

November 8, 2024

Re: Project's NH-CR 0014(185)229, 436() – PCN's 026Z & X05W– Urban Grading, Curb & Gutter, Sidewalk, Signals, Storm Sewer, Lighting, Asphalt Concrete Surfacing, PCC Surfacing, Water Main Improvement & Sewer Manhole Adjustments

To Whom It May Concern,

A pre-bid meeting for the US 14 (Euclid Ave) Reconstruction project is being held on November 26th at 1:30 PM CST via Microsoft TEAMS. Interested contracting parties are invited to attend the meeting virtually via the Microsoft Teams Meeting Link provided below.

This meeting will include a presentation of the project covering topics such as the overall scope of work, design aspects, traffic control, and contract time. There will be an opportunity for Contractors to present questions to Department staff, consultants, and project stakeholders.

Attendance is not a requirement, but all interested contracting parties are strongly encouraged to attend.

If attending the meeting you must join the meeting via the link provided. In order to reduce sound feedback please mute the microphone on your computer. Due to the meeting being virtual we are requesting that you please enter the name of your company followed by the individuals from your company attending the meeting into the chat feature of Microsoft Teams.

[Join Pre-bid Meeting](#)

Date: November 26, 2024

Time: 1:30-3:30 PM (CST)

Meeting ID: 211 221 837 478

Additional instructions regarding the meeting format will be provided at the beginning of the meeting.

We look forward to seeing you there!

Sincerely,
SD DOT

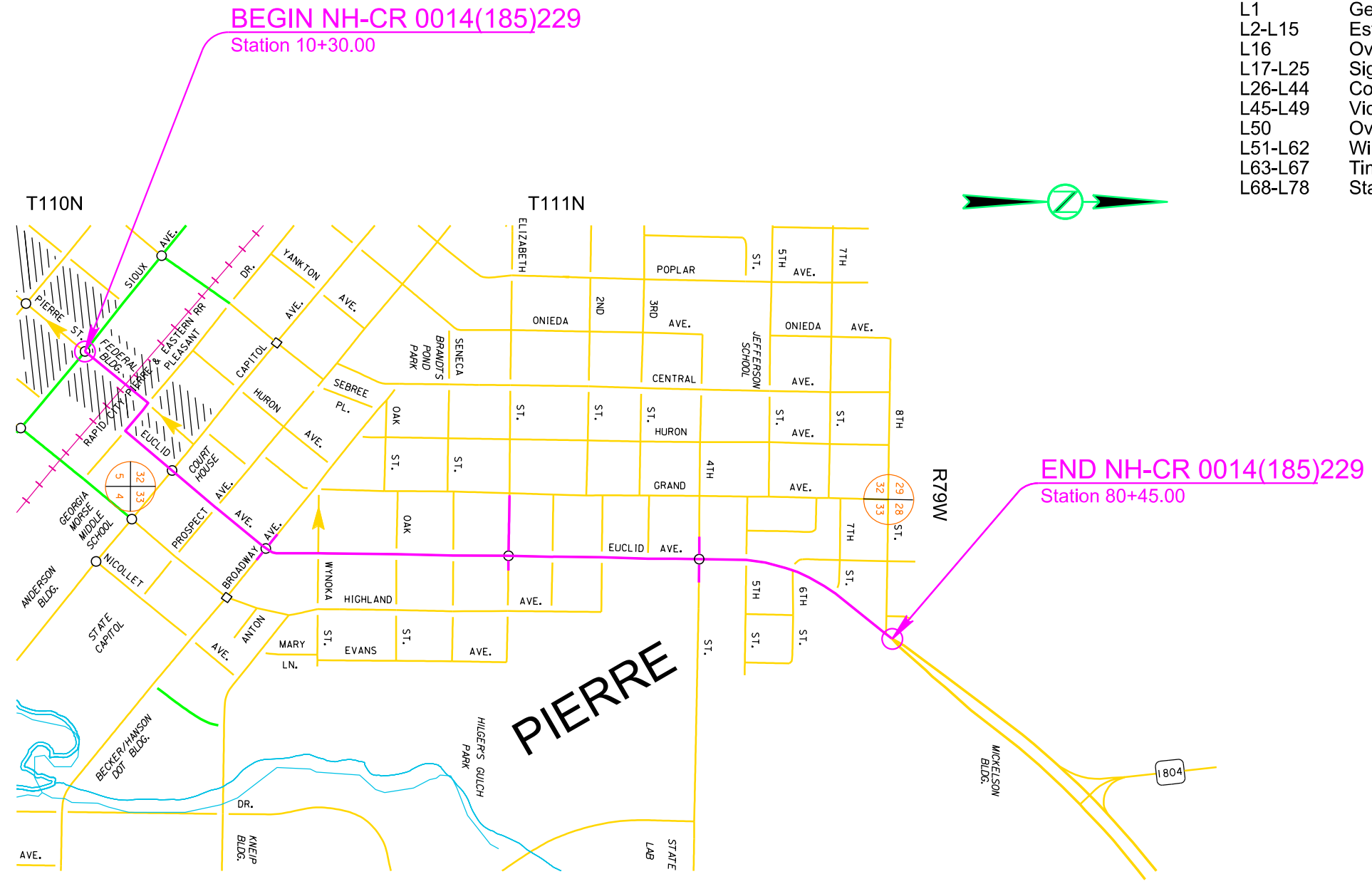
SECTION L: LIGHTING AND SIGNAL PLANS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0014(185)229	L1	L78

Plotting Date: 3/12/2024

INDEX OF SHEETS

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- L45-L49 Video Detection Layouts
- L50 Over-Height Detection System Layout
- L51-L62 Wiring Diagrams
- L63-L67 Timing Diagrams
- L68-L78 Standard Plates



