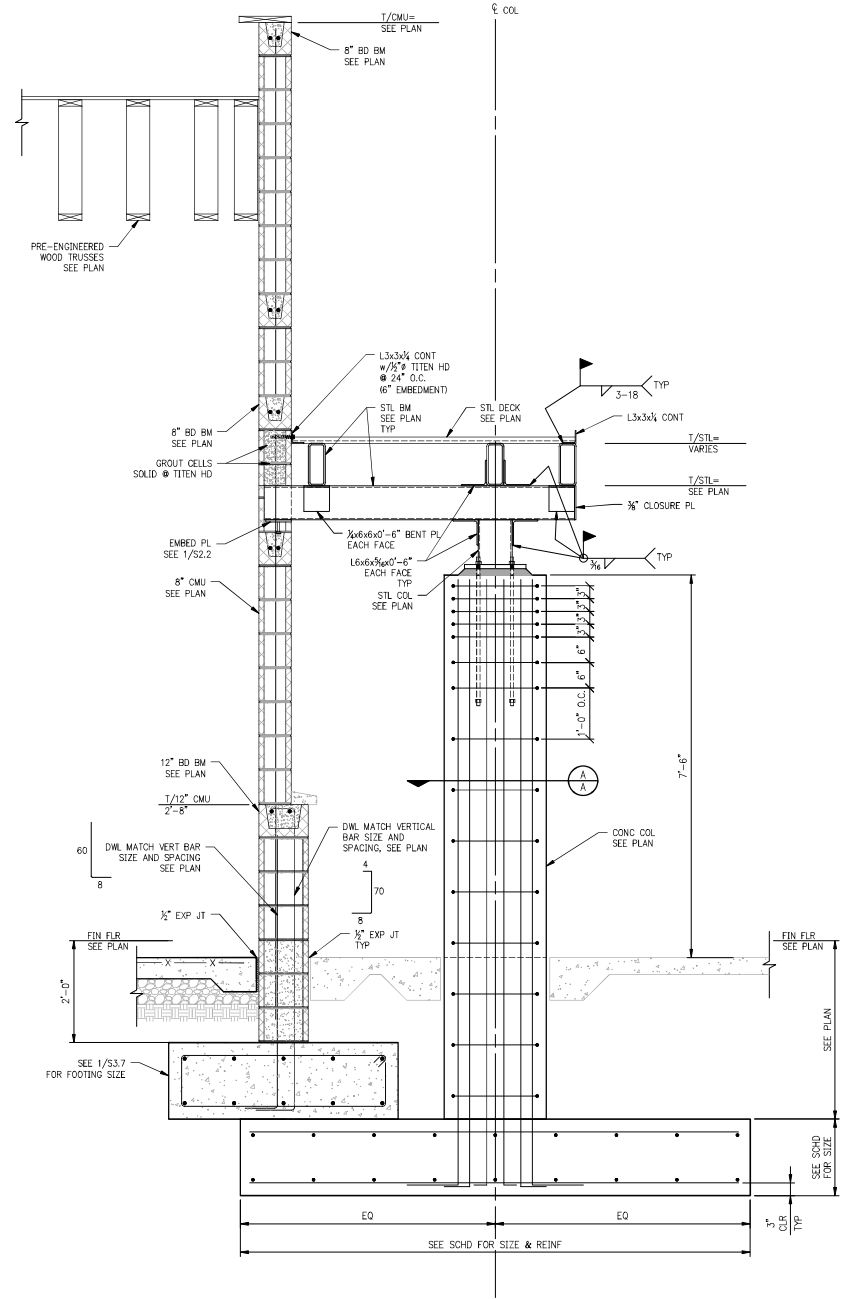
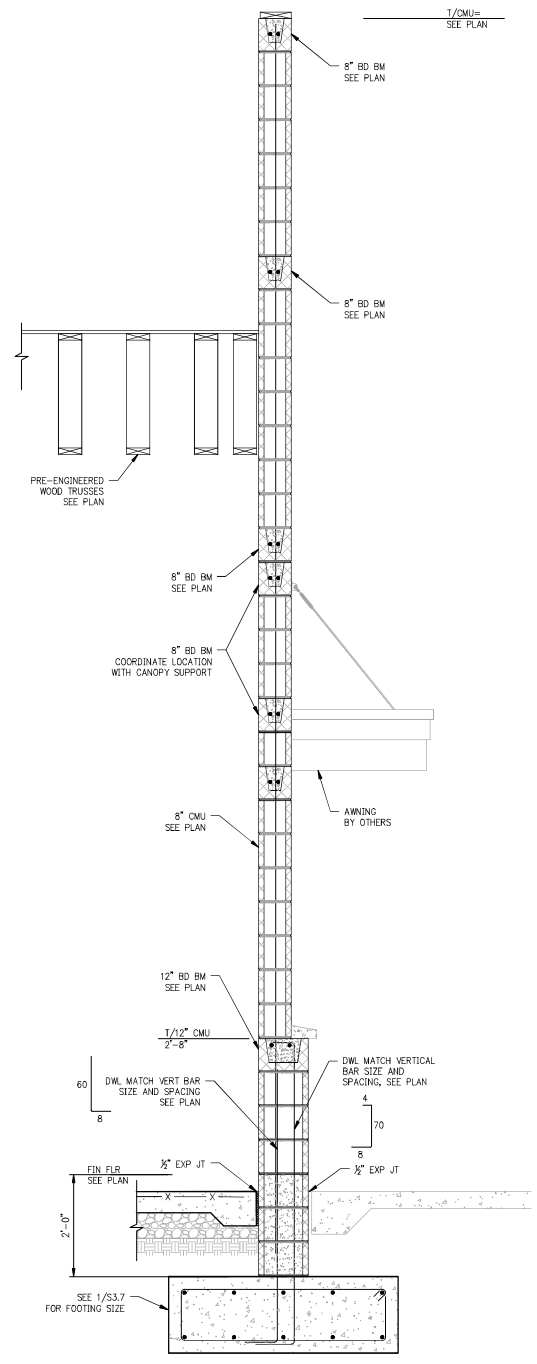




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HUGHES  
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1 SECTION  
S3.9 3/4" = 1'-0"



2 SECTION  
S3.9 3/4" = 1'-0"

A New Facility for:  
**Magic Carwash**  
Gulfport, Mississippi

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**Sections**

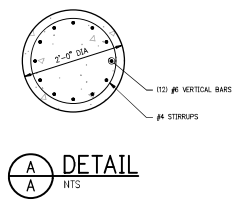
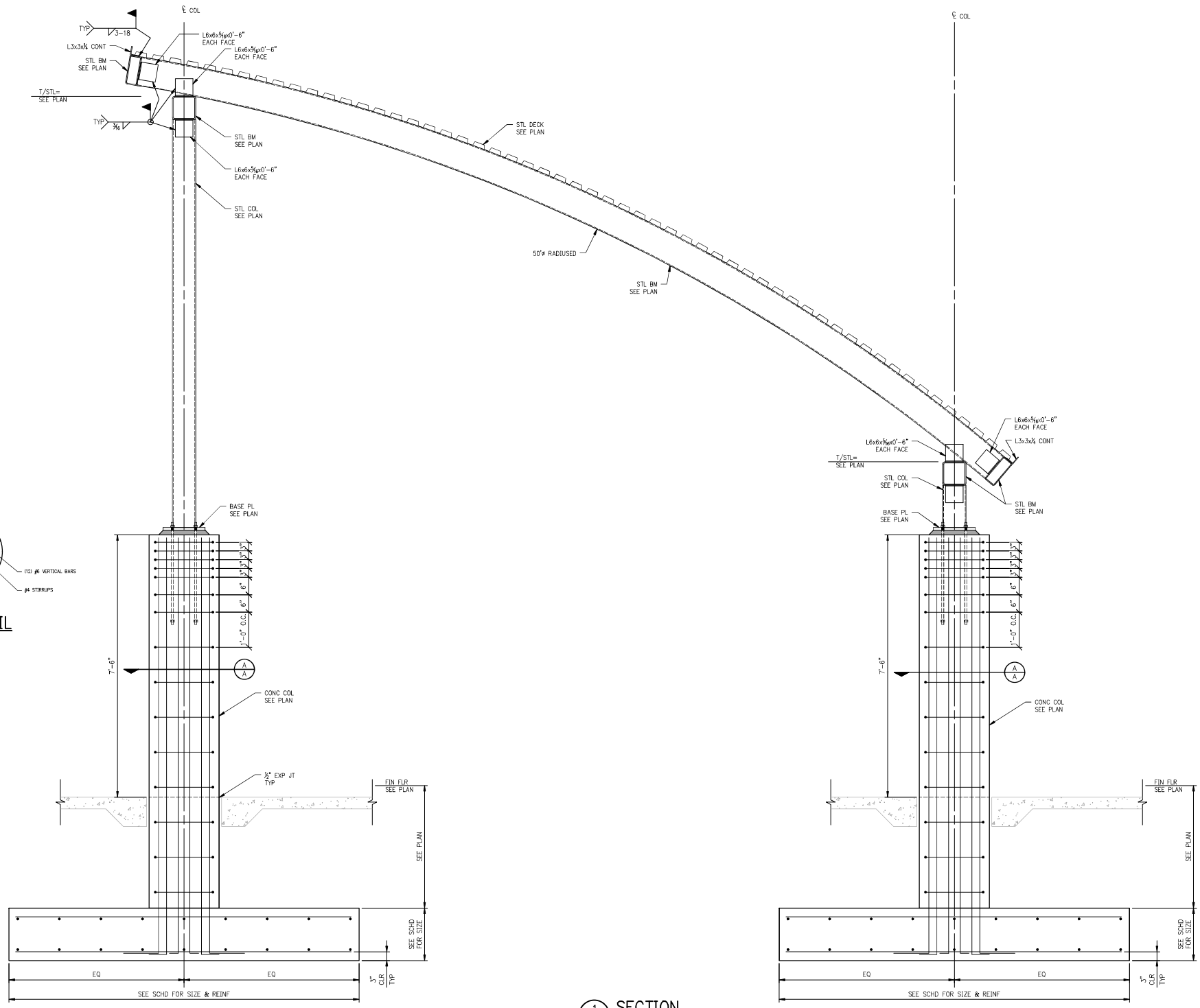
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**S3.9**



**LIVE OAK ENGINEERING**  
2509 7th AVENUE SOUTH  
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**A** DETAIL  
**A** NTS

**1** SECTION  
**S3.8** 3/4" = 1'-0"

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**Section**

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**S3.8**

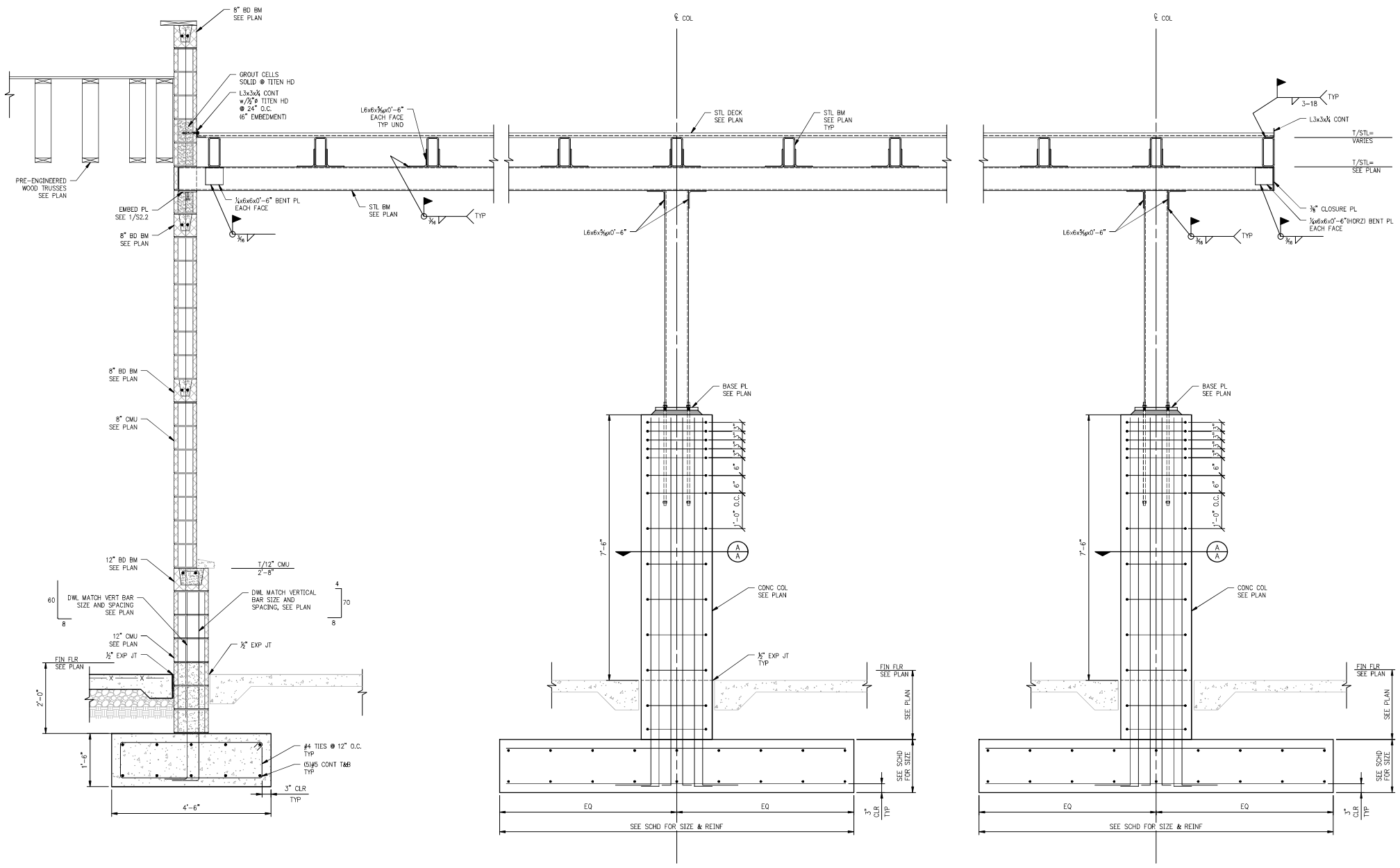
**LIVE OAK**  
**ENGINEERING**  
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BIRMINGHAM, AL 35233  
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SECTION  
S3.7 3/4" = 1'-0"

