

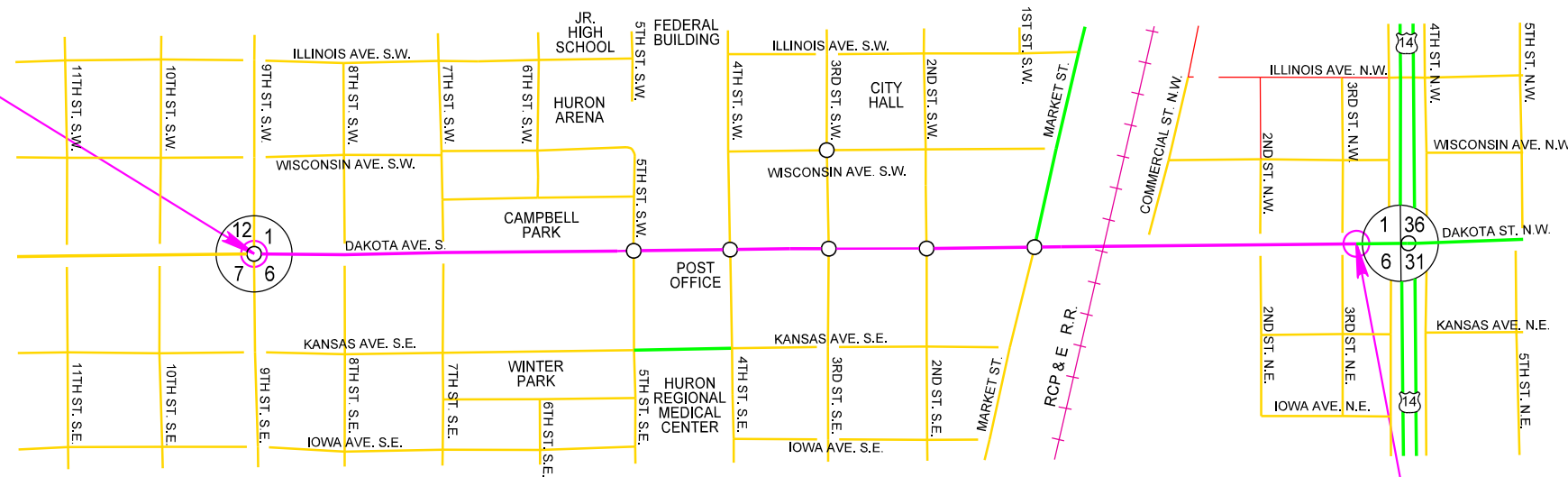
SECTION L: SIGNAL & LIGHTING PLANS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0037(158)126	L1	L54

INDEX OF SHEETS

L1	General Layout with Index
L2-L6	Estimate with General Notes & Tables
L7-L12	Conduit and Cable Quantities
L13-L20	Existing Signal & Signal Layouts
L21-L34	Conduit Layouts
L35-L37	Wiring Diagrams
L38-L41	Signal Timings
L42-L45	Traffic Signal Wiring Tables
L46	Special Detail
L47-L54	Standard Plates

BEGIN NH-CR 0037(158)126
 Station 9+32.27 = Station 16+76.01
 on F 0037(8)126 located 0.33 feet
 North and 50.49 feet West of the
 Southwest corner of Lot 13 of Block 1
 of County Auditor's Plat No. 2 of a
 portion of Outlots S and 25 to Huron
 MRM = 126.72+0.008



HURON

END NH-CR 0037(158)126
 Station 58+84.30 = Station 55+60.27
 on U 0037(5)127 located 111.48
 feet South and 47.56 feet West of the
 Northwest corner of Lot 9 of Weir Plat,
 a Subdivision of Outlot B in Lot 4 of
 Section 6 - Township 110 North -
 Range 61 West of the 5th P.M. to Huron
 MRM = 127.65+0.014

DESIGN DESIGNATION

AADT (2022)	10518
AADT (2047)	16198
DHV	2177
D	50%
DHV T%	2.6%
AAAT T%	5.8%
V	30 mph

STORM WATER PERMIT

Major Receiving
 Body of Water: James River
 Area Disturbed: 12 Ac
 Total Project Area: 14 Ac
 Approx. Begin Lat,Long: 44.356207, -98.214164

Gross Length	4952.03 Feet	0.938 Miles
Length of Exceptions	0 Feet	0 Miles
Net Length	4952.03 Feet	0.938 Miles

SECTION L ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
110E1520	Remove Signal Equipment	Lump Sum	LS
110E1530	Remove Signal Pole Footing	15	Each
110E1540	Remove Luminaire Pole Footing	19	Each
110E5100	Salvage Luminaire Pole	19	Each
110E5110	Salvage Signal Equipment	Lump Sum	LS
250E0010	Incidental Work	Lump Sum	LS
635E0050	Breakaway Base Luminaire Pole with Arm, 50' Mounting Height	11	Each
635E0902	Decorative Luminaire Pole with Twin Arms	24	Each
635E2000	Pedestal Signal Pole	1	Each
635E2020	Signal Pole with 20' Mast Arm	2	Each
635E2025	Signal Pole with 25' Mast Arm	1	Each
635E2030	Signal Pole with 30' Mast Arm	1	Each
635E2035	Signal Pole with 35' Mast Arm	2	Each
635E2054	Signal Pole with 50' and 40' Mast Arms with Luminaire Arm	1	Each
635E2120	Signal Pole with 20' Mast Arm and Luminaire Arm	1	Each
635E2125	Signal Pole with 25' Mast Arm and Luminaire Arm	1	Each
635E2135	Signal Pole with 35' Mast Arm and Luminaire Arm	1	Each
635E2140	Signal Pole with 40' Mast Arm and Luminaire Arm	4	Each
635E2145	Signal Pole with 45' Mast Arm and Luminaire Arm	1	Each
635E3700	Roadway Luminaire, LED with Photoelectric Cell	18	Each
635E3815	Decorative Luminaire, LED with Photoelectric Cell	48	Each
635E4030	3 Section Vehicle Signal Head	44	Each
635E4090	4 Section Directional Vehicle Signal Head	16	Each
635E5020	2' Diameter Footing	305.0	Ft
635E5030	3' Diameter Footing	165.0	Ft
635E5301	Type 1 Electrical Junction Box	32	Each
635E5303	Type 3 Electrical Junction Box	4	Each
635E5313	Type 3A Electrical Junction box	1	Each
635E5400	Electrical Service Cabinet	6	Each
635E5405	Electrical Service Cabinet with Secondary Disconnect	4	Each
635E5430	Traffic Signal Controller	4	Each
635E5515	Battery Backup System for Traffic Signal	4	Each
635E5520	Video Detection System	4	Each
635E5530	Preformed Detector Loop	16	Each
635E5560	Emergency Vehicle Preemption Unit	4	Each
635E5570	Optical Detector	16	Each
635E5880	Accessible Pedestrian Signal	32	Each
635E5910	Pedestrian Push Button Pole	21	Each
635E5922	Pedestrian Signal Head with Countdown Timer	32	Each
635E5930	Pedestrian Crossing Sign	32	Each
635E8110	1" Rigid Conduit, Schedule 40	555	Ft
635E8120	2" Rigid Conduit, Schedule 40	7,625	Ft

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
635E8130	3" Rigid Conduit, Schedule 40	30	Ft
635E8140	4" Rigid Conduit, Schedule 40	130	Ft
635E8220	2" Rigid Conduit, Schedule 80	2,725	Ft
635E8230	3" Rigid Conduit, Schedule 80	440	Ft
635E9014	1/C #4 AWG Copper Wire	1,160	Ft
635E9016	1/C #6 AWG Copper Wire	4,665	Ft
635E9018	1/C #8 AWG Copper Wire	23,955	Ft
635E9502	2/C #14 AWG Copper Tray Cable, K2	5,205	Ft
635E9503	3/C #14 AWG Copper Tray Cable, K2	560	Ft
635E9504	4/C #14 AWG Copper Tray Cable, K2	1,330	Ft
635E9505	5/C #14 AWG Copper Tray Cable, K2	975	Ft
635E9507	7/C #14 AWG Copper Tray Cable, K2	630	Ft
635E9525	25/C #14 AWG Copper Tray Cable, K2	2,500	Ft
635E9600	#16 AWG Copper Twisted Shielded Pair	240	Ft
635E9710	2/C #10 AWG Copper Pole and Bracket Cable	3,035	Ft
635E9924	24 Strand Fiber Optic Cable	2,230	Ft
900E5135	Traffic Counter Surface Utility Box	3	Each

SUPPLYING AS BUILT PLANS

If the traffic signal systems or roadway lighting systems are constructed differently than what is stated in the plans, the Contractor will supply as built plans to the Engineer and a copy will be sent to the Traffic Design Engineer. The as built plans may include conduit layouts, wiring diagrams, or other drawings depicting the changes from the original plans.

SHOP DRAWING AND CATALOG CUTS SUBMITTALS

The Contractor will submit shop drawings and catalog cuts in accordance with Section 985 of the Specifications.

PDF submittals will be sent to the following email addresses:

Rylev.Rapp@state.sd.us
Stacy.Bartlett@state.sd.us

ON-SITE INSPECTION

An on-site inspection of the traffic signals will be conducted before acceptance of the project once the traffic signals are completed and operational. The on-site inspection will be conducted by the Project Engineer or Region Traffic Engineer with the Contractor, City Traffic Engineer, and the Traffic Design Engineer present.

REMOVE SIGNAL POLE FOOTING

The footings of existing signal poles EB1-EB4, EC1-EC3, ED1-ED4, EE1-EE4 will be removed by the Contractor to a minimum of 2' below the ground surface. Restoration of the disturbed area will be to the satisfaction of the Engineer.

All costs for removing the footings of the existing signal poles will be incidental to the contract unit price per each for "Remove Signal Pole Footing".

REMOVE LUMINAIRE POLE FOOTING

The footings of existing luminaire poles EL1-EL19 will be removed by the Contractor to a minimum of 2' below the ground surface. Restoration of the disturbed area will be to the satisfaction of the Engineer.

All costs for removing the footings of the existing luminaire poles will be incidental to the contract unit price per each for "Remove Luminaire Pole Footing".

SALVAGE LUMINAIRE POLE

Existing luminaire poles EL1-EL19 will be salvaged and delivered to the City of Huron by the Contractor. The Contractor will notify the city 5 days before the delivery of the salvaged luminaire poles for a time and location of delivery. The city contact is Brett Runge at (605) 530-9607.

Poles damaged during salvaging or delivery will be repaired or replaced by the Contractor at no cost to the State.

All costs for work involved in the salvage and delivery of the existing luminaire poles will be incidental to the contract unit price per each for "Salvage Luminaire Pole".

COORDINATE CITY OWNED DECORATIVE LUMINAIRE POLE REMOVAL

The Contractor will coordinate with the City of Huron on the removal of decorative light poles at the locations listed below. The poles will be removed by City personnel at no expense to the State. The city contact is Brett Runge at (605) 530-9607.

Location of decorative light poles:

- Station:
- 32+04 L
- 32+28 R
- 33+44 R
- 36+44 R
- 37+19 L
- 37+42 L
- 37+59 R
- 37+68 L

SALVAGE SIGNAL EQUIPMENT

The existing signal equipment identified on the plans will be salvaged and delivered to the City of Huron by the Contractor. The Contractor will notify the city 5 days before the delivery of the salvaged signal equipment for a time and location of delivery. The city contact is Brett Runge at (605) 530-9607.

Any equipment damaged during salvaging or delivery will be repaired or replaced by the Contractor at no cost to the State.

All costs for work involved in the salvage and delivery of the existing signal equipment will be incidental to the contract lump sum price for "Salvage Signal Equipment".

SIGNAL POLES

The signal poles and arms from 5th to Market Street will be galvanized and have a painted or powder coated black finish.

Cantilever traffic signal supports, including anchor bolts, will be designed for fatigue in accordance with Fatigue Importance Category III without galloping and truck induced gusts.

The pole fabricator will be responsible for the determining the diameter, length, and number of anchor bolts.

Signal poles will have rotatable mast arms.

Luminaire extension(s) will have a 50-foot mounting height with 8-foot arm.

DECORATIVE LUMINAIRE POLES

Luminaire poles DL1 to DL24 will be decorative street lighting using fluted Millerbernd Bemidji Poles with a lower level back/pedestrian luminaire. The poles will have a height of 35-feet with twin arms, the arm orientated towards the street will have a mounting height of 35-feet with a 6-foot arm, and the arm orientated away from the street (towards the sidewalk) will have a mounting height of 15-feet with a 3-foot arm. Poles and arms will be galvanized and have a painted or powder coated black finish.

The pole fabricator will be responsible for the determining the diameter, length, and number of anchor bolts.

Decorative Luminaire poles will be designed to include loadings created by banners that are 30 inches wide by 80 inches long, mounted 15 feet from the top of footing to the bottom of the banner and will be able to support decorations that are 30lbs and 5'x5' dimensions.

Luminaire poles DL1-DL24 will have a convenience duplex festoon outlet receptacle (15-amp, 3 wire) suitable for outdoor use. Festoon will be placed 90° counterclockwise to the pole arm.

LUMINAIRE POLES

Luminaire poles L1-L11 will have a mounting height of 50-feet with a 8-foot arm.

The pole fabricator will be responsible for the determining the diameter, length, and number of anchor bolts.

Luminaire poles will be designed to include loadings created by banners that are 30 inches wide by 80 inches long, mounted 15 feet from the top of footing to the bottom of the banner and will be able to support decorations that are 30lbs with 5'x5' dimensions.

Luminaire poles L1-L11 will have a convenience duplex festoon outlet receptacle (15-amp, 3 wire) suitable for outdoor use. Festoon will be placed 90° counterclockwise to the pole arm.

PEDESTAL SIGNAL POLES

Pedestal signal poles may be aluminum. Aluminum poles will conform to the following requirements:

Aluminum will conform to ASTM B221, Alloy 6061, and Temper T6.

Poles will be round with a minimum outside pole diameter of 4 inches, and the pole assembly will have a square, cast aluminum base with aluminum access door. The base will conform to the breakaway requirements of NCHRP 350 or MASH. A grounding lug will be provided in the base.

The pole to base connection will be a threaded connection; threads will be 8 TPI, NPT. A collar (integral or non-integral) to prevent wind-induced loosening of pole will be provided. All bolt and connection threads will be coated with a commercially available anti-seize compound intended for use in aluminum-to-aluminum and steel-to-aluminum connections.

The pole finish will either be brushed satin or spun. The top of the pole will be sealed by the traffic signal head mounting hardware or by an aluminum cap.

Measurement and payment for aluminum poles will be as specified in Specifications Section 635.

DECORATIVE LUMINAIRES

The lighting design used the following parameters and provides 1.1 and greater average maintained foot-candles and uniformity ratios of 3:1 (average maintained to minimum maintained foot-candles) and 6:1 (maximum to minimum maintained foot candles):

Pole Setback:	2 Ft.
Lamp Loss Factor (LLF):	0.8
Width of Lighted Area:	65 Ft.
Luminaire Cycle Length:	Varies.
Configuration:	Staggered
Mounting Height:	35 Ft./15 Ft.
Arm Length	6 Ft. / 3 Ft.
Light Source:	LED

The following LED luminaires meet the requirements for this design:

Roadside/Forward facing luminaire at 35' will be a:

Holophane: ESL3-P35S-40K-MVOLT-BG3-BK-PR7

Sidewalk/Rear facing arm at 15' will be a:
Holophane: GVD3-P10-40K-MVOLT-CLF-GL3-TBK

LUMINAIRES

The lighting design used the following parameters and provides 1.1 and greater average maintained foot-candles and uniformity ratios of 3:1 (average maintained to minimum maintained foot-candles) and 6:1 (maximum to minimum maintained foot candles):

Pole Setback:	2 Ft.
Lamp Loss Factor (LLF):	0.8
Width of Lighted Area:	Varies
Luminaire Cycle Length:	Varies
Configuration:	Staggered
Mounting Height:	50 Ft.

Arm Length	8Ft.
Light Source:	LED

The following LED luminaires or approved equivalents meet the requirements for this design:

GE Evolve: ERL2-0-30-C5-40-A

AEL Autobahn: ATB2-P602-MVOLT-R3-P7

SIGNAL BACKPLATES

All new vehicle signal heads will have backplates with retroreflective border. The vehicle signal head backplates will have a factory applied 3-inch wide yellow retroreflective border. Sheeting for the border will be Type XI or Type IX in conformance with ASTM D4956. Backplates will be polycarbonate, aluminum, or aluminum-composite. Minimum material thicknesses are:

Polycarbonate, 0.10-inch
Aluminum, 0.06-inch
Aluminum-Composite, 0.08-inch

Signal backplates will extend not less than 5 inches from the edge of the signal head at the top, bottom, and sides. The bottom of the backplate on vehicle signal faces mounted directly above pedestrian signal indications will be sized to permit the separate adjustment of the vehicle and pedestrian signal indication and may be less than 4 inches.

All costs involved with furnishing and installing backplates with retroreflective border for the new vehicle signal heads will be incidental to the contract unit price per each for "3 Section Vehicle Signal Head", "4 Section Directional Vehicle Signal Head".

TABLE OF FOOTING DATA

Site Designation	Footing Diameter	* Footing Depth	**Spiral Diameter	**Spiral Length	Vertical Reinforcement
C2	2' - 0"	6' - 0"	1' - 8"	44' - 3"	8-#7 x 5' - 6"
DL1-DL24	2' - 0"	8' - 0"	1' - 8"	54' - 9"	8-#7 x 7' - 6"
L1-L11	2' - 0"	9' - 0"	1' - 8"	60' - 0"	8-#7 x 8' - 6"
B2,B4,C3,D2,D4, E2,E4	3' - 0"	10' - 0"	2' - 8"	104' - 3"	14-#8 x 9' - 6"
C1,E1	3' - 0"	11' - 0"	2' - 8"	112' - 6"	14-#8 x 10' - 6"
B3,C4,D1,D3,E3	3' - 0"	12' - 0"	2' - 8"	120' - 9"	14-#8 x 11' - 6"
B1	3' - 0"	13' - 0"	2' - 8"	129' - 3"	14-#8 x 12' - 6"

* Footing depth will be below ground level.

** The size of all spirals will be #3.

SUBSURFACE

During construction of the cylindrical footings, concrete placement operations should closely follow excavation procedures. The longer the excavations are left open, the more likely caving may occur.

Concrete will not be dropped through standing water. If water is present in the excavation it will be removed prior to concrete placement or the concrete will be tremied.

ELECTRICAL SERVICE CABINET WITH SECONDARY DISCONNECT

The electrical service cabinet will be a standard electrical service cabinet located adjacent to the power source.

The Contractor will install a NEMA 3R rainproof, 60 amp rated, non-fused safety switch (with lock) adjacent to the traffic signal cabinet. The secondary disconnect will be mounted on a galvanized steel post in accordance with standard plate 635.35.

METER SOCKETS FOR TRAFFIC SIGNALS

The meter sockets provided for traffic signals by the Contractor will be a 200-amp, positive by-pass.

TRAFFIC SIGNAL CONTROLLER

The new Traffic Signal Controller must be fully compatible with all features and functionality of Econolite Centrac Local Edition software.

The Contractor is responsible for programming controllers with the signal timings provided in these plans.

Controllers and flashers are not required to have dimming capability.

Anchor bolts for traffic signal cabinets may have hooked ends.

All costs for the detector units necessary to operate the signal as shown in these plans, constructing the concrete pad and footing, materials, labor, and furnishing and installing the controller cabinet will be incidental to the contract unit price per each for "Traffic Signal Controller".

OPTICAL DETECTOR

The optical detectors will be dual head with a single output. The detection eyes of each detector will be aimed at a single approach as directed by the Engineer. All costs associated with providing, installing, and aiming the optical detectors will be incidental to the contract unit price per each for "Optical Detector".

FIBER OPTIC ETHERNET SWITCH

The Contractor will supply in an environmentally hardened, managed layer 2 field Ethernet switch and all required mounting hardware, power supplies, cable, patch cords, and jumpers, in the following traffic signal cabinets:

SD 37 & 5TH Street
SD 37 & 4TH Street

SD 37 & 3RD Street
SD 37 & Market Street

The switch will be configurable using a web browser or graphical user interface. The switch will have the following:

- An operating temperature range of -40 degrees C to 70 degrees C.
- An operating humidity range of 10% to 95% relative humidity.
- A minimum of eight copper ports with RJ-45 connectors that are capable of 10/100Base-TX communications.
- A minimum of two small-form pluggable (SFP) ports capable of 1000Base-LX or 1000Base-ZX communications.

All costs for furnishing and installing three Ethernet switches will be incidental to the contract unit price per each for "Traffic Signal Controller".

BATTERY BACKUP CABINET

The Contractor will supply cabinets with concrete pad and footing for housing the battery backup system for all traffic signal systems in this project. The cabinets will be an aluminum NEMA 3R type. The cabinet will have a thermostatically controller exhaust fan. The cabinet will be securely attached to the concrete pad with steel anchors and to the back wall of the controller cabinet using chase nipples as approved by the Engineer. Anchor bolts for battery backup cabinets may have hooked ends.

All costs for constructing the concrete pad and footing, materials, labor, and furnishing and installing the battery backup cabinet will be incidental to the contract unit price per each for "Battery Backup System for Traffic Signal."

VIDEO DETECTION SYSTEM

The video detection system will be one of the following, or an approved equal:

Product	Manufacturer
GRIDSMART System	GRIDSMART Technologies, Inc. Knoxville TN 37932 Phone: 1-865-482-2112 www.gridsmart.com
Autoscope AIS-IV and RVP2	Econolite Anaheim, CA 92807 Phone: 1-714-630-3700 www.econolite.com
Vantage Next	Iteris, Inc. Santa Ana, CA 92705-5551 Phone: 1-949-270-9400 www.iteris.com
TrafficLink Detection	Miovision Technologies, Inc. 137 Glasgow St., Suite 110 Kitchener, Ontario Canada N2G 4X8 Phone: 1-519-513-2407 www.miovision.com

All cabling and hardware necessary to make the detection system operational will be incidental to the contract unit price per each for "Video Detection System".

ACCESSIBLE PEDESTRIAN SIGNAL

The work will consist of furnishing and installing accessible pedestrian signals (APS). Each APS will consist of an interactive vibrotactile pedestrian pushbutton with speaker, an informational sign, a latching light emitting diode (LED) indicator light, a solid-state electronic control board, a power supply, wiring, and all necessary mounting hardware. The operation and performance of the APS units will meet the requirements of MUTCD Sections 4E.08 to 4E.13. and the applicable sections of NEMA Standards Publication TS-2.

The APS units will be capable of supporting a minimum of 16 push button stations.

The traffic signal cabinet must have four dedicated load switches for the pedestrian phases. If the traffic signal cabinet does not have four dedicated load switches for the pedestrian phases, then the Contractor will furnish and install the necessary number of load switches. All costs associated with furnishing and installing any additional load switches will be incidental to the contract unit price per each for "Accessible Pedestrian Signal".

All mounting fasteners will be stainless steel; all threads will be coated with anti-seize compound meeting the requirements of USA Dept. of Defense specification MIL-PRF-907F.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0037(158)126	L5	L54

Plotting Date: 12/05/2023

Preformed Line Products
CommScope

COY1-002 with 80809958
FOSC450-C6-2-24-1-C3V

ACCESSIBLE PEDESTRIAN SIGNAL (CONTINUED)

The push button component of APS will meet the requirements of Section 985.1 S of the Specifications except that all housings and external hardware will be aluminum, powder coated yellow.

The APS control unit will include capability to monitor the push buttons and pedestrian signal head displays. Conflicts will cause the channel to be powered off.

The APS control unit will include capability to monitor communications with the push buttons. Communication faults will automatically reset the control unit.

Two licensed copies of any APS programming software will be furnished. All software programming, firmware updates, and audio message programming of the APS will be through USB port or Ethernet connection.

All costs for furnishing and installing the accessible pedestrian signal including labor, materials, and equipment, will be incidental to the contract unit price per each for "Accessible Pedestrian Signal".

PEDESTRIAN PUSH BUTTON POLE

Pedestrian push button poles will be aluminum and will conform to the following requirements:

Aluminum will conform to ASTM B221, Alloy 6061, and Temper T6.

Poles will be round with a minimum outside pole diameter of 4 inches, and the pole assembly will have a square, cast aluminum base with aluminum access door. The base will conform to the breakaway requirements of MASH.

The pole to base connection will be a threaded connection; threads will be 8 TPI, NPT. All bolt and connection threads will be coated with a commercially available anti-seize compound intended for use in aluminum-to-aluminum and steel-to-aluminum connections.

The pole finish will either be brushed satin or spun. The top of the pole will be sealed by an aluminum cap.

Anchor bolts for pedestrian push button poles may have hooked ends.

INCIDENTAL WORK

Incidental work includes, but is not limited to, the restoration of all disturbed areas and replacement of any paved surfaces removed to accomplish conduit installation to the satisfaction of the Engineer.

WIRE SPLICING FOR LIGHTING

All wire splices for lighting will be made using TE Connectivity GTAP connectors, NSI Industries Polaris Blue connectors, or an approved equal.

MULTICONDUCTOR CONTROL CABLE FOR SIGNAL CIRCUITS

The Conductor Jackets for the multiconductor control cables will be color coded in accordance with ICEA S-73-532 Table E2.

FIBER OPTIC CABLE

The fiber optic cable will be a 24 strand single mode fiber optic cable with each buffer containing twelve fibers. The buffer tubes will be color coded according to TIA specifications.

Fiber optic cable provided on this project will meet the latest applicable TIA Specifications for multimode and RUS PE-90-a Specifications for single mode. All fiber optic cable will be rated for outdoor use.

Multimode optical cable will have the following optical and physical characteristics:

- Core diameter of 62.5 μm +/- 3 μm .
- Cladding diameter of 125 μm +/- 2 μm .
- Numerical aperture of 0.275 +/- 0.015.
- The fibers will be coated with a UV Acrylate.
- The fibers will be strippable, using mechanical methods.
- The attenuation coefficient of 3.5 dB per kilometer or less at 850nm and 1.2 dB per kilometer or less at 1300 nm.

- The Information Transmission Capacity (ITC) or bandwidth, of the cable will be greater than or equal to 200 MHz per kilometer at 850 nm and 500 MHz per kilometer at 1300nm.
- One factory fusion splice per kilometer per fiber will be allowed.

Singlemode optical cable will have the following optical and physical characteristics:

- Cladding diameter of 125 μm +/- 2 μm .
- Zero dispersion slope will be 0.092 ps/ (nm²•km) or less.
- Zero dispersion wavelength, 1300 to 1322 nm.
- Cutoff wavelength, less than 1250 nm.
- Maximum attenuation at 1310 nm will be 0.4 dB per Kilometer.
- The outside diameter will be less than 22.1 nm.
- One factory fusion splice per kilometer per fiber will be allowed.

The fiber optic cable will have a seven-core configuration, dielectric central strength member, and thermoplastic tubes. The minimum bending radii of the cable will be 10X cable diameter under a static load and 20X cable diameter during installation. The installation tensile load rating will be 2.7 kN.

The cable core interstices will be filled with water blocking material. If a gel compound is used, the gel compound will be readily removable with a nontoxic solvent.

24 strand fiber will extend only to junction box at the controller. Drop fiber of minimum required fiber count will be used for termination into the controller cabinet. Drop fiber will be fusion spliced to 24 strand fiber in one of the following or an approved equal:

The enclosure will be configured to allow entrance for minimum of two 24-strand fiber cables and one drop fiber, sized to match diameter of cables in use. Fiber optic cable will be terminated in the controller cabinet with a wall mounted distribution enclosure. The distribution enclosure will be dust and moisture resistant. The size of the distribution enclosure will be adequate for the number of fibers to be used. The distribution enclosure will be mounted in the controller cabinet where it does not interfere with normal cabinet maintenance. The fiber optic cable will be prepared in accordance with the manufacturer's recommendations and have sufficient length to reach the interface panel. Only fibers needed to operate the equipment plus two spares will be terminated with LC connectors with less than 0.1 dB loss for multimode and with less than 0.2 dB loss for singlemode. The connector loss after 1000 matings will be less than 0.2 dB. The connector return loss will not be greater than 50 dB for singlemode and greater than 30 dB for multimode. All other fibers will be capped and sealed in accordance with the manufacturer's recommendations. Spare fibers will not be cut; 250um fiber will not be exposed in distribution enclosure. 250um fiber to be stored in splice tray, or use of fan-out kit employed to achieve 900 um.

The fiber optic cable will be installed in accordance with the manufacturer's recommendations and the NEC. Slack cable will be left in each controller and junction box. All junction boxes except for the junction at the controller will have 25feet of slack. The junction box at the controller cabinet will have 19.5 feet of slack. Controller cabinets will have 2 feet of slack. Slack cable will be over / under coiled. Tying will be loose and kept to a minimum to prevent damage when operating lid. No splices will be allowed in the fiber optic cable except in the controllers. Splices will be of the fusion splice type. All fusion splices will be placed in a splice tray. Terminations will be of the epoxy/polish type, or fusion splice to pig tail type.

The contractor will test the fiber optic cable after the installation to verify the integrity of the fiber.

The payment for supplying, installing, and testing will be incidental to the contract unit price per foot for "24 Strand Fiber Optic Cable".

AERONAUTICAL NOTIFICATION- LUMINAIRES

The Contractor must abide by the following FAA Study Determination for light poles/luminaires as set forth in Aeronautical Study 2023-AGL-8607-OE.

The Contractor shall notify the DOT Project engineer of the South Dakota Department of Transportation by 10/21/2024 if structure has not yet been completed. The SDDOT will then file for a determination extension as required by the FAA.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0037(158)126	L6	L54

Plotting Date: 12/05/2023

CRANE OPERATIONS-LUMINAIRES

The Contractor must abide by the following FAA crane determination requirements as set forth in Aeronautical Study No. 2023-AGL-8655-OE.

The crane height must not exceed a height of 20 feet above the height of the light pole/luminaire as specified in the plans.

The Contractor shall notify the DOT Project engineer of the South Dakota Department of Transportation by 10/21/2024 if the timeline for the crane use will need to be extended. The SDDOT will then file for a determination extension required by the FAA.

TRAFFIC COUNTER LOOPS AND SURFACE UTILITY BOX

The traffic counter loops will be installed at 3 locations. One location between 4th St. NW and 3rd St. NW, one location between 4th St. SW and 5th St. SW, and one location between 8th St. SE and 9th St. SE, per the Traffic Counter Loops and Surface Utility Box Details shown in the plans. The exact locations will be determined by the SDDOT Engineer. All costs for the loops will be included in the contract unit price per each for "Preformed Detector Loop".

The traffic counter surface utility boxes will be installed at 3 locations. One location between 4th St. NW and 3rd St. NW, one location between 4th St. SW and 5th St. SW, and one location between 8th St. SE and 9th St. SE, per the Traffic Counter Loops and Surface Utility Box Details shown in the plans. The exact locations will be determined by the SDDOT Engineer. All costs for the traffic counter surface utility boxes will be included in the contract unit price per each for "Traffic Counter Surface Utility Box".

Each traffic counter surface utility box will have a yellow Type 2 Object Marker installed on the oncoming traffic side of the box. See Surface Utility Box Details shown in the plans for marker and post details. All costs for the object marker and its post will be included in the contract unit price per each for "Traffic Counter Surface Utility Box".