Plot Scale - 1:200

Plotted From - L:\MCOQUEEN

File - ...Sheet Files\Section_L\LO1.dgn

SECTION L ESTIMATE OF QUANTITIES

Bid Item Number	Item	Quantity	Unit
110E1530	Remove Signal Pole Footing	14	Each
110E1540	Remove Luminaire Pole Footing	63	Each
110E5100	Salvage Luminaire Pole	61	Each
110E5110	Salvage Signal Equipment	Lump Sum	LS
635E0040	Breakaway Base Luminaire Pole with Arm, 40' Mounting Height	48	Each
635E0140	Breakaway Base Luminaire Pole with Twin Arms, 40' Mounting Height	2	Each
635E0050	Breakaway Base Luminaire Pole with Arm, 50' Mounting Height	1	Each
635E2025	Signal Pole with 25' Mast Arm	1	Each
635E2030	Signal Pole with 30' Mast Arm	3	Each
635E2035	Signal Pole with 35' Mast Arm	3	Each
635E2050	Signal Pole with 50' Mast Arm	1	Each
635E2140	Signal Pole with 40' Mast Arm and Luminaire Arm	2	Each
635E2145	Signal Pole with 45' Mast Arm and Luminaire Arm	3	Each
635E2150	Signal Pole with 50' Mast Arm and Luminaire Arm	1	Each
635E2155	Signal Pole with 55' Mast Arm and Luminaire Arm	2	Each
635E2160	Signal Pole with 60' Mast Arm and Luminaire Arm	1	Each
635E3700	Roadway Luminaire, LED with Photoelectric Cell	62	Each
635E4030	3 Section Vehicle Signal Head	52	Each
635E4040	4 Section Vehicle Signal Head	20	Each
635E5020	2' Diameter Footing	376.0	Ft
635E5030	3' Diameter Footing	192.0	Ft
635E5302	Type 2 Electrical Junction Box	41	Each
635E5303	Type 3 Electrical Junction Box	14	Each
635E5304	Type 4 Electrical Junction Box	20	Each
635E5400	Electrical Service Cabinet	6	Each
635E5430	Traffic Signal Controller	4	Each
635E5470	Wireless Interconnect System	4	Each
635E5510	Signal Flasher Unit	2	Each
635E5515	Battery Backup System for Traffic Signal	5	Each
635E5520	Video Detection System	5	Each
635E5530	Preformed Detector Loop	30	Each
635E5560	Emergency Vehicle Preemption Unit	4	Each
635E5570	Optical Detector	17	Each
635E5800	Miscellaneous Signal Parts	Lump Sum	LS
635E5880	Accessible Pedestrian Signal	40	Each
635E5910	Pedestrian Push Button Pole	40	Each
635E5922	Pedestrian Signal Head with Countdown Timer	40	Each
635E5930	Pedestrian Crossing Sign	40	Each
635E5960	Solar Powered Flashing Beacon	3	Each
635E6100	Over-Height Vehicle Detection System	2	Each
635E6200	Miscellaneous, Electrical	Lump Sum	LS
635E7500	Remove and Reset Luminaire Pole	2	Each
635E8120	2" Rigid Conduit, Schedule 40	12,000	Ft
635E8140	4" Rigid Conduit, Schedule 40	270	Ft
635E8220	2" Rigid Conduit, Schedule 80	6,625	Ft
635E8230	3" Rigid Conduit, Schedule 80	2,820	Ft
635E8240	4" Rigid Conduit, Schedule 80	240	Ft
635E8320	2" Innerduct, Schedule 40	7,095	Ft
635E8853	2/2/4 Aluminum Wire	17,220	Ft
635E9014	1/C #4 AWG Copper Wire	3,840	Ft
635E9016	1/C #6 AWG Copper Wire	1,485	Ft
635E9020	1/C #10 AWG Copper Wire	7,210	Ft
635E9502	2/C #14 AWG Copper Tray Cable, K2	6,935	Ft
635E9504	4/C #14 AWG Copper Tray Cable, K2	2,550	Ft
635E9505	5/C #14 AWG Copper Tray Cable, K2	900	Ft
635E9507	7/C #14 AWG Copper Tray Cable, K2	2,740	Ft
635E9512	12/C #14 AWG Copper Tray Cable, K2	65	Ft
635E9519	19/C #14 AWG Copper Tray Cable, K2	255	Ft
635E9524	24/C #14 AWG Copper Tray Cable, K2	2,740	Ft
635E9710	2/C #10 AWG Copper Pole and Bracket Cable	3,430	Ft
635E9924	24 Strand Fiber Optic Cable	7,320	Ft
900E5135	Traffic Counter Surface Utility Box	4	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 SUBMITTAL

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:

Lance.McQueen@hdrinc.com

Upon review of the submittals, they will be sent by the Engineer to the following email addresses for concurrence of approvals or remarks:

Stacy.Bartlett@state.sd.us

Nick.Waters@ci.pierre.sd.us

Devin.Harris@ci.pierre.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.

MISCELLANEOUS, ELECTRICAL

The contract lump sum price for "Miscellaneous, Electrical" will include all costs for the following work items:

- Connecting / tying to existing conduits and junction boxes
- Removal of existing traffic and lighting junction boxes
- Removal / abandonment of existing lighting and traffic conduits and cables
- Removal of existing service cabinets and meters
- Reprogramming of existing traffic signal controllers
- Rewiring within the existing controller cabinet & implementing the 4 section left turn (FYA) heads at the intersection of Sioux Avenue and Pierre Street

SALVAGE SIGNAL EQUIPMENT

The existing signal equipment identified on the plans will be salvaged and delivered to the City of Pierre by the Contractor. The Contractor will notify the City 5 days before the delivery of the salvaged signal equipment. The City contact is Nick Waters at 605-773-7439. The Contractor will deliver the salvaged signal equipment to the Pierre Maintenance Yard.

