UNIVERSITY OF MISSOURI

CP231546 GENERAL SITE - CHAMPIONS DRIVE SUBSTATION 69kV TRANSFORMER FOUNDATIONS
UNIVERSITY OF MISSOURI - COLUMBIA MISSOURI
FOR THE CURATORS OF THE UNIVERSITY OF MISSOURI

SEPTEMBER 17, 2025 **JACOBS PROJECT NUMBER : CP231546** **ISSUED FOR BID**

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SIGNATURE: 9/17/2025

STATE OF MISSOURI — JACOB CRONENWETT — NUMBER PE-2021027206 — PROFESSIONAL ENGINEER

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STATE OF MISSOURI — CHRISTOPHER ROYCE FARR — NUMBER PE-2007006016 — PROFESSIONAL ENGINEER

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SIGNATURE: 9/17/2025

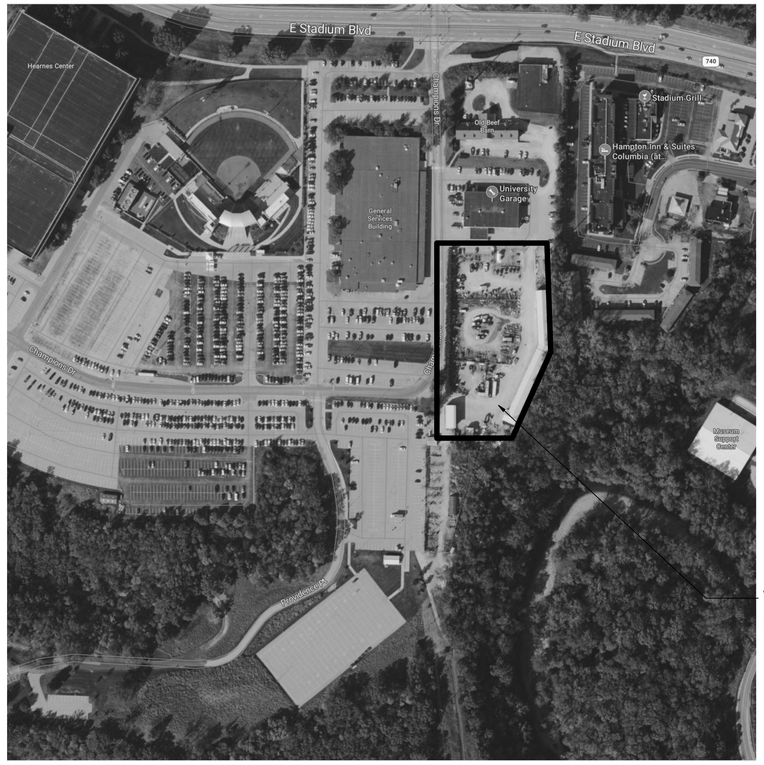
STATE OF MISSOURI — MICHAEL D. LEWIS — NUMBER PE- 2008033455 — PROFESSIONAL ENGINEER

CODES & STANDARDS

UM CONSULTANT PROCEDURES AND DESIGN GUIDELINES: CURRENT EDITION

IBC:	2024	NFPA 72:	2022
IEBC:	2024	NFPA 75:	2024
IMC:	2024	NFPA 90A:	2024
IPC:	2024	NFPA 96:	2024
IFC:	2024	NFPA110:	2022
IFGC:	2024	NFPA 150:	2022
ISPSC:	2024	NFPA 801:	2020
NEC:	2023	ASHRAE 62.1:	2022
NFPA 13:	2022	ASHRAE 90.1:	2022
NFPA 14:	2024	ASME A 17.1:	2016
NFPA 20:	2022	ICC A117.1:	2017
NFPA 45:	2024	ADA STD:	2010
NFPA 51B:	2024		

LOCATION MAP - CHAMPIONS DRIVE SUBSTATION 69kV TRANSFORMER FOUNDATIONS



https://apmeapps.jacobs.com/GeospatialImageLocator/

GENERAL

G-000	COVER & PROJECT INFORMATION

CIVIL

C-100	EROSION CONTROL PLAN
C-200	SITE LAYOUT PLAN
C-300	SITE DETAILS

STRUCTURAL

S-001	ABBREVIATIONS, GENERAL NOTES AND SYMBOLS
S-002	GENERAL NOTES
S-200	SUBSTATION TRANSFORMER FOUNDATION AND FRAMING PLANS
S-300	TYPICAL CONCRETE DETAILS
S-310	FOUNDATION SECTIONS AND DETAILS

ELECTRICAL

ES-101	OVERALL SITE PLAN
EG-101	ENLARGED GROUNDING PLAN
E-501	GROUNDING DETAILS
E-508	SUMP PUMP AND UNISTRUT SUPPORT DETAILS
E-510	DUCTBANK DETAILS
E-511	DUCTBANK DETAILS
E-600	PANEL SCHEDULES

DESIGN CONSULTANTS

Civil Engineer
SK DESIGN GROUP, INC
4600 COLLEGE BLVD, SUITE 100
OVERLAND PARK, KANSAS 66211
(T) 913-451-1818

PROJECT ADDRESS

University of Missouri - Columbia, at
980 Champions Dr. Columbia MO 65211

PROJECT DESCRIPTION

Construction of two (2) power transformer foundations, each incorporating containment pits, along with the installation of conduit systems connecting the transformers to the control panels.

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NO.	DATE	DSGN	DR	CHK	APVD
0	09/17/25	REINNER	AYODELE/AREF	REINNER	HENDON
				BY	APVD

REVISION
ISSUED FOR BID

111 General Services Building
Columbia, MO 65211
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CP231546

Project Title: GENERAL SITE - CHAMPIONS DRIVE SUBSTATION 69kV TRANSFORMER FOUNDATIONS

Drawing Title: COVER

Date: 09/17/25
Proj. No.: CP231546
Drawing No.: G-000

EROSION CONTROL NOTES

1. EXCEPT WHERE NECESSARY TO INSTALL EROSION AND SEDIMENT CONTROL DEVICES, CLEARING & DEMOLITION ACTIVITIES SHALL NOT BEGIN UNTIL ALL EROSION CONTROL DEVICES AND CONSTRUCTION FENCING HAVE BEEN INSTALLED AND APPROVED BY THE OWNER'S REPRESENTATIVE.
2. THE CONTRACTOR SHALL PROVIDE FOR CONTROL OF SURFACE EROSION AND SEDIMENT DEPOSITION DURING ALL PHASES OF CONSTRUCTION AND UNTIL THE OWNER ACCEPTS THE WORK AS COMPLETE. THE CONTRACTOR SHALL PROVIDE TEMPORARY SEEDING, BERMS, SILT FENCE, SEDIMENT TRAPS, OR OTHER MEANS TO PREVENT SEDIMENT FROM REACHING THE PUBLIC RIGHT-OF-WAY, STREAMS OR ADJACENT FACILITIES. IN THE EVENT THE PREVENTION MEASURES ARE NOT EFFECTIVE, THE CONTRACTOR SHALL REMOVE ANY DEBRIS SEDIMENT AND RESTORE THE PROPERTY TO IT'S ORIGINAL OR BETTER CONDITION.
3. CONTRACTOR IS RESPONSIBLE FOR KEEPING ALL ROADWAYS & SIDEWALKS ADJACENT TO THE CONSTRUCTION SITE FREE OF DIRT AND DEBRIS RESULTING FROM ACTIVITIES RELATED TO THE CONSTRUCTION OF THIS PROJECT.
4. THE CONTRACTOR SHALL CLEAN THE STREET ONCE PER DAY MINIMUM WHEN HEAVY TRACKOUT OCCURS. CONTRACTOR SHALL PROVIDE ADDITIONAL STREET CLEANING AT THEIR OWN EXPENSE TO KEEP STREETS CLEAN FROM MUD AND DEBRIS AS NECESSARY.
5. CONTRACTOR SHALL KEEP THE ENTIRE PROJECT SITE FREE OF DEBRIS AND TRASH AT ALL TIMES. CONTRACTOR SHALL EXECUTE WORK USING METHODS THAT MINIMIZE EXCESSIVE NOISE OR DUST EMISSIONS. CONTRACTOR SHALL PROVIDE METHODS, MEANS AND FACILITIES TO PREVENT CONTAMINATION OF SOIL OR WATER FROM DISCHARGE OF REGULATED MATERIALS (I.E., DIESEL FUEL) USED DURING CONSTRUCTION. CONTRACTOR SHALL PROVIDE SECONDARY CONTAINMENT WHEN MORE THAN 50 GALLONS OF FUEL ARE STORED ON SITE.
6. STOCKPILE AREAS SHALL BE GRADED SUCH THAT THEY DO NOT EXCEED 3:1, SILT FENCE SHALL BE INSTALLED AROUND THE PERIMETER OF THE AREAS AND THE AREAS SHALL BE SEEDED WITHIN 14 DAYS ONCE CONSTRUCTION ACTIVITIES ON THEM CEASE
7. THE CONTRACTOR SHALL REQUEST THE OWNER'S REPRESENTATIVE TO INSPECT AND APPROVE THE SEDIMENT CONTROL MEASURES UPON THE COMPLETION OF VARIOUS STAGES OF THE WORK.
8. CONTRACTOR MUST INSTALL AND MAINTAIN THE EROSION CONTROL MEASURES SHOWN ON THIS PLAN. IF THE ENGINEER, OWNER'S REPRESENTATIVE, DETERMINES THAT THE INSTALLATION OR THE MAINTENANCE IS INADEQUATE, THE CONTRACTOR MUST IMMEDIATELY CORRECT AT THEIR EXPENSE. IF IT IS DETERMINED THAT ADDITIONAL EROSION CONTROL MEASURES ARE NEEDED THE CONTRACTOR WILL BE DIRECTED TO INSTALL AND MAINTAIN THOSE MEASURES
9. FOLLOWING THE FINAL REMOVAL OF ALL EROSION CONTROL MEASURES THE CONTRACTOR SHALL RE-GRADE ALL AREAS THAT WERE DISTURBED BY THE REMOVAL.
10. THE CONTRACTOR SHALL INSPECT THE LAND DISTURBANCE SITE AT LEAST ONCE EVERY SEVEN (7) DAYS AND WITHIN TWENTY-FOUR (24) HOURS FOLLOWING EACH RAINFALL EVENT OF 0.25" OR MORE WITHIN ANY TWENTY-FOUR (24) HOUR PERIOD. THE CONTRACTOR SHALL ALSO INSPECT AND ASSURE THAT ALL SEDIMENT CONTROL DEVICES ARE IN WORKING CONDITION PRIOR TO ANY FORECASTED RAINFALL
11. THE CONTRACTOR SHALL REMOVE SEDIMENT FROM THE FLOW AREAS AND MAKE ALL NECESSARY REPAIRS TO MAINTAIN THE INTEGRITY OF THE SEDIMENT CONTROL MEASURES. SEDIMENT SHALL BE REMOVED ONCE IT REACHES 1/2 THE INSTALLED HEIGHT OF MEASURE
12. SOME OF THE EROSION AND SEDIMENT CONTROL MEASURES WILL REQUIRE THE CONTRACTOR TO INSTALL, REMOVE, AND REINSTALL THE MEASURES AS CONSTRUCTION PROCEEDS. THE PHASING OF THIS WORK IS DEPENDENT ENTIRELY ON THE CONTRACTOR'S SCHEDULE, AND IS NOT SPECIFIED HEREIN. HOWEVER, THE CONTRACTOR SHALL COORDINATE THESE ACTIONS WITH THE ENGINEER AT THE TIMES ADJUSTMENTS ARE NEEDED
13. IMMEDIATE INITIATION OF TEMPORARY STABILIZATION BMPS ON DISTURBED AREAS WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY CEASED ON THAT PORTION OF THE PROJECT SITE IF CONSTRUCTION ACTIVITIES WILL NOT RESUME FOR A PERIOD EXCEEDING 14 CALENDAR DAYS. TEMPORARY STABILIZATION MAY INCLUDE ESTABLISHMENT OF VEGETATION, GEOTEXTILES, MULCHES OR OTHER TECHNIQUES TO REDUCE OR ELIMINATE EROSION UNTIL EITHER FINAL STABILIZATION CAN BE ACHIEVED OR UNTIL FURTHER CONSTRUCTION ACTIVITIES TAKE PLACE TO RE-DISTURB THE AREA. THIS STABILIZATION MUST BE COMPLETED WITHIN 14 CALENDAR DAYS.
14. AN INSPECTION LOG SHALL BE MAINTAINED AND SHALL BE AVAILABLE FOR REVIEW BY THE REGULATORY AUTHORITY.
15. CONCRETE WASH OR RINSEWATER FROM CONCRETE MIXING EQUIPMENT, TOOLS AND/OR READY-MIX TRUCKS, TOOLS, ETC. MAY NOT BE DISCHARGED INTO OR BE ALLOWED TO RUN TO ANY EXISTING WATER BODY OR PORTION OF THE STORMWATER SYSTEM. ONE OR MORE LOCATIONS FOR CONCRETE WASH OUT WILL BE DESIGNATED ON SITE, SUCH THAT DISCHARGES DURING CONCRETE WASHOUT WILL BE CONTAINED IN A SMALL AREA WHERE WASTE CONCRETE CAN SOLIDIFY IN PLACE. PROPER SIGNAGE WILL BE INSTALLED TO DIRECT USERS TO THE CONCRETE WASHOUT. CONCRETE WASHOUTS MUST BE INSTALLED PRIOR TO POURING ANY CONCRETE.
16. POLLUTION OF STREAMS, LAKES, WETLANDS, DRAINAGE WAYS OR STORM SEWERS FROM FUEL, OILS, HAZARDOUS CHEMICALS, SEDIMENT, TRASH, DEBRIS, OR OTHER SUBSTANCES RESULTING FROM CONSTRUCTION ACTIVITIES SHALL NOT BE ALLOWED. CONTRACTOR SHALL REPORT ALL SPILLS TO THE UNIVERSITY OF MISSOURI CONSTRUCTION MANAGER.
17. NOTIFICATION TO ALL CONTRACTORS: THE PERMITTEE SHALL BE RESPONSIBLE FOR NOTIFYING EACH CONTRACTOR OR ENTITY (INCLUDING UTILITY CREWS AND CITY EMPLOYEES OR THEIR AGENTS) WHO WILL PERFORM WORK AT THE SITE OF THE EXISTENCE OF THE SWPPP AND WHAT ACTION OR PRECAUTIONS SHALL BE TAKEN WHILE ON-SITE TO MINIMIZE THE POTENTIAL FOR EROSION AND THE POTENTIAL FOR DAMAGING ANY BMP. THE SWPPP SHALL CONTAIN A LIST OF CONTRACTORS OR ENTITIES THAT HAVE BEEN NOTIFIED. THE PERMITTEE IS RESPONSIBLE FOR ANY DAMAGE A SUBCONTRACTOR MAY DO TO ESTABLISHED BMPS AND ANY SUBSEQUENT WATER QUALITY VIOLATION RESULTING FROM DAMAGE.

LEGEND:

- SILT FENCE — RE: 1/C300
- INLET PROTECTION — RE: 2/C300

NOTE: FUTURE SUBSTATION YARD SHOWN FOR REFERENCE ONLY (NOT THIS CONTRACT)

NOTE: FUTURE SUBSTATION YARD SHOWN FOR REFERENCE ONLY (NOT THIS CONTRACT)

INSTALL SILT FENCE (TYP.)

INSTALL INLET PROTECTION AT EXISTING GRATE INLET (TYP.)

STORAGE SHED

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JACOB CRONENWETT NUMBER PE-2021027208 PROFESSIONAL ENGINEER STATE OF MISSOURI 09/11/2025

NO.	DATE	DSGN	DR	CHK	BY
0	09/11/25	JC	AE	SM	APVD
					JC

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CP231546

Project Title: GENERAL SITE - CHAMPIONS DRIVE SUBSTATION 69KV TRANSFORMER FOUNDATIONS

Drawing Title: EROSION CONTROL PLAN

Date: 09/11/25
Proj. No.: CP231546
Drawing No.: C100

SCALE IN FEET

PLOT DATE/TIME:

LEGEND:

- NEW CHAIN LINK FENCE RE: 3/C300
- REINSTALL GRAVEL PAVEMENT
- B — NEW BOLLARD RE: 4/C300

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STATE OF MISSOURI — JACOB CRONENWETT — NUMBER PE-2021027268 — PROFESSIONAL ENGINEER — ON 11/21/2025

NO.	DATE	DSGN	DR	CHK	APVD	BY	APVD
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Project Title: GENERAL SITE - CHAMPIONS DRIVE SUBSTATION 69kV TRANSFORMER FOUNDATIONS

Drawing Title: SITE LAYOUT PLAN

Date: 09/11/25
Proj. No.: CP231546
Drawing No.: C200

PLOT DATE/TIME:

NEW 8' HIGH CHAIN LINK FENCE RE: 3/C300

N= 1128702.34 E= 1689804.73

N= 1128701.62 E= 1689841.74

N= 1128700.94 E= 1689876.73

N= 1128703.03 E= 1689769.73

N= 1128682.53 E= 1689769.33

N= 1128680.44 E= 1689876.33

N= 1128681.85 E= 1689804.33

N= 1128681.12 E= 1689841.34

4.00' (TYP.)

