

General Notes

EXAMINATION OF BIDDING DOCUMENTS/CONTRACTOR RESPONSIBILITY

- A. EACH BIDDER SHALL EXAMINE THE BIDDING DOCUMENTS CAREFULLY AND, NOT LATER THAN SEVEN DAYS PRIOR TO THE DATE OF RECEIPT OF BIDS, SHALL MAKE WRITTEN REQUEST TO THE ENGINEER FOR INTERPRETATION OR CORRECTION OF ANY DISCREPANCIES, AMBIGUITY, INCONSISTENCY, OR ERROR THEREIN WHICH MAYBE DISCOVERED. ANY INTERPRETATION OR CORRECTION WILL BE ISSUED AS AN ADDENDUM BY THE ENGINEER. ONLY A WRITTEN INTERPRETATION OR CORRECTION BY ADDENDUM SHALL BE BINDING. NO BIDDER SHALL RELY UPON INTERPRETATIONS OR CORRECTIONS GIVEN BY ANY OTHER METHOD. IF DISCREPANCIES, AMBIGUITY, INCONSISTENCY, OR ERROR ARE NOT COVERED BY ADDENDUM OR WRITTEN DIRECTIVE, CONTRACTOR SHALL INCLUDE IN THEIR BID, LABOR, MATERIALS AND METHODS OF CONSTRUCTION RESULTING IN HIGHER COST. AFTER AWARD OF CONTRACT, NO ALLOWANCE OR EXTRA COMPENSATION WILL BE MADE IN BEHALF OF THE CONTRACTOR DUE TO HIS FAILURE TO MAKE THE WRITTEN REQUESTS AS DESCRIBED ABOVE.
- B. THE PERSON SUBMITTING THE REQUEST WILL BE RESPONSIBLE FOR ITS PROMPT DELIVERY. FAILURE TO REQUEST CLARIFICATION OF ANY INADEQUACY, OMISSION, OR CONFLICT WILL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY. THE SIGNING OF THE CONTRACT WILL BE CONSIDERED IMPLICITLY DENOTING THAT THE CONTRACTOR HAS A THOROUGH COMPREHENSION OF THE FULL INTENT AND SCOPE OF THE WORKING DRAWINGS AND SPECIFICATIONS.
- C. THIS PROJECT REQUIRES A VERY HIGH LEVEL OF COORDINATION AND COOPERATION WITH OWNER, ENGINEER, OTHER TRADES, VENDORS, AND SPECIALTY CONTRACTORS. THIS CONTRACTOR SHALL OBTAIN AND STUDY SHOP DRAWINGS OF ALL ELECTRICALLY-CONNECTED EQUIPMENT AND SHALL ADJUST POINTS OF CONNECTION, LOCATIONS, AND MOUNTING HEIGHTS PRIOR TO ROUGH-IN.
- D. PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, TOOLS, ACCESSORIES, ETC., NECESSARY TO ACCOMPLISH A COMPLETE ELECTRICAL SYSTEM IN ACCORDANCE WITH THE DRAWINGS, SPECIFICATIONS, AND GENERAL NOTES.

IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS TO ESTABLISH A STANDARD OF QUALITY. THE ENGINEER RESERVES THE RIGHT TO VERBALLY APPROVE METHODS AND MATERIALS NOT REFLECTED HEREIN.

CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING AND PROPOSED CONDITIONS WHICH MAY AFFECT THE COURSE OF THEIR WORK PRIOR TO SUBMITTING A BID ON THIS PROJECT. NO EXTRAS WILL BE ALLOWED FOR FAILURE TO COMPLY WITH THIS REQUIREMENT.

VERIFY EXACT LOCATIONS OF EXISTING AND NEW UNDERGROUND UTILITIES, PIPING, AND RACEWAY SYSTEMS PRIOR TO TRENCHING. PROVIDE NECESSARY TRENCHING, BACKFILL EXCAVATION, SUPPORTS, SERVICE FEEDERS (CONDUIT AND/OR WIRE), PULLBOXES, TRANSFORMER PADS, SAWCUTTING, AND PATCHING, CONCRETE/PAVING, ETC., AS REQUIRED. CONTRACTOR SHALL VERIFY WITH THE UTILITY Co. EXACT SIZE OF SERVICE TRANSFORMER AND PAD PRIOR TO THE START OF THE PROJECT. BACKFILL TRENCHES TO 90% COMPACTION AND PATCH TO MATCH EXISTING. CONTRACTOR SHALL OBTAIN AND VERIFY EXACT UTILITY Co. DRAWINGS AND REQUIREMENTS PRIOR TO COMMENCING WORK ON THE UNDERGROUND.

WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST ADOPTED 'IBC', 'IFC', AND 'NEC' CODES AND ORDINANCES.

DO NOT SCALE DRAWINGS. VERIFY DIMENSIONS IN THE FIELD PRIOR TO COMMENCEMENT OF WORK.

OWNER TO OBTAIN AND PAY FOR ALL BUILDING AND WORKING PERMITS AND INSPECTION FEES REQUIRED FOR THIS PROJECT.

PROPOSED SUBSTITUTIONS OF ELECTRICAL EQUIPMENT OR REQUEST FOR "OR EQUAL" OR "APPROVED EQUAL" LISTING SHALL BE SUBMITTED TO ENGINEER NOT LESS THAN TEN (10) WORKING DAYS PRIOR TO BID. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

PROVIDE RECORD DRAWINGS TO THE ENGINEER. DRAWINGS SHALL INCLUDE ALL ADDENDUM ITEMS, CHANGE ORDERS, ALTERATIONS, REROUTINGS, ETC.

CONTRACTOR'S FAILURE TO ORDER OR RELEASE ORDER FOR MATERIALS AND/OR EQUIPMENT WILL NOT BE ACCEPTED AS A REASON TO SUBSTITUTE ALTERNATE MATERIALS, EQUIPMENT, OR INSTALLATION METHODS.

CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING EQUIPMENT WHICH IS DAMAGED DUE TO INCORRECT FIELD WIRING OR FACTORY WIRING IN EQUIPMENT PROVIDED UNDER THIS SECTION.

SYSTEMS SHALL BE TESTED FOR PROPER OPERATION. IF TESTS SHOW THAT WORK IS DEFECTIVE CONTRACTOR SHALL MAKE CORRECTIONS NECESSARY AT NO COST TO OWNER.

IDENTIFY ALL EQUIPMENT, SWITCHBOARD CIRCUITS, AND ELECTRICALLY CONNECTED EQUIPMENT WITH ENGRAVED NAMEPLATES. NAMEPLATES SHALL BE FASTENED WITH A MINIMUM OF TWO (2) SCREWS. PANEL DIRECTORIES SHALL BE TYPED.

ALL CIRCUITING SHALL BE IN CONDUIT. EMT WITH STEEL SET-SCREW FITTINGS MAY BE USED IN DRY, PROTECTED INTERIOR LOCATIONS. PVC SCHEDULE 40 WITH WRAPPED RIGID ELBOWS AND RISERS SHALL BE USED IN CONCRETE, BELOW GRADE, THROUGH- GRADE TRANSITIONS, AND STUB-UPS. RGS OR IMC SHALL BE USED IN ALL AREAS SUBJECT TO WEATHER OR MECHANICAL DAMAGE. ALL CIRCUITING SHALL BE CONCEALED. WHERE CONCEALMENT IS IMPRACTICAL, AND WITH THE SPECIFIC APPROVAL OF THE OWNER, SURFACE RACEWAY AND OUTLETS MAY BE INSTALLED AND FINISHED TO MATCH ADJACENT SURFACES. METAL-CLAD CABLE(TYPE MC) MAY BE USED, TYPE ENT RACEWAY IS NOT ALLOWED. CONNECT RECESSED AND SUSPENDED LIGHT FIXTURES, MOTORIZED, AND VIBRATING EQUIPMENT WITH STEEL FLEX. ALL EMPTY CONDUIT SHALL HAVE PULL CORD.

WIRE SHALL BE COPPER, 90 ° C RATED THWN-2 FOR GENERAL USE. SIZES INDICATED ARE FOR INSTALLATION IN A MAXIMUM 30 DEGREE C AMBIENT. CONDUCTOR AMPACITY SHALL BE DERATED FOR HIGHER AMBIENT INSTALLATIONS.

FUSES AND CIRCUIT BREAKERS SHALL BE SIZED PER ACTUAL NAMEPLATE OF EQUIPMENT SERVED. CIRCUIT BREAKERS SHALL BE RATED FOR THEIR RESPECTIVE APPLICATION (MOTOR CIRCUIT PROTECTOR, GROUND FAULT CIRCUIT INTERRUPTER, ARC FAULT CIRCUIT INTERRUPTER, ETC.). FUSES SHALL BE DUAL-ELEMENT, CURRENT-LIMITING, AND SHALL BE INTERCHANGEABLE BETWEEN FRAME SIZES WITH STANDARD FACTORY FUSE REDUCERS.

SUBMIT SIX COPIES OF FACTORY SHOP DRAWINGS FOR ALL LIGHTING FIXTURES, SWITCHGEAR, PANELS, MOTOR CONTROL, WIRING DEVICES, ETC. PROPOSED FOR THIS PROJECT. PROPOSED SUBSTITUTIONS SHALL BE EQUAL OR SUPERIOR TO SPECIFIED ITEMS IN ALL RESPECTS. DETERMINATION OF EQUALITY REST SOLELY WITH THE ENGINEER.

INDICATED LOCATIONS OF ALL OUTLETS AND EQUIPMENT ARE SUBJECT TO CHANGE. SHIFT, RELOCATE, OR RECONFIGURE ANY OUTLET, EQUIPMENT, OR CONNECTION POINT UP TO 10 FEET AS DIRECTED BY ENGINEER PRIOR TO WALLS BEING COVERED UP AT NO ADDED COST.

PROVIDE TO STRUCTURAL ENGINEER THE LOCATIONS AND DIMENSIONS OF ALL PENETRATIONS THROUGH STRUCTURAL WALLS FOR THEIR APPROVAL PRIOR TO INSTALLATION.

ALL PENETRATED FIRE RATED SURFACES SHALL BE FIRE SEALED WITH APPROVED 'UL' LISTED SEALANTS AND SUBJECT TO SUBMITTAL APPROVAL. DO NOT EXCEED MAXIMUM ALLOWABLE SURFACE PENETRATIONS DEPENDING ON RATING OF SURFACES. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS TO DETERMINE WHERE PENETRATIONS THROUGH FIRE RATED SURFACES OCCUR. ALL OUTLET OR JUNCTION BOXES INSTALLED IN FIRE RATED CEILINGS OR WALLS SHALL HAVE 'UL' LISTED "PUTTY PADS" INSTALLED ON THEM PRIOR TO COVERING UP WALLS. "PUTTY PADS" ARE SUBJECT TO SUBMITTAL APPROVAL.

NON-METALLIC AND FLEXIBLE METAL CONDUITS SHALL HAVE A CODE SIZED COPPER GROUNDING CONDUCTOR, INCREASE CONDUIT SIZE AS REQUIRED. FLEXIBLE METAL CONDUIT SHALL NOT EXCEED 6'-0" IN LENGTH.

FINAL CONNECTIONS TO EQUIPMENT SHALL BE PER MANUFACTURER'S APPROVED WIRING DIAGRAMS, DETAILS, AND INSTRUCTIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE MATERIALS AND EQUIPMENT COMPATIBLE WITH EQUIPMENT ACTUALLY SUPPLIED. USE FLEXIBLE CONDUIT FOR CONNECTIONS TO EQUIPMENT THAT VIBRATES. I.E. THE LAST 18 INCHES TO 3 FEET TO MOTORS OR TRANSFORMERS.

THE COMPLETE ELECTRICAL SYSTEM, AND ALL PORTIONS THEREOF, SHALL BE GUARANTEED TO BE FREE FROM DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD OF TWO (2) YEARS FROM DATE OF FINAL ACCEPTANCE. PROMPTLY REMEDY SUCH DEFECTS AND ANY SUBSEQUENT DAMAGE CAUSED BY THE DEFECTS OR REPAIR THEREOF AT NO EXPENSE TO THE OWNER. LIGHT BULBS ARE EXEMPT FROM THIS GUARANTEE BUT SHALL BE NEW AND UNUSED AT TIME OF FINAL ACCEPTANCE.

BIDDING CONTRACTOR SHALL HAVE CURRENT C2 ELECTRICAL STATE OF NEVADA CONTRACTORS LICENSE.

BIDDING CONTRACTOR SHALL SUBMIT WITH THEIR PROPOSAL A COMPANY RESUME, A LIST OF SIMILAR PROJECTS AND REFERENCES FROM THE OWNERS OF THE SIMILAR PROJECTS.

Electrical Symbols List

NOTE: THIS IS A TYPICAL MASTER SCHEDULE. NOT ALL SYMBOLS SHOWN MAY BE INDICATED ON THE DRAWINGS.

	DUPLEX RECEPTACLE		SWITCHGEAR
	DUPLEX RECEPTACLE - HALF SWITCHED (TOP HALF)		PANELBOARD - SURFACE MOUNTED
	DUPLEX RECEPTACLE W/ INTEGRAL GFCI CIRCUITRY		PANELBOARD - FLUSH MOUNTED
	SINGLE RECEPTACLE FOR EQUIPMENT		TRANSFORMER
	DOUBLE-DUPLEX RECEPTACLE		CONTROL STATION AT +48" TO TOP UON (PER ADA)
	DOUBLE-DUPLEX RECEPTACLE W/ INTEGRAL GFCI CIRCUITRY		RELAY
	TELEPHONE OUTLET		CONTACTOR WITH INTEGRAL HOA SELECTOR U.O.N.
	DATA OUTLET		MAGNETIC STARTER
	LED FIXTURE - RECESSED		DISCONNECT SWITCH: F=FUSIBLE, FUSE PER NAME PLATE: N=NONFUSED
	LED FIXTURE - SURFACE		COMBINATION STARTER & DISCONNECT
	LED FIXTURE - OPEN STRIP		SINGLE-PHASE MOTOR CONTROL ASSEMBLY: HP-RATED SWITCH AND POWER RELAY
	LED - SURFACE MOUNT		PULLBOX - SIZE AND LOCATION AS REQUIRED
	LED - WALL BRACKET		JUNCTION BOX - SIZE PER NEC REQUIREMENTS
	LED RECESSED		SHEET NOTE DESIGNATION
	LED - WALL WASH		FEEDER DESIGNATION
	POLE OR POST - ARM OR TOP MOUNTED CUT-OFF LUMINAIRE		SIGNAL CIRCUITING DESIGNATION (A=UNSHIELDED PAIR, B=SHIELDED PAIR, C=RG59/U, F=FIRE PAIR)
	TWIN-LAMP BATTERY PACK - WALL MOUNTED AT 12" BELOW CEILING U.O.N. (UNSWITCHED CKT.)		CIRCUITING IN WALL OR ABOVE CEILING
	EXIT LIGHT - FACES AND ARROWS AS INDICATED, UNIVERSAL MOUNTING, UNSWITCHED - MOUNTING HEIGHT AS SHOWN.		CIRCUITING IN FLOOR OR BELOW GRADE
	EXIT LIGHT - HIGH LEVEL: 6' - 8' A.F.F. TO BOTTOM		TICS = NO. OF WIRES IF MORE THAN TWO: --- = GROUND WIRE --- = ISOLATED GROUND WIRE --- = NEUTRAL WIRE
	WIRING DEVICE AT +18" TO CENTER LINE UON (PER ADA)		HOMERUN: TO PANEL
	DEVICES MOUNTED IN MULTIPLE UNDER COMMON COVER MAXIMUM HEIGHT ON WALLS = +48" TO TOP UON (PER ADA)		OVERHEAD SERVICE
	DEVICES MOUNTED IN OR ABOVE BACKSLASH: MAXIMUM HEIGHT ON WALLS = +48" TO TOP UON (PER ADA)		PRIMARY
	SWITCHES AT +48" TO TOP UON (PER ADA)		TELEPHONE
	S SINGLE POLE SWITCH		NEON LIGHTING
	S ₃ THREE WAY SWITCH		3/4" STUB-OUT TO ACCESSIBLE ATTIC WHERE APPLICABLE OR AS NOTED
	S _{OC} MOTION SENSOR SWITCH, MOTION ON- OCC OFF		COPPER GROUND - SIZE PER PLANS
	S _P SWITCH WITH PILOT TOGGLE (CONFIRM LIGHTED POSITION)		AFF ABOVE FINISH FLOOR
	D SLIDER-TYPE DIMMER (WATTAGE RATING AS REQUIRED)		AFG ABOVE FINISH GROUND
	S _M MANUAL MOTOR STARTER - POLES AND HEATERS AS REQUIRED		WP WEATHER PROOF (NEMA 3)
	DS DAYLIGHT SENSOR		WT WATERTIGHT (SUBMERSIBLE)
	OS OCCUPANCY SENSOR		F FUSE (DUAL-ELEMENT, TIME DELAY)
	T THERMOSTAT OUTLET AT +54" TO TOP UON (PER ADA)		NF NON-FUSED
	3 MOTOR OUTLET (NUMBER = HORSEPOWER)		HOA HAND-OFF-AUTOMATIC
	PE PHOTOELECTRIC SWITCH		C CONDUIT (WITH PULL CORD IF OTHERWISE EMPTY)
	EXHAUST FAN		NL NIGHT LIGHT
	AC 1 MECHANICAL EQUIPMENT DESIGNATION		RGS RIGID GALVANIZED STEEL
	A LIGHTING FIXTURE DESIGNATION: TYPE, QUANTITY, AND MISCELLANEOUS INFORMATION SEE LIGHT FIXTURE SCHEDULE FOR WATTAGE, LAMPING, MANUFACTURER AND DESCRIPTION		NIC NOT IN CONTRACT
			UON UNLESS OTHERWISE NOTED
			FBO FURNISHED BY OTHERS
			EMG EMERGENCY
			UNSW UNSWITCHED
			30/3 30 AMP / 3 POLE (REPRESENTATIVE)
			HP HORSEPOWER

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Code Requirements

2017 NATIONAL ELECTRIC CODE - "NEC"
2018 INTERNATIONAL FIRE CODE, SECTION 605.11

Permit Set



EV - Bus Project
1111 North Saliman Rd -
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Sheet Number EO.1

ELECTRICAL SPECIFICATIONS

GENERAL

ALL ELECTRICAL WORK SHALL COMPLY WITH ALL APPLICABLE CITY, COUNTY, STATE, AND SERVING ELECTRICAL UTILITY CODES ORDINANCES, RULES, AND REGULATIONS. THE ENTIRE INSTALLATION SHALL COMPLY WITH OR SURPASS THE REQUIREMENTS OF THE ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE.