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".



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REV DATE: 11/07/2024 INITIAL: LRM

REMOVE AND RESET LUMINAIRE POLE

The existing luminaire poles and luminaires (EPLL1, EPLL2 / PLL1, PLL2), adjacent to the existing parking lot @ the north side of the intersection of Pleasant Drive & Pierre Street, will be removed, salvaged and reset. The Contractor will verify the final pole reset locations with the parking lot owner.

It will be the Contractor's responsibility to obtain the bolt circle pattern and anchor bolts for the salvaged poles from the original pole manufacturer. The Contractor will determine the original pole manufacturer.

The existing luminaire poles have concrete footings. Flower beds and banners / hangers are also mounted to the existing poles. The luminaire pole, luminaire fixture, banners / hangers and flower beds will be removed, salvaged and reset with the pole. A photo of the existing light poles are shown to the right.

Luminaire poles, luminaire fixtures, banners / hangers and flower beds damaged during relocation will be repaired or replaced by the Contractor at no cost to the State.



All costs involved with removing and resetting the existing luminaire poles and luminaires, including new anchor bolts with associated hardware, will be incidental to the contract unit price per each for "Remove and Reset Luminaire Pole".

SALVAGE LUMINAIRE POLE

Existing luminaire poles will be salvaged and delivered to the City of Pierre by the Contractor. The Contractor will notify the City 5 days before the delivery of the salvaged luminaire poles. The City contact is Devin Harris at 605-773-7439. The Contractor will deliver the salvaged light poles to the Pierre Maintenance Yard.

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".

REMOVE LUMINAIRE POLE FOOTING

The footings of existing luminaire poles 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".

REMOVE SIGNAL POLE FOOTING

The footings of salvaged signal poles 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".



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TABLE OF FOOTING DATA

Site Designation	Footing Diameter	*Footing Depth	**Spiral Diameter	**Spiral Length	Vertical Reinforcement
L1	2' - 0"	8' - 0"	1' - 8"	54' - 9"	8-#7 x 7' - 6"
L2-L47	2' - 0"	7' - 0"	1' - 8"	49' - 6"	8-#7 x 6' - 6"
L48, L49	2' - 0"	8' - 0"	1' - 8"	54' - 9"	8-#7 x 7' - 6"
EZL1, EZL2	2' - 0"	7' - 0"	1' - 8"	49' - 6"	8-#7 x 6' - 6"
PLL1, PLL2	2' - 0"	8' - 0"	1' - 8"	54' - 9"	8-#7 x 7' - 6"
S1	3' - 0"	14' - 0"	2' - 8"	137' - 6"	14-#8 x 13' - 6"
S3	3' - 0"	12' - 0"	2' - 8"	120' - 9"	14-#8 x 11' - 6"
S4	3' - 0"	11' - 0"	2' - 8"	112' - 6"	14-#8 x 10' - 6"
S5	3' - 0"	12' - 0"	2' - 8"	120' - 9"	14-#8 x 11' - 6"
S6	3' - 0"	11' - 0"	2' - 8"	112' - 6"	14-#8 x 10' - 6"
S7	3' - 0"	12' - 0"	2' - 8"	120' - 9"	14-#8 x 11' - 6"
S8	3' - 0"	10' - 0"	2' - 8"	104' - 3"	14-#8 x 9' - 6"
S9	3' - 0"	13' - 0"	2' - 8"	129' - 3"	14-#8 x 12' - 6"
S10	3' - 0"	10' - 0"	2' - 8"	104' - 3"	14-#8 x 9' - 6"
S11	3' - 0"	11' - 0"	2' - 8"	112' - 6"	14-#8 x 10' - 6"
S12	3' - 0"	10' - 0"	2' - 8"	104' - 3"	14-#8 x 9' - 6"
S13	3' - 0"	11' - 0"	2' - 8"	112' - 6"	14-#8 x 10' - 6"
S14	3' - 0"	9' - 0"	2' - 8"	95' - 9"	14-#8 x 8' - 6"
S15	3' - 0"	12' - 0"	2' - 8"	120' - 9"	14-#8 x 11' - 6"
S16	3' - 0"	10' - 0"	2' - 8"	104' - 3"	14-#8 x 9' - 6"
S17	3' - 0"	13' - 0"	2' - 8"	129' - 3"	14-#8 x 12' - 6"
S18	3' - 0"	11' - 0"	2' - 8"	112' - 6"	14-#8 x 10' - 6"

* Footing depth will be below ground level.

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

SOILS INFORMATION

Subsurface conditions along the corridor consist of approximately 10 feet of brown to gray clay to gravelly silt clay, overlying dark gray shale. Groundwater was encountered at a depth of 10 feet in a boring conducted in April 2020 for the soils investigation.

Concrete placement operations should closely follow excavation procedures. The longer the excavations are left open the more likely caving may occur. If caving soils are encountered, it may be necessary to use casing or drilling fluids to maintain an open excavation. Casing will be of sufficient strength to withstand handling and installation procedures. Casing material may consist of Sonotube, corrugated metal pipe, PVC, smooth metal pipe or any other material as approved by the Engineer. Drilling fluids can be water or other slurries as approved by the Engineer. If caving is not an issue but water is present, it will be removed prior to concrete placement or the concrete will be tremied.

LIGHTING AND SIGNAL CONDUITS AND INNERDUCT INSTALLATION

All lighting and signal conduits and innerduct for the fiber optic cable will be installed beneath the proposed roadway fabric and gravel base that are being installed for roadway stability purposes.

The lighting and signal conduits and innerduct will be installed prior to installation of the roadway fabric and gravel base.