20.50'

35.00'

37.02'

35.00'

NEW TRANSFORMER PAD. TOP OF PAD ELEVATION = 733.00 SEE ELECTRICAL AND STRUCTURAL FOR ADDITIONAL INFORMATION

BASIN SUMP. RE: STRUCTURAL & ELECTRICAL

NEW BOLLARDS (2) RE: 4/C300 INSTALL 12" OFF ELECTRICAL EQUIPMENT PAD

TRENCH DRAIN

EXISTING FENCE TO REMAIN. REINSTALL IF NECESSARY FOR CONSTRUCTION ACTIVITIES

LOCATE AND PROTECT EXISTING STORM LINE TO REMAIN

NOTE: FUTURE SUBSTATION YARD SHOWN FOR REFERENCE ONLY (NOT THIS CONTRACT)

REMOVE AND REINSTALL EXISTING GRAVEL AS REQUIRED FOR INSTALLATION OF NEW ELECTRICAL CIRCUIT. GRAVEL SHALL BE RESTORED TO EXISTING CONDITION OR BETTER.

NEW UNDERGROUND ELECTRICAL CIRCUIT. SEE ELECTRICAL PLANS FOR ADDITIONAL INFORMATION

STORAGE SHED

EXISTING STORAGE SHED

730.80 FF

730.59 FF

6" CEDAR TRUNK 9' DRIP LINE

FENCING

FENCE GATE POST

WATER VALVE FIELD LOCATED

DIESEL TANK PAD

STEEL 'I' BEAM LIFT

SPEED BUMP

STORM JUNCTION BOX TOP=730.67' UNABLE TO ACCESS

GRATE INLET TOP=730.19' 12" RCP FL(NE)=727.84'

ELECTRIC MH TOP=730.53'

GRATE INLET TOP=729.34' 12" RCP FL(N)=727.24'

GRATE INLET TOP=729.5' 24" FL OUT(SE) = 720.5

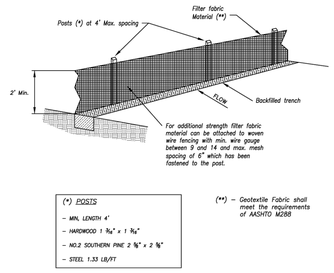
GRATE INLET TOP=728.48' 24" FL OUT(E) = 725.81

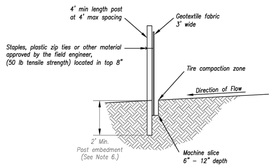
POTHOLED TOP OF PIPE = 724.66

POTHOLED TOP OF PIPE = 723.38

Note

10 5 0 10
SCALE IN FEET





(*) POSTS
- MIN. LENGTH 4'
- HARDWOOD 1 ¾" x 1 ¾"
- NO.2 SOUTHERN PINE 2 ⅜" x 2 ⅜"
- STEEL 1.33 LB/FT

(**) – Geotextile Fabric shall meet the requirements of AASHTO M288

Notes:

1. In order to contain water, the ends of the silt fence must be turned uphill (Figure A).
2. Long perimeter runs of silt fence must be limited to 100'. Runs should be broken up into several smaller segments to minimize water concentrations (Figure A).
3. Long slopes should be broken up with intermediate rows of silt fence to slow runoff velocities.
4. Attach fabric to upstream side of post.
5. Install posts a minimum of 2' into the ground.
6. Trenching will only be allowed for small or difficult installation, where slicing machine cannot be reasonably used.

Maintenance:

1. Remove and dispose of sediment deposits when the deposit approaches ½ the height of silt fence.
2. Repair as necessary to maintain function and structure.

SILT FENCE DETAILS
Not to Scale

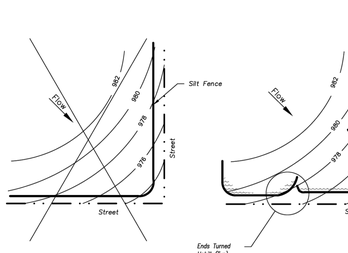
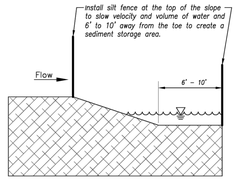
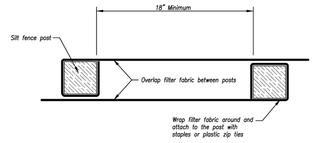


Figure A

SILT FENCE LAYOUT
Not to Scale





JOINING FENCE SECTIONS
Not to Scale

Modified from 2015 Overland Park Standard Details for Erosion and Sediment Control.

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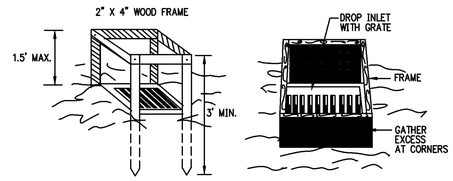
Kansas City Metro Chapter
KANSAS CITY METRO CHAPTER

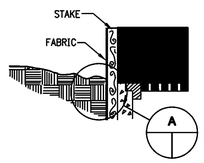
SILT FENCE	STANDARD DRAWING NUMBER ESC-03
	ADOPTED: 10/24/2016

1 SILT FENCE DETAIL
Not to Scale

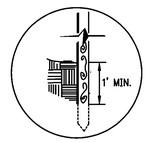
SEDIMENT FENCE DROP INLET PROTECTION



PERSPECTIVE VIEWS
NOT TO SCALE



ELEVATION OF STAKE AND FABRIC ORIENTATION



DETAIL A
NOT TO SCALE

SOURCE: MODIFIED FROM VA. DCR, 1992

SEDIMENT FENCE DROP INLET PROTECTION NOTES:

A) CONSTRUCTION SPECIFICATIONS:

1. SEDIMENT FENCE SHALL CONFORM TO THE CONSTRUCTION SPECIFICATIONS FOR EXTRA STRENGTH FOUND IN THE TABLE BELOW AND SHALL BE CUT FROM A CONTINUOUS ROLL TO AVOID JOINTS.

PHYSICAL PROPERTIES OF FABRIC IN SEDIMENT FENCE:

PHYSICAL PROPERTY	TEST	REQUIREMENTS
FILTERING EFFICIENCY	ASTM 5141	75%
TENSILE STRENGTH AT 20% (MAX.) ELONGATION*	ASTM 4632 AASHTO M288-96	EXTRA STRENGTH – 50 LBS./LINEAR INCH
FLOW RATE	ASTM 5141	0.2 GAL./SQ.FT/ MINUTE**
ULTRAVIOLET RADIATION STABILITY %	ASTM D 4355	90%

* REQUIREMENTS REDUCED BY 50% AFTER SIX MONTHS OF INSTALLATION.
** HIGH POROSITY FABRIC MADE BY BETTER SUITED FOR THIS DEVICE.

2. FOR STAKES, USE 2X4 WOOD OR EQUIVALENT METAL WITH A MINIMUM LENGTH OF 3 FEET.
3. SPACE STAKES EVENLY AROUND THE PERIMETER OF THE INLET A MAXIMUM OF 3 FEET APART, AND SECURELY DRIVE THEM INTO THE GROUND, APPROXIMATELY 18 INCHES DEEP.
4. TO PROVIDE NEEDED STABILITY TO THE INSTALLATION, FRAME WITH 2X4 WOOD STRIPS AROUND THE CREST OF THE OVERFLOW AREA AT A MAXIMUM OF 1.5 FEET ABOVE THE DROP INLET CREST.
5. PLACE THE BOTTOM 12 INCHES OF THE FABRIC IN A TRENCH AND BACKFILL THE TRENCH WITH 12-INCHES OF COMPACTED SOIL.
6. FASTEN FABRIC SECURELY BY STAPLES, OR WIRE IT TO THE STAKES AND FRAME. JOINTS MUST BE OVERLAPPED TO THE NEXT STAKE.
7. IT MAY BE NECESSARY TO BUILD A TEMPORARY DIKE ON THE DOWNSLOPE SIDE OF THE STRUCTURE TO PREVENT BYPASS FLOW.

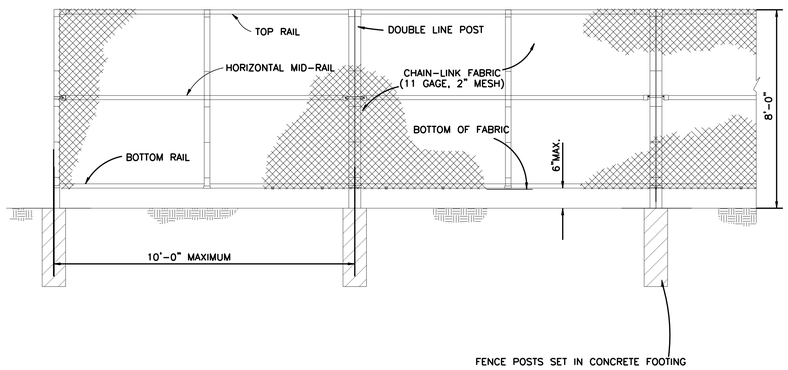
B) INSPECTION AND MAINTENANCE:

1. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN EVENT OF 1/2 INCH OR GREATER AND REPAIRS MADE AS NEEDED.
2. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE HALF THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
3. STRUCTURES SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

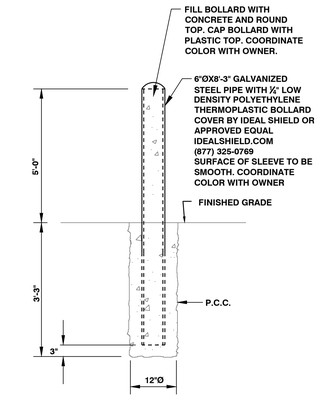
AMERICAN PUBLIC WORKS ASSOCIATION
APWA
KANSAS CITY METROPOLITAN CHAPTER

SEDIMENT FENCE DROP INLET PROTECTION	STANDARD DRAWING NUMBER ESC-19
	ADOPTED:

2 SEDIMENT FENCE DROP INLET SEDIMENT TRAP
Not to Scale



3 CHAIN LINK FENCE
Not to Scale



4 BOLLARD DETAIL
Not to Scale

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STATE OF MISSOURI
JACOB CRONENWETT
NUMBER PE-2010027056
PROFESSIONAL ENGINEER
09/11/2025

NO.	DATE	DSGN	DR	CHK	APVD	BY	APVD
0	09/11/25	JC	AE	SM	JC		

REVISION: ISSUED FOR BID

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(573)-882-8211
CP231546

Project Title: GENERAL SITE - CHAMPIONS DRIVE SUBSTATION 69KV TRANSFORMER FOUNDATIONS

Drawing Title: SITE DETAILS

Date: 09/11/25
Proj. No.: CP231546
Drawing No.: C300

PLOT DATE/TIME:

ABBREVIATIONS

(ALL ABBREVIATIONS/SYMBOLS SHOWN ARE NOT NECESSARILY USED ON THE DRAWINGS)

A

A/E	ARCHITECT/ENGINEER
AB	ANCHOR BOLT
ACI	AMERICAN CONCRETE INSTITUTE
ADDL	ADDITIONAL
ADJ	ADJACENT
AFF	ABOVE FINISH FLOOR
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
APPROX	APPROXIMATE (-LY)
ARCH	ARCHITECTURAL
ARCH'T	ARCHITECT
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS

B

BB	BACK TO BACK
BC	BOTTOM CHORD
BL	BASE LINE
BLDG	BUILDING
BM	BEAM
BOT	BOTTOM
BP	BASE PLATE
BRG	BEARING
BRKT	BRACKET
BS	BOTH SIDES
BSMT	BASEMENT
BVL	BEVELED
BW	BOTH WAYS

C

C	COMPRESSION, CHANNEL SHAPE
CG	CENTER OF GRAVITY
CGC	CENTER OF GRAVITY OF CONCRETE
CGS	CENTER OF GRAVITY OF STEEL
CJ	CONSTRUCTION JOINT OR CONTROL JOINT
CL	CENTERLINE
CLR	CLEAR, CLEARANCE
CMU	CONCRETE MASONRY UNIT
COE	CORPS OF ENGINEER'S
COL	COLUMN
CONC	CONCRETE
CONST	CONSTRUCTION
CONT	CONTINUOUS OR CONTINUED
CONX	CONNECTION
COR	CONTRACTING OFFICER'S REPRESENTATIVE

D

D	DEPTH
DETL	DETAIL
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DL	DEAD LOAD
DN	DOWN
DP	DAMP PROOFING
DWG	DRAWING (-S)
DWL	DOWEL

E

E	EAST
EA	EACH
EF	EACH FACE
EJ	EXPANSION JOINT
ELEC	ELECTRICAL
ELEV, EL	ELEVATION
EQ	EQUAL
EQUIP	EQUIPMENT
EW	EACH WAY
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR

F

FAB	FABRICATION
FD	FLOOR DRAIN
FDN	FOUNDATION
FF	FINISH FLOOR
FIN	FINISH (-ED)
FLR	FLOOR
FS	FAR SIDE
FT	FOOT/FEET
FTG	FOOTING

G

GA	GAGE OR GAUGE
GALV	GALVANIZED
GB	GRADE BEAM

H

HORIZ	HORIZONTAL
HP	HIGH POINT
HS	HEADED STUD
HSS	HOLLOW STRUCTURAL SECTION
HT	HEIGHT

I

ID	INSIDE DIAMETER
IN	INCH (-ES)
INT	INTERIOR

J

JST	JOIST
JT	JOINT

K

K	KIPS (1000 LBS)
KO	KNOCKOUT

L

L	ANGLE SHAPE
LB, #	POUND
LD	DEVELOPMENT LENGTH
LDG	LANDING
LH	LEFT HAND
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LONG	LONGITUDINAL
LP	LOW POINT
LSH	LONG SIDE HORIZONTAL
LW	LONG WAY

M

MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MC	MISCELLANEOUS CHANNEL SHAPE
MECH	MECHANICAL
MEP	MECHANICAL, ELECTRICAL, PLUMBING
MEZZ	MEZZANINE
MFR	MANUFACTURE (-R)
MID	MIDDLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MS	MIDDLE STRIP
MT	STRUCTURAL TEE CUT FROM MISC STEEL
MTL	METAL

N

N/A	NOT APPLICABLE
NF	NEAR FACE
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NS	NEAR SIDE
NTS	NOT TO SCALE

O

OA	OVERALL
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OPNG	OPENING (-S)
OPP	OPPOSITE
OPP HND, OH	OPPOSITE HAND
OPT	OPTIONAL
OVS	OVERSIZE

P

PC	PRECAST CONCRETE
PERP	PERPENDICULAR
PG	PLATE GIRDER
PL	PLATE
PLUMB	PLUMBING
PREFAB	PREFABRICATED
PRELIM	PRELIMINARY
PRMLD	PREMOLDED
PROJ	PROJECTION
PSTG	PRESTRESSED GIRDER
P/T	POST-TENSION (-ED, -ING)
PT	POINT
PVC	POLYVINYL CHLORIDE
PVT	PAVEMENT

R

R	RIGHT, RISER
RAD	RADIUS
RD	ROOF DRAIN
RE:	REFER TO
REINF	REINFORCING (-ED,-MENT)
REM	REMAINDER
REQD	REQUIRED
REV	REVISION
RH	RIGHT HAND
RJ	RUSTICATION JOINT
RND	ROUND
RO	ROUGH OPENING
RW	RETAINING WALL

S

S	SOUTH, STANDARD SHAPE
SC	SHEAR CONNECTORS, SLIP CRITICAL
SCHED	SCHEDULE(D)
SDI	STEEL DECK INSTITUTE
SECT	SECTION
SHT	SHEET
SIM	SIMILAR
SJ	SAW JOINT
SJI	STEEL JOIST INSTITUTE
SL	SLOPE
SPA	SPACE
SPEC	SPECIFICATION(S)
SPL	SPECIAL
SQ	SQUARE
SS	STAINLESS STEEL
STD	STANDARD
STIFF	STIFFENER
STIR	STIRRUP
STL	STEEL
STR	STRUCTURAL
STRUCT	STRUCTURE
SW	SHEAR WALL
SYM	SYMMETRICAL

T

T	TOP, TENSION
T/	TOP OF
T&B	TOP & BOTTOM
TEMP	TEMPERATURE
THRD	THREADED
THK	THICKNESS
TOS	TOP OF STEEL
TRD	TREAD (-S)
TRNV	TRANSVERSE
TW	TILT WALL
TYP	TYPICAL

U

UNO	UNLESS NOTED OTHERWISE

V

VERT	VERTICAL

W

W	WEST, WIDTH, WIDE FLANGE
WB	WIND BRACE
W/	WITH
W/O	WITHOUT
WP	WORK POINT
WPJ	WEAKENED PLANE JOINT
WT	WEIGHT, STRUCTURAL TEE CUT FROM WIDE FLANGE BEAM
WWF	WELDED WIRE FABRIC
WWM	WELDED WIRE MESH

X

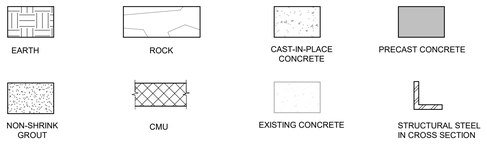
XFMR	TRANSFORMER

STRUCTURAL SYMBOLS

- SURFACE - STEPPED
- SURFACE - SLOPE UP
- SURFACE - SLOPE DOWN
- SURFACE - SLOPE (2) WAYS
- T/WALL — ELEVATION POINT (TOP OF ELEMENT INDICATED)
- WP — WORKPOINT
- MOMENT CONNECTION
- 100'-0" — TOP OF CONCRETE ELEVATION
- SLOPE INDICATOR
- STRUCTURAL ARROW (DIRECTION OF SPAN)
- COLUMN PASSING THRU THIS LEVEL
- (+3") — TOP OF STEEL ± DEVIATION FROM TYPICAL
- [X] — NUMBER OF EVENLY SPACED SHEAR STUDS
- [X,Y,Z] — SPECIAL STUD SPACING
- C 7/8" — THE AMOUNT OF MID-SPAN DEAD LOAD CAMBER

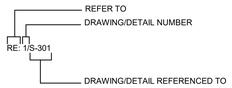
MATERIAL GRAPHIC SYMBOLS

THE FOLLOWING SYMBOLS ARE USED TO REPRESENT THE MATERIALS SHOWN ON THE STRUCTURAL DRAWINGS. REFER TO SPECIFICATIONS AND GENERAL NOTES FOR MATERIAL QUALITIES REQUIRED.