ALL MATERIAL SHALL BE NEW, OF FIRST CLASS QUALITY, SHALL BE U.L. LISTED AND LABELED AND FREE OF DEFECTS

ALL CUTTING AND PATCHING REQUIRED FOR INSTALLATION OF NEW RACEWAYS AND EQUIPMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. ALL WORK SHALL BE PERFORMED BY TRADESMAN EXPERIENCED IN THE WORK REQUIRED. ALL FINISHES SHALL MATCH EXISTING ADJACENT FINISHES. PATCH ALL OPENINGS IN FIRE RATED WALLS IN A MANNER MAINTAINING THE ORIGINAL FIRE AND SMOKE RATINGS.

CONTRACTOR SHALL BE RESPONSIBLE FOR ANY LOSS OR DAMAGE CAUSED BY HIM OR HIS WORKMEN TO THE FACILITY DURING THE COURSE OF CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING OR REPLACING SUCH LOSS OR DAMAGE AT NO ADDITIONAL COST TO THE OWNER.

DRAWINGS ARE DIAGRAMMATIC IN NATURE AND CANNOT SHOW EVERY CONNECTION. JUNCTION BOXES, WIRE, CONDUIT, ETC. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A COMPLETE AND FUNCTIONAL ELECTRICAL SYSTEM.

SCOPE OF WORK

FURNISH ALL MATERIALS, TOOL, AND LABOR REQUIRED FOR THE ELECTRICAL INSTALLATION UNLESS OTHERWISE NOTED ON PLANS. ALL PERMITS AND INSPECTIONS SHALL BE PROVIDED AS REQUIRED BY THE LOCAL CODE AUTHORITY.

THE CONTRACTOR SHALL VISIT THE SITE TO DETERMINE EXISTING CONDITIONS PRIOR TO SUBMITTING A BID.

CONCEAL ALL CONDUIT WORK UNLESS AS NOTED ON SPECIFIC DESIGN DRAWINGS.

COORDINATE ALL POWER OUTAGES WITH THE OWNERS REPRESENTATIVE IN ADVANCE.

RESTORE ALL SURFACES THAT WERE DAMAGED (PAINTING, PATCHING, PLASTERING, ETC...) DUE TO THE INSTALLATION OR REMOVAL OF ELECTRICAL ITEMS TO MATCH EXISTING FINISH.

FULLY GUARANTEE THE INSTALLATION FOR A PERIOD OF TWO YEARS FROM THE DATE OF FINAL ACCEPTANCE BY THE OWNER, AGAINST ANY IMPERFECT WORKMANSHIP AND MALFUNCTION OF EQUIPMENT. ANY WORK IDENTIFIED TO BE DEFECTIVE WITHIN THE GUARANTEE PERIOD SHALL BE PROMPTLY REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE OWNER.

SUBMITTALS

FURNISH TO THE ELECTRICAL ENGINEER'S OFFICE COMPLETE ELECTRICAL ROOM LAYOUT DRAWINGS (WHERE INSTALLATION VARIES FROM DESIGN HEREIN), SHOWING EXACT LOCATIONS AND DIMENSION OF ELECTRICAL EQUIPMENT PRIOR TO COMMENCEMENT OF CONSTRUCTION AND INSTALLATION OF STUB-UPS, INCLUDING TELEPHONE AND DATA EQUIPMENT ROOMS.

PROVIDE A MINIMUM OF SIX (6) SETS OF SUBMITTALS OR SHOP DRAWINGS FOR THE FOLLOWING DISCONNECT SWITCHES, PANELS, PIPE, FITTINGS, WIRE, PV-CONNECTORS, PV-INVERTER, PV-MODULE, AND SERVICE ENTRANCE EQUIPMENT. ALL SHOP DRAWING SUBMITTALS SHALL BE BOUND, LABELED, AND MARKED TO IDENTIFY EXACTLY WHICH ITEM SHALL BE PROVIDED. SUBMIT ALL SHOP DRAWINGS FOR REVIEW AT THE SAME TIME.

SUBSTITUTIONS

EQUIPMENT LISTED BY BRAND NAME OR CATALOG NUMBER SHALL BE INTERPRETED AS ESTABLISHING A STANDARD OF QUALITY. SUBSTITUTIONS WILL BE CONSIDERED IF A WRITTEN REQUEST IS SUBMITTED TO THE ENGINEER A MINIMUM OF (8) WORKING DAYS PRIOR TO THE BID DATE.

THE REQUEST SHALL INCLUDE THE FOLLOWING

- A STATEMENT DECLARING THAT THE EQUIPMENT PROPOSED IS EQUAL TO THAT SPECIFIED BY HAVING THE SAME PHYSICAL CHARACTERISTICS AND DIMENSIONS, AND WILL MEET THE DRAWING LAYOUT AND STRUCTURAL CONDITIONS.
- THE SPECIFIED AND SUBMITTAL CATALOG NUMBERS OF THE EQUIPMENT UNDER CONSIDERATION.
- AN EQUIPMENT CUT SHEET WITH DRAWING, DIMENSIONS, AND SPECIFICATIONS.
- A SAMPLE MAY BE REQUIRED AT THE ENGINEERS DISCRETION.
- COMPLETE CALCULATIONS AND WET STAMPED ENGINEERING DRAWINGS FOR ANY AND ALL DEVIATIONS IN TOTAL OUTPUT, INVERTER SIZE OR NUMBER, AND INDIVIDUAL PANEL OUTPUT.

ANY CONFLICT ARISING FROM THE USE OF SUBSTITUTED MATERIAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, WHO SHALL BEAR ALL COSTS REQUIRED TO MAKE THE EQUIPMENT COMPLY WITH THE INTENT OF THE PLANS AND SPECIFICATIONS. CHANGES, ETC.

NO MATERIAL OR APPARATUS SHALL BE SUBSTITUTED AFTER THE BID OPENING UNLESS APPROVED IN WRITING BY THE ENGINEER.

MANUFACTURERS SHALL NOT BE CONSIDERED APPROVED AS EQUAL UNTIL LISTED IN A FORMAL ADDENDUM. LISTING AS EQUAL DOES NOT RELIEVE THE ELECTRICAL CONTRACTOR FROM MEETING THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

CONDUIT AND WIRE

WHERE WIRING AND CONDUIT SIZES ARE INDICATED FOR HOMERUNS, THESE SIZES APPLY TO THE ENTIRE LENGTH FROM THE PROTECTIVE DEVICE IN THE PANELS TO THE EQUIPMENT OR LAST WIRING DEVICE.

CONCEAL ALL CONDUIT IN WALLS, PARTITIONS, ABOVE CEILING OR IN FLOOR SLAB UNLESS NOTED OTHERWISE ON PLANS.

EMT FITTINGS MUST BE STEEL COMPRESSION TYPE

ALL WIRING SHALL BE IN CONDUIT, RIGID OR INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR ALL CONDUIT 2" OR LARGER, WHERE SUBJECT TO MOISTURE OR WHERE SUBJECT TO PHYSICAL DAMAGE. ELECTRICAL METALLIC TUBING (EMT) MAY BE USED FOR INTERIOR, PROTECTED CONDUIT 2-1/2" IN SIZE AND SMALLER. MC CABLE SHALL BE USED IN CONCEALED WALLS AND CEILINGS

FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR ALL CONNECTIONS TO MOTORS, OR EQUIPMENT SUBJECT TO VIBRATION. LIQUID-TIGHT CONDUIT SHALL BE USED WHERE SUBJECT TO MOISTURE. BOND FLEXIBLE CONDUIT PER N.E.C. REQUIREMENTS.

INSTALL A PULL WIRE IN ALL EMPTY CONDUITS.

ALL CONDUCTORS SHALL BE COPPER. MINIMUM CIRCUIT WIRING SHALL BE #12 AWG. OTHER SIZES AS INDICATED ON THE DRAWINGS OR AS REQUIRED BY CODE. INSULATION FOR ALL CONDUCTORS (OTHER THAN, USE-2 PV WIRE WHERE SPECIFIED) SHALL BE THWN-2.

CIRCUIT NUMBERS ARE SHOWN FOR CIRCUIT IDENTIFICATION. CIRCUITING SHALL AGREE WITH THE NUMBERING ON THE PANEL SCHEDULE PROVIDED. BALANCE THE LOAD AS EVENLY AS POSSIBLE BETWEEN EACH PHASE.

ALL SECONDARY SERVICES, FEEDERS, AND BRANCH CIRCUIT CONDUCTORS SHALL BE COLOR CODED AS FOLLOWS

208/120 VOLT		480/277 VOLT	
BLACK	A	A	YELLOW
RED	B	B	BROWN
BLUE	C	C	ORANGE
WHITE	NEUTRAL	NEUTRAL	GRAY
GREEN	GROUND	GROUND	GREEN

CONTROL WIRES SHALL BE PURPLE OR VIOLET. ALL BRANCH CIRCUIT CONDUCTORS SHALL HAVE SOLID COLOR COMPOUND OR SOLID COLOR COATING.

ALL CONDUITS PENETRATING ROOFS, FLOORS, OR WALLS SHALL BE MADE WATERTIGHT BY PROPER FLASHING, CAULKING, OR SEALING.

GROUNDING

GROUNDING OF ELECTRICAL SERVICE AND EQUIPMENT SHALL BE PER THE APPLICABLE SECTIONS OF NEC. ART. 250 AND AS SHOWN ON THE DRAWINGS.

PROVIDE ANY INSULATED EQUIPMENT GROUNDING CONDUCTORS, IN ACCORDANCE WITH NEC. ART. 250(122), IN ALL CONDUITS WITH CONDUCTORS.

BOND ALL EXPOSED NON-CURRENT CARRYING METALLIC PARTS FOR PV SYSTEM TOGETHER AND TO THE EXISTING BUILDING GROUND PER NEC. 690

SERVICE EQUIPMENT

ALL ELECTRICAL COMPONENTS INSTALLED OUTDOORS, EXPOSED TO WEATHER, OR IN DAMP LOCATIONS SHALL BE WEATHERPROOF, NEMA 3R ENCLOSED.

SERVICE ENTRANCE ASSEMBLY AND ALL OF ITS COMPONENTS SHALL BE BRACED TO WITHSTAND A MINIMUM OF 100% OF THE AVAILABLE FAULT CURRENT SUPPLIED BY THE POWER COMPANY.

PROVIDE AT THE COMPLETION OF THE PROJECT NEATLY TYPED ACCURATE PANELBOARD DIRECTORIES INDICATING ALL BRANCH CIRCUITS AND SPARES. ALL SPARES SHALL BE LEFT IN THE OFF POSITION.

LABEL ALL SERVICE ENTRANCE EQUIPMENT, PANELBOARDS, AND MAJOR SINGLE LINE COMPONENTS WITH PERMANENTLY AFFIXED PHENOLIC LETTERING (2" MINIMUM). LABEL ALL RECEPTACLES, DEVICES, JUNCTION BOXES, DISCONNECT SWITCHES, ETC... WITH VINYL ADHESIVE TAPE INDICATING PANEL AND CIRCUIT NUMBER.

ALL SAFETY SWITCHES SHALL BE HEAVY DUTY TYPE, WITH COVER INTERLOCK AND HANDLE LOCK OFF PROVISIONS. SWITCHES SHALL BE MANUFACTURED BY GE, SQUARE D, SIEMENS, OR EATON AND SHALL BE 'UL' LISTED. RATING AND FUSING SHALL BE AS SHOWN ON THE DRAWINGS.

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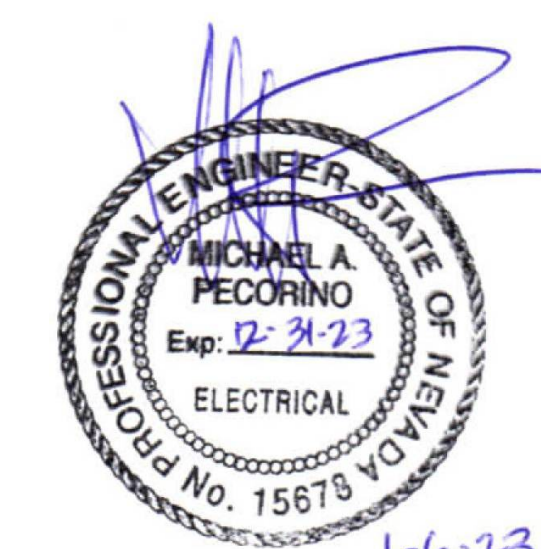
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Sheet Contents

Electrical Specifications

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EO.2



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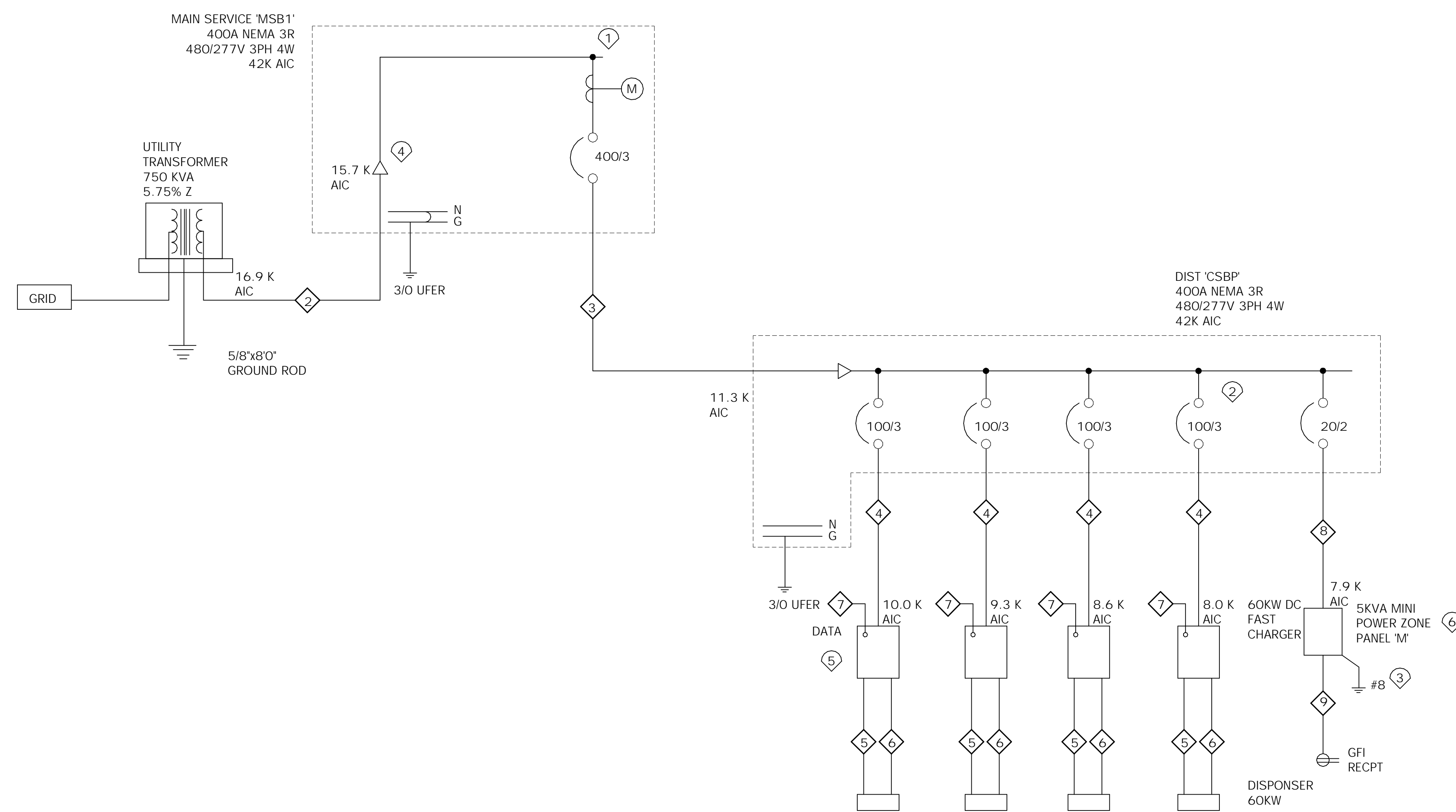
Single Line Diagram
Feeder Schedule
Switchgear Elevation