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**Section**

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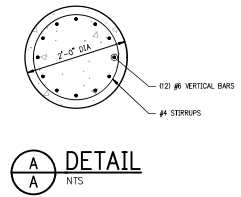
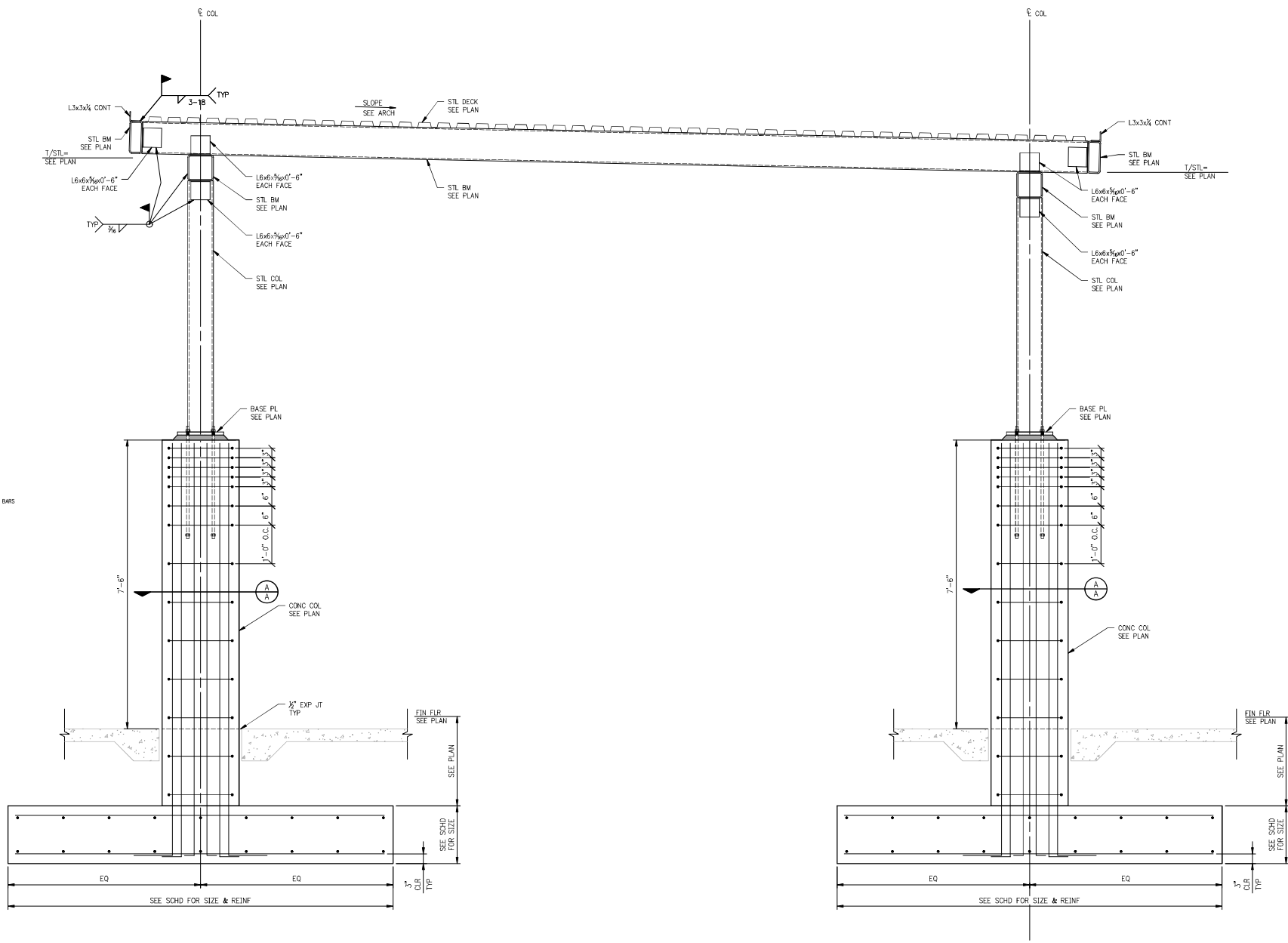
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1 SECTION  
S3.6 3/4" = 1'-0"



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A New Facility for:  
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**Section**

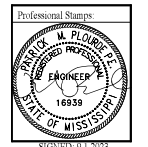
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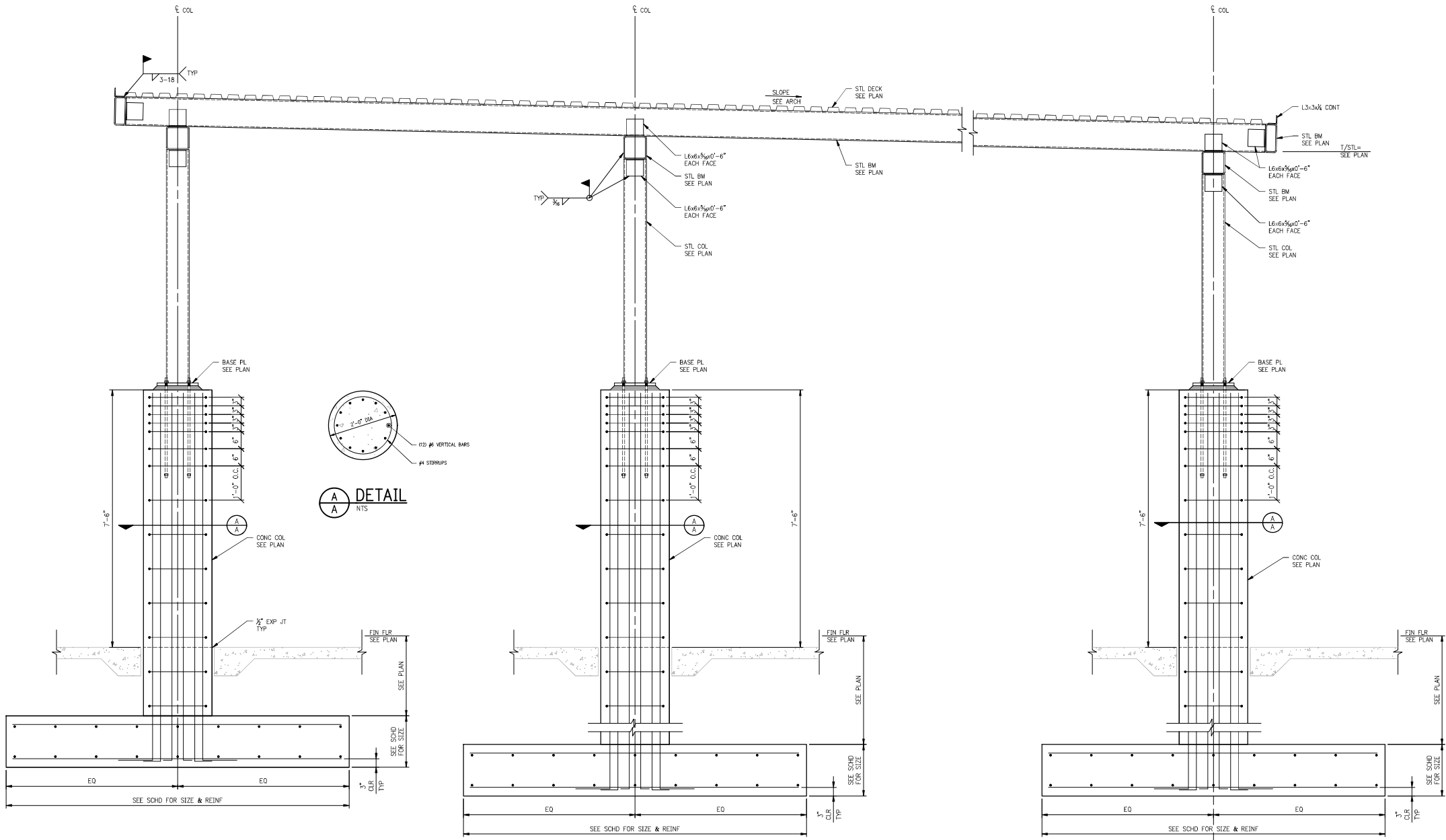
A New Facility for:  
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**Section**

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**S3.5**



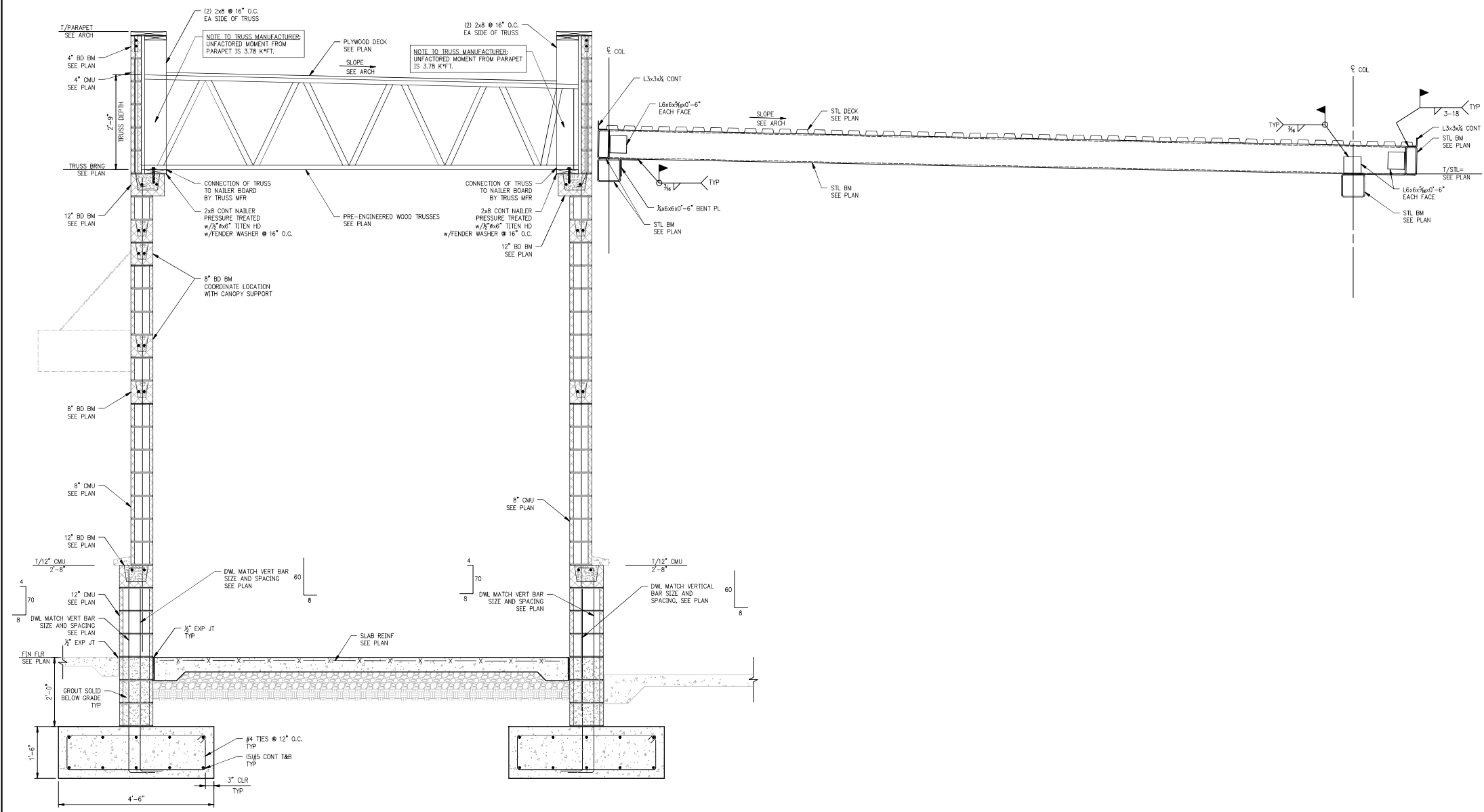
**1** SECTION  
3/4" = 1'-0"



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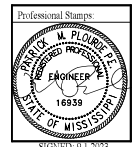
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SECTION  
S3.4 3/4" = 1'-0"

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**Section**

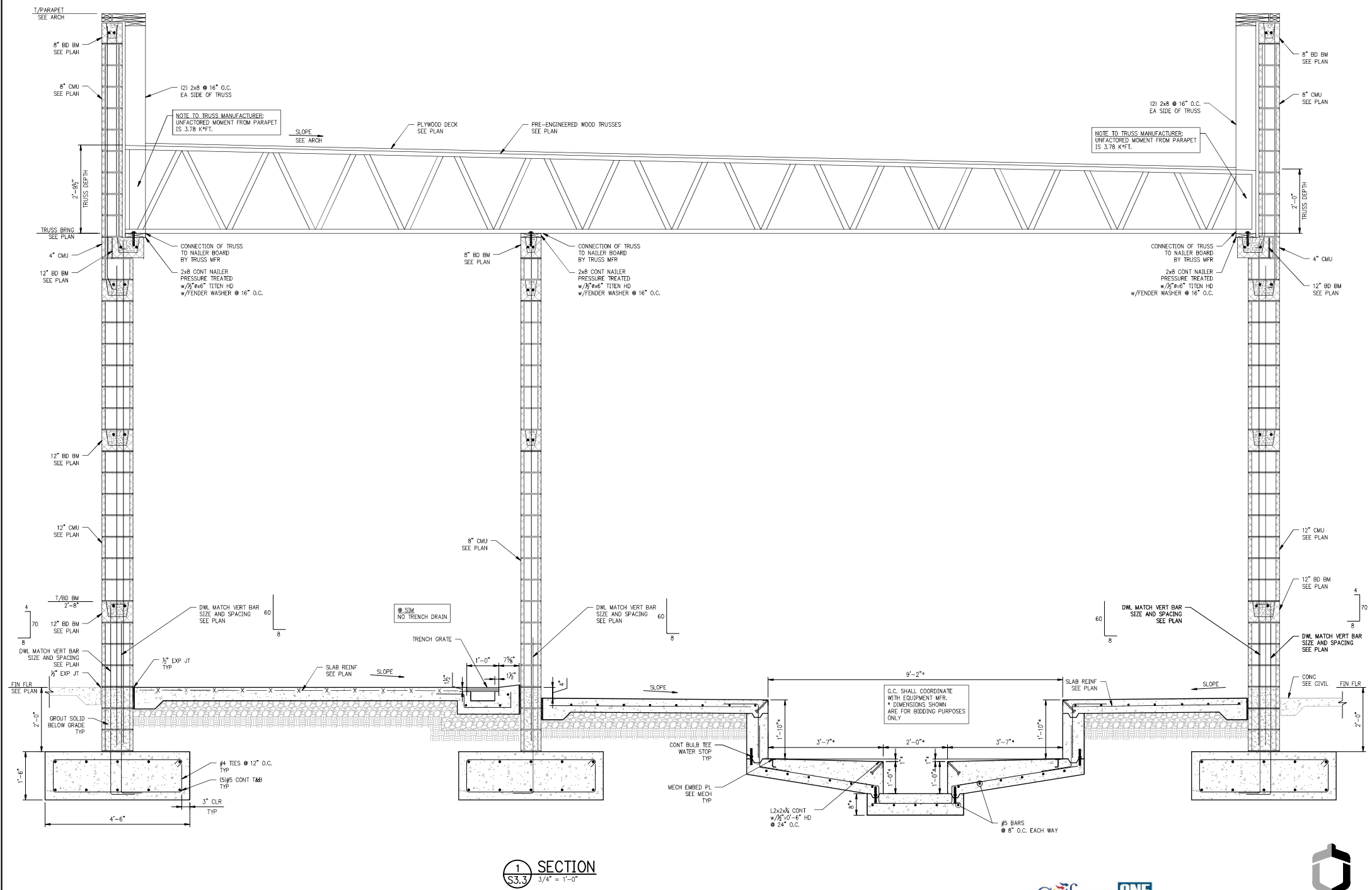
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**SECTION**  
S3.3 3/4" = 1'-0"