SHEET SYMBOLS

DRAWING/DETAIL REFERENCE KEY



GENERAL NOTES

A. BUILDING AND DESIGN CODES

1. THE INTERNATIONAL BUILDING CODE, 2021 EDITION.
2. ASCE 7, MINIMUM DESIGN LOADS AND ASSOCIATED CRITERIA FOR BUILDINGS AND OTHER STRUCTURES, 2016 EDITION.
3. AISC STEEL CONSTRUCTION MANUAL, 15TH EDITION.
4. AISC 360-16, SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS.
5. ACI 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, 2019 EDITION.
6. CRSI MANUAL OF STANDARD PRACTICE, THE LATEST EDITION ADOPTED BY GOVERNING CODES.
7. SDI, 2017 STANDARDS FOR COMPOSITE DECKS, FORM DECKS, AND ROOF DECKS.
8. TMS 402/602-16, BUILDING CODE REQUIREMENTS AND SPECIFICATIONS FOR MASONRY STRUCTURES.
9. ALL APPLICABLE STANDARDS AND CODES REQUIRED BY FEDERAL, STATE, AND LOCAL AGENCIES.

B. DESIGN LOADS:

1. LIVE LOADS:
   a. GRATING PLATFORM AT TRANSFORMER — UNIFORM LOAD 100 PSF
2. DEAD LOADS:
   a. DESIGN DEAD LOADS INCLUDE THE SELF-WEIGHT OF STRUCTURAL COMPONENTS AND PERMANENT FIXTURES IN ADDITION TO THE LOADS INDICATED BELOW.
   b. EQUIPMENT LOADS - LOADING FOR MECHANICAL EQUIPMENT EXCEEDING 500 LBS PER PIECE ARE BASED ON THE WEIGHTS GIVEN BELOW. ANY CHANGES IN THE TYPE, SIZE, LOCATION, OR NUMBER OF PIECES OF EQUIPMENT SHOULD BE REPORTED TO THE GOVERNMENT FOR VERIFICATION OF THE ADEQUACY OF SUPPORTING MEMBERS PRIOR TO PLACEMENT OF EQUIPMENT.

EQUIPMENT	FOOTPRINT (IN x IN)	WEIGHT (#)
SUBSTATION TRANSFORMER	162 x 95	230,142

   NOTES:
   c. ALL FOUNDATIONS ARE DESIGNED BASED ON PRELIMINARY EQUIPMENT INFORMATION. SIZE AND REINFORCEMENT OF FOUNDATIONS, AS WELL AS SIZE, LOCATION, QUANTITY AND SPACING OF ANCHOR RODS, GROUT POCKETS, ETC. MAY REQUIRE MODIFICATION UPON RECEIPT OF FINAL VENDOR INFORMATION. FINAL CERTIFIED EQUIPMENT VENDOR SHOP DRAWINGS SHALL BE REVIEWED AND APPROVED BY ENGINEER OF RECORD PRIOR TO CONSTRUCTION OF FOUNDATIONS.
3. SNOW LOADS:
   a. GROUND SNOW LOAD, P_g = 20 PSF
   b. RISK CATEGORY II
   c. FLAT-ROOF SNOW LOAD, P_f = 22 PSF
   d. SNOW EXPOSURE FACTOR, C_e = 1.0
   e. SNOW LOAD IMPORTANCE FACTOR, I_s = 1.1
   f. THERMAL FACTOR, C_t = 1.0
   g. SLOPE FACTOR, C_s = 1.0
   h. DRIFT SURCHARGE LOADS - NOT APPLICABLE
4. WIND LOADS:
   a. BASIC WIND SPEED (3 SECOND GUST) - V = 116 mph / V_{ASD} = 90 mph
   b. RISK CATEGORY - III
   c. EXPOSURE C
   d. ENCLOSURE CLASSIFICATION - ENCLOSED
   e. INTERNAL PRESSURE COEFFICIENT = ±0.18
   f. COMPONENTS & CLADDING DESIGN PRESSURE - SEE DIAGRAM, RE: S-003
5. SEISMIC LOADS:
   a. RISK CATEGORY - III
   b. SEISMIC IMPORTANCE FACTOR - I = 1.25
   c. MAPPED SPECTRAL RESPONSE ACCELERATIONS - S_S = 0.163g, S_1 = 0.095g
   d. SITE CLASS - C
   e. SPECTRAL RESPONSE COEFFICIENT - S_{DS} = 0.141g, S_{D1}= 0.095g
   f. SEISMIC DESIGN CATEGORY - B

C. GENERAL REQUIREMENTS:

1. SPECIFICATIONS ARE PART OF THE CONSTRUCTION DOCUMENTS AND MUST BE USED IN CONJUNCTION WITH THE DRAWINGS.
2. VERIFY EXISTING CONDITIONS AND DIMENSIONS PRIOR TO BEGINNING WORK OR FABRICATING MATERIALS. NOTIFY ENGINEER OF RECORD OF DISCREPANCIES BEFORE PROCEEDING WITH ANY PHASE OF WORK.
3. VERIFY WITH OTHER DISCIPLINES THE LOCATIONS OF CHASES, INSERTS, OPENINGS, SLEEVES, FINISHES, DEPRESSIONS, PADS, AND WALL OPENINGS.
4. DO NOT SCALE DRAWINGS FOR THE PURPOSE OF ESTABLISHING DIMENSIONS.
5. DETAILS LABELED "TYPICAL DETAILS" ON DRAWINGS APPLY TO SITUATIONS OCCURRING ON THE PROJECT THAT ARE THE SAME OR SIMILAR TO THOSE SPECIFICALLY DETAILED. SUCH DETAILS APPLY WHETHER OR NOT DETAILS ARE REFERENCED AT EACH LOCATION. NOTIFY ENGINEER OF RECORD OF CONFLICTS REGARDING APPLICABILITY OF "TYPICAL DETAILS".
6. DO NOT LOAD THE FOUNDATIONS WITH ERECTION CRANES OR ERECTION EQUIPMENT. THE FOUNDATIONS HAVE NOT BEEN DESIGNED FOR CRANE LOADS AND WILL REQUIRE AN INCREASE IN THICKNESS AND/OR REINFORCEMENT. OBTAIN ENGINEER OF RECORD'S APPROVAL ON PROPOSED CRANE SUPPORT PLAN FOR FOUNDATIONS PRIOR TO COMMENCING WORK.
7. THE CONTRACT STRUCTURAL DOCUMENTS REPRESENT THE FINISHED STRUCTURE. THE CONTRACTOR IS RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION. PROVIDE ALL MEASURES REQUIRED TO PROTECT THE STRUCTURE, WORKMEN, AND OTHER PERSONS DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT ARE NOT LIMITED TO, BRACING, SHORING FOR CONSTRUCTION EQUIPMENT, SHORING FOR THE BUILDING, FORMS AND SCAFFOLDING, SHORING OF RETAINING WALLS AND OTHER TEMPORARY SUPPORTS AS REQUIRED.
8. PRINCIPAL OPENINGS THROUGH THE FRAMING ARE SHOWN ON DRAWINGS. EXAMINE THE ELECTRICAL AND MECHANICAL DRAWINGS FOR THE REQUIRED OPENINGS AND PROVIDE FOR REQUIRED OPENINGS WHETHER SHOWN ON THE STRUCTURAL DRAWINGS OR NOT. VERIFY SIZE AND LOCATION OF OPENINGS WITH THE SUBCONTRACTOR. DEVIATIONS FROM THE OPENINGS SHOWN ON THE STRUCTURAL DRAWINGS MUST BE APPROVED PRIOR TO IMPLEMENTING THE CHANGES.
9. COORDINATE AND PROVIDE ALL THE MISCELLANEOUS STEEL SHOWN ON THE ARCHITECTURAL DRAWINGS. THIS STEEL MAY NOT BE SHOWN ON THE STRUCTURAL DRAWINGS.
10. WHERE REFERENCE IS MADE TO VARIOUS TEST STANDARDS FOR MATERIALS, SUCH STANDARDS SHALL BE THE LATEST EDITION AND/OR ADDENDUM.
11. WHERE ANY DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE MORE STRINGENT REQUIREMENTS SHALL GOVERN. WHERE FURTHER CLARIFICATION IS REQUIRED, NOTIFY ENGINEER OF RECORD.
12. FOR SIZES AND LOCATIONS OF CONCRETE EQUIPMENT PADS AND CONCRETE CURBS, SEE ARCHITECTURAL AND OTHER ENGINEERING DISCIPLINE'S DRAWINGS. EXACT SIZES AND LOCATIONS ARE SUBJECT TO VERIFICATION PRIOR TO CONSTRUCTION DUE TO VENDOR SPECIFIC INFORMATION. FOR CONCRETE EQUIPMENT PAD AND CURB CONSTRUCTION, SEE TYPICAL DETAILS.

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STATE OF MISSOURI — CHRISTOPHER ROYCE FARR — NUMBER PE-2009024964 — PROFESSIONAL ENGINEER
09/11/25

NO.	DATE	DSGN	DR	CHK	APV'D	BY	APV'D	CF
0	09/11/25		ISSUED FOR BID		RP		AB	

111 General Services Building
Columbia, MO 65211
(573)-882-8211
CP231546

Project Title: GENERAL SITE - CHAMPIONS DRIVE SUBSTATION 69kV TRANSFORMER FOUNDATIONS

Drawing Title: ABBREVIATIONS, GENERAL NOTES AND SYMBOLS

Date: 08/26/25

Proj. No.: CP231546

Drawing No.: S-001

CONCRETE NOTES

A. PROVIDE CONCRETE AS INDICATED IN THE CONCRETE MATERIAL SCHEDULE. PROVIDE BATCH MIXING, TRANSPORTATION, PLACING AND CURING OF CONCRETE IN ACCORDANCE WITH RECOMMENDATIONS OF ACI 301, ACI 318 AND ASTM C94. USE TYPE II PORTLAND CEMENT UNLESS OTHERWISE NOTED. PROVIDE ADMIXTURES AND SPECIAL REQUIREMENTS AS SPECIFIED.

B. CONCRETE MUST REACH THE FOLLOWING PERCENTAGES OF ITS 28 DAY COMPRESSIVE STRENGTH (F'c) BEFORE FORMS MAY BE REMOVED:

1. SIDES OF FORMED FOUNDATIONS - 70 PERCENT (OR MINIMUM 7 DAYS)

C. PROVIDE CONCRETE MIXES DESIGNED BY A QUALIFIED TESTING LABORATORY FOR REVIEW AND APPROVAL BY THE STRUCTURAL ENGINEER.

D. PROVIDE CONSTRUCTION AND CONTROL JOINTS AS INDICATED ON DRAWINGS. HORIZONTAL CONSTRUCTION JOINTS ARE NOT ALLOWED UNLESS SPECIFICALLY NOTED OR APPROVED BY STRUCTURAL ENGINEER. NOTIFY STRUCTURAL ENGINEER OF PROPOSED CONSTRUCTION JOINT OR CONTROL JOINT LOCATIONS WHICH ARE DIFFERENT OR IN ADDITION TO JOINTS INDICATED ON DRAWINGS.

E. CHAMFER EXPOSED EDGES 3/4 INCH UNLESS OTHERWISE NOTED.

F. REFERENCE THE APPROPRIATE DISCIPLINE'S DRAWINGS FOR SUBSLAB PIPING, FLOOR DRAINS, AND SLAB PENETRATIONS.

G. PROVIDE ADEQUATE STRUCTURAL FRAMING AS APPROVED BY THE STRUCTURAL ENGINEER FOR MECHANICAL OPENINGS THROUGH THE SLABS. OPENINGS WILL NOT BE PERMITTED THROUGH BEAMS UNLESS SPECIFICALLY DETAILED.

STRUCTURAL STEEL NOTES

A. PROVIDE STRUCTURAL STEEL OF THE FOLLOWING ASTM DESIGNATIONS UNLESS OTHERWISE NOTED:

1. STRUCTURAL STEEL WIDE FLANGE AND WT SHAPES - ASTM A992
2. STRUCTURAL STEEL HSS SHAPES - ASTM A500 GR. C
3. STRUCTURAL STEEL, CHANNELS - ASTM A992
4. STRUCTURAL STEEL, ANGLES - ASTM A572-50
5. EDGE ANGLES, BENT PLATES, HANGER AND BRACES - ASTM A36
6. BASE PLATES AND MISCELLANEOUS STEEL PLATES - ASTM A572 GRADE 50
7. CAST IN PLACE ANCHOR RODS - ASTM F1554 GRADE 55 (S1 - WELDABLE)
8. CONNECTION MATERIALS:
   a. ALL CONNECTION MATERIALS, EXCEPT AS OTHERWISE NOTED HEREIN OR IN THE DRAWINGS, INCLUDING BEARING PLATES, GUSSET PLATES, STIFFENER PLATES, ANGLES, ETC. - ASTM A572 GRADE 50
9. HIGH STRENGTH BOLTS - ASTM F3125 GRADE A325
10. HARDENED STEEL WASHERS - ASTM F436
11. HEAVY HEX NUTS - ASTM A563
12. STRUCTURAL PIPE - ASTM A53, GRADE B

B. WELD MINIMUM SIZE AND STRENGTH:

1. PROVIDE MINIMUM SIZE OF FILLET WELDS AS SPECIFIED IN TABLE J2.4 OF THE AISC MANUAL.
2. PROVIDE MINIMUM EFFECTIVE THROAT THICKNESS OF PARTIAL PENETRATION GROOVE WELDS AS SPECIFIED IN TABLE J2.3 OF THE AISC MANUAL.
3. DEVELOP THE FULL TENSILE STRENGTH OF THE MEMBER ELEMENT JOINED ON ALL SHOP AND FIELD WELDS UNLESS OTHERWISE NOTED ON THE DRAWINGS.
4. WHERE CONNECTIONS ARE NOTED ON DRAWINGS AS MOMENT CONNECTIONS, PROVIDE WELDS TO DEVELOP FULL FLEXURAL CAPACITY OF THE LESSER MEMBER.
5. PROVIDE ELECTRODES FOR FIELD OR SHOP WELDING THAT CONFORM TO AWS D1.1 CLASS E70XX.

C. PROVIDE MINIMUM OF TWO BOLTS PER CONNECTION. MINIMUM BOLT DIAMETER TO BE 3/4 INCH.

D. PROVIDE BOLTS, NUTS AND WASHERS THAT ARE HOT DIP GALVANIZED ACCORDING TO ASTM A 153, CLASS C WHEN USED TO CONNECT STEEL ELEMENTS THAT ARE HOT DIP GALVANIZED AFTER FABRICATION.

E. STEEL FABRICATION:

1. FABRICATE AND ASSEMBLE STRUCTURAL MEMBERS/ASSEMBLIES IN SHOP TO GREATEST EXTENT POSSIBLE.
2. SPLICING OF STRUCTURAL STEEL MEMBERS IS PROHIBITED WITHOUT PRIOR APPROVAL BY THE ENGINEER OF RECORD.
3. BE RESPONSIBLE FOR ALL ERRORS OF DETAILING ON THE SHOP DRAWINGS, ERRORS IN FABRICATION, AND THE CORRECT FITTING OF STRUCTURAL STEEL MEMBERS.