Sheet Number
EO.3.1

Feeder Schedule

FEEDER	AMPERE	CONDUIT & WIRE (COPPER) THWN-2	EQUIP. GROUND (Cu)
1	1000	(3) 4" C WITH PULL STRING	-
2	400	(4) 1" C WITH PULL STRING	-
3	400	4" C - 4 - 500MCM	#2
4	100	3" C - 4 - 2 THWN-2	#8
5	200	3" C - (2) 3/0 XHHW-2 1KV (2) 18 AWG 1KV	#4
6	-	1" C - (2) 20/2 SHIELD (2) 20 SHIELD TWISTED PAIR (1) 18 SHIELD	#10
7	-	3/4" C (1) CAT6e	-
8	20	1/2" C - 2 - #12	#12
9	20	1/2" C - 2 - #10	#10
10	-	1" C (2) CAT 6e	-
11	1000	(3) 3" C - 4 - 400MCM	#2/0 EACH

DISTRIBUTION EQUIPMENT SCHEDULE CSBP						
LOCATION: BUS PARKING						
AREA SERVED: BUS PARKING						
EQUIPMENT SERVICE SUPPLY VOLTAGE/AMP RATING: 480/277 V, 3PH, 4W, 400AMPS						
EQUIPMENT TYPE: NEMA 3R		MAIN: MLO				
BUS TYPE: AL		BUS AMPS: 400A				
NEUTRAL BUS: AL		A.I.C. RATING: 42K				
GROUND BUS: AL		BRANCH DISCONNECT:				
LOAD: 240 KVA			LOAD: 289 A			
CIRCUIT NUMBER	SWITCH FRAME SIZE	FUSE OR TRIP SETTING	KVA LOAD	DESCRIPTION	LOCATION	FEEDER
1	125	100	60.0	EV CHGR 1	BUS PARKING	4
2	125	100	60.0	EV CHGR 2	BUS PARKING	4
3	125	100	60.0	EV CHGR 3	BUS PARKING	4
4	125	100	60.0	EV CHGR 4	BUS PARKING	4
5	60	20	5.0	POWER ZONE	BUS PARKING	8



Phase I Single Line Diagram

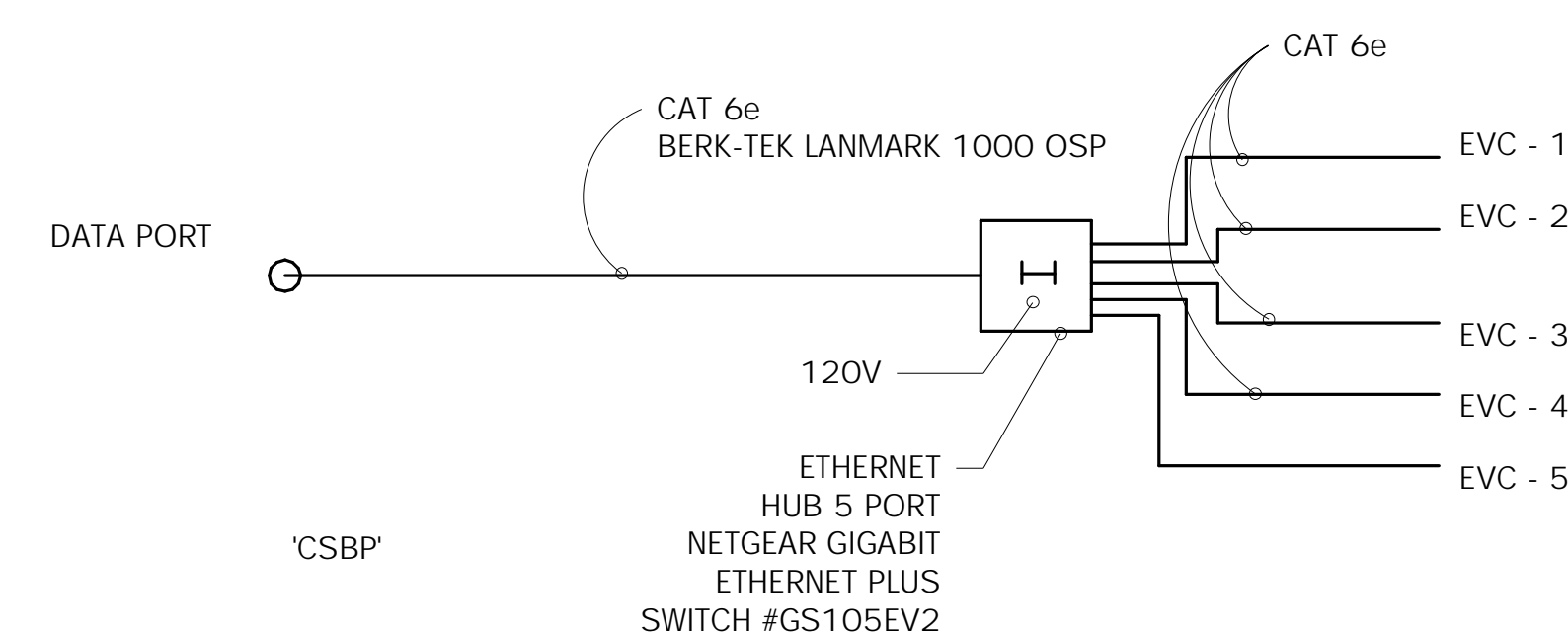
NTS

General Notes

1. CONDUCTORS FOR BRANCH CIRCUITS SHALL BE SIZED TO PREVENT AVOLTAGE DROP EXCEEDING 3% AT THE FARTHEST OUTLET. THE MAXIMUM TOTAL VOLTAGE DROP ON BOTH FEEDERS AND BRANCH CIRCUITS TO THE FARTHEST OUTLET SHALL NOT EXCEED 5%

Sheet Notes

- PROVIDE (13) JAW METER SOCKET WITH TEST BYPASS FACILITIES PER UTILITY STANDARDS FOR METERING.
- PROVIDE LOCK OUT - OFF HARDWARE FOR 100/3 BREAKERS
- GROUND FOR SEPARATELY DERIVED ALTERNATING CURRENT SYSTEM PER NEC 250.20(B). PROVIDE GROUND CONDUCTOR TO NEW UFER
- INSTALL LABEL WITH CALCULATED MAXIMUM AVAILABLE FAULT CURRENT AT THE MAIN SERVICE USING THE VALUES SHOWN ON SINGLE LINE PER NEC 110.24(B)
- PROVIDE CAT 6e CABLE TO HUB FOR HARDWIRED ETHERNET CONNECTIVITY
- MOUNT MINI POWER-ZONE TO SIDE OF DIST CSBP SQUARE D #MPZ5 S40F OR EQUAL

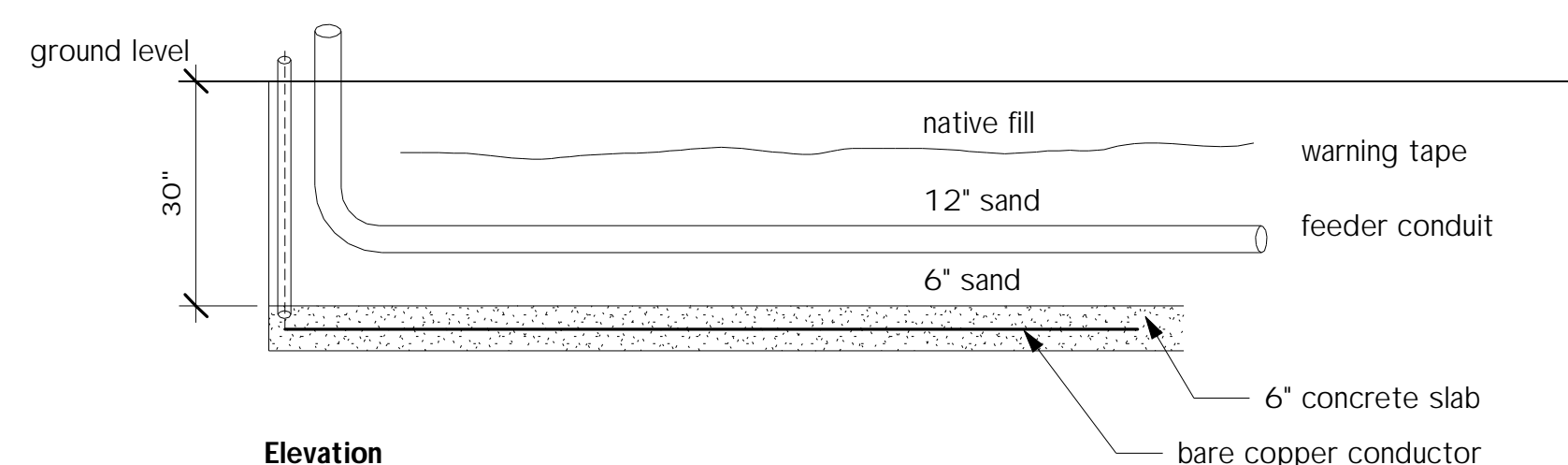
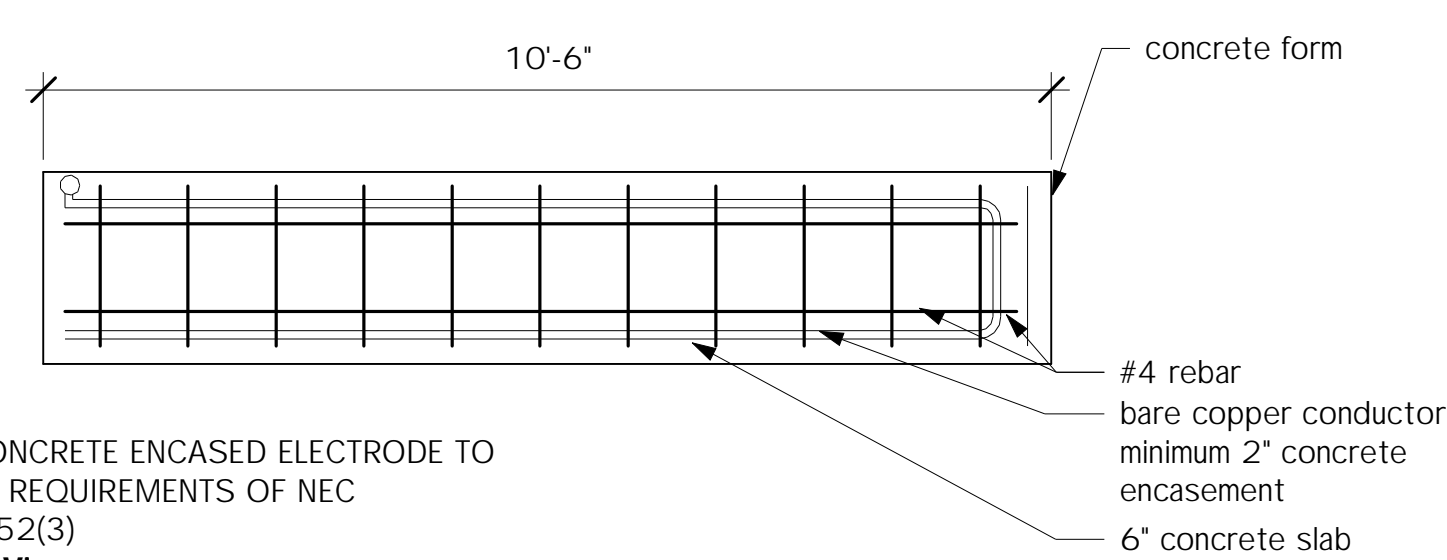


Ethernet Details

NTS

LOCATION: DISTR CSBP		MINI POWER ZONE						NEMA RATING 3R	
TYPE	DIRECTORY	LOAD	BKR	CIR	CIR	BKR	LOAD	DIRECTORY	TYPE
GFI	ETHERNET CAB	150	20	1	2	-		SPACE	
GFI	RECPTS	400	20	3	4	-		SPACE	
	SPARE		20	5	6	-		SPACE	
	SPARE		20	7	8	-		SPACE	
	SPARE		20	9	10	-		SPACE	

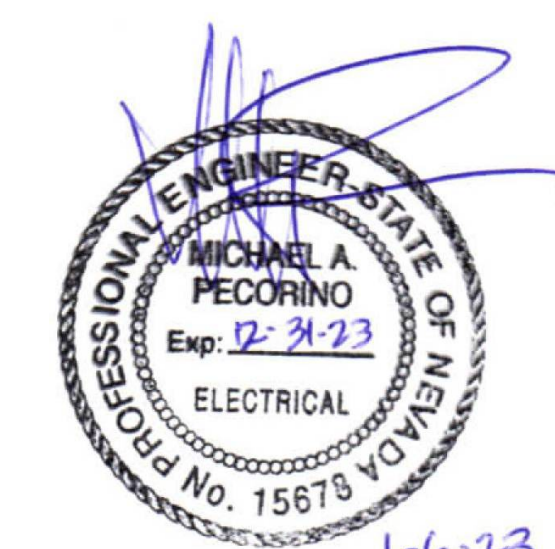
VOLTS: <input checked="" type="checkbox"/> 240/120V, 3PH, 4W.	<input type="checkbox"/> 480/277V, 3PH, 4W.	PHASE A LOAD: 0.15 KVA (1A)
AMPS: <input type="checkbox"/> 125A <input type="checkbox"/> 200A <input type="checkbox"/> 400A <input checked="" type="checkbox"/> 30A	<input type="checkbox"/> DB. LUGS	PHASE B LOAD: 0.18 KVA (2A)
MAIN: <input type="checkbox"/> MLO <input checked="" type="checkbox"/> MCB	<input type="checkbox"/> COPPER	PHASE C LOAD: 0.0 KVA (0A)
BUS: <input checked="" type="checkbox"/> ALUMINUM	<input type="checkbox"/> SURFACE	TOTAL CONNECTED LOAD: 0.33 KVA (1A)
MTD: <input type="checkbox"/> FLUSH <input checked="" type="checkbox"/> STANDARD	<input type="checkbox"/> DOOR IN DOOR	NEUTRAL BUS: 100% GROUND BUS: STD
		AIC RATING: <input type="checkbox"/> 10K <input checked="" type="checkbox"/> 14K <input type="checkbox"/> 22K <input type="checkbox"/> .