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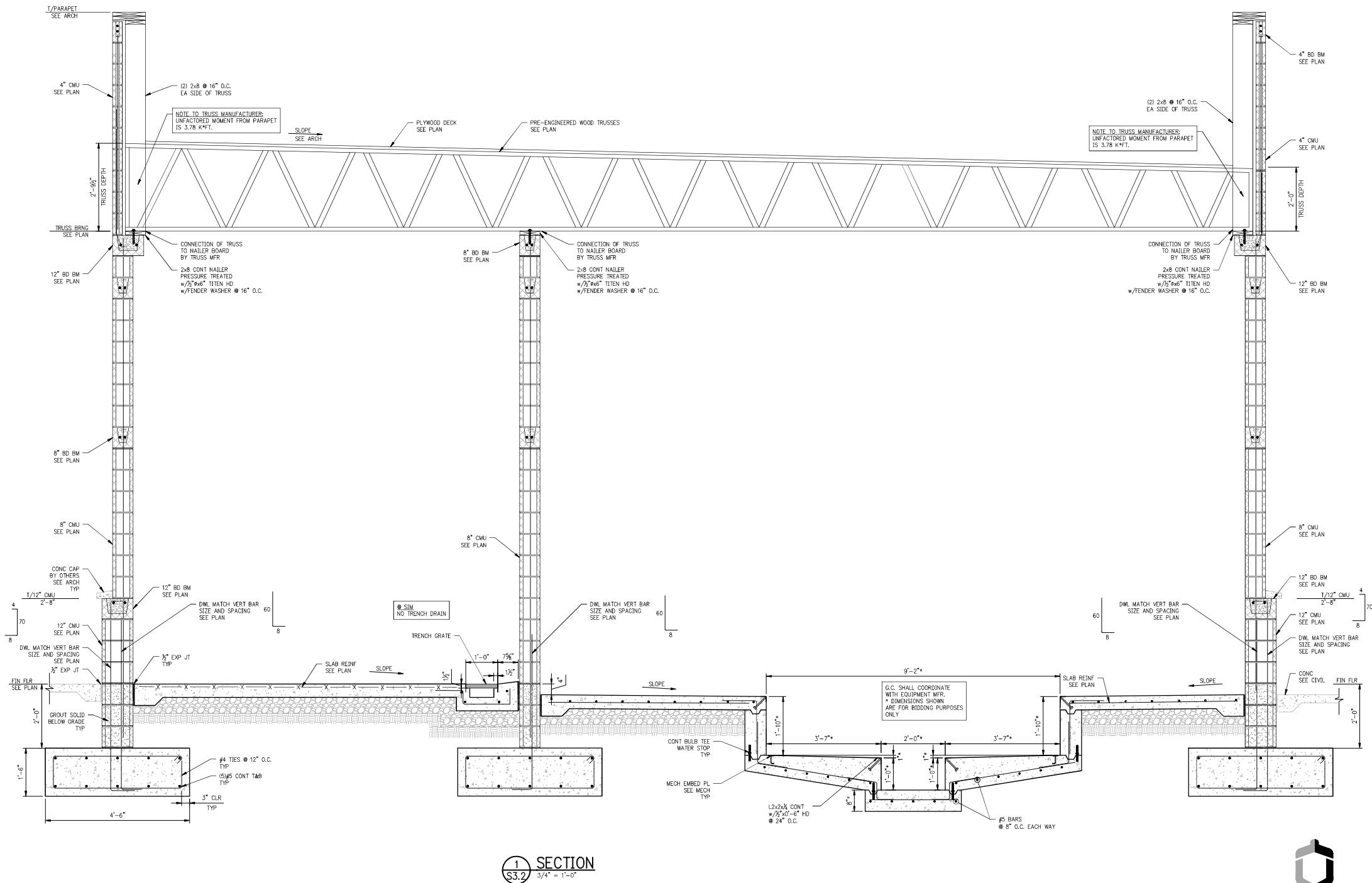
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**S3.3**





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SECTION  
S3.2  
3/4" = 1'-0"

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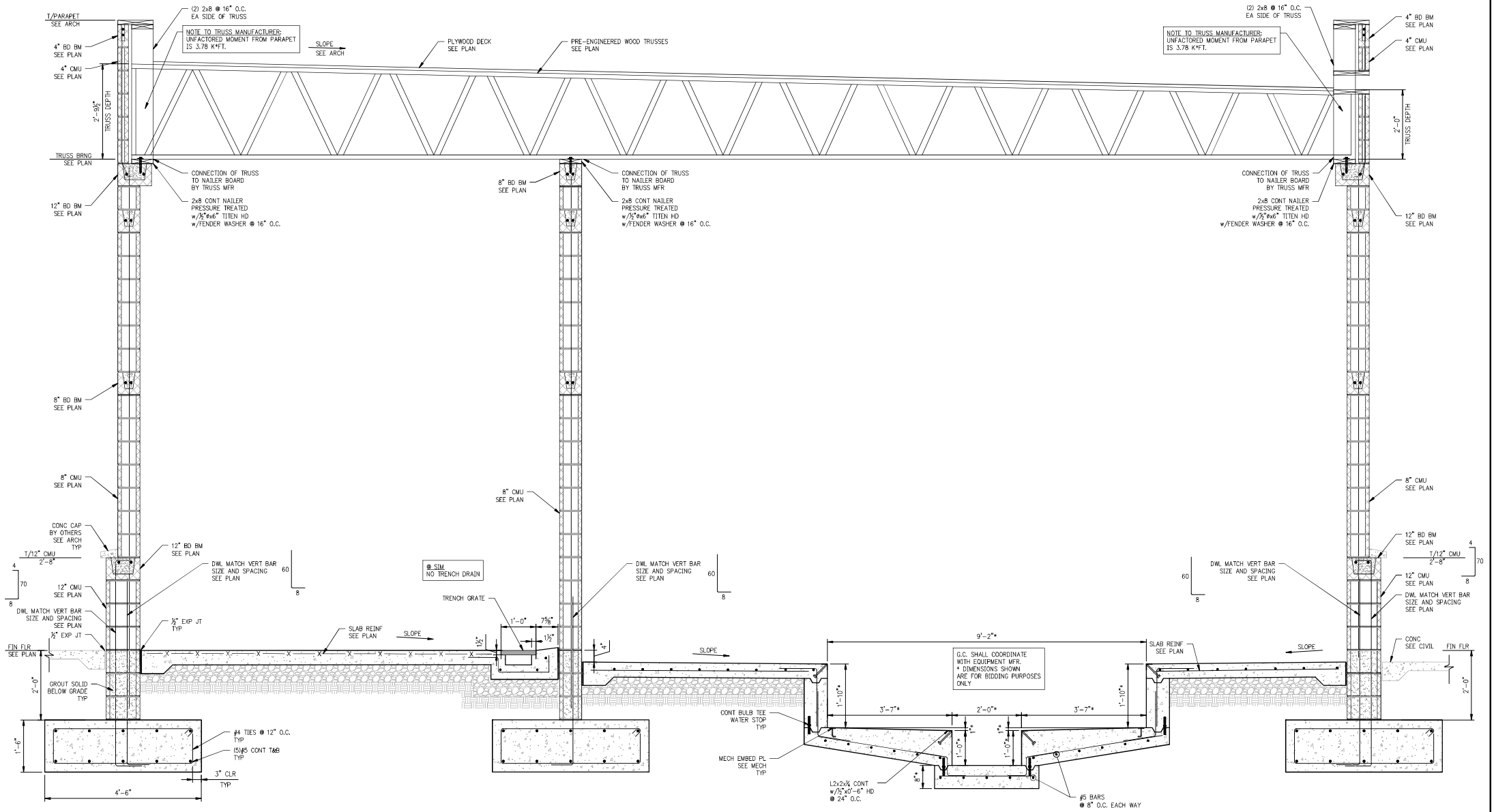
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**SECTION**  
S3.1  
3/4" = 1'-0"

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**Section**

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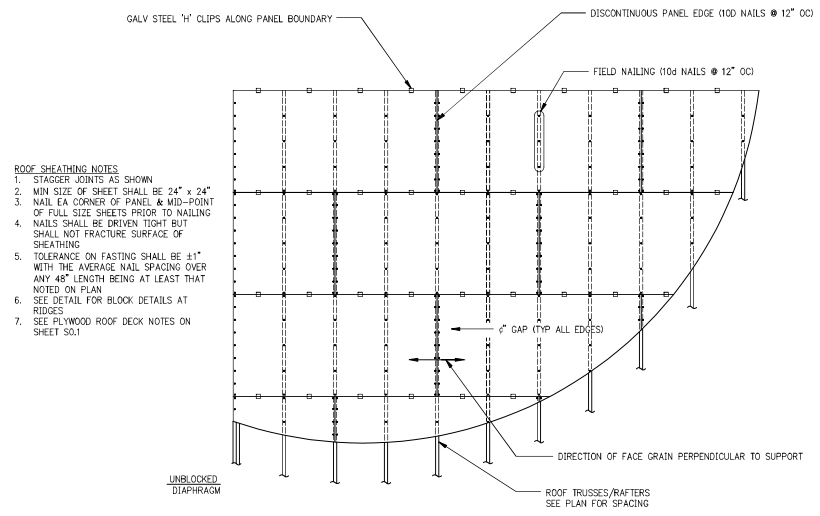
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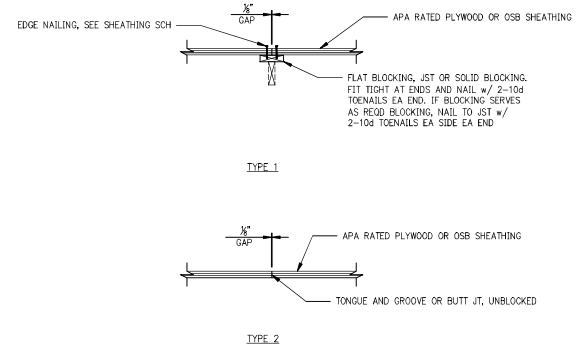


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HUGHES  
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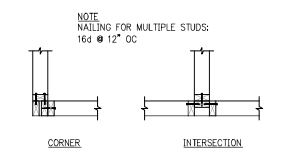


- ROOF SHEATHING NOTES
1. STAGGER JOINTS AS SHOWN
  2. MIN SIZE OF SHEET SHALL BE 24" x 24"
  3. NAIL EA CORNER OF PANEL & MID-POINT OF FULL SIZE SHEETS PRIOR TO NAILING
  4. NAILS SHALL BE DRIVEN TIGHT BUT SHALL NOT FRACTURE SURFACE OF SHEATHING
  5. TOLERANCE ON FASTING SHALL BE ±1" WITH THE AVERAGE NAIL SPACING OVER ANY 48" LENGTH BEING AT LEAST THAT NOTED ON PLAN
  6. SEE DETAIL FOR BLOCK DETAILS AT RIDGES
  7. SEE PLYWOOD ROOF DECK NOTES ON SHEET S01

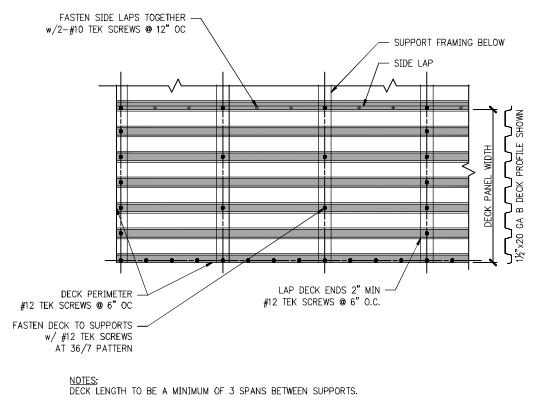
1  
S2.4  
DETAIL-ROOF SHEATHING ON WOOD TRUSSES  
NTS



2  
S2.4  
DETAIL-TYP PLYWOOD OR OSB EDGE CONDITIONS  
NTS



3  
S2.4  
DETAIL-TYP STUD WALL DETAILS  
PLAN VIEWS  
NTS



4  
S2.4  
DETAIL - TYPICAL 1 1/2\"/>

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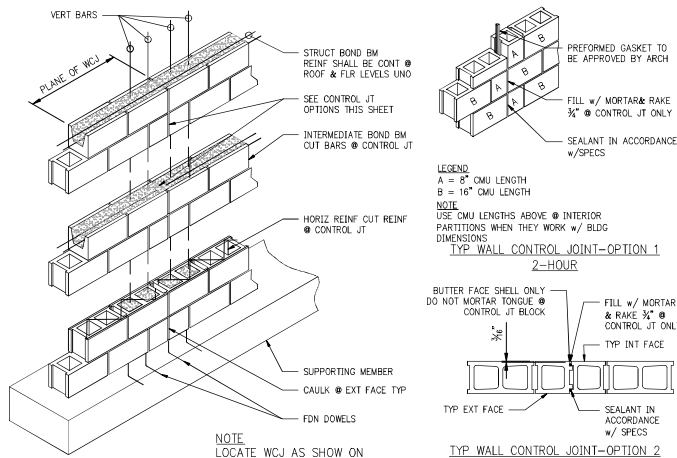



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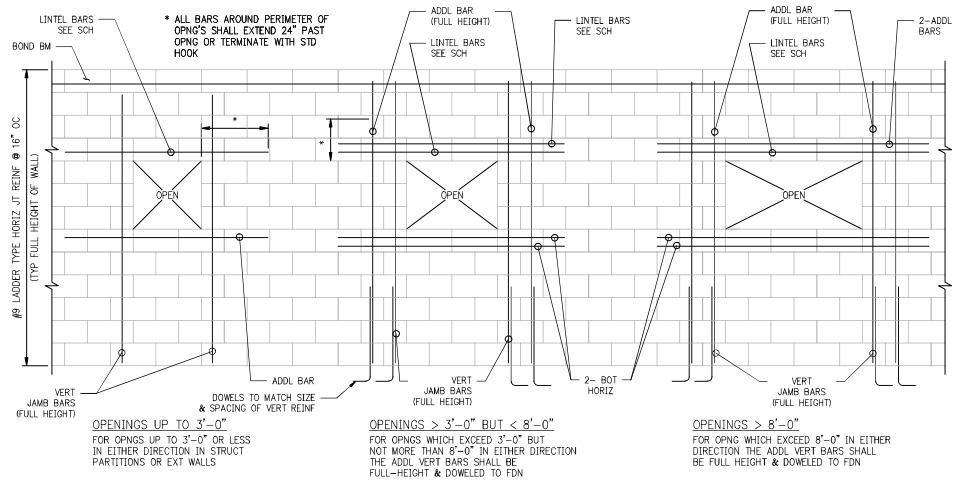
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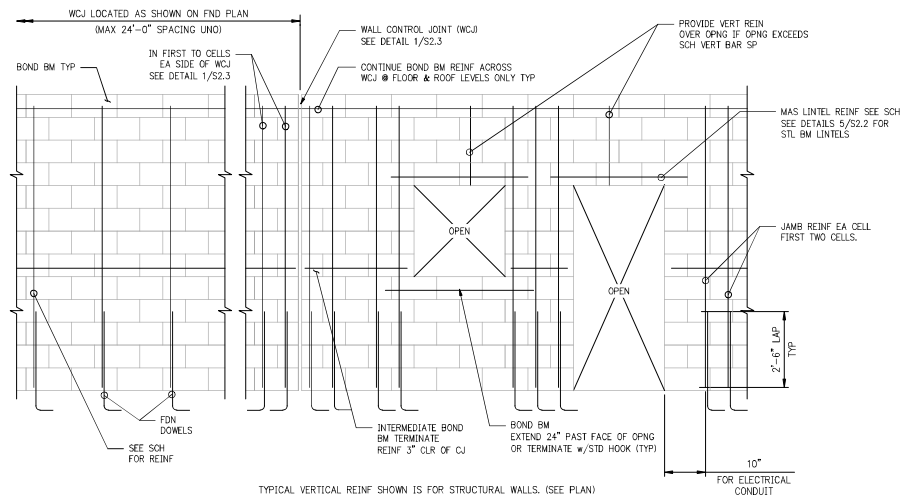
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**1** S2.3 NTS  
**DETAIL-TYP CMU WALL CONTROL JOINT (WCJ)**