F. CONFORM TO THE AISC CODE OF STANDARD PRACTICE, FOR ERECTION TOLERANCES. FIELD MODIFICATION TO STRUCTURAL STEEL IS PROHIBITED WITHOUT PRIOR APPROVAL BY THE STRUCTURAL ENGINEER.

G. CLEAN STEEL OF RUST, LOOSE MILL SCALE AND OTHER FOREIGN MATERIALS WHERE REQUIRED FOR FABRICATION, FITTING UP, OR WELDING.

H. DO NOT CUT STRUCTURAL STEEL MEMBERS FOR THE WORK OF OTHER TRADES WITHOUT PRIOR REVIEW AND APPROVAL OF THE STRUCTURAL ENGINEER.

I. AFTER FABRICATION, HOT DIP GALVANIZE STRUCTURAL STEEL AND THEIR CONNECTIONS PERMANENTLY EXPOSED TO THE OUTSIDE .

J. FURNISH STEEL SHOP DRAWINGS FOR STRUCTURAL ENGINEER'S REVIEW PRIOR TO FABRICATION. INCLUDE WELDING PROCEDURES, TESTING PROGRAMS FOR WELDING AND HIGH STRENGTH BOLTING, COATING MATERIAL, AND ERECTION SEQUENCE ON SHOP DRAWINGS.

K. HEADED STUDS AND DEFORMED ANCHORS:

1. PROVIDE HEADED STUDS MADE OF MATERIAL CONFORMING TO ASTM A108.
2. PROVIDE DEFORMED ANCHORS MADE OF MATERIAL CONFORMING TO ASTM A496.
3. WELD STUDS ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. MANUAL ARC (STICK) WELDING OF HEADED STUDS AND/OR DEFORMED ANCHORS IS NOT ALLOWED.

FOUNDATION NOTES

A. REFER TO THE GEOTECHNICAL REPORT AND SPECIFICATIONS FOR GENERAL REQUIREMENTS OF EARTHWORK, OVER EXCAVATION, SUBGRADE PREPARATION, FILL AND COMPACTION, WATERPROOFING AND OTHER PERTINENT REQUIREMENTS AND INFORMATION.

B. FOUNDATION DESIGN IS BASED UPON THE GEOTECHNICAL ENGINEERING EXPLORATION REPORT BY CROCKETT GEOTECHNICAL - TESTING LAB DATED AUGUST 19, 2025, PROJECT NUMBER G251201.1.

C. SHALLOW FOUNDATIONS ARE DESIGNED FOR AN ALLOWABLE GROSS BEARING PRESSURE OF 2,500 PSF FOR ISOLATED FOUNDATIONS AND 2,100 PSF FOR CONTINUOUS FOUNDATIONS, AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.

D. PROTECT PIPES AND CONDUITS RUNNING THROUGH WALLS AND SLABS WITH 1/2 INCH EXPANSION MATERIAL. PROVIDE A CONCRETE JACKET IF PIPES ARE LOW ENOUGH TO BE PLACED BELOW THE FOOTINGS AND GRADE BEAMS.

E. MAINTAIN SUBGRADE AND FILL MOISTURE CONTENT UNTIL FOUNDATIONS ARE PLACED.

F. ARRANGE FOR OWNER'S INDEPENDENT TESTING AGENCY TO MONITOR CUT AND FILL OPERATIONS AND PERFORM FIELD DENSITY AND MOISTURE CONTENT TESTS TO VERIFY COMPACTION AND APPROVE FOOTING SUBGRADES PRIOR TO PLACING CONCRETE.

G. DO NOT PLACE FOOTINGS OR SLABS AGAINST SUBGRADE CONTAINING FREE WATER, FROST, OR ICE.

H. MAINTAIN PROPER SITE DRAINAGE DURING CONSTRUCTION TO ENSURE SURFACE RUNOFF AWAY FROM STRUCTURES AND TO PREVENT PONDING OF SURFACE RUNOFF NEAR THE STRUCTURES.

I. KEEP OPEN EXCAVATIONS DRY. BACKFILL AGAINST FOUNDATIONS AND GRADE BEAMS AS SOON AS PRACTICAL. PUMP WATER OUT OF OPEN EXCAVATIONS IF FLOODED PRIOR TO BACKFILLING.

J. DO NOT BACKFILL AGAINST WALLS, WHEREVER FEASIBLE, UNTIL BASEMENT AND GROUND FLOOR SLABS HAVE ATTAINED 75 PERCENT OF THE SPECIFIED 28-DAY COMPRESSIVE STRENGTH. IF THE WALLS ARE BACKFILLED PRIOR TO COMPLETION OF GROUND AND BASEMENT FLOORS BEFORE THE SPECIFIED PERCENT STRENGTH CAN BE ATTAINED, BRACE THE WALLS FOR THE SPECIFIED DESIGN PRESSURE. OBTAIN THE APPROVAL OF THE A/E FOR THE ADEQUACY OF SUCH BRACE.

K. DEEP FOUNDATIONS ARE DESIGNED FOR AN ALLOWABLE CAPACITY IN TERMS OF MOMENT, SHEAR AND AXIAL LOADS PER THE GEOTECHNICAL ENGINEERING EXPLORATION REPORT INDICATED BELOW:

   a. ALLOWABLE END BEARING PRESSURE=30,000 PSF (LIMESTONE)
   b. ALLOWABLE SKIN FRICTION=2000 PSF (LIMESTONE)

L. PLACE CONCRETE FOR PIER HOLES WITHIN 8 HOURS AFTER DRILLING. DO NOT LEAVE HOLE OPEN OVERNIGHT.

M. USE TEMPORARY CASING IF REQUIRED TO PREVENT CAVING OR SLOUGHING OF THE HOLE, OR TO PREVENT INFLUX OF WATER.

N. CLEAN BOTTOM OF EACH PIER HOLE OF LOOSE MATERIAL.

O. PLACE CONCRETE USING A HOPPER AND CHUTE PIPE. PROVIDE CONCRETE FREE FALL OF LESS THAN 10 FEET.

P. REMOVE LAITANCE MATERIAL FROM THE TOP OF EACH PIER PRIOR TO PLACING CONCRETE.

Q. ARRANGE FOR OWNER'S INDEPENDENT TESTING AGENCY TO INSPECT PIER HOLES PRIOR TO PLACING CONCRETE AND VERIFY PIER SIZE, REINFORCING, DEPTH, BEARING STRATA, EMBEDMENT DEPTH AND REMOVAL OF CUT MATERIAL.

R. REMOVE EXCESS CONCRETE AT TOP OF PIERS BEYOND THE LIMITS OF THE PIER DIAMETER.

S. FORM SIDES OF FOUNDATIONS STRAIGHT AND TO SPECIFIED DIMENSIONS. EARTH FORMS WILL NOT BE PERMITTED.

T. REFER TO CIVIL DRAWINGS FOR LIMITS OF EXCAVATIONS.

U. BEFORE FOUNDATION CONSTRUCTION, VERIFY THAT THE FOUNDATION BOTTOM ELEVATION IS LOCATED SUCH THAT A MINIMUM OF 4 FEET OF SEPARATION IS PROVIDED BETWEEN THE FOUNDATION BOTTOM AND ANY EXPANSIVE SOIL.

REINFORCING STEEL NOTES

A. PROVIDE DETAILING, FABRICATION, AND INSTALLATION OF REINFORCING AND ACCESSORIES IN ACCORDANCE WITH ACI 315 AND ACI 318.

B. PROVIDE NEW STEEL REINFORCING BARS IN ACCORDANCE WITH ASTM A615, GRADE 60.

C. PROVIDE NEW STEEL REINFORCING BARS IN ACCORDANCE WITH ASTM A706, GRADE 60, FOR BARS INTENDED TO BE WELDED.

D. COORDINATE PLACEMENT OF CAST-IN-PLACE EMBEDS AND ANCHOR RODS. SET ANCHOR RODS WITH A TEMPLATE. SECURELY ATTACH EMBED ITEMS TO FORMWORK OR REINFORCING.

E. PROVIDE CLASS "B" REINFORCEMENT SPLICES FOR CONTINUOUS REINFORCEMENT. PROVIDE STANDARD 90-DEGREE HOOKS IN ACCORDANCE WITH ACI 318, UNLESS OTHERWISE NOTED. STAGGER SPLICES UNLESS SPECIFICALLY NOTED.

F. MAINTAIN THE FOLLOWING CONCRETE COVERAGE FOR REINFORCING STEEL UNLESS OTHERWISE NOTED:

1. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH - 3 INCHES
2. CONCRETE EXPOSED TO EARTH OR WEATHER:
   a. NO. 6 AND LARGER - 2 INCHES
   b. NO. 5 AND SMALLER - 1 1/2 INCHES
3. CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH THE GROUND:
   a. SLABS AND WALLS
      - NO.11 AND SMALLER - 1 1/2 INCHES
   b. BEAM STIRRUPS AND COLUMN TIES - 1 1/2 INCHES

G. DO NOT WELD OR BEND REINFORCEMENT IN THE FIELD UNLESS SPECIFICALLY SHOWN OR APPROVED BY STRUCTURAL ENGINEER.

H. WHEN SPECIFICALLY APPROVED, PROVIDE WELDED REINFORCEMENT IN ACCORDANCE WITH ASTM A706. USE LOW HYDROGEN ELECTRODES FOR WELDING OF REINFORCEMENT IN CONFORMANCE WITH "RECOMMENDED PRACTICES FOR WELDING REINFORCING STEEL", AMERICAN WELDING SOCIETY, AWS D12.1.

I. WHERE REQUIRED, PROVIDE DOWELS TO MATCH SIZE AND SPACING OF MAIN REINFORCING.

J. PROVIDE CONTINUOUS HORIZONTAL REINFORCEMENT WITH 90-DEGREE BENDS AND EXTENSIONS AT CORNERS AND INTERSECTIONS AS SHOWN ON TYPICAL BAR PLACING DETAILS.

K. PROVIDE BAR SUPPORT ACCESSORIES IN ACCORDANCE WITH THE LATEST ACI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES. SUPPORT BEAM REINFORCING ON BEAM BOLSTERS SPACED NOT MORE THAN 4 FEET ON CENTER.

L. ALL LAP SPLICES TO BE CONTACT SPLICES. NON-CONTACT SPLICES ARE NOT PERMITTED.

SPECIAL INSPECTIONS AND STRUCTURAL OBSERVATIONS

A. THE SPECIAL INSPECTOR(S) SHALL BE A QUALIFIED PERSON WHO SHALL DEMONSTRATE COMPETENCE, TO THE SATISFACTION OF THE OWNER, FOR INSPECTION OF THE PARTICULAR TYPE OF CONSTRUCTION OR OPERATION REQUIRING SPECIAL INSPECTION. THE SPECIAL INSPECTOR(S) SHALL KEEP RECORDS OF INSPECTIONS.

B. THE SPECIAL INSPECTOR(S) SHALL FURNISH INSPECTION REPORTS TO THE OWNER'S REPRESENTATIVE AND THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. REPORTS SHALL INDICATE THAT WORK INSPECTED WAS DONE IN CONFORMANCE TO APPROVED CONSTRUCTION DOCUMENTS.

C. THE SPECIAL INSPECTOR(S) SHALL BRING DISCREPANCIES TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF DISCREPANCIES ARE NOT CORRECTED, THE SPECIAL INSPECTOR(S) SHALL BRING DISCREPANCIES TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE AND THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE PRIOR TO COMPLETION OF THAT PHASE OF WORK.

D. THE SPECIAL INSPECTOR(S) SHALL PERIODICALLY SUBMIT A REPORT OF INSPECTIONS DOCUMENTING REQUIRED SPECIAL INSPECTIONS AND CORRECTION OF ANY DISCREPANCIES NOTED IN THE INSPECTIONS AT A FREQUENCY DETERMINED BY THE OWNER'S REPRESENTATIVE.

E. THE SPECIAL INSPECTOR(S) SHALL VERIFY THAT EACH FABRICATOR MAINTAINS DETAILED FABRICATION AND QUALITY CONTROL PROCEDURES THAT PROVIDE A BASIS FOR INSPECTION, CONTROL OF WORKMANSHIP AND THE FABRICATOR'S ABILITY TO CONFORM TO APPROVED CONSTRUCTION DOCUMENTS AND REFERENCED STANDARDS. THE SPECIAL INSPECTOR(S) SHALL REVIEW THE PROCEDURES FOR COMPLETENESS AND ADEQUACY RELATIVE TO THE CODE REQUIREMENTS FOR THE FABRICATOR'S SCOPE OF WORK. SPECIAL INSPECTIONS ARE NOT REQUIRED WHERE THE FABRICATOR IS APPROVED AS DESCRIBED BELOW.

F. THE SPECIAL INSPECTION(S) OF FABRICATORS ARE NOT REQUIRED WHERE THE WORK IS DONE ON THE PREMISES OF A FABRICATOR REGISTERED AND APPROVED TO PERFORM SUCH WORK WITHOUT SPECIAL INSPECTION. APPROVAL SHALL BE BASED UPON REVIEW OF THE FABRICATOR'S WRITTEN PROCEDURAL AND QUALITY CONTROL MANUALS AND PERIODIC AUDITING OF FABRICATION PRACTICES BY AN APPROVED SPECIAL INSPECTION AGENCY. AT COMPLETION OF FABRICATION, THE APPROVED FABRICATOR SHALL SUBMIT A CERTIFICATE OF COMPLETION WITH THE APPROVED CONSTRUCTION DOCUMENTS.

G. STRUCTURAL WORK REQUIRING SPECIAL INSPECTION AND STRUCTURAL TESTING SHALL BE AS INDICATED ON THE SCHEDULE OF SPECIAL INSPECTIONS AND WITHIN THE SPECIFICATIONS.

H. THE CONTRACTOR SHALL PROVIDE ONE BUSINESS DAY NOTICE, MINIMUM, OF THE INITIATION OF ANY WORK REQUIRED TO HAVE SPECIAL INSPECTIONS. REGARDLESS OF NOTICE PROVIDED TO THE SPECIAL INSPECTOR(S), ALL WORK PERFORMED WITHOUT REQUIRED SPECIAL INSPECTION WILL BE SUBJECT TO REMOVAL AT THE DISCRETION OF THE STRUCTURAL ENGINEER.

SCHEDULE OF SPECIAL INSPECTIONS

INSPECTION AND TESTS OF CONCRETE CONSTRUCTION (RE: IBC 2021 - TABLE 1705.3)

VERIFICATION AND INSPECTION TASK	INSPECTION FREQUENCY
1. INSPECTION OF REINFORCING STEEL, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT.	PERIODIC
2. REINFORCING BAR WELDING.	
2a. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706.	PERIODIC
2b. INSPECT SINGLE PASS FILLET WELDS MAXIMUM 5/16".	PERIODIC
2c. INSPECT ALL OTHER WELDS.	CONTINUOUS
3. INSPECT ANCHORS CAST IN CONCRETE.	PERIODIC
4. INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS	
4a. ADHESIVE ANCHORS INSTALLED HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSIONS LOADS.	CONTINUOUS
4b. MECHANICAL AND ADHESIVE ANCHORS NOT DEFINED IN 4a.	PERIODIC
5. VERIFY USE OF REQUIRED MIX DESIGN.	PERIODIC
6. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURES OF THE CONCRETE	CONTINUOUS
7. INSPECT CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	CONTINUOUS
8. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	PERIODIC
9. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	PERIODIC
10. INSPECT ERECTION OF PRECAST CONCRETE MEMBERS.	PERIODIC
11. VERIFY IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLAB.	PERIODIC
12. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	PERIODIC

INSPECTION AND TESTS OF SOILS (RE: IBC 2021 - TABLE 1705.6)

VERIFICATION AND INSPECTION TASK	INSPECTION FREQUENCY
1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.	PERIODIC
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.	PERIODIC
3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.	PERIODIC
4. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	CONTINUOUS
5. PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	PERIODIC

INSPECTION OF CAST-IN-PLACE DEEP FOUNDATION ELEMENTS (RE: IBC 2021 - TABLE 1705.8)

VERIFICATION AND INSPECTION TASK	INSPECTION FREQUENCY
1. INSPECT DRILLING OPERATIONS AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH ELEMENT.	CONTINUOUS
2. VERIFY PLACEMENT LOCATIONS AND PLUMBNESS, CONFIRM ELEMENT DIAMETERS, BELL DIAMETERS (IF APPLICABLE), LENGTHS, EMBEDMENTS INTO BEDROCK (IF APPLICABLE)AND ADEQUATE END-BEARING STRATA CAPACITY. RECORD CONCRETE OR GROUT VOLUMES.	CONTINUOUS
3. FOR CONCRETE ELEMENTS, PERFORM ADDITIONAL INSPECTIONS IN ACCORDANCE WITH TABLE 1705.3.	-

STRUCTURAL STEEL, BOLTING, AND WELDING SPECIAL INSPECTION

VERIFICATION AND INSPECTION TASK	REFERENCED CRITERIA
1. SPECIAL INSPECTION OF STRUCTURAL STEEL, BOLTING, AND WELDING SHALL BE IN ACCORDANCE WITH QUALITY CONTROL AND QUALITY ASSURANCE PLAN REQUIREMENTS OF AISC 360-16 (CHAPTER N).	SEE AISC 360-16 FOR ADDITIONAL AND MORE SPECIFIC INSPECTION REQUIREMENTS.