Plot Scale - 1:200

Plotted From - TRPR17199

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CONDUIT AND CABLE QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L7	TOTAL SHEETS L54
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Plotting Date: 12/05/2023

Location to Location	Rigid Conduit				Rigid Conduit			Copper Wire			Copper Tray Cable, K2					Twisted Shielded Pair			Preemption Cable		Fiber Optic Cable		Pole and Bracket Cable				
	Schedule 40				Schedule 80						#14 AWG								(not a bid item)								
	1"	2"	3"	4"	2"	3"	4"	1/C #4 AWG	1/C #6 AWG	1/C #8 AWG	2/C	3/C	4/C	5/C	7/C	25/C	#16 AWG				24 Strand			2/C #10 AWG			
Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft		
SD 37 & FIFTH STREET																											
ELEC. SERV.	SECONDARY DISC.			140																							
SECONDARY DISC.	CONTRLLER			30																							
CONTROLLER	JB1																										
SECONDARY DISC.	JB1																										
JB1	PB1			35																							
JB1	B1																										
JB1	JB2																										
JB2	B2																										
JB2	PB2																										
JB2	PB3																										
JB1	JB4																										
JB4	B4																										
JB4	PB5																										
JB4	JB3																										
JB3	B3																										
JB3	PB4																										
Signal Poles																											
Sig Pole	B1																										
Sig Pole	B2																										
Sig Pole	B3																										
Sig Pole	B4																										
Ped Pushbutton Pole	PB1																										
Ped Pushbutton Pole	PB2																										
Ped Pushbutton Pole	PB3																										
Ped Pushbutton Pole	PB4																										
Ped Pushbutton Pole	PB5																										
Subtotal:		105	335		35																						

Plot Scale - 1:200

Plotted From - TRPR17199

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CONDUIT AND CABLE QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0037(158)126	L8	L54

Plotting Date: 12/05/2023

Location to Location	Rigid Conduit				Rigid Conduit			Copper Wire			Copper Tray Cable, K2					Twisted Shielded Pair			Preemption Cable		Fiber Optic Cable		Pole and Bracket Cable					
	Schedule 40				Schedule 80						#14 AWG								(not a bid item)									
	1"	2"	3"	4"	2"	3"	4"	1/C #4 AWG	1/C #6 AWG	1/C #8 AWG	2/C	3/C	4/C	5/C	7/C	25/C	#16 AWG				24 Strand			2/C #10 AWG				
Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft			
SD 37 & FOURTH STREET																												
ELEC. SERVICE	JC4	JC4																										
JC4	JC1		210																									
JC1	SECONDARY DISC.		25																									
SECONDARY DISC.	CONTROLLER		15																									
CONTROLLER	JC1																											
JC1	C1		15																									
JC1	PC1	30																										
JC1	PC2	20																										
JC1	JC2																											
JC2	C2		15																									
JC2	PC3	20																										
JC2	PC4	35																										
JC4	C4		35																									
JC4	PC6	15																										
JC4	JC3		30																									
JC3	C3		30																									
JC3	PC5	15																										
Signal Poles																												
Sig Pole	C1																											
Sig Pole	C2																											
Sig Pole	C3																											
Sig Pole	C4																											
Ped Pushbutton Pole	PC1																											
Ped Pushbutton Pole	PC2																											
Ped Pushbutton Pole	PC3																											
Ped Pushbutton Pole	PC4																											
Ped Pushbutton Pole	PC5																											
Ped Pushbutton Pole	PC6																											
Subtotal:		135	400		25																							

Plot Scale - 1:200

Plotted From - TRPR17199

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CONDUIT AND CABLE QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L9	TOTAL SHEETS L54
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Plotting Date: 12/05/2023

Location to Location	Rigid Conduit				Rigid Conduit			Copper Wire			Copper Tray Cable, K2					Twisted Shielded Pair			Preemption Cable		Fiber Optic Cable		Pole and Bracket Cable				
	Schedule 40				Schedule 80						#14 AWG								(not a bid item)								
	1"	2"	3"	4"	2"	3"	4"	1/C #4 AWG	1/C #6 AWG	1/C #8 AWG	2/C	3/C	4/C	5/C	7/C	25/C	#16 AWG				24 Strand			2/C #10 AWG			
	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft		
SD 37 & THIRD STREET																											
ELEC. SERVICE	JD2	JD1	200																								
JD2	JD1					80				495	165				85										85		
JD1	SECONDARY DISC.		35							325																	
SECONDARY DISC.	CONTROLLER		25							80																	
CONTROLLER	JD1				35						290				145										145		
JD1	D1		25							80	30				30										30		
JD1	PD1	15									20															20	
JD2	D2		15								20				20											20	
JD2	PD2	35									40															40	
JD1	JD4			30				75			325	435			220										220		
JD4	D4		35								40				40											40	
JD4	PD5	20									25															25	
JD4	JD3	40				75					360	240			120										120		
JD3	D3		20								65	25			25											25	
JD3	PD4	35									40															40	
Signal Poles																											
Sig Pole	D1										5	35	85	60												55	65
Sig Pole	D2										5	35	70	20												45	
Sig Pole	D3											35	80	65												60	65
Sig Pole	D4										5	35	55	20												50	
Ped Pushbutton Pole	PD1										5																5
Ped Pushbutton Pole	PD2										5																5
Ped Pushbutton Pole	PD3										5																5
Ped Pushbutton Pole	PD4										5																5
Subtotal:																											
	145	355	30	35	75	155				2,970	1,405	140	290	165	685											895	130

Plot Scale - 1:200

Plotted From - TRPR17199

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CONDUIT AND CABLE QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L10	TOTAL SHEETS L54
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Revised 1/09/2024 - RR

Location to Location		Rigid Conduit				Rigid Conduit			Copper Wire			Copper Tray Cable, K2						Twisted Shielded Pair			Preemption Cable		Fiber Optic Cable		Pole and Bracket Cable		
		Schedule 40				Schedule 80						#14 AWG									(not a bid item)						
		1"	2"	3"	4"	2"	3"	4"	1/C #4 AWG	1/C #6 AWG	1/C #8 AWG	2/C	3/C	4/C	5/C	7/C	25/C	#16 AWG				24 Strand			2/C #10 AWG		
		Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft		
SD 37 & MARKET STREET																											
ELEC. SERVICE	JE2		30																								
JE2	JE1					80				745	330			85	165									165			
JE1	SECONDARY DISC.		25							235																	
SECONDARY DISC.	CONTROLLER		25							80																	
CONTROLLER	JE1				35						210			55	105									105			
JE1	E1		35								40			40	40									40			
JE1	PE1	20									25																
JE2	E2		15							60	20				20									20			
JE2	PE2	25									30																
JE2	PE3	35									40																
JE1	JE4		40			75					220				110									110			
JE4	E4		30								35				35									35			
JE4	PE6	20									25																
JE2	JE3					120				375	250			125	125									125			
JE3	E3		20							25	25			25	25									25			
JE3	PE4	25									25																
JE3	PE5	45									50																
Signal Poles																											
Sig Pole	E1										5	35	115	60										55			65
Sig Pole	E2											35	65	20										50			65
Sig Pole	E3										5	35	120	65										60			65
Sig Pole	E4										5	35	65	20										45			
Ped Pushbutton Pole	PE1										5																
Ped Pushbutton Pole	PE2										5																
Ped Pushbutton Pole	PE3										5																
Ped Pushbutton Pole	PE4										5																
Ped Pushbutton Pole	PE5										5																
Traffic Counters																											
JTC1	TC1		15																					120			
JTC2	TC2		15																					60			
JTC3	TC3		15																					60			
Subtotal:		170	265		35		75	200			1,800	1,365	140	365	165	330	625		240					835			195

Plot Scale - 1:200

Plotted From - TRPR17199

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CONDUIT AND CABLE QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L12	TOTAL SHEETS L54
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Revised 1/09/2024 - RR

Location to Location	Rigid Conduit				Rigid Conduit			Copper Wire			Copper Tray Cable, K2					Twisted Shielded Pair			Preemption Cable		Fiber Optic Cable		Pole and Bracket Cable			
	Schedule 40				Schedule 80						#14 AWG								(not a bid item)							
	1"	2"	3"	4"	2"	3"	4"	1/C #4 AWG	1/C #6 AWG	1/C #8 AWG	2/C	3/C	4/C	5/C	7/C	25/C	#16 AWG				24 Strand			2/C #10 AWG		
Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft				Ft			Ft			
Fiber Optic																										
Controller 5th St.																										
JB1	JB1																									
JB1	JC1	375																								
JC1	Controller 4th St.																									
JC1	JD1	375																								
JD1	Controller 3rd St.																									
JD1	JF1	400																								
JF1	JE1	440																								
JE1	Controller Market St.																									
Luminaire Poles																										
L1																										
L2																										
L3																										
L4																										
L5																										
L6																										
L7																										
L8																										
L9																										
L10																										
L11																										
DL1																										
DL2																										
DL3																										
DL4																										
DL5																										
DL6																										
DL7																										
DL8																										
DL9																										
DL10																										
DL11																										
DL12																										
DL13																										
DL14																										
DL15																										
DL16																										
DL17																										
DL18																										
DL19																										
DL20																										
DL21																										
DL22																										
DL23																										
DL24																										
Subtotal:		0	1,590		295																				2,230	2,515
TOTAL:		555	7,625	30	130	2,725	440	1,160	4,665	23,955	5,205	560	1,330	975	630	2,500	240							3,300	2,230	3,035

Plot Scale - 1:200

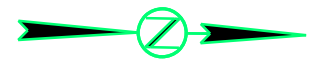
Plotted From - TRPR17199

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EXISTING SIGNAL LAYOUT

SD HWY 37/DAKOTA AVE & FIFTH ST

Revised 1/23/2024 - RR

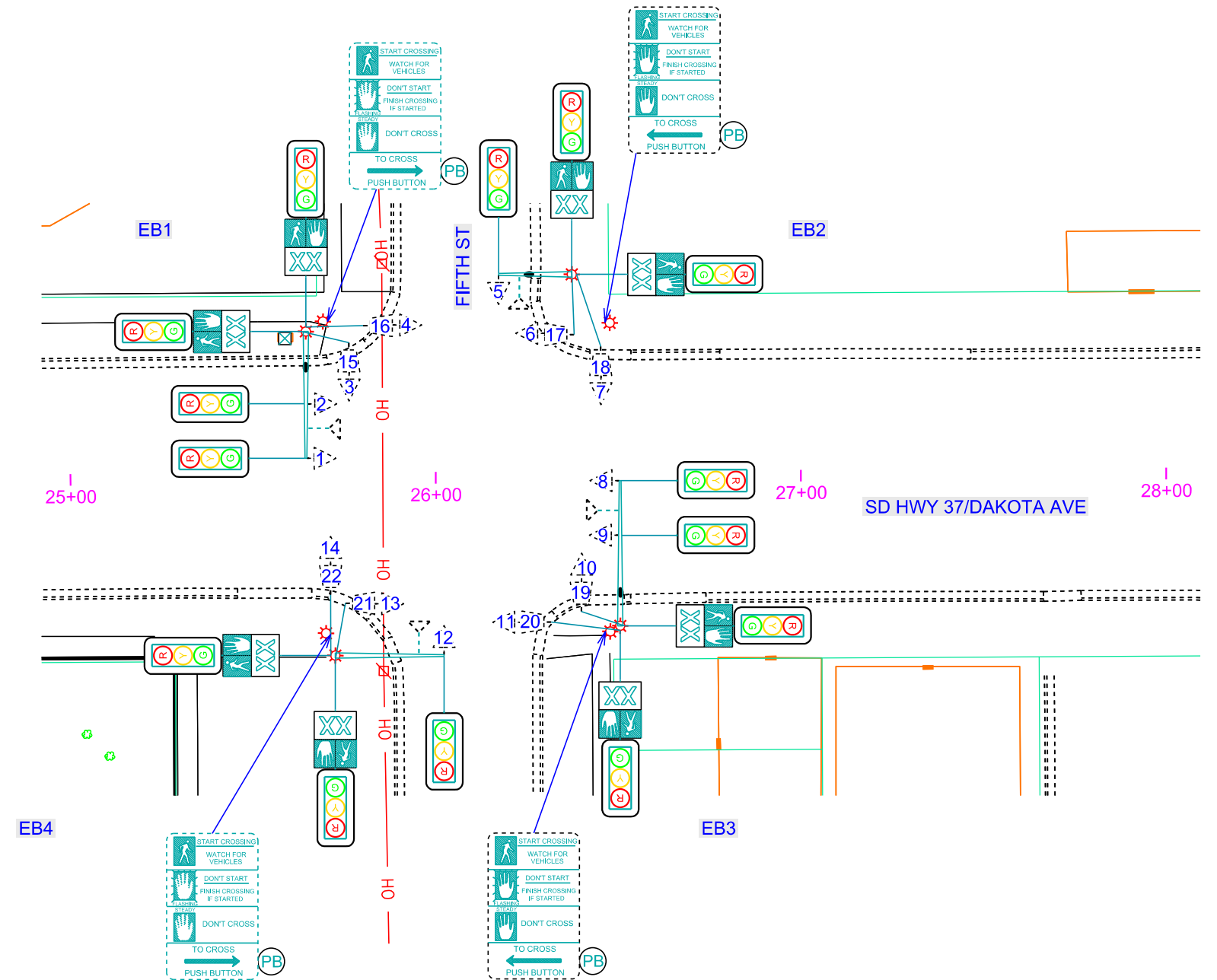


EXISTING ITEMS	
KEY	ITEM
	Signal Pole w/30' Mast Arm (EB4)
	Signal Pole w/20' Mast Arm & 8' Lumin Arm (EB2)
	Signal Pole w/35' Mast Arm & 8' Lumin Arm (EB1)
	Signal Pole w/40' Mast Arm & 8' Lumin Arm (EB3)
	Roadway Luminaire, 400w with P.E. (EB1-EB3)
	3 Section Vehicle Signal Head (1-14)
	Traffic Signal Controller
	Emergency Vehicle Preemption Unit (4-Channel)
	Optical Detector
	Pedestrian Signal Head w/Countdown Timer (15-22)
	Pedestrian Crossing Sign R10-3e (Left -2 /Right - 2)

REMOVE ITEMS	
KEY	ITEM
	Optical Detector
	Pedestrian Crossing Sign R10-3e (Left -2 /Right - 2)

SALVAGE ITEMS				
KEY	ITEM	EST QUANT	UNIT	
	Signal Pole w/30' Mast Arm (EB4)	1	EACH	
	Signal Pole w/20' Mast Arm & 8' Lumin Arm (EB2)	1	EACH	
	Signal Pole w/35' Mast Arm & 8' Lumin Arm (EB1)	1	EACH	
	Signal Pole w/40' Mast Arm & 8' Lumin Arm (EB3)	1	EACH	
	3 Section Vehicle Signal Head (1-14)	14	EACH	
	Pedestrian Signal Head w/Countdown Timer (15-22)	8	EACH	
	Traffic Signal Controller	1	EACH	

ESTIMATE OF QUANTITIES				
KEY	ITEM	EST QUANT	UNIT	
	Remove Signal Pole Footing (EB1-EB4)	4	EACH	
	Remove Signal Equipment	LUMP SUM	LS	
	Salvage Signal Equipment	LUMP SUM	LS	



Plot Scale - 1"=40'

Plotted From - TRPR17199

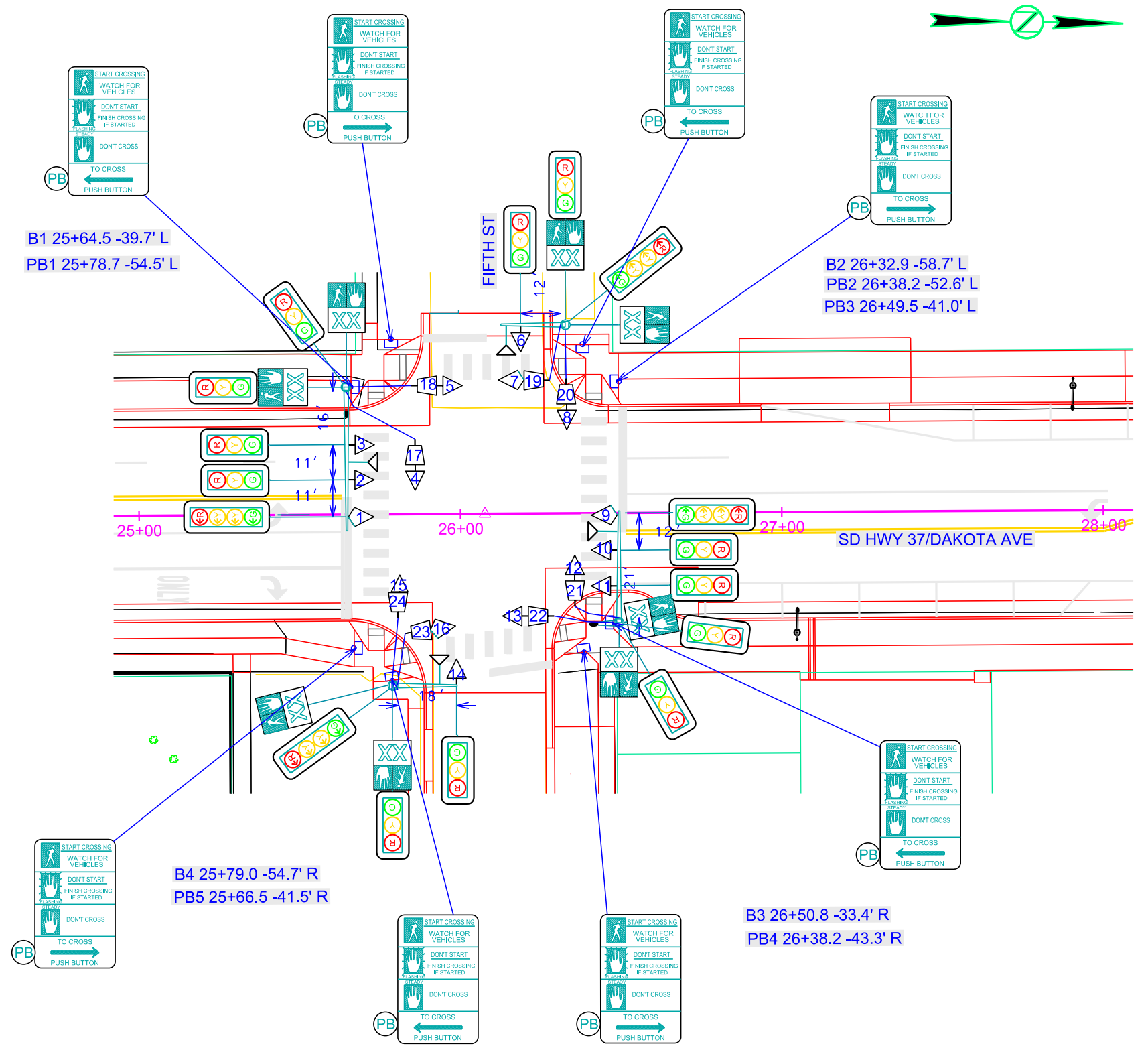
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SIGNAL LAYOUT

SD HWY 37/DAKOTA AVE & FIFTH ST

Plotting Date: 12/05/2023

ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
	Signal Pole w/20' Mast Arm (B2, B4)	2	EACH
	Signal Pole w/35' Mast Arm & 8' Lumin Arm (B3)	1	EACH
	Signal Pole w/45' Mast Arm & 8' Lumin Arm (B1)	1	EACH
	Roadway Luminaire, LED with P.E. (B1, B3)	2	EACH
	3 Section Vehicle Signal Head (2-6, 8, 10-15)	12	EACH
	4 Section Directional Vehicle Signal Head (1, 7, 9, 16)	4	EACH
	Emergency Vehicle Preemption Unit (4-Channel)	1	EACH
	Optical Detector	4	EACH
	Accessible Pedestrian Signal	8	EACH
	Pedestrian Push Button Pole (PB1-PB5)	5	EACH
	Pedestrian Signal Head w/Countdown Timer (17-24)	8	EACH
	Pedestrian Crossing Sign R10-3e (Left 4 /Right 4)	8	EACH



Plot Scale - 1:40

Plotted From - TRPR17199

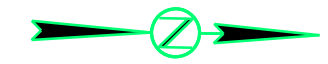
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EXISTING SIGNAL LAYOUT

SD HWY 37/DAKOTA AVE & FOURTH ST

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L15	TOTAL SHEETS L54
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Plotting Date: 12/05/2023

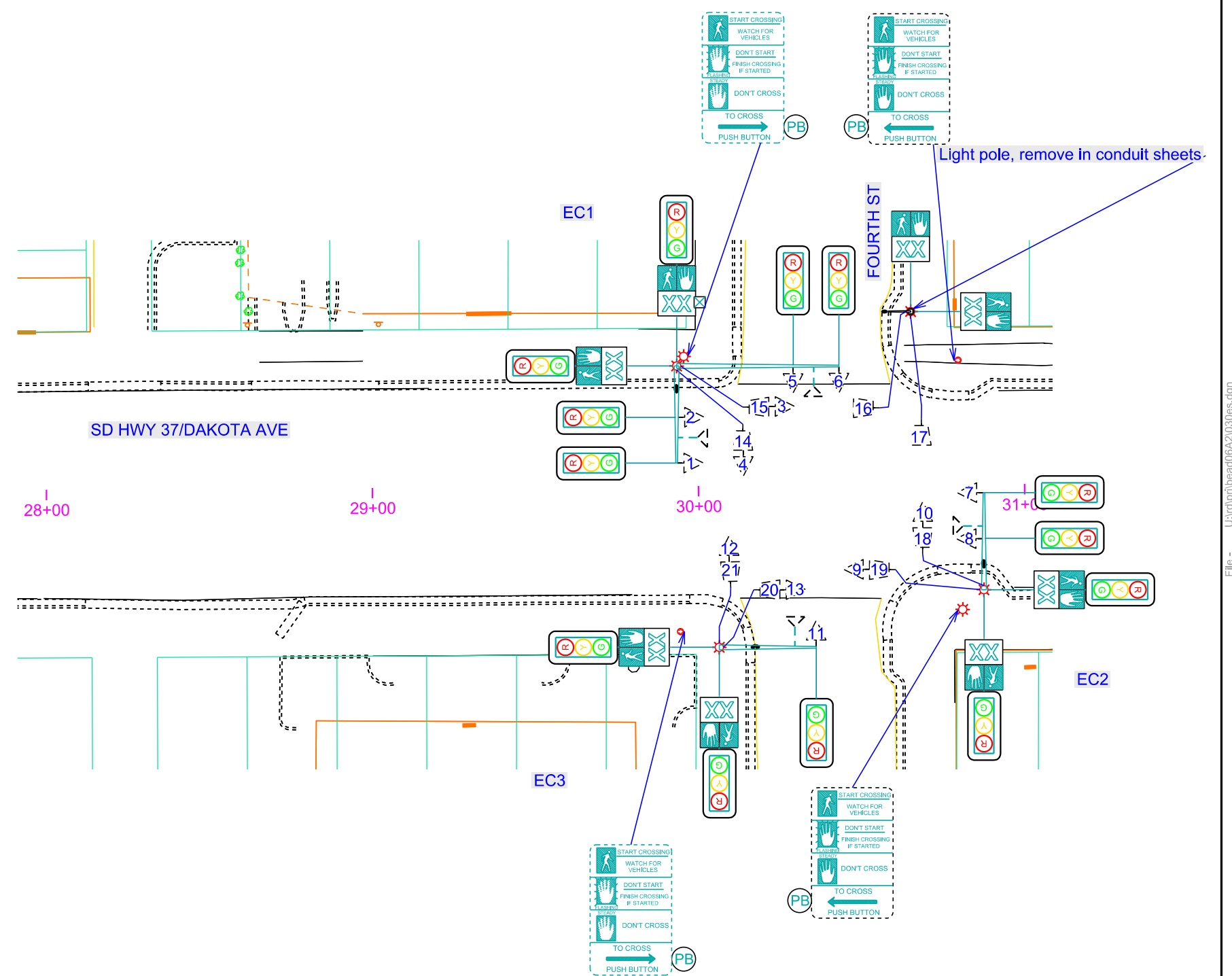


EXISTING ITEMS	
KEY	ITEM
	Signal Pole w/30' Mast Arm & 8' Lumin Arm (EC2,EC3)
	Signal Pole w/Dual 30' and 50' Mast Arms & 8' Lumin Arm (EC1)
	Roadway Luminaire, 400w with P.E. (EC1,EC2,EC3)
	3 Section Vehicle Signal Head (1-13)
	Emergency Vehicle Preemption Unit (4-Channel)
	Optical Detector
	Pedestrian Signal Head w/Countdown Timer (14-21)
	Traffic Signal Controller
	Pedestrian Crossing Sign R10-3e (Left - 2 /Right -2)

ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
	Remove Signal Pole Footing (EC1-EC3)	3	EACH
	Remove Signal Equipment	LUMP SUM	LS
	Salvage Signal Equipment	LUMP SUM	LS

SALVAGE ITEMS			
KEY	ITEM	EST QUANT	UNIT
	Signal Pole w/30' Mast Arm & 8' Lumin Arm (EC2,EC3)	2	EACH
	Signal Pole w/Dual 30' and 50' Mast Arms & 8' Lumin Arm (EC1)	1	EACH
	3 Section Vehicle Signal Head (1-13)	13	EACH
	Pedestrian Signal Head w/Countdown Timer (14-21)	8	EACH
	Traffic Signal Controller	1	EACH

REMOVE ITEMS			
KEY	ITEM	EST QUANT	UNIT
	Roadway Luminaire, 400w with P.E. (EC1,EC2,EC3)	3	EACH
	Pedestrian Crossing Sign R10-3e (Left - 2 /Right -2)		



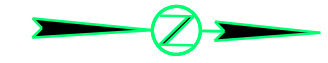
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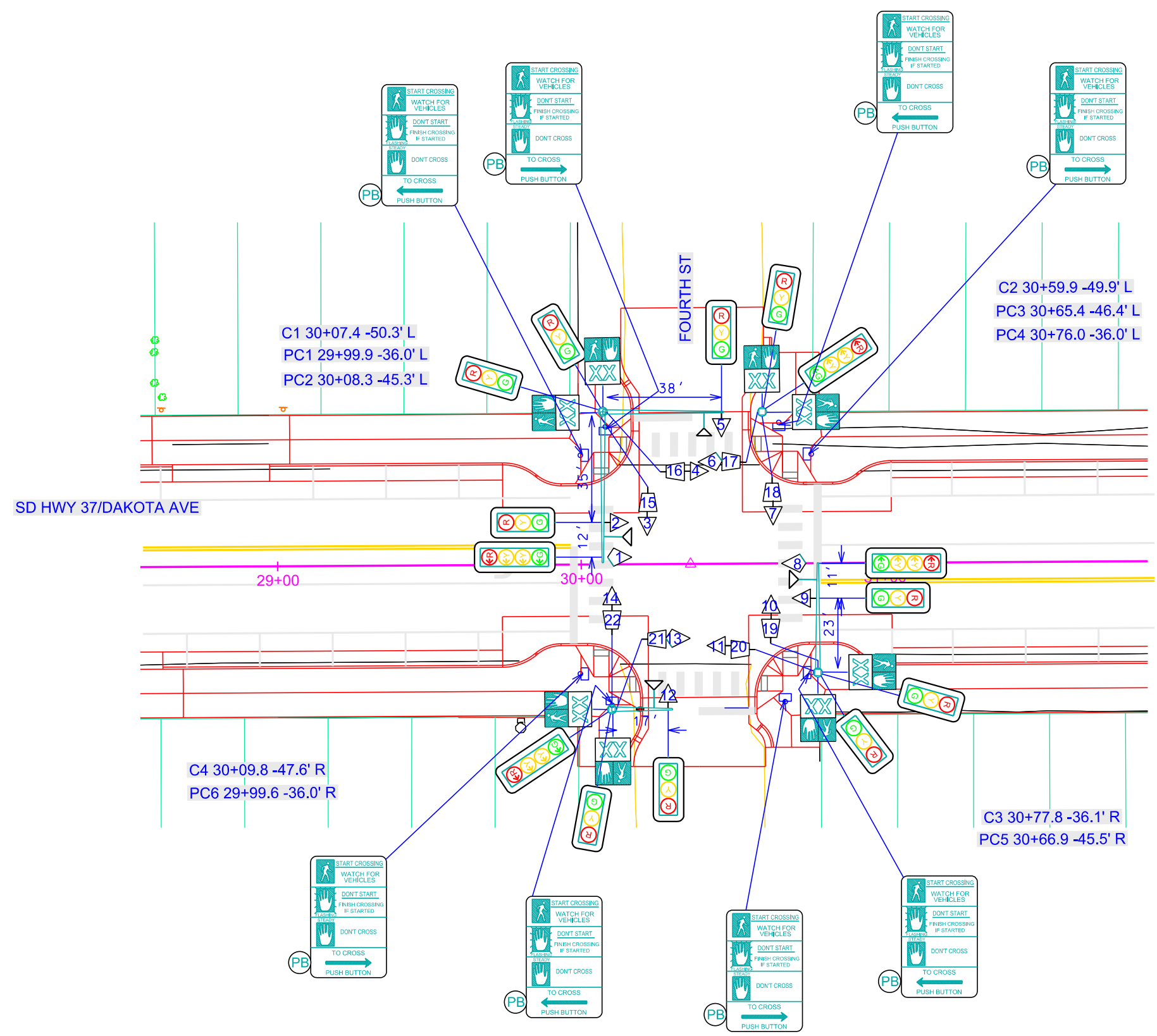
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SIGNAL LAYOUT

SD HWY 37/DAKOTA AVE & FOURTH ST



ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
	Signal Pole w/35' Mast Arm (C3)	1	EACH
	Signal Pole w/40'+50' Mast Arm (C1)	1	EACH
	Signal Pole w/20' Mast Arm & 8' Lumin Arm (C4)	1	EACH
	Pedestal Signal Pole (C2)	1	EACH
	Roadway Luminaire, LED with P.E. (C4)	1	EACH
	3 Section Vehicle Signal Head (2-5,7,9-12,14)	10	EACH
	4 Section Directional Vehicle Signal Head (1,6,8,13)	4	EACH
	Emergency Vehicle Preemption Unit (4-Channel)	1	EACH
	Optical Detector	4	EACH
	Accessible Pedestrian Signal	8	EACH
	Pedestrian Push Button Pole (PC1-PC5)	5	EACH
	Pedestrian Signal Head w/Countdown Timer (15-22)	8	EACH
	Pedestrian Crossing Sign R10-3e (Left 4 /Right 4)	8	EACH



Plot Scale - 1"=40'

Plotted From - TRPR17199

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EXISTING SIGNAL LAYOUT

SD HWY 37/DAKOTA AVE & THIRD ST

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L17	TOTAL SHEETS L54
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Plotting Date: 12/05/2023

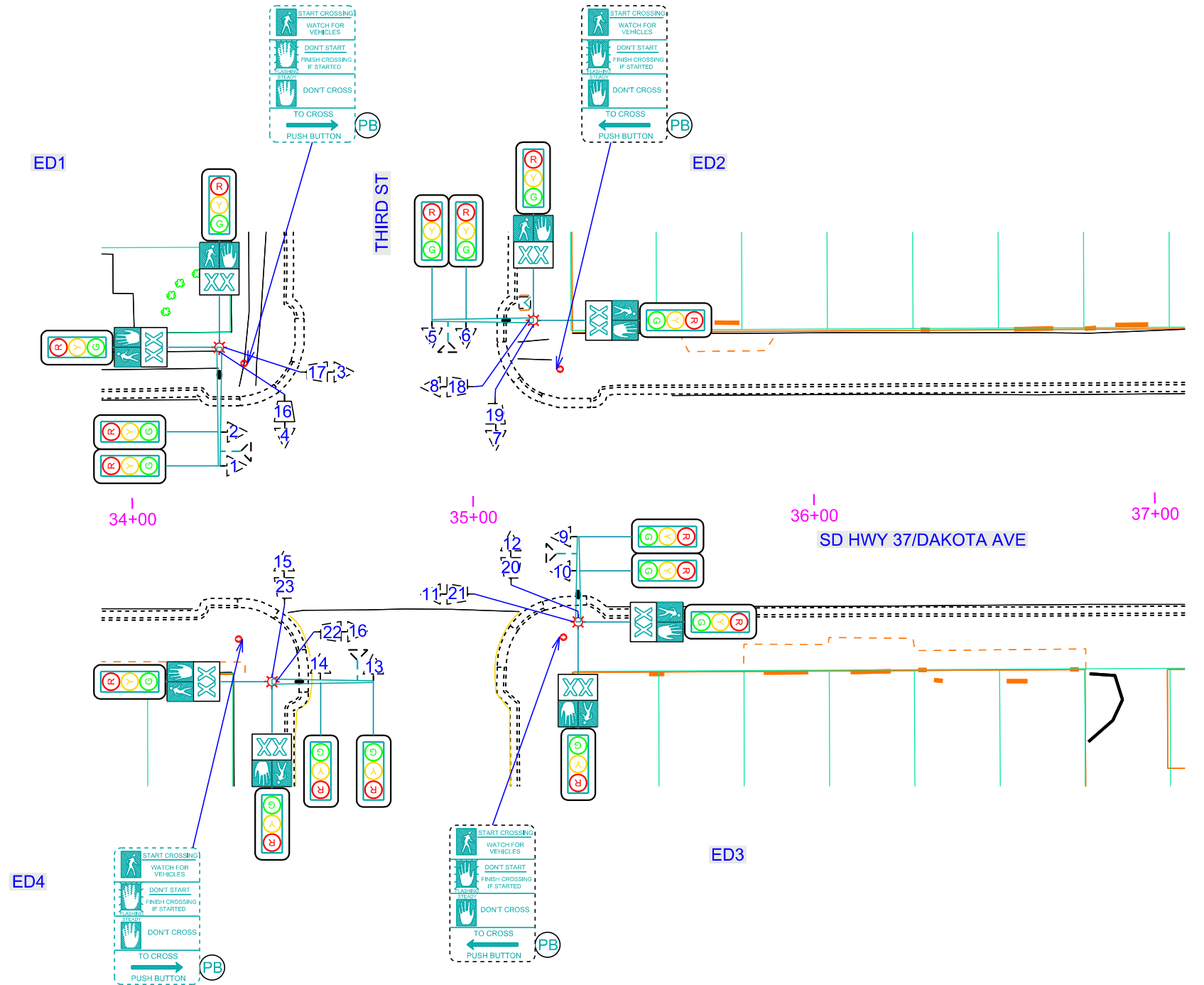


EXISTING ITEMS	
KEY	ITEM
	Signal Pole w/25' Mast Arm & 8' Lumin Arm (ED3)
	Signal Pole w/30' Mast Arm & 8' Lumin Arm (ED2,ED4)
	Signal Pole w/35' Mast Arm & 8' Lumin Arm (ED1)
	Roadway Luminaire, 400w with P.E. (ED1-ED4)
	3 Section Vehicle Signal Head (1-15)
	Emergency Vehicle Preemption Unit (4-Channel)
	Optical Detector
	Accessible Pedestrian Signal
	Pedestrian Signal Head w/Countdown Timer (16-23)
	Traffic Signal Controller
	Pedestrian Crossing Sign R10-3e (Left -2 /Right -2)

ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
	Remove Signal Pole Footing (ED1-ED4)	4	EACH
	Remove Signal Equipment	LUMP SUM	LS
	Salvage Signal Equipment	LUMP SUM	LS

SALVAGE ITEMS			
KEY	ITEM	EST QUANT	UNIT
	Pedestal Signal Pole (A1)	1	EACH
	Signal Pole w/25' Mast Arm & 8' Lumin Arm (ED3)	1	EACH
	Signal Pole w/30' Mast Arm & 8' Lumin Arm (ED2,ED4)	1	EACH
	Signal Pole w/35' Mast Arm & 8' Lumin Arm (ED1)	1	EACH
	3 Section Vehicle Signal Head (1-14)	14	EACH
	Pedestrian Signal Head w/Countdown Timer (15-22)	8	EACH
	Traffic Signal Controller	1	EACH

REMOVE ITEMS	
KEY	ITEM
	Roadway Luminaire, 400w with P.E. (ED1-ED4)
	Pedestrian Crossing Sign R10-3e (Left -2 /Right -2)



Plot Scale - 1"=40'

