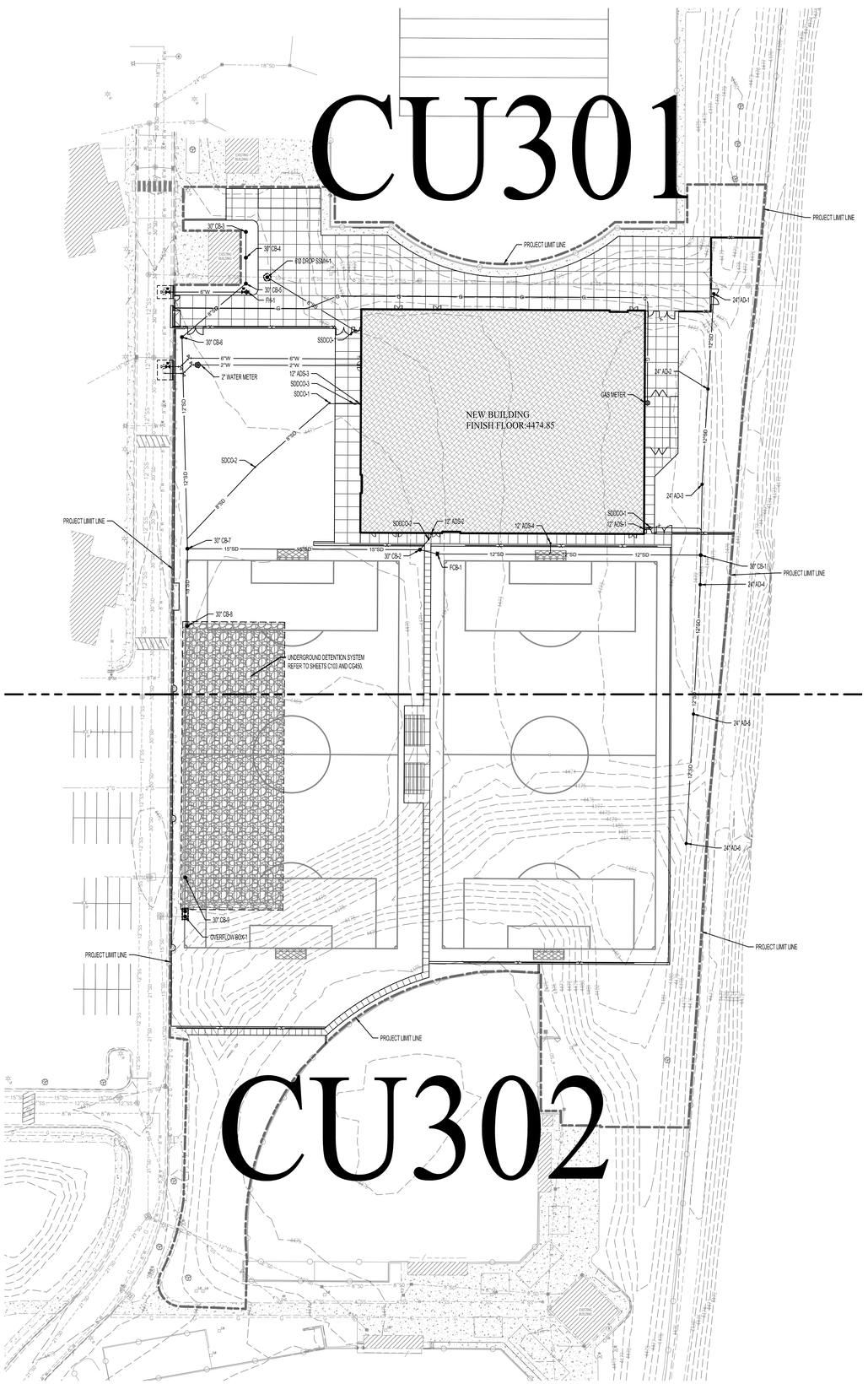

STRUCTURE LABEL	DETAIL #
AD5 - 12"Ø AREA DRAIN	DETAIL A SHEET C101
AD - 24"Ø AREA DRAIN	DETAIL B SHEET C101
CB - 30"Ø CATCH BASIN	DETAIL C SHEET C101
OVERFLOW BOX	DETAIL D SHEET C101
SSCO & SSCO - STORM AND SEWER CLEANOUT	DETAIL F SHEET C101
DROP SSMH - SANITARY SEWER DROP MANHOLE	SVSD SS-2E SHEET C101
FH - FIRE HYDRANT	CITY DETAIL 3056 SHEET C102
2" WATER METER	CITY DETAIL 3101 SHEET C102

GENERAL UTILITY NOTES:

1. PLUMBING CONTRACTOR WILL TERMINATE THEIR ROOF DRAIN LINES WITH A CLEAN OUT APPROXIMATELY 5' FROM THE BUILDING. COORDINATE WITH PLUMBING CONTRACTOR ON SCHEDULE AND PLACEMENT OF ROOF DRAIN LINES NEAR THE BUILDING.

2. ALIGN ALL INTERIOR AND EXTERIOR UTILITIES. SITE UTILITY CONTRACTOR TO COORDINATE PLACEMENT HORIZONTALLY AND VERTICALLY WITH BUILDING PLUMBING CONTRACTOR. SITE " INTERFACE LINE" BETWEEN THE BUILDING PLUMBING CONTRACTOR AND THE SITE UTILITY CONTRACTOR WILL BE AT 5' FROM THE BUILDING AND (EXCEPT FOR THE FIRE SPRINKLER LINE) A CLEAN OUT WILL BE INSTALLED BY THE PLUMBING CONTRACTOR APPROXIMATELY 5' FROM THE BUILDING FOR STORM DRAIN AND SEWER LINES. CONNECTION TO BUILDING PIPING AND ALL PIPING BEYOND THIS INTERFACE SHALL BE THE SITE UTILITY CONTRACTOR'S RESPONSIBILITY. PROVIDE REDUCERS, ADAPTERS, OR OTHER FITTINGS AS REQUIRED AT THE INTERFACE TO CONNECT TO BUILDING PIPE. COLLECT ROOF DRAIN LINES AS SHOWN AND ROUTE TO NEW CATCH BASINS OR CLEAN OUTS ON SITE. PREFERRED SLOPES, APPROXIMATE DISTANCES, AND INVERTS OF GRAVITY PIPING ARE SHOWN ON THE PLAN MAY REQUIRE ADJUSTMENT TO CONNECT TO BUILDING ROOF OR SEWER DRAIN LINES. MAINTAIN 2% SLOPE FOR 4" DIAMETER OR SMALLER PIPES, 1% FOR 6" AND 0.5% FOR 8" DIAMETER PIPES.

3. ALL PROPOSED SITE ELECTRICAL EQUIPMENT STRUCTURES AND LINES SHOWN ON CIVIL PLANS ARE SCHEMATICALLY SHOWN ONLY AS A COORDINATION BETWEEN ELECTRICAL AND CIVIL. PLEASE REFER DIRECTLY TO ELECTRICAL PLANS FOR THE LAYOUT AND DETAILS OF ALL SITE ELECTRICAL EQUIPMENT AND LINES.

4. SITE CONTRACTOR SHALL COORDINATE WITH SOUTH VALLEY SEWER DISTRICT WHEN COMPLETING THE SEWER CONNECTION.

5. SITE CONTRACTOR SHALL COORDINATE WITH DRAPER CITY INSPECTOR WHEN COMPLETING WATER CONNECTIONS IN CITY STREETS OR ON SITE WHERE REQUIRED.

6. ALL CONSTRUCTION IN THE CULINARY WATERLINE AND SANITARY SEWER LINE PIPE ZONE SHALL COMPLY WITH ALL DRAPER CITY AND SOUTH VALLEY SEWER DISTRICT SPECIFICATIONS AND REQUIREMENTS. SEE GENERAL NOTES ON SHEET C100. WHERE THRUST BLOCKING CANNOT BE COMPLETED DUE TO OTHER ADJACENT UTILITIES OR OTHER SITE CONSTRAINTS, RESTRAINED JOINTS WILL BE REQUIRED PER DRAPER CITY STANDARD SPEC'S. THRUST BLOCK ALL WATERLINE FITTINGS PER DRAPER CITY STANDARDS TYP.

7. COORDINATES FOR FIRE HYDRANTS, CURB INLETS, CATCH BASINS, OR CLEAN OUTS ARE AT THE CENTER OF THE UTILITY STRUCTURE. ALL STORM DRAIN BOXES ARE 3'X3', UNLESS OTHERWISE NOTED OR THOSE INLETS PLACES IN CURB AND GUTTER.

8. ALL VALVES, AREA CATCH BASINS (NOT IN C&G), CLEAN OUTS, OR MANHOLES SHALL HAVE CONCRETE GRADE ADJUSTMENT COLLARS PLACED PER DETAIL F ON C100.