**2** S2.3 NTS  
**DETAIL-TYP ADDL REINF AROUND WALL OPENINGS**



**3** S2.3 NTS  
**DETAIL-TYP BOND BM, CONTROL JT & WALL REINF**



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**S2.3**



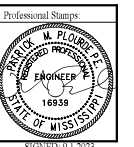
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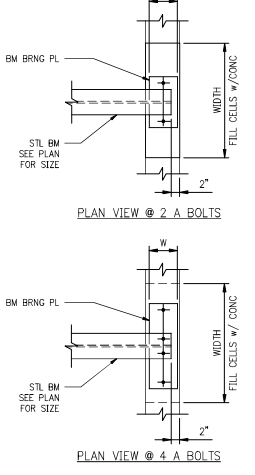
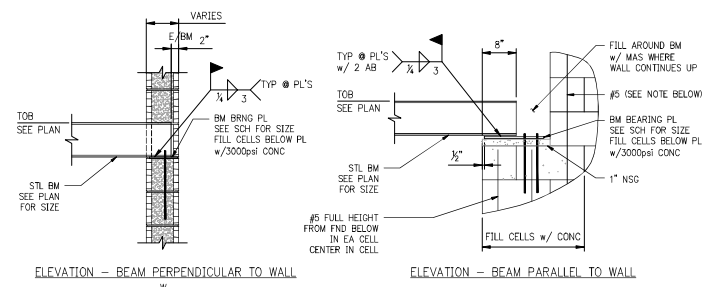
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**S2.2**

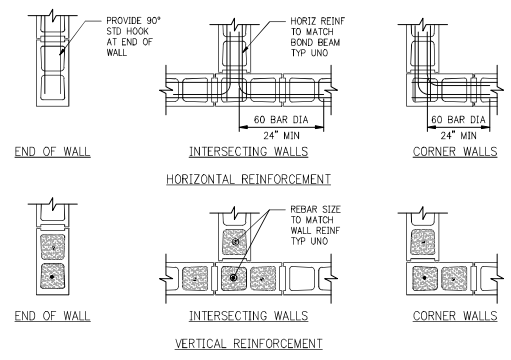


**BEAM BEARING PLATE SCHEDULE**

BEAM SIZE	PLATE SIZE	ANCHOR BOLT QTY / DIA
W8,W10	1/2x6x1'-0"	2-3/4"φ
W12,W14,W16	3/4x6x1'-0"	2-3/4"φ
W18	1x6x1'-8"	2-3/4"φ
W21	1 1/2x6x2'-0"	2-3/4"φ
W24	1 3/4x6x2'-0"	4-3/4"φ

NOTES:  
W=CMU WIDTH=36"  
WHERE PL NOTED OR DETAILED TO HAVE 4 ANCHOR BOLTS, PROVIDE OVERSIZED HOLES AND WASHERS TWO BOLTS TO BE SP AT BM WEB DO NOT WELD BM TO PL PROVIDE 1" MIN NSG BELOW PL.

**1** **S2.2** **DETAIL-TYP BEAM BEARING**  
3/4"φ=1'-0"

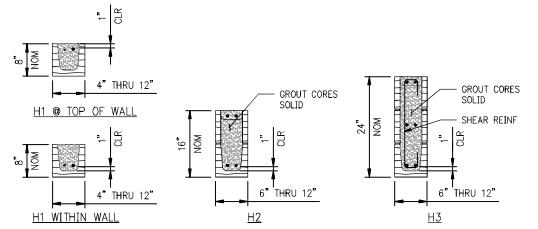


NOTES:  
1. REINFORCEMENT SHOWN IS IN ADDITION TO MINIMUM WALL REINFORCEMENT SHOWN IN FOUNDATION DETAILS.  
2. REINFORCING TO BE CONTINUOUS FROM FOOTING TO TOP OF WALL. FILL CORES SOLID WITH GROUT AS NOTED IN THE SPECIFICATIONS OR GENERAL NOTES.

**2** **S2.2** **DETAIL-TYP CMU WALL INTERSECTIONS**  
NONE

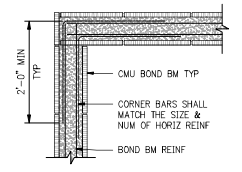
**HEADER SCHEDULE**

MARK	WALL	REINFORCEMENT	SHEAR REINFORCEMENT	REMARKS
H1	4"	1-#5 CONT	N/A	-
	8"	2-#5 CONT		-
	12"	2-#5 CONT		-
H2	8"	2-#5 CONT T & B	N/A	-
	12"	-		-
H3	8"	(2)#6 CONT TOP, MID & BOT	#3 @ 8" O.C. (ALT)	-
	12"	-		-

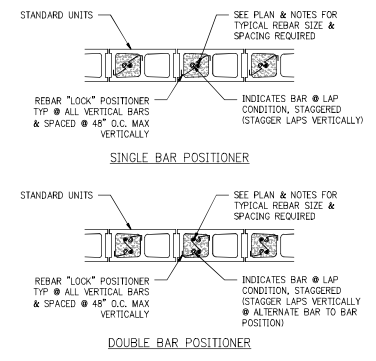


NOTE:  
1. SEE STRUCT DWGS FOR GENERAL LOCATION OF HEADERS - SEE ARCH FOR SPECIFIC LOCATION & CLEAR SPAN.  
2. LINTELS SHALL SPAN CONT RTWN BRNGS EACH SIDE.  
3. PROVIDE 8"MIN BRNG FOR CLEAR SPAN 6'-0" OR LESS, 16"MIN BRNG FOR CLEAR SPAN GREATER THAN 8'-0".  
4. EXTEND BOT REINF TO END OF BRNG EACH SIDE - EXTEND TOP REINF WHERE POSSIBLE - BASIC DEVELOPMENT LENGTH - TERMINATE TOP REINF W/STD HOOK AT CONTROL JTS OR FREE EDGES.  
5. PROVIDE SOLID GROUTED OF SOLID MAS JAMB UNDER LINTEL EA SIDE OF OPNG FOR CLEAR SPAN GREATER THAN 6'-0".

**5** **S2.2** **DETAIL- REINFORCED MASONRY HEADER SCHEDULE**  
NTS



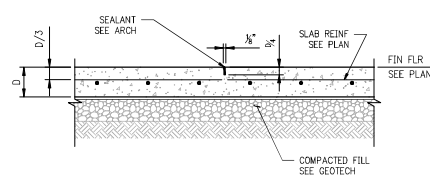
**4** **S2.2** **DETAIL- TYP BOND BM CORNER REINF**  
NTS



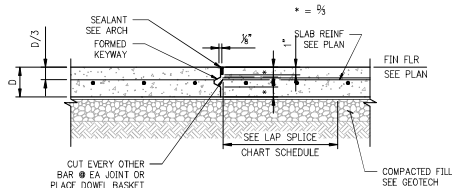
**3** **S2.2** **DETAIL-TYP MASONRY WALL REINFORCEMENT POSITIONERS**



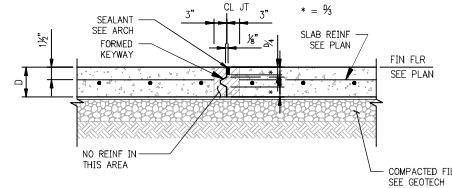
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SAWCUT CONTROL JOINT



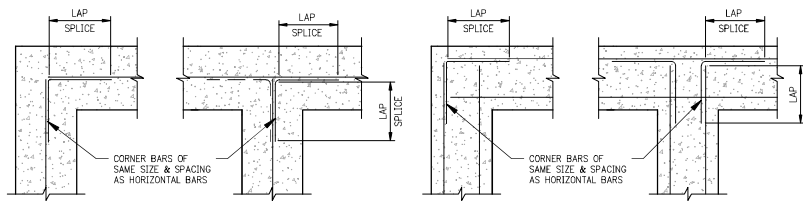
CONSTRUCTION JOINT



EXPANSION JOINT

- NOTES
1. SEE FOUNDATION PLAN(S) FOR SLAB THICKNESS AND REINF.
  2. CUT EVERY OTHER BAR @ EA JOINT OR PLACE DOWEL BASKET (C.C. OPTION)
  3. THE SAWCUTTING SHALL BE DONE WITHIN 8 HOURS OF PLACEMENT OR AS SOON AS THE CONCRETE HAS SUFFICIENTLY CURED TO PERMIT CUTTING WITHOUT CHIPPING, SPALLING OR TEARING.

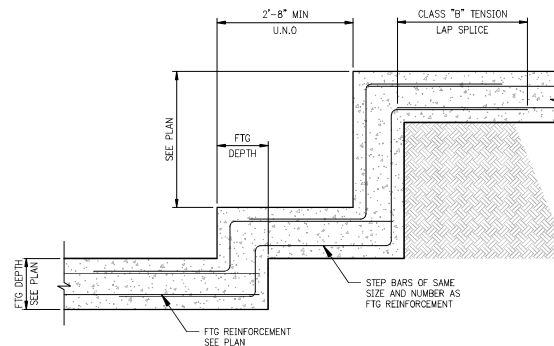
**1** DETAIL-TYP SLAB JOINTS  
S2.1 NTS



SINGLE LAYER REINFORCEMENT

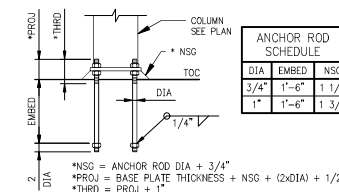
DOUBLE LAYER REINFORCEMENT

NOTE:  
ALL LAP SPLICES CLASS "B" TENSION



**3** DETAIL-STEPPED FOOTING  
S2.1 NTS

- NOTES
1. ANCHOR RODS SHALL BE PROVIDED WITH HEX NUTS AND CUT WASHERS OF SPECIFICATIONS COMPATIBLE WITH THOSE OF THE THREADED SHANKS UNLESS NOTED OTHERWISE.
  2. NUTS SHALL BE PROVIDED UNDER THE BASE PLATE FOR LEVELING AND PLUMBING OF COLUMN.
  3. AT PEMB NSG = 0" OR PEMB REQUIREMENTS

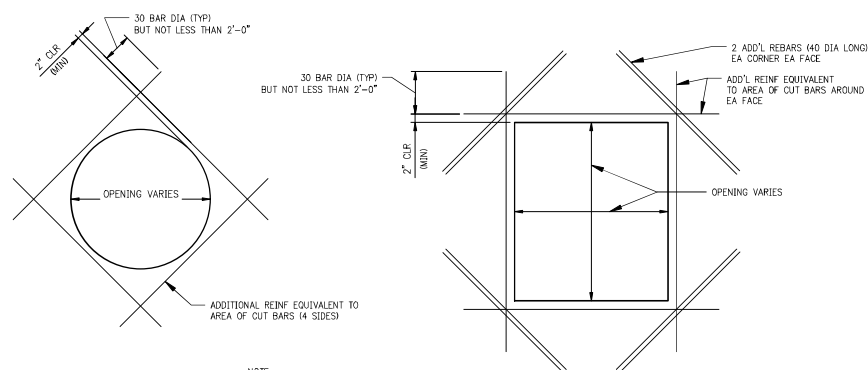


ANCHOR ROD SCHEDULE		
DIA	EMBED	NSG
3/4"	1'-6"	1 1/2"
1"	1'-6"	1 3/4"

\*NSG = ANCHOR ROD DIA + 3/4"  
\*PROJ = BASE PLATE THICKNESS + NSG + (2xDIA) + 1/2"  
\*THRD = PROJ + 1"

**4** DETAIL-ANCHOR ROD  
S2.1 NTS

**2** WALL REINFORCING AT CORNERS & INTERSECTIONS  
S2.1 NTS

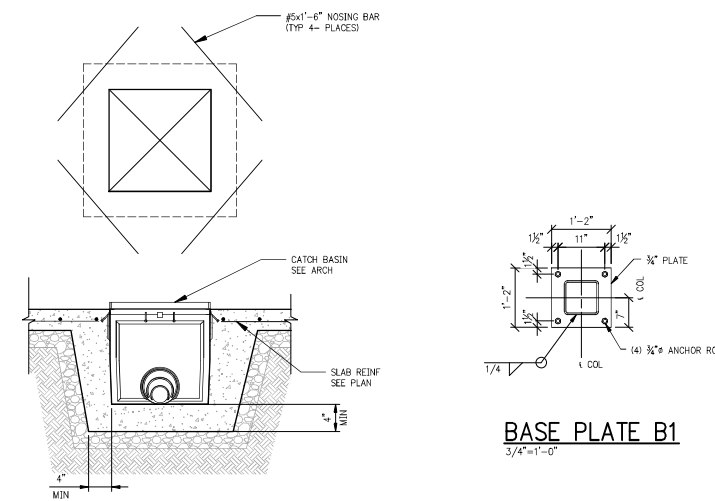


CIRCLE OPENING

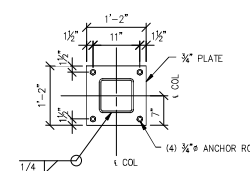
RECTANGULAR OPENING

NOTE:  
SLAB RE-ENTRY BARS SHALL BE #4 U.N.O.  
WALL RE-ENTRY BARS SHALL MATCH WALL REINFORCEMENT SIZE U.N.O.