Plotted From - TRPR17199

File - U:\trproj\bead06A2\03ses.dgn

SIGNAL LAYOUT

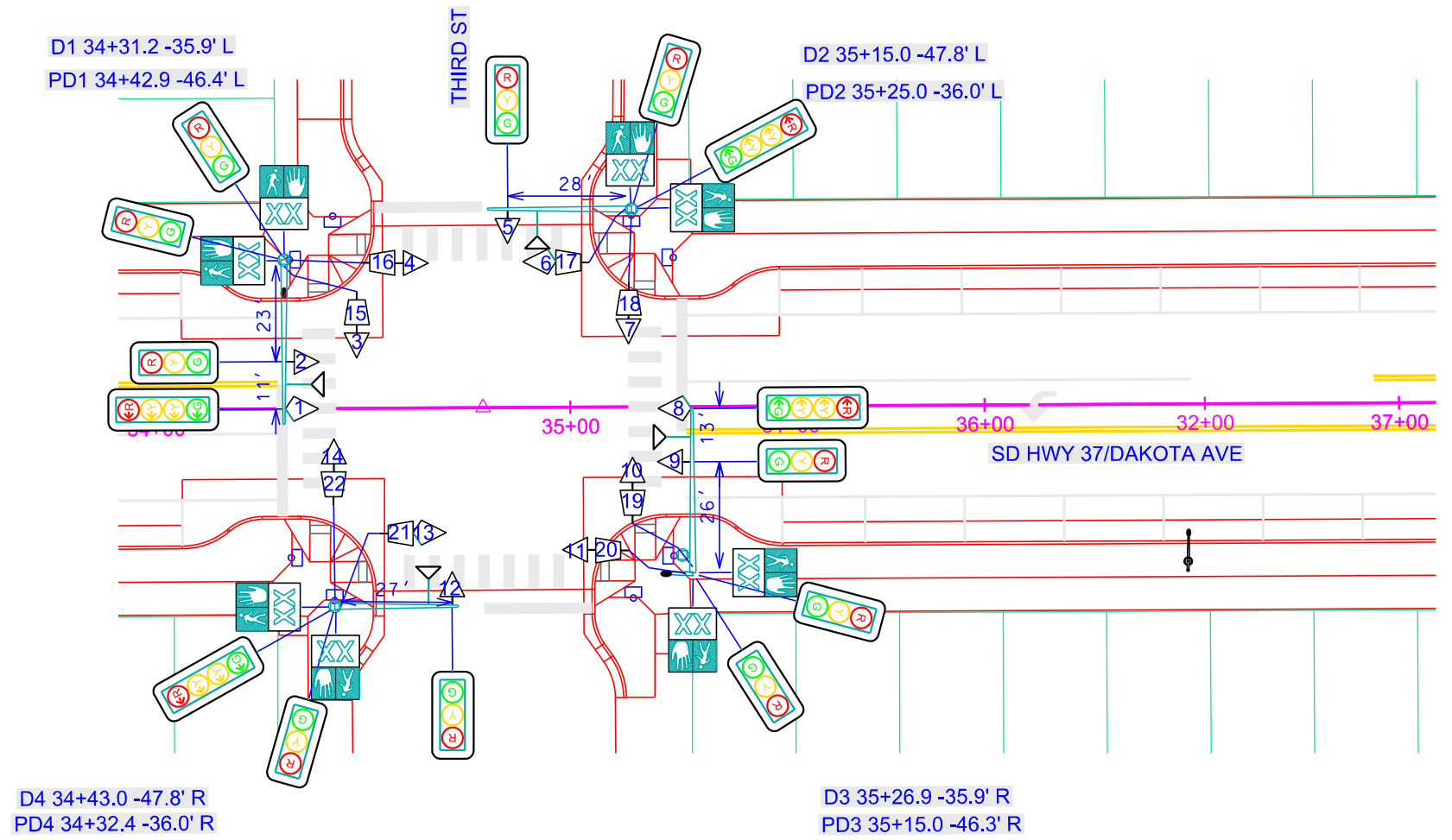
SD HWY 37/DAKOTA AVE & THIRD ST

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L18	TOTAL SHEETS L54
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Plotting Date: 12/05/2023



ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
	Signal Pole w/30' Mast Arm (D4)	1	EACH
	Signal Pole w/35' Mast Arm (D2)	1	EACH
	Signal Pole w/40' Mast Arm & 8' Lumin Arm (D1, D3)	2	EACH
	Roadway Luminaire, LED with P.E. (D1, D3)	2	EACH
	3 Section Vehicle Signal Head (2-5, 7, 9-12, 14)	10	EACH
	4 Section Directional Vehicle Signal Head (1, 6, 8, 13)	4	EACH
	Emergency Vehicle Preemption Unit (4-Channel)	1	EACH
	Optical Detector	4	EACH
	Accessible Pedestrian Signal	8	EACH
	Pedestrian Push Button Pole (PD1-PD5)	5	EACH
	Pedestrian Signal Head w/Countdown Timer (15-22)	8	EACH
	Pedestrian Crossing Sign R10-3e (Left 4 /Right 4)	8	EACH



Plot Scale - 1:40

Plotted From - TRPR17199

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EXISTING SIGNAL LAYOUT

SD HWY 37/DAKOTA AVE & MARKET ST

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L19	TOTAL SHEETS L54
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Plotting Date: 12/05/2023

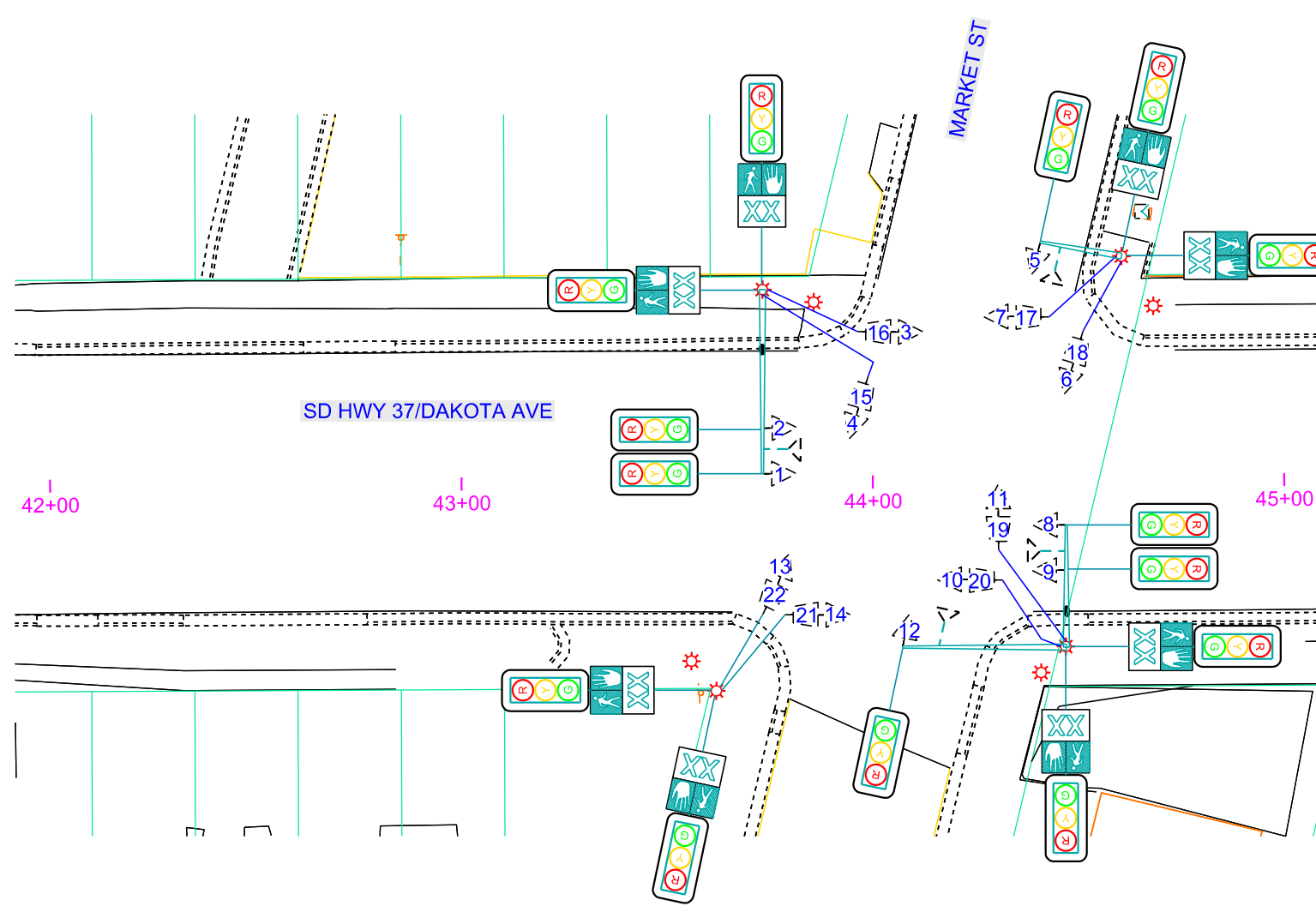


EXISTING ITEMS	
KEY	ITEM
	Pedestal Signal Pole (EE4)
	Signal Pole w/20' Mast Arm (EE2)
	Signal Pole w/45' Mast Arm & 8' Lumin Arm (EE1)
	Signal Pole w/ Dual 30' and 40' Mast Arm & 8' Lumin Arm (EE3)
	Roadway Luminaire, 400w with P.E. (A1,A2,A3,A4)
	3 Section Vehicle Signal Head (1-14)
	Emergency Vehicle Preemption Unit (4-Channel)
	Optical Detector
	Accessible Pedestrian Signal
	Traffic Signal Controller
	Pedestrian Signal Head w/Countdown Timer (15-22)
	Pedestrian Crossing Sign R10-3e (Left - 2 /Right - 2)

ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
	Remove Signal Pole Footing (EE1-EE4)	4	EACH
	Remove Signal Equipment	LUMP SUM	LS
	Salvage Signal Equipment	LUMP SUM	LS

SALVAGE ITEMS			
KEY	ITEM	EST QUANT	UNIT
	Pedestal Signal Pole (EE4)	1	EACH
	Signal Pole w/20' Mast Arm (EE2)	1	EACH
	Signal Pole w/45' Mast Arm & 8' Lumin Arm (EE1)	1	EACH
	Signal Pole w/ Dual 30' and 40' Mast Arm & 8' Lumin Arm (EE3)	1	EACH
	3 Section Vehicle Signal Head (1-14)	14	EACH
	Pedestrian Signal Head w/Countdown Timer (15-22)	8	EACH
	Traffic Signal Controller	1	EACH

REMOVE ITEMS	
KEY	ITEM
	Roadway Luminaire, 400w with P.E. (A1,A2,A3,A4)
	Pedestrian Crossing Sign R10-3e (Left - 2 /Right - 2)



Plot Scale - 1"=40'

Plotted From - TRPR17199

File - U:\trp\proj\bead06A2\044res.dgn

SIGNAL LAYOUT

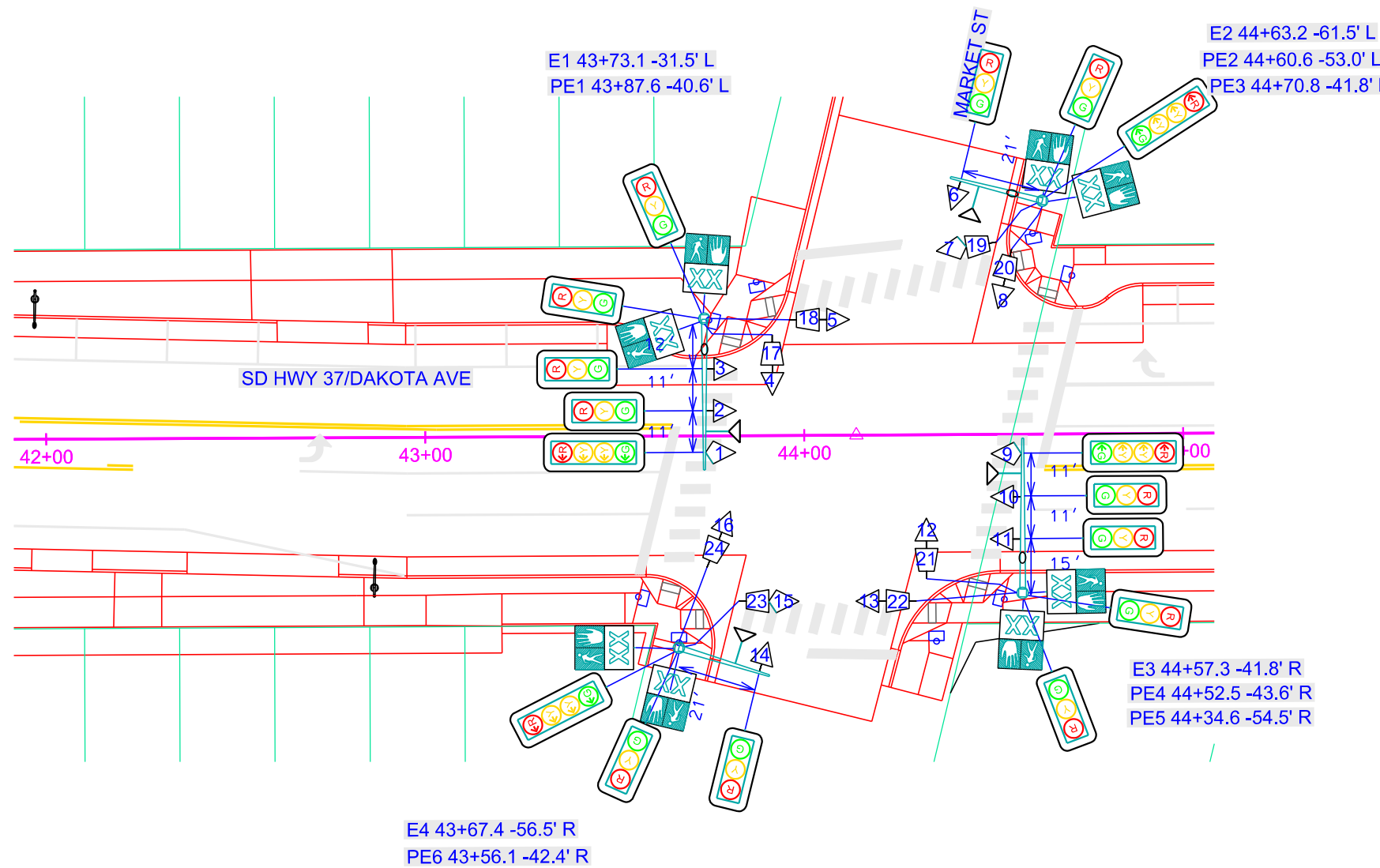
SD HWY 37/DAKOTA AVE & MARKET ST

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L20	TOTAL SHEETS L54
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Revised 1/09/2024 - RR



ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
	Signal Pole w/25' Mast Arm & 8' Lumin Arm (E2)	1	EACH
	Signal Pole w/25' Mast Arm (E4)	1	EACH
	Signal Pole w/40' Mast Arm & 8' Lumin Arm (E1,E3)	2	EACH
	Roadway Luminaire, LED with P.E. (E2,E3)	2	EACH
	3 Section Vehicle Signal Head (2-6, 8, 10-14, 16)	12	EACH
	4 Section Directional Vehicle Signal Head (1, 7, 9, 15)	4	EACH
	Emergency Vehicle Preemption Unit (4-Channel)	1	EACH
	Optical Detector	4	EACH
	Accessible Pedestrian Signal	8	EACH
	Pedestrian Push Button Pole (PE1-PE6)	6	EACH
	Pedestrian Signal Head w/Countdown Timer (17-24)	8	EACH
	Pedestrian Crossing Sign R10-3e (Left -4 /Right -4)	8	EACH



Plot Scale - 1:40

Plotted From - TRPR17199

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CONDUIT LAYOUT

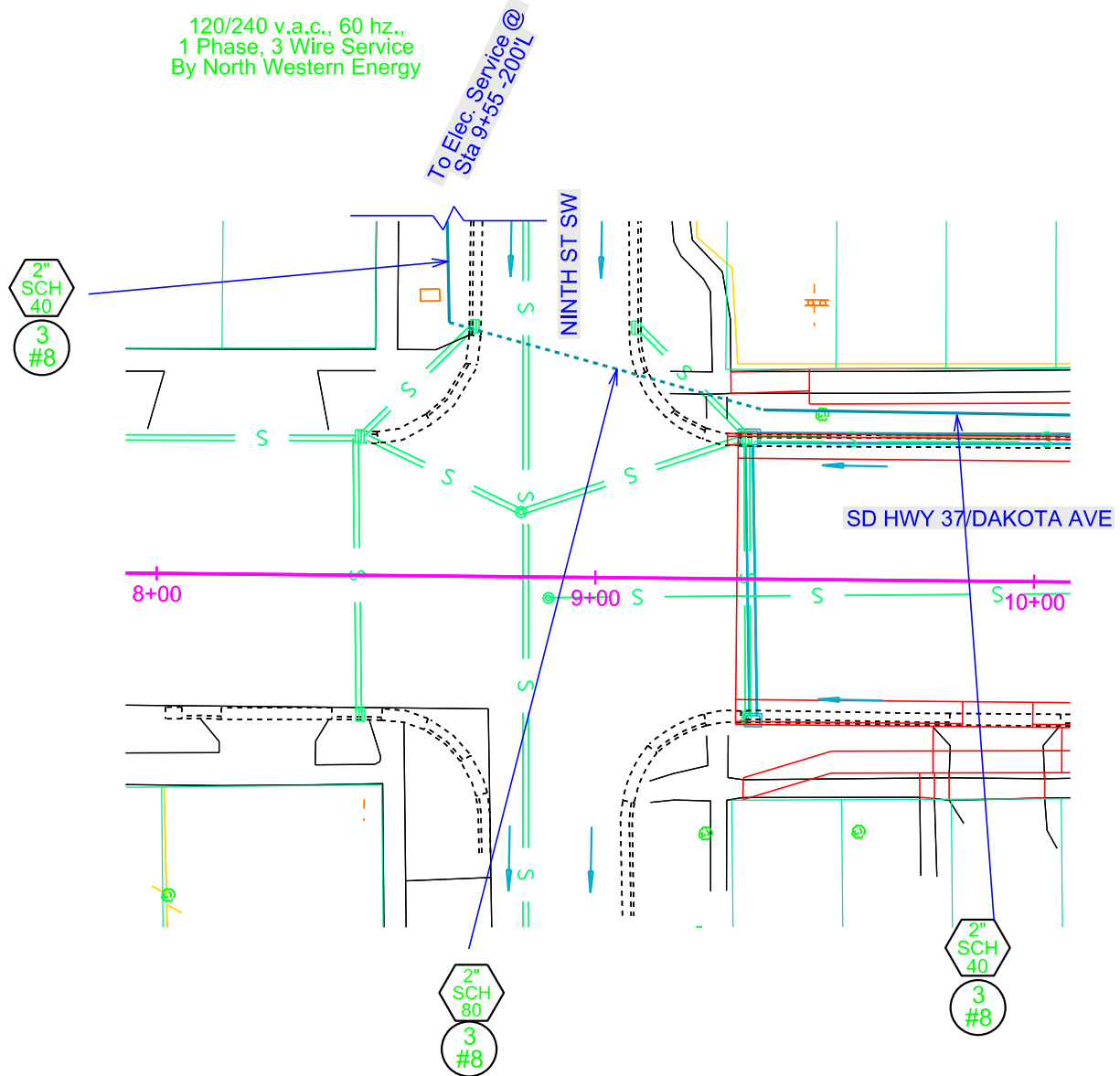
SD HWY 37/DAKOTA AVE & NINTH ST SW

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L21	TOTAL SHEETS L54
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Plotting Date: 12/05/2023



ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
	Salvage Luminaire Pole (EL1-EL19)	19	EACH
	Remove Luminaire Pole Footing (EL1-EL19)	19	EACH
	Breakaway Base Luminaire Pole w/8' Arm 50' Mounting Height (L1-L11)	11	EACH
	Roadway Luminaire, LED with P.E. (L1-L11)	11	EACH
	Breakaway Base Decorative Luminaire Pole w/3' Front Arm and 2' Rear Arm, 35' Mounting Height (DL1-DL24)	24	EACH
	Decorative Roadway Luminaire, LED with P.E. (DL1-DL24)	48	EACH
	2' Diameter Footing (L1-L11, DL1-DL25)	291	FT
	Type 1 Electrical Junction Box (JL1-JL17)	17	EACH
	Type 3A Electrical Junction Box (JF1)	1	EACH
	Electrical Service Cabinet	6	EACH
	Galvanized Steel Utility Pole Not a Bid Item	6	EACH
	Meter Socket Not a Bid Item	6	EACH
	2" Rigid Conduit, Schedule 40	6270	FT
	2" Rigid Conduit, Schedule 80	2260	FT
	1/C #4 AWG Copper Wire	1160	FT
	1/C #6 AWG Copper Wire	4665	FT
	1/C #8 AWG Copper Wire	14650	FT
	2/C #10 AWG Copper Pole & Bracket Cable	2515	FT
	Fiber Optic Cable 24 Strand	2230	FT



Plot Scale - 1:40

Plotted From - TRPR17199

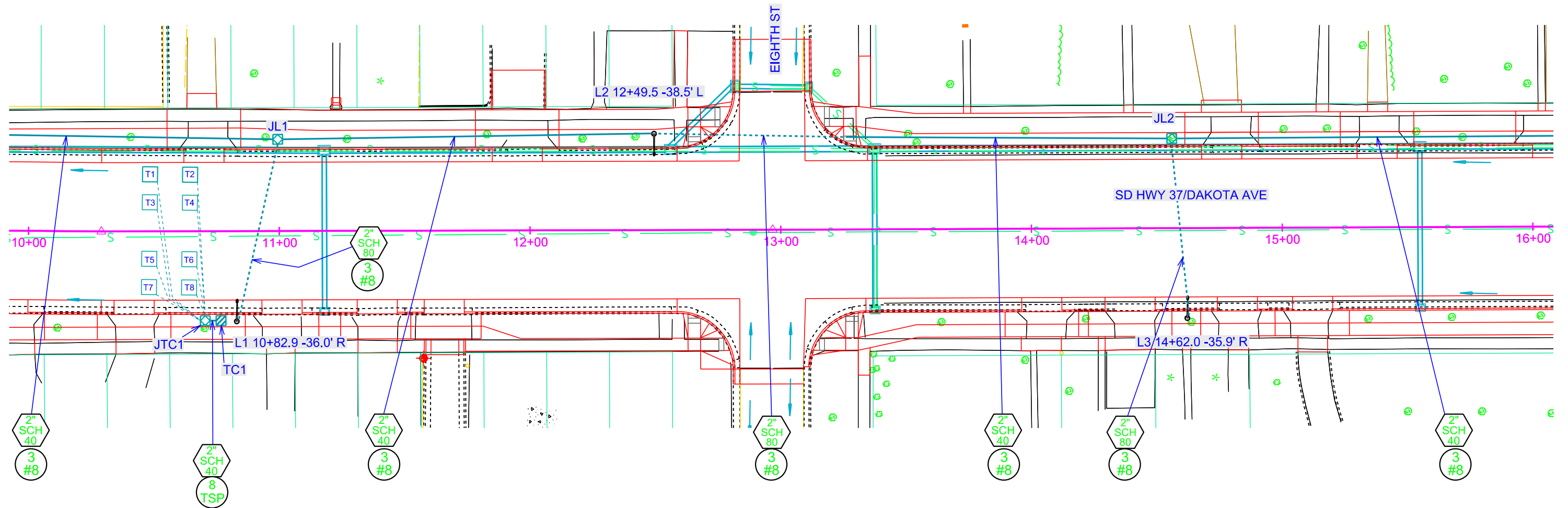
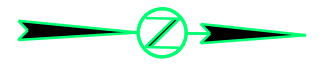
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CONDUIT LAYOUT

SD HWY 37/DAKOTA AVE

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L22	TOTAL SHEETS L54
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Plotting Date: 12/05/2023



ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
	Traffic Counter Surface Utility Box (TC1)	1	EACH
	2" Rigid Conduit, Schedule 40	15	FT
	#16 AWG Copper Twisted Shielded Pair	120	FT
	Preformed Detector Loop (T1-T8)	8	EACH
	Type 1 Electrical Junction Box (JTC1)	1	EACH

Plot Scale - 1:40

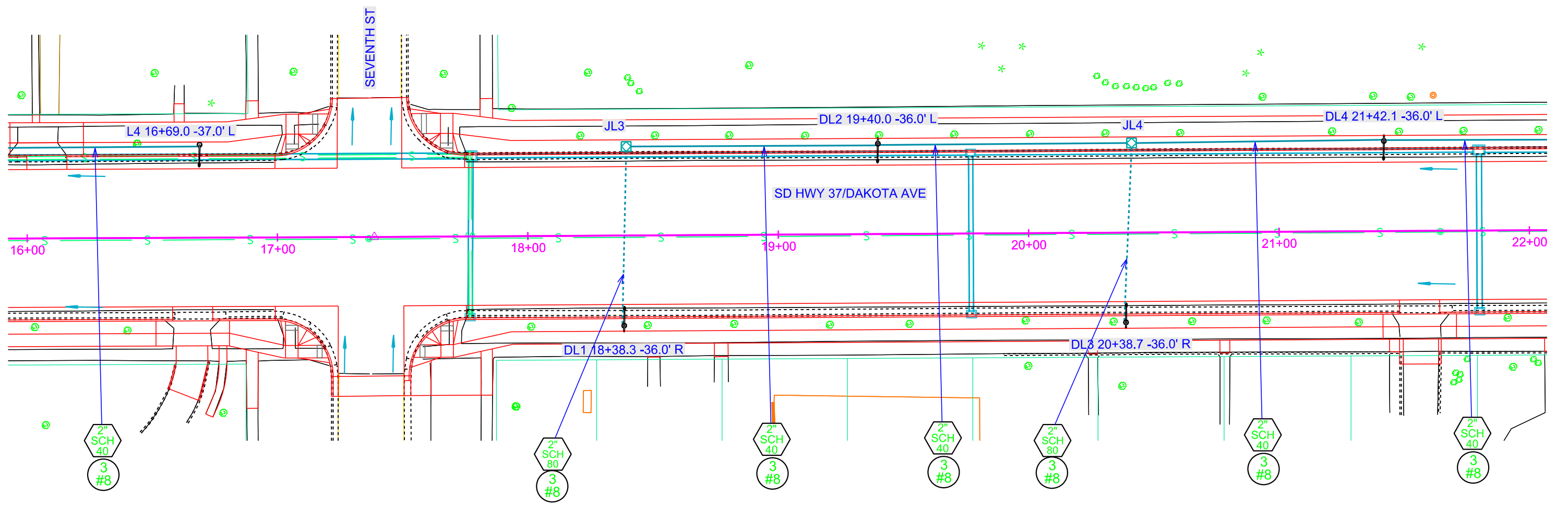
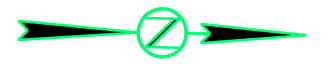
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CONDUIT LAYOUT SD HWY 37/DAKOTA AVE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0037(158)126	L23	L54

Plotting Date: 12/05/2023



Plot Scale - 1:40

Plotted From - TRPR17199

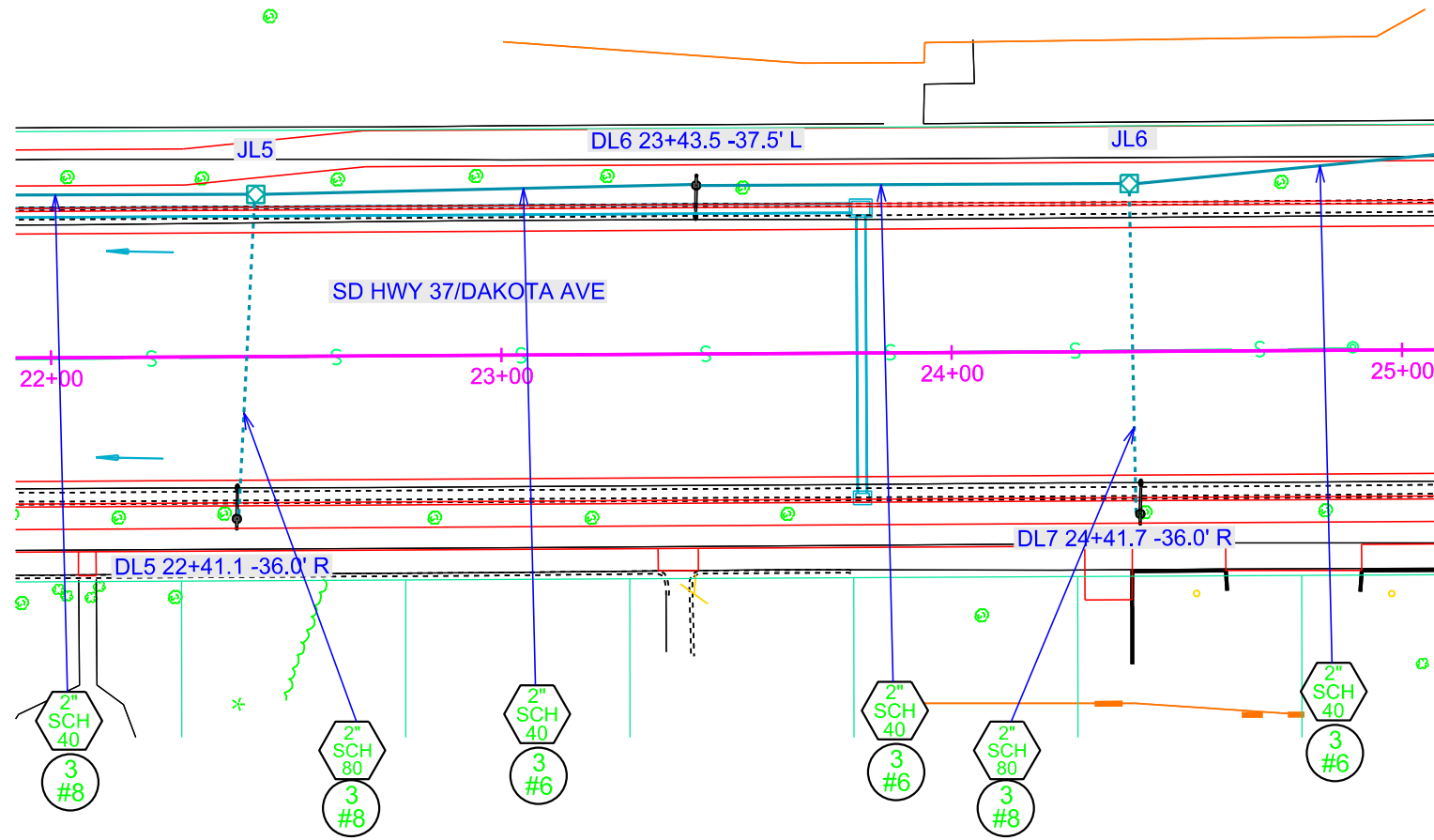
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CONDUIT LAYOUT

SD HWY 37/DAKOTA AVE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0037(158)126	L24	L54

Plotting Date: 12/05/2023



Plot Scale - 1:40

Plotted From - TRPR17199

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CONDUIT LAYOUT

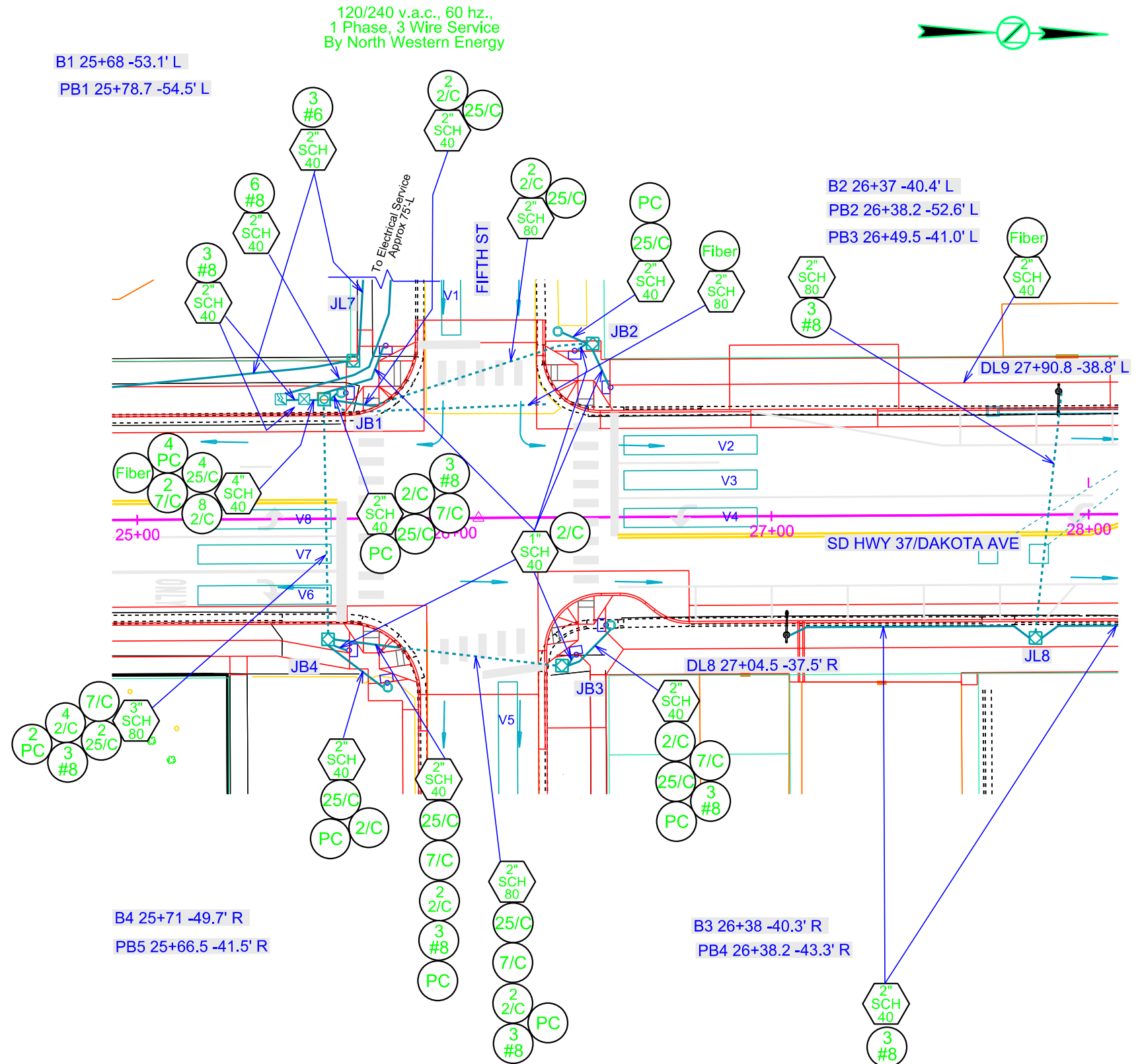
SD HWY 37/DAKOTA AVE & FIFTH ST

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L25	TOTAL SHEETS L54
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Plotting Date: 12/05/2023



ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
○	3' Diameter Footing (B1-B4)	45	FT
☒	Type 1 Electrical Junction Box (JB2-JB4)	3	EACH
☑	Type 3 Electrical Junction Box (JB1)	1	EACH
▲	Electrical Service Cabinet with Secondary Disconnect	1	EACH
∅	Galvanized Steel Utility Pole Not a Bid Item	1	EACH
Ⓜ	Meter Socket Not a Bid Item	1	EACH
☒	Traffic Signal Controller	1	EACH
	Battery Backup System for Traffic Signal Controller	1	EACH
□	Video Detection Zone (6' x 42') (V1-V8) (Not a Bid Item)	8	EACH
	Video Detection System	1	EACH
1" SCH 40	1" Rigid Conduit, Schedule 40	105	FT
2" SCH 40	2" Rigid Conduit, Schedule 40	335	FT
4" SCH 40	4" Rigid Conduit, Schedule 40	35	FT
2" SCH 80	2" Rigid Conduit, Schedule 80	135	FT
3" SCH 80	3" Rigid Conduit, Schedule 80	85	FT
#8	1/C #8 AWG Copper Wire	1910	FT
2/C	2/C #14 AWG Copper Tray Cable, K2	1245	FT
3/C	3/C #14 AWG Copper Tray Cable, K2	140	FT
4/C	4/C #14 AWG Copper Tray Cable, K2	335	FT
5/C	5/C #14 AWG Copper Tray Cable, K2	170	FT
7/C	7/C #14 AWG Copper Tray Cable, K2	300	FT
25/C	25/C #14 AWG Copper Tray Cable, K2	615	FT
	2/C #10 AWG Copper Pole & Bracket Cable	130	FT
PC	Preemption Cable (Not a Bid Item)	830	FT