9. STORM DRAIN CLEAN OUTS TO BE SIMILAR TO DETAIL SHOWN ON PLUMBING PLANS AND SHALL BE EXTENDED TO GRADE. ALL EXTERIOR ROOF DRAIN PIPING TO BE CAST IRON SOIL PIPE AND FITTINGS IN ACCORDANCE WITH ASTM A 74.

10. ROOF DRAIN CONNECTIONS AT CATCH BASINS OR CLEAN OUT BOXES TO BE CORE DRILLED AND EPOXY GROUTED INTO PRECAST BOXES DUE TO FIELD ADJUSTMENTS WHICH MAY BE NECESSARY TO CONNECT TO BUILDING PIPING. 3" &4" INTERIOR ROOF DRAIN PIPE TO BECOME 4" OR 6" STORM DRAIN PIPE. 5" &6" INTERIOR ROOF DRAIN PIPE TO BECOME 8" STORM DRAIN PIPE.

11. THE FIRE SPRINKLER LINE SHALL BE ROUTED INTO THE FIRE SPRINKLER ROOM INSIDE THE BUILDING AND TERMINATE 12" ABOVE FINISH FLOOR WITH A 6" FLANGE. CAP WITH BLIND FLANGE FOR LINE TESTING. REFER TO PLUMBING PLANS FOR RISER LOCATION IN THE BUILDING. THE FIRE SERVICE LINE SHALL BE CEMENT LINED DUCTILE IRON PIPE (PER AWWA C151 350 PSI AND AWWA C104) WRAPPED IN POLYETHYLENE (PER AWWA C105) FROM THE BUILDING CONNECTION TO THE TEE AT THE FIRE LOOP CONNECTION PER CITY WATER STANDARD SPECIFICATIONS AND DETAILS.

12. ALL CONSTRUCTION, PIPING MATERIALS AND INSTALLATION TO BE:

WATER LINES:
- 6" FIRE SPRINKLER LINE PER CITY STANDARD
- 2" POLY CONFORM TO DRAPER CITY STANDARDS.
- 4", 6", AND 8" PVC AWWA C-900 WITH CEMENT/MORTAR LINED DUCTILE IRON PIPE FITTINGS WRAPPED IN 10 MIL POLYETHYLENE SLEEVES PER AWWA AND CITY STANDARDS FOR FIRE SPRINKLER AND WATER LINES.

SEWER LINES, MANHOLES, DROP MANHOLES, AND CLEANOUTS:
- APWA AND SEWER DISTRICT STANDARDS WITH STANDARD FITTINGS AND CLEANOUTS.
- PVC PIPE 6" TO 12" (SDR 35), USE 6" DI AT FITTING ON SERVICE LINES TO BUILDINGS REFER TO CLEAN OUT DETAILS.
- MANHOLES, DROP MANHOLES, AND CLEANOUTS TO SOUTH VALLEY SEWER DISTRICT STANDARDS. PVC PIPING, PRECAST MANHOLES.

STORM DRAIN:
- APWA AND DRAPER CITY STANDARD, RCP FOR 12" OR LARGER PIPE (CLASS III). SITE STORM DRAIN LINES 8" OR SMALLER TO BE PVC RIPE (SDR 35).
- SITE DRAIN PIPING HDPE FOR 12" OR LARGER (ADS OR APPROVED EQUIVALENT). EXCEPT WITH CITY ROW.

ROOF DRAIN PIPING:
- PROJECT PLUMBING SPECIFICATIONS, CAST IRON SOLID PIPE 4" TO 8" ROOF DRAIN PIPING WRAPPED IN POLYETHYLENE SLEEVES (PER AWWA C105).
- ROOF AND AREA DRAIN PIPING. 6" TO 8" PIPING PVC (SDR 35).
- 6" HDPE OR DWV PIPE (SCH 40) FROM DOWN SPOUT TO RD BOXES.

UNDERGROUND DETENTION SYSTEM:
- SEE DETAILS ON SHEET C103.

GAS LINE:
- COORDINATE WITH ENBRIDGE ENERGY.

13. PROJECT SHALL COMPLY WITH ALL UTAH DIVISION OF DRINKING WATER RULES AND REGULATIONS INCLUDING, BUT NOT LIMITED TO, THOSE PERTAINING TO BACKFLOW PROTECTION AND CROSS CONNECTION PREVENTION. ANY NEW BACKFLOW DEVICES AND THE STOP AND WASTE VALVE ARE SHOWN ON THE LANDSCAPE DRAWINGS.

14. INSPECTION AND APPROVAL FOR THE SEWER/WATER LINE CROSSINGS ON SITE SHALL BE REVIEWED AND APPROVED BY DRAPER CITY AND SOUTH VALLEY SEWER DISTRICT PRIOR TO CONSTRUCTION OF THE CROSSING. DRAPER CITY AND SOUTH VALLEY SEWER DISTRICT SHALL ALSO INSPECT THE CROSSING PRIOR TO BACKFILL.

15. REFER TO SHEET C200 FOR PROJECT BASIS OF BEARING, BASIS OF COORDINATES AND BENCHMARK.

16. ALL UTILITIES OUTSIDE OF PUBLIC R.O.W. ARE PRIVATELY OWNED AND SHALL BE MAINTAINED BY OWNER UNLESS NOTED OTHERWISE.

17. POT HOLE AND FIELD VERIFY THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

18. TEMPORARY PUMPING OF SANITARY SEWER MAY BE REQUIRED AS PORTIONS OF THE SYSTEM ARE REPLACED. BACKUP PUMPS AND POWER WILL BE REQUIRED WHERE PUMPING IS NECESSARY TO MAINTAIN SERVICE TO THE EXISTING BUILDING AT ALL TIMES DURING CONSTRUCTION.

19. USE FLOWABLE FILL BETWEEN UTILITY CROSSINGS THAT ARE LESS THAN 12" SEPARATION. ALL GRAVITY LINES MUST BE INSTALLED BEFORE PRESSURIZED LINES.

20. PIPING LENGTHS ARE APPROXIMATE LENGTHS AND ARE ROUNDED TO THE NEAREST FOOT. LENGTHS ARE FROM CENTER TO CENTER OF INLETS OR CLEANOUTS. PIPE SLOPES ARE ALSO APPROXIMATE. USE INVERTS AT EACH BOX FOR CONTROL OF PIPE INSTALLATION.

21. ALL FIRE SPRINKLER LINES SHALL HAVE 60" OF COVER MINIMUM. ALL OTHER WATERLINES INCLUDING EXISTING LINES TO HAVE 48" MINIMUM COVER.

22. POTHOLE ALL EXISTING UTILITY CROSSINGS PRIOR TO ROUTING ANY NEW UTILITIES. ALL NEW SEWER, DRAINAGE, OR OTHER GRAVITY LINES SHALL BE COMPLETED PRIOR TO ROUTING ANY PRESSURE LINES. WHERE EXISTING UTILITIES CONFLICT WITH NEW GRAVITY LINES. RAISE OR LOWER EXISTING UTILITIES TO ACCOMMODATE NEW GRAVITY LINES. PROVIDE 12" MIN. CLEARANCE BETWEEN WATER AND OTHER UTILITIES. WATER LINES SHALL NOT BE PLACED UNDER SEWER LINES AND SHALL HAVE A MINIMUM OF 18" CLEARANCE OF SEWER.

23. THRUST BLOCK ALL FITTINGS OR PROVIDE RESTRAINED JOINTS PER CITY STANDARDS. THE NEW 4" AND 6" CONNECTIONS TO THE NEW BUILDING WILL REQUIRE RESTRAINED JOINTS FOR MANY FITTINGS DUE TO LIMITED SPACE BETWEEN PIPES.

24. COORDINATE WITH LANDSCAPE PLANS PRIOR TO COMPLETION OF PAVEMENT FOR INSTALLATION OF IRRIGATION SLEEVES ACROSS PAVING OR PARKING AREAS.

25. WATER VALVES, SEWER MANHOLES, STORM DRAIN INLETS OR CLEANOUT BOXES, AND OTHER SURFACE UTILITY ACCESSORIES SHALL BE RAISED AND SLOPED TO ACCURATE FINISH SURFACE BY A CONCRETE GRADE COLLAR IN PAVEMENT. COLLAR SHALL BE A 12" WIDE AROUND THE UTILITY APPURTUSES AND 6" MINIMUM THICKNESS. PLACE 2 #4 REBAR HOOPS IN COLLAR. REFER TO DETAIL ON SHEET C100. CONCRETE COLLARS TO BE USED IN ONLY ASPHALT PAVEMENT AREAS OR PAVER AREAS.