Ufer Details

NTS

Permit Set



EV - Bus Project
1111 North Saliman Rd -
Transportation
CCSD #51.22.01

Revisions:

Date: 01/06/2023
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Drawn By: CRN
Checked By: MP
Scale: As indicated
Project No.: 19-185

Sheet Contents

Sheet Number
EO.3.2

Feeder Schedule

FEEDER	AMPERE	CONDUIT & WIRE (COPPER) THWN-2	EQUIP. GROUND (Cu)
1	1000	(3) 4" C WITH PULL STRING	-
2	400	(4) 4" C WITH PULL STRING	-
3	400	4" C - 4 - 500MCM	#2
4	100	3" C - 4 - 2 THWN-2	#8
5	200	3" C - (2) 3/0 XHHW-2 1KV (2) 18 AWG 1KV	#4
6	-	1" C - (2) 20/2 SHIELD (2) 20 SHIELD TWISTED PAIR (1) 18 SHIELD	#10
7	-	3/4" C (1) CAT6e	-
8	20	1/2" C - 2 - #12	#12
9	20	1/2" C - 2 - #10	#10
10	-	1" C (2) CAT 6e	-
11	1000	(3) 3" C - 4 - 400MCM	#2/0 EACH

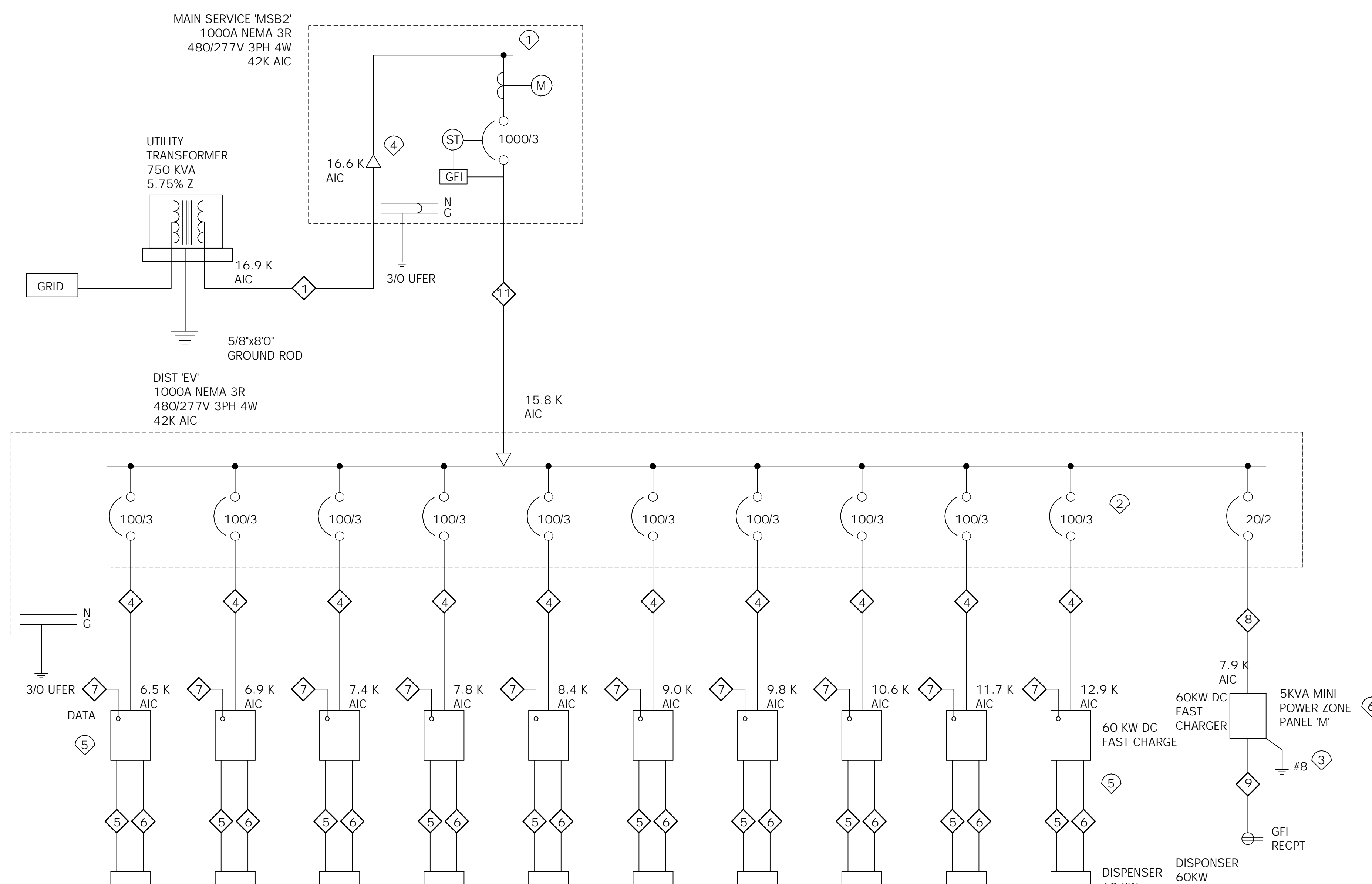
DISTRIBUTION EQUIPMENT SCHEDULE EV

LOCATION: BUS PARKING
AREA SERVED: BUS PARKING
EQUIPMENT SERVICE SUPPLY VOLTAGE/AMP RATING: 480/277 V, 3PH, 4W, 1000AMPS

EQUIPMENT TYPE:	NEMA 3R	MAIN:	MLO
BUS TYPE:	AL	BUS AMPS:	1000A
NEUTRAL BUS:	AL	A.I.C. RATING:	42K
GROUND BUS:	AL	BRANCH DISCONNECT:	

LOAD: 600 KVA LOAD: 722 A

CIRCUIT NUMBER	SWITCH FRAME SIZE	FUSE OR TRIP SETTING	KVA LOAD	DESCRIPTION	LOCATION	FEEDER
1	125	100	60.0	EV CHGR 1	BUS PARKING	4
2	125	100	60.0	EV CHGR 2	BUS PARKING	4
3	125	100	60.0	EV CHGR 3	BUS PARKING	4
4	125	100	60.0	EV CHGR 4	BUS PARKING	4
5	125	100	60.0	EV CHGR 5	BUS PARKING	4
6	125	100	60.0	EV CHGR 6	BUS PARKING	4
7	125	100	60.0	EV CHGR 7	BUS PARKING	4
8	125	100	60.0	EV CHGR 8	BUS PARKING	4
9	125	100	60.0	EV CHGR 9	BUS PARKING	4
10	125	100	60.0	EV CHGR 10	BUS PARKING	4
11	60/2	20/2	5.0	POWER ZONE	BUS PARKING	8



Phase 2 Single Line Diagram

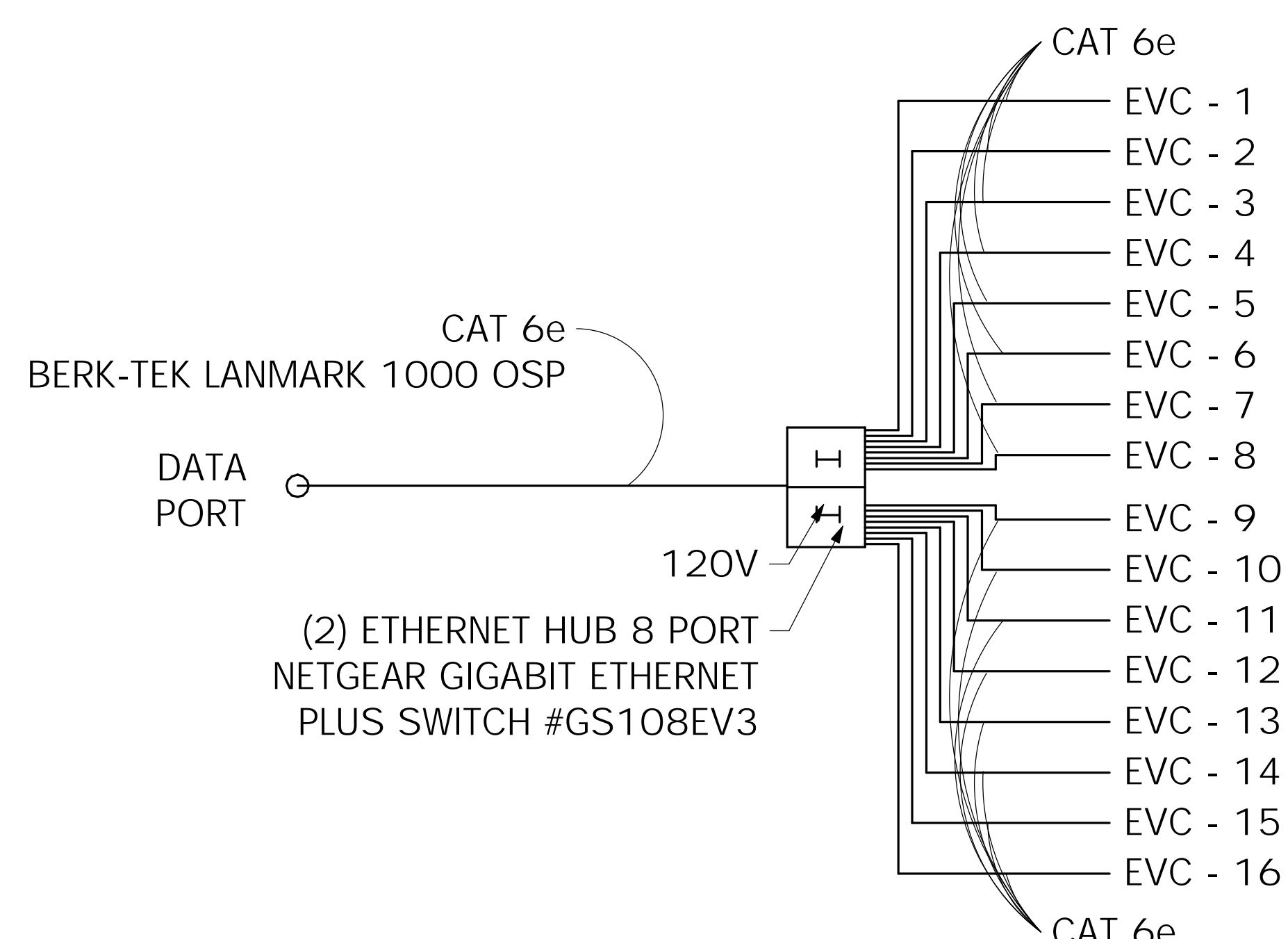
NTS

General Notes

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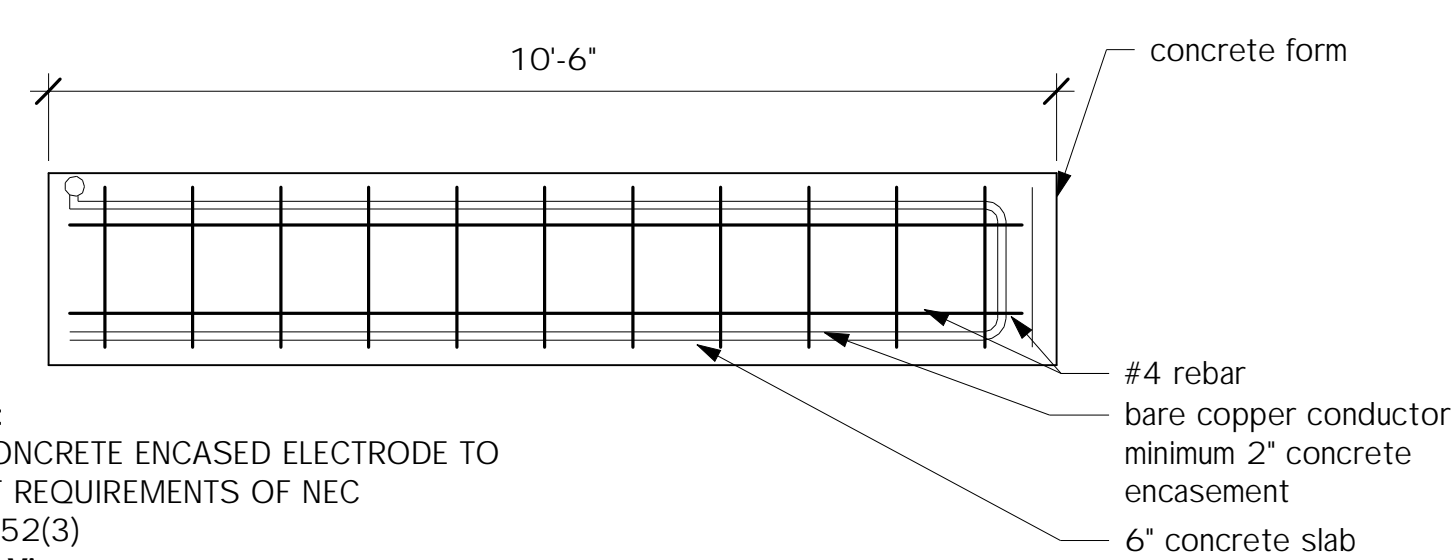
Sheet Notes

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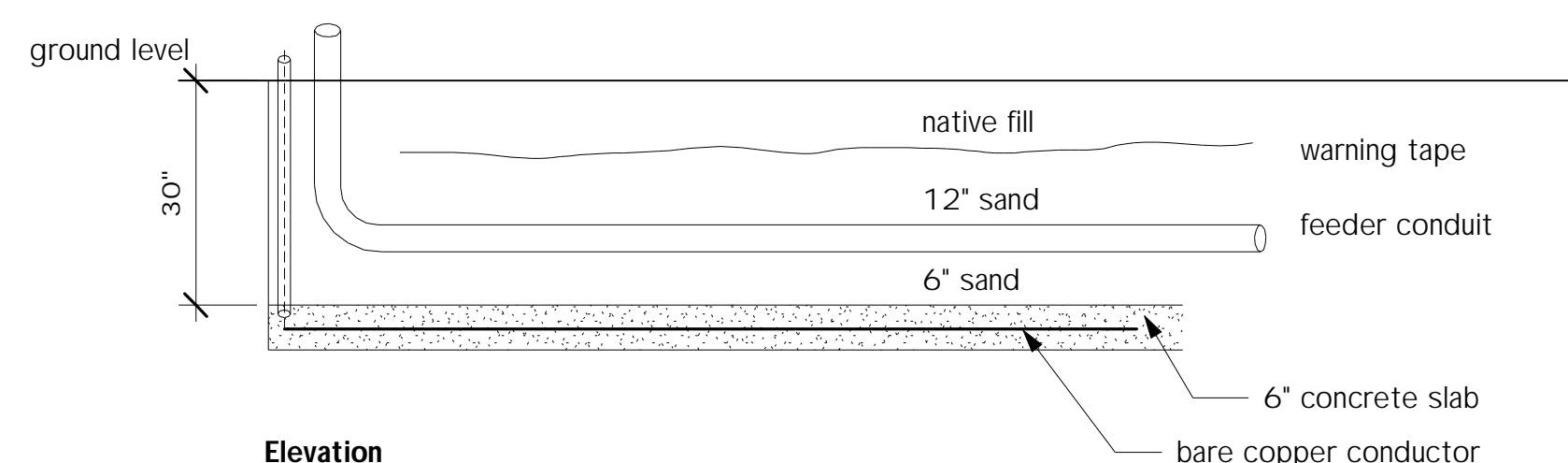


Ethernet Details System 2

NTS



Note:
1. CONCRETE ENCASED ELECTRODE TO MEET REQUIREMENTS OF NEC 250.52(3)
Plan View



Ufer Details System 2

NTS

LOCATION: DISTR 'CSBP' MINI POWER ZONE NEMA RATING 3R

TYPE	DIRECTORY	LOAD	BKR	CIR	CIR	BKR	LOAD	DIRECTORY	TYPE
GFI	ETHERNET CAB	150	20	1	2	-		SPACE	
GFI	RECPTS	400	20	3	4	-		SPACE	
	SPARE		20	5	6	-		SPACE	
	SPARE		20	7	8	-		SPACE	
	SPARE		20	9	10	-		SPACE	

VOLTS: 240/120V, 3PH, 4W. 480/277V, 3PH, 4W.
 AMPS: 125A 200A 400A 30A
 MAIN: MLO MCB DB. LUGS
 BUS: ALUMINUM COPPER
 MTD: FLUSH SURFACE
 DOOR: STANDARD DOOR IN DOOR

PHASE A LOAD: 0.15 KVA (1A)
 PHASE B LOAD: 0.18 KVA (2A)
 PHASE C LOAD: 0.0 KVA (0A)
 TOTAL CONNECTED LOAD: 0.33 KVA (1A)
 NEUTRAL BUS: 100% GROUND BUS: STD
 AIC RATING: 10K 14K 22K

'M2'

Berk-Tek LANmark™-1000 OSP



Berk-Tek's LANmark-1000 OSP (Outside Plant) Enhanced Category 6 OSP cables are designed for outside applications, either aerial or buried in conduit or duct, where building to building interconnections must be made.

DESCRIPTION

Construction: 23 AWG bare copper wire insulated with polyethylene. Two insulated conductors twisted together to form a pair and four such pairs cabled around a cross filler to form the basic unit which is injected with a water resistant flooding compound and jacketed with black weather resistant polyethylene jacket.