Plot Scale - 1"=40'

Plotted From - TRPR37199

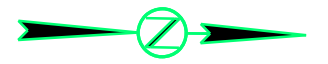
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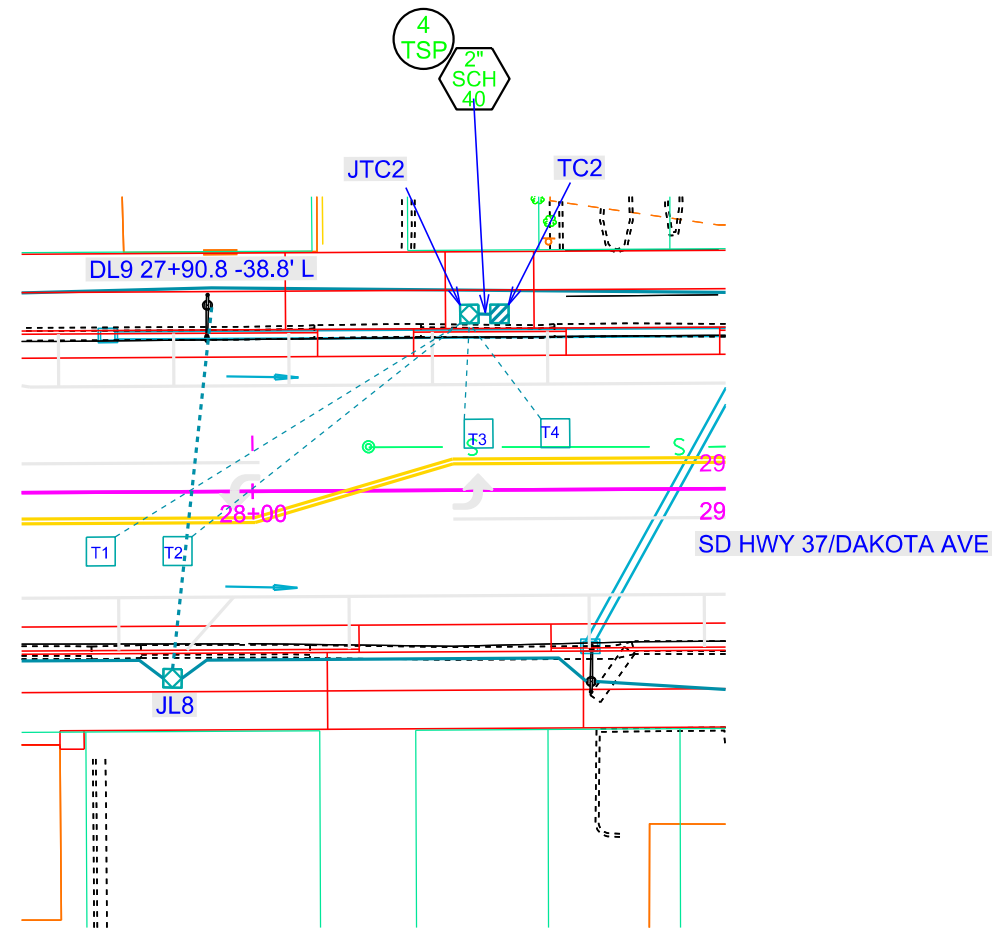
SD HWY 37/DAKOTA AVE & FIFTH ST

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L26	TOTAL SHEETS L54
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Plotting Date: 12/05/2023



ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
☑	Traffic Counter Surface Utility Box (TC2)	1	EACH
⬡ 2" SCH 40	2" Rigid Conduit, Schedule 40	15	FT
⊙ TSP	#16 AWG Copper Twisted Shielded Pair	60	FT
□	Preformed Detector Loop (T1-T4)	4	EACH
☑	Type 1 Electrical Junction Box (JTC2)	1	EACH



Plot Scale - 1:40

Plotted From - TRPR17199

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CONDUIT LAYOUT

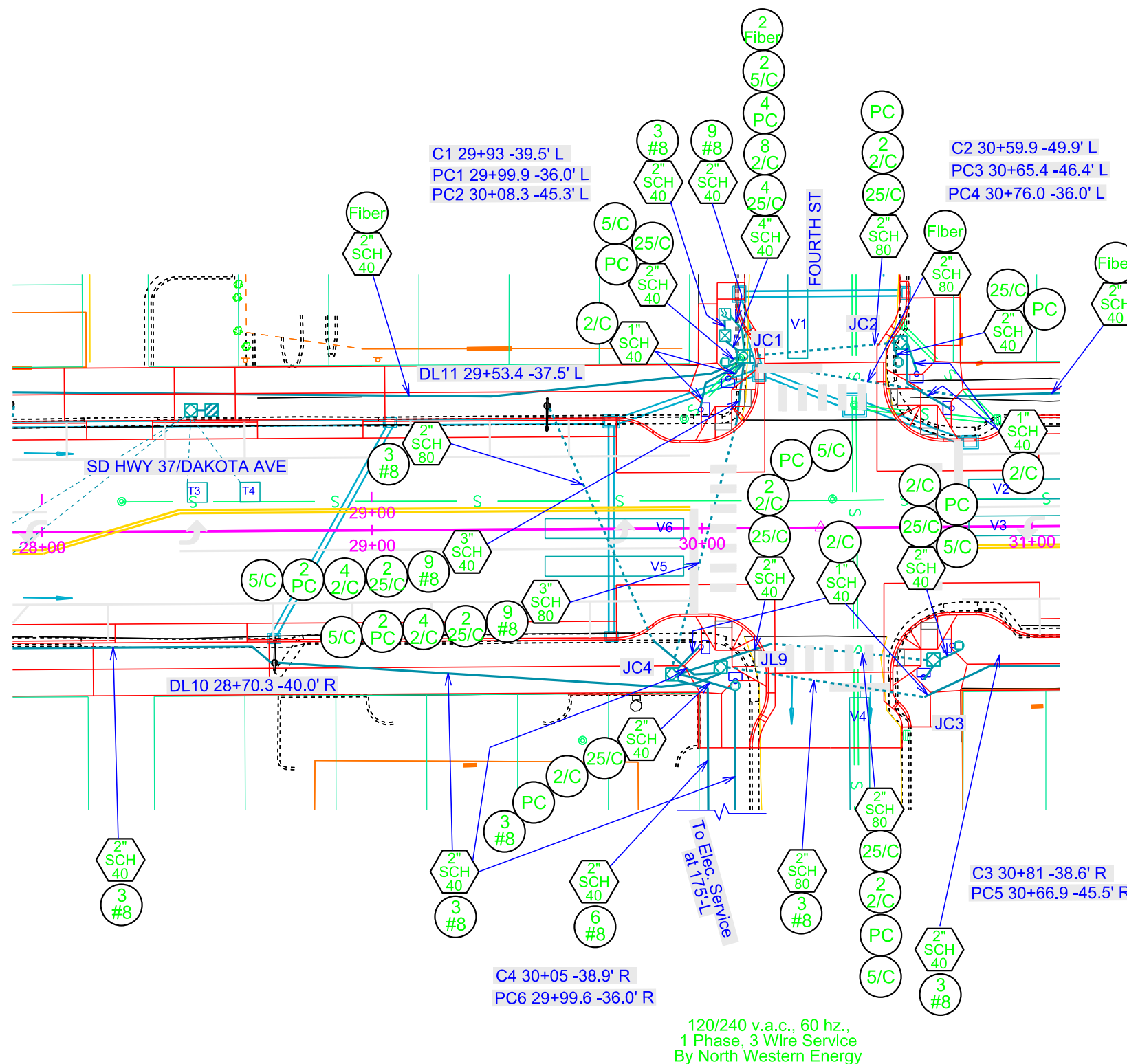
SD HWY 37/DAKOTA AVE & FOURTH ST

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L27	TOTAL SHEETS L54
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Plotting Date: 12/05/2023



ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
	2' Diameter Footing (C2)	6	FT
	3' Diameter Footing (C1, C3-C4)	33	FT
	Type 1 Electrical Junction Box (JC2-JC4)	3	EACH
	Type 3 Electrical Junction Box (JC1)	1	EACH
	Electrical Service Cabinet with Secondary Disconnect	1	EACH
	Galvanized Steel Utility Pole Not a Bid Item	1	EACH
	Meter Socket Not a Bid Item	1	EACH
	Traffic Signal Controller	1	EACH
	Battery Backup System for Traffic Signal Controller	1	EACH
	Video Detection Zone (6' x 42') (V1-V6) (Not a Bid Item)	6	EACH
	Video Detection System	1	EACH
	1" Rigid Conduit, Schedule 40	135	FT
	2" Rigid Conduit, Schedule 40	400	FT
	4" Rigid Conduit, Schedule 40	25	FT
	2" Rigid Conduit, Schedule 80	180	FT
	1/C #8 AWG Copper Wire	2625	FT
	2/C #14 AWG Copper Tray Cable, K2	1190	FT
	3/C #14 AWG Copper Tray Cable, K2	140	FT
	4/C #14 AWG Copper Tray Cable, K2	320	FT
	5/C #14 AWG Copper Tray Cable, K2	475	FT
	25/C #14 AWG Copper Tray Cable, K2	575	FT
	2/C #10 AWG Copper Pole & Bracket Cable	65	FT
	Preemption Cable (Not a Bid Item)	740	FT



Plot Scale - 1"=40'

Plotted From - TRPR17199

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CONDUIT LAYOUT

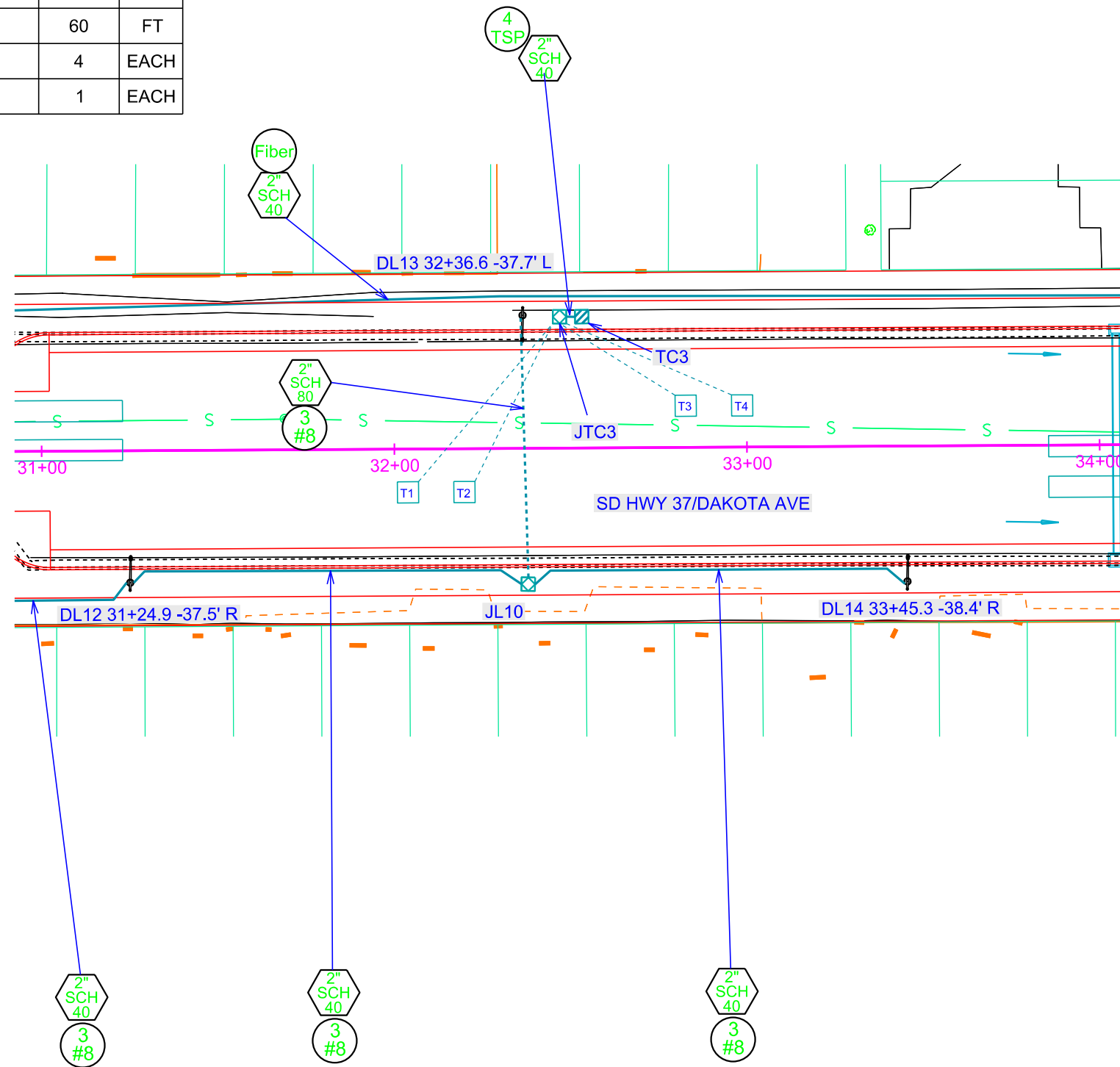
SD HWY 37/DAKOTA AVE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0037(158)126	L28	L54

Plotting Date: 12/05/2023



ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
	Traffic Counter Surface Utility Box (TC3)	1	EACH
	2" Rigid Conduit, Schedule 40	15	FT
	#16 AWG Copper Twisted Shielded Pair	60	FT
	Preformed Detector Loop (T1-T4)	4	EACH
	Type 1 Electrical Junction Box (JTC3)	1	EACH



Plot Scale - 1:40

TRPR17199

Plotted From -

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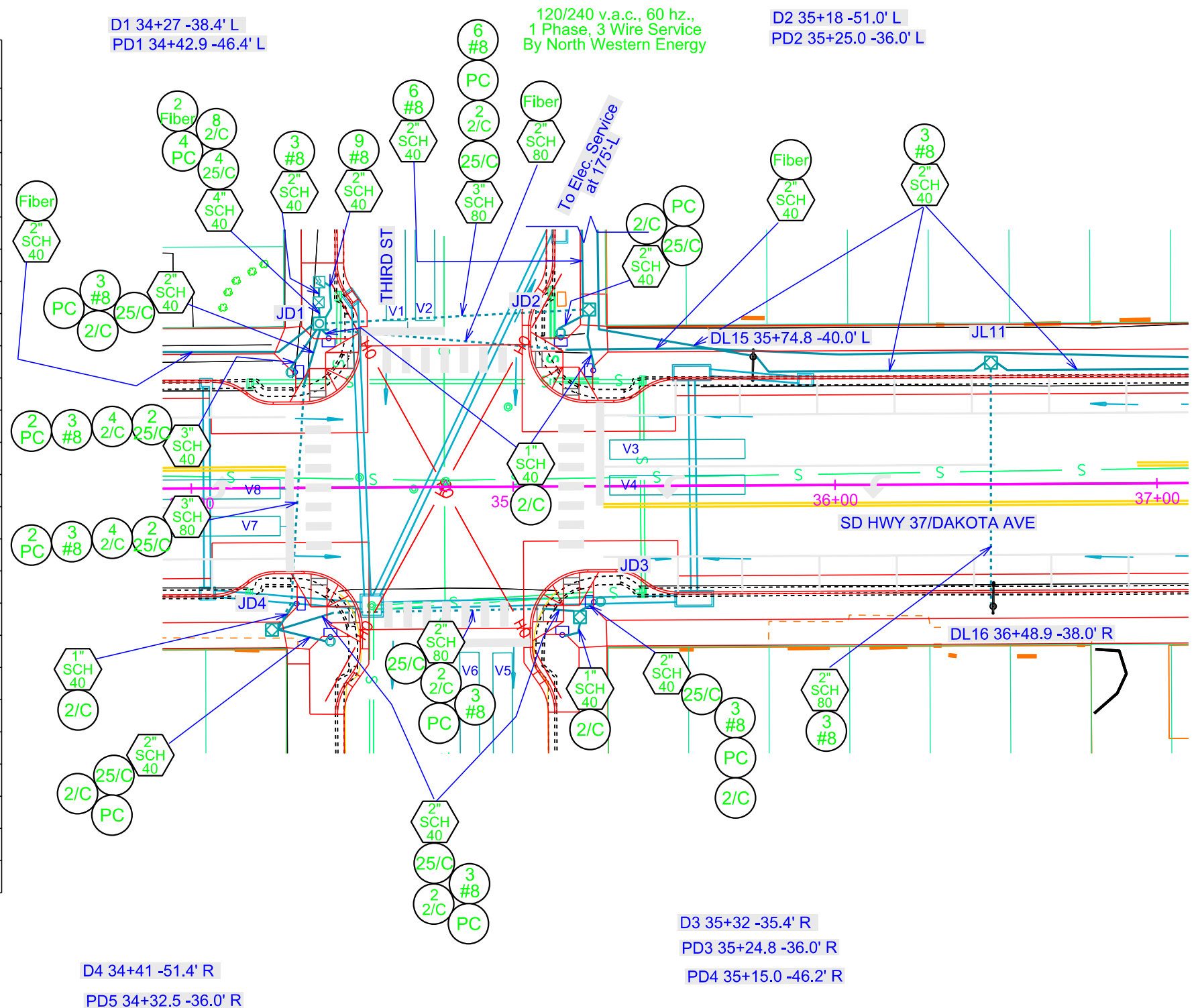
CONDUIT LAYOUT

SD HWY 37/DAKOTA AVE & THIRD ST

Plotting Date: 12/05/2023



ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
○	3' Diameter Footing (D1-D4)	44	FT
⊠	Type 1 Electrical Junction Box (JD2-JD4)	3	EACH
⊠	Type 3 Electrical Junction Box (JD1)	1	EACH
▲	Electrical Service Cabinet with Secondary Disconnect	1	EACH
∅	Galvanized Steel Utility Pole Not a Bid Item	1	EACH
Ⓜ	Meter Socket Not a Bid Item	1	EACH
⊠	Traffic Signal Controller	1	EACH
	Battery Backup System for Traffic Signal Controller	1	EACH
□	Video Detection Zone (6' x 42') (V1-V8) (Not a Bid Item)	8	EACH
	Video Detection System	1	EACH
1" SCH 40	1" Rigid Conduit, Schedule 40	145	FT
2" SCH 40	2" Rigid Conduit, Schedule 40	355	FT
3" SCH 40	3" Rigid Conduit, Schedule 40	30	FT
4" SCH 40	4" Rigid Conduit, Schedule 40	35	FT
2" SCH 80	2" Rigid Conduit, Schedule 80	75	FT
3" SCH 80	3" Rigid Conduit, Schedule 80	155	FT
#8	1/C #8 AWG Copper Wire	2970	FT
2/C	2/C #14 AWG Copper Tray Cable, K2	1405	FT
3/C	3/C #14 AWG Copper Tray Cable, K2	140	FT
4/C	4/C #14 AWG Copper Tray Cable, K2	290	FT
5/C	5/C #14 AWG Copper Tray Cable, K2	165	FT
25/C	25/C #14 AWG Copper Tray Cable, K2	685	FT
	2/C #10 AWG Copper Pole & Bracket Cable	130	FT
PC	Preemption Cable (Not a Bid Item)	895	FT



Plot Scale - 1"=40'

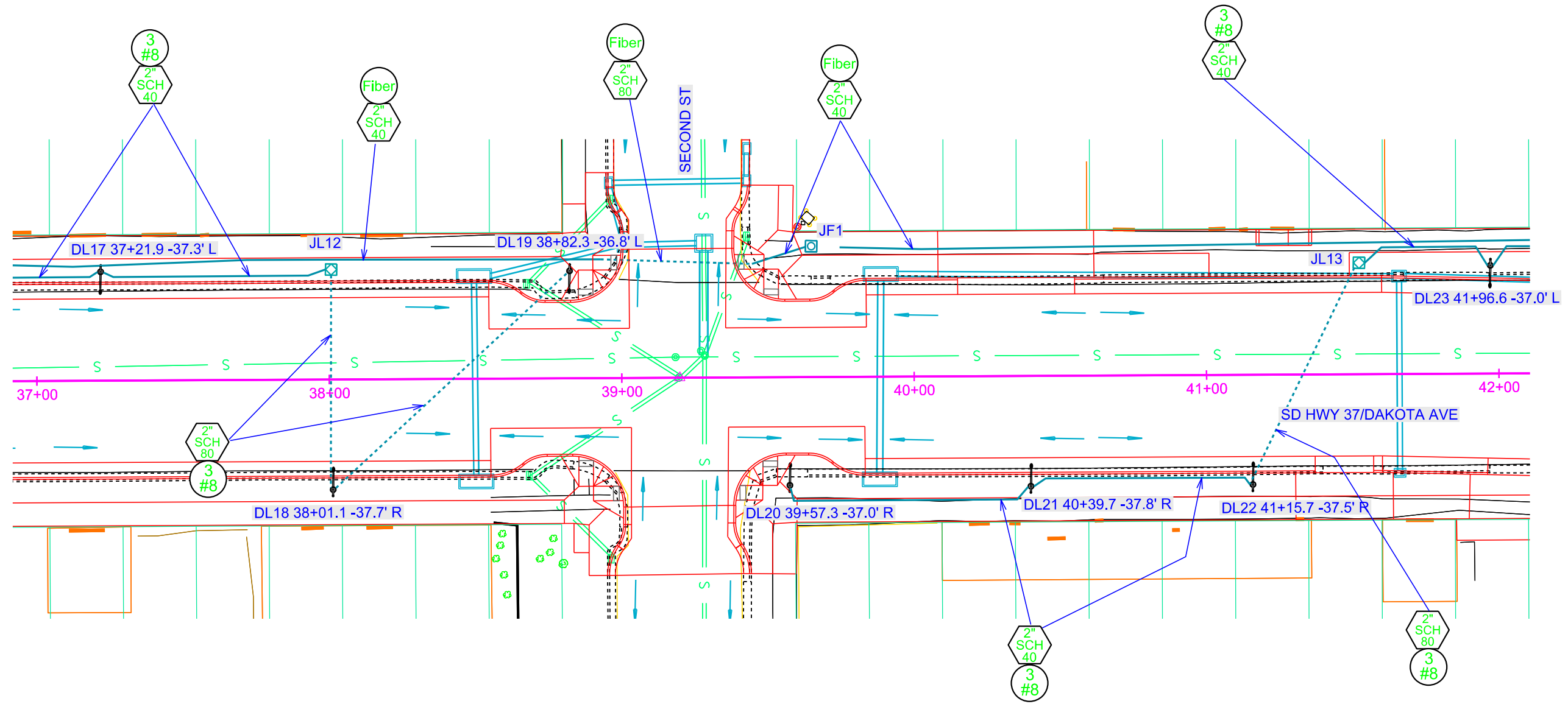
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CONDUIT LAYOUT

SD HWY 37/DAKOTA AVE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0037(158)126	L30	L54
Plotting Date:		12/05/2023	



Plot Scale - 1"=40'

Plotted From - TRPR17199

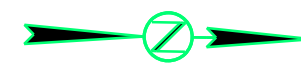
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CONDUIT LAYOUT

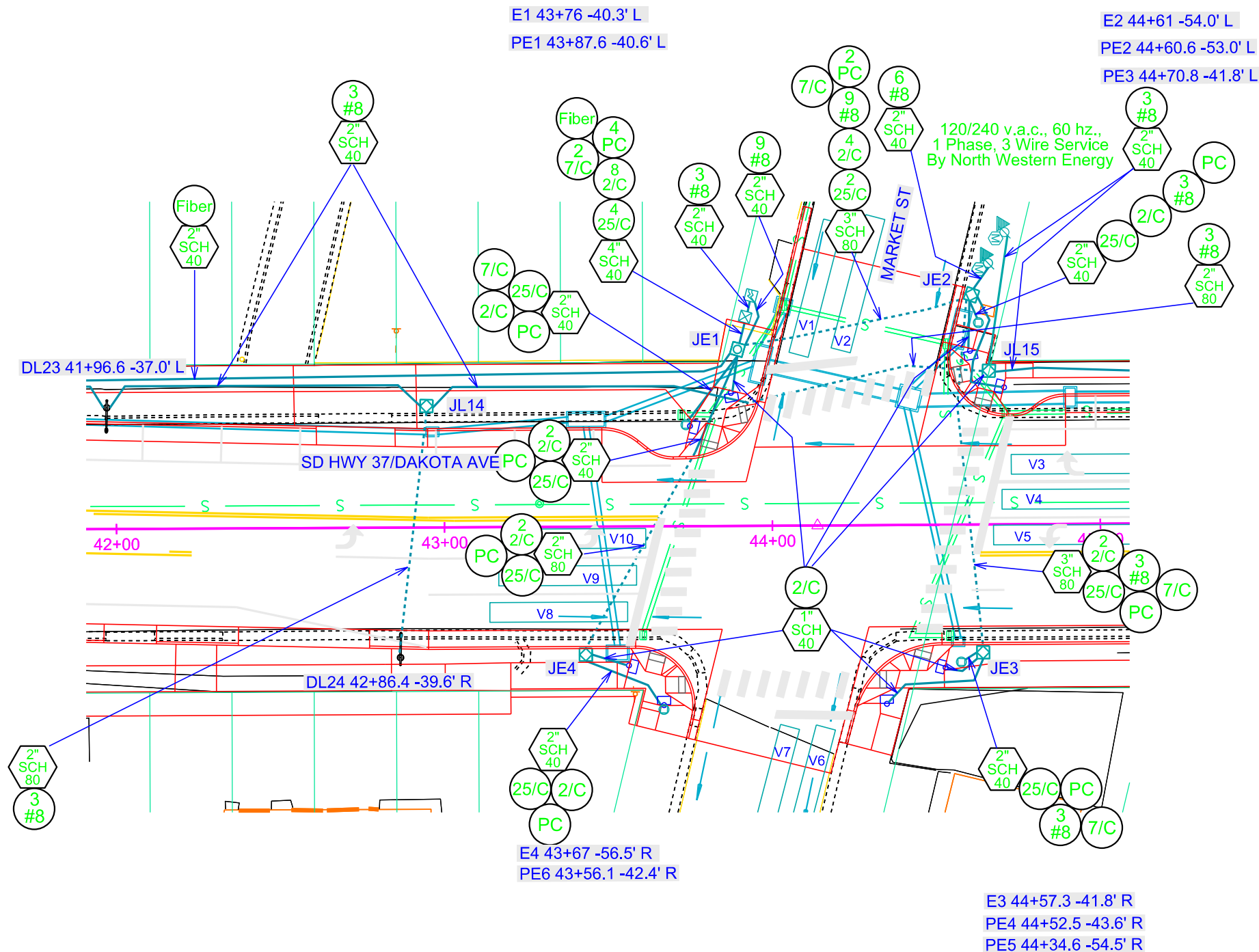
SD HWY 37/DAKOTA AVE & MARKET ST

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L31	TOTAL SHEETS L54
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Revised 1/09/2024 -RR



ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
○	3' Diameter Footing (E1-E4)	43	FT
⊠	Type 1 Electrical Junction Box (JE2-JE4)	3	EACH
⊠	Type 3 Electrical Junction Box (JE1)	1	EACH
▲	Electrical Service Cabinet with Secondary Disconnect	1	EACH
∅	Galvanized Steel Utility Pole <small>Not a Bid Item</small>	1	EACH
Ⓜ	Meter Socket <small>Not a Bid Item</small>	1	EACH
⊠	Traffic Signal Controller	1	EACH
	Battery Backup System for Traffic Signal Controller	1	EACH
□	Video Detection Zone (6' x 42') (V1-V10) <small>(Not a Bid Item)</small>	10	EACH
	Video Detection System	1	EACH
1" SCH 40	1" Rigid Conduit, Schedule 40	170	FT
2" SCH 40	2" Rigid Conduit, Schedule 40	75	FT
4" SCH 40	4" Rigid Conduit, Schedule 40	200	FT
2" SCH 80	2" Rigid Conduit, Schedule 80	195	FT
3" SCH 80	3" Rigid Conduit, Schedule 80	80	FT
#8	1/C #8 AWG Copper Wire	1800	FT
2/C	2/C #14 AWG Copper Tray Cable, K2	1365	FT
3/C	3/C #14 AWG Copper Tray Cable, K2	140	FT
4/C	4/C #14 AWG Copper Tray Cable, K2	365	FT
5/C	5/C #14 AWG Copper Tray Cable, K2	165	FT
7/C	7/C #14 AWG Copper Tray Cable, K2	330	FT
25/C	25/C #14 AWG Copper Tray Cable, K2	625	FT
	2/C #10 AWG Copper Pole & Bracket Cable	195	FT
PC	Preemption Cable <small>(Not a Bid Item)</small>	835	FT



Plot Scale - 1:40

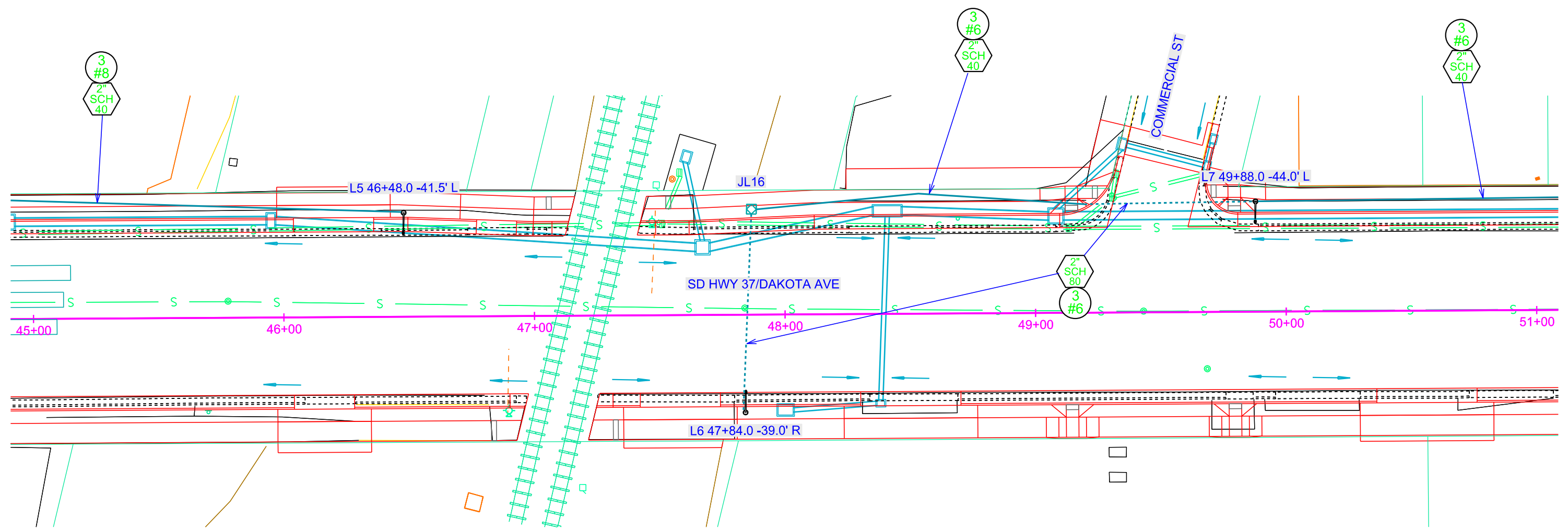
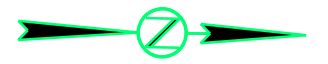
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CONDUIT LAYOUT SD HWY 37/DAKOTA AVE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0037(158)126	L32	L54

Plotting Date: 12/05/2023



Plot Scale - 1:40

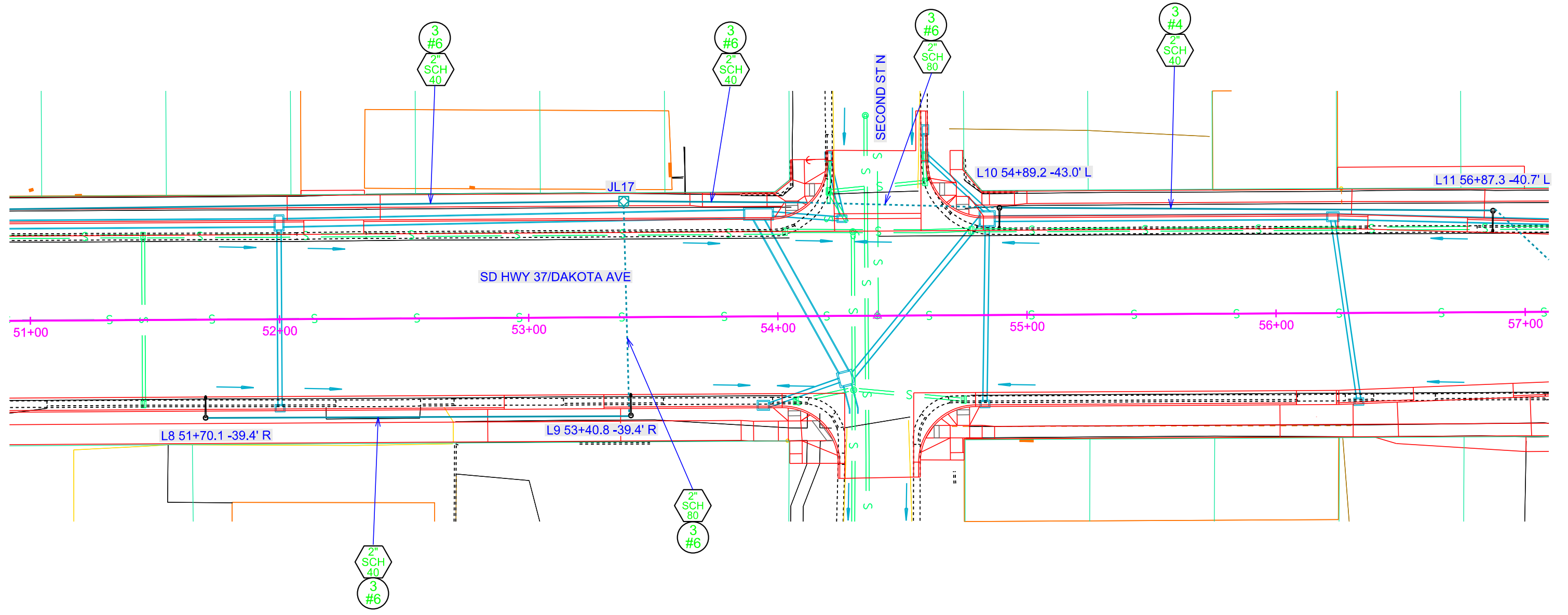
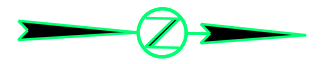
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CONDUIT LAYOUT SD HWY 37/DAKOTA AVE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0037(158)126	L33	L54