POST-INSTALLED ANCHORS

A. POST-INSTALLED ANCHORS SHALL ONLY BE INSTALLED WHERE SHOWN ON DRAWINGS OR APPROVED BY STRUCTURAL ENGINEER.

B. INSTALL ANCHOR IN ACCORDANCE WITH CURRENT ICC-ES REPORT FOR THE BOLT AND RECOMMENDATIONS OF THE MANUFACTURER.

C. INSTALL ANCHOR PERPENDICULAR TO THE FACE OF CONCRETE. DEVIATION FROM PERPENDICULAR GREATER THAN 10 DEGREES WILL NOT BE ACCEPTABLE.

D. CREATE A TEMPLATE AT EACH ANCHOR CONNECTION LOCATION PRIOR TO FABRICATING HOLES IN CONNECTION PLATES. MAKE TEMPLATE BY LOCATING EXISTING REBAR WITH A PACHOMETER. REPOSITION ANCHORS A MAXIMUM OF 1-1/2 INCHES TO AVOID CONFLICTS WITH EXISTING REINFORCING.

E. DRILL HOLES TO DEPTH AND DIAMETER RECOMMENDED BY MANUFACTURER. DO NOT ENLARGE OR REDIRECT HOLES ALONG LENGTH OF ANCHOR.

F. DRILL HOLES IN CONTINUOUS OPERATION. BLOW DUST FROM THE HOLE USING COMPRESSED AIR.

G. FILL ABANDONED HOLES WITH EPOXY GROUT.

H. PROVIDE HOLES IN CONNECTION PLATES NO MORE THAN 1/16 INCH LARGER THAN THE ANCHOR DIAMETER. IF LARGER HOLES ARE NEEDED FOR ERECTION PURPOSES, PROVIDE PLATE WASHERS WELDED TO THE CONNECTION PLATE TO TRANSFER THE ANCHOR LOAD.

DELEGATED SYSTEMS

A. THE FOLLOWING ITEMS SHALL BE CONSIDERED DELEGATED SYSTEMS FOR WHICH DESIGN DRAWINGS AND CALCULATIONS SHALL BE PROVIDED BY THE CONTRACTOR. THE CONTRACTOR'S DELEGATED SYSTEMS SHALL INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING ITEMS UNLESS NOTED OTHERWISE WITHIN THE DESIGN DOCUMENTS.

1. EQUIPMENT ANCHORAGE NOT DETAILED ON THESE DOCUMENTS.

B. DESIGN DRAWINGS, SHOP DRAWINGS, AND CALCULATIONS FOR THE DESIGN AND FABRICATION OF DELEGATED SYSTEMS SHALL BEAR THE SEAL AND SIGNATURE OF A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF MISSOURI, AND SHALL BE SUBMITTED FOR REVIEW AND APPROVAL PRIOR TO FABRICATION. CALCULATIONS SHALL BE INCLUDED FOR ALL CONNECTIONS TO THE STRUCTURE, CONSIDERING LOCALIZED EFFECTS ON STRUCTURAL ELEMENTS INDUCED BY THE CONNECTION LOADS. DESIGN SHALL BE BASED ON THE REQUIREMENTS OF THE CODES AS LISTED IN THE GENERAL NOTES ON S-001.

C. FIELD-ENGINEERED DETAILS DEVELOPED BY THE CONTRACTOR THAT DIFFER FROM OR ADD TO THE STRUCTURAL DRAWINGS SHALL BEAR THE SEAL AND SIGNATURE OF A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF MISSOURI AND SHALL BE SUBMITTED FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

D. THE USE OF REPRODUCTIONS OR PHOTOCOPIES OF THE CONTRACT DRAWINGS TO CREATE DELEGATED SYSTEMS SHALL NOT BE PERMITTED.

BUILDING CONCRETE MATERIAL SCHEDULE

ELEMENT	28 - DAY CYLINDER STRENGTH (PSI)	CEMENT TYPE	MAXIMUM WATER/ CEMENT RATIO	DRY UNIT WEIGHT (PCF)	MAXIMUM AGGREGATE SIZE (IN)	AGGREGATE CLASS DESIGNATION (ASTM C33)	TARGET AIR CONTENT (%)	MAXIMUM DESIGN SLUMP* (IN)	MAXIMUM CHLORIDE CONTENT** (%)	EXPOSURE CATEGORIES***
PIER CAPS, BASEMENT WALLS AND OTHER EXTERIOR SLABS/FOUNDATIONS	4,500	II	0.45	145	3/4"	3S	6.0%	4"/8"	0.30%	F2, S1, W0, C1
DRILLED PIERS	4,000	II	0.45	145	3/4"	1S	5.0%	4"/8"	0.30%	F1, S1, W0, C1

NOTES:
1. * VALUES SHOWN ARE SLUMP WITHOUT SUPERPLASTICIZERS OVER SLUMP WITH SUPERPLASTICIZERS.
2. ** VALUES GIVEN ARE MAX WATER-SOLUBLE CHLORIDE ION CONTENT IN CONCRETE IN PERCENT BY WEIGHT.
3. *** RE: ACI 318 CHAPTER 19 FOR DEFINITIONS OF EXPOSURE CATEGORIES.
4. RE: PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

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STATE OF MISSOURI
CHRISTOPHER ROYCE FARR
NUMBER PE-~~2009029407~~
PROFESSIONAL ENGINEER
09/11/25

NO.	DATE	DSGN	DR	CHK	APVD	BY	APVD
0	09/11/25	JW	DR	RP	AB		CF

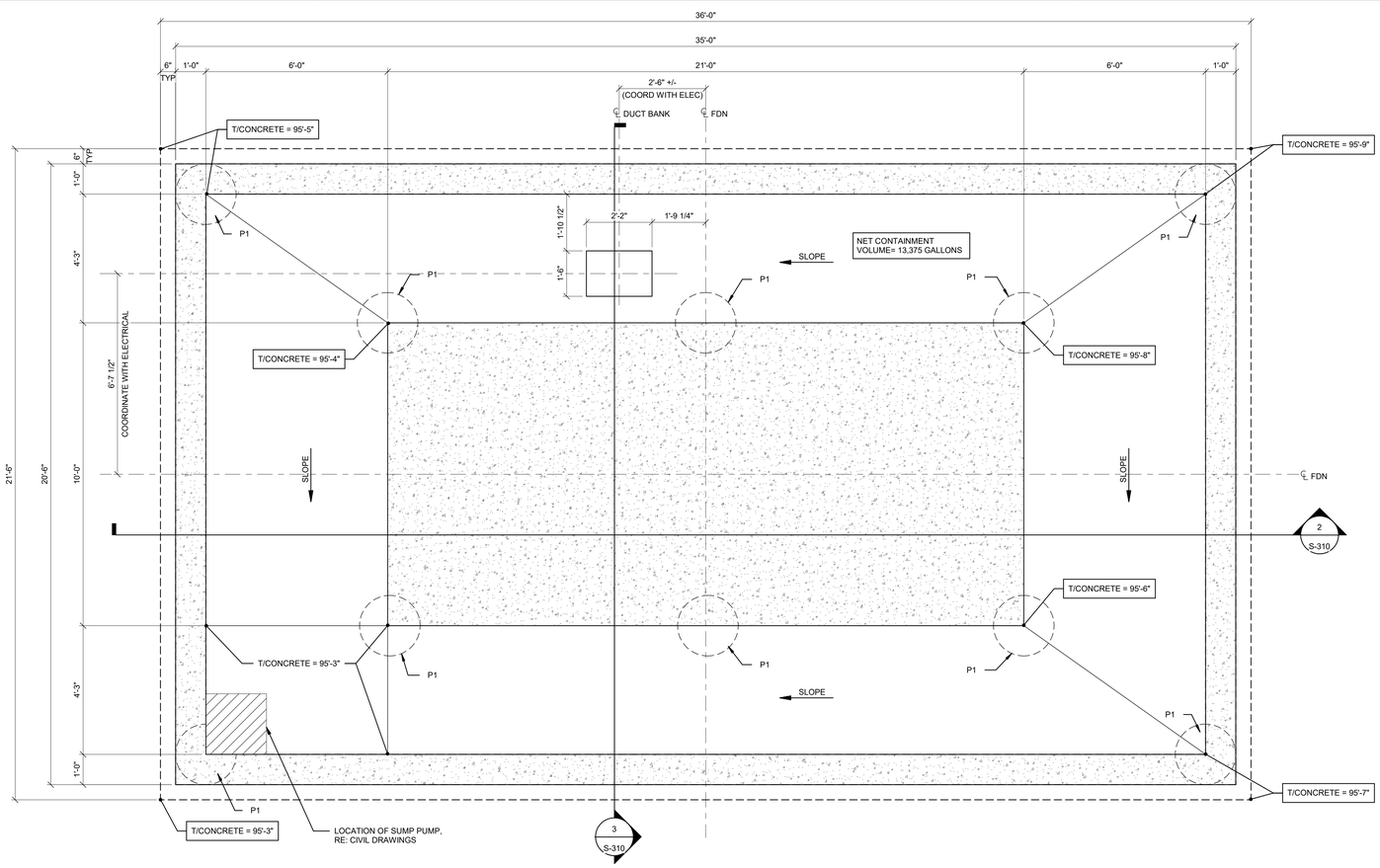
REVISION: ISSUED FOR BID

111 General Services Building
Columbia, MO 65211
(573)-882-8211
CP231546

Project Title: GENERAL SITE - CHAMPIONS DRIVE SUBSTATION 69kV TRANSFORMER FOUNDATIONS

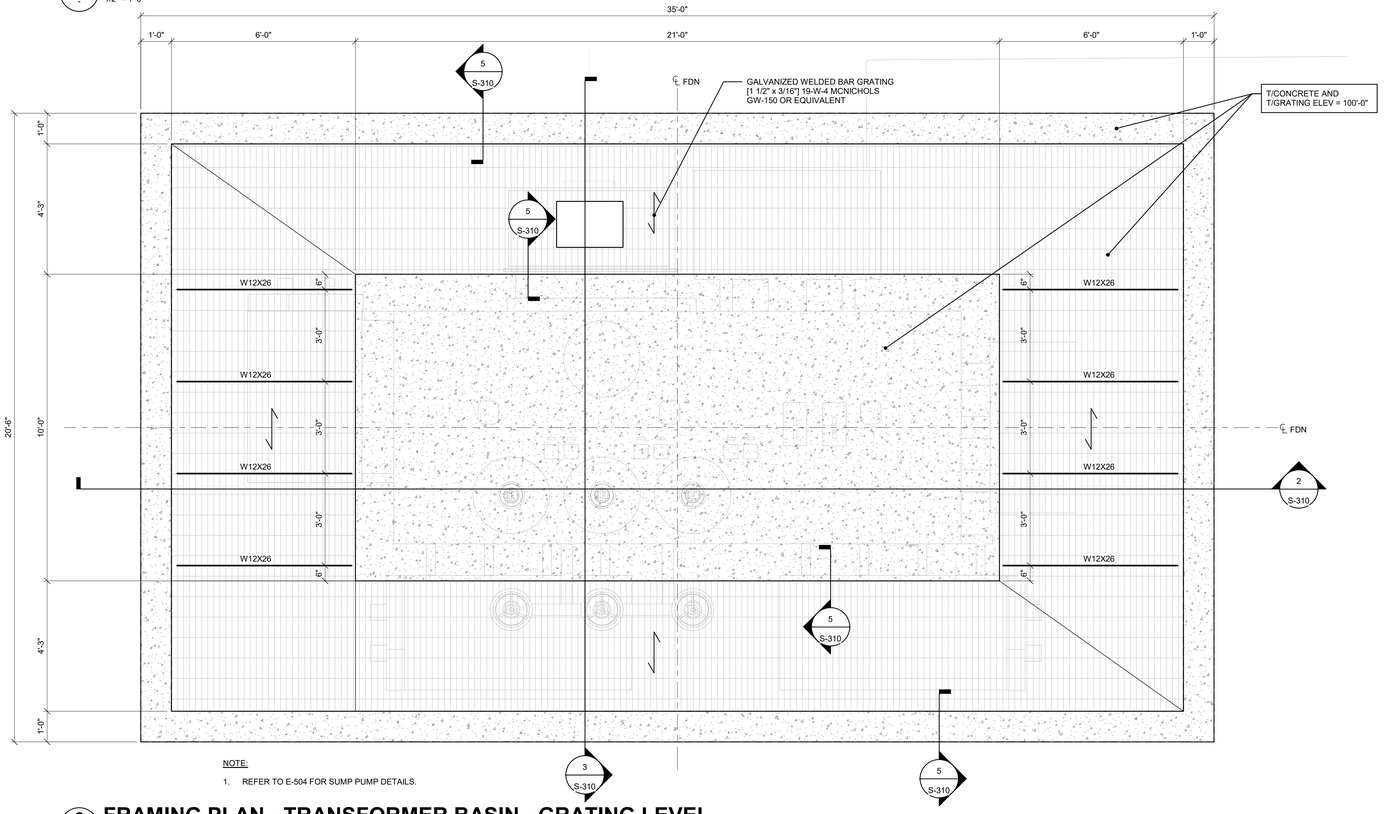
Drawing Title: GENERAL NOTES

Date: 09/11/25
Proj. No.: CP231546
Drawing No.: S-002



1 FOUNDATION PLAN - TRANSFORMER BASIN

1/2" = 1'-0"



NOTE:

1. REFER TO E-504 FOR SUMP PUMP DETAILS.

2 FRAMING PLAN - TRANSFORMER BASIN - GRATING LEVEL

1/2" = 1'-0"

GENERAL NOTES

A. T/CONC ELEVATIONS = 100'-0" CORRESPONDS TO ACTUAL ELEVATION OF 733.00', RE: CIVIL

B. RE: S-001, S-002 & S-003 FOR GENERAL NOTES.

C. RE: S-300 FOR TYPICAL CONCRETE DETAILS.

D. RE: CIVIL DRAWINGS FOR GENERAL BUILDING FOUNDATION LOCATION AND ORIENTATION.

E. RE: ELEC DRAWINGS FOR EQUIPMENT LAYOUT.

F. COORDINATE ANCHOR ROD SIZES, STEEL GRADE, LOCATIONS, ETC. WITH MANUFACTURER DRAWINGS.

G. Px - INDICATES PIER, RE: 1/S-310 FOR SCHEDULE

J. REFER TO THE GEOTECHNICAL REPORT FOR SITE PREPARATION RECOMMENDATIONS.

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STATE OF MISSOURI
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NUMBER PE-~~2009029284~~
PROFESSIONAL ENGINEER
09/11/25

NO.	DSGN	DATE	BY	APV'D
0	JW	09/11/25	DR	CF
		ISSUED FOR BID	CHK	AB
		REVISION	RIP	APV'D

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Project Title:
GENERAL SITE - CHAMPIONS DRIVE SUBSTATION
69kV TRANSFORMER FOUNDATIONS

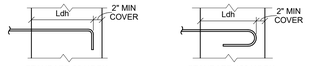
Drawing Title:
SUBSTATION TRANSFORMER FOUNDATION AND FRAMING PLANS

Date: 09/11/25

Proj. No.: CP231546

Drawing No.:
S-200

'Ldh' TENSION DEVELOPMENT (EMBEDMENT) LENGTH FOR STANDARD END HOOKS (GRADE 60 BARS - NORMAL WEIGHT CONCRETE - GENERAL USE)



STANDARD 90 HOOK SIDE COVER > 2 1/2"

STANDARD 180 HOOK SIDE COVER > 2 1/2"

BAR SIZE	f'c=4000 psi	f'c=5000 psi	f'c=6000 psi	f'c=8000 psi
	Ldh (in)	Ldh (in)	Ldh (in)	Ldh (in)
# 3	7	7	7	6
# 4	11	11	10	9
# 5	15	15	14	13
# 6	20	19	19	16
# 7	25	24	24	20
# 8	30	29	29	25
# 9	36	35	34	30
# 10	43	42	41	35
# 11	51	49	48	41

NOTES:

1. REINFORCING SPACING IS AT LEAST 3 BAR DIAMETERS AND LESS THAN 6BAR DIAMETERS ON CENTER FOR DEVELOPMENT LENGTHS SHOWN. IF REINFORCING SPACING IS GREATER THAN 6 BAR DIAMETERS, DECREASE DEVELOPMENT LENGTH BY A FACTOR OF 0.625 ROUNDED TO THE NEAREST INCH. HOOK REINFORCING SHALL NOT BE USED WHERE SPACING IS LESS THAN 3 BAR DIAMETERS ON CENTER.