Standards: North American: ANSI/TIA-568 2-D Category 6

ANSI/ICEA S-56-434 Outdoor Use

Flame Rating: Not flame rated

ANSI/ICEA 5-107-704-2012, PAR 8.2.1 - Water Penetration

Applications: Berk-Tek's LANmark-1000 OSP cable is intended for high speed data applications including:

- IEEE 802.3 1000BASE-T 1 Gb/s
- TIA/EIA-854 1000BASE-TX 1 Gb/s
- ATM 155 Mb/s 155 Mb/s
- IEEE 802.3 100BASE-TX 100 Mb/s
- CDDI 100 Mb/s
- IEEE 802.3 10BASE-T 10 Mb/s
- IEEE802.3af PoE, Type 1 1 Gb/s
- IEEE802.3at PoE, Type 2 1 Gb/s
- IEEE802.3bt PoE, Types 3 & 4 10 Gb/s

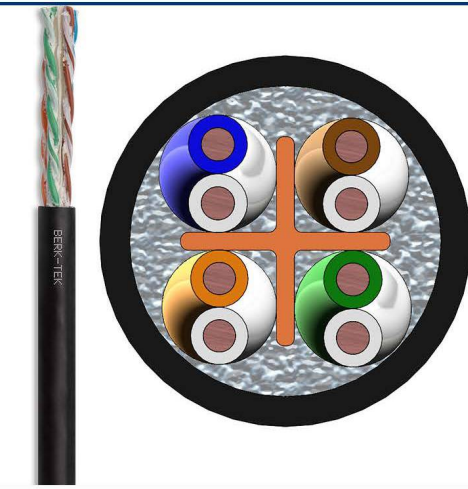
Features

- Meets the requirements of ANSI/TIA-568 2-D
- Usable bandwidth up to 350 MHz
- Fully water blocked

Benefits

- Can be used to interconnect buildings or can be run beneath a slab in duct or conduit
- Simplified structured cabling solution preserving long-term network investment
- Warranted, trouble-free cabling installation and maintenance
- Meets NEC requirement for wet locations

PROUDLY MADE IN THE USA



STANDARDS
National ANSI/TIA 568 2-D

Berk-Tek LANmark™-1000 OSP



CHARACTERISTICS

Construction characteristics	
Type of cable	OSP
Colour	Black
Dimensional characteristics	
Length per reel	10000.0 ft
Number of pairs	4
Usage characteristics	
Packaging	Reel
Field of application	Outdoor
Category	Cat. 6
Recommended installation temperature range	-40 .. 60 °C
Recommended operating temperature range	-40 .. 60 °C

PRODUCT LIST

Part Number	Description
11072213	LANmark-1000 OSP

🔍 = Make to order, 📦 = In stock

LANMARK™-1000 OSP - TECHNICAL INFORMATION

Electrical Characteristics				
Freq.	RL (dB)	Insertion Loss (dB)	PSNEXT (dB)	NEXT (dB)
	min.	max.	min.	min.
1	20.0	2.0	77.3	79.3
4	23.8	3.8	68.3	70.3
10	26.0	5.9	62.3	64.3
16	28.0	7.5	59.3	61.3
20	28.0	8.4	57.8	59.8
31.25	25.0	10.8	54.9	56.9
62.5	23.5	15.3	50.4	52.4
100	22.5	19.7	47.3	49.3
250	20.5	32.6	41.3	43.3
350	19.8	39.5		41.2
Freq.	ACR** (dB)	PSACR (dB)	ACRF (dB)	PSACRF (dB)
	min.	min.	min.	min.
1	77.3	75.3	72.8	69.8
4	68.5	64.5	60.7	57.7
10	58.4	56.4	52.8	49.8
16	53.8	51.7	48.7	45.7
20	51.4	49.4	46.8	43.8
31.25	49.3	44.3	42.9	39.9
62.5	37.1	35.1	36.8	33.8
100	29.6	27.6	32.8	29.8
250	19.7	8.7	24.8	21.8
350	1.63	-0.37	21.9	18.9

** Values for ACR are provided as calculations

Berk-Tek LANmark™-1000 OSP



Parametric Measurements	
Description	
Mutual Capacitance	5.3 nF/100m nom.
DC Resistance	9.38 Ohms/100m max.
Skew	35 ns/100m max.
Pair-to-Ground Unbalance	330 pF/100m max.
Velocity of Propagation	65% nom.
DC Resistance Unbalance	5% max.
Color Code	
Pair-1	White/Blue Blue
Pair-2	White/Orange Orange
Pair-3	White/Green Green
Pair-4	White/Brown Brown

Technical Data - Physical	
Conductor	23 AWG Bare Copper
Conductor Diameter - in. (mm)	0.022 (0.56)
Insulated Conductor Diameter - in. (mm)	0.04 (1.02)
Cable Diameter - in. (mm)	0.245 (6.22)
Nom. Cable Weight - lb./ft. (kg/Mt)	30.5 (13.83)
Max. Installation Tension - lb. (N)	25 (110)
Min. Bend Radius - in. (mm)	1.00 (25.4)

SELLING INFORMATION

PLEASE NOTE: In the interest of product improvement, Berk-Tek may make improvements or changes in the products, the programs or services described at any time without notice. Additionally, the information contained herein may include typographical errors or technical inaccuracies. Changes will be periodically made to address any such issues.



Data Sheet
Gigabit Ethernet Plus Switches



Control and Configure Beyond Plug-and-Play Connectivity

Today's growing businesses rely more on their network to carry out mission-critical business activities. Deployment of VoIP and IP surveillance needs the network intelligence to separate the voice and video traffic from data, and prioritize them accordingly. However, companies do not necessarily have more money or advanced training to deal with complex managed switches.

NETGEAR® Plus Switches meet this growing need by providing fundamental network features such as VLANs, QoS, and IGMP Snooping that will help optimize the performance of business networks. Plus Switches come in a variety of configurations ranging from 5 port desktop to 48 port rack mount.

Some models support Power-over-Ethernet (PoE) and can power devices such as IP phones, IP surveillance cameras and wireless access points with just an Ethernet cable, perfect for low cost PoE deployments. Plus Switches are the perfect upgrade from the plug-and-play unmanaged switch, delivering essential networking features at a very affordable price.

Highlights

- Enable network configuration and management at the price point of Unmanaged Switches
- Gigabit connection delivers up to 2000 Mbps of dedicated, non-blocking bandwidth per port
- Simple, yet useful network set-up on top of plug-and-play connectivity
- Flexible management via easy-to-use web browser-based management GUI or using the PC-based Utility application
- Web interface with multiple language option!
- VLAN support for traffic segmentation
- Quality of Service (QoS) for traffic prioritization
- Auto "denial-of-service" (DoS) prevention
- Troubleshoot connection issues via cable test
- Loop detection and broadcast storm controls
- IGMP snooping v1, v2 and v3 support for multicast optimization
- Rate limiting for better bandwidth allocation
- Port mirroring for network monitoring
- Link aggregation/port trunking for bigger uplink bandwidth (16-port and 24-port models support static manual LAGs only; GS750E supports static manual LAGs and LACP)
- Jumbo frame support
- Energy Efficient Ethernet (IEEE 802.3az) support for maximum power savings
- *Limited Lifetime Hardware Warranty (excludes external power adapters on applicable models)
- Lifetime 24/7 Chat Technical Support*
- Next-Business-Day Hardware Replacement*



* Option only available on the GS108Ev3, GS108PEv3, GS116Ev2, GS750E, JGS516PE, JGS524E-2, JGS524PE, GS105Ev2 and GS105PE. English, German, and Japanese are the current supported languages.



Data Sheet
Gigabit Ethernet Plus Switches

Hardware at a Glance

Model Name	Form-Factor	FRONT		REAR	
		10/100/1000 Base-T RJ45 ports	PoE 802.3af Ports	Power Supply	PoE budget
GS105Ev2	Desktop	5	N/A	External Power Adapter	N/A
GS105PE	Desktop	5	2	NO POWER SUPPLY - must be powered from another PoE device	PoE passthru 19W with 802.3af 7.5W with 802.3af input power
GS108Ev3	Desktop	8	N/A	External Power Adapter	N/A
GS108PEv3	Desktop	8	4	External Power Adapter	53W
GS116Ev2	Desktop	16	N/A	External Power Adapter	N/A
JGS516PE	Rack mount	16	8	Internal	85W
JGS524E-2	Rack mount	24	N/A	Internal	N/A
JGS524PE	Rack mount	24	12	Internal	100W
GS750E	Rack mount	48 Copper and 2 SFP	N/A	Internal	N/A

Software at a Glance

Management	IP Multicast filtering	IEEE 802.3az Auto-EEE	VLANs	QoS	Port Trunking ¹	Rate Limiting	Jumbo Frame Support
PC Utility Tool Web GUI	IGMP Snooping v1, v2 and v3	Yes	Port-based, IEEE 802.1Q, based VLANs	Port-based, IEEE 802.1p-based	16-ports and larger	Yes	Yes

¹ GS116Ev2, JGS516PE, JGS524E-2, and JGS524PE support static manual LAGs only. GS750E supports static manual LAGs and LACP.

Permit Set



EV - Bus Project
1111 North Saliman Rd -
Transportation
CCSD #51.22.01

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Date:	01/06/2023
Issued For:	Permit
Drawn By:	Author
Checked By:	Checker
Scale:	
Project No.:	19-185

Sheet Contents

Sheet Number
EO.3.3



We Make Electric Vehicles Greener

EVSE@nuvve.com
NUVVE.com

Nuvve DC Heavy Duty Charging Station

V2G | 60kW | DC CCS | Heavy-Duty

The Nuvve DC Heavy-Duty Charging Station (RES-HD60-V2G) is designed specifically for vehicle-to-grid (V2G) applications and is the ideal solution for the rapid, smart charging of heavy-duty fleet vehicles such as electric school buses. The RES-HD60-V2G is fully controllable through Nuvve's fleet management app and our V2G platform (GIVE™) enables unidirectional charging of any vehicle or full, bidirectional V2G and vehicle-to-building (V2B) services when connected to a V2G-compatible vehicle.

Key Features

- CCSI connector (combo)
- IEEE 1547
- UL-1741 SA
- 95% efficiency

Powerful, Reliable Charging
The Nuvve DC Heavy-Duty Charging Station (RES-HD60-V2G) features a CCS connector that can charge any vehicle with combo connector and can discharge vehicles with V2G capability. It is designed to meet all utility safety standards in North America to enable interconnection of vehicles as a distributed energy resource.

Your Fleet's Charging Activity at a Glance
Nuvve's fleet management app allows you to set and schedule charge levels for each vehicle in your fleet. Instant access to view vehicle charging status and state of charge allow quick views of an entire fleet with the ability to trigger instant charging if needed.

Intelligent Grid Services
Nuvve's solution is fully scalable to fit your needs and can perform a variety of grid services including frequency regulation, demand response, demand charge management, and time-of-use rate arbitrage.

Technical Specs RES-HD60-V2G

AC Specifications (Power)	
Bidirectional Capable	Yes
Rated Power (kW/kVA)	60
Utility Grid Voltage (Vdc)	480-3P
Max Rated Utility Current (Aac)	79A @ 480VAC (60 Hz)
Wiring	3 phase WYE (L1, L2, L3, Neutral, Gnd)
Utility Grid Frequency (Hz)	60
Power Factor Range	-/- 0.5
THD for Linear Loads	<5%
Maximum Efficiency	>95%
Grid Isolation	Galvanic, Integrated
DC Output	
Maximum Power (kW)	60
Voltage Operating Range (Vdc)	270 to 870
Maximum Current (Aac)	+/- 200A (charging cable limited)
Connector and Cable	CCSI, up to 8m (25 ft)
Energy Metering	
AC Energy Meter (Option)	+/- 1% from 10% to full scale
Mechanical	
PCS Dimensions	31.5" W x 24.5" D x 82" H
PCS Weight	1600 lbs
Dispenser Dimensions	22" W x 17" D x 75" H
Dispenser Weight	150 lbs (configuration dependent)
Environmental	
Cooling	Air cooled
Environmental Rating	NEMA 3P
Operating Ambient Temp.	-20°C to 45°C (-4 to 113°F)
Storage Temperature Range	-30°C to 60°C (-22 to 140°F)
Humidity	0 to 95% (non-condensing)
Altitude	De-rated over 2,000 m above sea level
Communication & Control	
Network Interface	Standard Ethernet (Optional: WiFi, 3G, 4G, LTE)
Certification, Safety, Compliance	
Certifications	UL1741-SA, UL 2202, IEEE 1547.1 & CSA C22.2 No. 1071-H6

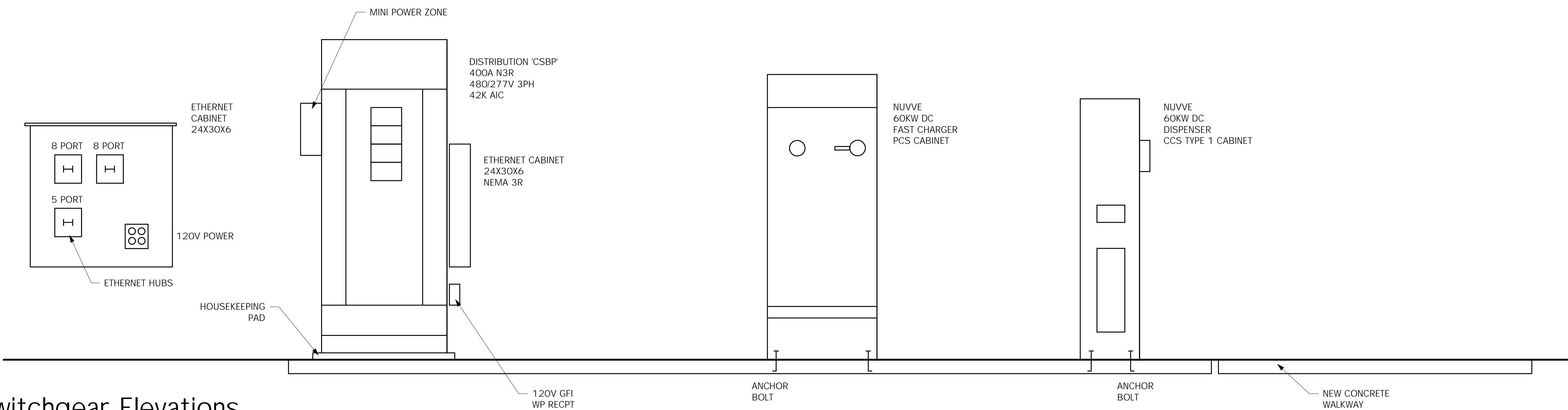
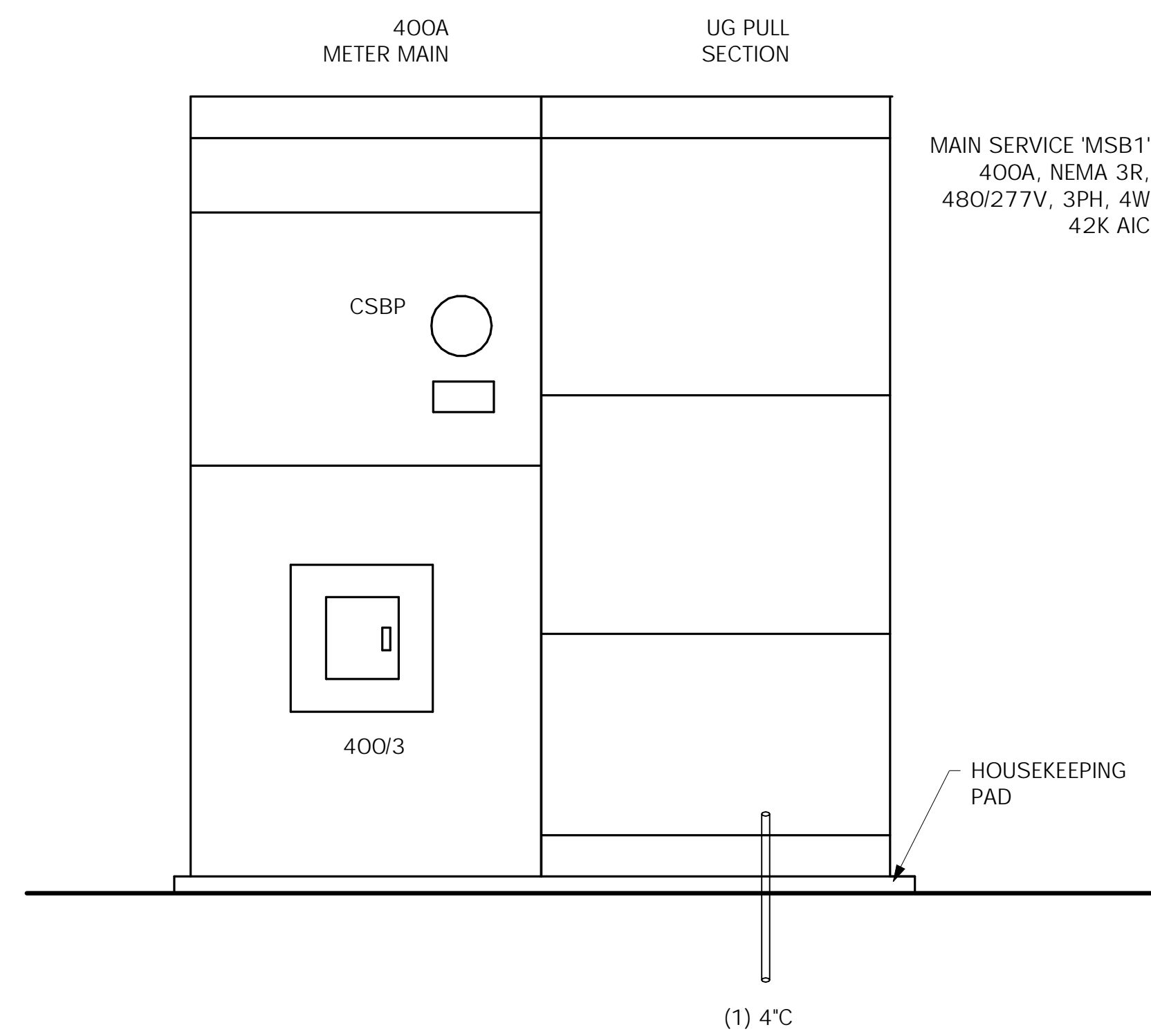