2/2/4 ALUMINUM WIRE

The proposed 2/2/4 Aluminum Wire will be compact stranded AA-8000 series aluminum alloy conductor for use with 600 volts or less, with 60mils of XLPE insulation. The 2/2/4 Aluminum Wire will be Stephens-8000 as manufactured by Omni or approved equal.

POLE AND BRACKET CABLE

The proposed pole and bracket cable will be 10-2 UF-B wire/cable for use with 600 volts or less as manufactured by Cerromax or approved equal.

EUCLID AVENUE LUMINAIRES

The accepted design for Euclid Ave, Pierre Street to the north edge of Wynoka Street, will provide 1.1 and greater average maintained foot-candles and a uniformity ratio (average maintained to minimum maintained foot-candles) of 3:1 and 5:1 (maximum to minimum maintained foot candles):

L1, S1
 Setback: 5.0 Ft.
 Lamp Loss Factor (LLF): 0.8
 Width of Lighted Area: 52 Ft.
 Spacing: 130 Ft.
 Configuration: Staggered
 Mounting Height: 50 Ft.
 Arm Extension Length: 8 Ft.
 Luminaire: Type 3 - 106W LED

L2-L20, S3, S5, S7, S9
 Setback: 3.0 Ft.
 Lamp Loss Factor (LLF): 0.8
 Width of Lighted Area: 40-48 Ft.
 Spacing: 125 Ft.
 Configuration: Staggered
 Mounting Height: 40 Ft.
 Arm Extension Length: 8 Ft.
 Luminaire: Type 3 - 106W LED

The accepted design for Euclid Ave, from the north edge of Wynoka Street to north of Eighth Street, will provide 0.9 and greater average maintained foot-candles and a uniformity ratio (average maintained to minimum maintained foot-candles) of 3:1 and 5:1 (maximum to minimum maintained foot candles):

L21-L47, S11, S13, S15, S17
 Setback: 3.0 Ft.
 Lamp Loss Factor (LLF): 0.8
 Width of Lighted Area: 48-60 Ft.
 Spacing: 135 Ft.
 Configuration: Staggered
 Mounting Height: 40 Ft.
 Arm Extension Length: 8 Ft.
 Luminaire: Type 3 - 106W LED

L48-L49
 Setback: 3.0 Ft.
 Lamp Loss Factor (LLF): 0.8
 Width of Lighted Area: 48 Ft.
 Spacing: 175 Ft.
 Configuration: Median
 Mounting Height: 40 Ft.
 Arm Extension Length: twin 8 Ft.
 Luminaire: Type 3 - 106W LED

The accepted design for Elizabeth Street, Grand Ave to Euclid Ave, will provide 0.9 and greater average maintained foot-candles and a uniformity ratio (average maintained to minimum maintained foot-candles) of 3:1 and 5:1 (maximum to minimum maintained foot candles):

EZL1, EZL2
 Setback: 3.0 Ft.
 Lamp Loss Factor (LLF): 0.8
 Width of Lighted Area: 26-33 Ft.
 Spacing: 155 Ft.
 Configuration: Staggered
 Mounting Height: 40 Ft.
 Arm Extension Length: 8 Ft.
 Luminaire: Type 3 - 106W LED

ROADWAY LUMINAIRES

Luminaires will meet the DOT specifications and the specifications listed below. Approved equals are allowed for these luminaires.

- Type 3 - 106W LED
 - o Leotek GC2-96G-MV-NW-3R-GY-350-FFA or approved equal
 - o Voltage will be universal 120-277V
 - o Distribution will be Type 3
 - o Absolute Lumens will be 14,853
 - o Will have a BUG rating of B3-U0-G3
 - o CCT will be 4000K
 - o Color will be gray
 - o 20kV/10kA SPD Surge Protection will be provided
 - o A Terminal Block will be provided
 - o A 7 pin photocontrol receptacle will be provided
 - o A Long Life Photocontrol receptacle will be provided
 - o Bird guards will be provided on the mounting hole of the LED fixture



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SIGNAL POLES

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.

SIGNAL HEADS

All new vehicle signal heads will have a 0.160" wall / housing thickness throughout the signal head and will be constructed of 10% fiberglass reinforced polycarbonate.

SIGNAL HEAD BRACKETS

All new vehicle signal head brackets will be Astro-Brac Galaxy Assy, 1-Way Cable Mount as manufactured Pelco or approved equal.

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 the appropriate type and size of signal head.

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.

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 proposed traffic signal controllers and cabinets will meet the following requirements. For further information, contact Nick Waters (#605-773-7439) of the City.

The traffic signal controller cabinets will be Econolite or approved equal.

The controller will be Cobalt as manufactured by Econolite or approved equal. The controller will have a 7" touch screen. The controller will be compatible with the existing controllers installed within the City of Pierre, SD. The controller will be fully functional with the City's Traffic Management Licensed Software, Centracs LE ATMS.

The UPS system will be tested to comply with UL 1778, CSA 22.2 No. 107.3 and must bear the UL CSA mark. The UPS inverter/charger unit will include a 4.3" backlit LCD Touchscreen display for viewing all status and configuration information. The UPS will have pre-configured performance logs that run continuously and automatically, viewable on a web browser. There will be separate charts for Seconds, Minutes, Hours, and Days that shows the Average, Minimum, and Maximum values for each sample. A daily log that has the Average, Minimum, and Maximum values will be logged and be downloadable as a csv file by web browser.

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

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".

CONTROLLER PROGRAMMING

Existing controllers will be reprogrammed to use the patterns and timings specified on the Signal Timing Sheets by a qualified technician. Costs for reprogramming the controllers will be incidental to the contract lump sum price for "Miscellaneous, Electrical".

BATTERY BACKUP CABINET

The Contractor will supply cabinets with concrete pad and footing for housing the battery backup system for traffic signal systems at all locations where a new signal cabinet is being installed. 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."