1 TYPICAL DEVELOPMENT (EMBEDMENT) LENGTH FOR STANDARD END HOOKS

N.T.S.

LAP SPLICE LENGTH (Lst) - REINFORCING STEEL STRENGTH, Fy = 60ksi (1,2,4,5,6,7)

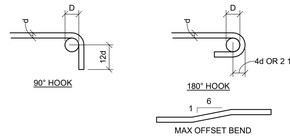
BAR SIZE	C-C (8) SPACING (IN)	f'c=4000 psi					f'c=5000 psi					f'c=6000 psi					f'c=8000 psi				
		COVER (IN)					COVER (IN)					COVER (IN)					COVER (IN)				
		0.75	1.5	2.0	2.5	3.0	0.75	1.5	2.0	2.5	3.0	0.75	1.5	2.0	2.5	3.0	0.75	1.5	2.0	2.5	3.0
#3	2≤s<4	15	15	15	15	15	13	13	13	13	13	12	12	12	12	12	12	12	12	12	12
	4≤s<6	15	15	15	15	15	13	13	13	13	13	12	12	12	12	12	12	12	12	12	12
	6≤s	15	15	15	15	15	13	13	13	13	13	12	12	12	12	12	12	12	12	12	12
#4	2≤s<4	25	25	25	25	25	22	22	22	22	22	20	20	20	20	20	18	18	18	18	18
	4≤s<6	25	20	20	20	20	22	18	18	18	18	20	16	16	16	16	18	14	14	14	14
	6≤s	25	20	20	20	20	22	18	18	18	18	20	16	16	16	16	18	14	14	14	14
#5	2≤s<4	38	38	38	38	38	34	34	34	34	34	31	31	31	31	31	27	27	27	27	27
	4≤s<6	36	25	25	25	25	32	22	22	22	22	29	20	20	20	20	26	18	18	18	18
	6≤s	36	25	25	25	25	32	22	22	22	22	29	20	20	20	20	26	18	18	18	18
#6	2≤s<4	55	55	55	55	55	49	49	49	49	49	45	45	45	45	45	39	39	39	39	39
	4≤s<6	49	29	29	29	29	44	26	26	26	26	40	24	24	24	24	35	21	21	21	21
	6≤s	49	29	29	29	29	44	26	26	26	26	40	24	24	24	24	35	21	21	21	21
#7	2≤s<4	93	93	93	93	93	83	83	83	83	83	76	76	76	76	76	66	66	66	66	66
	4≤s<6	78	48	47	47	47	70	43	42	42	42	64	39	38	38	38	55	34	33	33	33
	6≤s	78	48	43	43	43	70	43	38	38	38	64	39	35	35	35	55	34	30	30	30
#8	2≤s<4	121	121	121	121	121	108	108	108	108	108	99	99	99	99	99	86	86	86	86	86
	4≤s<6	97	61	61	61	61	87	54	54	54	54	79	50	50	50	50	69	43	43	43	43
	6≤s	97	61	49	49	49	87	54	44	44	44	79	50	40	40	40	69	43	35	35	35
#9	2≤s<4	153	153	153	153	153	137	137	137	137	137	125	125	125	125	125	109	109	109	109	109
	4≤s<6	117	77	77	77	77	105	69	69	69	69	96	63	63	63	63	83	55	55	55	55
	6≤s	117	75	60	55	55	105	67	54	49	49	96	61	49	45	45	83	55	43	39	39
#10	2≤s<4	194	194	194	194	194	174	174	174	174	174	159	159	159	159	159	138	138	138	138	138
	4≤s<6	141	97	97	97	97	126	87	87	87	87	115	80	80	80	80	100	69	69	69	69
	6≤s	141	91	74	65	65	126	82	66	58	58	115	75	61	53	53	100	65	53	46	46
#11	2≤s<4	240	240	240	240	240	214	214	214	214	214	196	196	196	196	196	170	170	170	170	170
	4≤s<6	165	120	120	120	120	147	107	107	107	107	135	98	98	98	98	117	85	85	85	85
	6≤s	165	109	89	80	80	147	97	80	72	72	135	89	73	66	66	117	77	63	57	57

NOTES:

1. LAP SPLICE AND DEVELOPMENT LENGTHS SHOWN IN SCHEDULES ARE IN INCHES.
2. REINFORCING BARS ARE VERTICAL REINFORCING, HORIZONTAL REINFORCING, OR DIAGONAL REINFORCING WITH ANGLE GREATER THAT 45 DEGREES TO HORIZONTAL WITH MORE THEN 12 INCHES OF CONCRETE CAST BELOW THE BARS. STANDARD HOOKS WITH SIDE COVER (NORMAL TO PLANE OF HOOK) > 2.5" AND COVER ON BAR EXTENSION BEYOND HOOK > 2".
3. DEVELOPMENT LENGTH SHOWN IS BASED ON 2" CONCRETE COVER. FOR REINFORCING WITH A DIFFERENT CONCRETE COVER, DETERMINE SPLICE LENGTH BY DECREASING LAP SPLICE LENGTH BY A FACTOR OF 0.77 ROUNDED UP TO THE NEAREST INCH. MINIMUM LAP SPLICE LENGTH =12".
4. WHERE LESS THAN 12" OF FRESH CONCRETE IS PLACED BELOW HORIZONTAL REINFORCEMENT, DECREASE LAP SPLICE LENGTHS IN TABLE BY A FACTOR OF 0.77 ROUNDED UP TO THE NEAREST INCH. MINIMUM LAP SPLICE LENGTH = 12".
5. UNLESS NOTED OTHERWISE, LAP SPLICE IN CONCRETE BEAMS, SLABS, AND WALLS MUST BE TENSION LAP SPLICES. LAP SPLICES IN COLUMNS MUST BE TENSION LAP SPLICE. UNLESS NOTED OTHERWISE, ALL TENSION LAP SPLICES MUST BE CLASS -B.
6. LAP SPLICES FOR BARS LARGER THAN No.11 ARE NOT PERMITTED. PROVIDE MECHANICAL COUPLER IN ACCORDANCE WITH SPECIFICATION SECTION 03 30 00 CAST-IN-PLACE CONCRETE FOR #14 AND #18 REINFORCING BARS.
7. IF BARS OF DIFFERENT SIZES ARE LAP SPLICED, SPLICE LENGTH MUST BE THE LARGER L_d OF THE LARGER BAR OR L_{st} OF THE SMALLER BAR.
8. C-C INDICATES CENTER-TO-CENTER

TENSION BAR DEVELOPMENT LENGTH (Ld) - REINFORCING STEEL STRENGTH, Fy = 60ksi (1,2,3)

BAR SIZE	C-C (8) SPACING (IN)	f'c (psi)			
		4000	5000	6000	8000
#3	2≤s<4	12	12	12	12
	4≤s<6	12	12	12	12
	6≤s	12	12	12	12
#4	2≤s<4	19	17	16	12
	4≤s<6	15	14	13	12
	6≤s	15	14	13	12
#5	2≤s<4	29	26	24	21
	4≤s<6	19	17	16	14
	6≤s	19	17	16	14
#6	2≤s<4	42	38	34	30
	4≤s<6	23	20	19	16
	6≤s	23	20	19	16
#7	2≤s<4	71	64	58	51
	4≤s<6	36	32	29	26
	6≤s	33	29	27	23
#8	2≤s<4	93	83	76	66
	4≤s<6	47	42	38	33
	6≤s	37	34	31	27
#9	2≤s<4	118	106	97	84
	4≤s<6	59	53	49	42
	6≤s	46	42	38	33
#10	2≤s<4	150	134	122	106
	4≤s<6	75	67	61	53
	6≤s	57	51	47	41
#11	2≤s<4	184	165	151	131
	4≤s<6	92	83	76	53
	6≤s	68	61	56	49
#14	2≤s<4	266	238	217	188
	4≤s<6	133	119	109	94
	6≤s	94	84	77	66
#18	2≤s<4	472	422	385	334
	4≤s<6	236	211	193	167
	6≤s	158	141	129	112



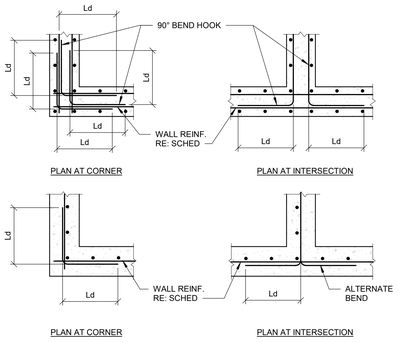
BAR DIA	MIN "D"
#3	2 1/4"
#4	3"
#5	3 3/4"
#6	4 1/2"
#7	5 1/4"
#8	6"
#9	9 1/2"
#10	10 3/4"
#11	12"

DETAIL NOTES:

1. BENDS SHALL BE MADE COLD.
2. #14 AND #18 BARS SHALL BE BEND-TESTED AND APPROVED PRIOR TO BENDING.

3 BAR BENDS

N.T.S.

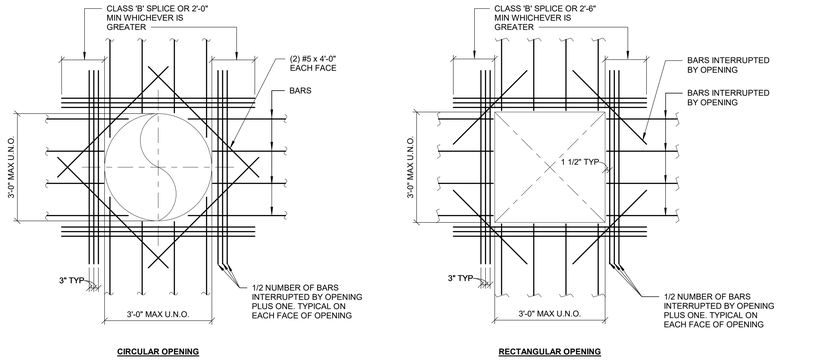


NOTE:

1. ALL CORNER BARS SHALL MATCH SIZE AND SPACING OF HORIZONTAL WALL REINFORCEMENT.

4 CORNER BAR PLACEMENT DETAIL

N.T.S.



CIRCULAR OPENING

RECTANGULAR OPENING

5 TYPICAL ADDITIONAL BAR PLACING DETAIL FOR WALL OR SLAB OPENINGS

N.T.S.

2 LAP SPLICE AND DEVELOPMENT LENGTH SCHEDULE FOR UNCOATED 60 KSI REINFORCING

N.T.S.

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			ISSUED FOR BID	REVISION				

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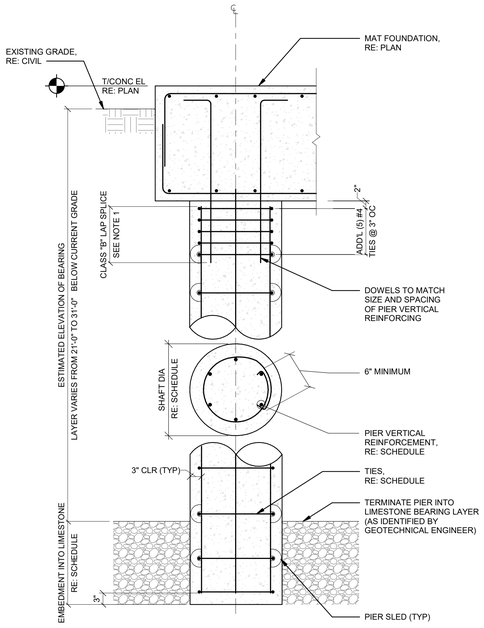
Project Title: GENERAL SITE - CHAMPIONS DRIVE SUBSTATION 69KV TRANSFORMER FOUNDATIONS

Drawing Title: TYPICAL CONCRETE DETAILS

Date: 09/11/25

Proj. No.: CP231546

Drawing No.: S-300



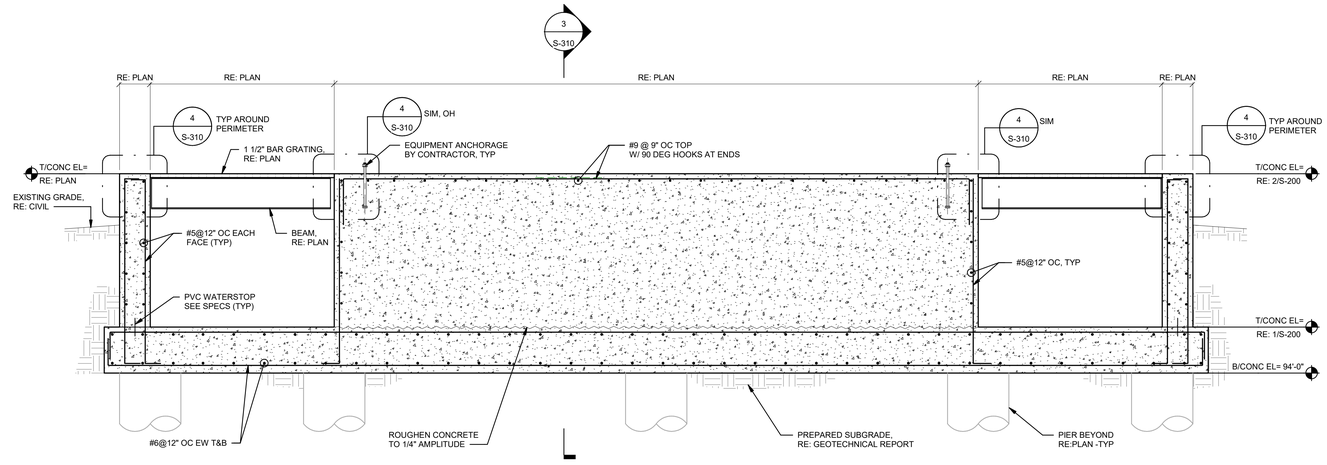
NOTES:

1. PROVIDE CONTACT SPLICE. NON-CONTACT SPLICES NOT PERMITTED.
2. AFTER REACHING THE REQUIRED DEPTH, THE EXCAVATION SHALL BE FILLED WITH GROUT. THE GROUT SHALL BE DISCHARGED A MAXIMUM OF 2 FEET ABOVE THE SHAFT BOTTOM, PUMPED UNDER PRESSURE FROM THE "BOTTOM UP" TO HELP ASSURE THE SHAFTS ARE CONTINUOUS.
3. A MINIMUM ACTUAL GROUT VOLUME OF 125 PERCENT OF THE THEORETICAL SHAFT VOLUME SHALL BE ACHIEVED FOR EACH SHAFT, UNLESS OTHERWISE APPROVED BYTHE GEOTECHNICAL OR STRUCTURAL ENGINEER.
4. THE CONSTRUCTION OF THE SHAFTS SHALL BE IN A MANNER THAT DRILLING OF THE SHAFTS DOES NOT DISTURB THE "WET" GROUT IN ADJACENT SHAFTS. ADJACENT SHAFTS UNDER CONSTRUCTION SHALL BE A MINIMUM OF 6 SHAFT DIAMETERS FROM ANY SHAFT HAVING GROUT LESS THAN 24-HOURS OLD.
5. ALL DRILLED SHAFTS SHALL BE INSTALLED UNDER OBSERVATION OF THE SPECIAL INSPECTOR.
6. REFER TO SPECIFICATIONS FOR GEOTECHNICAL REPORT AND BORING LOGS FOR ANTICIPATED ELEVATIONS OF ROCK.
7. TEMPORARY CASINGS MAY BE REQUIRED TO FACILITATE PIER CONSTRUCTION, REFER TO GEOTEHCNIAL REPORT FOR ADDITIONAL INFORMATION.

PIER SCHEDULE

PIER MARK	SHAFT DIA	EMBEDMENT INTO LIMESTONE BEARING LAYER	VERT REINF.	TIES
P1	24"	1'-0"	(8)-#7	#4@12" OC
P2	24"	4'-6"	(8)-#7	#4@12" OC

1 PIER DETAIL WITH PIER CAP
N.T.S.



NOTES:

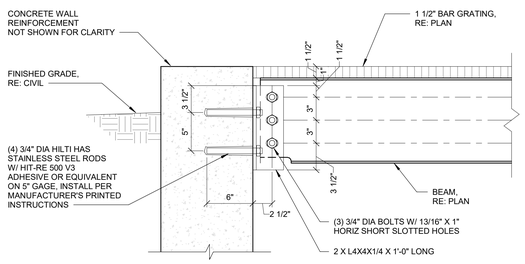
1. ALL STEEL SHALL BE HOT-DIPPED GALVANIZED (EXCEPT AT ANCHORS INDICATED TO BE STAINLESS STEEL).