Charging Station



Dispenser

*Images not to scale



Switchgear Elevations

NTS

VUVVE DC CHARGING STATION NOTES

- NUVVE # RES-HD60-V2G
- 60 KW DC HEAVY DUTY CHARGING STATION
- VEHICLE - TO - GRID (V2G) FOR RAPID, SMART CHARGING OF FLEET VEHICLES
- CHARGING CONTROL THRU NUVVE'S FLEET MANAGEMENT APP
- PLATFORM ENABLES UNIDIRECTIONAL CHARGING OF VEHICLE OR FULL, BIDIRECTIONAL AND VEHICLE TO BUILDING
- 60KW 480V-3P WYE 79 AMP
- 60HZ <5% THD >95% EFFICIENCY
- Vdc: 270 TO 870 MAX Aac: +/- 200A 25' CCSI CABLE
- NEMA 3R AIR COOLED DEDICATED IP ADDRESS
- INSTALL PER MANUFACTURERS GUIDE LINES
- SEE GUIDE FOR ANCHORING DETAILS AND CONDUIT ENTRY
- INSTALL INSULATED GROUNDING CONDUCTOR IN FEEDER GROUNDS TO NEW USER AT DISTRIBUTION SECTION
- PRIOR TO ENERGIZING VERIFY ALL HIGH VOLTAGE DC WIRE INSULATION RESISTANCE CABLES USING A 1KV MEGOHM METER SEE GUIDE FOR REQUIRED TEST
- PROVIDE CAT 6e DATA CABLE FOR EACH CHARGER COORDINATE WITH CCHS IT DEPARTMENT FOR INDIVIDUAL IP ADDRESS
- CHARGERS WILL BE FURNISHED BY CCSD. COORDINATE COMMISSIONING WITH VUVVE

Construction Design Services, inc.
ELECTRICAL ENGINEERING
PO BOX 34051, RENO, NV 89533
phone: 775-636-0080

Permit Set



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CCSD #51.22.01

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Checked By: MP
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Project No.: 19-185

Sheet Contents

Switchgear Elevation

Sheet Number
EO.4.1

Technical Specs RES-HD60-V2G

AC Specifications (Power)	
Bidirectional Capable	Yes
Rated Power (kW/kVA)	60
Utility Grid Voltage (Vdc)	480-3P
Max Rated Utility Current (Aac)	79A @ 480VAC (80 Hz)
Wiring	3 phase WYE (L1, L2, L3, Neutral, Gnd)
Utility Grid Frequency (Hz)	60
Power Factor Range	+/- 0.5
THD for Linear Loads	<5%
Maximum Efficiency	>95%
Grid Isolation	Galvanic, Integrated
DC Output	
Maximum Power (kW)	60
Voltage Operating Range (Vdc)	270 to 870
Maximum Current (Aac)	+/- 200A (charging cable limited)
Connector and Cable	CCSI, up to 8m (25 ft)
Energy Metering	
AC Energy Meter (Option)	+/- 1% from 10% to full scale
Mechanical	
PCS Dimensions	31.5"W x 24.5"D x 82"H
PCS Weight	1600 lbs
Dispenser Dimensions	22"W x 17"D x 75"H
Dispenser Weight	150 lbs (configuration dependent)
Environmental	
Cooling	Air cooled
Environmental Rating	NEMA 3R
Operating Ambient Temp.	-20°C to 45°C (-4 to 113°F)
Storage Temperature Range	-30°C to 60°C (-22 to 140°F)
Humidity	0 to 95% (non-condensing)
Altitude	De-rated over 2,000 m above sea level
Communication & Control	
Network Interface	Standard: Ethernet (Optional: WiFi, 3G, 4G, LTE)
Certification, Safety, Compliance	
Certifications	UL1741-SA, UL 2202, IEEE 15471 & CSA C22.2 No. 1071-16



Charging Station



Dispenser

*Images not to scale



We Make Electric Vehicles Greener

EVSE@nuvve.com
NUVVE.com

Nuvve DC Heavy Duty Charging Station

V2G | 60kW | DC CCS | Heavy-Duty

The Nuvve DC Heavy-Duty Charging Station (RES-HD60-V2G) is designed specifically for vehicle-to-grid (V2G) applications and is the ideal solution for the rapid, smart charging of heavy-duty fleet vehicles such as electric school buses. The RES-HD60-V2G is fully controllable through Nuvve's fleet management app and our V2G platform (GIVE™) enables unidirectional charging of any vehicle or full, bidirectional V2G and vehicle-to-building (V2B) services when connected to a V2G-compatible vehicle.

Key Features

- CCSI connector (combo)
- IEEE 1547
- UL-1741 SA
- 95% efficiency

Powerful, Reliable Charging

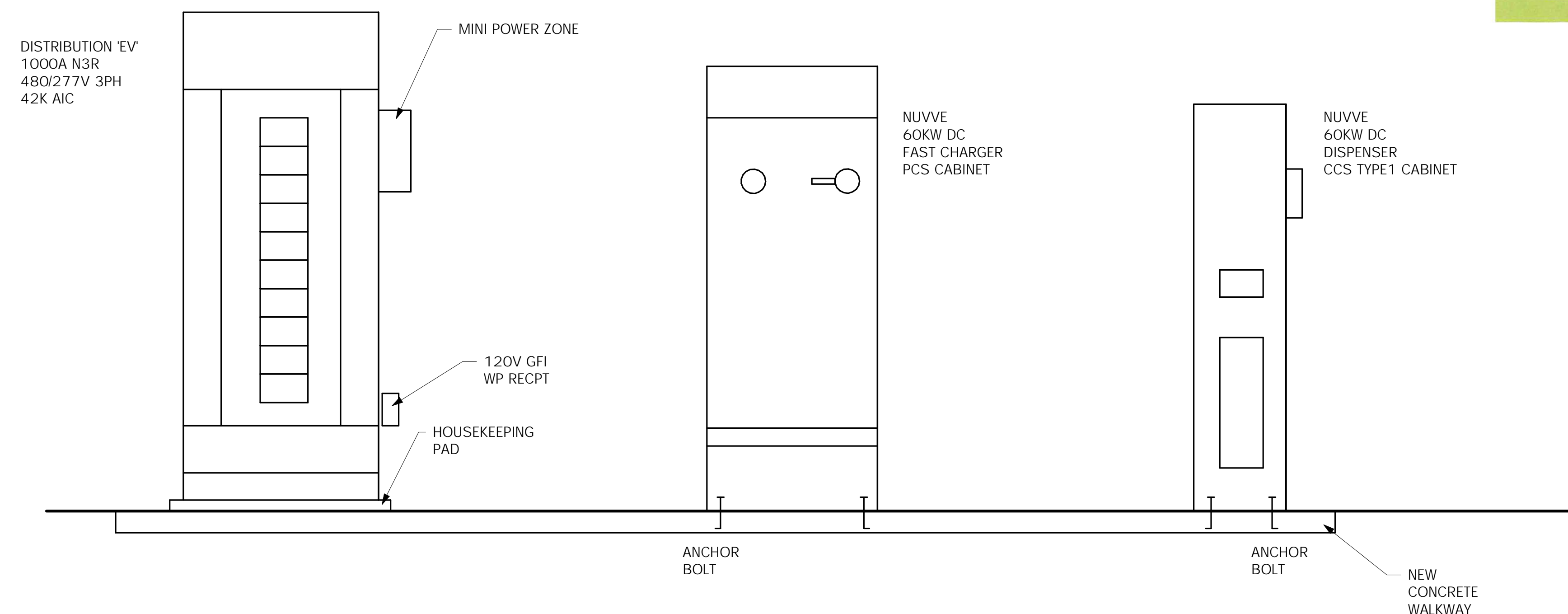
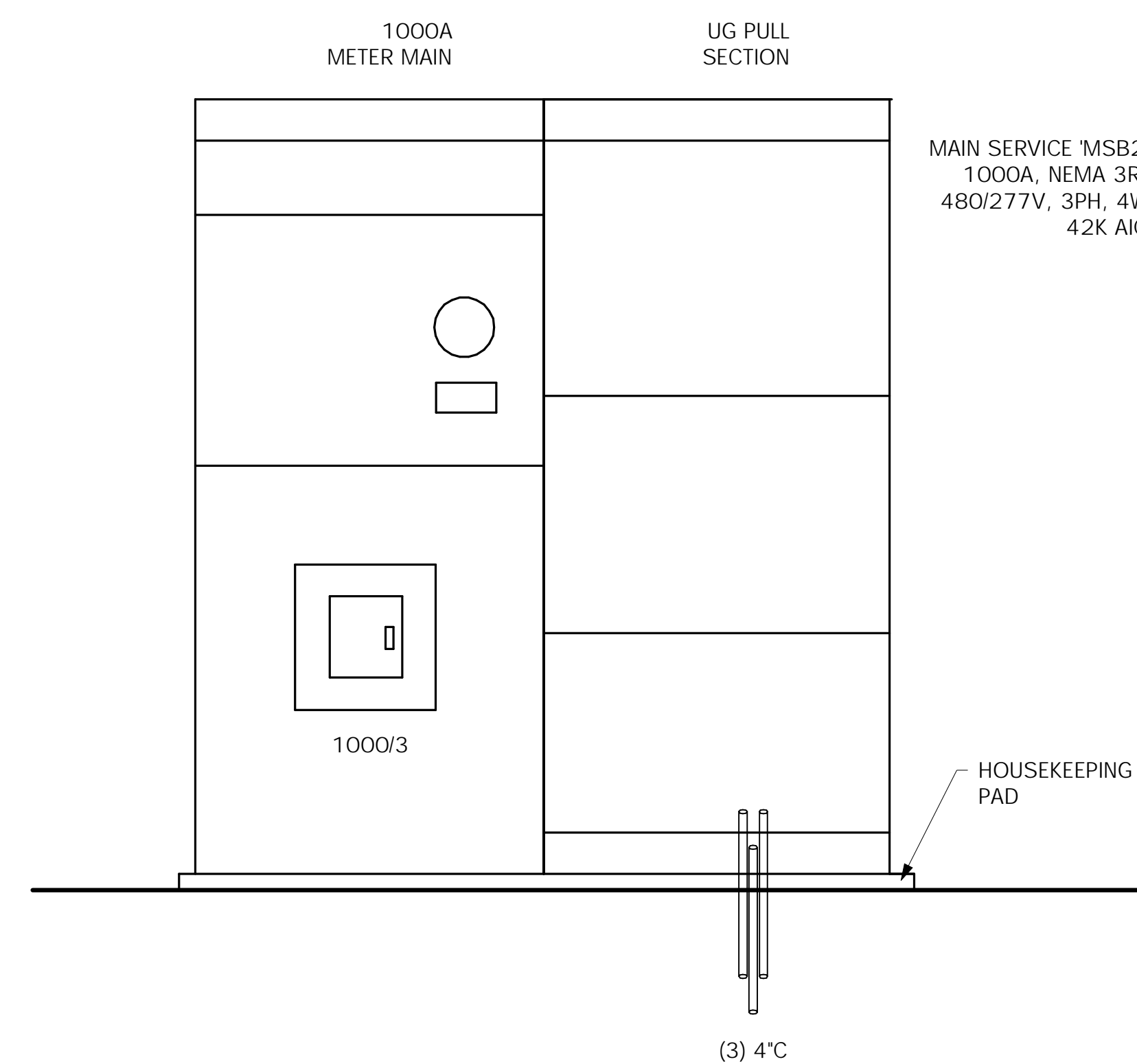
The Nuvve DC Heavy-Duty Charging Station (RES-HD60-V2G) features a CCSI connector that can charge any vehicle with combo connector and can discharge vehicles with V2G capability. It is designed to meet all utility safety standards in North America to enable interconnection of vehicles as a distributed energy resource.

Your Fleet's Charging Activity at a Glance

Nuvve's fleet management app allows you to set and schedule charge levels for each vehicle in your fleet. Instant access to view vehicle charging status and state of charge allow quick views of an entire fleet with the ability to trigger instant charging if needed.

Intelligent Grid Services

Nuvve's solution is fully scalable to fit your needs and can perform a variety of grid services including frequency regulation, demand response, demand charge management, and time-of-use rate arbitrage.



Switchgear Elevations System II

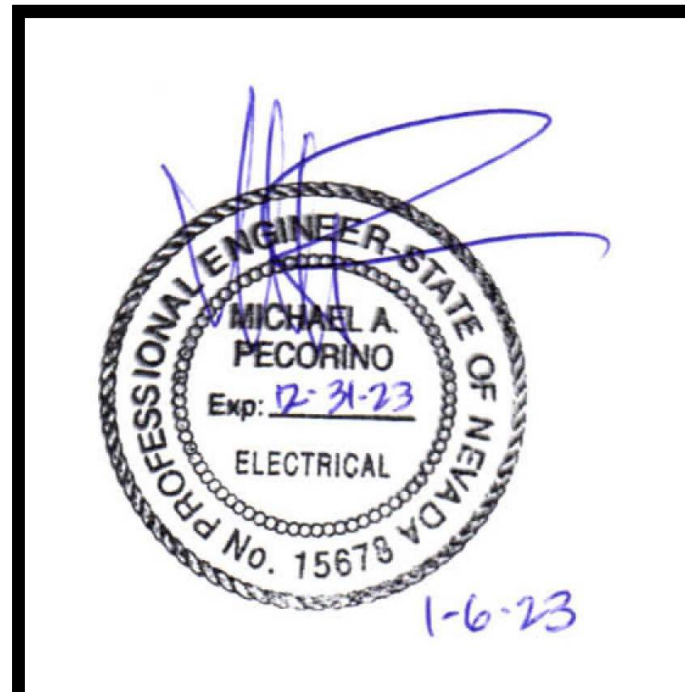
VUVVE DC CHARGING STATION NOTES

- NUVVE # RES-HD60-V2G
- 60 KW DC HEAVY DUTY CHARGING STATION
- VEHICLE - TO - GRID (V2G) FOR RAPID, SMART CHARGING OF FLEET VEHICLES
- CHARGING CONTROL THRU NUVVE'S FLEET MANAGEMENT APP
- PLATFORM ENABLES UNIDIRECTIONAL CHARGING OF VEHICLE OR FULL, BIDIRECTIONAL AND VEHICLE TO BUILDING

- 60KW
- 60HZ
- NEMA 3R
- 480V-3P WYE
- 4.5% THD
- MAX Aac +/- 200A
- AIR COOLED
- 79 AMP
- >95% EFFICIENCY
- 25' CCSI CABLE
- DEDICATED IP ADDRESS

- INSTALL PER MANUFACTURERS GUIDE LINES
- SEE GUIDE FOR ANCHORING DETAILS AND CONDUIT ENTRY
- INSTALL INSULATED GROUNDING CONDUCTOR IN FEEDER GROUNDS TO NEW UFER AT DISTRIBUTION SECTION
- PRIOR TO ENERGIZING VERIFY ALL HIGH VOLTAGE DC WIRE INSULATION RESISTANCE CABLES USING A 1KV MEGAOHM METER SEE GUIDE FOR REQUIRED TEST
- PROVIDE CAT 6a DATA CABLE FOR EACH CHARGER COORDINATE WITH CCHS IT DEPARTMENT FOR INDIVIDUAL IP ADDRESS
- CHARGERS WILL BE FURNISHED BY CCSD. COORDINATE COMMISSIONING WITH VUVE

Permit Set



EV - Bus Project
1111 North Saliman Rd -
Transportation
CCSD #51.22.01

Revisions:

Date: 01/06/2023
Issued For: Permit
Drawn By: CRN
Checked By: MP
Scale: As indicated
Project No.: 19-185