**5** TYPICAL DETAIL OF EXTRA REINFORCING REQ. @ OPENINGS IN CONC. WALLS & SLABS  
S2.1 NTS



**6** DETAIL-THICKENED SLAB @ CATCH BASIN  
S2.1 NTS



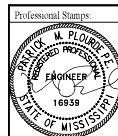
BASE PLATE B1  
3/4"-1'-0"



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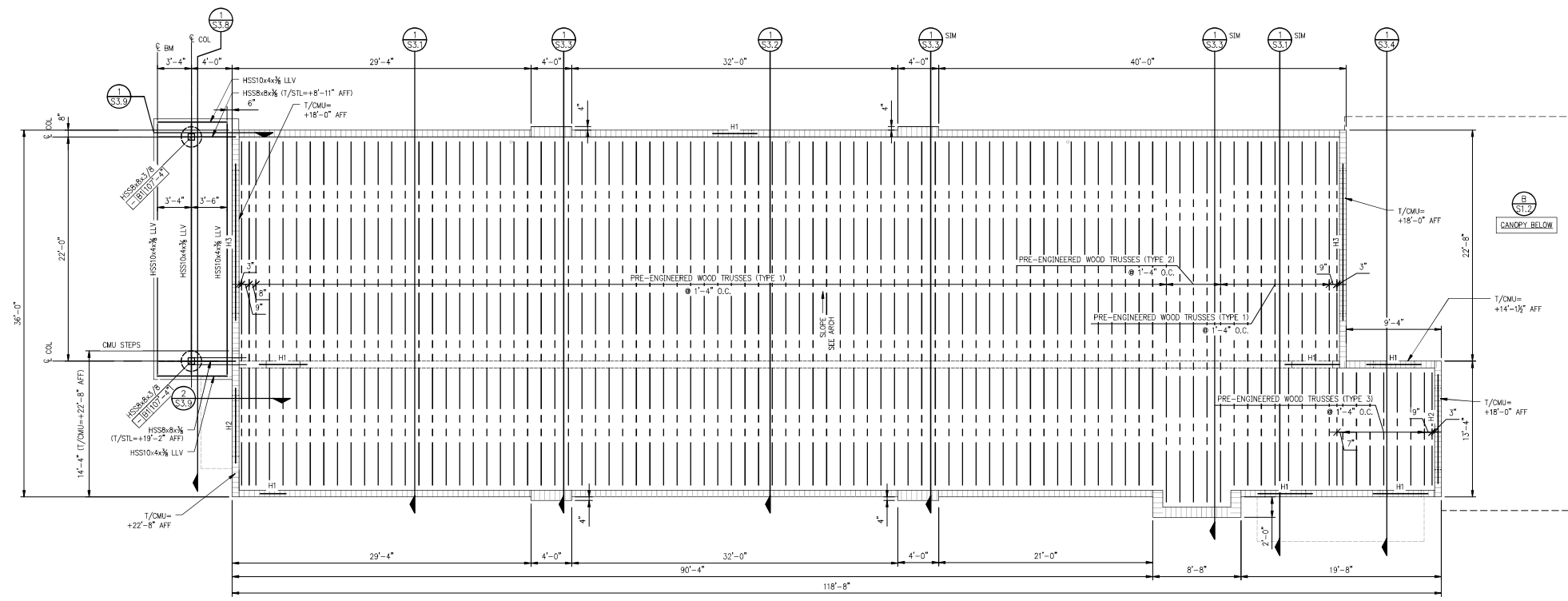
**S2.1**



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BIRMINGHAM, AL 35233  
205.837.3115  
LOE PROJECT# 250-2

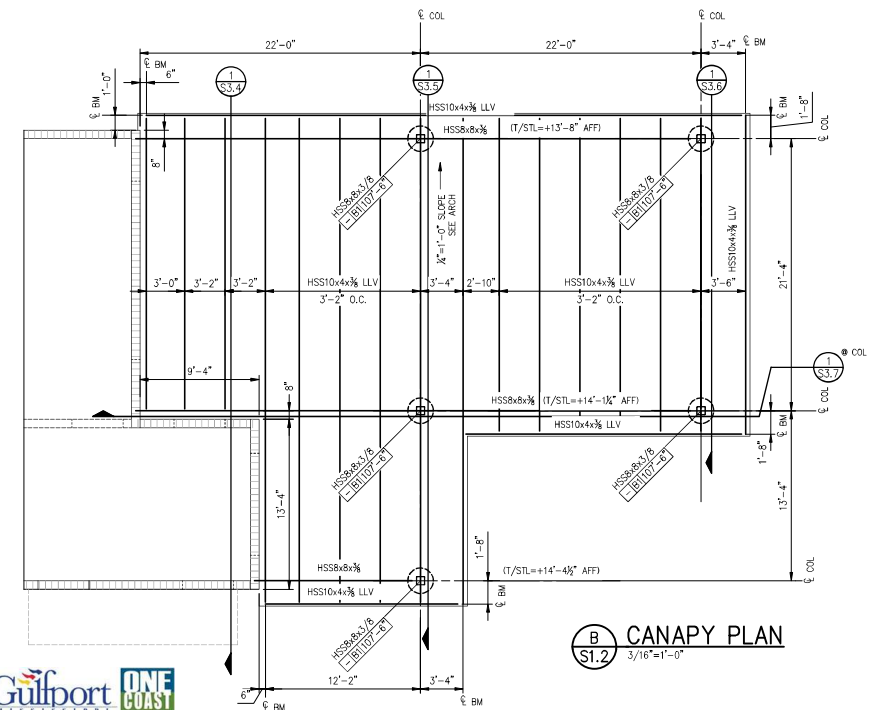
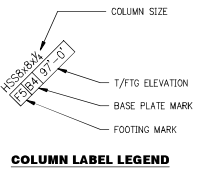


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**FRAMING PLAN**  
3/16"=1'-0"

- ROOF PLAN NOTES: (TYPICAL UNO)**
1. SEE S1.1 FOR MASONRY WALL NOTES.
  2. TRUSS BEARING +14'-1 1/2" AFF TYPICAL.
  3. TOP PARAPET VARIES - SEE ARCH.
  4. H/H = HEADER SEE 4/S2.2
  5. ROOF DECK SEE DETAIL 1/S2.4
  6. CANOPY ROOF DECK: 1 1/2" X 20 GA "B" DECK (SEE DETAIL S2.4 FOR ATTACHMENT)
  7. DIMENSIONS ARE BASED ON PLAN CUT ALONG 8" CMU.
  8. TOP OF STEEL DIMENSIONS REFERENCE TOP OF EQUIP/OFFICE SLAB.



**CANOPY PLAN**  
3/16"=1'-0"

A New Facility for:  
**Magic Carwash**  
Gulfport, Mississippi

Revisions:




Sheet Title:  
**Framing Plan**

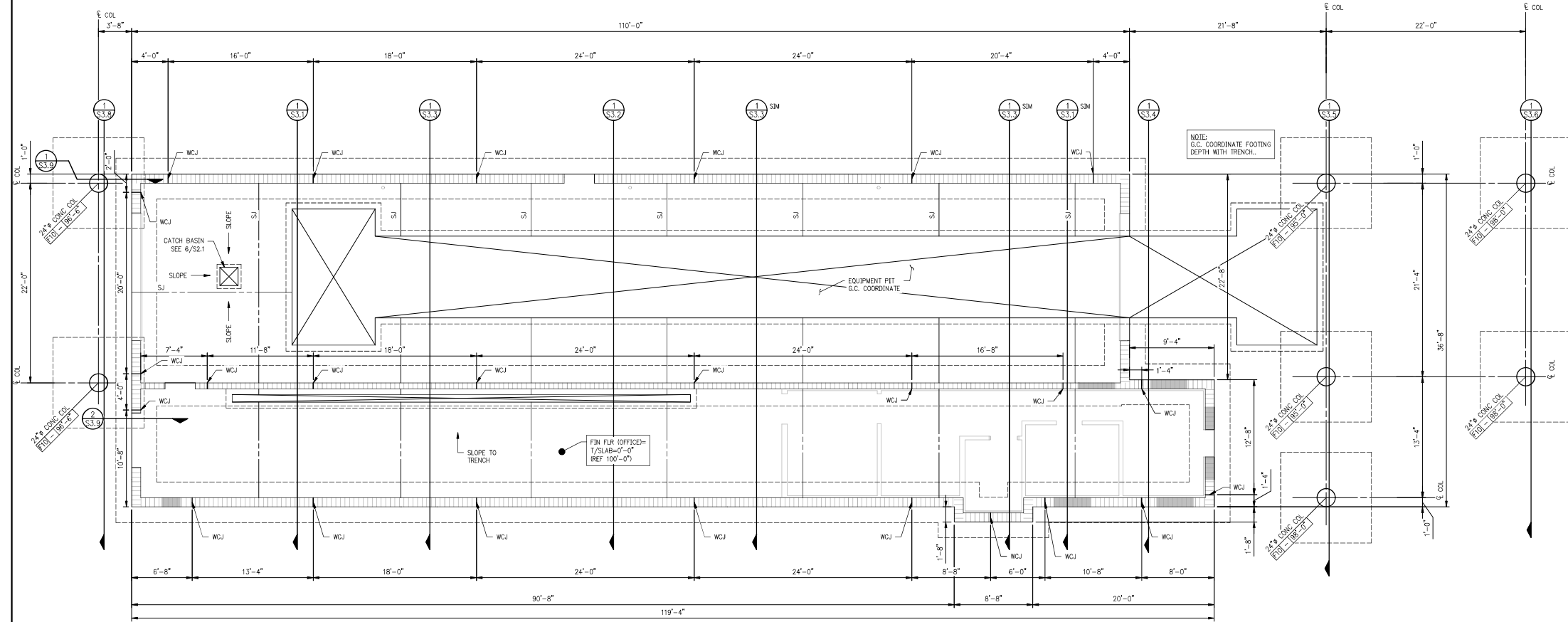
Date: 9.1.2024  
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**S1.2**





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**FOUNDATION PLAN**  
A S1.1 3/16"=1'-0"

**LEGEND**

- WCJ = WALL CONTROL JOINT SEE 1/SZ.3
- SJ = SAW JOINT SEE 1/SZ.1
- ☐ = OPENING ABOVE SEE ARCH

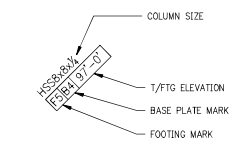
**FOOTING AND FOUNDATION PLAN NOTES: (TYPICAL UNO)**

- TOP OF CONCRETE SLAB EL. 0'-0" = SITE DATUM EL. SEE CIVIL.
- 5" NORMAL WEIGHT CONCRETE ON VAPOR BARRIER, REIN. w/ 6#x6-W2.9xW2.9 WWF FLAT SHEETS ONLY. w/ #4 @ 48" EW PLACE REBAR ON CHAIRS.
- SEE 1/SZ01 FOR SLAB ON GRADE CONSTRUCTION JOINT, CONTROL JOINT, CONTROL JOINT PATTERN TO BE MAXIMUM 15'x15'.
- GENERAL CONTRACTOR TO COORDINATE WITH MEPI MECHANICAL, ELECTRICAL AND PLUMBING CONTRACTORS FOR ANY AND ALL LOCATIONS OF SLEEVED OPENINGS IN FOUNDATION WALLS.
- ENSURE A SMOOTH TRANSITION FROM THE EQUIPMENT ROOM TO THE BAY.
- REFER TO THE EQUIPMENT DRAWINGS FOR THE CONVEYOR DIMENSIONS AND LAYOUT.
- THE OVERHEAD DOORS ARE TO BE CENTERED ON THE BAY.
- DIMENSIONS ARE BASE ON PLAN CUT ALONG 12" O.M.U.

**NOTE TO G.C.:**  
FINAL FOOTING LOCATIONS AND STEPS NEED TO BE COORDINATED WITH EQUIPMENT MFR FINAL DRAWINGS

**MASONRY WALL NOTES: (TYPICAL UNO)**

- STRUCTURAL CONCRETE MASONRY WALLS TO BE NOMINALLY 8" & 4" THICK AND REINFORCE FROM FOOTING TO TOP OF WALL UNO. GROUT REINFORCED CELLS SOLID REINFORCE AND GROUT SOLID CELLS AT CORNERS, OPENINGS, JAMBS AND END OF WALLS. SEE SZ.2 & SZ.3 FOR TYPICAL DETAILS.
- DOWEL SPACING TO MATCH VERTICAL REINFORCEMENT.
- MASONRY CONTROL JOINT SHALL OCCUR AS SHOWN ON PLAN, SEE DETAIL 1/SZ.3.
- REINFORCEMENT DISCONTINUOUS ACROSS CONTROL JOINTS.
- FOR 8" WALL (1) #6 @ 16" O.C.
- FOR 8" WALL CORNERS (1) #6 EA CELL, THREE CELLS.
- FOR 8" WALL CONTROL JOINT (2) #6, TWO CELLS EA SIDE.
- FOR 8" WALL JAMB (2) #6, TWO CELLS EA SIDE.
- FOR 12" WALL (2) #6 @ 16" O.C.
- FOR 12" WALL CORNERS (2) #6 EA CELL, THREE CELLS.
- FOR 12" WALL CONTROL JOINT (2) #6, ONE CELL EA SIDE.
- FOR 12" WALL JAMB USE (2) #6, THREE CELLS EA SIDE.
- PROVIDE CONT BOND BEAM AT 8'-0" VERTICAL ALL MASONRY WALL, SEE 5/SZ.2, H1 FOR BOND BEAMS.
- PROVIDE STANDARD HOOK INTO TOP BOND BEAM FOR ALL VERTICAL BARS.
- GROUT SOLID ALL MASONRY BELOW FINISHED FLOOR.
- FOR 4" WALL #4 @ 16" O.C., GROUT ENTIRE WALL SOLID.



**COLUMN LABEL LEGEND**

PAD FOOTING SCHEDULE		
MARK	FOOTING SIZE	REINFORCEMENT
F10	10'-0"x10'-0"x1'-6"	(1) #6 EW T&B

Revisions:




Sheet Title:  
**Foundation Plan**

Date: 9/1/2024  
Sheet:

**LIVE OAK ENGINEERING**  
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LOE PROJECT# 250-2

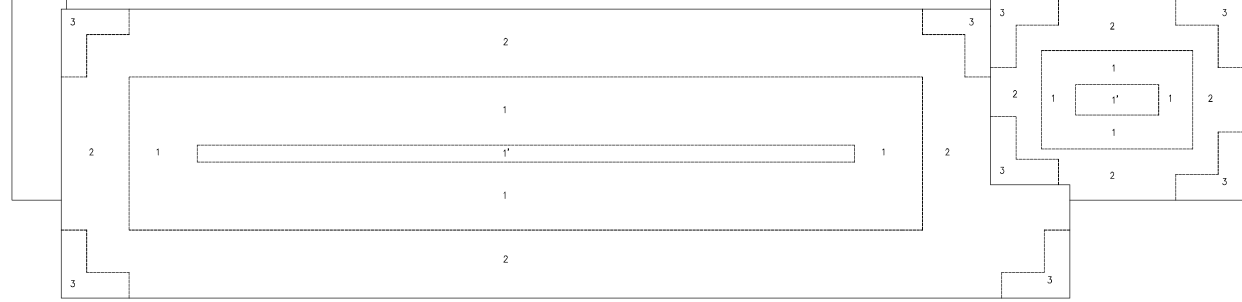


**S1.1**





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TYPICAL C&C ROOF DIAGRAM



TYPICAL C&C WALL DIAGRAM

ULT. WALL WIND PRESSURE (PSF)					ULT. PARAPET WIND PRESSURE (PSF)							ULT. ROOF WIND PRESSURE (PSF)					ULT. OVERHANG WIND PRESSURE (PSF)										
WIND AREA	ZONE 4		ZONE 5		ZONE 4&2		ZONE 4&3		ZONE 5&2		ZONE 5&3		AREA	ZONE 1'	ZONE 1	ZONE 2	ZONE 3	AREA	ZONE 1'	ZONE 1	ZONE 2	ZONE 3					
	WIN	LEE	WIN	LEE	WIN	LEE	WIN	LEE	WIN	LEE	WIN	LEE											WIN	LEE	WIN	LEE	WIN
10SF	60.1	-65.1	60.1	-80.1	188.1	-111.1	188.1	-111.1	188.1	-127.0	188.1	-127.0	10SF	-60.1	-104.6	-138.0	-138.0	10SF	-94.6	-94.6	-128.0	-128.0	10SF	-94.6	-94.6	-128.0	-128.0
20SF	57.4	-62.4	57.4	-74.8	175.9	-105.5	175.9	-105.5	175.9	-118.6	175.9	-118.6	20SF	-60.1	-97.7	-129.1	-129.1	20SF	-92.9	-92.9	-116.1	-116.1	20SF	-92.9	-92.9	-116.1	-116.1
50SF	53.9	-58.9	53.9	-67.8	159.8	-98.1	159.8	-98.1	159.8	-107.4	159.8	-107.4	50SF	-60.1	-88.6	-117.4	-117.4	50SF	-90.7	-90.7	-100.5	-100.5	50SF	-90.7	-90.7	-100.5	-100.5
100SF	51.2	-56.2	51.2	-62.4	147.6	-92.4	147.6	-92.4	147.6	-99.0	147.6	-99.0	100SF	-60.1	-81.7	-108.5	-108.5	100SF	-89.0	-89.0	-88.7	-88.7	100SF	-89.0	-89.0	-88.7	-88.7
200SF	48.6	-53.6	48.6	-57.1	135.5	-86.8	135.5	-86.8	135.5	-90.5	135.5	-90.5	200SF	-40.6	-65.6	-87.9	-87.9	200SF	-74.6	-74.6	-76.8	-76.8	200SF	-74.6	-74.6	-76.8	-76.8
500SF	45.1	-50.1	45.1	-50.1	119.3	-79.4	119.3	-79.4	119.3	-79.4	119.3	-79.4	500SF	-32.3	-65.6	-87.9	-87.9	500SF	-55.6	-55.6	-61.2	-61.2	500SF	-55.6	-55.6	-61.2	-61.2