Plotting Date: 12/05/2023



Plot Scale - 1:40

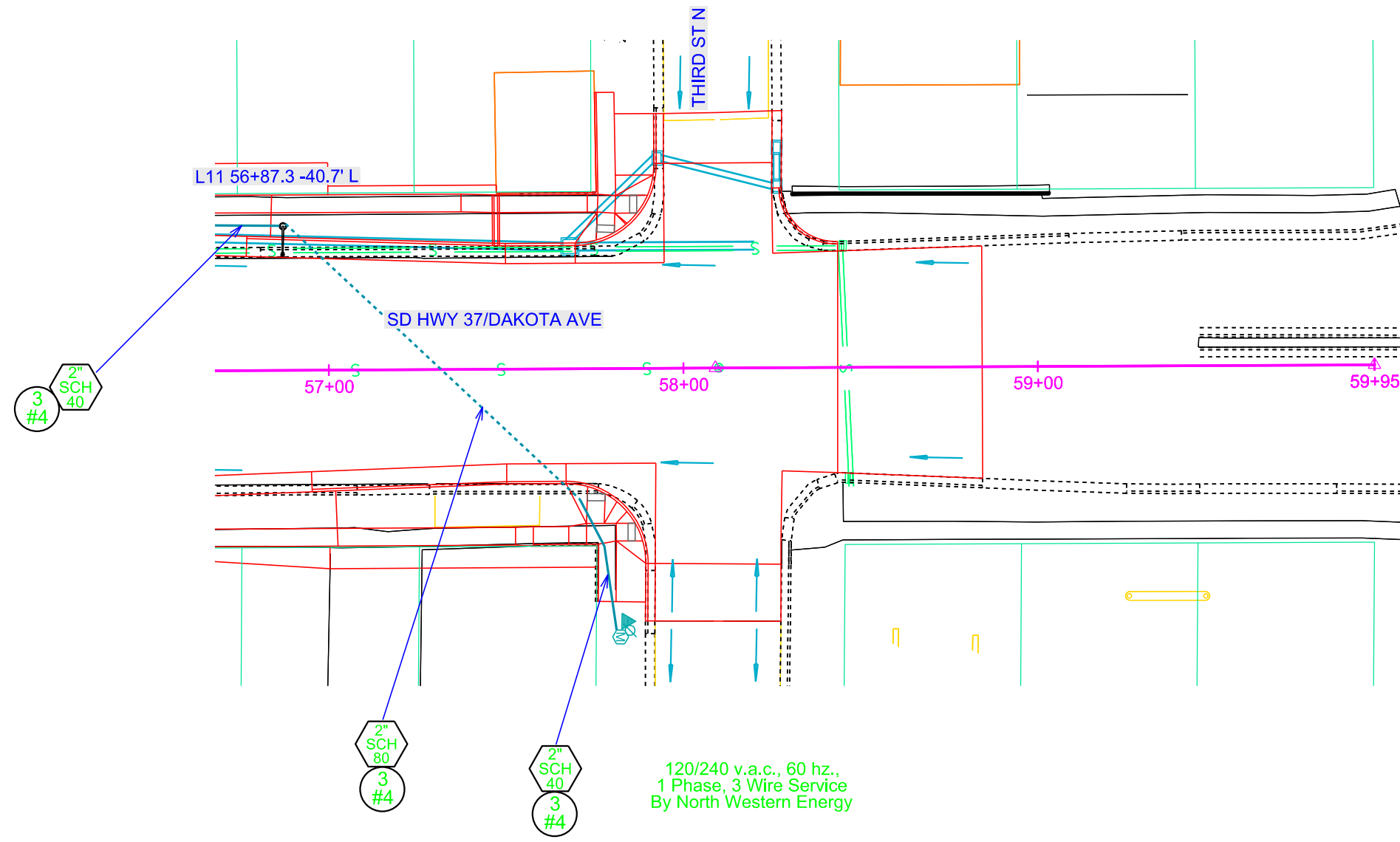
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CONDUIT LAYOUT SD HWY 37/DAKOTA AVE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0037(158)126	L34	L54

Plotting Date: 12/05/2023



Plot Scale - 1"=40'

Plotted From - TRPR17199

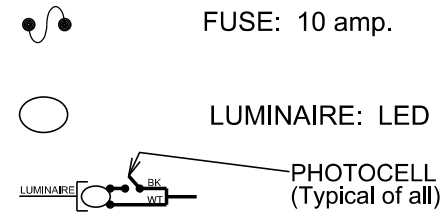
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WIRING DIAGRAM

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L35	TOTAL SHEETS L54
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Plotting Date: 12/05/2023

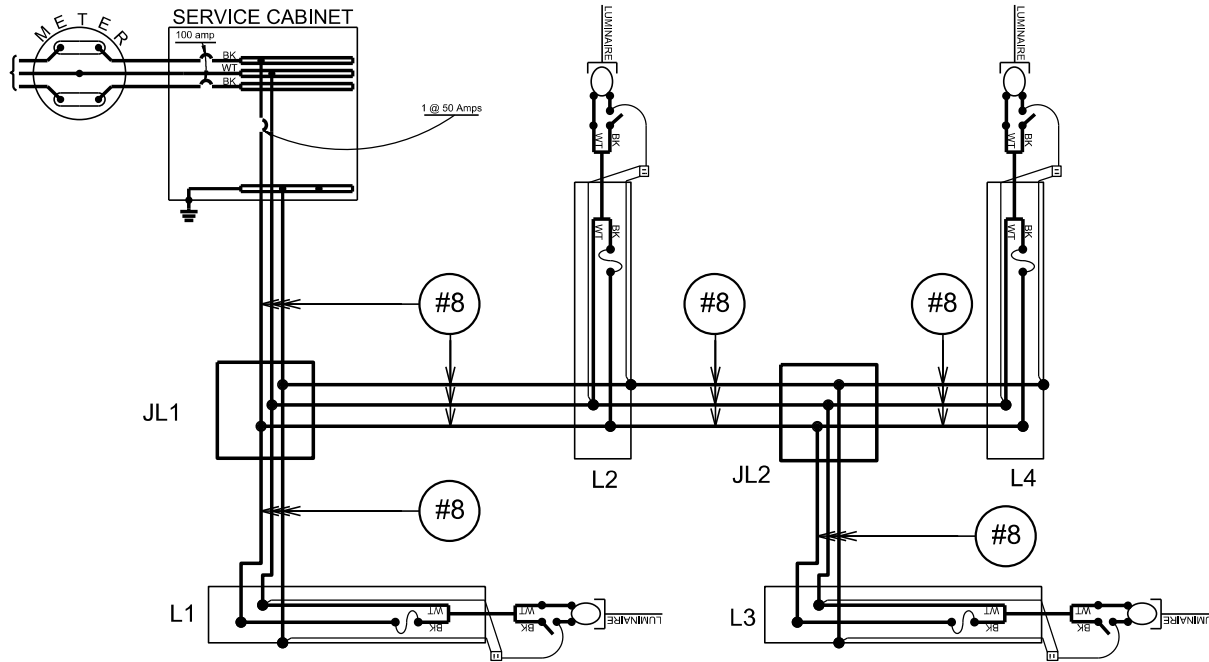
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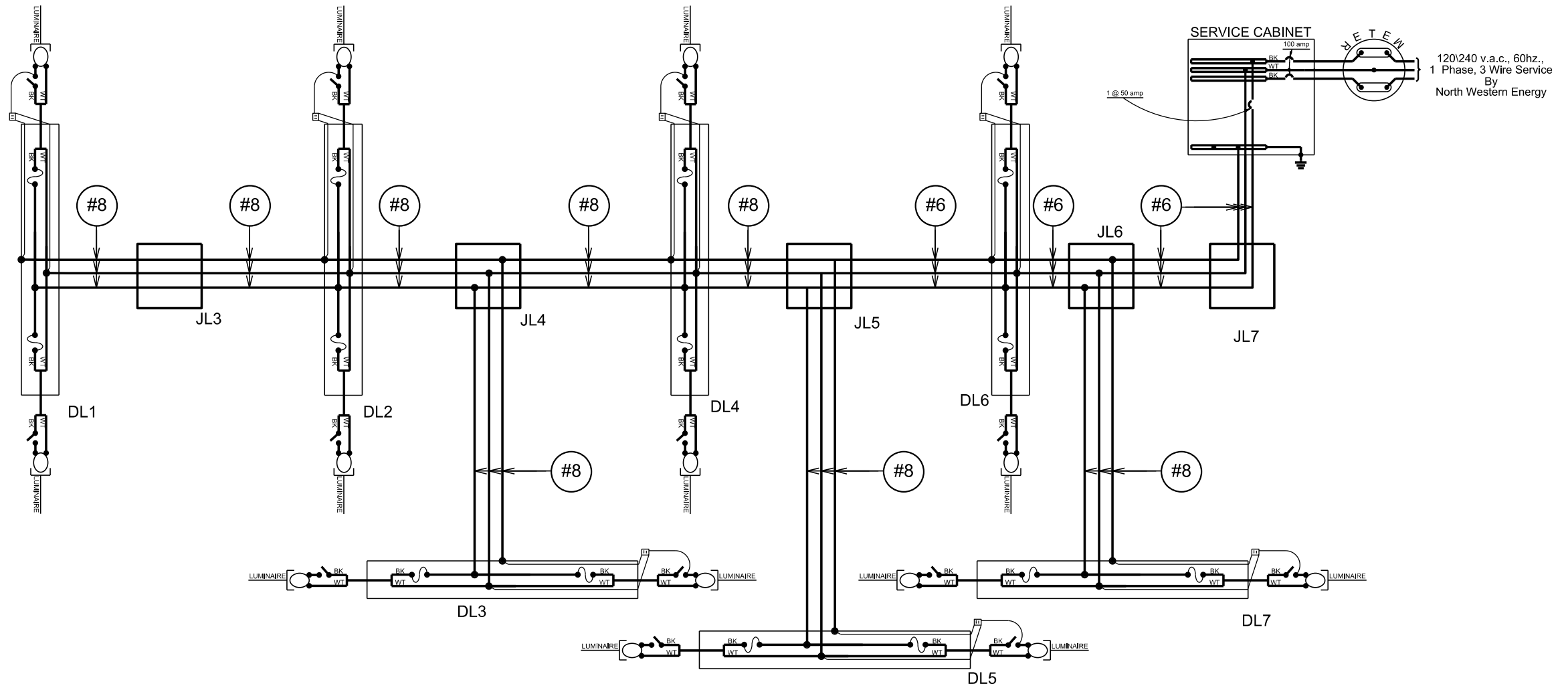
NOTE:

All circuits shall be bonded in accordance with the NATIONAL ELECTRICAL CODE. Quantities for bonding conductors are not included in these plans.

120/240 v.a.c., 60hz.,
By
North Western Energy



1 Phase, 3 Wire Service



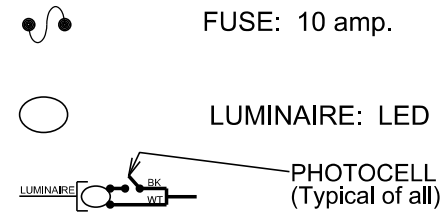
120/240 v.a.c., 60hz.,
1 Phase, 3 Wire Service
By
North Western Energy

WIRING DIAGRAM

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L36	TOTAL SHEETS L54
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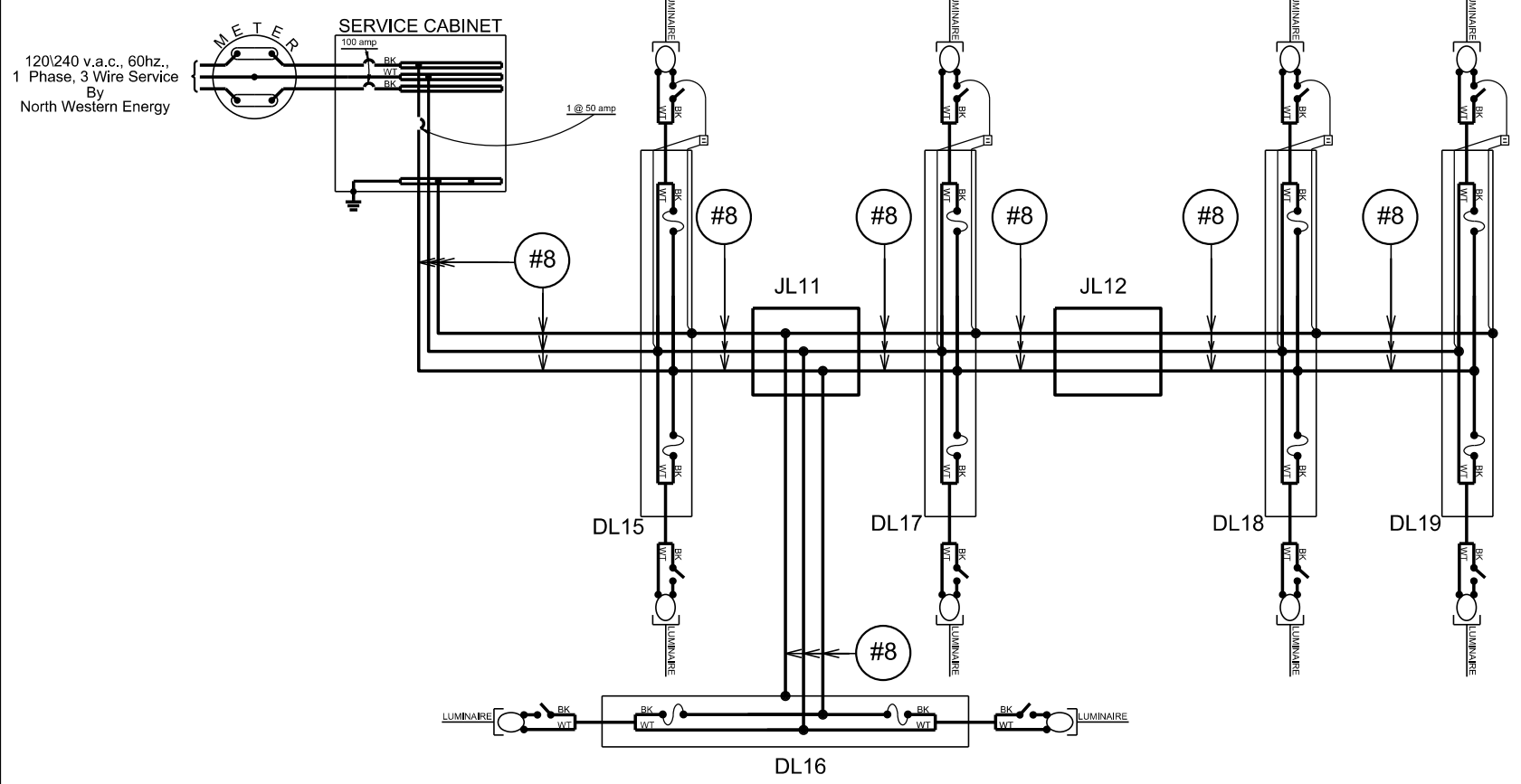
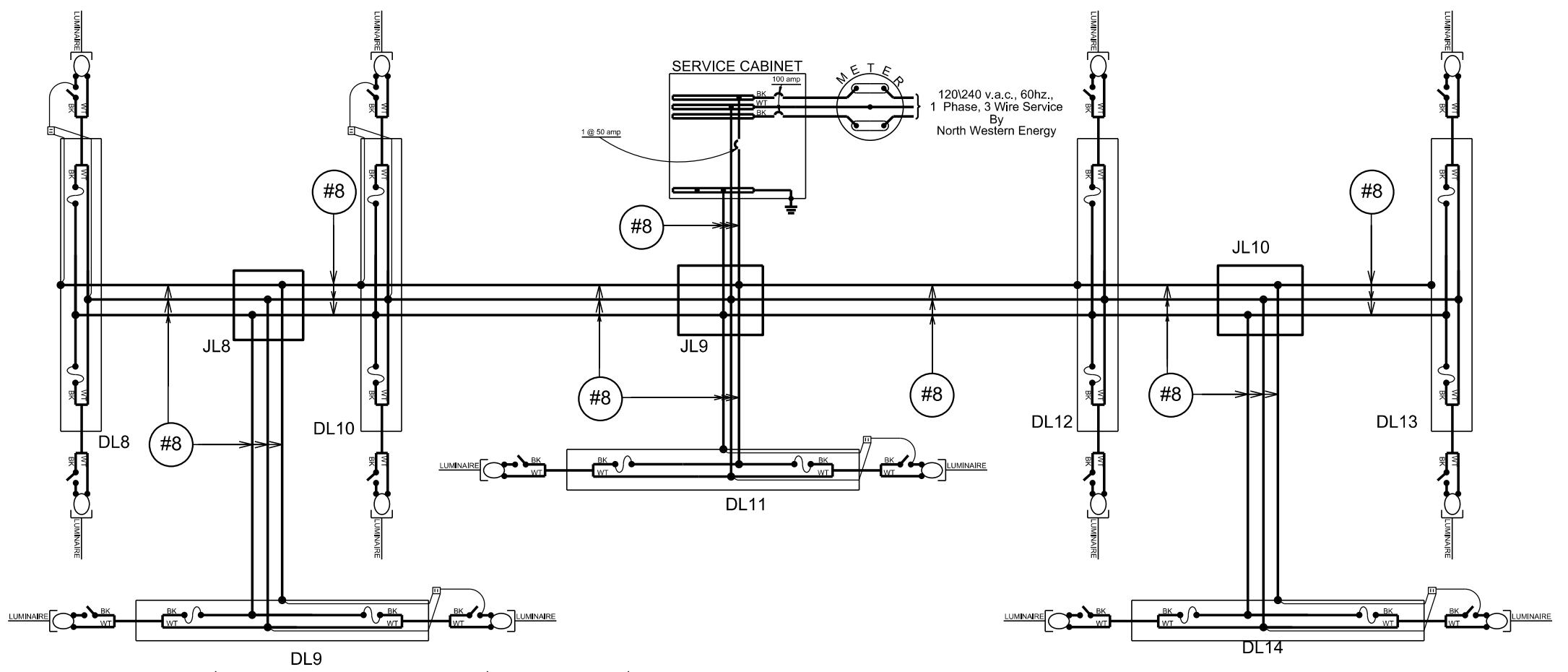
Plotting Date: 12/05/2023

LEGEND:



NOTE:
All circuits shall be bonded in accordance with the NATIONAL ELECTRICAL CODE. Quantities for bonding conductors are not included in these plans.

1 Phase, 3 Wire Service



Plot Scale - 1:40

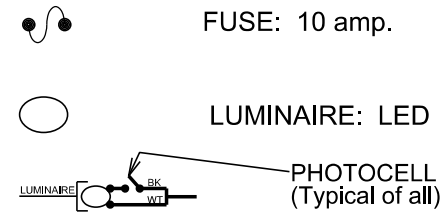
Plotted From - TRPR17199

WIRING DIAGRAM

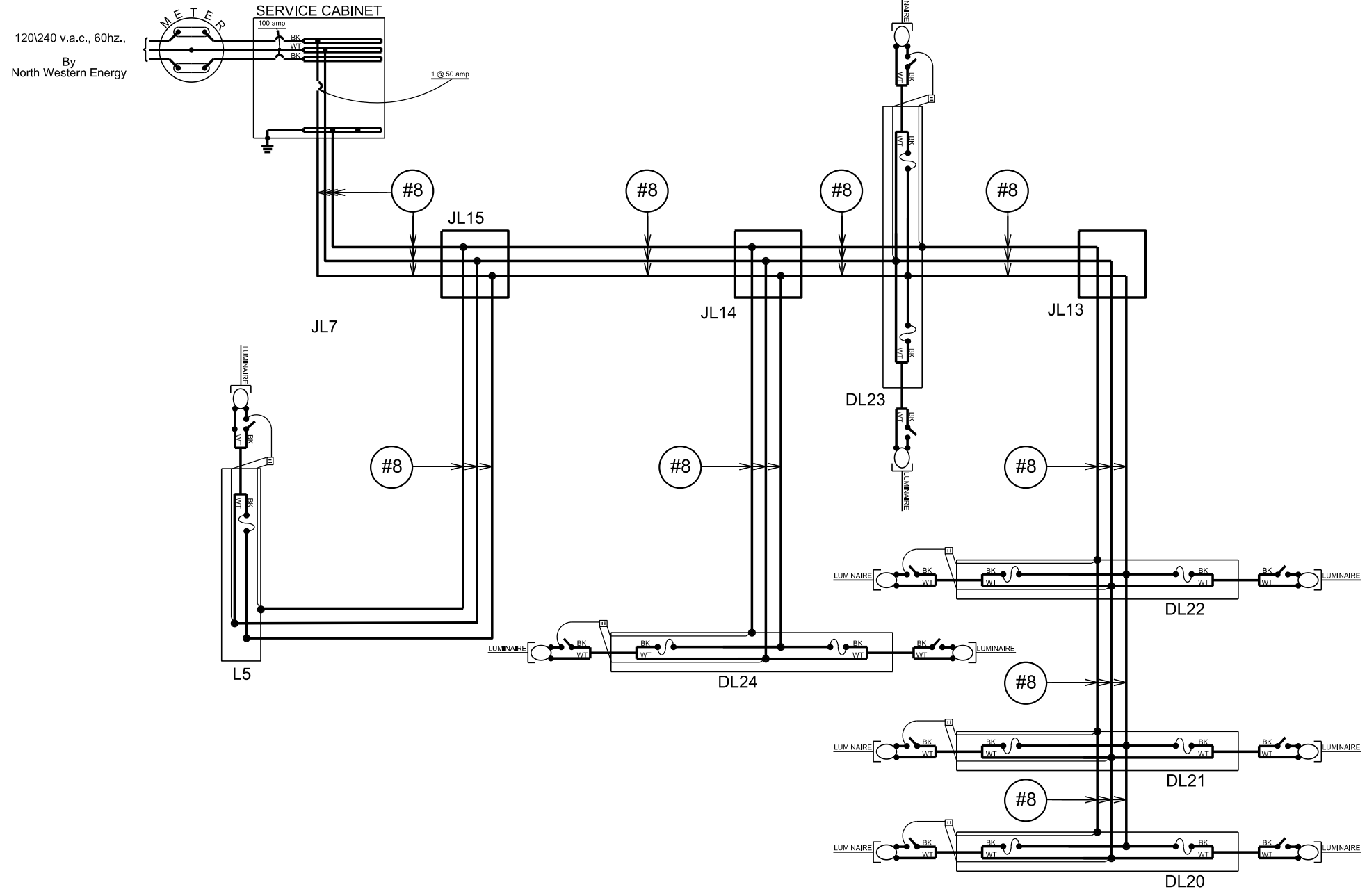
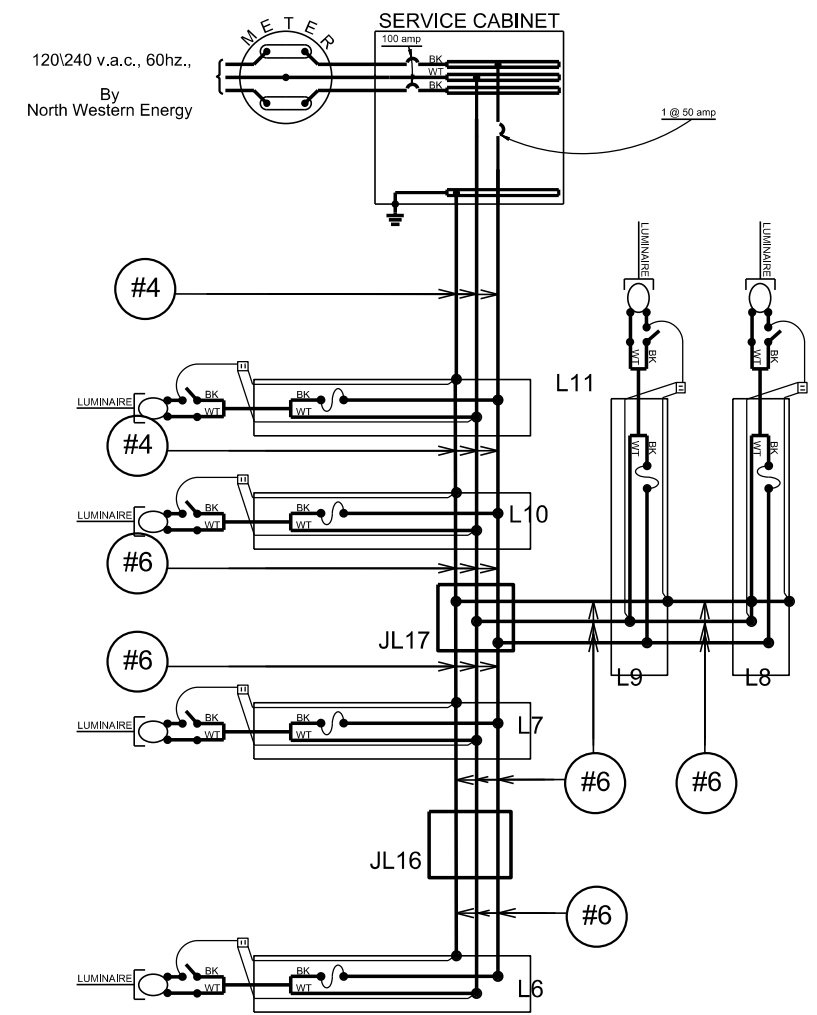
STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L37	TOTAL SHEETS L54
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Plotting Date: 12/05/2023

LEGEND:



NOTE:
All circuits shall be bonded in accordance with the NATIONAL ELECTRICAL CODE. Quantities for bonding conductors are not included in these plans.



Plot Scale - 1:40

Plotted From - TRPR17199

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SIGNAL TIMING

SD HWY 37/DAKOTA AVE & FIFTH ST.

Plotting Date: 12/05/2023

BASIC INTERVALS								
Phase	1	2	3	4	5	6	7	8
Movement	SBL	NB		EB	NBL	SB		WB
Lag		X				X		
Min Green	5	10		10	5	10		10
Extension	2	2		2	2	2		2
Max 1	5.5	27		10.5	5	27		10.5
Max 2								
Time Before								
Time to Reduce								
Minimum Gap								
Yellow	3.5	4		4	3.5	4		4
All Red	2	1		2.5	2	1		2.5
Walk		7		7		7		7
Ped Clearance		9		16		9		13
Recall		Min				Min		
Prog Flash Display	R	Y		R	R	Y		R
Start Up Ø		X				X		

PREEMPTION				
Plan	3	4	5	6
Calls Ø	8	4	5 & 2	1 & 6
Output	CH13R	CH14R	CH15R	CH16R

WEEKLY PROGRAM							
	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Timing Plan	2	1	1	1	1	1	2

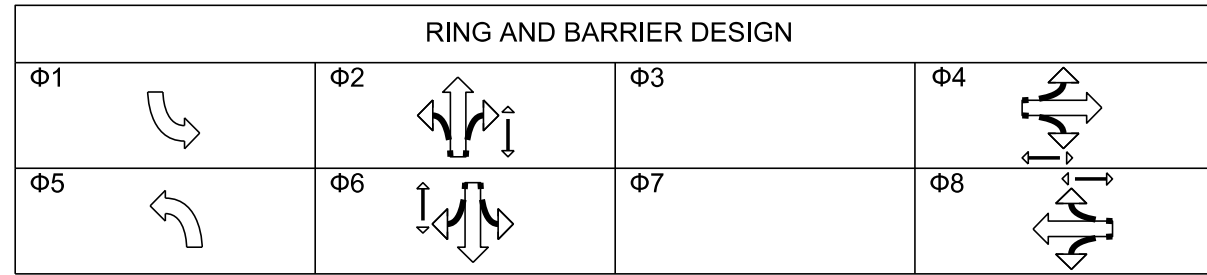
SPLIT PATTERNS										
	Φ1	Φ2	Φ3	Φ4	Φ5	Φ6	Φ7	Φ8		
Coord Phase		X				X				
Pattern (C/S/O)	Split	Split	Split	Split	Split	Split	Split	Split	Cycle Length	Offset
1/1/1	10.5	30		29.5	11	29.5		29.5	70	50
2/1/1	10.5	35		29.5	11	34.5		29.5	75	68
3/1/1	10.5	40		29.5	11	39.5		29.5	80	0

TIMING PLAN 1	
Time of Day (TOD)	Pattern (C/S/O)
7:00-10:30	1/1/1
10:30-14:30	2/1/1
14:30-18:30	3/1/1
18:30-22:00	Free
22:00-7:00	Flash

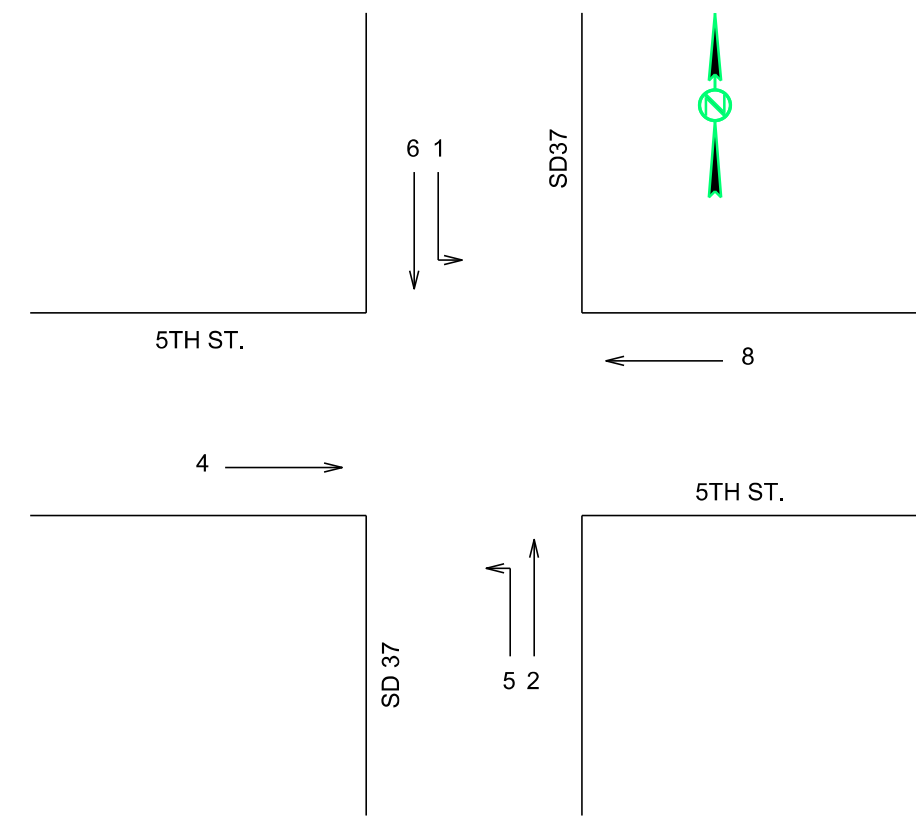
TIMING PLAN 3	
Time of Day (TOD)	Pattern (C/S/O)

TIMING PLAN 2	
Time of Day (TOD)	Pattern (C/S/O)
7:00-22:00	Free
22:00-7:00	Flash

TIMING PLAN 4	
Time of Day (TOD)	Pattern (C/S/O)



DETECTOR TABLE															
Local Detector	Controller Detector #	Phase Called (Call/Call Locking/Extend)												Controller Settings	
		1	2	3	4	5	6	7	8	9	10	11	12	Extend	Delay
V1	1				C/E										
V2-V3	2							C/E							
V4	3	C/E													
V5	4								C/E						
V6	5		C/E												10
V7	6		C/E												
V8	7					C/E									



Plot Scale - 1"=40'

Plotted From - TRPR17199

File - U:\trproj\bead06A2\026\Time.dgn

SIGNAL TIMING

SD HWY 37/DAKOTA AVE & FOURTH ST.

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L39	TOTAL SHEETS L54
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Plotting Date: 12/05/2023

BASIC INTERVALS								
Phase	1	2	3	4	5	6	7	8
Movement	SBL	NB		EB	NBL	SB		WB
Lag		X				X		
Min Green	5	10		10	5	10		10
Extension	2	2		2	2	2		2
Max 1	10	27		10	10	28.5		10
Max 2								
Time Before								
Time to Reduce								
Minimum Gap								
Yellow	3	4		4	3	4		4
All Red	2	1		2.5	2	1		2.5
Walk		7		7.5		7		7
Ped Clearance		7.5		12		7.5		12
Recall		Min				Min		
Prog Flash Display	R	Y		R	R	Y		Y
Start Up Ø		X				X		

PREEMPTION				
Plan	3	4	5	6
Calls Ø	8	4	5 & 2	1 & 6
Output	CH13R	CH14R	CH15R	CH16R

WEEKLY PROGRAM							
	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Timing Plan	2	1	1	1	1	1	2

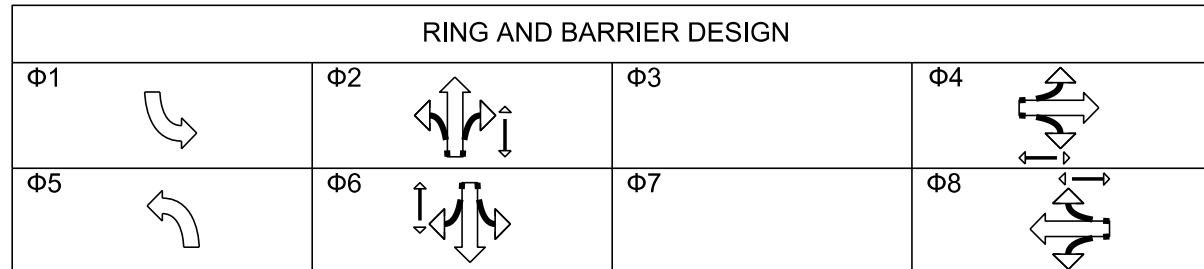
SPLIT PATTERNS										
	Φ1	Φ2	Φ3	Φ4	Φ5	Φ6	Φ7	Φ8		
Coord Phase		X				X				
Pattern (C/S/O)	Split	Split	Split	Split	Split	Split	Split	Split	Cycle Length	Offset
1/1/1	10	34		26	10	34		26	70	59
2/1/1	10	39		26	10	39		26	75	74
3/1/1	10	44		26	10	44		26	80	0

TIMING PLAN 1	
Time of Day (TOD)	Pattern (C/S/O)
7:00-10:30	1/1/1
10:30-14:30	2/1/1
14:30-18:30	3/1/1
18:30-22:00	Free
22:00-7:00	Flash

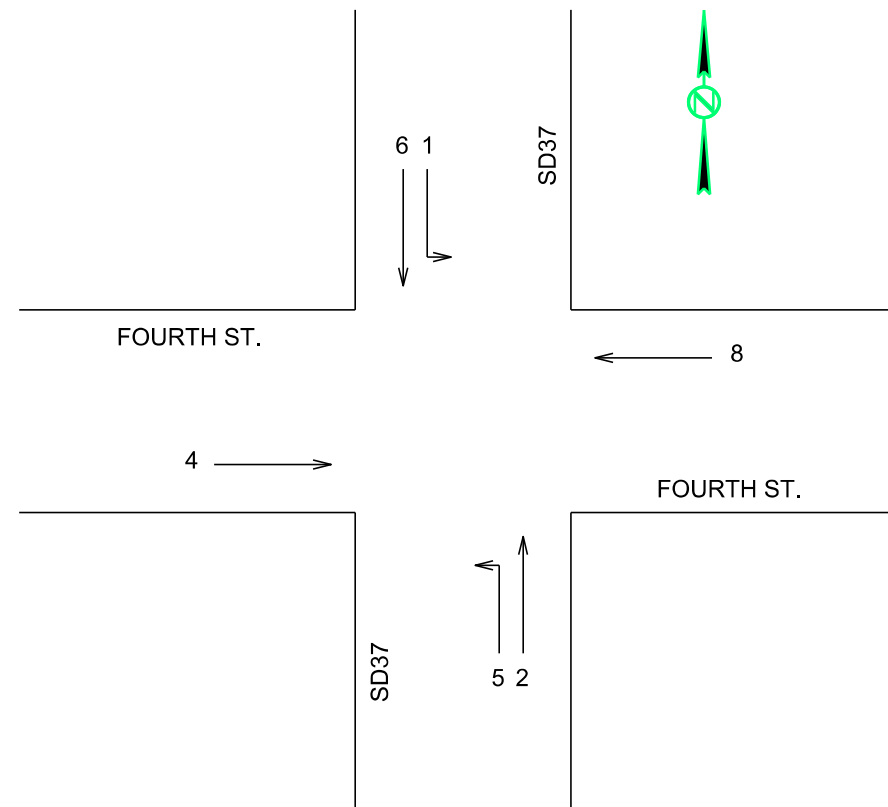
TIMING PLAN 3	
Time of Day (TOD)	Pattern (C/S/O)

TIMING PLAN 2	
Time of Day (TOD)	Pattern (C/S/O)
7:00-22:00	Free
22:00-7:00	Flash

TIMING PLAN 4	
Time of Day (TOD)	Pattern (C/S/O)



DETECTOR TABLE															
Local Detector	Controller Detector #	Phase Called (Call/Call Locking/Extend)												Controller Settings	
		1	2	3	4	5	6	7	8	9	10	11	12	Extend	Delay
V1	1				C/E										
V2	2						C/E								
V3	3	C/E													
V5	4						C/E								
V6	5					C/E									



Plot Scale - 1"=40'

Plotted From - TRPR17199

File - U:\trproj\bead06A2\030\Time.dgn

SIGNAL TIMING

SD HWY 37/DAKOTA AVE & THIRD ST.