26. WHERE UTILITY LINES CROSS OR ARE ADJACENT TO SITE WALLS, WALL FOOTINGS, SHALL STEP BELOW UTILITIES FOR WATER AND STORM DRAIN LINES THAT DO NOT HAVE 3' OF FILL BETWEEN THE BOTTOM OF THE NORMAL WALL FOOTING DEPTH (30" DEPTH) AND THE TOP OF PIPE REFER TO DETAIL ON STRUCTURAL PLANS FOR TYPICAL FOOTING STEP DETAIL. WHERE UTILITY LINES HAVE A MINIMUM OF 3' OF FILL BETWEEN THE TOP OF PIPE AND BOTTOM WALL FOOTING THE WALL FOOTING DOES NOT NEED TO STEP BELOW THE NORMAL 30" DEPTH.

27. USE HS-20 SOLID COVERS ON ALL MANHOLES, CIB, AND CBS. AD AND ADS BOXES TO HAVE PEDESTRIAN TRAFFIC GRATED COVERS EXCEPT AS NOTED. ALL CIB BOXES TO HAVE HS-20 FRAME AND GRATES.

28. REPAIR PAVEMENT, AS WELL AS CURB AND GUTTER, AND SIDEWALKS WHERE UTILITIES CROSS INTO PUBLIC R.O.W. TO MAINTAIN TRAFFIC THROUGH THESE AREAS. ALL REPAIR IN PUBLIC R.O.W. TO MEET APWA AND CITY STANDARDS.

29. SET NEW UTILITY MANHOLE OR STRUCTURE OVER EXISTING PIPING WHERE NEW AND EXISTING PIPING CONNECT. RECONNECT ALL EXISTING PIPING TO NEW STRUCTURES. PROVIDE NEW SECTIONS OF PIPE IF NECESSARY TO RECONNECT ALL PIPING TO THE NEW UTILITY STRUCTURES.

30. GAS LINE CONSTRUCTION TO THE BUILDING METER WILL BE COMPLETED BY ENBRIDGE ENERGY/ COORDINATE GAS INSTALLATION WITH ENBRIDGE ENERGY.

31. 8"X8" WYE FITTINGS FOR ROOF DRAIN OR OTHER WYE CONNECTIONS TO THE 6" OR 8" PVC DRAIN LINES TO BE DI FITTINGS WRAPPED IN 10 MIL. POLYETHYLENE (PER AWWA C105). PLACE CONCRETE ON WYE FITTING SIMILAR TO THE CLEANOUT DETAIL (DETAIL F ON SHEET C101).

32. ALL CB TO HAVE LOCKED DOWN GRATES IN DETENTION SYSTEM AREAS.

33. CONTRACTOR RESPONSIBLE FOR ACQUIRING ALL NECESSARY PERMITS AND INSPECTIONS WHILE WORKING IN THE PUBLIC RIGHT OF WAY.

34. PROJECT LOCATED IN FEMA FLOOD PLAIN ZONE X, 49035C0463H EFFECTIVE 11/19/2021.

35. VALVES ATTACH DIRECTLY TO TEE FITTINGS. "FL" INDICATES FLANGE FITTING AND "MJ" INDICATED MECHANICAL JOINT FITTING. ALL VALVING WILL CONNECT TO MAIN LINE PIPE WITH FLANGE FITTING. MAIN LINE FITTINGS CONNECTING TO VALVES WILL ALSO BE FLANGE FITTINGS. WRAP AND GREASE ALL FITTINGS PER SPECIFICATIONS AND NOTES.

36. USE MECHANICAL JOINTS FOR EACH PIPE JOINT ON THE SEWER LINE FROM THE BUILDING CONNECTION TO 10' NORTH OF THE GEOTHERMAL LINES CROSSING. PIPE ZONE MATERIAL TO BE CONCRETE FILL FOR THE SEWER LINE (SEE SHEET C301), AND FLOW FILL FOR THE WATER AND GEOTHERMAL LINE WITHIN 10' OF THE SEWER LINE CROSSING. POLYETHYLENE ENCASEMENT (8MIL.) FOR ALL MECHANICAL JOINTS.

37. ALL MANHOLES (BOTH SEWER AND STORM) TO BE 4' IN DIAMETER UNLESS SPECIFIED OTHERWISE.

38. THE CONTRACTOR SHALL MAINTAIN 10 FOOT HORIZONTAL AND 18 INCH VERTICAL SEPARATION BETWEEN SANITARY SEWER AND CULINARY WATER LINES. FOLLOW CITY STANDARDS FOR ALL WATER/SEWER CROSSINGS.

39. SPOT ELEVATION PREFIX OF 45 OR 44 HAS BEEN DROPPED FROM THE ELEVATIONS IE: ELEVATION 00.00 = 4500.00 AND 96.50 = 4496.50.

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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD
BP-3

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

	DESCRIPTION	DATE
1	ADD-04	10/08/2024

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PM / PA:	NLL
PIC:	

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

OVERALL UTILITY PLAN

Blue Stakes of UTAH 811

SHEET NUMBER

CU300

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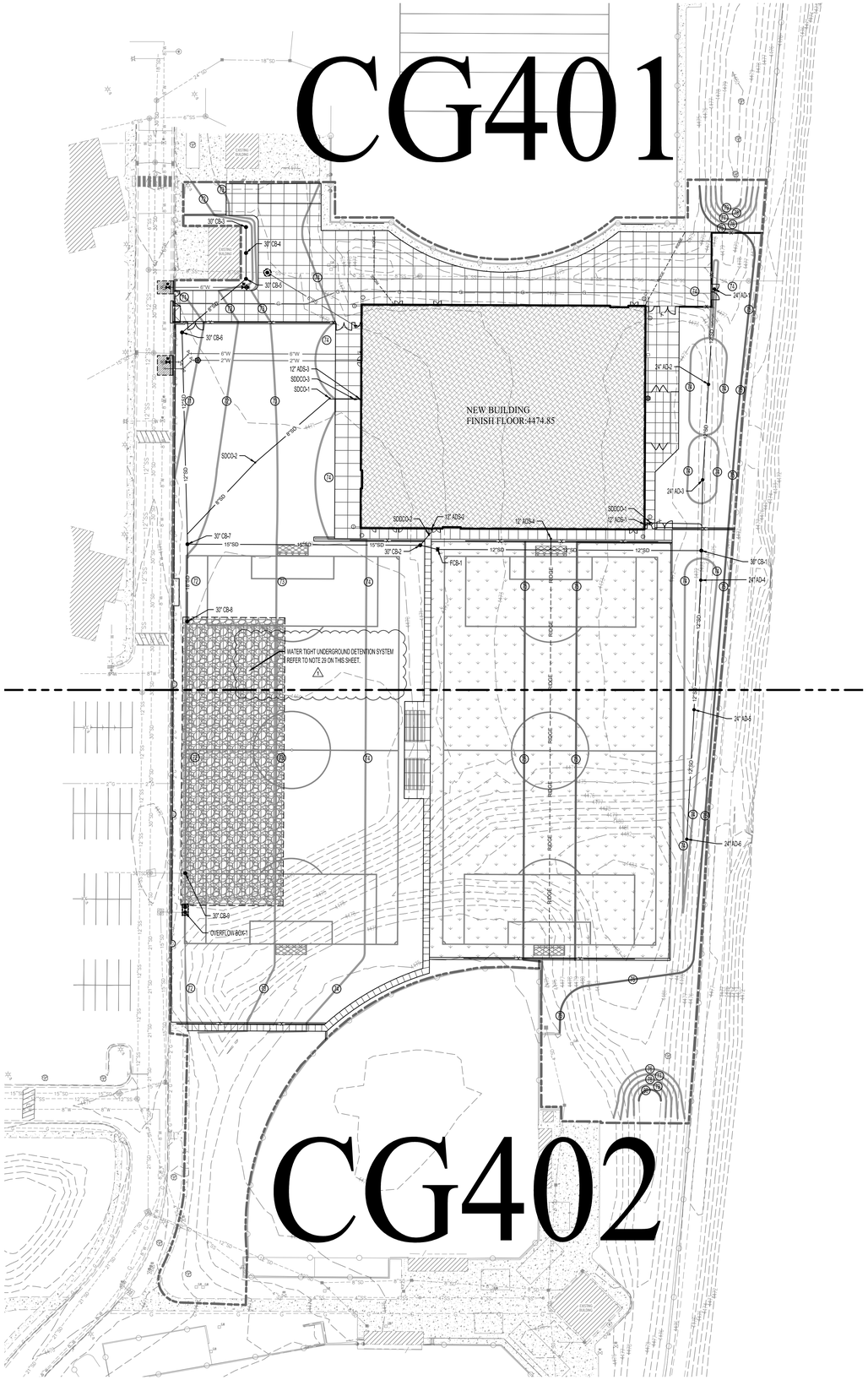

GENERAL GRADING NOTES:

1. CONTOURS OF THE SITE ARE BASED ON A SURVEY BY MERIDIAN ENGINEERING. REFER TO SHEET C200 FOR PROJECT BENCH MARK AND BASIS OF BEARING.
2. PROVIDE APPROVED SILT PROTECTION FOR ALL NEW AND EXISTING CATCH BASINS UNTIL LANDSCAPING IS WELL ESTABLISHED AND PARKING IS COMPLETE. THE PIPING SYSTEM SHALL BE CLEANED OUT BEFORE FINAL APPROVAL. USE MIRAFI "DANDY BAG" OR ANOTHER APPROVED EQUIVALENT FOR EXISTING INLET PROTECTION. REFER TO SHEET C500 AND C510.
3. DIMENSIONS OR COORDINATES ARE TO THE CENTER OF CATCH BASINS FOR AREA INLETS AND AT THE CENTER OF THE CATCH BASIN AT TBC FOR INLETS IN CURB AND GUTTER.
4. ALL WALKWAYS SHALL NOT EXCEED 5% SLOPE. THE PERPENDICULAR CROSS SLOPE TO NOT EXCEED 2% MAX. SLOPE FOR WALKWAYS 2% MAX. FROM BUILDING OR STAIR RISERS FOR 8' MINIMUM. ALSO SLOPE 2% MAX FOR 8' AT THE END OF THE 1:12 SLOPE OF ALL H.C. RAMPS.
5. REFER TO SITE LAYOUT PLAN ON SHEET CS230.
6. PIPING LENGTHS ARE APPROXIMATE LENGTHS AND ARE ROUNDED TO THE NEAREST FOOT. LENGTHS ARE FROM CENTER TO CENTER OF INLETS OR CLEANOUTS. PIPE SLOPES ARE ALSO APPROXIMATE. USE INVERTS AT EACH BOX FOR CONTROL OF PIPE INSTALLATION.
7. "TBC" IS TOP BACK OF CURB ELEVATIONS. "FS" IS FINISH SURFACE ELEVATIONS. "TOC" IS TOP OF CONCRETE ELEVATIONS. "TOW" IS TOP OF WALL ELEVATIONS. "BOT" IS FINISH SURFACE AT BOTTOM OF WALL ELEVATIONS. "FL" IS FLOW LINE.
8. TRANSITION FACE OF CURB TO BE FLUSH TO ADJACENT FINISHED SURFACE WHERE INDICATED BY "TBC/FS" TO FULL HEIGHT OVER 5' (MIN).
9. PLACE CONCRETE COLLAR AROUND ALL NEW CATCH BASINS OR CLEANOUTS (NOT IN CURB AND GUTTER). COLLAR TO BE 1' MINIMUM WIDTH AND SHALL BE 6" MINIMUM THICKNESS. PLACE 2 #4 BARS AROUND OPENING. SEE DETAIL ON SHEET C100.
10. REFER TO SHEET C100 AND C210 FOR REQUIRED PAVEMENT SECTIONS.
11. ALL STORM WATER TO BE DETAINED ONSITE USING 2.20 CFS RELEASE FLOW (PER SHEET C31 DATED DECEMBER 2014 PLANS) FOR THE 10-YEAR STORM EVENT.
12. DO NOT DRIVE HEAVY EQUIPMENT OR TRUCKS OVER EXCAVATED SUBGRADE. SOFT AREAS CAUSED BY ROUTING HEAVY EQUIPMENT OR TRUCKS OVER SUBGRADE WILL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. REPAIRS TO BE COMPLETED AS OUTLINED IN THE SPEC SECTION WITH UP TO 2' OF IMPORTED STRUCTURAL GRANULAR FILL TO STABILIZE SOFT AREAS CAUSED BY ROUTING HEAVY EQUIPMENT OR TRUCKS OVER EXCAVATED SUBGRADE.
13. SITE SOILS MAY NOT SUPPORT CONSTRUCTION TRAFFIC DURING WET PERIODS OF THE YEAR. CONTRACTOR WILL BE RESPONSIBLE TO PLACE GRANULAR FILL AND/OR COBBLE MATERIALS AS NECESSARY TO MAINTAIN ACCESS TO THE SITE OR BUILDING THROUGHOUT THE CONSTRUCTION SITE AT ALL TIMES. EXCESS MATERIAL SHALL BE REMOVED AS REQUIRED TO COMPLETE THE SITE TO THE GRADES SHOWN ON GRADING PLANS. ALSO REFER TO GEOTECHNICAL INVESTIGATION SHEETS FOR SITE SOIL PREPARATION REQUIREMENTS.
14. PROVIDE TEMPORARY STORM DRAIN PUMPING, PONDING, BERMING, PIPING AND INLETS OR OTHER MEASURES TO RETAIN CONSTRUCTION STORM DRAIN RUNOFF ON SITE DURING CONSTRUCTION UNTIL THE NEW SYSTEM IS OPERATIONAL. ALL CONSTRUCTION SITE RUNOFF TO HAVE HEAVY SEDIMENT REMOVED PRIOR TO RELEASING TO EXISTING SITE DRAIN SYSTEM. PROTECT ADJACENT BUILDING FROM CONSTRUCTION RUNOFF AT ALL TIMES.
15. THERE SHOULD BE NO STANDING WATER ONSITE. ALL STORM WATER SHALL DRAIN TO AN INLET OR AREA DRAIN. CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD IF ANY LOW SPOTS THAT DO NOT DRAIN ARE ENCOUNTERED. A WATER TEST WILL BE PERFORMED BY THE CONTRACTOR WITH THE ENGINEER OF RECORD IN ATTENDANCE OR A SURVEY OF THE NEW IMPROVEMENTS PROVIDED TO THE ENGINEER AT COMPLETION OF THE PROJECT TO VERIFY THAT ALL STORM DRAIN WATER DRAINS AS DESIGNED.
16. ALL "MATCH" LOCATIONS INDICATE THAT THE CONTRACTOR IS TO MATCH THE EXISTING GRADE. AN APPROXIMATE ESTIMATE IS PROVIDED BY THE ENGINEER BASED ON AN INTERPOLATION OF NEAREST SPOT ELEVATIONS PROVIDED BY THE SURVEY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THESE ELEVATIONS. IF THE ELEVATION PROVIDED BY THE ENGINEER VARIES GREATLY FROM THE ACTUAL ELEVATION FOUND BY THE CONTRACTOR THE CONTRACTOR IS TO NOTIFY THE ENGINEER SO THAT THE ENGINEER CAN PROVIDE FURTHER DIRECTION.
17. GRADE UNIFORMLY BETWEEN SPOT ELEVATIONS AND CONTOURS UNLESS NOTED OTHERWISE. IF ANY QUESTIONS ARISE ABOUT THE PROPOSED GRADING SHOWN ON PLANS CONTACT THE ENGINEER OF RECORD BEFORE FIELD GRADING.
18. MAINTAIN DRAINAGE FROM EXISTING STORM DRAIN LINES OFFSITE THAT ROUTE THROUGH THE DETENTION BASIN ONSITE DURING CONSTRUCTION OF ALL PHASES. PROVIDE TEMPORARY MEASURES OF NEW PIPING, PUMPING, OR OTHER METHODS TO MAINTAIN DRAINAGE FROM ALL EXISTING STORM DRAINS WHILE NEW PIPING SYSTEMS OUTFALLS ARE COMPLETED.
19. REMOVE ALL CLAY MATERIALS FROM UNDER BUILDINGS AND ARTIFICIAL TURF AS OUTLINED IN THE SPECIFICATIONS. UNDER NEW PAVEMENT REMOVE A MINIMUM OF 12" OF CLAY LAYER AND REPLACE WITH GRANULAR FILL AS OUTLINED IN THE PAVEMENT DETAILS ON C100 AND THE EARTH MOVING SPECIFICATION. ALL UTILITIES TRENCHES TO BE BACKFILLED WITH GRANULAR BACKFILL PER TRENCH DETAIL ON C100.
20. SITE GRADING SHALL BE PERFORMED IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS AND THE RECOMMENDATIONS SET FORTH IN THE GEOTECHNICAL STUDY REFERENCED IN PLAN SET. CONTRACTOR SHALL SUBMIT A COMPACTION REPORT PREPARED BY A QUALIFIED SOILS ENGINEER, REGISTERED WITHIN THE STATE WHERE THE WORK IS BEING PERFORMED, VERIFYING THAT ALL FILLED AREAS AND SUBGRADE AREAS WITHIN HAVE BEEN COMPACTED IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS AND THE RECOMMENDATIONS SET FORTH IN THE SOIL REPORT.
21. ADS INJECTION MOLDED 45° REDUCER WYE (OR APP EQUIVALENT) FLOWABLE FILL TO BE PLACED AROUND EACH WYE CONNECTION. TYP.
22. NO STORM WATER TO ENTER THE DETENTION SYSTEM UNTIL THE PIPING SYSTEM AND PRE-TREATMENT INLET HAS BEEN INSTALLED. CONTRACTOR TO CLEAN ENTIRE SYSTEM BEFORE IT IS ATTACHED TO THE DETENTION BASIN.
23. NOTIFY ENGINEER OF RECORD IF THERE ARE ANY CONFLICTS WITH UTILITY LINES OR IF ASSUMED INVERTS VARY. FOR FURTHER COORDINATION. SEWER AND WATERLINES TO HAVE 18" SEPARATION WITH WATER OVER SEWER. ALL OTHER UTILITIES TO HAVE 12" SEPARATION MIN. IF 12" SEPARATION CANNOT BE ACHIEVED UTILITIES TO HAVE FLOWABLE FILL BETWEEN THE UTILITY LINES 5' EACH WAY.
24. CONTRACTOR IS RESPONSIBLE TO INFORM THE ENGINEER OF RECORD IF THE GRADES SHOWN ON THE SURVEY DO NOT MEET THE ACTUAL GRADES IN THE FIELD.
25. ALL STRUCTURE LIDS WITHIN THE PROJECT LIMITS WILL NEED TO HAVE THEIR GRADE ADJUSTED. WATER VALVES, SEWER MANHOLES, STORM DRAIN INLETS OR CLEANOUT BOXES, AND OTHER SURFACE UTILITY ACCESSORIES SHALL BE RAISED AND SLOPED TO ACCURATE FINISH SURFACE BY A CONCRETE GRADE COLLAR IN PAVEMENT. COLLAR SHALL BE 12" WIDE AROUND THE UTILITY APPARATUSES AND 8" MINIMUM THICKNESS. PLACE 2 #4 REBAR HOOPS IN COLLAR. CONCRETE COLLARS TO BE USED ONLY IN ASPHALT CONCRETE AREAS.
26. REMOVE AND REPLACE ANY DAMAGED CURB, GUTTER, OR SIDEWALK ALONG FRONTAGE BEFORE FINAL INSPECTION.
27. ALL GUTTERS TO SLOPE 0.5% MINIMUM TOWARDS CURB INLET BOX. CONTRACTOR TO NOTIFY ENGINEER OF RECORD IF THE PROPOSED GRADE DOES NOT MEET 0.5% SLOPE IN GUTTER.
28. SPOT ELEVATION PREFIX OF 45 OR 44 HAS BEEN DROPPED FROM THE ELEVATIONS IE: ELEVATION 00.00 = 4500.00 AND 96.50 = 4496.50.
29. 30 MIL PVC IMPERMEABLE LINER REQUIRED FOR DETENTION SYSTEM. LINER TO BE PVC WELDED ON SITE AND TESTED FOR WATER TIGHTNESS BEFORE BEING BURIED. REFER TO ADS DETAILS ON SHEET C103.