FOR WALLS: WIN IS WINDWARD FACE  
LEE IS LEEWARD FACE

FOR PARAPETS: WIN IS CASE A = p1+p2  
LEE IS CASE B = p3+p4

a= 3.4ft    0.2h= 2.8ft    0.6a= 8.4ft

COMPONENTS AND CLADDING TABLES

A New Facility for:  
**Magic Carwash**  
 Gulfport, Mississippi

Revisions:




Sheet Title:  
**COMPONENTS  
 and  
 CLADDING**

Date: 9/1/2024  
 Sheet:  
**S0.2**



LOE PROJECT# 250-2



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+  
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MICHAEL LEO HUGHES,  
ARCHITECT

A New Facility for:  
**Magic Carwash**  
Gulfport, Mississippi

Revisions:




SIGNED: 9.1.2023

Sheet Title:  
**General Notes and Tables**

Date: 9.1.2023  
Sheet:

**S0.1**



**LIVE OAK  
ENGINEERING**  
2509 7th AVENUE SOUTH  
BIRMINGHAM, AL 35233  
205.843.3111

LOE PROJECT# 250-2



**ABBREVIATIONS**

AB	- Anchor bolts)	F/	- Face of	NSG	- Non-shrink grout	T&G	- Tongue & groove
ADDL	- Additional	FD	- Floor drain	NTS	- Not-to-scale	THK	- Thick, Thickness
AFF	- Above finish floor	FDN	- Foundation	NUM	- Number	THRD	- Threaded
ALT	- Alternate	FIN FLR	- Finish floor elevation	OC	- On-center	THRU	- Through
ARCH	- Architect, Architectural	FS	- Fair side	OD	- Outside diameter, Outside dimension	TM	- Top-of-masonry elevation
B/	- Back of	FT	- Foot, Feet	OH	- Opposite hand, Overhead	TOB	- Top-of-beam elevation
BLDG	- Building(s)	FTC	- Footing	OPNG	- Opening(s)	TOC	- Top-of-concrete elevation
BLK	- Block(s)	GA	- Gage, Gauge	OPP	- Opposite	TOF	- Top-of-footing elevation
BM	- Beam(s)	GLB	- Glue-laminated beam	PAR	- Parallel	TOS	- Top-of-steel elevation
BOF	- Bottom of footing elevation	GR BM	- Grade beam	PC	- Precast, Precast concrete	TP	- Top-of-parapet elevation
BOT	- Bottom	GR	- Grade	PDF	- Power driven fastener	TW	- Top-of-wall elevation
BRDG	- Bridging	GP BD	- Gypsum board	PL	- Pounds per linear foot	UNT	- Unless noted otherwise
BRNG	- Bearing	HD	- Heeded, Heavy duty	PLYWD	- Plywood	VERT	- Vertical
BRK	- Brick(s)	HDR	- Header	PNL	- Panel	W/	- With
BTWN	- Between	HI	- High	PROJ	- Project, Projection	W/O	- Without
BUR	- Built-up roof	HK	- Hook	PSF	- Pounds per square foot	WB	- Wind bracing
CJ	- Control joint, Contraction joint, Construction joint	HORZ	- Horizontal	PSI	- Pounds per square inch	WCJ	- Wind wall control joint
CL	- Centerline	HR	- Handrail	PTD	- Painted	WD	- Wood
CLG	- Ceiling	HS	- Heeded stud	PVMT	- Pavement	WP	- Working point
CLR	- Clear	HSS	- Hollow steel section	QTY	- Quantity	WPR	- Waterproofing
CMU	- Concrete masonry unit(s)	HVAC	- Heating, ventilation, & air conditioning	R	- Radius	WS	- Waterstop
COL	- Column(s)	ID	- Inside diameter	RD	- Roof drain	WWF	- Welded wire fabric
CONC	- Concrete	IN	- Inch, Inches	REBAR	- Reinforcing bar		
CONN	- Connection(s)	INSUL	- Insulate, Insulation	REF	- Reference		
CONST	- Construction	INT	- Interior	REINF	- Reinforce, Reinforcing, Reinforcement		
CONT	- Continue, Continuous	JNT	- Joint	REQD	- Required		
CTRD	- Centered	JBE	- Joint bearing elevation	REV	- Reverse, Revision		
DBA	- Dowel bar anchor, Deformed bar anchor	JST	- Joist(s)	RH	- Right hand		
DBL	- Double	JT	- Joint	RO	- Rough opening		
DIA	- Diameter	K	- Kips(s) (1,000 pounds)	S	- South		
DIAG	- Diagonal	LF	- Linear foot, Linear feet	SC	- Slotted connection, Slip connection		
DIM	- Dimension	LG	- Light Gauge	SOH	- Schedule		
DWS	- Drawing	LL	- Long leg	SECT	- Section		
DWSL	- Drawings	LLV	- Long leg vertical	SF	- Square feet		
E/	- Edge of, End of	LO	- Low point	SHT	- Sheet		
EA	- Each	LP	- Low point	SHTG	- Sheathing		
EB	- Expansion bolt(s)	LT	- Left, Light	SM	- Similar		
EBC	- Extended bottom chord	LT WT	- Lightweight	SJ	- Saw joint		
EF	- Each face	MAX	- Maximum	SK	- Shear key		
EFES	- Exterior Insulated finish system	MECH	- Mechanical	SP	- Space(s), Southern Pine		
EJ	- Expansion joint	MFR	- Manufacturer	SPECS	- Specifications		
EL	- Elevation	MIN	- Minimum	SQ	- Square		
ELEC	- Electrical	MISC	- Miscellaneous	SSL	- Stainless steel		
ELEV	- Elevator	MO	- Masonry opening	STD	- Standard		
ENG	- Engineer(s)	MPH	- Miles per hour	STF	- Stiffener		
EQ	- Equal	MTL	- Metal	STR	- Straight		
EXP	- Expansion	N	- North	STRUCT	- Structural		
EQMT	- Equipment	NIC	- Not-in-contract	SYM	- Symmetrical		
EW	- Each way	NOM	- Nominal	T&B	- Top & bottom		
EWJ	- Engineered wood 1-joint	NS	- Near side				
EXST	- Existing						
EXT	- Exterior						

**WOOD TRUSSES**

- All members shall be cut from lumber which bears the proper grade-mark stamp of a recognized grading association or licensed lumber inspection agency.
- No lumber shall be used which does not appear to conform to the proper dimension and/or grades.
- Wood Trusses are to be designed nail plate trusses. Truss connector plates shall be manufactured from only prime, commercial quality galvanized steel of no less than 20-gauge thickness, which has a minimum yield strength of 33 ksi and a minimum ultimate tensile strength of 55 ksi. Corrosion resistant coating shall be 1 1/2 oz. per square foot, commercial class hot-dipped galvanized or equivalent.
- Hangers for wood members shall be as manufactured by "Simpson Strong Tie Company" or equal. Sizes and thickness of material to be determined by the loading conditions as determined by the Truss Engineer.
- Each truss shall be permanently stamped with the name and address of the Truss Fabricator.
- Proper erection bracing shall be installed to hold the trusses true and plumb and in safe condition until permanent truss bracing and bridging can be safely installed in place to form a structurally sound roof framing system. All erection and permanent bracing shall be installed and all components permanently fastened before the application of any loads.
- During entire construction period all Contractors shall provide means for adequate distribution of concentrated loads so that the carrying capacity of any one truss and/or other component is not exceeded.
- Wood Roof Trusses
  - At all multiple member truss girders, the Truss Supplier shall include as part of his design and shop drawings a metal hold-down capable of resisting the net uplift of each truss girder and the Contractor shall supply and install these hold-downs.
  - Truss Fabricator Engineer shall compute variable dimensions for skewed, graduated, or other trusses spaced as indicated on the drawings.
  - Minimum roof loading to be in accordance with International Building Code, 2018 edition, but not less than the following:
    - Top Chord Live Load . . . . . 20 psf
    - Top Chord Net Wind Uplift . . . See Component & Cladding Table
    - Top Chord Dead Load . . . . . 20 psf
    - Truss Selfweight Dead Load . Per Truss Manufacturer
    - Bottom Chord Dead Load . . . 5 psf, where mech shown on mech dwgs
    - Bottom Chord Live Load . . . 10 psf

**PLYWOOD ROOF DECK**

- All roof deck shall be 3/4" Structural Grade 1, Exterior Sheathing and shall be placed in a manner to stagger all end joints of panels and with long dimensions perpendicular to supports. Aluminum panel clips shall be placed at midspan of panels between each truss as decking is being laid. Installer shall leave 1/4" space at all panel edges and end joints, unless otherwise recommended by manufacturer.
- Fastening requirements for decking to supports shall be in conformance with the American Plywood Association's (APA) "Recommended minimum fastening schedule for APA panel roof sheathing" as stated herein: Decking shall be fastened to trusses with 10d nails (1/2" minimum fastener penetration) spaced at 6" intervals along panel edges and at 12" intervals along intermediate supports.
- Cover exposure 1 sheathing as soon as possible with roofing felt for protection against excessive moisture prior to roofing application. Sheathing panels shall not be covered with roofing felt if wet but shall be allowed to dry to prevent trapping moisture against panel. Exposure 1 sheathing panels' surface may become warped and uneven under prolonged moisture exposure. All warped or uneven panels are not acceptable and shall be removed at the contractor's expense. Contractor shall trim, handle, protect, and install sheathing panels as recommended by the APA and the sheathing supplier.
- Preparation for the application of roof decking shall begin with a true and plumb structural framing system. All roof trusses shall be installed and braced in strict conformance with the roof truss supplier's recommendations and shop drawing data concerning temporary erection bracing and all permanent lateral bracing. It is the contractor's responsibility to provide all required bracing to insure a true and plumb, uniformly spaced and safe roof framing system before application of decking is begun. Install 2x4 blocking between trusses as required to support panel edges at hips, valleys, ridges and roof openings.

**WOOD FRAMING** The following applies unless noted otherwise on the plans:

- Plywood sheathing shall be DFWA CD with exterior glue. All roof sheathing shall be installed with joist/bays between trusses.
- Timber Connectors indicated by the letter and numbers shall be Strong Tie by Simpson Company, as specified in their catalog. Equivalent devices by other manufacturers may be substituted, provided they have I.B.C.C. approval for equal or greater load capacities. Provide number and size of fasteners as specified by Manufacturer. Connectors shall be installed in accordance with the Manufacturer's recommendations. Bolts in wood members shall conform to ASTM A307. Provide washers under the heads and nuts of all bolts and lag screws bearing on wood(UNO), all nails shall be common, all shims shall be seasoned, dried, and of the same Grade (Minimum) as the members connected, all joists shall be connected to flush beams with Joist hangers (UNO).
- All wood framing details not shown otherwise shall be constructed to the minimum standards of the 2018 Building Code. Minimum Nailing(UNO), shall be common. Coordinate the size and location of all openings with Mechanical and Architectural Drawings. Provide Washers under the heads and nuts of all bolts and lags screws bearing on wood.
  - Wall Framing:**
    - All studs shown and not otherwise noted shall be 2x4 studs at 16" O.C. Two studs/Minimum shall be provided at the end of Walls and at each side of all openings, solid blocking for wood columns shall be provided through floors to support below, provide solid blocking between studs at Mid-height of All stud walls of 8'-0" in height.
    - All stud walls shall have their lower wood plates attached to wood framing below with 16d nails at 12" o.c. staggered or bolted in concrete with 3/8"x3/4" Top Caps at 16" O.C. (UNO).
    - Members of Built-up posts shall be nailed to each other with 16d at 12" O.C. staggered, refer to the Plans and shear wall schedule for required sheathing and nailing. When not otherwise noted, provide gypsum wallboard on interior surfaces nail to all studs, top and bottom plates, and blocking with nails at 7" O.C. Use the latest edition of AWS D1.1 corresponding to the AISI specification used and all welds including field welds shall be made by certified welders using E70XX electrodes.
    - Intermediate studs and blocking with 8d nails at 8" O.C. all 1/8" spacing at all panel edges and ends.
    - All lumber shall be sound and free from warp.
    - All lumber shall be Southern Pine Grade No. 2 or better with the following minimum properties (UNO):
      - F<sub>b</sub> = 1,200 psi
      - F<sub>y</sub> = 150 psi
      - F<sub>c</sub> = 975 psi
      - E = 1,600,000 psi
      - I = 11% = Maximum Moisture Content
    - All wood in contact with concrete or masonry shall be pressure treated.
    - Pressure treated lumber shall be impregnated with a CCA salt treatment in accordance with F.5, T1-W-571 and bear the American Wood Preservers Institute Quality Mark LP-2
    - Provide a single plate at the bottom and a double plate at the top of the bearing wall studs.
    - Studs shall be doubled at all angles and around all openings, studs shall be tripled at all corners.
    - Install all connectors and ties per manufacturers to their highest capacity.
    - If wood shows evidence of cracking from fasteners, pre-drill for fasteners or use self-tapping screws.
    - The proposed use of different wood species and/or grades must be submitted in writing to the structural engineer of record for formal approval.
- Floor and Roof Framing:**
  - Provide double joist under and around all opening in floors or roofs (UNO).
  - Provide bridging at 8'-0" O.C. and solids blocking at all bearing points.
  - Toenail joist to supports with low 16d nails. Attach timber joist to flush headers or beams with Simpson Metal Joist Hangers in accordance with schedule. Nail all Multi-Joist beams together with 16d nails at 12" O.C. Staggered.
  - Unless Note otherwise on the plans, APA rated roof and floor sheathing shall be placed with strength Axis perpendicular to supports and nailed with 8d nails at 6" O.C. to framed panel edges and over stud walls as shown on plans and at 12" O.C. to intermediate supports. Provide approved plywood edge clips centered between joist/trusses at unblocked roof sheathing edges. All floor sheathing edges shall have approved tongue-and-groove joints or shall be supported with solid blocking. All 1/4" spacing at all panels edges and ends of all roof and floor sheathing, toenail blocking to supports with 2016d at each end or 12" O.C. (UNO)
- All joints in double top plates shall be centered over a stud and shall be staggered 4'-0" min. Splices shall not occur less than 4'-0" from a corner. Top plates shall lap at corners & intersections.
- Follow manufacturer's recommendations for fastening of hangers in order to achieve the required allowable loads shown on the plans. Where required allowable loads are not shown, use the maximum rated strength of the hanger.
- Provide supplemental structural framing and blocking as required to achieve solid and sound structural and non-structural elements using accepted framing practices.