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L40	TOTAL SHEETS L54
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Plotting Date: 12/05/2023

BASIC INTERVALS								
Phase	1	2	3	4	5	6	7	8
Movement	SBL	NB		EB	NBL	SB		WB
Lag								
Min Green	5	10		10	5	10		10
Extension	2	2		2	2	2		2
Max 1	6.5	24		12.5	5	26		12.5
Max 2								
Time Before								
Time to Reduce								
Minimum Gap								
Yellow	3	4		4	3	4		4
All Red	2.5	1		2.5	2	1		2.5
Walk		7		7		7		7
Ped Clearance		12		12		12		12
Recall		Min				Min		
Prog Flash Display	R	Y		R	R	Y		R
Start Up Ø		X				X		

PREEMPTION				
Plan	3	4	5	6
Calls Ø	8	4	5 & 2	1 & 6
Output	CH13R	CH14R	CH15R	CH16R

WEEKLY PROGRAM							
	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Timing Plan	2	1	1	1	1	1	2

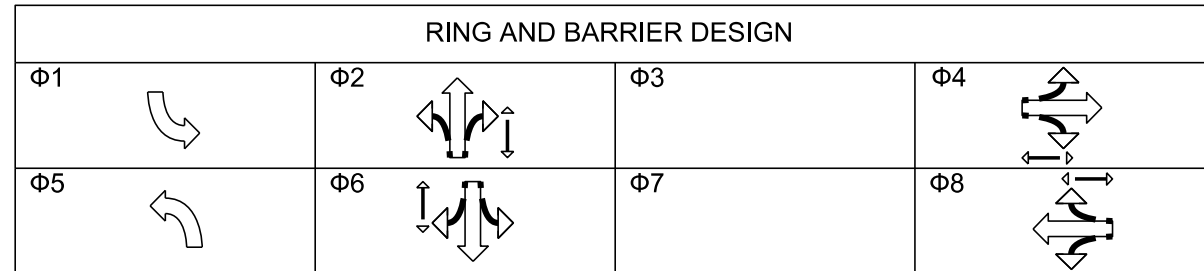
SPLIT PATTERNS										
	Φ1	Φ2	Φ3	Φ4	Φ5	Φ6	Φ7	Φ8		
Coord Phase		X				X				
Pattern (C/S/O)	Split	Split	Split	Split	Split	Split	Split	Split	Cycle Length	Offset
1/1/1	10.5	34		25.5	10	34.5		25.5	70	51
2/1/1	11	38		26	10	39		26	75	72
3/1/1	10.5	43.5		26	10	44		26	80	0

TIMING PLAN 1	
Time of Day (TOD)	Pattern (C/S/O)
7:00-10:30	1/1/1
10:30-14:30	2/1/1
14:30-18:30	3/1/1
18:30-22:00	Free
22:00-7:00	Flash

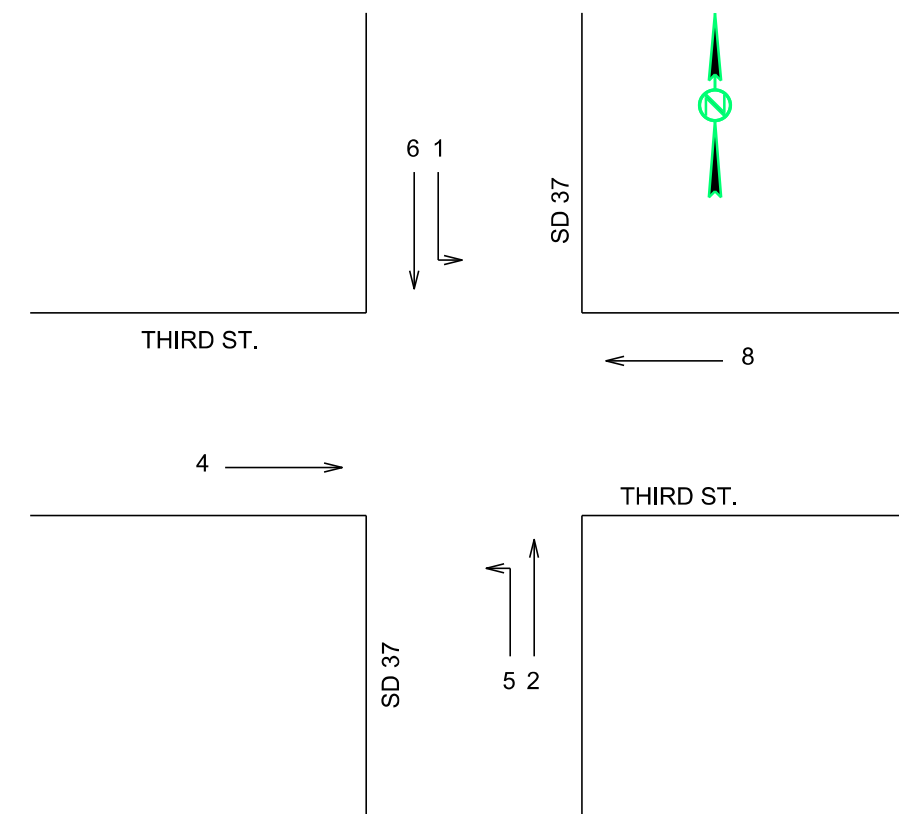
TIMING PLAN 3	
Time of Day (TOD)	Pattern (C/S/O)

TIMING PLAN 2	
Time of Day (TOD)	Pattern (C/S/O)
7:00-22:00	Free
22:00-7:00	Flash

TIMING PLAN 4	
Time of Day (TOD)	Pattern (C/S/O)



DETECTOR TABLE															
Local Detector	Controller Detector #	Phase Called (Call/Call Locking/Extend)												Controller Settings	
		1	2	3	4	5	6	7	8	9	10	11	12	Extend	Delay
V1-V2	1				C/E										
V3	2					C/E									
V4	3	C/E													
V5-V6	4							C/E							
V7	5		C/E												
V8	6				C/E										



Plot Scale - 1"=40'

Plotted From - TRPR37199

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SIGNAL TIMING

SD HWY 37/DAKOTA AVE & MARKET ST.

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L41	TOTAL SHEETS L54
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Plotting Date: 12/05/2023

BASIC INTERVALS								
Phase	1	2	3	4	5	6	7	8
Movement	SBL	NB		EB	NBL	SB		WB
Lag		X				X		
Min Green	5	10		10	5	10		10
Extension	2	2		2	2	2		2
Max 1	5	27		10	9	27		10
Max 2								
Time Before								
Time to Reduce								
Minimum Gap								
Yellow	3	4		4	3	4		4
All Red	3	1		3	3	1		3
Walk		0		0		0		0
Ped Clearance		0		0		0		0
Recall		Min				Min		
Prog Flash Display	R	Y		R	R	Y		R
Start Up Ø		X				X		

PREEMPTION				
Plan	3	4	5	6
Calls Ø	8	4	5 & 2	1 & 6
Output	CH13R	CH14R	CH15R	CH16R

WEEKLY PROGRAM							
	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Timing Plan	2	1	1	1	1	1	2

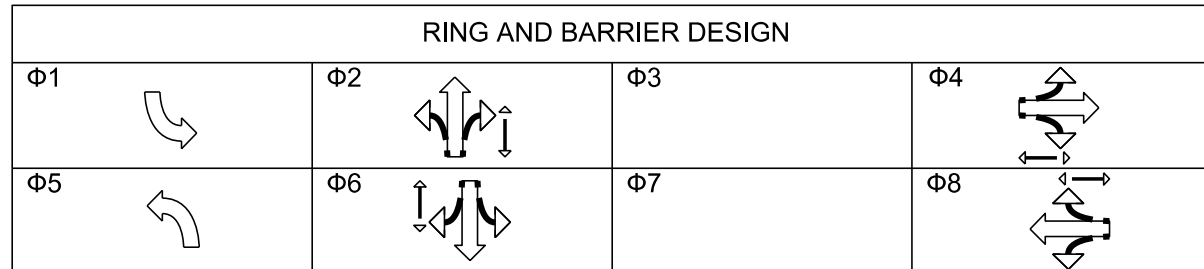
SPLIT PATTERNS										
	Φ1	Φ2	Φ3	Φ4	Φ5	Φ6	Φ7	Φ8		
Coord Phase		X				X				
Pattern (C/S/O)	Split	Split	Split	Split	Split	Split	Split	Split	Cycle Length	Offset
1/1/1	11	27.5		31.5	11	27.5		31.5	70	16
2/1/1	11	32.5		31.5	11	32.5		31.5	75	44
3/1/1	11	37.5		31.5	11	37.5		31.5	80	40

TIMING PLAN 1	
Time of Day (TOD)	Pattern (C/S/O)
7:00-10:30	1/1/1
10:30-14:30	2/1/1
14:30-18:30	3/1/1
18:30-22:00	Free
22:00-7:00	Flash

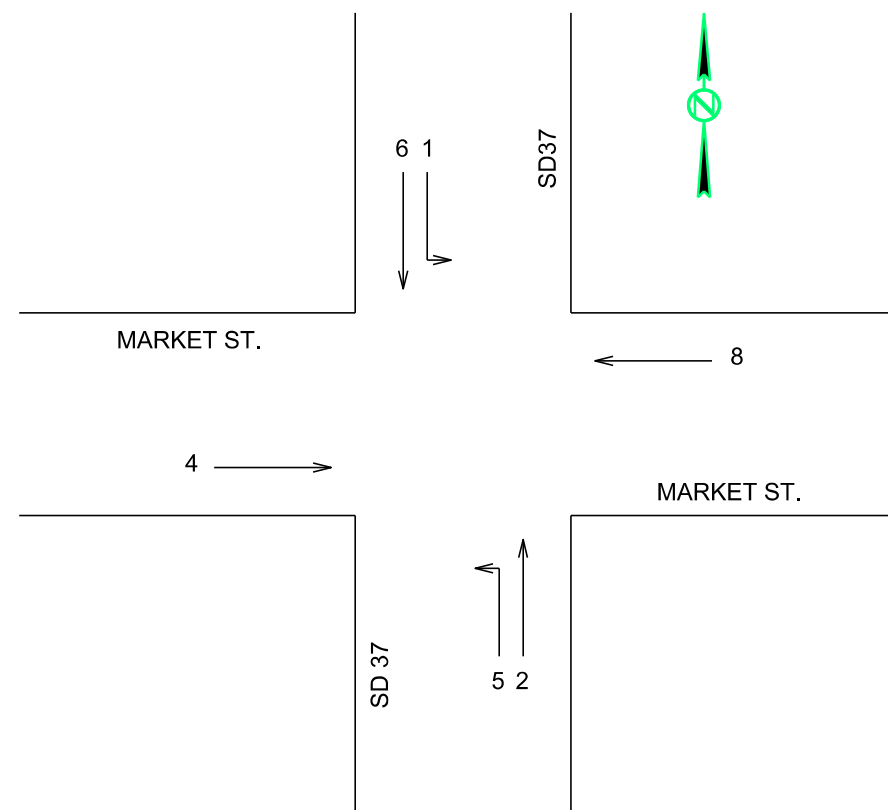
TIMING PLAN 3	
Time of Day (TOD)	Pattern (C/S/O)

TIMING PLAN 2	
Time of Day (TOD)	Pattern (C/S/O)
7:00-22:00	Free
22:00-7:00	Flash

TIMING PLAN 4	
Time of Day (TOD)	Pattern (C/S/O)



DETECTOR TABLE															
Local Detector	Controller Detector #	Phase Called (Call/Call Locking/Extend)												Controller Settings	
		1	2	3	4	5	6	7	8	9	10	11	12	Extend	Delay
V1-V2	1				C/E										
V3	2						C/E								10
V4	3						C/E								
V5	4	C/E													
V6-V7	5								C/E						
V8	6		C/E												10
V9	7		C/E			C/E									
V10	8					C/E									



Plot Scale - 1"=40'

Plotted From - TRPR17199

File - U:\trproj\bead06A2\044\Time.dgn

TRAFFIC SIGNAL WIRING TABLES

SD HWY 37/DAKOTA AVE & FIFTH ST.

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L42	TOTAL SHEETS L54
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Plotting Date: 12/05/2023

POLE: B1 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
6R	Red/Black	RED	R	2	6
6Y	Orange/Black	ORANGE	Y	2	6
6G	Blue/Black	BLUE	G	2	6
N	Yellow/Black	BLACK	N	2	6
6R	Black/Red	RED	R	3	6
6Y	Orange/Red	ORANGE	Y	3	6
6G	Blue/Red	BLUE	G	3	6
N	Brown/Black	BLACK	N	3	6
8R	Brown/Red	RED	R	4	8
8Y	Orange/Blue	ORANGE	Y	4	8
8G	Red/Blue	BLUE	G	4	8
N	Black/Blue	BLACK	N	4	8
6R	Red/Orange	RED	R	5	6
6Y	Yellow/Orange	ORANGE	Y	5	6
6G	Yellow/Blue	BLUE	G	5	6
N	Black/Orange	BLACK	N	5	6
10R	Yellow/Red	RED	DW	17	4P
10G	Brown/Blue	BLUE	W	17	4P
N	Brown	BLACK	N	17	4P
11R	Red	RED	DW	18	6P
11G	Blue	BLUE	W	18	6P
N	Black	BLACK	N	18	6P
	Orange				
	Yellow				
	Blue/Orange				

POLE: B2 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
8R	Red	RED	R	6	8
8Y	Orange	ORANGE	Y	6	8
8G	Blue	BLUE	G	6	8
N	Black	BLACK	N	6	8
5R	Red/Black	RED	RA	7	5
5Y	Orange/Black	ORANGE	YA	7	5
11Y	Yellow/Black	YELLOW	FYA	7	5
5G	Blue/Black	BLUE	GA	7	5
N	Brown/Black	BLACK	N	7	5
8R	Black/Red	RED	R	8	8
8Y	Orange/Red	ORANGE	Y	8	8
8G	Blue/Red	BLUE	G	8	8
N	Brown	BLACK	N	8	8
11R	Yellow/Red	RED	DW	19	6P
11G	Orange/Blue	BLUE	W	19	6P
N	Black/Blue	BLACK	N	19	6P
12R	Brown/Red	RED	DW	20	8P
12G	Red/Blue	BLUE	W	20	8P
N	Black/Orange	BLACK	N	20	8P
	Yellow				
	Yellow/Blue				
	Brown/Blue				
	Red/Orange				
	Blue/Orange				
	Yellow/Orange				

POLE: B3 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
2R	Red	RED	R	10	2
2Y	Orange	ORANGE	Y	10	2
2G	Blue	BLUE	G	10	2
N	Black	BLACK	N	10	2
2R	Red/Black	RED	R	11	2
2Y	Orange/Black	ORANGE	Y	11	2
2G	Blue/Black	BLUE	G	11	2
N	Yellow/Black	BLACK	N	11	2
4R	Yellow/Red	RED	R	12	4
4Y	Orange/Blue	ORANGE	Y	12	4
4G	Yellow/Blue	BLUE	G	12	4
N	Black/Blue	BLACK	N	12	4
2R	Black/Red	RED	R	13	2
2Y	Orange/Red	ORANGE	Y	13	2
2G	Blue/Red	BLUE	G	13	2
N	Brown/Black	BLACK	N	13	2
12R	Brown/Red	RED	DW	21	8P
12G	Red/Blue	BLUE	W	21	8P
N	Black/Orange	BLACK	N	21	8P
9R	Red/Orange	RED	DW	22	2P
9G	Blue/Orange	BLUE	W	22	2P
N	Brown/Blue	BLACK	N	22	2P
	Yellow				
	Brown				
	Yellow/Orange				

POLE: B4 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
4R	Red/Black	RED	R	14	4
4Y	Orange/Black	ORANGE	Y	14	4
4G	Blue/Black	BLUE	G	14	4
N	Yellow/Black	BLACK	N	14	4
1R	Red	RED	RA	15	1
1Y	Orange	ORANGE	YA	15	1
9Y	Yellow	YELLOW	FYA	15	1
1G	Blue	BLUE	GA	15	1
N	Black	BLACK	N	15	1
4R	Black/Red	RED	R	16	4
4Y	Orange/Red	ORANGE	Y	16	4
4G	Blue/Red	BLUE	G	16	4
N	Brown/Black	BLACK	N	16	4
9R	Yellow/Red	RED	DW	23	2P
9G	Black/Blue	BLUE	W	23	2P
N	Black/Orange	BLACK	N	23	2P
10R	Red/Blue	RED	DW	24	2P
10G	Orange/Blue	BLUE	W	24	2P
N	Brown/Red	BLACK	N	24	4P
	Brown				
	Yellow/Blue				
	Brown/Blue				
	Red/Orange				
	Blue/Orange				
	Yellow/Orange				

POLE: B1 CABLE SIZE: 7/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
1R	Red	RED	RA	1	1
1Y	Orange	ORANGE	YA	1	1
9Y	Yellow	YELLOW	FYA	1	1
1G	Blue	BLUE	GA	1	1
N	Black	BLACK	N	1	1
	Brown				
	Red/Black				

POLE: B3 CABLE SIZE: 7/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
5R	Red	RED	RA	9	5
5Y	Orange	ORANGE	YA	9	5
11Y	Yellow	YELLOW	FYA	9	5
5G	Blue	BLUE	GA	9	5
N	Black	BLACK	N	9	5
	Brown				
	Red/Black				

Plot Scale - 1:200

Plotted From - TRPR37199

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TRAFFIC SIGNAL WIRING TABLES

SD HWY 37/DAKOTA AVE & FOURTH ST.

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L43	TOTAL SHEETS L54
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Plotting Date: 12/05/2023

POLE: C1 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
6R	Red	RED	R	2	6
6Y	Orange	ORANGE	Y	2	6
6G	Blue	BLUE	G	2	6
N	Black	BLACK	N	2	6
8R	Red/Black	RED	R	3	8
8Y	Orange/Black	ORANGE	Y	3	8
8G	Blue/Black	BLUE	G	3	8
N	Yellow/Black	BLACK	N	3	8
6R	Black/Red	RED	R	4	6
6Y	Orange/Red	ORANGE	Y	4	6
6G	Blue/Red	BLUE	G	4	6
N	Brown/Black	BLACK	N	4	6
8R	Yellow/Red	RED	R	5	8
8Y	Yellow/Orange	ORANGE	Y	5	8
8G	Brown/Blue	BLUE	G	5	8
N	Brown	BLACK	N	5	8
10R	Red/Blue	RED	DW	15	4P
10G	Orange/Blue	BLUE	W	15	4P
N	Black/Blue	BLACK	N	15	4P
11R	Red/Orange	RED	DW	16	6P
11G	Yellow/Blue	BLUE	W	16	6P
N	Black/Orange	BLACK	N	16	6P
	Yellow				
	Brown/Red				
	Blue/Orange				

POLE: C2 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
5R	Red	RED	RA	6	5
5Y	Orange	ORANGE	YA	6	5
11Y	Yellow	YELLOW	FYA	6	5
5G	Blue	BLUE	GA	6	5
N	Black	BLACK	N	6	5
8R	Red/Black	RED	R	7	8
8Y	Orange/Black	ORANGE	Y	7	8
8G	Blue/Black	BLUE	G	7	8
N	Yellow/Black	BLACK	N	7	8
11R	Black/Red	RED	DW	17	6P
11G	Blue/Red	BLUE	W	17	6P
N	Brown/Black	BLACK	N	17	6P
12R	Orange/Red	RED	DW	18	8P
12G	Orange/Blue	BLUE	W	18	8P
N	Black/Blue	BLACK	N	18	8P
	Brown				
	Yellow/Red				
	Brown/Red				
	Red/Blue				
	Yellow/Blue				
	Brown/Blue				
	Black/Orange				
	Red/Orange				
	Blue/Orange				
	Yellow/Orange				

POLE: C3 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
1R	Red	RED	RA	8	1
1Y	Orange	ORANGE	YA	8	1
9Y	Yellow	YELLOW	FYA	8	1
1G	Blue	BLUE	GA	8	1
N	Black	BLACK	N	8	1
2R	Red/Black	RED	R	9	2
2Y	Orange/Black	ORANGE	Y	9	2
2G	Blue/Black	BLUE	G	9	2
N	Yellow/Black	BLACK	N	9	2
4R	Black/Red	RED	R	10	4
4Y	Orange/Red	ORANGE	Y	10	4
4G	Blue/Red	BLUE	G	10	4
N	Brown/Black	BLACK	N	10	4
2R	Yellow/Red	RED	R	11	2
2Y	Orange/Blue	ORANGE	Y	11	2
2G	Black/Blue	BLUE	G	11	2
N	Brown/Red	BLACK	N	11	2
12R	Red/Blue	RED	DW	19	8P
12G	Yellow/Blue	BLUE	W	19	8P
N	Black/Orange	BLACK	N	19	8P
	Brown				
	Brown/Blue				
	Red/Orange				
	Blue/Orange				
	Yellow/Orange				

POLE: C4 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
4R	Red	RED	R	12	4
4Y	Orange	ORANGE	Y	12	4
4G	Blue	BLUE	G	12	4
N	Black	BLACK	N	12	4
1R	Red/Black	RED	RA	13	1
1Y	Orange/Black	ORANGE	YA	13	1
9Y	Yellow/Black	YELLOW	FYA	13	1
1G	Blue/Black	BLUE	GA	13	1
N	Brown/Black	BLACK	N	13	1
4R	Black/Red	RED	R	14	4
4Y	Orange/Red	ORANGE	Y	14	4
4G	Blue/Red	BLUE	G	14	4
N	Black/Blue	BLACK	N	14	4
9R	Red/Blue	RED	DW	21	2P
9G	Orange/Blue	BLUE	W	21	2P
N	Black/Orange	BLACK	N	21	2P
10R	Brown/Red	RED	DW	22	4P
10G	Brown/Blue	BLUE	W	22	4P
N	Brown	BLACK	N	22	4P
	Yellow				
	Yellow/Red				
	Yellow/Blue				
	Red/Orange				
	Blue/Orange				
	Yellow/Orange				

POLE: C1 CABLE SIZE: 5/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
1R	Red	RED	RA	1	1
1Y	Orange	ORANGE	YA	1	1
9Y	Yellow	YELLOW	FYA	1	1
1G	Blue	BLUE	GA	1	1
N	Black	BLACK	N	1	1

POLE: C3 CABLE SIZE: 5/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
9R	Red	RED	DW	20	2P
9G	Blue	BLUE	W	20	2P
N	Black	BLACK	N	20	2P
	Orange				
	Yellow				

Plot Scale - 1:200

Plotted From - TRPR37199

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TRAFFIC SIGNAL WIRING TABLES

SD HWY 37/DAKOTA AVE & THIRD ST.

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L44	TOTAL SHEETS L54
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Plotting Date: 12/05/2023

POLE: D1 CABLE SIZE: 25/C

POLE: D2 CABLE SIZE: 25/C

POLE: D3 CABLE SIZE: 25/C

POLE: D4 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
1R	Red	RED	RA	1	1
1Y	Orange	ORANGE	YA	1	1
9Y	Yellow	YELLOW	FYA	1	1
1G	Blue	BLUE	GA	1	1
N	Black	BLACK	N	1	1
6R	Red/Black	RED	R	2	6
6Y	Orange/Black	ORANGE	Y	2	6
6G	Blue/Black	BLUE	G	2	6
N	Yellow/Black	BLACK	N	2	6
8R	Yellow/Red	RED	R	3	8
8Y	Orange/Blue	ORANGE	Y	3	8
8G	Black/Blue	BLUE	G	3	8
N	Black/Orange	BLACK	N	3	8
6R	Black/Red	RED	R	4	6
6Y	Orange/Red	ORANGE	Y	4	6
6G	Blue/Red	BLUE	G	4	6
N	Brown/Black	BLACK	N	4	6
10R	Red/Orange	RED	DW	15	4P
10G	Blue/Orange	BLUE	W	15	4P
N	Brown/Blue	BLACK	N	15	4P
11R	Red/Blue	RED	DW	16	6P
11G	Yellow/Blue	BLUE	W	16	6P
N	Brown	BLACK	N	16	6P
	Brown/Red				
	Yellow/Orange				

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
8R	Red	RED	R	5	8
8Y	Orange	ORANGE	Y	5	8
8G	Blue	BLUE	G	5	8
N	Black	BLACK	N	5	8
5R	Red/Black	RED	RA	6	5
5Y	Orange/Black	ORANGE	YA	6	5
11Y	Yellow/Black	YELLOW	FYA	6	5
5G	Blue/Black	BLUE	GA	6	5
N	Brown/Black	BLACK	N	6	5
8R	Yellow/Red	RED	R	7	8
8Y	Orange/Red	ORANGE	Y	7	8
8G	Blue/Red	BLUE	G	7	8
N	Black/Red	BLACK	N	7	8
11R	Brown/Red	RED	DW	17	6P
11G	Black/Blue	BLUE	W	17	6P
N	Black/Orange	BLACK	N	17	6P
12R	Red/Blue	RED	DW	18	8P
12G	Orange/Blue	BLUE	W	18	8P
N	Brown	BLACK	N	18	8P
	Yellow				
	Yellow/Blue				
	Brown/Blue				
	Red/Orange				
	Blue/Orange				
	Yellow/Orange				

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
5R	Red	RED	RA	8	5
5Y	Orange	ORANGE	YA	8	5
11Y	Yellow	YELLOW	FYA	8	5
5G	Blue	BLUE	GA	8	5
N	Black	BLACK	N	8	5
2R	Red/Black	RED	R	9	2
2Y	Orange/Black	ORANGE	Y	9	2
2G	Blue/Black	BLUE	G	9	2
N	Brown	BLACK	N	9	2
4R	Black/Red	RED	R	10	4
4Y	Orange/Red	ORANGE	Y	10	4
4G	Blue/Red	BLUE	G	10	4
N	Brown/Black	BLACK	N	10	4
2R	Brown/Red	RED	R	11	2
2Y	Orange/Blue	ORANGE	Y	11	2
2G	Black/Blue	BLUE	G	11	2
N	Yellow/Black	BLACK	N	11	2
12R	Red/Orange	RED	DW	19	8P
12G	Yellow/Blue	BLUE	W	19	8P
N	Black/Orange	BLACK	N	19	8P
9R	Yellow/Red	RED	DW	20	2P
9G	Red/Blue	BLUE	W	20	2P
N	Brown/Blue	BLACK	N	20	2P
	Blue/Orange				
	Yellow/Orange				

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
8R	Red/Black	RED	R	12	8
8Y	Orange/Black	ORANGE	Y	12	8
8G	Blue/Black	BLUE	G	12	8
N	Yellow/Black	BLACK	N	12	8
1R	Red	RED	RA	13	1
1Y	Orange	ORANGE	YA	13	1
9Y	Yellow	YELLOW	FYA	13	1
1G	Blue	BLUE	GA	13	1
N	Black	BLACK	N	13	1
8R	Black/Red	RED	R	14	8
8Y	Orange/Red	ORANGE	Y	14	8
8G	Blue/Red	BLUE	G	14	8
N	Brown/Black	BLACK	N	14	8
9R	Yellow/Red	RED	DW	21	2P
9G	Black/Blue	BLUE	W	21	2P
N	Black/Orange	BLACK	N	21	2P
10R	Red/Blue	RED	DW	22	4P
10G	Orange/Blue	BLUE	W	22	4P
N	Brown	BLACK	N	22	4P
	Brown/Red				
	Yellow/Blue				
	Brown/Blue				
	Red/Orange				
	Blue/Orange				
	Yellow/Orange				

Plot Scale - 1:200

Plotted From - TRPR17199

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TRAFFIC SIGNAL WIRING TABLES

SD HWY 37/DAKOTA AVE & MARKET ST.