THE CONTRACTOR TO SCHEDULE THE ENGINEER OF RECORD IN WRITING 3 DAYS MINIMUM BEFORE PLACEMENT OF CONCRETE CURBING, FLATWORK, OR ASPHALT PAVING. ALL AREAS MUST BE FORMED AND HAVE COMPACTED BASE COURSE IN PLACE FOR THE ENGINEER TO COMPLETE A RANDOM SPOT GRADE CHECK BEFORE ASPHALT AND CONCRETE CONSTRUCTION. THE RANDOM GRADE CHECKS ARE FOR GENERAL CONFORMANCE TO SLOPES AND GRADING SHOWN ON PLANS USING A SMART LEVEL. RANDOM CHECKS DO NOT ALLEVIATE THE CONTRACTOR'S RESPONSIBILITY TO ENSURE GRADING IS IN CONFORMANCE WITH PLANS AND SPECIFICATIONS AND SATISFY PERFORMANCE OF HIS WORK. WITHIN 2 DAYS OF THE RANDOM SPOT CHECK, RESULTS OF THE SPOT CHECKS AND AREAS OF NON COMPLIANCE WILL BE PROVIDED TO THE CONTRACTOR AND ARCHITECT.

GRADING LEGEND

75	MAJOR CONTOUR
72	MINOR CONTOUR
	HALF FOOT CONTOUR

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STATE OF UTAH
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No. 8023335

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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD BP-3

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

	DESCRIPTION	DATE
1	ADD-04	10/08/2024

PROJECT INFORMATION

DATE:	SEPTEMBER 12, 2024
PROJECT #:	23-013
PM / PA:	NLL
PIC:	

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

OVERALL GRADING PLAN

Blue Stakes of UTAH 811 Utah811.com

SHEET NUMBER

CG400

Autodesk Docs://24-013 CCHS Fieldhouse & Soccer Field/24-013 CCHS Fieldhouse & Soccer Field.rvt
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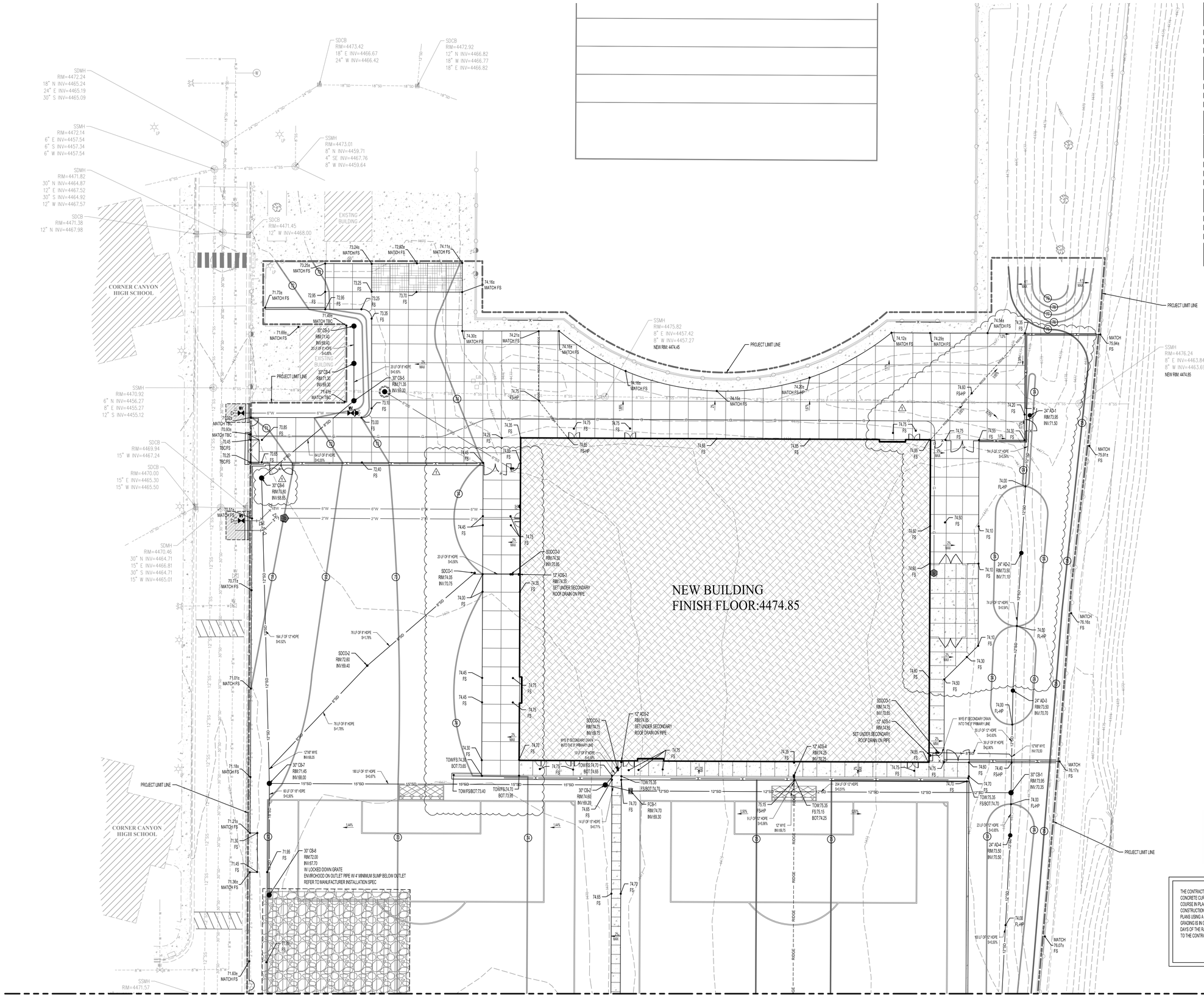

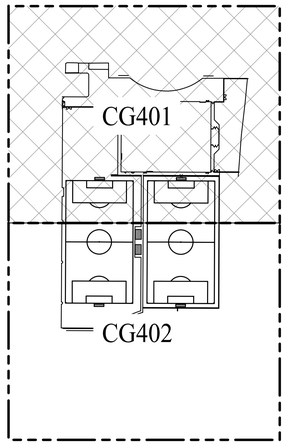

KEYMAP

GRADING LEGEND

MAJOR CONTOUR

MINOR CONTOUR

THE CONTRACTOR TO SCHEDULE THE ENGINEER OF RECORD IN WRITING 3 DAYS MINIMUM BEFORE PLACEMENT OF CONCRETE CURBING, FLATWORK, OR ASPHALT PAVING. ALL AREAS MUST BE FORMED AND HAVE COMPACTED BASE COURSE IN PLACE FOR THE ENGINEER TO COMPLETE A RANDOM SPOT GRADE CHECK BEFORE ASPHALT AND CONCRETE CONSTRUCTION. THE RANDOM GRADE CHECKS ARE FOR GENERAL CONFORMANCE TO SLOPES AND GRADING SHOWN ON PLANS USING A SMART LEVEL. RANDOM CHECKS DO NOT ALLEVIATE THE CONTRACTORS RESPONSIBILITY TO ENSURE GRADING IS IN CONFORMANCE WITH PLANS AND SPECIFICATIONS AND SATISFY PERFORMANCE OF HIS WORK. WITHIN 2 DAYS OF THE RANDOM SPOT CHECK, RESULTS OF THE SPOT CHECKS AND AREAS OF NON COMPLIANCE WILL BE PROVIDED TO THE CONTRACTOR AND ARCHITECT.