EMERGENCY VEHICLE PREEMPTION SYSTEM

The proposed emergency vehicle preemption system will be infrared Opticom brand manufactured by Global Traffic Technologies or approved equal. The emergency vehicle preemption system will be compatible with the existing emergency vehicle preemption systems and hardware installed throughout the City of Pierre, SD. Contact Nick Waters (#605-773-7439) of the City for further information.

FISHEYE VIDEO CAMERA DETECTION SYSTEM

The Fisheye Video Camera, Processor Unit, and Cables will be furnished and installed by the Contractor to meet the specifications discussed below.

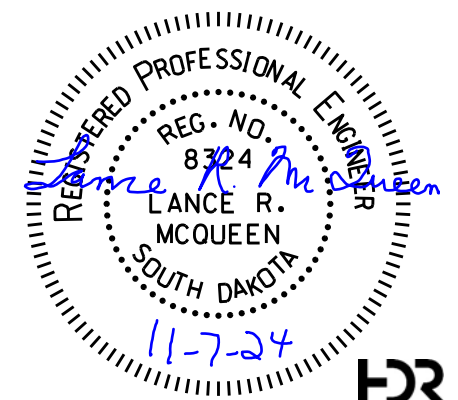
All costs to furnish and install the complete Fisheye Video Camera Detection System will be included in the contract unit price per each for "Video Detection System". These costs will include, but not be limited to:

- fisheye camera, mounting brackets, and hardware
- processor unit, cabling between processor and controller, Shielded CAT-5e cable, and antenna
- all equipment required in the controller cabinet to provide a fully functioning fisheye video vehicle detection system

The Fisheye Video Camera Detection Systems will also be furnished and installed with a module capable of traffic counting and enhanced pedestrian and cyclist detection, as well as functionality for generating reports for traffic counts, length-based classifications, turning movements, red and green occupancy, and cycle lengths. The module will be incidental to the contract unit price per each for "Video Detection System". Any perpetual subscription / license required to allow for the module to work on an annual basis will be included in the contract unit price per each for "Video Detection System".

The Shielded CAT-5e cable for the Fisheye Camera will be installed from the controller cabinet to the camera unit without splices. The Contractor will use only shielded cable approved by the camera manufacturer to protect against Electromagnetic Interference (EMI). Cable will be rated for outdoor use and installed according to the manufacturer's recommendations. All costs for the Shielded CAT-5e cable will be incidental to the contract unit price per each for "Video Detection System".

The Contractor will coordinate with the City prior to determining the final video camera mounting location. Contact Nick Waters (#605-773-7439) of the City.



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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.

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.

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.

INNERDUCT

The innerduct conduit will be red in color. The innerduct bid items will include furnishing and installing the innerduct, as well as all work to seal the traffic interconnect conduit within the junction boxes. Innerduct ends will be sealed using a mastic style tape wrapped around the end of the innerduct and fiber optic cable. If innerduct is empty, a heat shrinkable cap will be installed over the end of the innerduct.

All costs for the innerduct will be included in the contract unit price per foot for "2" Innerduct, Schedule 40".

FIBER OPTIC CABLE

The fiber optic cable will be a 24 strand fiber optic cable with 24 singlemode with each buffer containing six 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.

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

- Cladding diameter of 125µm +/- 2µm.
- 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.

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.

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 6.5 feet 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 coiled and tied in a minimum of three places around the coil. No splices will be allowed in the fiber optic cable except in the controllers. Splices will be of the epoxy/polish 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".

FIBER OPTIC CABLE MODEM

New controller cabinets will be equipped with a fiber optic modem.

All costs for furnishing and installing fiber optic modems in new and existing controllers will be incidental to the contract unit price per each for "Traffic Signal Controller".

FIBER OPTIC ETHERNET SWITCH

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

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".

FIBER OPTIC PATCH CORDS

Patch cords used within the controller cabinets for the fiber optic work will be factory-manufactured assemblies and will be fully compatible with the fiber interconnect cable.

The patch cords and pigtails will be equipped with connectors and will be 6' in length or as required. The length will be sized to preclude possible damage in the installation and of moving of equipment.

All costs, materials and labor to furnish and install the patch cords will be incidental to the contract unit price per each for "Traffic Signal Controller".

FIBER OPTIC CABLE TERMINATION ENCLOSURES

Fiber optic cable termination enclosures will be furnished and installed by the Contractor.

Fiber optic cable will be terminated in a wall mounted termination enclosure. The termination enclosure will be dust and moisture resistant. The size of the termination enclosure will be adequate for the number of fibers to be used. The termination enclosure will be mounted in side mounted cabinets, as shown on the fiber cable wiring diagrams. Termination enclosures will be Corning WIC-04P, Panduit FWME4 or approved equal. LC type connectors will be used for the fiber strand terminations.

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

All costs for the fiber optic cable termination enclosures, fiber optic cable terminations, patch cords, related equipment and testing will be incidental to the contract unit price per each for "Traffic Signal Controller".



STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0014(185)229	L6	L78

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OVER-HEIGHT DETECTION SYSTEM

The over-height detection system will consist of a transmitter, receiver and all necessary cable for power and signal transmission to the wireless interconnect system. See the Over-Height Detection System plan sheet for more information.

The over-height detector system will be capable of detecting over height vehicles in any of the traffic lanes.

The transmitter and receiver of the over height detector system will be constructed of a non-corrosive material and be resistant to prevalent weather conditions and vandal damage.

The over-height detector system will be capable of operation under the following conditions:

- Night or Day
- Direct sunlight
- Ambient temperature range -40° F to +135° F.
- Vehicles traveling in a full range of speeds from 3mph to 75mph.
- All types of weather conditions including adverse weather conditions such as rain, snow or fog.