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0037(158)126	SHEET L45	TOTAL SHEETS L54
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Plotting Date: 12/05/2023

POLE: E1 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
6R	Red	RED	R	2	6
6Y	Orange	ORANGE	Y	2	6
6G	Blue	BLUE	G	2	6
N	Black	BLACK	N	2	6
6R	Red/Black	RED	R	3	6
6Y	Orange/Black	ORANGE	Y	3	6
6G	Blue/Black	BLUE	G	3	6
N	Brown	BLACK	N	3	6
8R	Yellow/Red	RED	R	4	8
8Y	Orange/Blue	ORANGE	Y	4	8
8G	Black/Blue	BLUE	G	4	8
N	Brown/Black	BLACK	N	4	8
6R	Black/Red	RED	R	5	6
6Y	Orange/Red	ORANGE	Y	5	6
6G	Blue/Red	BLUE	G	5	6
N	Yellow/Black	BLACK	N	5	6
10R	Red/Orange	RED	DW	17	4P
10G	Yellow/Blue	BLUE	W	17	4P
N	Black/Orange	BLACK	N	17	4P
11R	Red/Blue	RED	DW	18	6P
11G	Blue/Orange	BLUE	W	18	6P
N	Brown/Red	BLACK	N	18	6P
	Yellow				
	Brown/Blue				
	Yellow/Orange				

POLE: E2 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
8R	Red/Black	RED	R	6	8
8Y	Orange/Black	ORANGE	Y	6	8
8G	Blue/Black	BLUE	G	6	8
N	Brown	BLACK	N	6	8
5R	Red	RED	RA	7	5
5Y	Orange	ORANGE	YA	7	5
11Y	Yellow	YELLOW	FYA	7	5
5G	Blue	BLUE	GA	7	5
N	Black	BLACK	N	7	5
8R	Black/Red	RED	R	8	8
8Y	Orange/Red	ORANGE	Y	8	8
8G	Blue/Red	BLUE	G	8	8
N	Brown/Black	BLACK	N	8	8
11R	Yellow/Red	RED	DW	19	6P
11G	Orange/Blue	BLUE	W	19	6P
N	Yellow/Black	BLACK	N	19	6P
12R	Brown/Red	RED	DW	20	8P
12G	Red/Blue	BLUE	W	20	8P
N	Black/Blue	BLACK	N	20	8P
	Yellow/Blue				
	Brown/Blue				
	Black/Orange				
	Red/Orange				
	Blue/Orange				
	Yellow/Orange				

POLE: E3 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
2R	Red	RED	R	10	2
2Y	Orange	ORANGE	Y	10	2
2G	Blue	BLUE	G	10	2
N	Black	BLACK	N	10	2
2R	Red/Black	RED	R	11	2
2Y	Orange/Black	ORANGE	Y	11	2
2G	Blue/Black	BLUE	G	11	2
N	Yellow/Black	BLACK	N	11	2
4R	Yellow/Red	RED	R	12	4
4Y	Orange/Blue	ORANGE	Y	12	4
4G	Red/Blue	BLUE	G	12	4
N	Black/Blue	BLACK	N	12	4
2R	Black/Red	RED	R	13	2
2Y	Orange/Red	ORANGE	Y	13	2
2G	Blue/Red	BLUE	G	13	2
N	Brown/Black	BLACK	N	13	2
12R	Brown/Red	RED	DW	21	8P
12G	Yellow/Blue	BLUE	W	21	8P
N	Black/Orange	BLACK	N	21	8P
9R	Red/Orange	RED	DW	22	2P
9G	Blue/Orange	BLUE	W	22	2P
N	Brown	BLACK	N	22	2P
	Yellow				
	Brown/Blue				
	Yellow/Orange				

POLE: E4 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
4R	Red/Black	RED	R	14	4
4Y	Orange/Black	ORANGE	Y	14	4
4G	Blue/Black	BLUE	G	14	4
N	Yellow/Black	BLACK	N	14	4
1G	Blue	BLUE	G	15	1
1R	Red	RED	RA	15	1
1Y	Orange	ORANGE	YA	15	1
9Y	Yellow	YELLOW	FYA	15	1
N	Black	BLACK	N	15	1
4R	Black/Red	RED	R	16	4
4Y	Orange/Red	ORANGE	Y	16	4
4G	Blue/Red	BLUE	G	16	4
N	Brown/Black	BLACK	N	16	4
9R	Brown/Red	RED	DW	23	2P
9G	Orange/Blue	BLUE	W	23	2P
N	Black/Blue	BLACK	N	23	2P
10R	Yellow/Red	RED	DW	24	4P
10G	Yellow/Blue	BLUE	W	24	4P
N	Black/Orange	BLACK	N	24	4P
	Brown				
	Red/Blue				
	Brown/Blue				
	Red/Orange				
	Blue/Orange				
	Yellow/Orange				

POLE: E1 CABLE SIZE: 7/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
5R	Red	RED	RA	1	5
5Y	Orange	ORANGE	YA	1	5
11Y	Yellow	YELLOW	FYA	1	5
5G	Blue	BLUE	GA	1	5
N	Black	BLACK	N	1	5
	Brown				
	Red/Black				

POLE: E3 CABLE SIZE: 7/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
5R	Red	RED	RA	9	5
5Y	Orange	ORANGE	YA	9	5
11Y	Yellow	YELLOW	FYA	9	5
5G	Blue	BLUE	GA	9	5
N	Black	BLACK	N	9	5
	Brown				
	Red/Black				

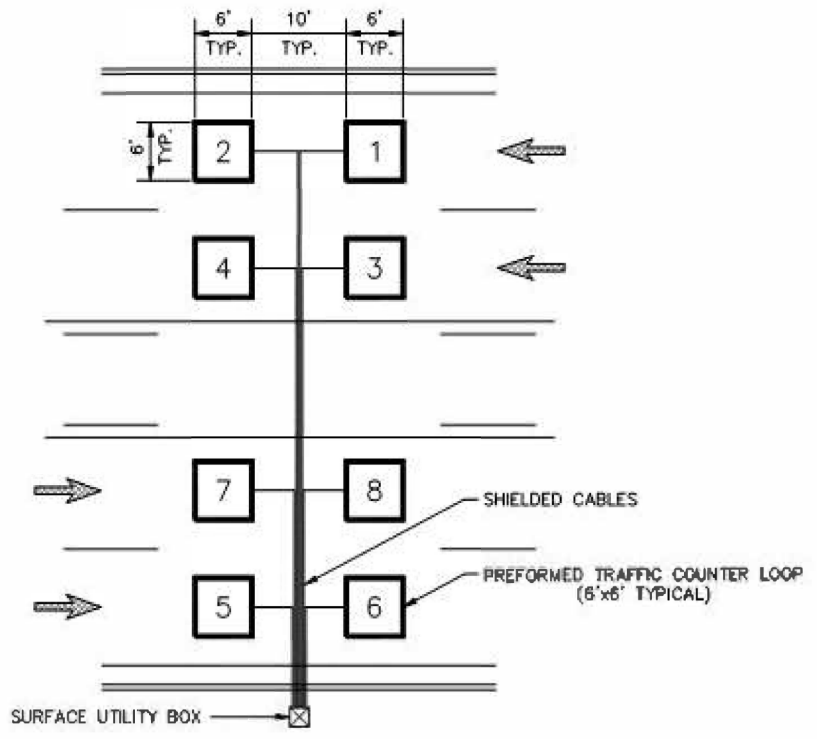
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Plotted From - TRPR37199

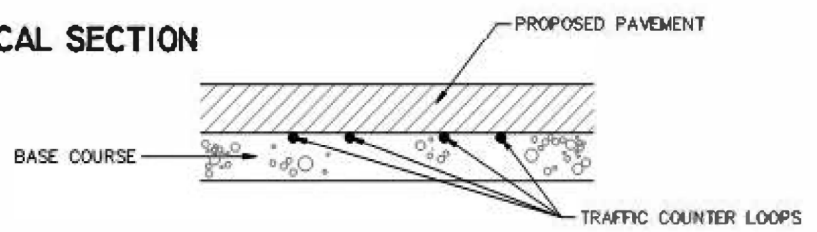
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PLAN VIEW

LOOP	COLOR
1	Brown
2	Orange
3	Violet
4	Yellow
5	Red
6	Blue
7	Green
8	White

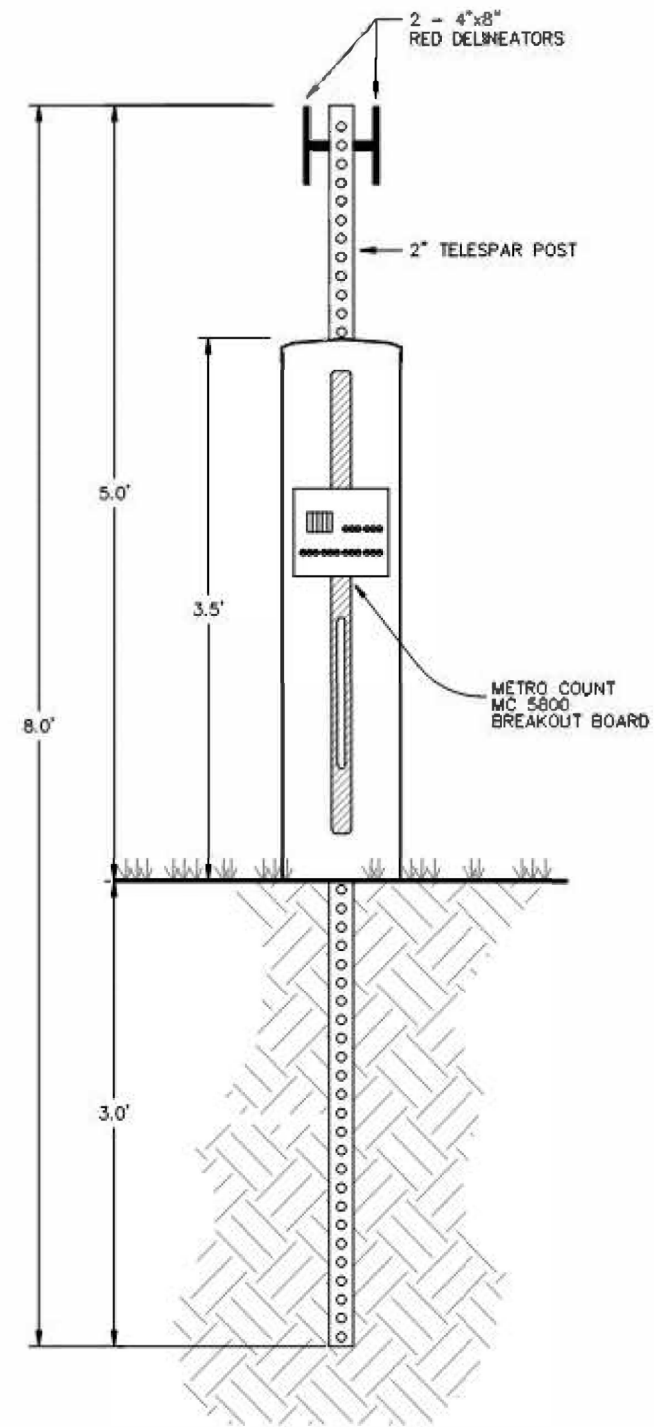


TYPICAL SECTION

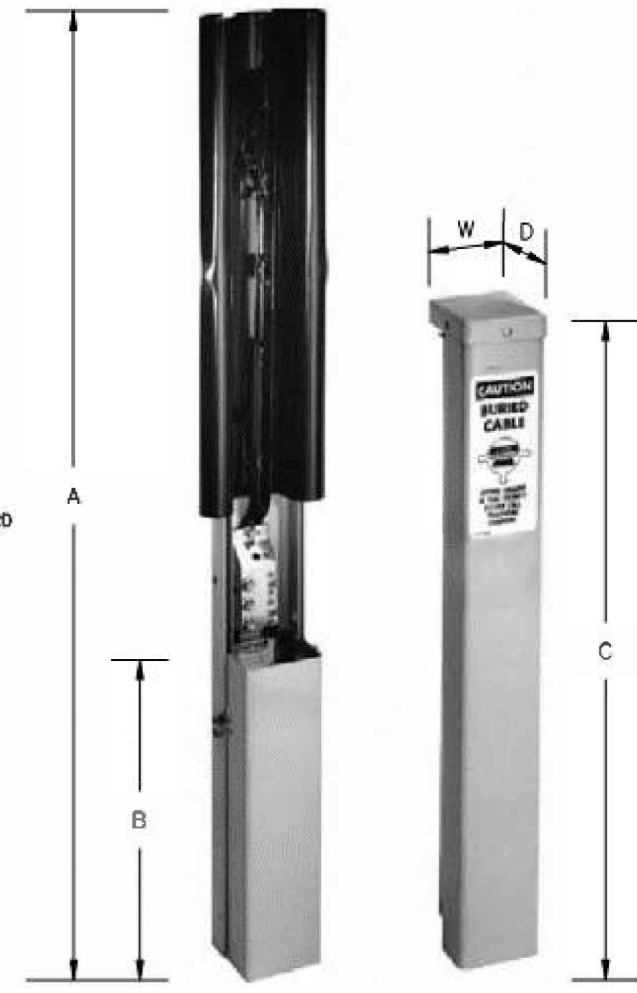


GENERAL NOTES:

1. TRAFFIC COUNTER LOOPS ARE TO BE PLACED IN THE SURFACE OF THE BASE COURSE PRIOR TO PLACEMENT OF PROPOSED PAVEMENT.
2. TRAFFIC COUNTER LOOPS ARE TO BE CENTERED UNDER EACH PROPOSED DRIVING LANE.
3. ALL SHIELDED CABLES LEADING FROM EACH LOOP TO THE SURFACE UTILITY BOX MAY BE PLACED IN THE SAME TRENCH.



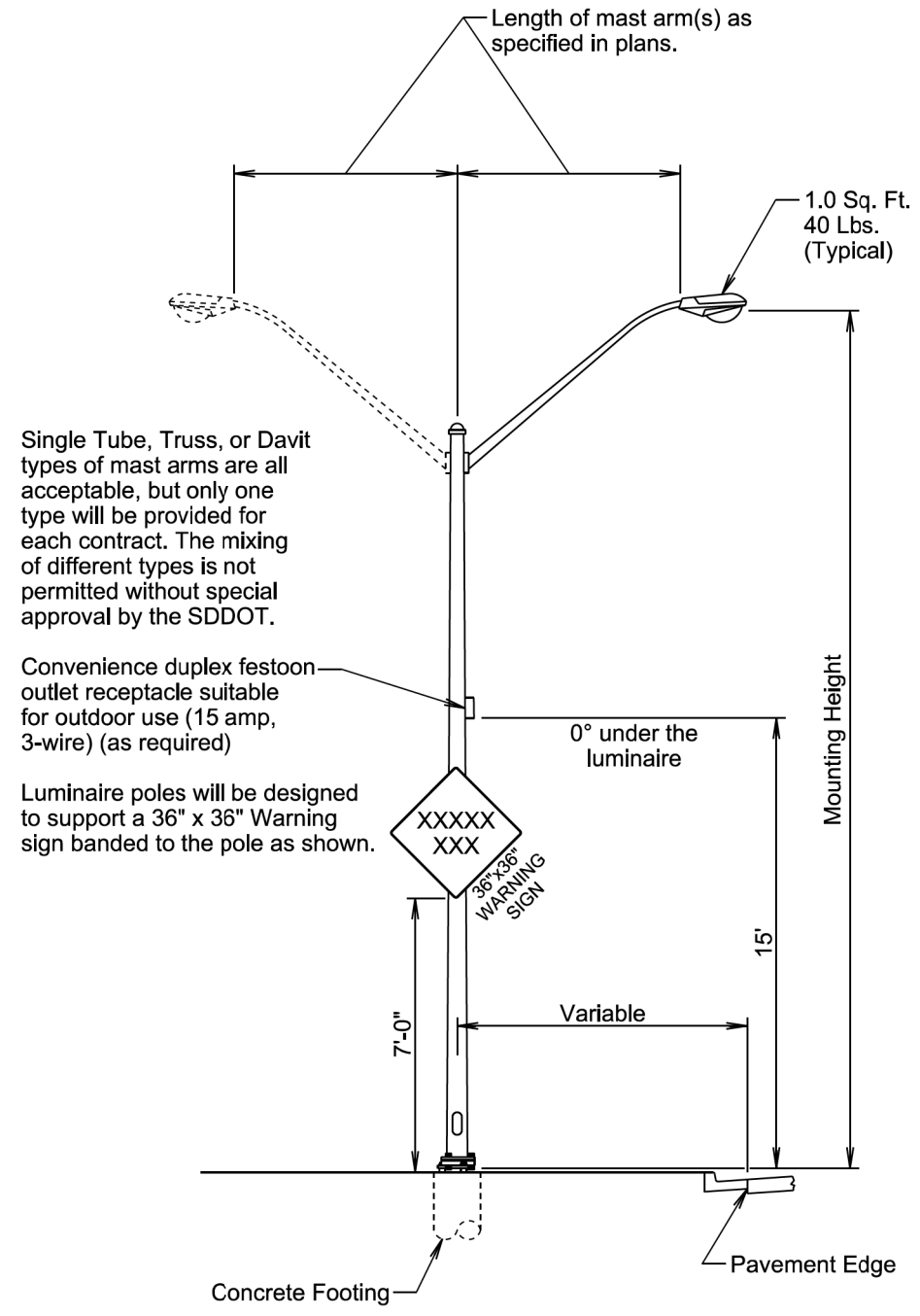
NOTES
 THE PERMANENT TRAFFIC COUNTER SURFACE UTILITY BOX SHALL BE EMERSON NETWORK POWER - UPCBD3.
 BOLT BOX TO TELESPAR POST WITH A MINIMUM OF TWO (2) BOLTS.
 * BOX OPENING TO FACE AWAY FROM STREET.



Dimensions (Inches)				
A	B	C	D	W
36.5	12	24.5	6	6

TRAFFIC COUNTER LOOPS AND SURFACE UTILITY BOX DETAILS

Plot Scale - 1:200



Single Tube, Truss, or Davit types of mast arms are all acceptable, but only one type will be provided for each contract. The mixing of different types is not permitted without special approval by the SDDOT.

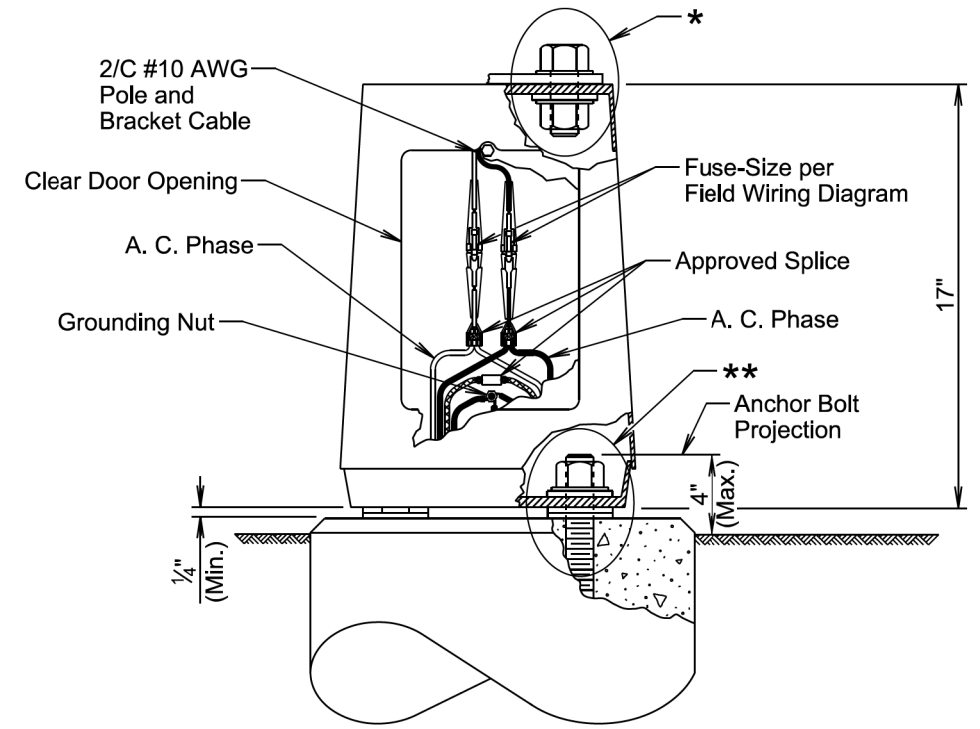
Convenience duplex festoon outlet receptacle suitable for outdoor use (15 amp, 3-wire) (as required)

Luminaire poles will be designed to support a 36" x 36" Warning sign banded to the pole as shown.

November 19, 2022

S D D O T	STEEL ROADWAY LUMINAIRE POLE WITH MAST ARM(S)	PLATE NUMBER 635.01
		Sheet 1 of 1

Published Date: 2024



GENERAL NOTES:

Base details are provided for example only and are not intended to be a complete design.

Fused connectors will be breakaway type.

* Hardware connecting the pole to the base will be installed in accordance with the manufacturer's recommendation.

** Hardware connecting the base to the footing will be installed in accordance with the manufacturer's recommendation. The Contractor will install leveling devices in accordance with the manufacturer's recommendation if shimming is necessary to install the light poles plumb and level. The washers and shims will be installed around the anchor bolts.

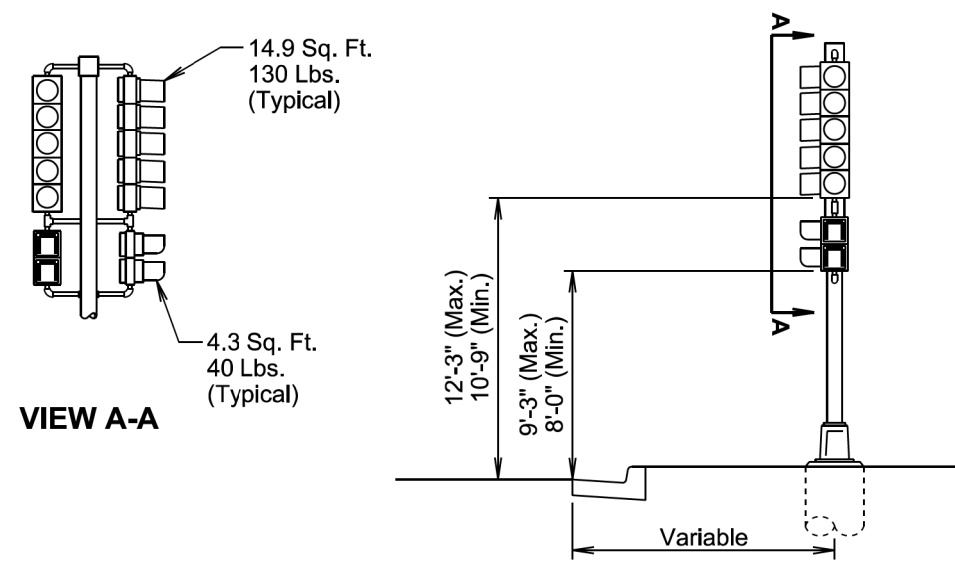
November 19, 2022

S D D O T	ROADWAY LUMINAIRE POLE BREAKAWAY TRANSFORMER BASE	PLATE NUMBER 635.21
		Sheet 1 of 1

Published Date: 2024

Plotted From - TRPR17199

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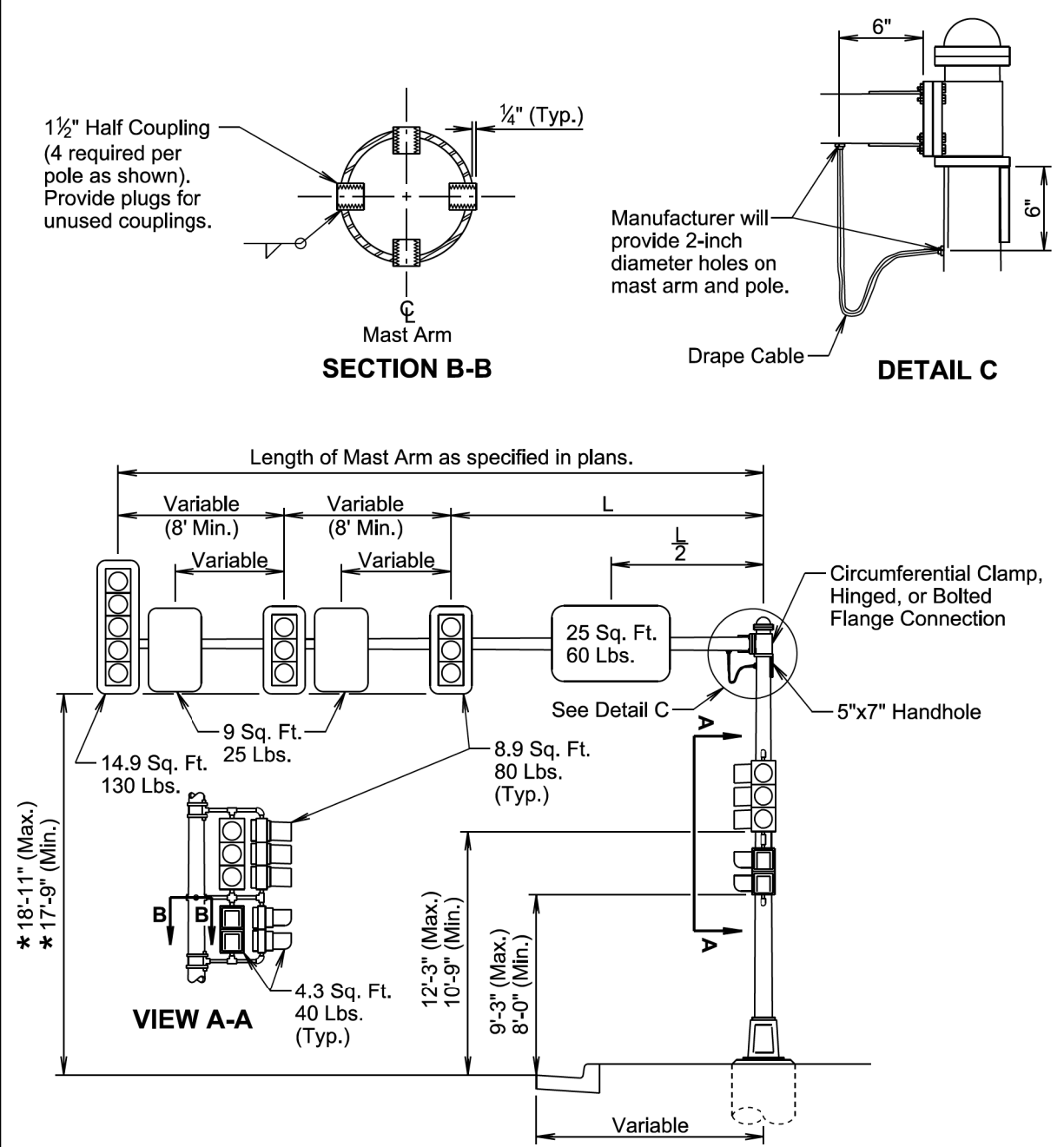


GENERAL NOTE:
The signal heads are shown with backplates removed so that the mounting hardware is visible.

November 19, 2022

S D D O T	SIGNAL POLE (PEDESTAL)	PLATE NUMBER 635.30
		Sheet 1 of 1

Published Date: 2024



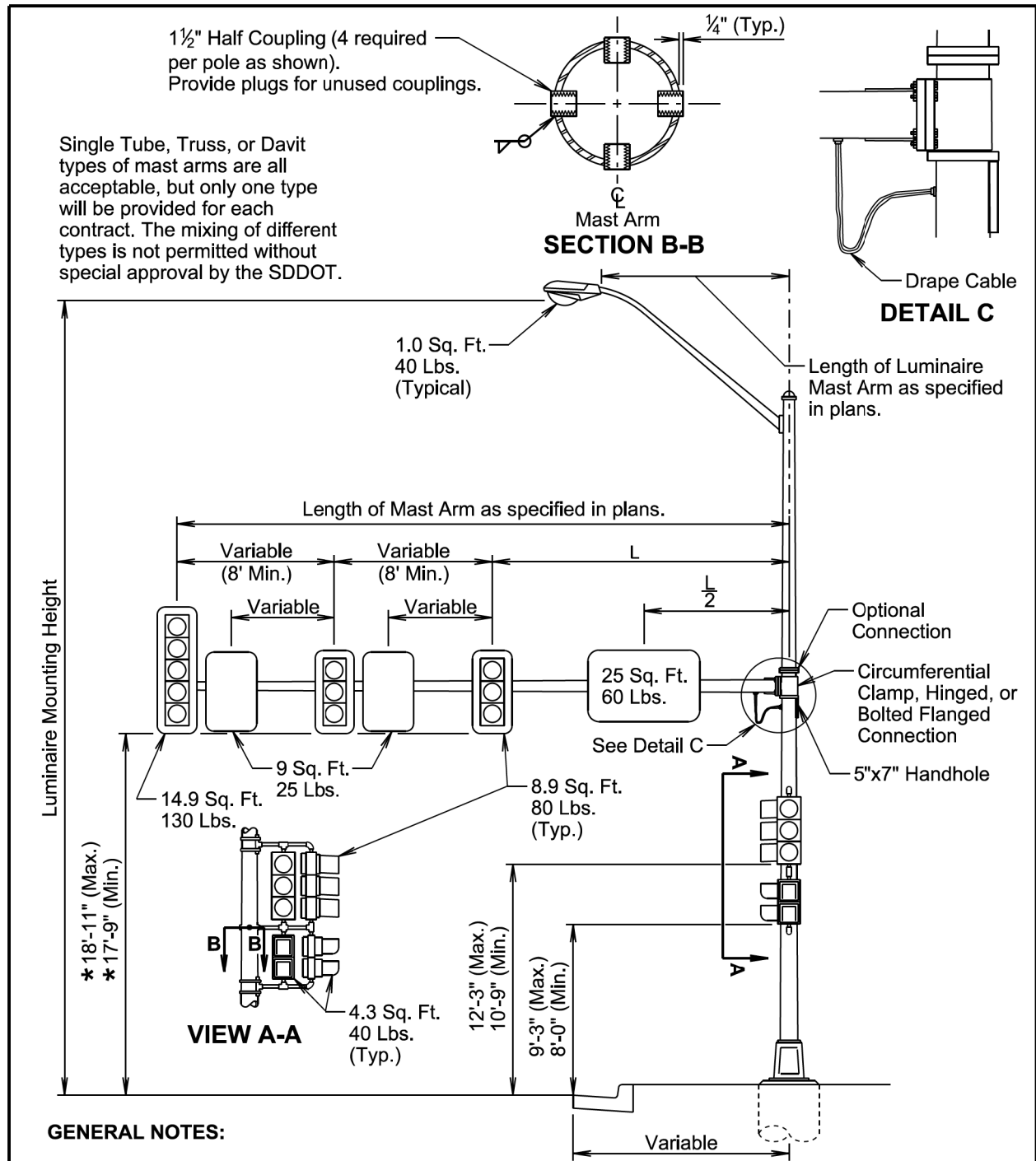
GENERAL NOTES:
Some of the signal heads are shown with backplates removed so that the mounting hardware is visible.

*The signal height allowances shown above are based on a horizontal distance greater than 53' between the signals and stop line. For horizontal distance of 53' and less between the signals and the stop line, the height allowances will be as specified in Section 4D.15 of the MUTCD.

November 19, 2022

S D D O T	SIGNAL POLE (WITH MAST ARM)	PLATE NUMBER 635.31
		Sheet 1 of 1

Published Date: 2024



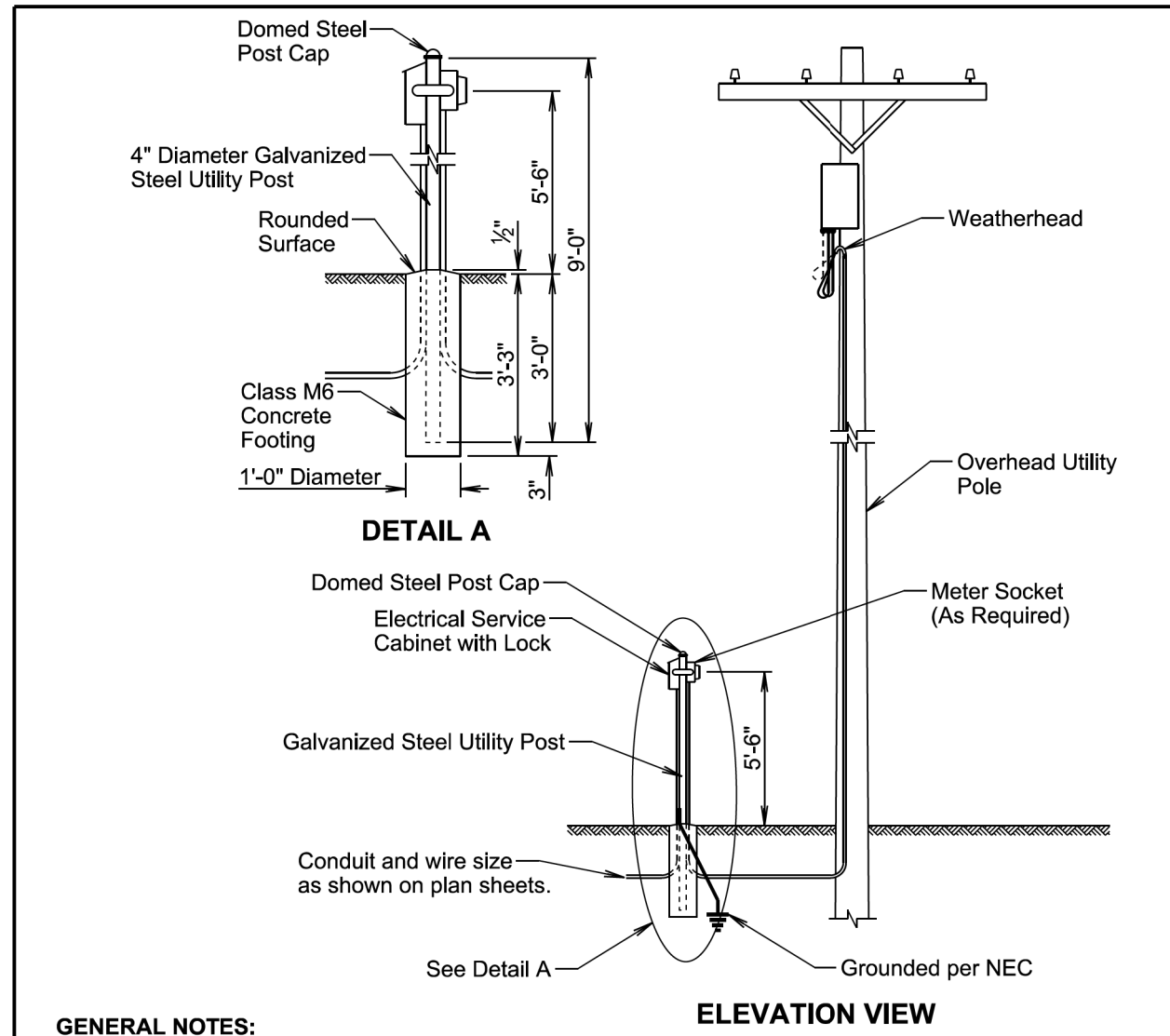
GENERAL NOTES:

Some of the signal heads are shown with backplates removed so that the mounting hardware is visible.

* The signal height allowances shown above are based on a horizontal distance greater than 53' between the signals and stop line. For horizontal distance of 53' and less between the signals and the stop line, the height allowances will be as specified in Section 4D.15 of the MUTCD.

November 19, 2022

S D D O T	SIGNAL POLE (WITH MAST ARM AND LUMINAIRE EXTENSION)	PLATE NUMBER 635.32
	Published Date: 2024	Sheet 1 of 1



GENERAL NOTES:

The service cabinet will include an externally mounted 15A receptacle outlet. The receptacle will be housed in a lockable NEMA 3R enclosure. The Contractor will furnish a lock and keys to the Engineer as directed.

The concrete for the post footing will be class M6 concrete.

The 4" diameter galvanized steel utility post will be 9' long and will be in conformance with AASHTO Standard Specifications M181. The post will be Type 1 and either Grade 1 or Grade 2. The domed steel post cap will be in conformance with AASHTO Standard Specifications M181 and will be Type 1.

The Contractor will contact and coordinate his/her work with the Utility Companies regarding hookup requirements, fees, materials, and equipment necessary.

All costs for furnishing and installing all materials from the electrical service cabinet to the transformer including labor, equipment, hookup fees, all items within the cabinet, lockable enclosure with receptacle outlet, lock and keys, post, concrete footing, post cap, meter socket if required, conduit, and incidentals will be incidental to the contract unit price per each for "Electrical Service Cabinet".