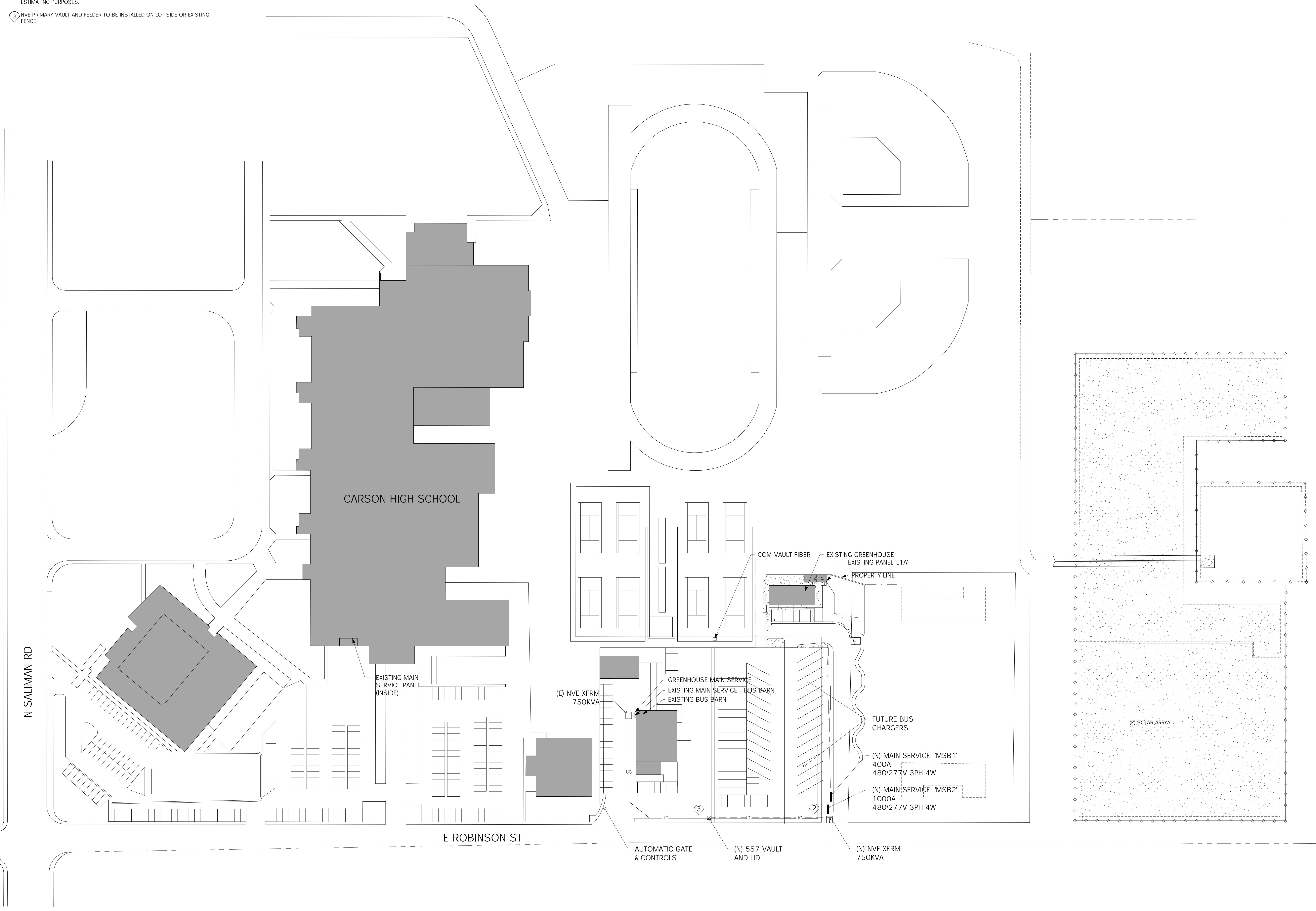
Sheet Contents

Sheet Number
EO.4.2



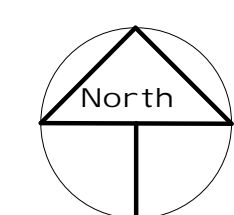
Sheet Notes

- ① EXTEND AND CONNECT BRANCH CIRCUITING FROM JUNCTION BOX TO WIRING DEVICE IN THIS AREA WITH THE SAME CIRCUIT NUMBER.
- ② ACTUAL ENGINEERED PG&E DRAWINGS SHALL SUPERCEDE THIS SITE DRAWING SHOWING INCOMING SERVICE. THIS DRAWING IS DIAGRAMMATIC IN NATURE ONLY AND IS INTENDED FOR BUDGET OR ESTIMATING PURPOSES.
- ③ NVE PRIMARY VAULT AND FEEDER TO BE INSTALLED ON LOT SIDE OR EXISTING FENCE.



Overall Site Utility Plan

Scale 1" = 60'-0"



Permit Set



EV - Bus Project
 1111 North Saliman Rd -
 Transportation
 CCSD #51.22.01

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Date:	01/06/2023
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Sheet Contents

Overall Site Lighting Plan
 Sheet Notes

Sheet Number
E1.0

Sheet Notes

- ① FIELD VERIFY SENSOR LOOPS FOR GATE CONTROLS. MAINTAIN A 10' CLEARANCE TO ANY GATE CONTROLS
- ② INSTALL 8X8X6 NEMA 3R PULL CAN AND RUN A 1" C TO IT N9 BOX AT DISTRCSBP. RUN A 3/4" EMT UP BLOCK WALL. PENETRATE TO A 4 1 1/16" BOX & COVER INSIDE AT RAFTERS OF MEZZANINE AND EXTEND TO IT RACK. LEAVE 6" OF SLACK FOR TERMINATION BY SCHOOL IT DEPT. RUN (2) CAT 6e BERK-TEK LANMARK 1000 OSP OUTSIDE PLANT CABLE
- ③ NVE PRIMARY VAULT AND FEEDER TO BE INSTALLED ON LOT SIDE OR EXISTING FENCE

Permit Set



EV - Bus Project
1111 North Saliman Rd -
Transportation
CCSD #51.22.01

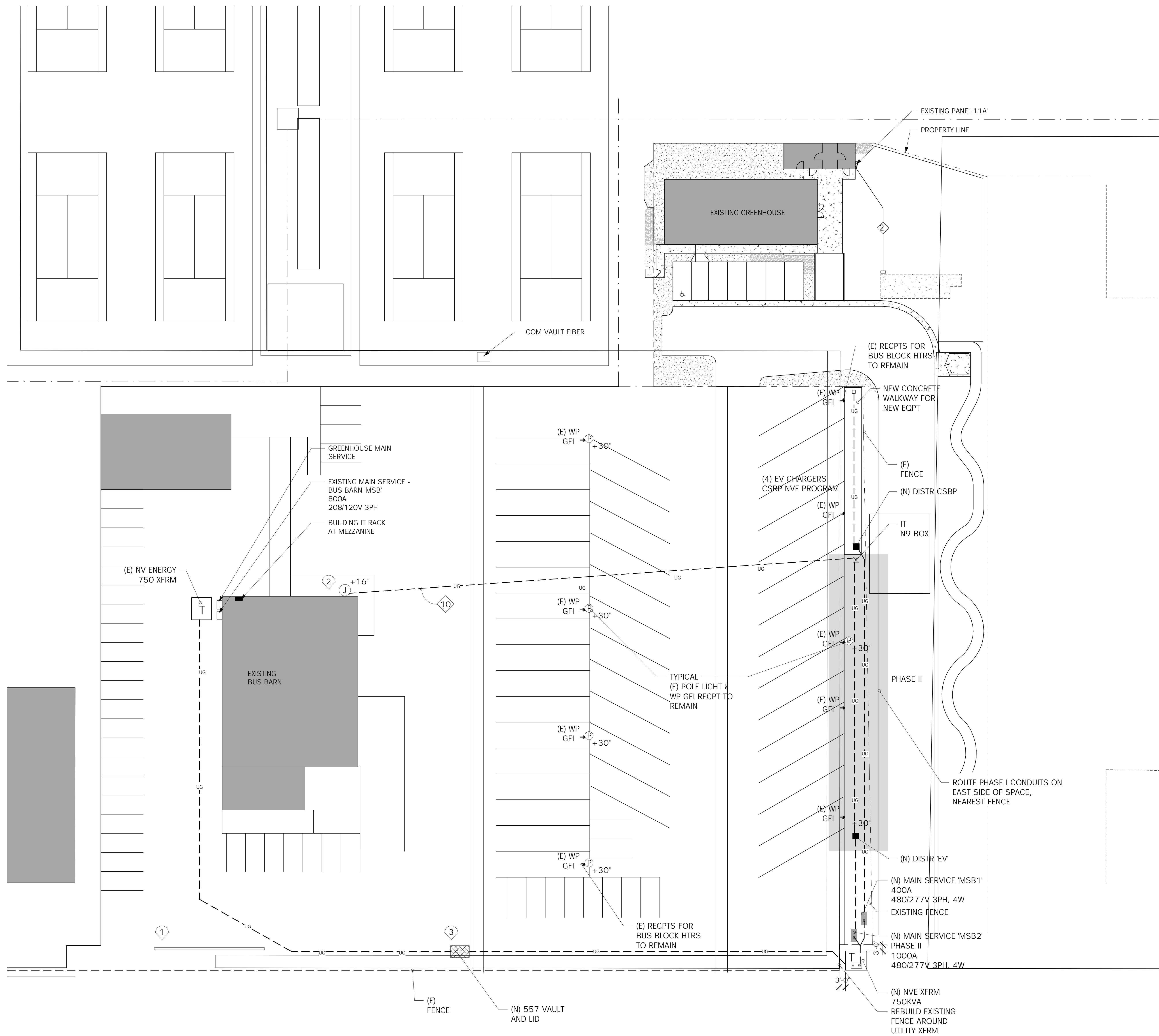
Revisions:

Date:	01/06/2023
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Scale:	As indicated
Project No.:	19-185

Sheet Contents

Enlarged Site Plan

Sheet Number
E1.1.1



Enlarged Site Plan Phase I

Scale 1" = 20'-0"



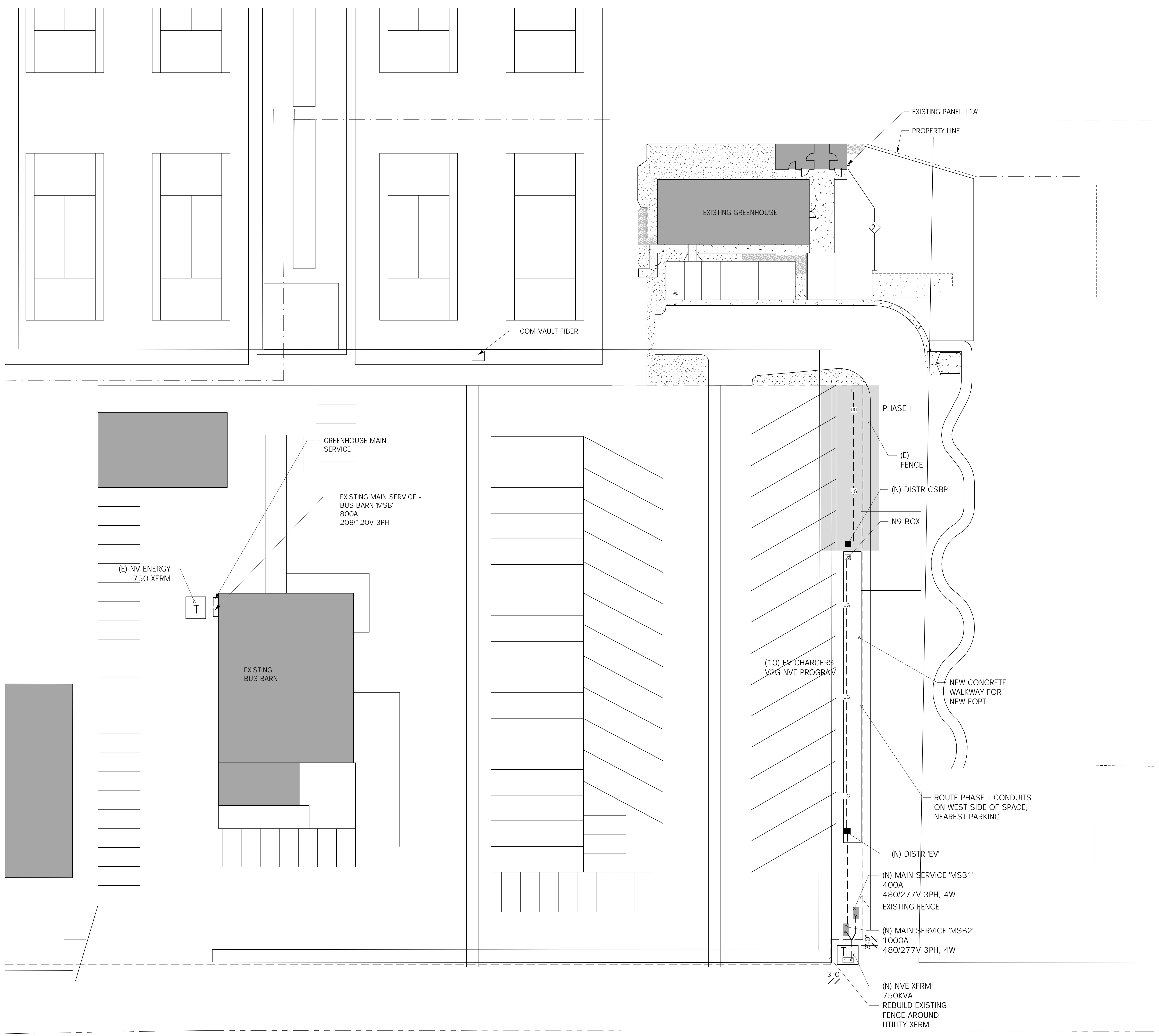
EV - Bus Project
 1111 North Saliman Rd -
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 CCSD #51.22.01

Revisions:

Date:	01/06/2023
Issued For:	Permit
Drawn By:	CRN
Checked By:	MP
Scale:	1" = 20'-0"
Project No.:	19-185

Sheet Contents

Sheet Number
E1.1.2



Enlarged Site Plan Phase II
 Scale 1" = 20'-0"

Permit Set



EV - Bus Project
 1111 North Saliman Rd -
 Transportation
 CCSD #51.22.01

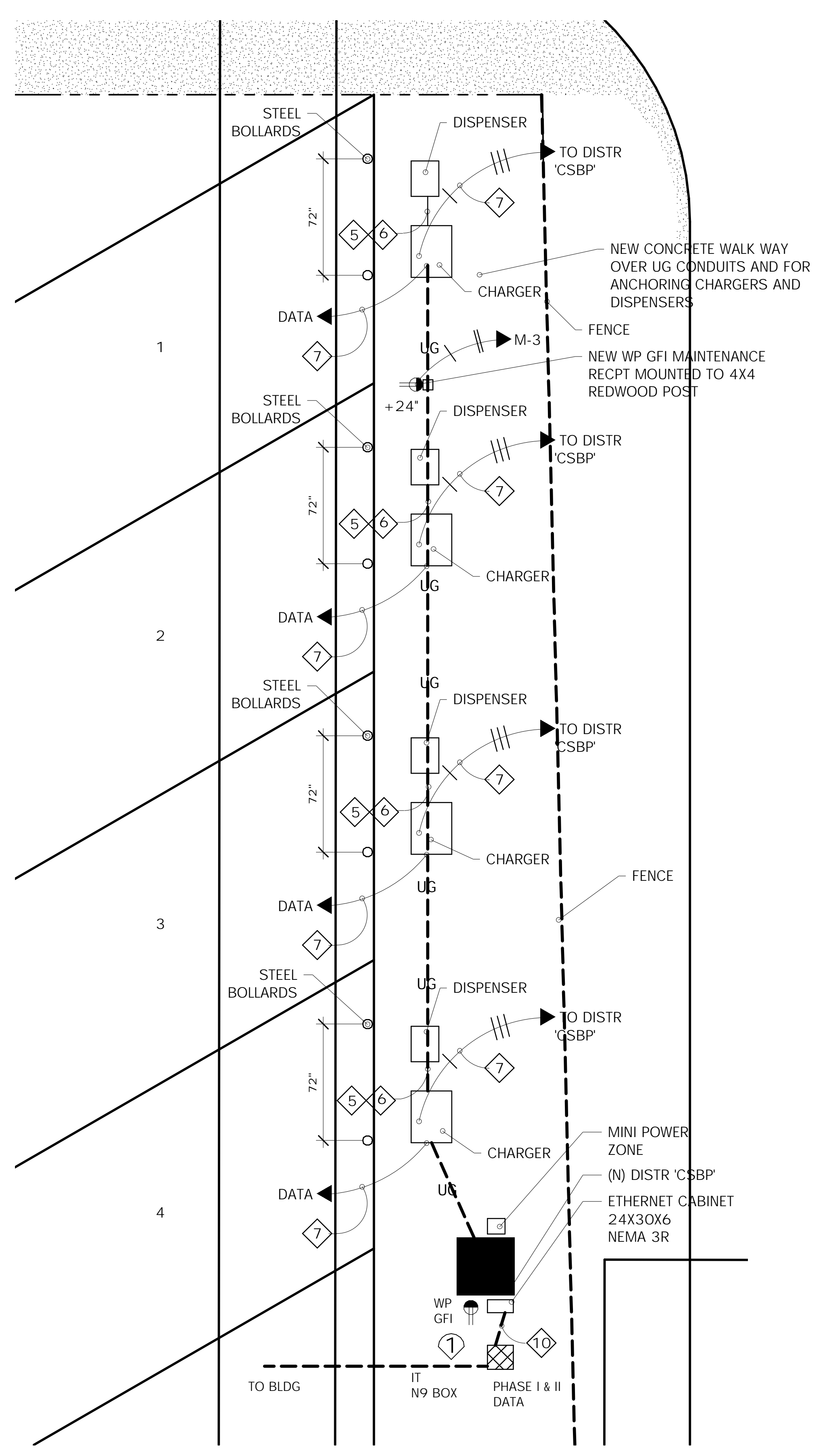
Revisions:

Date:	01/06/2023
Issued For:	Permit
Drawn By:	CRN
Checked By:	MP
Scale:	As indicated
Project No.:	19-185