The Contractor will install the transmitter and receiver on the proposed signal poles discussed on the Over-Height Detection System sheet. The transmitter and receiver will be mounted to detect vehicles higher than the existing railroad bridge structure over Pierre Street. The transmitter and receiver will communicate with the cabinet via hard wire cables. If a wireless system is to be used, it will need to be approved by the Engineer.

All costs to install the over height vehicle detection system and all other appurtenances to be installed for the system to fully function will be included in the contract unit price per each intersection for "Over-Height Detector System".

SOLAR POWERED FLASHING BEACON

Solar powered flashing beacons will consist of a flashing LED indication, solar panel, batteries, radio communication, flasher unit, sign, post, and mounting hardware. See the Over-Height Detection System plan sheet for more information.

The solar powered flashing beacon radio system will be capable of communicating via ISM 902-928 MHz spread spectrum radio with a transmission range of 900 ft. and 16 possible addresses.

The solar powered flashing beacon system will operate at temperatures of -40° F to +165° F.

The flashing LED's will have dimming capabilities.

The post to support the sign and equipment will be designed by the Contractor.

All costs to install the solar powered flashing beacon, signs, post and all other appurtenances to be installed for the system to fully function will be included in the contract unit price per each for "Solar Powered Flashing Beacon".

- The R12-2 signs to be installed with the beacons will be incidental to this bid item. These signs will follow the requirements discussed in Section S.
- The flashing LED's will be arrayed along the perimeter of the R12-2 signs, per the manufacturer's recommendations.

SIGNAL FLASHER UNIT

The signal flasher unit will consist of the following:

- The proposed large cabinet and equipment within the cabinet (with concrete footing) to be installed at the southwest side of the existing railroad bridge structure on Pierre Street.
- The proposed small cabinet and equipment within the cabinet to be installed on the existing post of the existing detour / flashing beacon side at the south side of the Pleasant Drive and Euclid Ave intersection.
- See the Over-Height Detection System plan sheet for more information.

One of the flasher units in the flasher cabinet will be for the amber flashing beacons on the north side of the railroad bridge structure and will flash at all times. The second flasher unit will be for the amber flashing beacons on the south side of the railroad bridge structure.

The Contractor will connect the cables for power and the amber flashing beacons on the structure to the new flasher units.

All costs for the cabinet (with concrete footing), two flasher units, connecting to the existing cables, and all other appurtenances to be installed within the cabinet for the system to fully function will be included in the contract unit price per each for "Signal Flasher Unit".

MISCELLANEOUS SIGNAL PARTS

The Contractor will replace the existing circular amber beacons on the north side (2 Each) and south side (2 Each) of the existing railroad structure over Pierre Street, and the existing circular amber beacons (2 Each) on the existing sign at the south side of the Pleasant Drive and Euclid Avenue intersection, with the proposed circular amber beacons discussed on the Over-Height Detection System plan sheet. The quantity of circular amber beacons being replaced are 6 Each.

All costs to replace the existing circular amber beacons with the proposed circular amber beacons will be included in the contract lump sum price for "Miscellaneous Signal Parts". The bid item "Miscellaneous Signal Parts" will also include the traffic counters discussed in the note shown below on this sheet.

WIRELESS INTERCONNECT SYSTEM

The over-height detector system will communicate with the flashing beacons and solar powered beacons by the wireless interconnect system. See the Over-Height Detection System plan sheet for more information.

The Contractor will install the Wireless Interconnect System per the manufacturer's recommendations.

All costs to fully install the wireless interconnect system (including antennas, cables, interconnect units, etc.) will be included in the contract unit price per each for "Wireless Interconnect System".

TRAFFIC COUNTER LOOPS AND SURFACE UTILITY BOX AND COUNTERS

The traffic counter loops will be installed at 4 locations 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 4 locations 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".

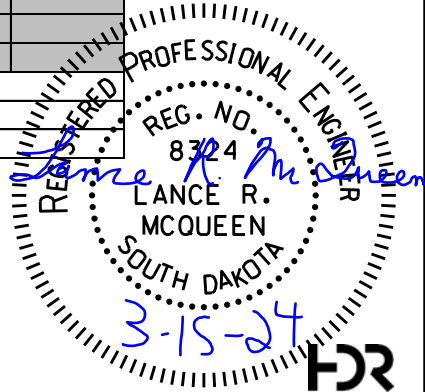
The Contractor will furnish four traffic counters. The counters will be delivered to the SDDOT engineer. The traffic counters will be Metro Count Model 5805 counters. All costs to furnish and deliver the traffic counters will be included in the contract lump sum price for "Miscellaneous Signal Parts".



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TABLE FOR CONDUIT & CABLE QUANTITIES																								
Location to Location		Conduit					Innerduct	Cable ¹																
		Sch 40		Sch 80			Sch 40	2/2/4	1C #4	1C #6	1C #10	2/C #14	4/C #14	5/C #14	7/C #14	12/C #14	19/C #14	24/C #14	Pole & Bracket	PC (EVP & 3c)	24 Strand Fiber Cable	CAT5 ² (video)	Conduit ³ Boring	
		2"	4"	2"	3"	4"	2"	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)
LIGHTING																								
Pierre Street, Sioux Ave to Pleasant Drive																								
EJS3	S1		10																					
EJS3	L2	95																						
L2	L4	170		80																				
L4	JL1	30																						
JL1	L6	145																						
L1	L3	215																						
L3	JL2	100		60																				
JL2	M1	60																						
M1	Transformer			20																				
JL2	JL1			140																				
JL2	L5	80																						
L5	JL4	50		40																				
Pleasant Drive, Pierre Street to Euclid Ave																								
JL3A	PLL1	55																						
PLL1	PLL2			70																				
L6	JL3			90																				
JL3	L7	50		40																				
L7	JL5	90		40																				
JL4	L8	45		160																				
L8	JL5C			115																				
L8	JL5A			80																				
JL5A	JL5B	115																						
JL5A	L9	55																						
Euclid Ave, Pleasant Drive to Capitol Ave																								
JL5	L10	150																						
L10	JL10	85		205																				
L9	L11	120		105																				
L11	JL6	65																						
Capitol Ave intersection																								
Transformer	JL13			30																				
JL13	JL11			65																				
JL11	JL8			110																				
JL8	M2			25																				
M2	JL9	20																						
JL9	S3			75																				
JL9	JL10	60																						
JL10	JL12			65																				
JL12	S5	30																						
JL12	JL6			120																				

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2 - Incidental to conduit bid items.
3 - Incidental to "Video Detection System" bid item.