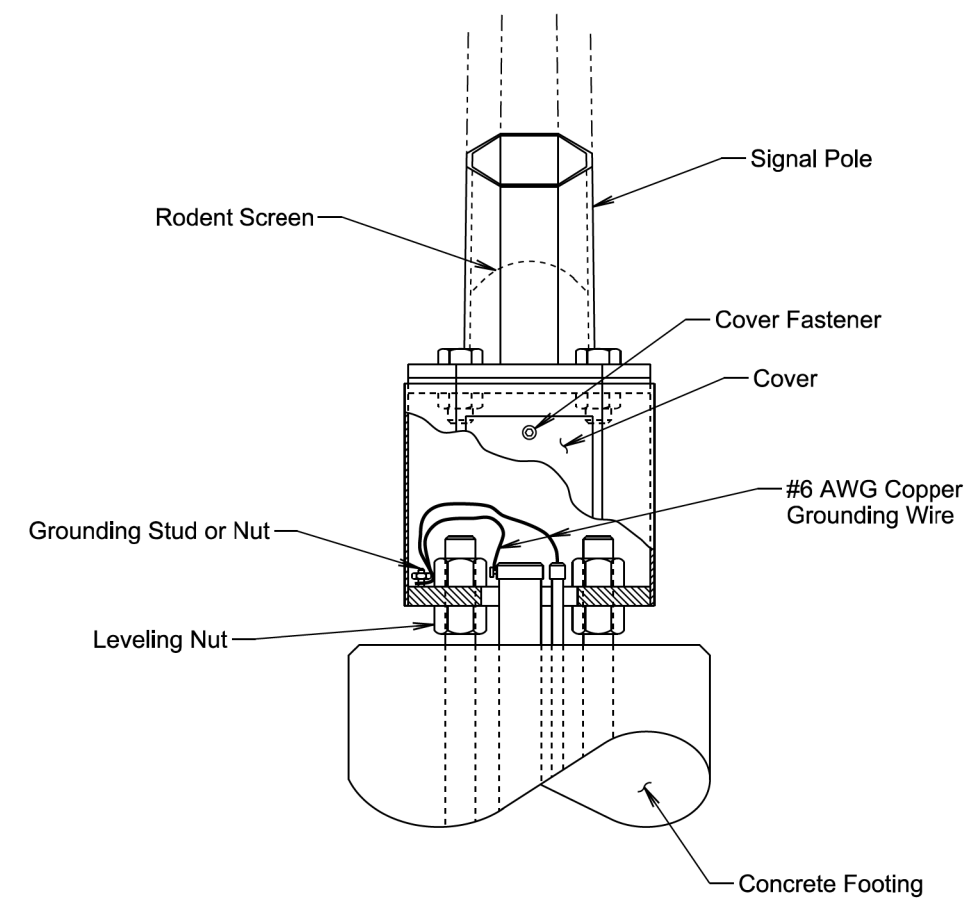
November 19, 2022

S D D O T	GALVANIZED STEEL UTILITY POST WITH OVERHEAD UTILITY POLE	PLATE NUMBER 635.35
	Published Date: 2024	Sheet 1 of 1

Plot Scale - 1:200

Plotted From - TRPR17199

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GENERAL NOTES:

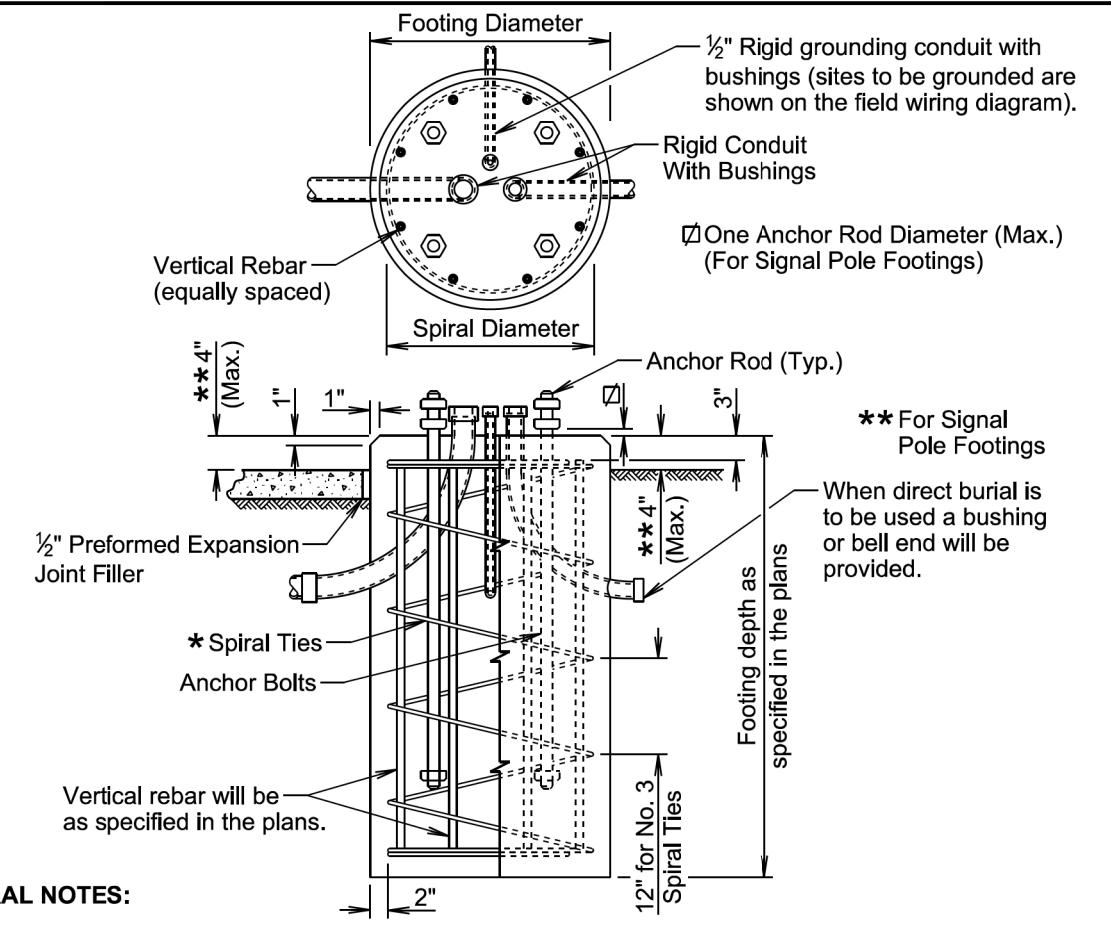
Base details are provided for example only and are not intended to be a complete design.

The Contractor will furnish and install a rodent screen in the signal pole above the transformer base. The rodent screen will be a galvanized steel mesh with a maximum opening size of 1/4 inch. The rodent screen will be friction fitted or installed by other methods approved by the Engineer.

All costs for furnishing and installing the rodent screen including labor, equipment, and materials will be incidental to the contract unit price per each for the corresponding signal pole contract item.

February 14, 2020

<i>Published Date: 2024</i>	S D D O T	TRANSFORMER SIGNAL POLE BASE	PLATE NUMBER 635.50
			Sheet 1 of 1



GENERAL NOTES:

* Circular ties may be used in lieu of the spiral ties. The No. 3 ties will be spaced 12 inches apart except for the top two which will be spaced 6 inches apart. The ties will be lapped 18 inches and the laps will be staggered around the cage.

Spiral ties will have 1-1/2 extra turns at each end.

See Section 985 of the Specifications for footing materials.

Conduits and bushings may project 2 1/2 inches to 6 inches above footing for fixed base poles but will not project above the slip plane or fracture plane for breakaway poles.

Conduits will be sealed water-tight during all phases of construction until poles are in place.

The anchor rods will fit inside the reinforcing steel cage. If the anchor rods designed by the Pole Manufacturer do not fit, contact the Office of Bridge Design for footing redesign. No additional payment will be made for the redesigned footing.

Costs of conduit and conduit bushings shown on footing detail will be incidental to the footing bid item(s).

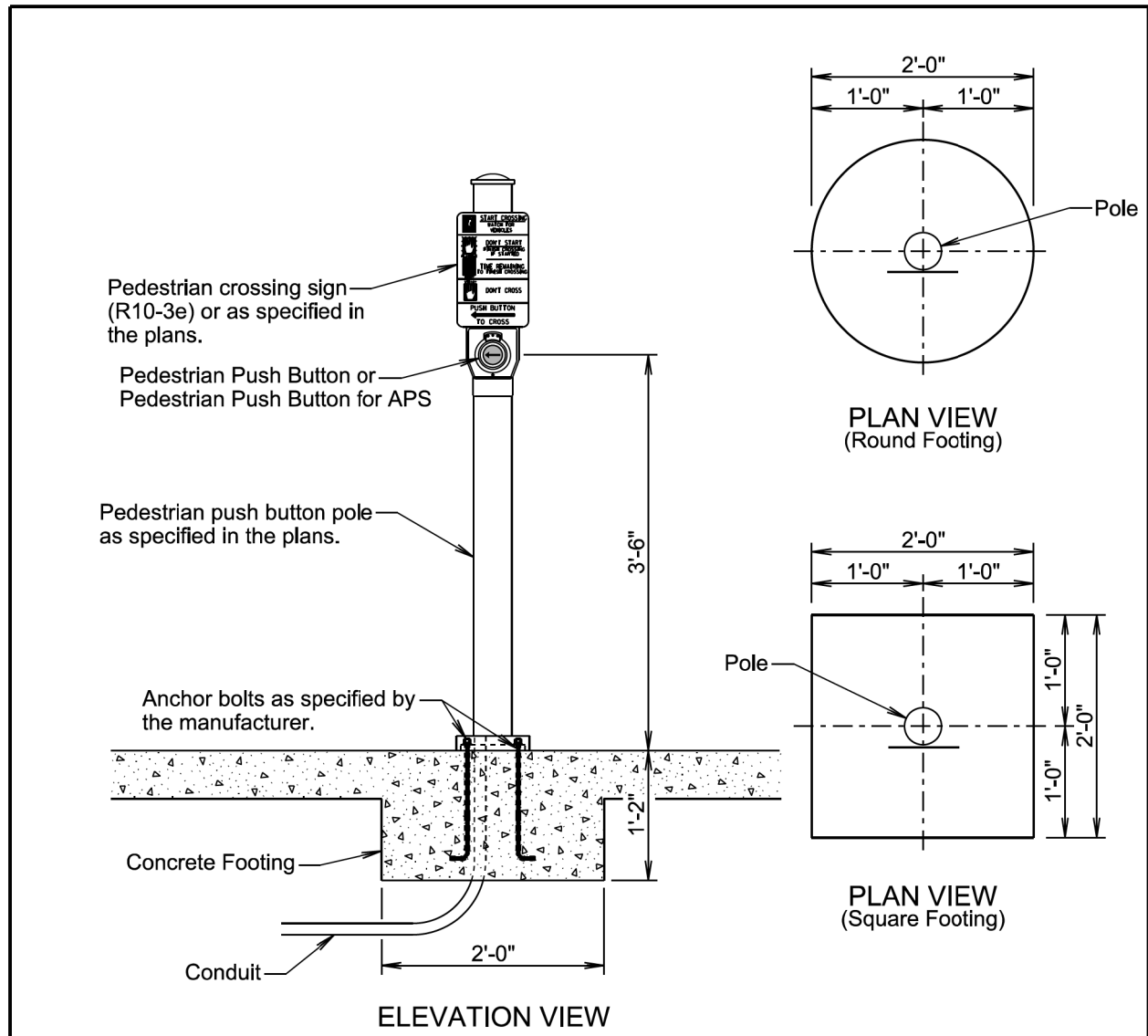
The pole will not be installed until the concrete has attained design strength (4000 psi).

The contour of the area surrounding the breakaway pole will be flat, though not necessarily level for a distance of 5 feet in all directions. The Contractor may be required to provide finish grading at some breakaway pole locations.

November 19, 2022

<i>Published Date: 2024</i>	S D D O T	POLE FOOTING	PLATE NUMBER 635.55
			Sheet 1 of 1

Plot Scale - 1:200



GENERAL NOTES:

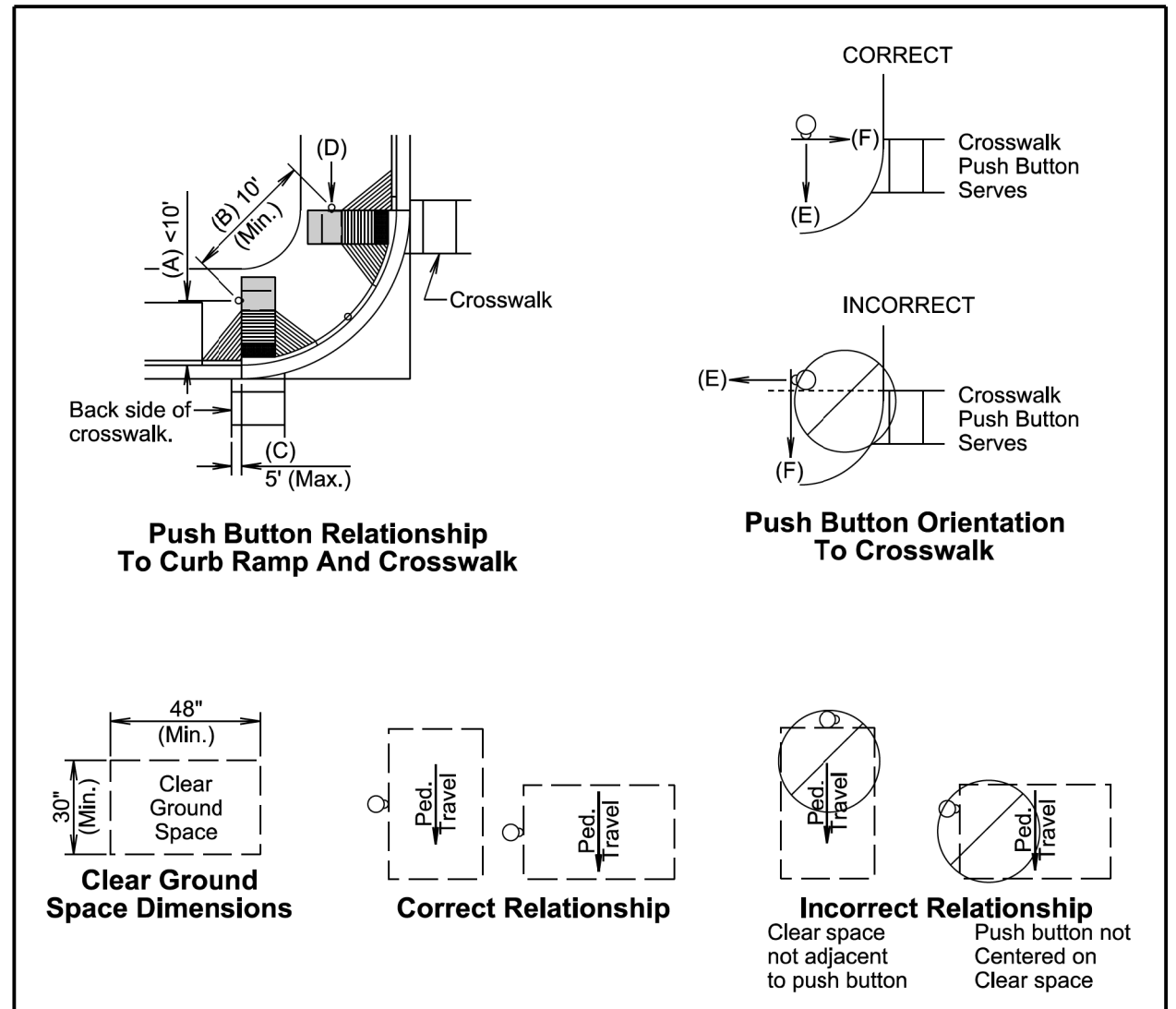
- The pedestrian push button pole will be as specified in the plans.
- The Contractor will install either the round or the square concrete footing. For informational purpose, the quantity of concrete for one footing is 0.14 cubic yards for the round footing and 0.17 cubic yards for the square footing.
- The concrete for the footing will be class M6 concrete.
- All costs for furnishing and installing the concrete footing will be incidental to the contract unit price per square foot for the corresponding concrete sidewalk bid item.
- All costs for furnishing and installing the pedestrian push button pole including labor, equipment, and materials including the pole, cap, and the conduit in the footing will be incidental to the contract unit price per each for "Pedestrian Push Button Pole".

May 9, 2020

S D D O T	PEDESTRIAN PUSH BUTTON POLE	PLATE NUMBER 635.57
		Sheet 1 of 2

Published Date: 2024

Plotted From - TRPR17199



General Notes:

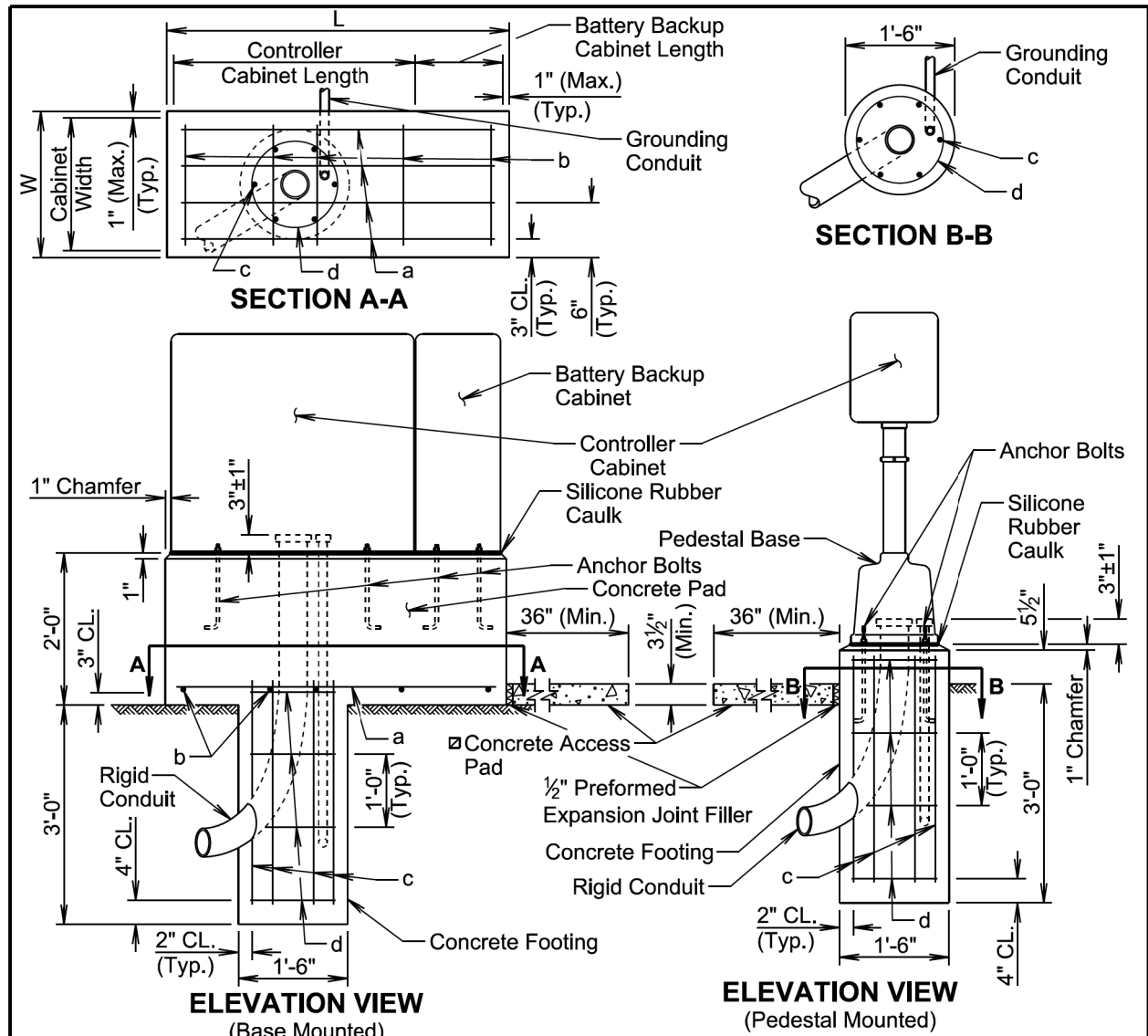
- Pedestrian Push Buttons Location and Orientation Requirements:
- (A) Within 10 feet from the front face of curb.
 - (B) Where two push buttons are provided, the push buttons should have at least 10 feet of separation from each other.
 - (C) If two curb ramps are used, the push button should be within 5 feet of the backside of the crosswalk.
 - (D) The push button should be mounted adjacent to a clear ground space (within 10 inches maximum reach). The clear ground space will be a least 30 inches x 48 inches and will slope no more than 50:1 (2%) in any direction. The push button will be centered on either side of the clear ground space (either the 30 inch or 48 inch side). The 30 inch x 48 inch clear ground space shouldn't touch the detectable warning panel.
 - (E) The push button should face the edge of roadway.
 - (F) The push button face should be parallel to the crosswalk being used.
- The push button poles will not interfere with the minimum clear width of the Pedestrian Access Route.

May 9, 2020

S D D O T	PEDESTRIAN PUSH BUTTON POLE	PLATE NUMBER 635.57
		Sheet 2 of 2

Published Date: 2024

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GENERAL NOTES:

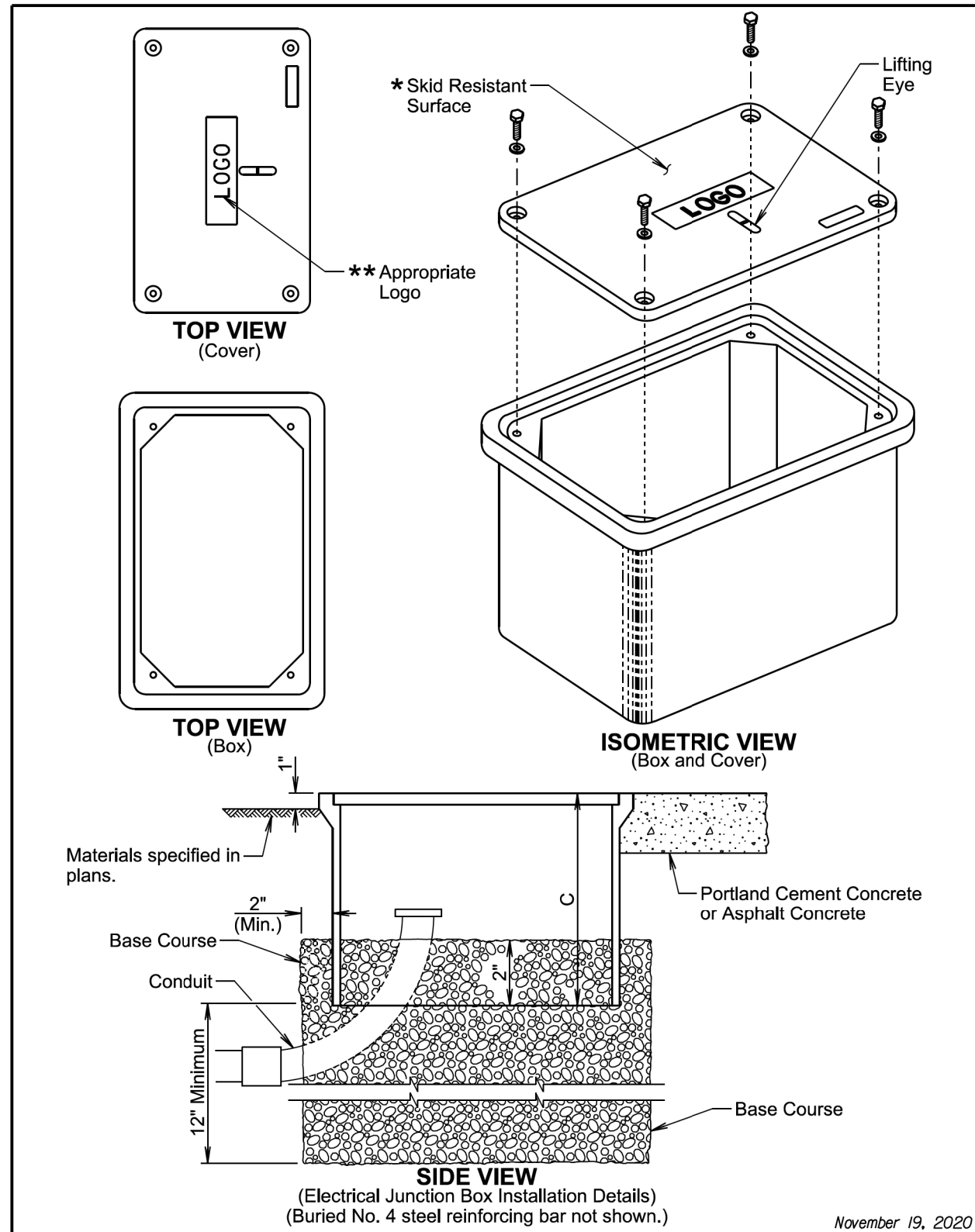
- The concrete pad will conform to the base of the controller and battery backup cabinets to the satisfaction of the Engineer.
- Conduits will be sealed water-tight until the conductor cables are installed.
- ☐ If the controller and battery backup concrete pad and footing is not located within or adjacent to an existing sidewalk, the Contractor will provide a concrete access pad as directed by the Engineer.
- Anchor bolts and related hardware will conform to the controller and battery backup cabinets manufacturer's specifications.
- A continuous bead of silicone rubber caulk will provide a weather-tight seal between the concrete pad or footing, and the cabinet or base.

REINFORCING SCHEDULE (for one footing)					
Mk.	No.	Size	Length	Type	Bending Detail
a	*	3	L-4"	Str.	
b	*	3	W-4"	Str.	
c	6	6	3'-0"	Str.	
d	4	3	4'-0"	T3	

Note: Dimensions are out to out of bar
* Vary number of bars as required by footing size.

November 19, 2022

S D D O T	CONTROLLER CABINET AND FOOTING	PLATE NUMBER 635.60
	Published Date: 2024	Sheet 1 of 1



November 19, 2020

S D D O T	ELECTRICAL JUNCTION BOXES TYPE 1 THROUGH TYPE 4	PLATE NUMBER 635.65
	Published Date: 2024	Sheet 1 of 2

Plot Scale - 1:200

Plotted From - TRPR37199

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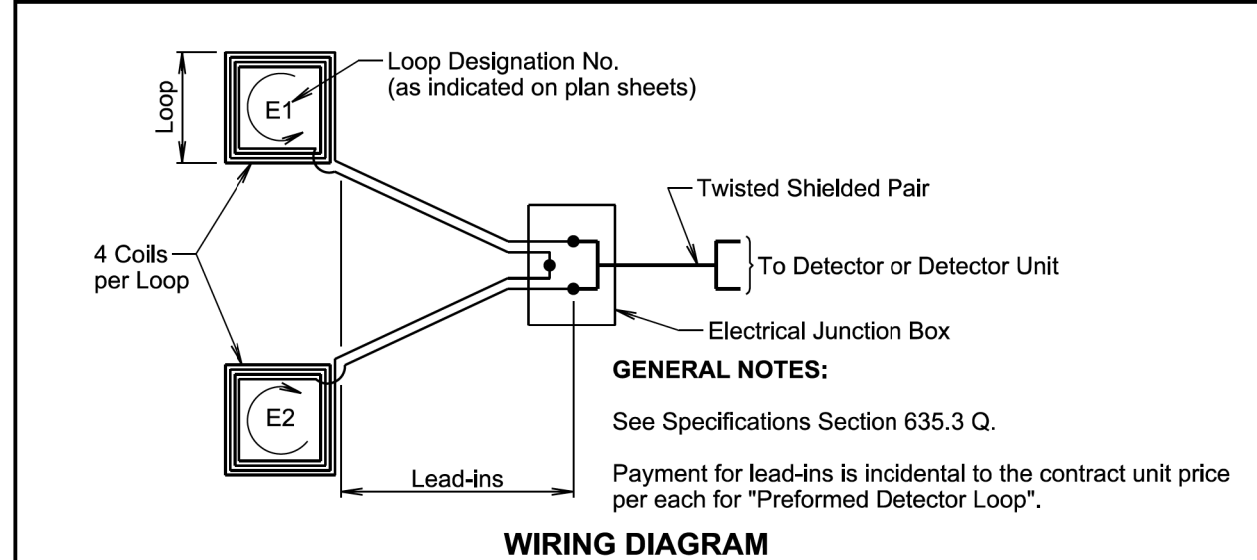
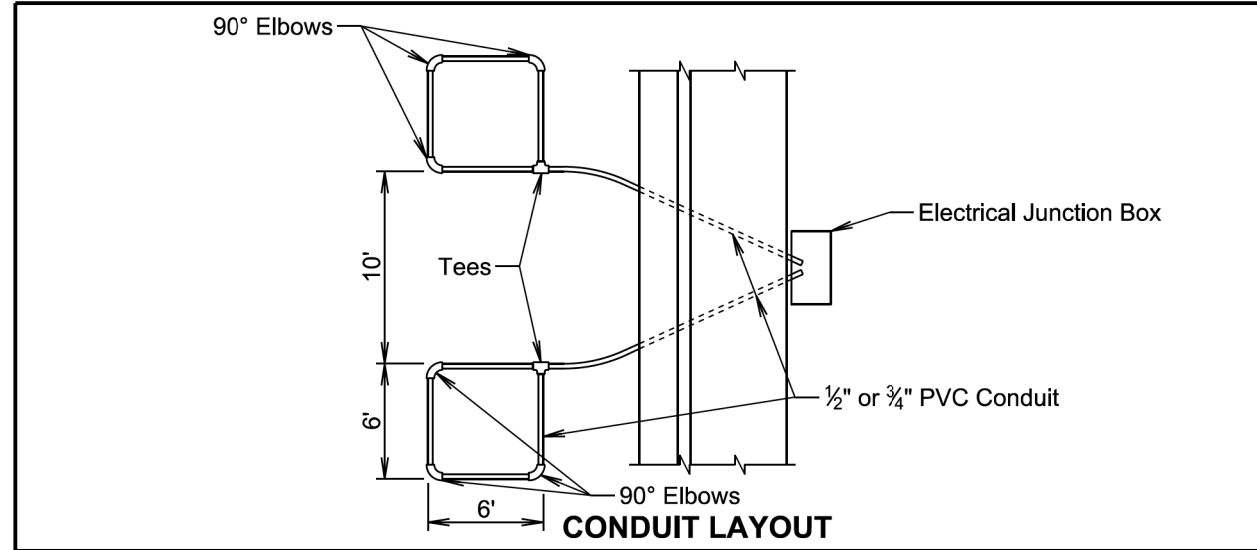
ELECTRICAL JUNCTION BOX			
TYPE	DESCRIPTION	APPROXIMATE COVER SIZE	MINIMUM DEPTH (C)
1	Open Bottom with Gasket	11"x18"	18"
2	Open Bottom with Gasket	13"x24"	18"
3	Open Bottom with Gasket	17"x30"	18"
3A	Open Bottom with Gasket	24"x36"***	24"
4	Open Bottom with Gasket	30"x48"***	24"

GENERAL NOTES:

- The cover will be gasketed with a minimum of two stainless steel bolts and washers.
 - The cover will have a lifting eye.
 - * The surface of the cover will have a minimum wet and dry coefficient of friction value of 0.5 as determined by ASTM F609.
 - ** The cover of the junction box will have the appropriate logo in one inch size letters and will be recessed. When the junction box contains cables or wires for a traffic signal then the logo will be "Signal". When the junction box contains lighting conductors then the logo will be "Lighting".
 - *** Two piece covers will be used for Type 3A and Type 4 junction boxes.
- The electrical junction boxes will comply with the American National Standards Institute (ANSI)/Society of Cable Telecommunications Engineers (SCTE) 77 2007 Specification for Underground Enclosure Integrity. The loading requirement for all electrical junction boxes and covers will be Tier 22 of ANSI/SCTE 77 2007.
- The electrical junction boxes will be UL listed.
- For junction boxes located outside of pavement, a No. 4 steel reinforcing bar with a minimum length of 18" will be buried adjacent to the long side of the junction box. All costs associated with furnishing and placing the steel reinforcing bar will be incidental to the contract unit price per each for "Type _ Electrical Junction Box".

November 19, 2020

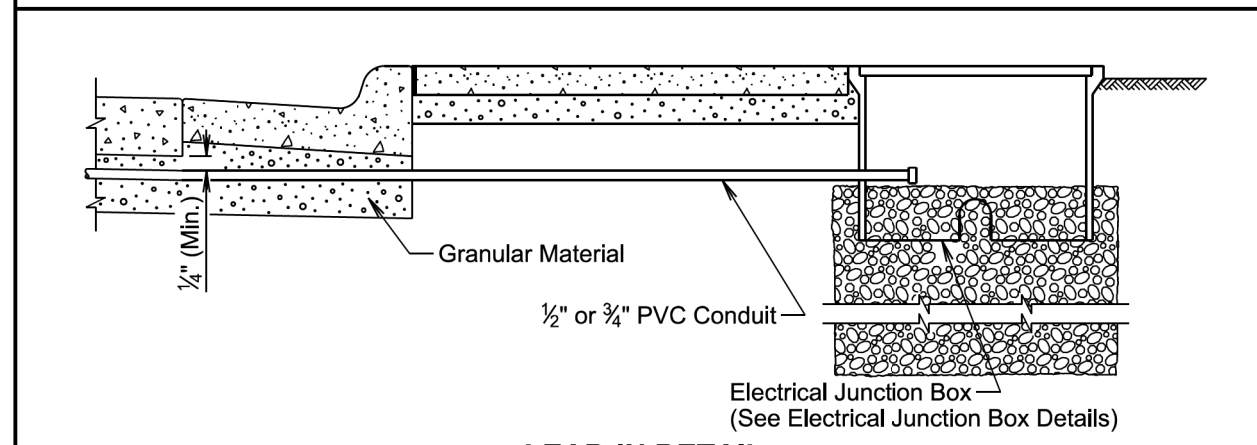
Published Date: 2024	S D D O T	ELECTRICAL JUNCTION BOXES TYPE 1 THROUGH TYPE 4	PLATE NUMBER 635.65
			Sheet 2 of 2



GENERAL NOTES:

- See Specifications Section 635.3 Q.
- Payment for lead-ins is incidental to the contract unit price per each for "Preformed Detector Loop".

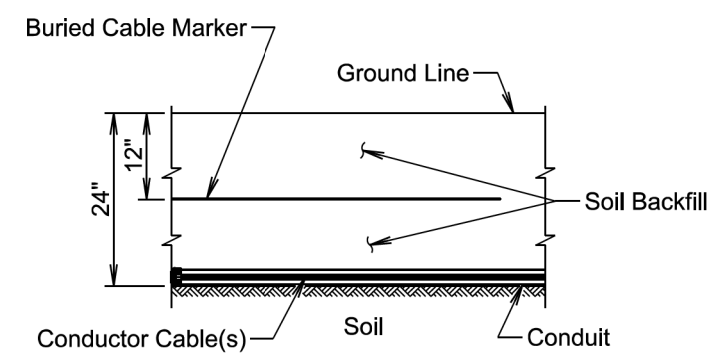
WIRING DIAGRAM



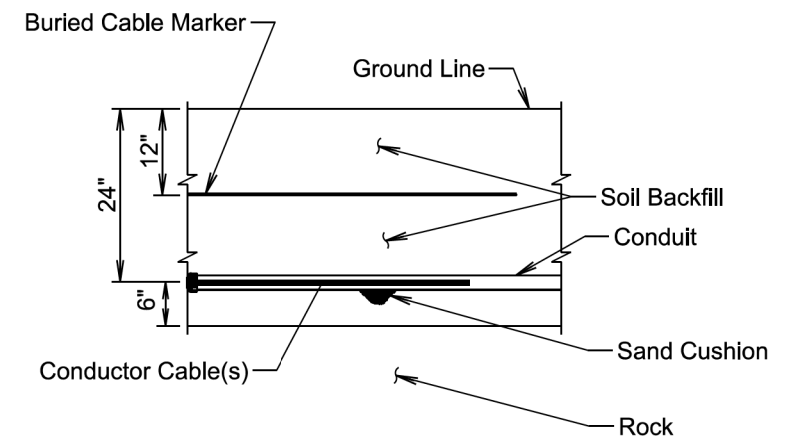
LEAD-IN DETAIL

November 19, 2022

Published Date: 2024	S D D O T	PREFORMED DETECTOR LOOP	PLATE NUMBER 635.70
			Sheet 1 of 1



SECTION VIEW



SECTION VIEW

GENERAL NOTE:

The Buried Cable Marker will be plastic, approximately 6" wide, and will be capable of sustaining a minimum of a 350% tolerance of elongation without tearing. The Buried Cable Marker will have a life expectancy approximately equal to that of the conductor(s) beneath it. A phrase indicating the presence of a buried electric circuit below will be printed in a contrasting color on the cable marker. The Buried Cable Marker will be subject to approval by the Engineer. All costs associated with furnishing and installing the Buried Cable Marker will be incidental to the contract unit price per foot for the bid item used for the electrical conductor.

November 19, 2022

S D D O T	CONDUIT INSTALLATION	PLATE NUMBER 635.76
		Sheet 1 of 1

Published Date: 2024

Plot Scale - 1:200

Plotted From - TRPR17199

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