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CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD
BP-3

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

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BID SET

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SHEET TITLE

ENLARGED GRADING PLAN

SHEET NUMBER

CG401

Blue Stakes of UTAH 811

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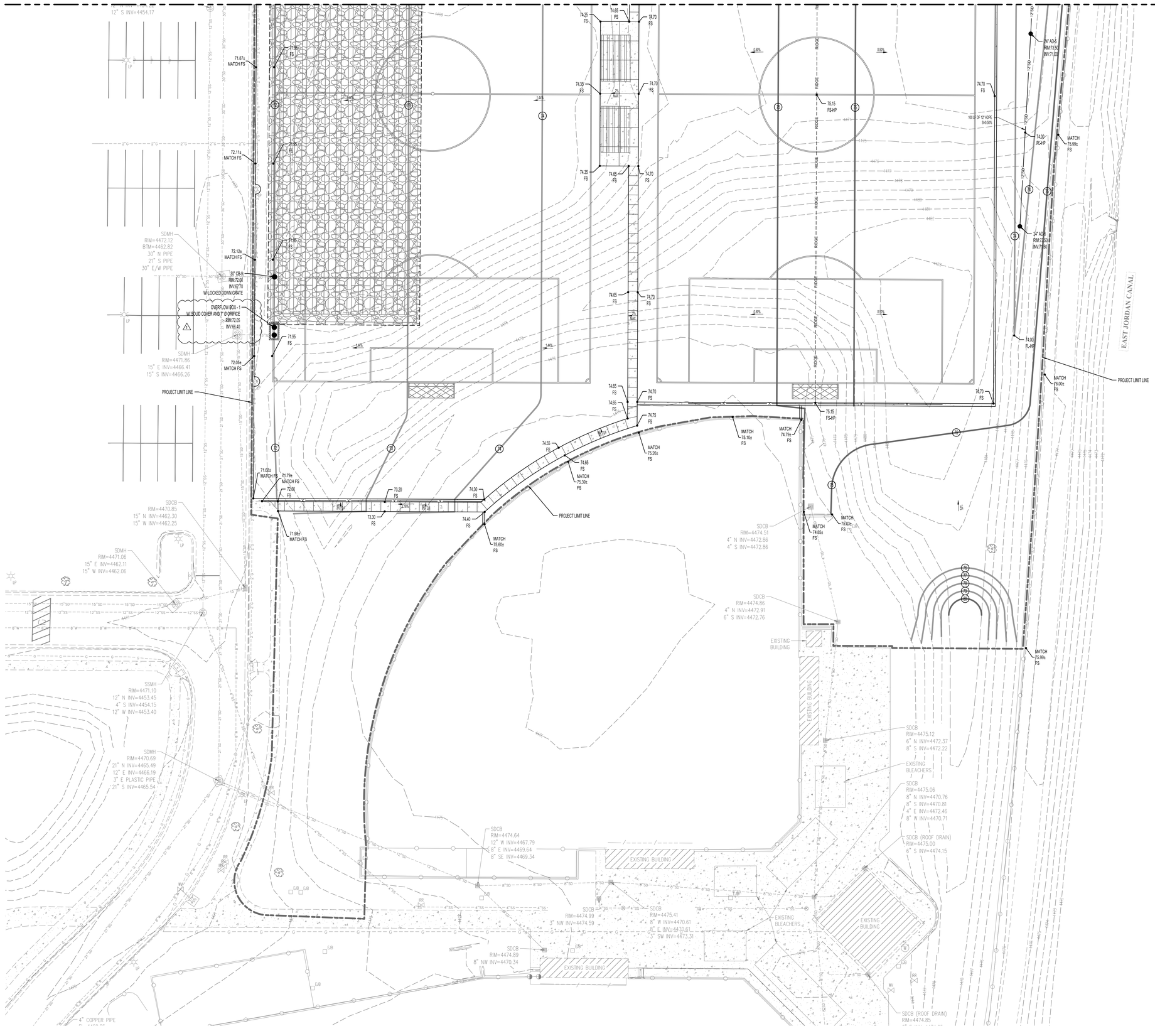
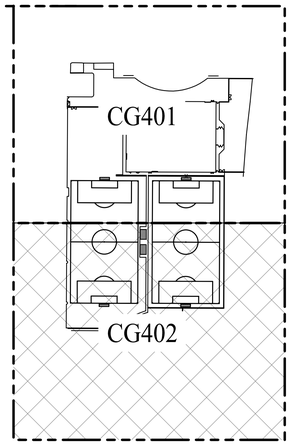
REFER TO SHEET CG401





KEYMAP

SCALE 1"=20'

GRADING LEGEND

76	MAJOR CONTOUR
75	MINOR CONTOUR

THE CONTRACTOR TO SCHEDULE THE ENGINEER OF RECORD IN WRITING 3 DAYS MINIMUM BEFORE PLACEMENT OF CONCRETE CURBING, FLATWORK, OR ASPHALT PAVING. ALL AREAS MUST BE FORMED AND HAVE COMPACTED BASE COURSE IN PLACE FOR THE ENGINEER TO COMPLETE A RANDOM SPOT GRADE CHECK BEFORE ASPHALT AND CONCRETE CONSTRUCTION. THE RANDOM GRADE CHECKS ARE FOR GENERAL CONFORMANCE TO SLOPES AND GRADING SHOWN ON PLANS USING A SMART LEVEL. RANDOM CHECKS DO NOT ALLEVIATE THE CONTRACTOR'S RESPONSIBILITY TO ENSURE GRADING IS IN CONFORMANCE WITH PLANS AND SPECIFICATIONS AND SATISFY PERFORMANCE OF HIS WORK. WITHIN 2 DAYS OF THE RANDOM SPOT CHECK, RESULTS OF THE SPOT CHECKS AND AREAS OF NON COMPLIANCE WILL BE PROVIDED TO THE CONTRACTOR AND ARCHITECT.