**STRUCTURAL STEEL**

- Unless specifically noted otherwise, fabrication and erection of structural steel shall be in accordance with AISC specifications, latest edition.
- Unless detailed otherwise or reactions are indicated, beam connections shall be designed to support one-half the total uniform load capacity shown in the "ALLOWABLE UNIFORM LOAD TABLES" of the AISC Steel Construction Manual, Latest Edition, for the given beam size, span and steel specification or for the beam reaction shown on the drawings, whichever is greater. The minimum beam connection shall not be smaller than those listed in AISC Steel Construction Manual, Latest Edition, for the given beam depth, bolt diameter and weld specification.
- The Fabricator shall be responsible for the design and adequacy of all connections that are not designed or fully detailed on the Contract Documents. Shop drawings, depicting the configuration and fabrication details, along with calculations sealed by a Registered Professional Engineer licensed to practice in the state in which the project is located, shall be submitted to the Structural Engineer of Record for review.
- Where no reaction is shown on the Contract Drawings, beam connections shall be designed to support reaction "R" equal to one half of the total allowable uniform load capacity for a given shape, span, and AISC specification.
- Unless otherwise indicated, beam reactions shown on the Plans are design Service Level (ASD) gravity (Dead Load plus Live Load) shear loads. Any axial or other loads required must be considered in addition to the vertical reactions shown.
- The minimum design load for any connection shall be six (6) kips (ASD) or ten (10) kips (LRFD) regardless of the beams reaction(s) shown on the Plans.
- Unless detailed otherwise, all shop connections shall be welded. Unless detailed otherwise, all field connections shall be made using 3/8", and 1" as where indicated, ASTM A325-N or ASTM F1552 high strength bolts (10" indicates bearing type with threads included in shear plane). Washers shall be installed under nuts of fasteners when required by the specifications of structural joints.
- Where field and shop welds are indicated on the drawings, they shall be the size and type noted. All welding of structural steel shall be done in accordance with the latest edition of AWS D1.1 corresponding to the AISI specification used and all welds including field welds shall be made by certified welders using E70XX electrodes.
- High strength bolts (3/8" and 1" - A325 or F1552) shall be tightened to provide, when all bolts in the joint are tight, a minimum bolt tension of 28,000 lbs for 3/8" bolts and 51,000 lbs for 1" bolts. One of the following methods shall be used.
  - Power wrenches adjusted to stall or cut-out at the correct tension.
  - Manual torque wrenches with torque indication set to give the correct tension.
  - Manual wrenches using the "turn-of-nut" method of assuring the correct bolt tension.
- Unless specifically noted otherwise, all high-strength bolts (A325, F1552, and A490) shall be pre-tensioned to meet slip-critical requirements even if the joint is designed as a "Snug-Tight" bearing connection. All joints shall be designed to be bearing type connections unless noted otherwise.
- Steel frames are non-self-supporting and column anchor rods are designed for a completed condition only. Metal roof deck, beam-to-column moment connections, portal frames, and diagonal bracing are required to provide lateral stability for the frame and building. This includes resistance to wind and seismic forces during and after construction. The Contractor shall provide all temporary bracing required to maintain stability until the lateral force resisting system for the building is complete.
- All steel exposed to view at close of project shall be classified as "Architecturally Exposed Structural Steel" and shall meet the requirements of AISC Code of Standard Practice.
- All steel members exposed to weather shall be galvanized or painted with TNEMC Epoxy System or similar system meeting the requirements for painting structural steel in the project specifications. All other steel members shall be furnished with a shop coat of TNEMC red or gray oxide primer or similar system meeting the requirements for painting structural steel in the project specifications. All primers shall be compatible with top coatings specified.
- All steel members that are to receive spray or trowel applied, cementitious based, fire-resisting coatings shall be furnished without prime coatings unless otherwise noted.
- The General Contractor shall be responsible for including the costs for all miscellaneous steel in their bid regardless of whether or not those items are indicated on the structural drawings. These costs shall include, but are not limited to, miscellaneous steel items shown on Architectural, Civil, Mechanical, Plumbing, and Electrical drawings.
- Bearing ends of all columns shall be square cut.
- All hangers, clips, inserts, etc. suspended from the floor structure or the roof structure (Beams, Joists, and Deck) shall be installed prior to the application of the sprayed-on fireproofing. Patch any fireproofing damaged after the initial application.
- All exterior exposed steel shall be hot-dipped galvanized, including masonry support brackets, unless noted otherwise.
- Field cutting, drilling, or other modification of structural steel components is not permitted without written approval of the Structural Engineer of Record. Where beam penetrations cannot be avoided or where cutting is required, the Contractor shall submit, to the Structural Engineer of Record, all pertinent information including penetration shape, size, location, and method of cutting the openings.
- Steel erector shall provide the necessary bracing during erection and until all steel is plumb and secure.

**STEEL ROOF DECK**

- All deck shall be furnished and installed per the requirements of the Steel Deck Institute (SDI). The Contractor shall follow all recommended practices in the SDI manual.
- Roof deck shall be intermediate or wide rib Type "B", 1 1/2", 20 gauge, galvanized steel deck unless noted otherwise on the drawings.
- Where steel deck is part of a rated assembly, supply all deck and components, which comply with requirements of Underwriters Laboratories (UL) for each type of assembly specified, reference plans and specifications. Where deck is to receive spray fireproofing, finishes shall be compatible with fireproofing material and comply with UL assembly requirements. Before the fireproofing material is applied, the deck surface to be treated shall be free of rust, scale, oil, or other contaminants or elements which will impair bond.
- Alternate fastening options using mechanical fasteners, powder-actuated, or screws may be considered, if submitted by the Contractor. Alternate systems and documentation certifying that the proposed system provides at least the same uplift and diaphragm shear resistance as the system and pattern specified must be submitted to the Structural Engineer of Record prior to use.
- Provide a 2" minimum bearing and a 4" lap at the splice point of all pieces of deck.
- Where possible, all decking shall be 3-span continuous, minimum. Decking specified on this project assumes a 3-span condition unless noted otherwise. The Contractor shall provide heavier gauge deck, as required, for one or two span conditions to meet equivalent load capacity of the specified deck under a 3-span condition.
- Steel roof deck shall not be used to support load from plumbing HVAC ducts, light fixtures, architectural elements, or equipment of any kind unless specifically noted.
- Hanging any loads directly from steel roof deck shall be avoided whenever possible. Nevertheless, normal suspended acoustical ceilings with a total weight per wire not exceeding 50 lbs may be hung from the steel roof deck in cases where hanging loads from the deck cannot be avoided. If possible, the attachment should be staggered to further distribute the load. If load is directly supported by the deck, tabs or other built-in devices should be provided for hanging referenced loads.
- Where deck ribs are cut at penetrations, provide deck support angles or deck stiffeners as required.
- Supply 8" wide, minimum, plates matching deck gauge or heavier for all ridge, valley, and change in deck direction locations, which do not fall over a supporting member at least 4" wide.



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LOE PROJECT# 250-2

**GENERAL NOTES**

In case of conflict between the General Notes below and the Specifications, the more rigid requirement shall govern unless amended in writing by the Structural Engineer of Record.

**DESIGN DATA**

- 1. Design Codes – (All latest editions unless noted otherwise.)
  - International Building Codes (IBC 2018)
  - American Society of Civil Engineers (ASCE 7–16) Minimum Design Loads for Buildings and Other Structures
  - American Concrete Institute (ACI)
  - American Institute of Steel Construction (AISC)
  - American Welding Society (AWS)
  - American Iron and Steel Institute Specifications for the Design of Cold Formed Steel Structural Members (AISJ)
  - National Design Specification for Wood Construction (ANSI)/AF&PA NDS–2001
  - Steel Deck Institute (SDI)
- 2. Design Loads (IBC & ASCE7)
  - Dead Load Design Data
    - Roof 20 psf
    - Exterior Stud Wall Self Weight
    - Exterior CMU Wall Self Weight
  - Live Load Design Data
    - Sub-On-Grade 100 psf
    - Live Roof Load Design Data
      - Roof (Sloped) 20 psf
      - Roof (Flat) 20 psf
  - Wind Design Data
    - Risk Category II
    - Velocity 160mph
    - Wind Exposure Category C
    - Internal Pressure Coefficient,  $C_{pi}$  0.18±
    - Snow Design Data
      - Importance Factor for Snow,  $I_s$  1.0
      - Ground Snow Load,  $P_g$  0 psf
      - Exposure Coefficient,  $C_e$  1.0
      - Thermal Factor,  $C_t$  1.0
      - Roof Snow Factor,  $C_s$  1.0
      - Flat Roof Snow Load,  $P_f$  0 psf

- Seismic Criteria
  - Risk Category II
  - Seismic Importance Factor,  $I_e$  1.0
  - Site Soil Class E
  - Mapped Spectral Response Coefficients  $S_{DS} = 0.0956 / S_1 = 0.059$   
 $S_{M1} = 0.153 / S_{M2} = 0.165$
  - Seismic Design Category Ordinary Masonry Reinforced Shear Wall
  - Basic Seismic Force Resisting System 0.0306W
  - Design Base Shear Seismic Response Coefficient,  $C_s$  0.03
  - Response Modifications Factor,  $R$  5.0
  - Analysis Procedure Equivalent Lateral Force
- Deflection and Drift Limitations
  - Roof/Floor Members L/360
  - Building Drift H/600
  - Max Wall Deflection L/600
  - Story Drift (Seismic) 0.025 h<sub>st</sub>

Material & Component Design Criteria					
– Cast-In-Place Concrete					
– Concrete Reinforcing – Bar (Typical)	ASTM A615, GR 60				
– Concrete Reinforcing – Bar (Weldable)	ASTM A706, GR 60				
– Concrete Reinforcing – Welded Wire Fabric	ASTM A185, (Plain) ASTM A497, (Deformed)				
– Cement	ASTM C150				
– Aggregate	ASTM C33, ASTM C330				
Concrete Mix Criteria					
Class Use	Category				
	$f'_c$ , PSI				
	WT, PCF				
	AGG, IN				
	AE, %				
	F S W C				
I, FTG/EDN/PC	1 0 0 1	3500	145	3/4"	NA
II, Interior Slab	0 0 0 1	4000	145	3/4"	NA
III, Exterior Slab	0 0 1 1	4000	145	3/4"	5-11
IV, All Other	1 0 0 1	4000	145	3/4"	NA

Reference ACI 318 Chapter 19 For Additional Information Regarding Durability Category And Class Requirement	
Concrete Mix Design Shall be Submitted For Each Class In Accordance With The Procedure Outlined in ACI 301, Standard Specification For Structural Concrete. Documentation Submitted Shall Include The Mix Data, For Additional Submit Requirements, Reference ACI 301. For Requirements On The Use Of Admixtures And Limits On The Water/Cementitious Materials Ratio For Durability, Reference The Project Manual/Specifications And ACI 318, Building Code Requirements For Structural Concrete.	

**DESIGN DATA cont.**

- Structural Masonry
- Design Compressive Strength ( $F'_m = 1,500$  PSI)
  - Concrete Masonry: ASTM C90, NORMAL WT
  - Reinforcing Steel (UNO):
    - Bar Reinforcing (Typical) ASTM A615, GR 60
    - Bar Reinforcing (Weldable) ASTM A706, GR 60
    - Joint Reinforcement: ASTM A951
    - Grout ( $f'_c = 3,000$  PSI, Self Consolidating) ASTM C476 and ASTM C109
    - Mortar, Type S ASTM C270 or ASTM C780

- Structural Steel
- Structural Shapes (UNO)
    - Wide Flange ASTM A992 or ASTM A572
    - Channels, Angles and Plates ASTM A36 or ASTM A572
    - Non-Shrink Grout Under Plates ( $f'_c = 8,000$  PSI) ASTM C1107, GR A
  - Hollow Structural Sections
    - HSS, ( $F_y = 46$  KSI) ASTM A500, GR C
    - Pipe, ( $F_y = 35$  KSI) ASTM A53, GR C
    - Bolts And Fasteners (UNO) ASTM A325
    - Structural/Anchor Rods ASTM F1554, Grade 55 (Weldable)
    - Headed Shear Studs ASTM A108, AWS D11.1, Type B

3. Design Soil Bearing Pressures
- Footings on natural soils or compacted structural fill are designed for a minimum soil bearing pressure of 1,500 psf.
  - If the soil at the footing bearing elevations shown is of questionable bearing value, the Engineer or Architect shall be notified immediately.
  - After footing excavations are completed and before placing concrete, the excavated areas shall be inspected and approved by the Owner selected independent testing laboratory.

**GENERAL INFORMATION**

1. All columns shall be centered on grid lines unless noted otherwise.
2. All column footings shall be centered on columns unless noted otherwise.
3. All wall footings shall be centered on walls unless noted otherwise.
4. Unless otherwise noted or detailed, concrete pads for mechanical equipment shall be 4" thick (minimum) and reinforced with #3 @ 12" oc each way centered.
5. Substitution of expansion anchors for embedded anchors shall not be permitted.
6. Weights of mechanical equipment shown on the structural plans are for units specified by the Mechanical Engineer. Contractor shall verify weights and any substitutions that result in increased weight shall be approved by the Structural Engineer.
7. Backfill both sides of all foundation and retaining walls equally until low side is up to finish grade. Do not backfill any walls until concrete has reached its specified 28-day compressive strength.
8. Permanent stability of the building and components is not provided until the erection is completed as shown on the contract drawings. Per AISC Latest Edition Code of Standard Practice, "Temporary supports, such as temporary guys, braces, falsework, cribbing or other elements required for the erection operation will be determined, furnished and installed by the erector."
9. The contractor shall insure that no construction load exceeds the design live loads indicated on the structural drawings and that these loads are not put on the structural members prior to the time that all framing members and their connections are in place.
10. The Contractor shall be responsible for verifying all existing conditions. The Contractor shall be responsible for coordinating architectural, structural, mechanical, and electrical details and dimensions. Any Discrepancies between such details and dimensions shall be reported to the COR prior to proceeding with the work.
11. The Contractor shall be responsible for erection procedure and sequence to insure the integrity of the building and it's component parts during construction.