Sheet Contents

Site Plan

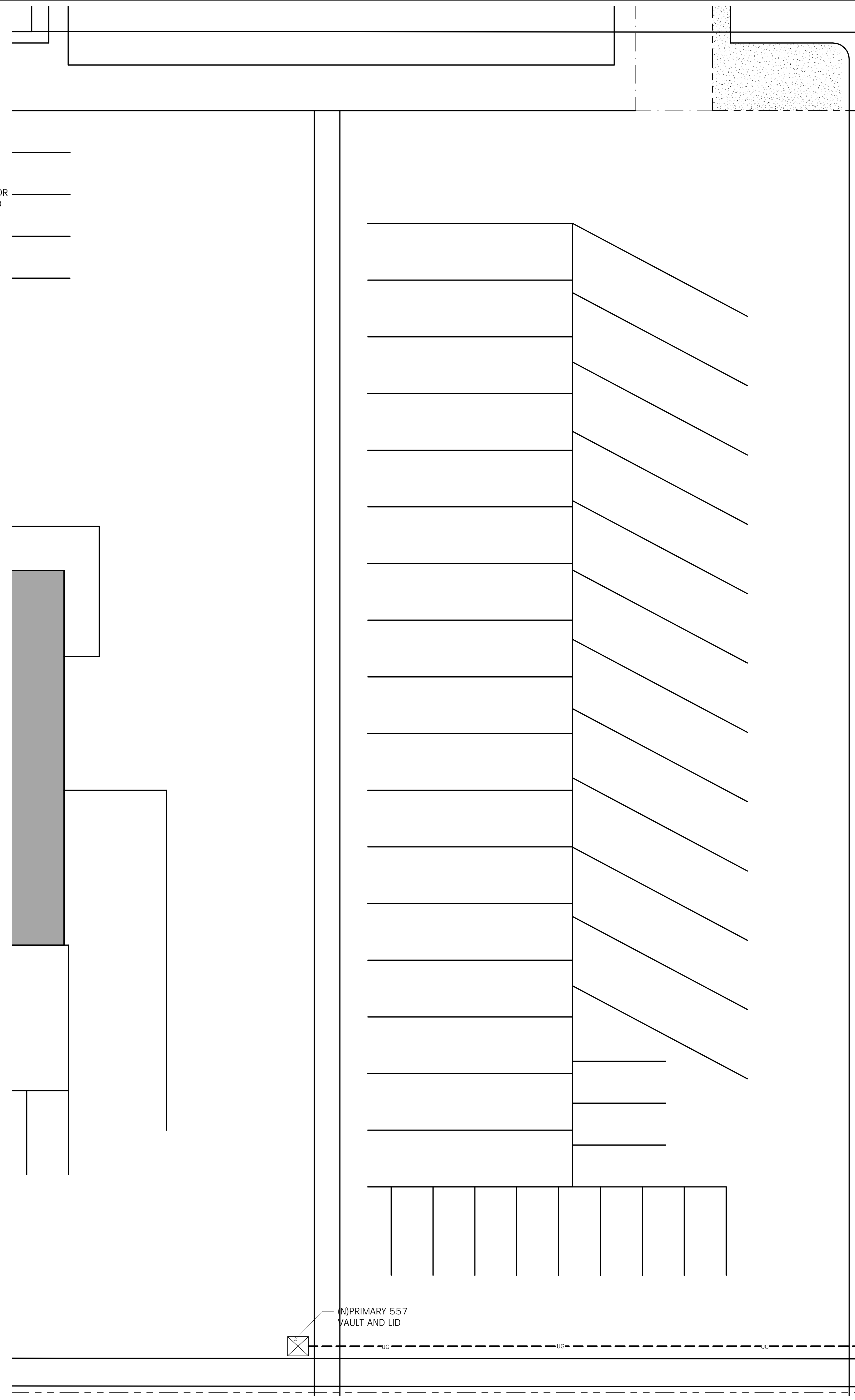
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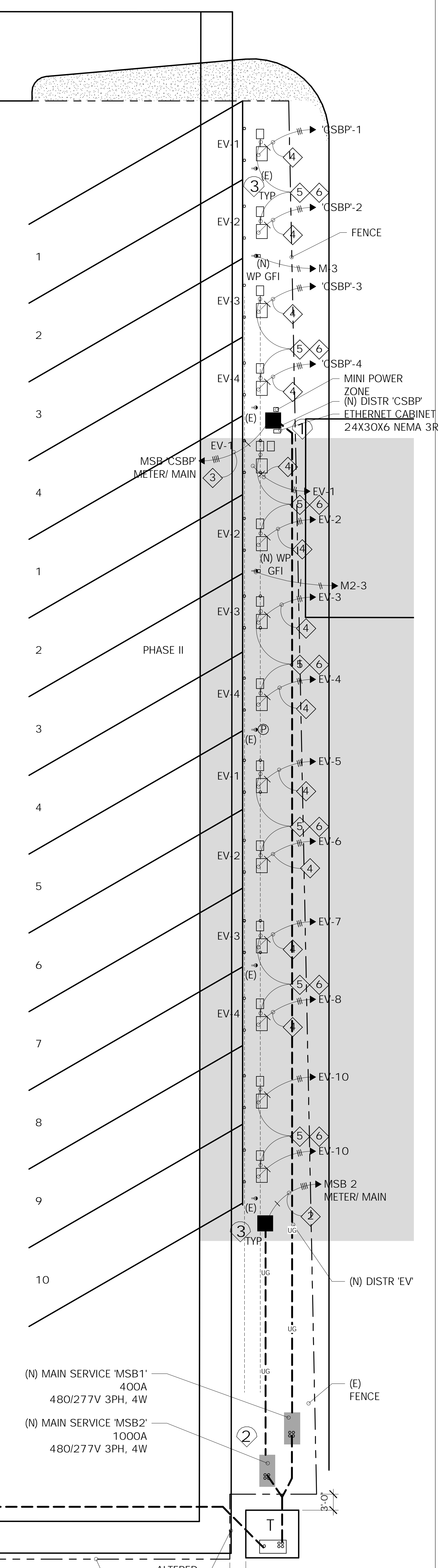
Enlarged Plan Phase I
 Scale 1/4" = 1'-0"

Sheet Notes

- ① PHASE I & II DATA. INSTALL N9 BOX, LID & EXTENSION; (2) 1" CAT 6e TO ETHERNET IT RACK BLDG MEZZANINE
- ② PHASE II POWER. INSTALL N9 BOX, LID & EXTENSION; (3) 4" C TO NVE XFRM SECONDARY WINDOW
- ③ EXISTING WP RECPTS FOR BUS BLOCK HTRS TO REMAIN



Site Charger Plan Phase I
 Scale 3/32" = 1'-0"



Scale 3/32" = 1'-0"

Permit Set



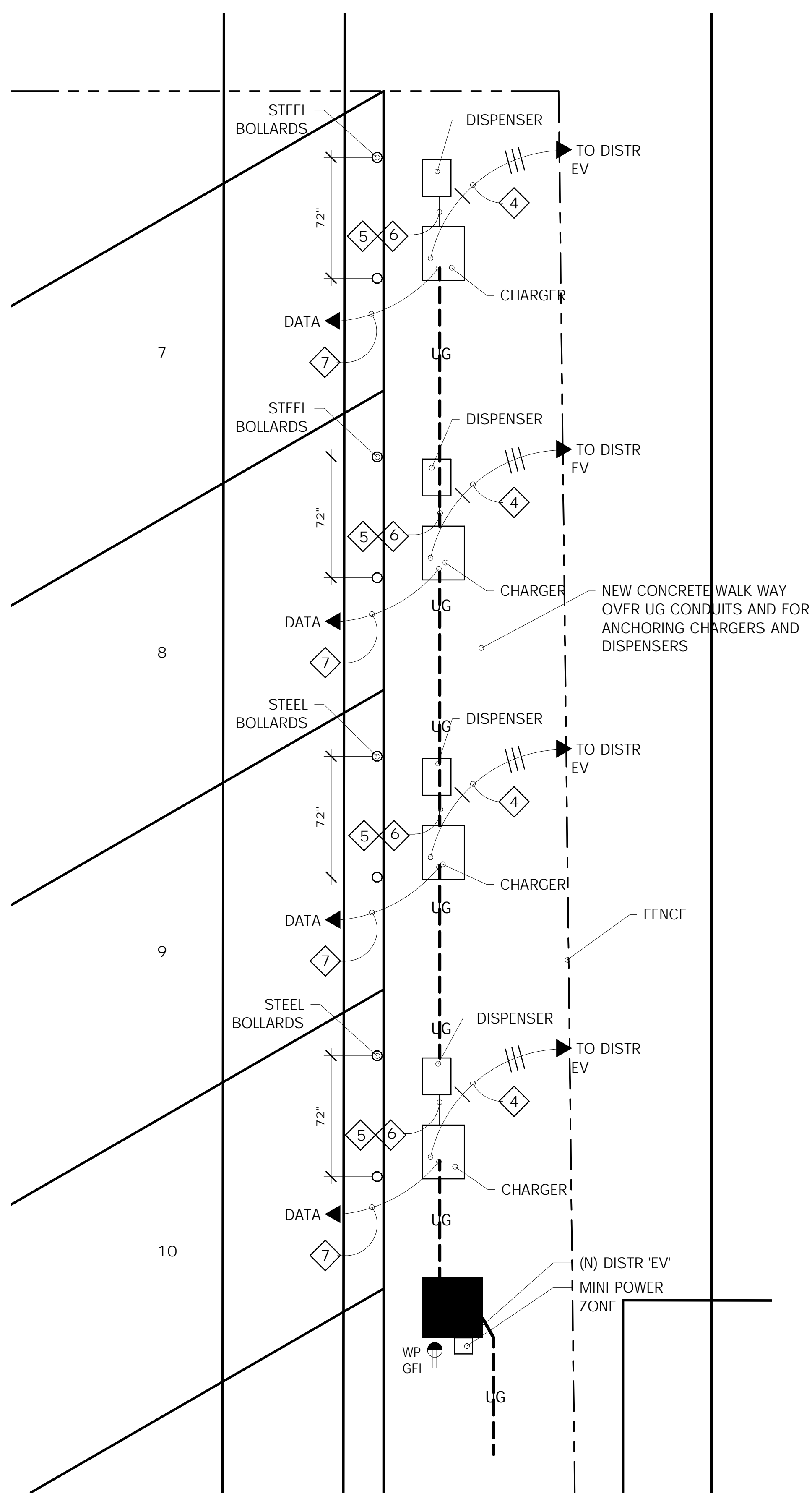
EV - Bus Project
 1111 North Saliman Rd -
 Transportation
 CCSD #51.22.01

Revisions:

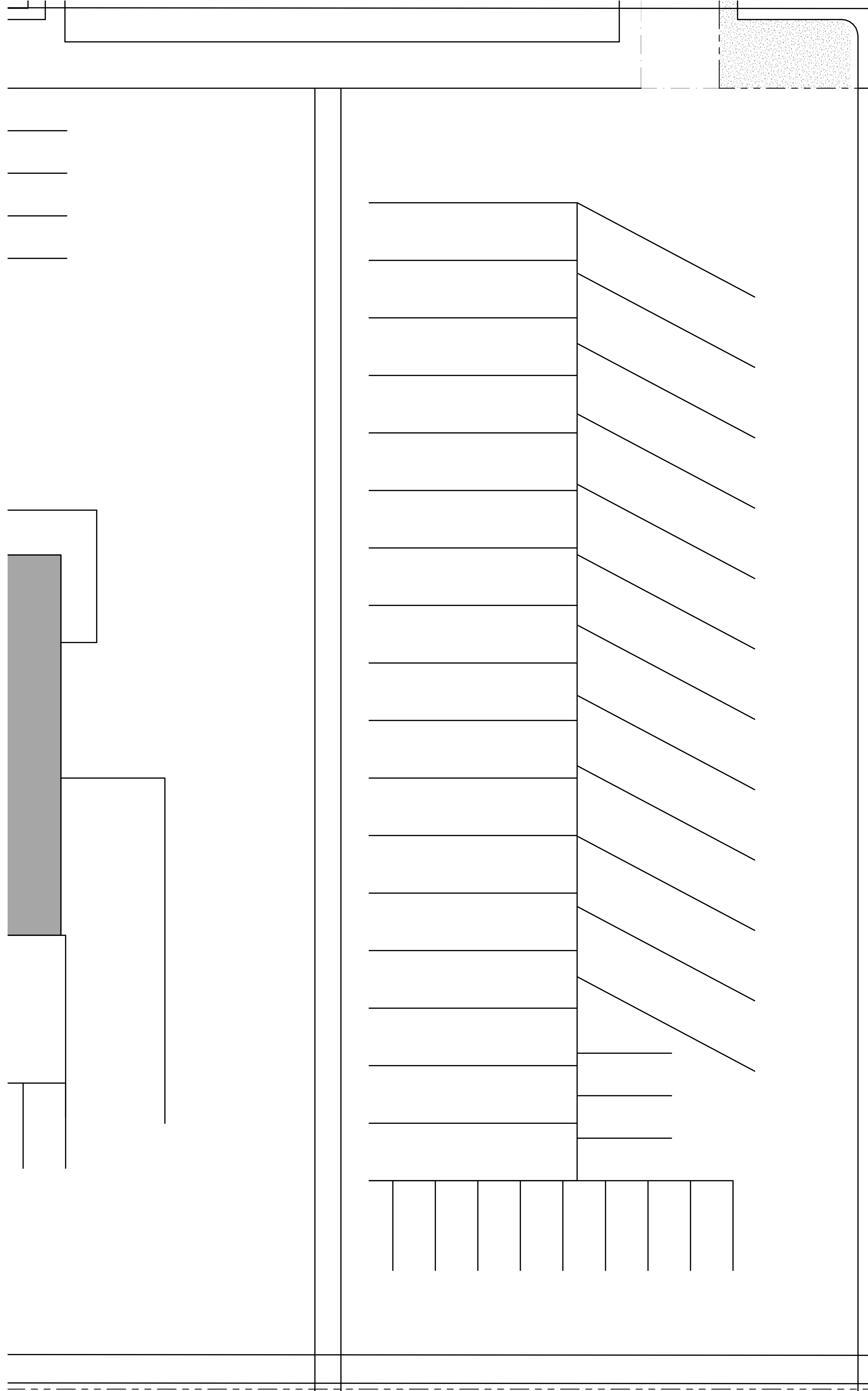
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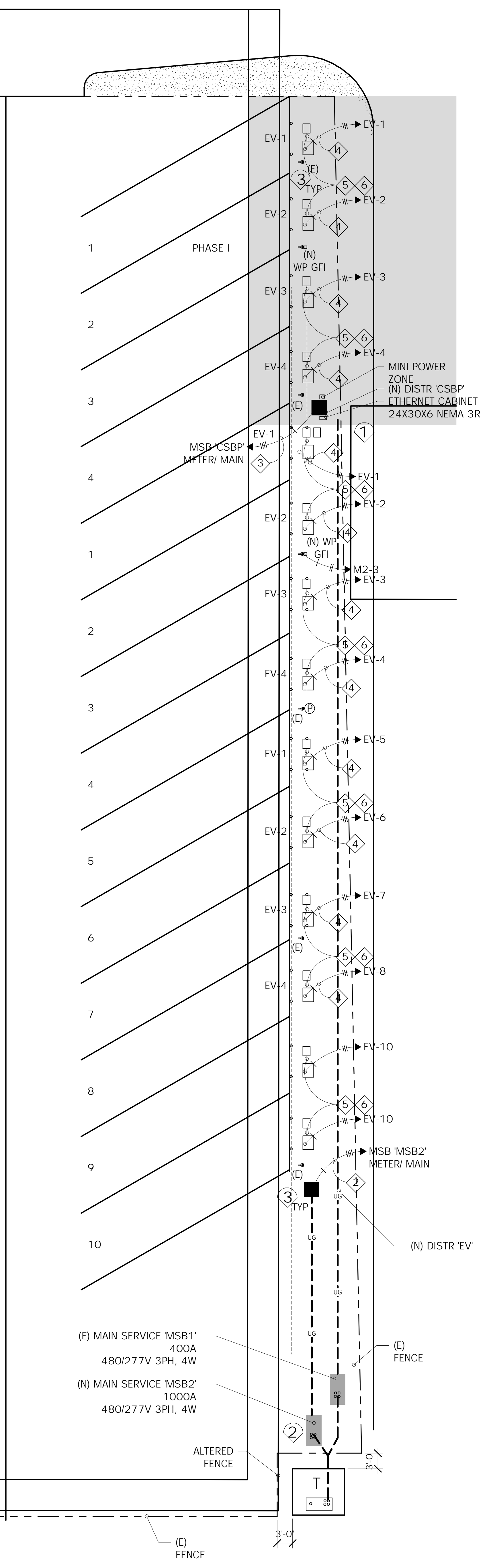
Sheet Number
E1.2.2



Enlarged Plan Phase II
 Scale 1/4" = 1'-0"



Site Charger Plan Phase II
 Scale 3/32" = 1'-0"



- Sheet Notes
- ① PHASE I & II DATA, INSTALL N9 BOX, LID & EXTENSION; (2) 1" CAT 6e TO ETHERNET IT RACK BLDG MEZZANINE
 - ② PHASE II POWER, REMOVE N9 BOX AND EXTEND (3) 4" C TO ABOVE GRADE INTO MSB2 HOUSE KEEPING PAD
 - ③ EXISTING WP RECPTS FOR BUS BLOCK HTRS TO REMAIN

(E) MAIN SERVICE 'MSB1'
 400A
 480/277V 3PH, 4W

(N) MAIN SERVICE 'MSB2'
 1000A
 480/277V 3PH, 4W

(E) FENCE

ALTERED FENCE

(N) DISTR 'EV'