2 SECTION AT TRANSFORMER BASIN FOUNDATION
1/2" = 1'-0"

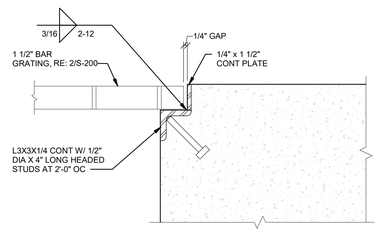
NOTES:

1. ALL STEEL SHALL BE HOT-DIPPED GALVANIZED (EXCEPT AT ANCHORS INDICATED TO BE STAINLESS STEEL).

3 SECTION AT TRANSFORMER BASIN FOUNDATION
1/2" = 1'-0"



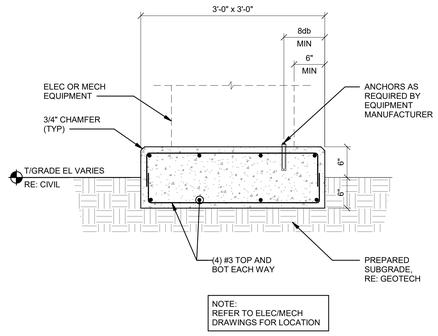
4 SECTION
1 1/2" = 1'-0"



NOTE:

1. BAR GRATING, ANGLE, AND PLATE TO BE HOT-DIP GALVANIZED.

5 DETAIL
3" = 1'-0"



NOTE:
REFER TO ELEC/MECH
DRAWINGS FOR LOCATION

6 CONCRETE PAD FOR TEMPORARY ELECTRICAL EQUIPMENT
1" = 1'-0"

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					AP/D
					CF

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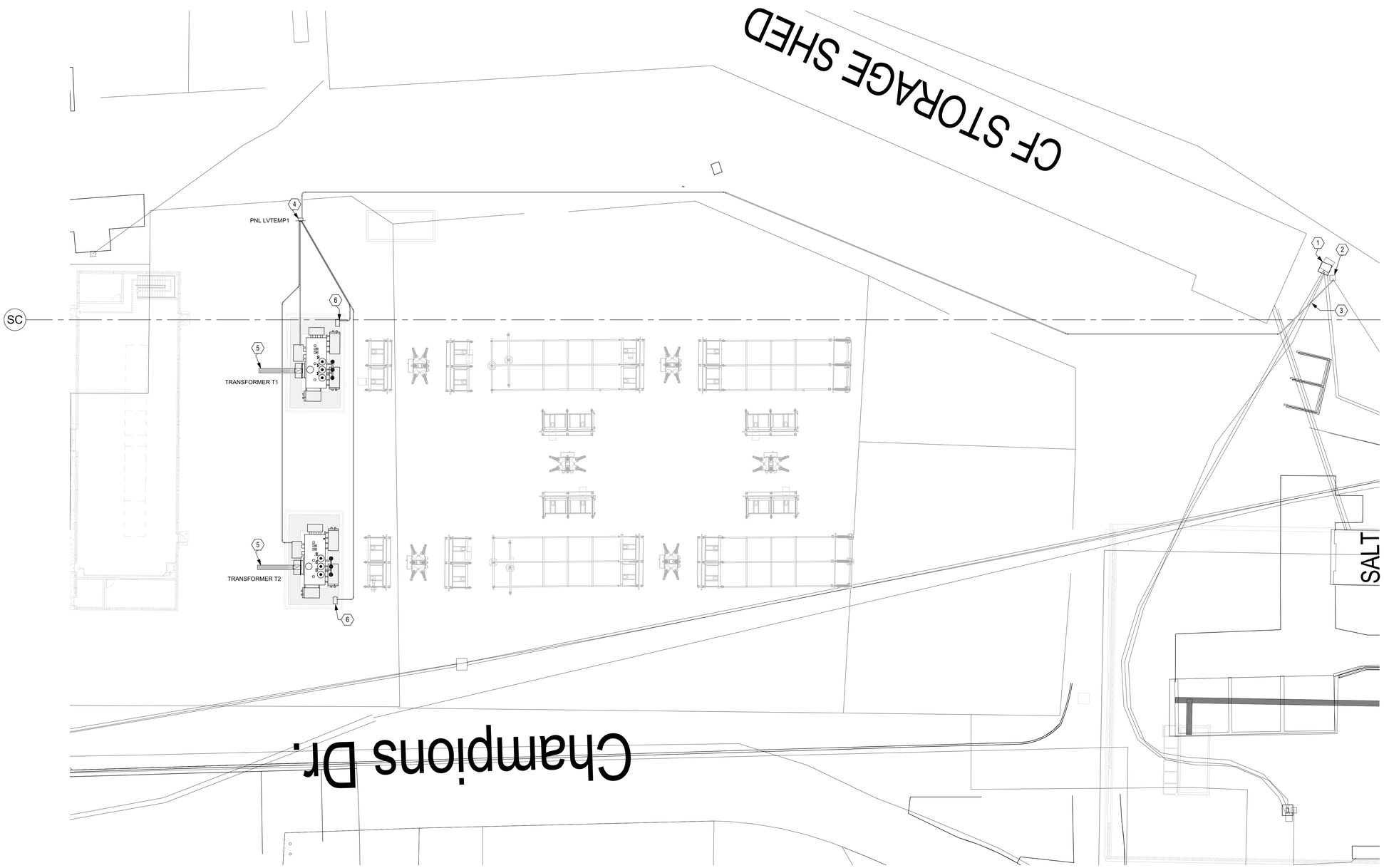
Project Title:
GENERAL SITE - CHAMPIONS DRIVE SUBSTATION
69kV TRANSFORMER FOUNDATIONS

Drawing Title:
FOUNDATION SECTIONS AND DETAILS

Date: 09/11/25
Proj. No.: CP231546
Drawing No.: S-310

KEYED NOTES

1	EXISTING 50 KVA SINGLE PHASE TRANSFORMER, SECONDARY VOLTAGE IS 120/240VAC
2	PROVIDE A 200A SERVICE ENTRANCE RATED DISCONNECT SWITCH WITH AN INLINE CLASS 200 METER BASE FOR FORM 2S METER TO BE PROVIDED BY UEM INSTALLED ON UNISTRUT FRAME ADJACENT TO EXISTING TRANSFORMER. PROVIDE UNISTRUT SUPPORT, RE: 2/E-508
3	PROVIDE 3x3/0, THWN IN 2" PVC CONDUIT, DIRECT BURIED, 24" BELOW GRADE.
4	PROVIDE AN 18 POLE 200A 120/240 VAC PANEL NEMA 3R ENCLOSURE MOUNTED ON UNISTRUT STAND.
5	PROVIDE 3 X 2 X 5" CONDUITS IN CONCRETE ENCASED DUCT BANK, RE:E-510
6	SUMP PUMP INSTALLATION RE:E-508



1 . **SUBSTATION OVERALL SITE PLAN**
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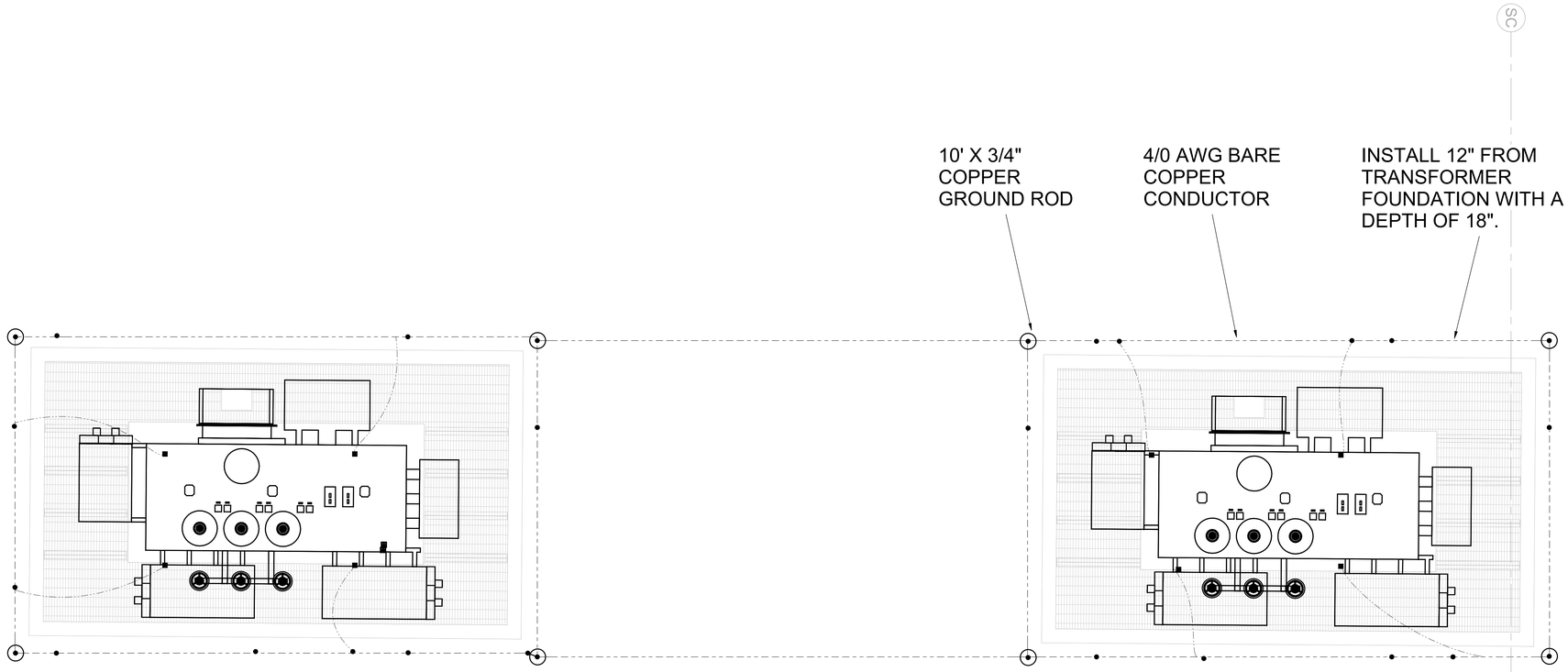
Project Title:
GENERAL SITE - CHAMPIONS DRIVE SUBSTATION
69KV TRANSFORMER FOUNDATIONS

Drawing Title:
OVERALL SITE PLAN

Date: 08/11/25
Proj. No.: CP231546
Drawing No.: ES-101



1 TRANSFORMER GROUNDING
1/4" = 1'-0"

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GENERAL SITE - CHAMPIONS DRIVE SUBSTATION
69kV TRANSFORMER FOUNDATIONS

Drawing Title:
ENLARGED GROUNDING PLAN

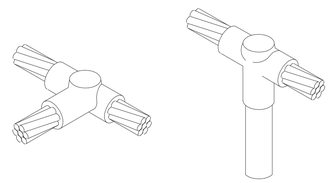
Date: 08/26/2025
Proj. No.: CP231546
Drawing No.:
EG-101

CABLE TO CABLE TAP SCHEDULE

LEGEND	RUN SIZE	TAP SIZE	CADWELD		THERMOWELD	
			MOLD #	METAL #	MOLD #	METAL #
1	#4/0AWG	#2	TAC-2Q1V	90	M-246	90
2	#4/0AWG	#2/0	TAC-2Q2G	90	M-243	90
3	#4/0AWG	#4/0	TAC-2Q2Q	90	M-241	150

CABLE TO GROUND ROD TAP SCHEDULE

LEGEND	ROD SIZE	TAP SIZE	CADWELD		THERMOWELD	
			MOLD #	METAL #	MOLD #	METAL #
4	3/4"X10'	#4/0	GRC-182Q	90	M-518	90



NOTES:
1. ALL UNDERGROUND CONNECTIONS SHALL BE BARE COPPER.
2. ALL EXPOSED COPPER CONNECTIONS SHALL BE THOROUGHLY CLEANED AND COVERED WITH TWO COATS OF GLYPTAL VARNISH.
3. ALL UNDERGROUND GROUND WIRE SHALL BE INSTALLED A MINIMUM OF 2'-6" BELOW GRADE PER NEC 250.53(F).

2 GROUNDING - CADWELD TYPE TA
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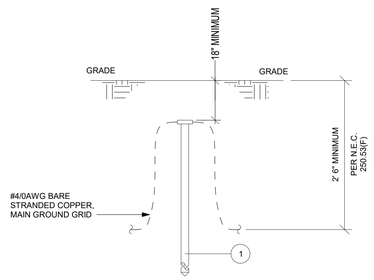
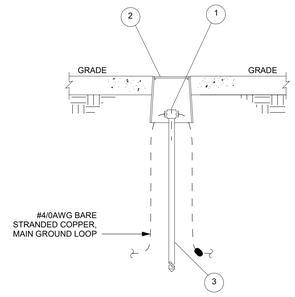


BILL OF MATERIAL	
ITEM	DESCRIPTION
1	ROD, 3/4" X 10' LONG, COPPER CLAD, WITH COPPER BONDED TO STEEL

3 GROUNDING - 3/4" GROUND ROD TO 4/0AWG TAP
NTS



BILL OF MATERIAL	
ITEM	DESCRIPTION
1	MECHANICAL CONNECTOR FOR (2)4/0AWG TO 3/4" GROUND ROD
2	INSPECTION WELL, HDPE, GREEN, ERICO #T416B
3	GROUND ROD, 3/4" X 10' LONG, COPPER CLAD WITH COPPER BONDED TO STEEL, CONE POINTED WITH CHAMFER

4 GROUNDING - TEST WELL - 3/4" GROUND ROD
6" = 1'-0"

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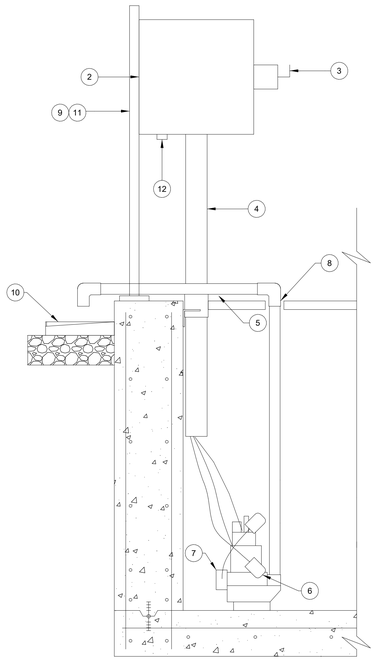
Project Title:
GENERAL SITE - CHAMPIONS DRIVE SUBSTATION
69kV TRANSFORMER FOUNDATIONS

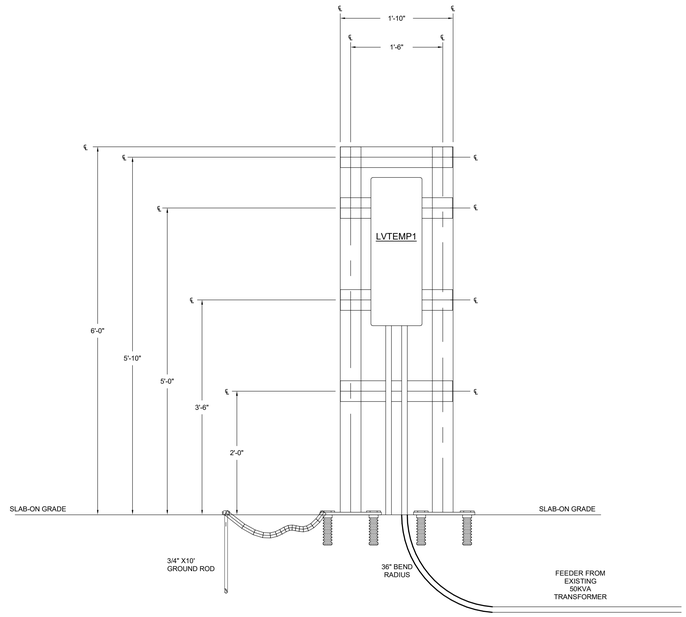
Drawing Title:
GROUNDING DETAILS

Date: 09/11/25
Proj. No.: CP231546
Drawing No.:
E-501

1.	STANCOR SE50 SUMP PUMP (0.5hp) PACKAGE OR EQUAL WITH CHECK VALVE, ON-OFF FLOAT SWITCH, HIGH LEVEL FLOAT SWITCH, OIL MINDER PROBE AND ASSOCIATED CONTROL SYSTEM. INSTALL PER MANUFACTURER INSTRUCTIONS.
2.	20" X 20" X 8" MIN NEMA 4 ENLCOSURE TO HOUSE OIL MINDER CONTROL SYSTEM. PROVIDE UL LISTED AND LABELED CONTROL CABINET.
3.	DISCONNECT SWITCH 20/2/NF IN NEMA 3R ENCLOSURE.
4.	TWO (2) 1" AL. CONDUIT FOR PUMP POWER AND CONTROL CABLES. PROVIDE LONG RADIUS BENDS TO ALLOW INSTALLATION OF CABLES WITH PRE-INSTALLED CONNECTORS. CONTRACTOR TO SEAL END OF CONDUIT AT CONTROL CABINET.
5.	CHECKVALVE DELETED
6.	"PUMP ON" FLOAT SWITCH. LOCATE PER MANUFACTUERS INSTRUCTIONS.
7.	OIL DETECTION PROBE. LOCATE PER MANUFACTURERS INSTRUCTIONS. PROVIDE VISUAL ALARMS.
8.	MODIFY GRATING AS REQUIRED.
9.	PROVIDE GALVANIZED UNISTRUT SUPPORT STRUCTURE WITH STAINLESS STEEL HARDWARE.
10.	SPLASHBLOCK.
11.	BOND EQUIPMENT TO GROUND GRID WITH (2) #2/0AWG BARE COPPER CONDUCTORS.
12.	MOISTURE BLEED..
13.	REFERENCE STRUCTURAL DRAWING S-201 FOR ADDITIONAL OIL CONTAINMANT ENCLOSURE DETAILS.