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SHEET TITLE

ENLARGED GRADING PLAN

BLUE STAKES OF UTAH 811

SHEET NUMBER

CG402

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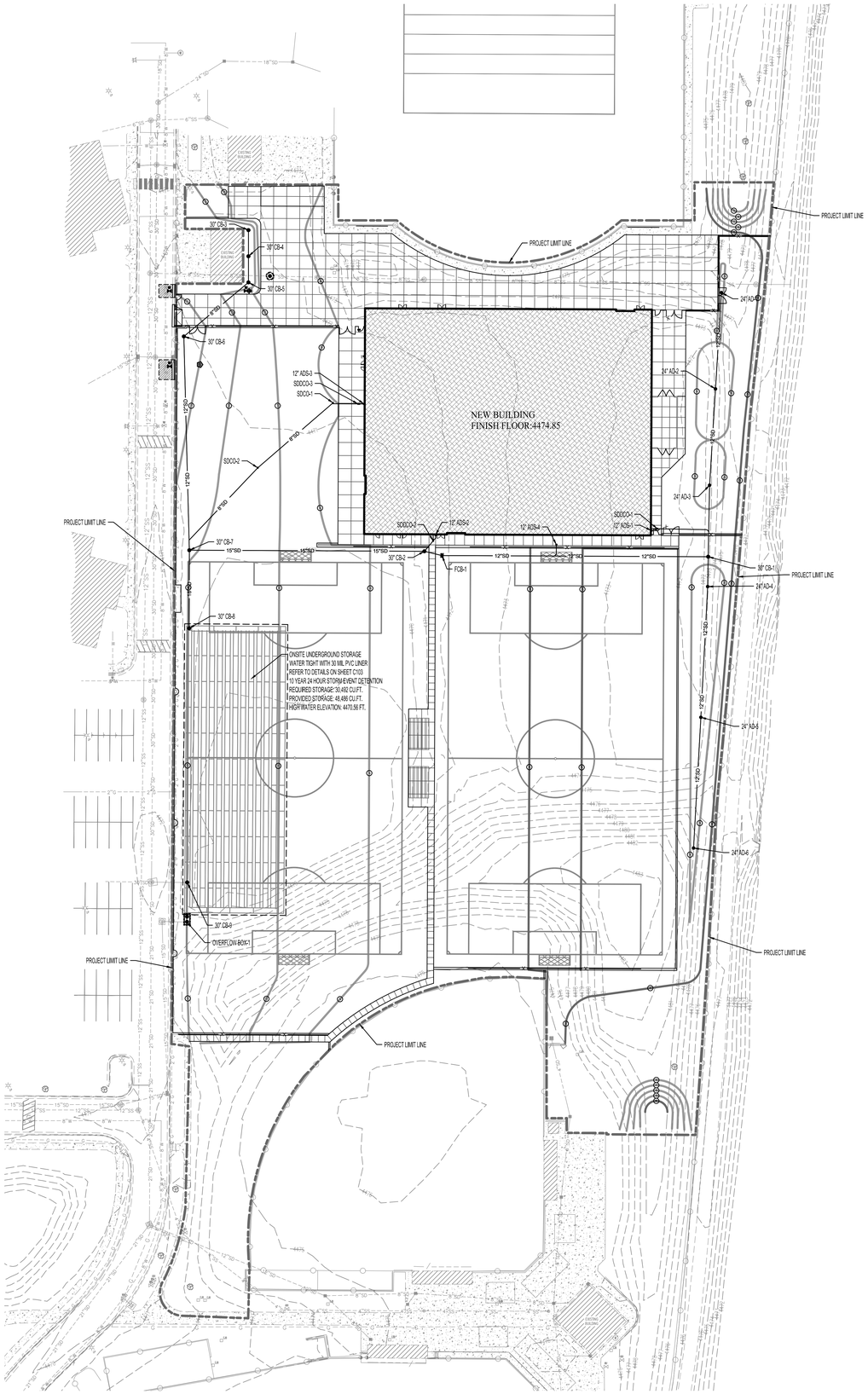

NOTES:

1. SEDIMENT WILL NOT BE ALLOWED INTO DETENTION SYSTEM DURING CONSTRUCTION AND DURING LANDSCAPE STABILIZATION OF SOILS. CONTRACTOR WILL BE REQUIRED TO CLEAN OR REPLACE RETENTION BASINS THAT ARE NOT MAINTAINED FREE OF SEDIMENT DURING CONSTRUCTION AND DURING ESTABLISHMENT OF ALL LANDSCAPED AREAS.
2. APPROXIMATED A 10-YEAR 24-HOUR STORM EVENT IS TO BE DETAINED UNDERGROUND.
3. TR-55 CALCULATIONS SHOWN IN THIS SHEET, HOWEVER, THE DESIGN FOR THE DETENTION SYSTEM USED RATIONAL METHOD, WHICH CONSERVATIVELY ACCOUNTS FOR THE VOLUME EXPECTED IN THE TR-55 METHOD.
4. HYDROLOGIC MODEL OF THE PROJECT WAS COMPETED USING HYDROLOGIC MODELING SYSTEM (HEC-HMS) VERSION 4.9, BUILD 2944, DATE 12SEP2024.
5. ORIFICE DESIGN CALCULATIONS WERE BASED USING HEC-HMS TO MEET THE EXISTING SITE RELEASE RATE OF 2.20 CFS.

SCALE 1"=40'

Date: 12-Sep-24
Project Location: CDS Corner Canyon HS Fieldhouse
Location: Basin 1
Method: Rational

Allowable Release Flow: **2.20 cfs** *City Connection*

Existing Improvements:
This reflects all areas indicated on sheet C31 minus original A-13. Plus the new improvements (dated December 2014)

Drainage Area	Area (acres)	C	CA
A-1	0.94	0.62	0.58
A-2	0.33	0.86	0.28
A-3	0.41	0.87	0.36
A-4	0.54	0.86	0.46
A-5	0.25	0.59	0.15
A-6	0.20	0.69	0.14
A-7	5.46	0.70	3.82
A-8	0.30	0.64	0.19
A-9	2.47	0.50	1.24
A-10	5.60	0.82	4.59
A-11	0.52	0.51	0.27
A-12	7.42	0.30	2.23
A-13 - updated	6.15	0.52	3.19
Total:	**30.59**	**0.57**	**17.49**

New Improvements:

			Runoff Coefficients
New Landscape Area	140,361	SF	C= 0.20
New Paved Area	30,262	SF	C= 0.90
New Building Area	37,825	SF	C= 0.95
Others:	59,381	SF	C= 0.80
Total Area:	**267829**	**SF**	**Weighted C = 0.52**
Total Area:	**6.15**	**AC**	

Combined Required Detention:
This reflects all areas indicated on sheet C31 minus original A-13 (dated December 2014). Plus the new improvements.

Lapsed Time Minutes	Accum. Rainfall Inches(10 yr)	"CA" Acre	Total Runoff Vol. CF	Discharge CF	Req'd Storage CF
15	0.532	17.49	33498	1980	31518
30	0.716	17.49	45084	3960	41124
60	0.887	17.49	55851	7920	47931
120	1.010	17.49	63596	15840	47756
180	1.090	17.49	68633	23760	44873
360	1.330	17.49	83745	47520	36225
720	1.640	17.49	103264	95040	8224
1440	1.780	17.49	112080	190080	0
COMBINED REQUIRED DETENTION STORAGE:					**47,931 CF (10 yr)**

Lapsed Time Minutes	Accum. Rainfall Inches(100 yr)	"CA" Acre	Total Runoff Vol. CF	Discharge CF	Req'd Storage CF
15	1.04	17.49	65485	1980	63505
30	1.41	17.49	88782	3960	84822
60	1.74	17.49	109561	7920	101641
120	1.90	17.49	119636	15840	103796
180	1.93	17.49	121525	23760	97765
360	2.09	17.49	131599	47520	84079
720	2.48	17.49	156156	95040	61116
1440	2.50	17.49	157415	190080	0
					103,796 CF (100 yr)

Underground Detention System Volume:

Total: **48,486** CF

COMBINED DETENTION STORAGE PROVIDED:	**48,486 CF (10 yr)**

HEC SUMMARY TABLE	
HIGHWATER:	4470.56 FT
PIPE INVERT:	4466.40 FT
PEAK ELEVATION:	4468.70 FT
TOTAL STORAGE:	**0.7 AC-FT**
	30,492 CUBIC FEET

Time of Concentration Calculations

Sheet Flow								Shallow Concentrated Flow							Basin	UH
Path Paved (Y/N)	Manning Roughness	Flow Length Ft	2yr 24 hr Depth in	Begin El Ft	End El Ft	Slope ft/ft	T_{sheet} Min	Flow Length Ft	Begin El Ft	End El Ft	Slope ft/ft	Path Paved (Y/N)	V/S coeff k	$T_{shallow}$ Min	Tc Min	Lag Time Min
No	0.410	721	1.32	82.00	74.00	0.0111	175.4	1767.33	74.00	60.25	0.0078	Yes	20.8	16.1	191.5	114.9

Combined Required Detention:
This reflects all areas indicated on sheet C31 minus A-13 (dated December 2014). Plus the new improvements.

DRAINAGE AREA	AREA (AC)	CN = BLDG 98	CN = HARD 98	CN = TURF 80	CN = LAND 30	COMPOSITE CN
A-1	0.94	0.00	0.56	0.00	0.38	
A-2	0.33	0.00	0.31	0.00	0.02	
A-3	0.41	0.00	0.39	0.00	0.02	
A-4	0.54	0.00	0.51	0.00	0.03	
A-5	0.25	0.00	0.14	0.00	0.11	
A-6	0.20	0.13	0.00	0.00	0.07	
A-7	5.46	0.43	0.00	4.02	1.01	
A-8	0.30	0.00	0.19	0.00	0.11	
A-9	2.47	0.73	0.27	0.00	1.47	
A-10	5.60	1.20	3.65	0.00	0.75	
A-11	0.52	0.00	0.23	0.00	0.29	
A-12	7.42	0.00	1.02	0.00	6.40	
A-13 - updated	6.15	0.87	0.69	1.36	3.22	
TOTALS:	**30.59**	**3.36**	**7.96**	**5.38**	**13.88**	**64**

TOTAL AREA: **1,332,435 SF** **Weighted CN= 64**
TOTAL AREA: **30.59 Ac.** **Initial Abstraction (I) = 1.13**
Max Runoff (S) = 5.63

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STATE OF UTAH
DATE ISSUED: 09/12/2024
NICHOLE LEE LUTH
No. 8023335