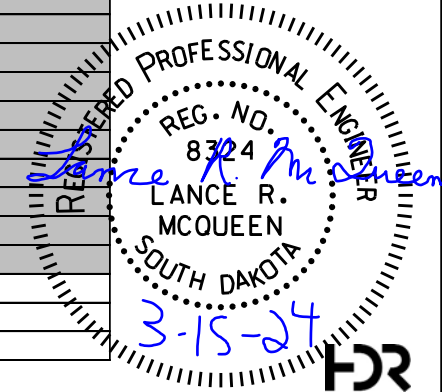


Plotting Date: 3/12/2024

TABLE FOR CONDUIT & CABLE QUANTITIES

Location to Location		Conduit					Innerduct	Cable ¹															
		Sch 40		Sch 80			Sch 40	2/2/4	1C #4	1C #6	1C #10	2/C #14	4/C #14	5/C #14	7/C #14	12/C #14	19/C #14	24/C #14	Pole & Bracket	PC (EVP & 3c)	24 Strand Fiber Cable	CAT5 ² (video)	Conduit ³ Boring
		2"	4"	2"	3"	4"	2"																
(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	
Euclid Ave, Capitol Ave to Broadway Ave																							
JL10	L13	165					175											55					
L13	L15	130		120			260											55					
L15	L17	200		60			270											55					
L17	JL14	70		35			115																
JL12	L12			55			65											55					
L12	L14	185		50			245											55					
L14	L16	180		70			260											55					
L16	JL18	80		145			230																
Broadway Ave intersection																							
Transformer	JL17			70				240															
JL17	M3			20				120															
M3	JL16	20					30																
JL16	S9	30					40											55					
JL16	JL18			125			135																
JL16	JL15			100			105																
JL15	JL14			85			90																
JL14	S7	10					25											55					
Euclid Ave, Broadway Ave to Elizabeth Street																							
JL15	L19	155		40			205											55					
L19	L21	205		60			280											55					
L21	L23	220		30			260											55					
L23	L25	205		60			275											55					
L25	L27	240		35			290											55					
L27	L29	200		75			290											55					
L29	JL20	105					110																
JL16	L18	75					85											55					
L18	L20	255					265											55					
L20	L22	195		95			300											55					
L22	L24	240		25			275											55					
L24	L26	160		85			255											55					
L26	L28	130		150			290											55					
L28	JL23	230		30			265																
Elizabeth Street intersection																							
Transformer	JL36			15				120															
JL36	JL19			245				765															
JL19	M4			15				120															
M4	JL20	15					30																
JL20	EZL2	100		60			170											55					
EZL2	JL35	100		70			175																
JL35	EZL1			60			75											55					
JL20	S11	30					40											55					
JL20	JL21			120			125																
JL20	JL23			75			80																
JL23	JL22			110			120																
JL22	S13	20					30											55					

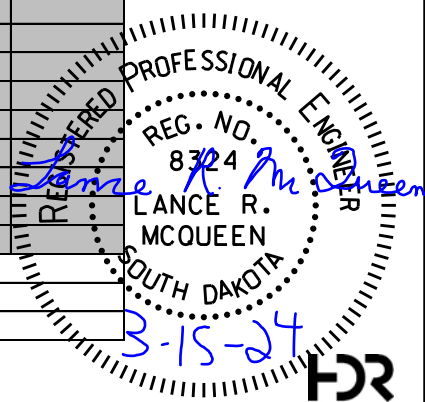
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Plotting Date: 3/12/2024

TABLE FOR CONDUIT & CABLE QUANTITIES																							
Location to Location		Conduit					Innerduct	Cable ¹															
		Sch 40		Sch 80			Sch 40	2/2/4	1C #4	1C #6	1C #10	2/C #14	4/C #14	5/C #14	7/C #14	12/C #14	19/C #14	24/C #14	Pole & Bracket	PC (EVP & 3c)	24 Strand Fiber Cable	CAT5 ² (video)	Conduit ³ Boring
		2"	4"	2"	3"	4"	2"	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)
Euclid Ave, Elizabeth Street to Fourth Street																							
JL21	L31	225		85			325											55					
L31	L33	265		25			300											55					
L33	L35	225		105			340											55					
L35	JL24	225		125			355																
JL22	L30	110		45			165											55					
L30	L32	120		175			305											55					
L32	L34	230		65			305											55					
L34	L36	250		90			355											55					
L36	JL29	120		40			170																
Fourth Street intersection																							
Transformer	JL25			20				120														20	
JL25	JL27			210				660														25	
JL27	M5			20				120															
M5	JL26	25					40																
JL26	JL24			115			120																
JL24	S15	20					30											55					
JL26	JL28			100			105																
JL28	S17	15					25											55					
JL28	JL29			120			125																
Euclid Ave, Fourth Street to Sixth Street																							
JL27	L37	105		30			145											55					
L37	L39	160		110			280											55					
L39	JL30	195					200																
JL28	L38	155		85			250											55					
L38	L40	200		70			280											55					
L40	JL31	65					70																
Euclid Ave, Sixth Street to north end																							
Transformer	JL32			20				120															
JL32	M6			160				540															
M6	JL31	35					50																
JL31	JL30			70			75																
JL30	L41			95			105											55					
L41	L44	390		60			460											55					
L44	L45	135					145											55					
L45	JL33	325		150			490																
JL31	L42	145		95			250											55					
L42	L43	130					140											55					
L43	L46	380		45			435											55					
L46	L47	120		45			175											55					
L47	JL34	185					195																
JL34	JL33			80			85																
JL34	L48			45			60											110					
L48	L49	180					195											110					
L49	EL61	175					185																