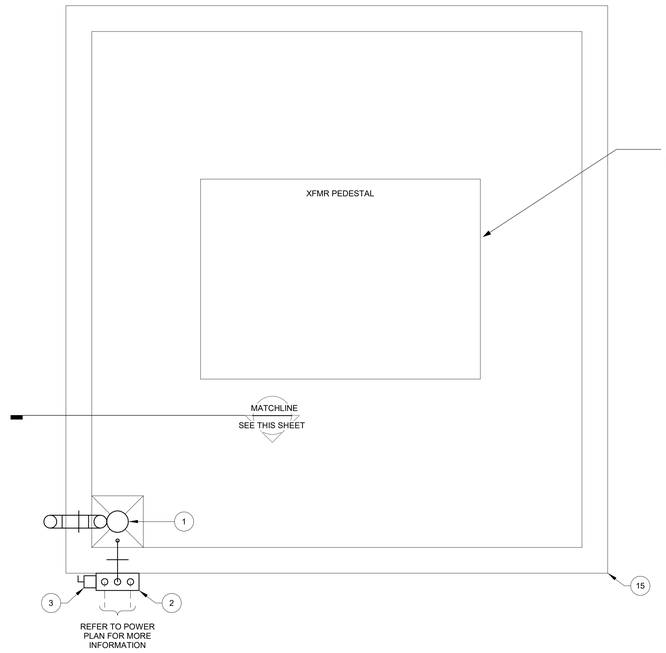


1 DETAILS - SUMP PUMP INSTALLATION ELEVATION
NTS



RE: STRUCTURAL FOR FOUNDATION REQUIREMENTS

2 UNISTRUT SUPPORT DETAIL
1" = 1'-0"



3 DETAILS - TRANSFORMER OIL CONTAINTMENT SUMP PUMP
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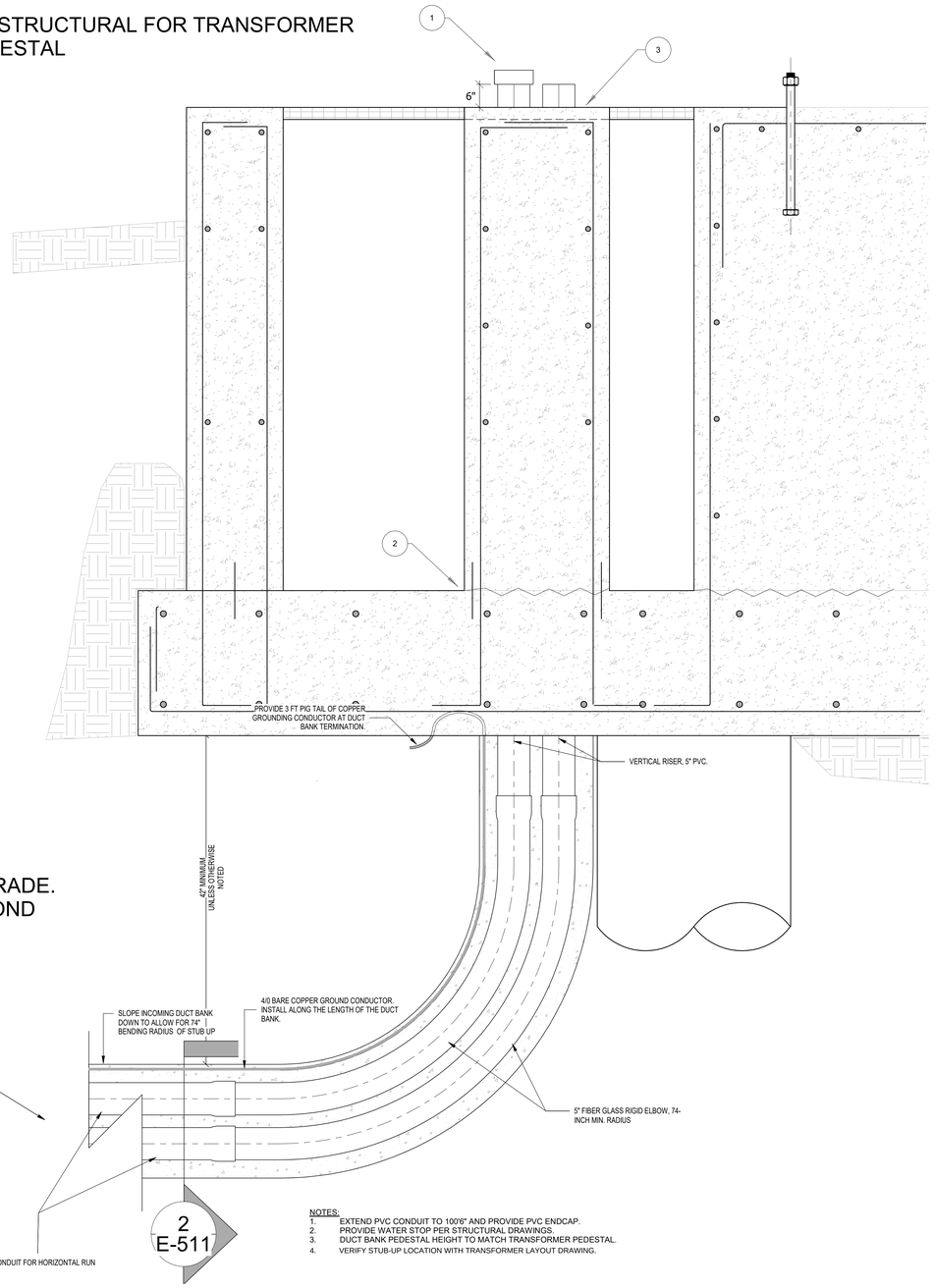
Project Title:
GENERAL SITE - CHAMPIONS DRIVE SUBSTATION
69kV TRANSFORMER FOUNDATIONS

Drawing Title:
SUMP PUMP AND UNISTRUT SUPPORT DETAILS

Date: 08/26/25
Proj. No.: CP231546
Drawing No.:
E-508

RE: STRUCTURAL FOR TRANSFORMER PEDESTAL



EXTEND DUCTBANK 5' BEYOND TRANSFORMER CONTAINMENT BASIN AND CAP CONDUIT BELOW GRADE. PROVIDE ADEQUATE CONDUIT BEYOND EDGE OF CONCRETE FOR FUTURE EXTENSION TO SUBSTATION BUILDING.

NOTES:
1. EXTEND PVC CONDUIT TO 100'6" AND PROVIDE PVC ENDCAP.
2. PROVIDE WATER STOP PER STRUCTURAL DRAWINGS.
3. DUCT BANK PEDESTAL HEIGHT TO MATCH TRANSFORMER PEDESTAL.
4. VERIFY STUB-UP LOCATION WITH TRANSFORMER LAYOUT DRAWING.

1 - 69kV 3X2 DUCT BANK STUB UP DETAIL
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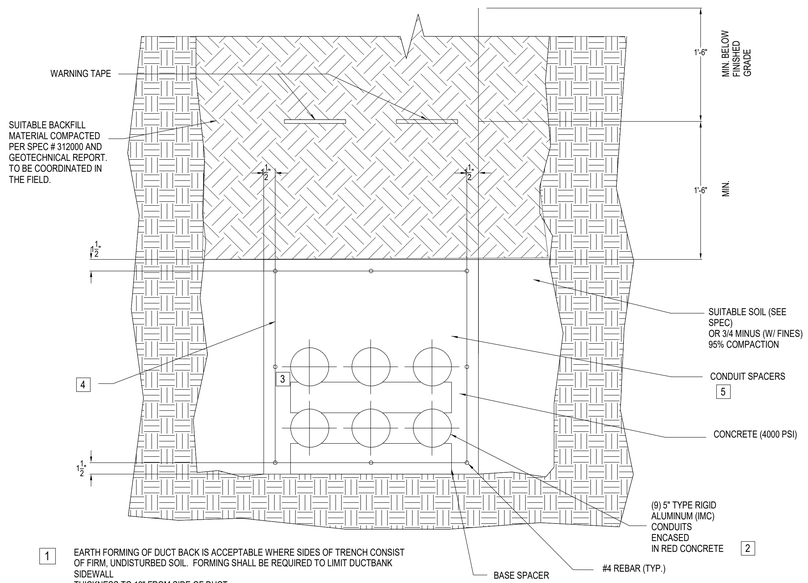
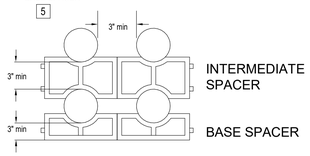
Project Title: GENERAL SITE - CHAMPIONS DRIVE SUBSTATION 69KV TRANSFORMER FOUNDATIONS

Drawing Title: DUCTBANK DETAILS

Date: 08/26/25
Proj. No.: CP231546
Drawing No.: E-510



1. EARTH FORMING OF DUCT BACK IS ACCEPTABLE WHERE SIDES OF TRENCH CONSIST OF FIRM, UNDISTURBED SOIL. FORMING SHALL BE REQUIRED TO LIMIT DUCTBANK SIDEWALL THICKNESS TO 12" FROM SIDE OF DUCT.
2. IN PLACING RED CONCRETE, USE A DELIVERY CHUTE TO MINIMIZE FALL OF THE CONCRETE INTO THE TRENCH. USE A SPLASH BOARD TO DIVERT THE FLOW OF CONCRETE AWAY FROM THE TRENCH SIDES AND AVOID DISLODGING SOIL AND STONES. CONCRETE SLUMP SHALL HAVE CONSISTENCY TO INSURE FLOWING OF GROUT BETWEEN, UNDER, AND ALL AROUND DUCTS. PRECAUTIONS SHALL BE USED TO PREVENT VOIDS AND AIR POCKETS, AND TO PREVENT THE DUCT FROM FLOATING.
3. EACH UNDERGROUND CONDUIT MUST HAVE A MINIMUM 3" CONCRETE ENVELOPE IN EACH DIRECTION AND MAXIMUM OF 6" VERTICAL AND A MAXIMUM OF 12" HORIZONTAL. THE NUMBER AND CONFIGURATION OF CONDUIT IN DUCT BANKS WILL VARY.
4. #4 REBAR TIE LOOP EVERY 48" MAXIMUM O.C.. SPACE BETWEEN LONGITUDINAL REINFORCING REBAR IS 12" MAXIMUM.
5. INSTALL SPACERS AT A MAXIMUM OF EVERY 8 FEET.



SPACER DETAIL 5

2. 15kV 3X2 DUCT BANK DETAIL
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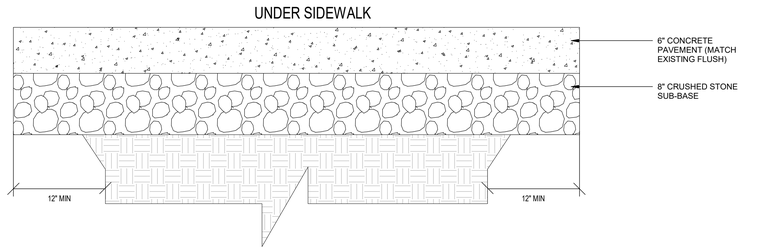

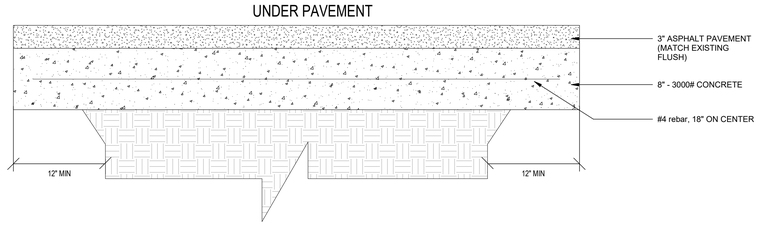

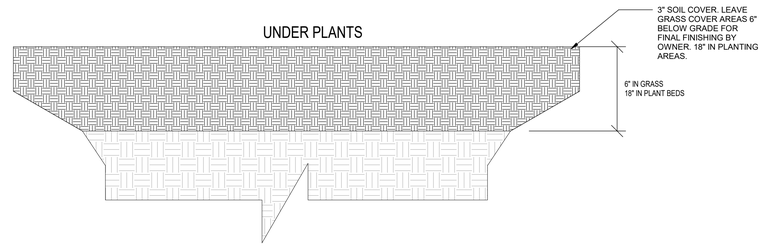

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STATE OF MISSOURI
MICHAEL D. LEWIS
NUMBER PE-2009033455
PROFESSIONAL ENGINEER
09/12/2025

NO.	DATE	DSGN	DR	CHK	APVD	BY	APVD
A	09/11/25	MS	RC	ML	ML		ML

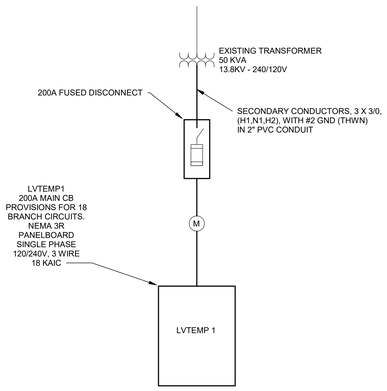
A ISSUED FOR BID

111 General Services Building
Columbia, MO 65211
(573)-882-8211
CP231546

Project Title:
GENERAL SITE - CHAMPIONS DRIVE SUBSTATION
69kV TRANSFORMER FOUNDATIONS

Drawing Title:
DUCTBANK DETAILS

Date: 08/26/25
Proj. No.: CP231546
Drawing No.:
E-511



1 - **ONE LINE DIAGRAM**
NTS

PANELBOARD: LVTEMP1

LOCATION:
SUPPY...
MOUNTING: Surface
ENCLOSURE: NEMA 3R

VOLTAGE: 120/240V,1P,3W,60Hz
MAINS TYPE / LOCATION: MCB
MCB FRAME / TRIP SIZE: 200 AT

INTERRUPTING RATING (kA SYMMETRICAL): 18 kA
MINIMUM BUS RATING: 200 A
NEUTRAL BUS RATING:

CKT NO.	ACC.	DESCRIPTIONS	CIRCUIT SIZE	TRIP AMPS	POLES	A		B		POLES	TRIP AMPS	CIRCUIT SIZE	DESCRIPTIONS	ACC.	CKT NO.
1		XFMR T1 AUX POWER	3 X #8 AWG, #8 GND	50 A	2	8320 VA	8320 VA			2	50 A	3 X #8 AWG, #8 GND	XFMR T2 AUX POWER		2
3	--	--	--	--	--			8320 VA	8320 VA	--	--	--	--	--	4
5	--	XFMR T1 SUMP PUM	2X #12 AWG, #12GND	20 A	1	0 VA	0 VA			1	20 A	2X #12 AWG, #12GND	XFMR T2 SUMP PUMP	--	6
7	--	SPARE	--	20 A	1			0 VA	0 VA	1	20 A	--	SPARE	--	8
9	--	SPARE	--	20 A	1	0 VA	0 VA			1	20 A	--	SPARE	--	10
11	--	SPACE	--	--	1			--	--	1	--	--	SPACE	--	12
13	--	SPACE	--	--	1	--	--			1	--	--	SPACE	--	14
15	--	SPACE	--	--	1			--	--	1	--	--	SPACE	--	16
17	--	SPACE	--	--	1	--	--			1	--	--	SPACE	--	18
			TOTAL CONNECTED LOAD / PHASE			**16640 VA**		**16640 VA**							

LOAD CLASSIFICATIONS	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND
Power	33280 VA	100.00%	33280 VA

TOTAL LOAD SUMMARY			
LOAD (KVA)		CURRENT (AMPS)	
CONNECTED LOAD:	33.3 kVA	CONNECTED CURRENT	138.7 A
ESTIMATED DEMAND LOAD:	33.3 kVA	ESTIMATED DEMAND CURRENT	138.7 A
ESTIMATED DEMAND FACTOR:	100.00%	ESTIMATED GROWTH CURRENT	0 A
APPLIED GRTOWTH FACTOR:			

PANELBOARD...

GENERAL NOTES

A. ALL CONDUCTORS ARE THWN.

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NO.	DATE	REVISION	DSGN	DR	CHK	BY
A	09/11/25	ISSUED FOR BID	Designer	Author	Checker	APVD
						Approver

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GENERAL SITE - CHAMPIONS DRIVE SUBSTATION
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Drawing Title:
PANEL SCHEDULES

Date: 08/26/2025
Proj. No.: CP231546
Drawing No.:
E-600