**SUBMITTALS**

1. Review of shop drawings and other submittals by the Structural Engineer does not relieve the Contractor of the responsibility to review and check shop drawings before submitting to the Structural Engineer. The Contractor remains solely responsible for errors and omissions associated with the preparation of shop drawings as they pertain to member sizes, details, and dimensions specified in the Contract Documents. All shop drawings must be stamped by the Contractor prior to submit.
  2. Shop Drawings: The Contractor shall submit for Structural Engineer review shop drawings for the following items. Items marked (\*) shall have shop drawings sealed by a Professional Engineer registered in the state in which the project is located. Items marked (g) shall be submitted for Structural Engineer's record only.
    - A. Structural Steel (\*)
    - B. Steel Deck
    - C. Concrete Mix Designs
    - D. CMU Reinforcing Steel
    - E. Concrete Reinforcing Steel
    - F. Wood Trusses (\*)
  3. Design Calculations: The Contractor shall submit for Structural Engineer's record, design calculations sealed by a Professional Engineer registered in the state in which the project is located for the following items.
    - A. Structural Steel Connections
    - B. Wood Trusses (\*)

**FOUNDATIONS**

1. All soil preparation shall be in accordance with the recommendations given in the referenced Geotechnical Report.
2. Strip area of all gravel, surface vegetation, topsoil, and any debris. Remove all existing structures, foundations, and below grade site features. After stripping and making required cuts, exposed subgrade should be compacted. Overexcavate and stabilize any soft or unstable areas discovered by proof rolling.
3. The Geotechnical Engineer shall be present during proof rolling and shall inspect the subgrade prior to any fill operations. All compacted fill shall be continuously inspected by the Owner's selected independent testing laboratory.
4. If the soil at the bearing elevations shown is of questionable bearing value, the Structural Engineer of Record or Architect shall be notified immediately.
5. After footing excavations are completed and before placing concrete, the excavated areas shall be inspected and approved by the Owner's selected independent testing laboratory.
6. A polyethylene film vapor barrier, See Arch.

**CAST-IN-PLACE CONCRETE**

1. Arrangement and bending of reinforcing steel shall be in accordance with ACI Detailing Manual, latest edition.
2. Reinforcing steel shall be new and all bars shall be deformed.
3. Reinforcing Bars: ASTM A615 Grade 60 and ASTM A706 Grade 60 for weldable reinforcing.
4. Unless noted otherwise, bar laps shall be Class B tension laps and shall be lapped with minimum lengths as shown in Typical Details, where splices are required in reinforcing. Shorter laps may be acceptable if specific locations of alternate laps are shown on the reinforcement placement drawings and calculations are submitted by a Registered Professional Engineer, licensed to practice in the state in which the project is located, justifying the alternate lap lengths.
5. Provide suitable wire spacers, chairs, ties, etc. for supporting reinforcing steel in the proper position while placing concrete. Do not "wet stick" dowels.
6. All Welded Wire Fabric (WWF): ASTM A185. Minimum lap and embedment to be the greater of one cross wire spacing plus 2" or 6".
7. Minimum concrete protective covering for reinforcement at surfaces not exposed directly to the ground shall be 3/4" for slabs, joists, and walls and 1 1/2" for beam supports, column ties, or sprials and noted otherwise.
8. Before placing concrete, clean reinforcement for foreign particles or coatings. Place, support, and secure reinforcement against displacement. For cast-in-place concrete, provide cover as shown below, unless noted otherwise on drawings, and as specified in ACI 318, building code requirements for structural concrete.

Application/condition	Required cover, Inches
Cast against and permanently exposed to earth	3"
Exposed to earth or weather:	
No.6 through No. 19 bars	2"
No.5 bar, W31 or D31 wire, and smaller	1 1/2"

- Not exposed to weather or in contact with ground:
- Slab, walls, joints:
    - No. 14 and No. 18 bars 1 1/2"
    - No. 11 bar and smaller 3/4"
  - Beam, columns:
    - Primary reinforcements, ties, stirrups, spirals 1 1/2"
  - Shells, folded plate members:
    - No.6 bar and larger 3/4"
    - No.5 bar, W31 or D31 wire, and smaller 1/2"

9. Locations and sizes of openings, sleeves, etc. required for other trades must be verified by these trades before placing concrete.
10. All slabs, sleeves, trenches, and other embedded items shall be set and secured against movement before the concrete is placed. See Architectural, Electrical, Mechanical, Plumbing, and Vendor drawings for sizes and locations. Coordinate locations, spacings, and sizes with the Structural Engineer of Record prior to pouring concrete.
11. Conduits and pipes embedded in concrete slabs may be no larger than 1/3 of the slab thickness (based on the maximum outside diameter) and shall have a center-to-center spacing no less than three (3) conduit diameters. Regardless of diameter, the minimum clear spacing between conduits or reinforcing shall be one (1) inch.
12. No more than four conduits may be placed adjacent to each other without prior approval in writing from the Structural Engineer of Record.
13. No aluminum conduits, devices, or fixtures may be embedded into the concrete so that the aluminum is in direct contact with the concrete.
14. Corner bars shall be provided for all horizontal reinforcing bars at the intersections and corners of all strip footings, beams, and walls unless noted otherwise. Corner bars shall be of the same size and grade as the horizontal reinforcing they connect. Minimum lap lengths shall be as indicated with the Typical Details unless noted otherwise.
15. For slabs-on-grade, provide saw-cut control joints at intervals of 15'-0" oc max across the width of the slab. Refer to the Structural Drawings for typical control joint layout and details.
16. Saw-cuts shall be made as soon as the concrete can support the saw without damaging the surface (eight (8) hours max from the start of the concrete pour).
17. Reinforcing steel shown in sections and detail are a schematic indication that reinforcing exists. See schedules, section notes and General Notes for actual reinforcing required.
18. Detail reinforcement in accordance with ACI 315. Reinforcement shall not be welded unless noted or approved by the Structural Engineer.
19. Pedestal, Column and Wall Vertical Reinforcing: Dowel to foundation with hooked bars of same size and spacing as vertical reinforcing, terminate top of reinforcement with hooked bar of same size and spacing as vertical reinforcing.
20. Beam Horizontal Reinforcing: Terminate each end with standard.
21. Closed Tie and Stirrup Reinforcing: Terminate each end with standard hook.
22. Concrete design and detailing shall conform to the requirements of ACI 318 and ACI 301, latest editions.
23. Contractor shall provide reinforcing shop drawings which adequately depict the reinforcing bar sizes and placement. Written description of reinforcement without adequate sections, elevations and details is not acceptable.
24. Submit written reports of each proposed mix design for each class of concrete with concrete cylinder test results at least 15 days prior to start of work.
25. All concrete that will be exposed to the weather shall have air entrainment.
26. All structural concrete exposed to view to be smooth formed finished with 3/4" chamfers at all exposed edges.

**ACI lap splice length (inches)**

BAR SIZE	$f'_c = 3000$ PSI		$f'_c = 3500$ PSI		$f'_c = 4000$ PSI	
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
#3	28	42	22	32	26	39
#4	37	56	29	43	35	52
#5	47	70	36	54	44	65
#6	56	84	43	64	52	78
#7	81	122	63	109	76	114
#8	93	139	72	107	87	130
#9	105	157	81	121	89	147
#10	118	177	91	136	110	165
#11	131	196	101	151	122	183

BAR SIZE	$f'_c = 4500$ PSI		$f'_c = 5000$ PSI		$f'_c = 6000$ PSI	
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
#3	23	35	18	27	22	33
#4	31	46	24	35	29	43
#5	38	57	30	45	36	54
#6	46	69	35	53	43	64
#7	67	100	52	77	63	94
#8	76	115	59	88	72	108
#9	86	129	67	100	81	122
#10	97	145	75	112	91	137
#11	107	161	83	124	101	152

- NOTES:
1. Tabulated values are based on grade 60 bars and normal weight concrete.
  2. Cases 1 and 2, which depend on the type of structural element, concrete cover, and the center-to-center spacing of the bars, are defined as:
    - Case 1: Cover at least 1.0 db and C.C. spacing of at least 2.0 db.
    - Case 2: Cover less than 1.0 db and C.C. spacing less than 2.0 db.
  3. Top bars are horizontal beam and slab bars with more than 12" of concrete below the bars.
  4. For lightweight aggregate concrete, multiply the tabulated values by 1.3.
  5. For epoxy-coated bars, multiply the tabulated values by one of the following factors:
    - Concrete cover < 3.0 DB or C.C. spacing < 7.0 DB 1.7/1.3 = 1.31 1.50
    - Cover > 3.0 DB or C.C. spacing > 7.0 DB 1.20
  6. Bar development length = lap spliced length/ 1.3.
  7. Wire mesh lap
    - Lap all wire mesh cross wires one cross wire spacing plus 2", typical.

**CONCRETE MASONRY**

1. For product material specifications, reference the structural notes, material & component design criteria and the project specification.
2. Submit documentation demonstrating compliance with the specified strength of masonry,  $F'_m$ , in accordance with the (prism test method or the unit strength method) as outlined in the TMS 402/602-16, Building Code Requirements for Masonry Structures, and the associated testing and test methods and test data as specified for level 1 quality assurance. This shall include verification of  $F'_m$  both prior to construction and during as well as verification of materials and proportions for concrete masonry units, mortar and grout construction for every 5000 square feet of masonry placed.
3. Submit reinforcing shop drawings showing placement of all reinforcement and embedments and the reinforcing fabrication dimensions and details.
4. Place concrete units such that the vertical cells to be grouted are aligned and provide unobstructed openings for grout placement. Face joints shall be fully mortared, webs shall be fully mortared in all courses of piers, columns and pilasters, in the starting course on foundations, when necessary to confine grout or loose-fill insulation and when otherwise noted. Head joints are to be mortared a minimum distance from each face equal to the face shell thickness of the unit. Unless otherwise required, solidly fill collar joints less than 3/4" wide with mortar as the work progresses.
5. Place reinforcement and embedments in accordance with the drawings. Maintain a clear distance between the reinforcing bars and any face of masonry unit or formed surface of not less than 1/2" unless noted otherwise. Where reinforcing bar are spliced, provide a minimum lap as shown in chart below or a mechanical splice that provides 125% of the bar capacity. Tolerances for placement of reinforcing bars shall be +/- 1/2 inch perpendicular to the face of the masonry unit and within 2-inches along the length of the wall unless note otherwise. Reinforcement shall be tied in place or otherwise supported to prevent displacement during grouting.
6. Place grout within 1 1/2 hours from introducing water in the mixture and prior to initial set. Grout pour height shall conform to the requirements as outlined in TMS 402/602-16, Specification for Masonry Structures, for grout type and grout space dimensions. In no case shall grout lift exceed 4 feet in height. Consolidate pours by mechanical vibration and reconsolidate by mechanical vibration after initial water loss and settlement has occurred.
7. Provide joint reinforcement in every bed joint (8-inch on center) for stack bond and every other joint (16-inch on center) for running bond masonry placement. Place such that longitudinal wires overlap 6-inches and are embedded in mortar with a minimum cover of 5/8".
8. As a minimum, control joints in masonry walls shall be provided within 4-feet of corners, at each change of wall height or thickness and at a maximum spacing of 25-feet unless noted otherwise on drawings.
9. Structural masonry shall be reinforced a specified on the drawings. All cells containing reinforcing shall be fully grouted. Provide dowels from the foundation to match the vertical reinforcing.
10. Provide a bond beam with continuous bars where shown on the drawings and, at a minimum, at the tops of all masonry walls and at all slab or beam bearing locations where the wall is not already grouted solid below the bearing. Extend the bond beam a minimum of 2-feet beyond the end of the bearing condition.
11. At beam bearing locations, reinforce each cell below the bearing plate with typical vertical reinforcing to the top of the footing unless noted otherwise.
12. At masonry control joints, reinforce the first cell either side of the joint with the typical wall reinforcing specified on the drawings. Also, at ends of walls, reinforce the last cell with the typical wall reinforcing specified. Horizontal joint reinforcing shall be discontinuous at control joints. Bond beam reinforcing shall be discontinuous across control joints.
13. All cells containing reinforcing bars shall be fully grouted.
14. All expansion bolts placed in masonry are to be Hilti Kwik Bolt III or approved equal are to be installed in grouted cells in accordance with the manufacturer's recommendations and inspected by the special inspector. All post-installed anchors shall be installed in the presence of the special inspector.

**CONCRETE MASONRY cont.**

15. All post installed dowels placed in masonry are to be set in HIT-HY 90 adhesive or approved equal are to be bed installed in accordance with the manufacturer's recommendations and inspected by the special inspector. All post-installed anchors shall be installed in the presence of the special inspector.
16. All mechanical anchors shall be installed in accordance with the product manufacturer's recommendations and the installation shall be inspected by the special inspector. Individual products shall be submitted to the architect/engineer for approval prior to installation. All post-installed anchors shall be installed in the presence of the special inspector.
17. When the ambient temperature falls below 40F or the temperature of the masonry units is below 40F, comply with the provisions of TMS 602, Section 1.8C, Specification for Masonry Structures, for cold weather construction.
18. When the ambient temperature exceeds 90F, comply with the provisions of TMS 602, Section 1.8D, Specification for Masonry Structures, for hot weather construction.
19. Brick Ties (for stud backup)

There shall be a minimum of one brick tie for every 2.67 sq. ft. of wall area. These shall be spaced at a maximum of 18-inches on center. Ties shall be of a minimum 9 GA. corrosion resistant wire and shall be of an adjustable tie such as DUF--Wall adjustable D/A 213 or equal. Corrugated galvanized sheet ties are not acceptable. All ties must be attached through the sheathing to the studs per manufacturer's recommendations.

There shall be a minimum of one brick tie for every 2.67 sq. ft. of wall area. These shall be spaced at a maximum of 18-inches vertical. Ties shall be a minimum of 3/16" diameter corrosion resistant wire. Corrugated galvanized sheet ties are not acceptable.

CMU Lap Splice Lengths  
Reinforcement Centered  
1 Bar Per Core

MINIMUM LAP SPLICE LENGTH (INCHES)				
BAR SIZE	8" CMU	8" CMU	10" CMU	12" CMU
#3	12	12	12	12
#4	20	15	12	12
#5	32	23	18	15
#6	54	43	34	28
#7	N/P	60	46	38
#8	N/P	72	71	57
#9	N/P	N/P	82	74

Note:  
N/P= Not Permitted

CMU Lap Splice Lengths  
Reinforcement Off-Centered  
2 Bar Per Core

MINIMUM LAP SPLICE LENGTH (INCHES)				
BAR SIZE	8" CMU	10" CMU	12" CMU	16" CMU
#3	19	19	19	19
#4	34	34	34	34
#5	45	45	45	45
#6	54	54	54	54
#7	63	63	63	63
#8	N/P	72	72	72
#9	N/P	N/P	82	82

Note:  
N/P= Not Permitted



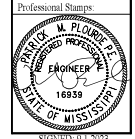
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501 315 0487 FX

MICHAEL LEO HUGHES,  
ARCHITECT

There shall be a minimum of one brick tie for every 2.67 sq. ft. of wall area. These shall be spaced at a maximum of 18-inches vertical. Ties shall be a minimum of 3/16" diameter corrosion resistant wire. Corrugated galvanized sheet ties are not acceptable.

A New Facility for:  
**Magic Carwash**  
Gulfport, Mississippi

Revisions:

SIGNED: 9.1.2023

Sheet Title:  
**General Notes and Tables**

Date: 9.1.2023  
Sheet:



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