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OWNER INFORMATION

CANYONS SCHOOL DISTRICT

PROJECT TITLE AND ADDRESS

CCHS FIELDHOUSE & SOCCER FIELD BP-3

12943 SOUTH 700 EAST
DRAPER, UTAH 84020

REVISIONS

	DESCRIPTION	DATE
1	ADD-04	10/08/2024

PROJECT INFORMATION

DATE: SEPTEMBER 12, 2024
PROJECT #: 23-013
PM / PA: NLL
PIC:

DRAWING SET STATUS

BID SET

THIS DRAWING SET IS INTENDED TO BE PRINTED IN COLOR

SHEET TITLE

HYDROLOGY PLAN

Blue Stakes of UTAH 811 Blue Stakes.org

SHEET NUMBER

CG450

Autodesk Docs://24-013 CCHS Fieldhouse & Soccer Field/24-013 CCHS Fieldhouse & Soccer Field.rvt
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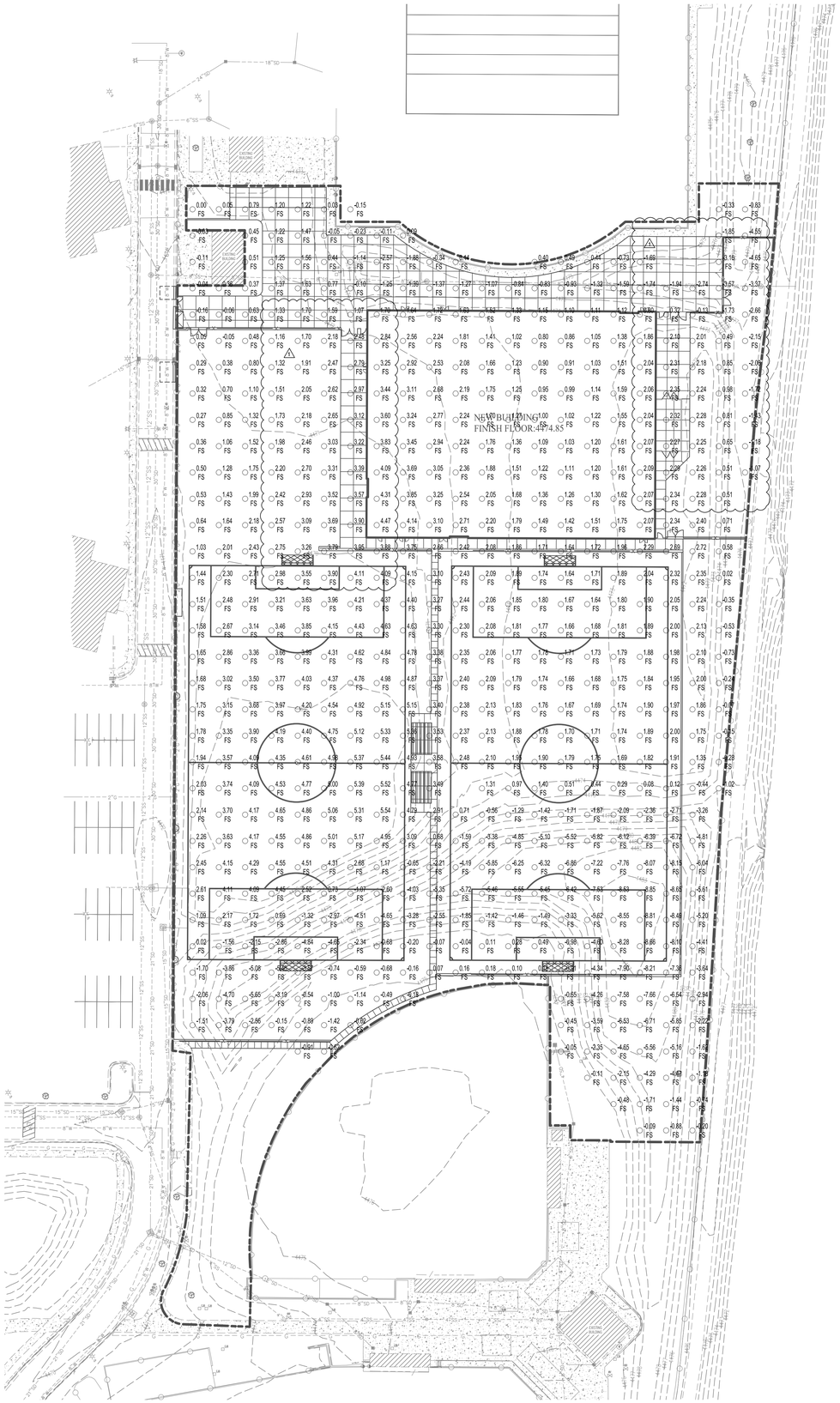

NOTES:

1. SITE EXCAVATION MATERIALS ARE NOT ALLOWED FOR USE BELOW FOOTING, BUILDING SLAB, OR OTHER STRUCTURAL ITEMS ON SITE (REFER TO SPECIFICATIONS.) SITE EXCAVATION MATERIALS CAN BE USED UNDER PAVEMENTS IF THEY MEET THE PROJECT SPECIFICATIONS AND REQUIREMENTS FROM THE GEOTECHNICAL REPORT. THE FILL MATERIAL SHOWN ON THE CALCULATIONS INCLUDED ALL NECESSARY FILL (INCLUSIVE OF PAVEMENT, CONCRETE, BASE COURSE, AND IMPORTED STRUCTURAL FILL.) TO BRING THE SITE TO THE FINISH SURFACE SHOWN ON THE GRADING PLANS. ADDITIONAL EXCAVATION IS REQUIRED IN CUT AREAS TO EXCAVATE TO THE NECESSARY SUBGRADE ELEVATIONS FOR THE NEW PAVEMENT.
2. ANY TOP SOIL ON THE SITE IS ASSUMED TO BE REMOVED AND REUSED AT THE TOP OF THE GRASS PLAY FIELD, AND OTHER LANDSCAPE AREAS AS INDICATED ON THE LANDSCAPE PLANS. CONTRACTOR SHALL STRIP THE TOP OF MATERIAL AS OUTLINED IN THE SPECIFICATIONS AND LANDSCAPE PLAN PRIOR TO ANY EXCAVATIONS OR BACKFILLING. SCREEN ALL TOPSOIL IN ACCORDANCE WITH LANDSCAPING SPECIFICATIONS PRIOR TO FINAL PLACEMENT OF THE MATERIAL.
3. THE MASS GRADING QUANTITIES ARE CALCULATED TO THE FINISH FLOOR OF THE BUILDING. ALL OTHERS AREAS ARE ALSO CALCULATED TO THE FINISH SURFACE SHOWN ON THE GRADING PLAN INCLUDING PAVEMENT AND TOPSOIL.
4. EXCAVATION FOR BUILDING FOOTINGS, UTILITY TRENCHES, SITE RETAINING WALLS, AND PAVEMENT/SIDEWALK SECTIONS OR OTHER MISCELLANEOUS STRUCTURES ARE NOT INCLUDED IN THE APPROXIMATED MASS GRADING QUANTITIES UNDER ALL SITE PAVEMENT.
5. SEE ATHLETIC ELEMENTS, LANDSCAPE, SPRINKLING AND FENCING PLANS FOR FURTHER INFORMATION AND LOCATIONS OF CONCRETE WORK INCLUDING LARGE SITE SIGNS (MONUMENT, AND VICTORY BELL), VARIOUS MOW STRIPS, COLLARS AND SLABS, ETC.
6. SEE THE FENCING PLANS FOR FURTHER INFORMATION ON BLOCK WALLS, FENCING TYPES, LOCATIONS, GATES, ETC.

LEGEND

1.6	APPROXIMATE FILL TO GRADE (SEE NOTE 3)
-1.6	APPROXIMATE CUT TO GRADE (SEE NOTE 3)

CONTRACTOR BID NOTE:

THESE QUANTITIES ARE PREPARED TO HELP IN THE PREPARATION OF THE GRADING PLAN TO MINIMIZE THE REMOVAL OF MATERIAL FROM THE SITE AND TO APPROXIMATE THE AMOUNT OF MASS GRADING THAT WILL BE NECESSARY TO COMPLETE THE WORK. THE CONTRACTOR WILL NEED TO COMPLETE THEIR OWN EARTHWORK TAKE OFF BASED ON THE GRADING PLANS. THE ACTUAL QUANTITIES OF EARTHWORK MAY VARY FROM THE AMOUNTS SHOWN ON THIS SHEET. THE CONTRACTOR'S BID WILL INCLUDE ALL NECESSARY EARTHWORK TO COMPLETE THE PROJECT TO THE FINISH GRADES SHOWN ON THE GRADING PLANS.

MERIDIAN ENGINEERING

0 40 80
SCALE 1"=40'

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CUT/FILL EXHIBIT

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CG460

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