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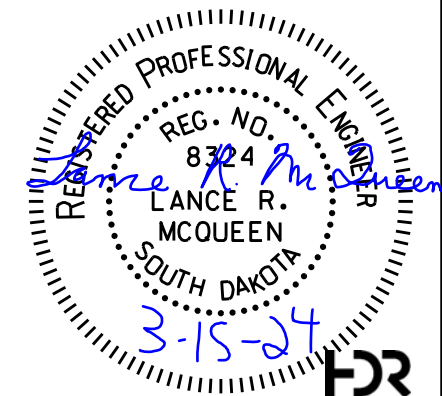
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Location to Location		TABLE FOR CONDUIT & CABLE QUANTITIES																					
		Conduit					Innerduct	Cable ¹															
		Sch 40		Sch 80			Sch 40	2/2/4	1C #4	1C #6	1C #10	2/C #14	4/C #14	5/C #14	7/C #14	12/C #14	19/C #14	24/C #14	Pole & Bracket	PC (EVP & 3c)	24 Strand Fiber Cable	CAT5 ² (video)	Conduit ³ Boring
		2" (Ft)	4" (Ft)	2" (Ft)	3" (Ft)	4" (Ft)	2" (Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)
FIBER OPTIC CABLE																							
ECC1	EJS3																					30	
EJS3	JS1				80																	350	
JS1	CC1																					30	
JS1	JF1																					450	
JF1	JF2				85																	100	
JF2	JF3																					250	
JF3	JF4				200																	650	
JF4	CC2																					50	
JF4	JF5				110																	450	
JF5	JF6				175																	700	
JF6	JF7				100																	350	
JF7	CC3																					50	
JF6	JF8				100																	500	
JF8	JF9				90																	550	
JF9	JF10				35																	300	
JF10	JF11				70																	600	
JF11	CC4																					50	
JF11	JF12				170																	450	
JF12	JF13				130																	650	
JF13	JF14				180																	700	
JF14	CC5																					60	
JF14	JF15				140																		
JF15	JF16				150																		
JF16	JF17																						
JF17	JF18				150																		

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2 - Incidental to conduit bid items.

3 - Incidental to "Video Detection System" bid item.



Plotting Date: 3/12/2024

Location to Location		Conduit					Innerduct	Cable ¹															
		Sch 40		Sch 80			Sch 40	2/2/4	1C #4	1C #6	1C #10	2/C #14	4/C #14	5/C #14	7/C #14	12/C #14	19/C #14	24/C #14	Pole & Bracket	PC (EVP & 3c)	24 Strand Fiber Cable	CAT5 ² (video)	Conduit ³ Boring
		2" (Ft)	4" (Ft)	2" (Ft)	3" (Ft)	4" (Ft)	2" (Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)
SIGNALS																							
Sioux Ave & Pierre Street intersection																							
EJS1	PB1	20																					
EJS1	PB2	10																					
EJS3	S1		10																				
EJS3	PB3	25																					
EJS3	PB4	10																					
EJS4	L1		30																				
EJS4	PB5	25																					
EJS4	PB6	15																					
EJS5	PB7	25																					
EJS5	PB8	10																					
ECC1	ES1																					260	
ECC1	PB1										170												
ECC1	PB2										180												
ECC1	S1													65	65			290					
ECC1	PB3										70												
ECC1	PB4										65												
ECC1	L1															190							
ECC1	PB5										180												
ECC1	PB6										170												
ECC1	PB7										270												
ECC1	PB8										255												
	ES1											30	15										
	S1											185	85										
	L1											30	15										
	ES4											90	70										
Railroad Structure & Pierre Street intersection																							
JL1	JS1	75										255											
JS1	CC1	15										90											

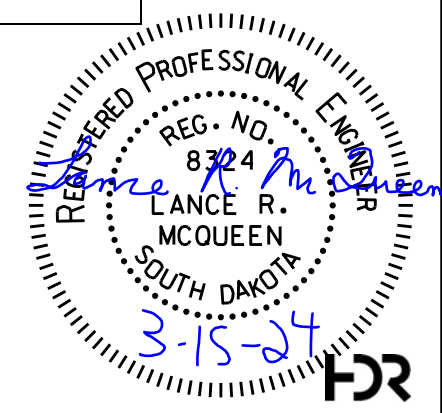
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		Conduit					Innerduct	Cable ¹															Pole & Bracket	PC (EVP & 3c)	24 Strand Fiber Cable	CAT5 ² (video)	Conduit ³ Boring
		Sch 40		Sch 80			Sch 40	2/2/4	1C #4	1C #6	1C #10	2/C #14	4/C #14	5/C #14	7/C #14	12/C #14	19/C #14	24/C #14	(Ft)	(Ft)	(Ft)	(Ft)					
2"	4"	2"	3"	4"	2"	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)				
SIGNALS																											
Capitol Ave & Euclid Ave intersection																											
M2	CC2	40																									
CC2	JS3		40																								
JS3	S4	15																									
JS3	PB11	20																									
JS3	PB12	30																									
JS3	JS2																										
JS2	S3		15																								
JS2	PB9	30																									
JS2	PB10	20																									
JS3	JS4																										
JS4	S5	15																									
JS4	PB13	25																									
JS4	PB14	15																									
JS4	JS5																										
JS5	S6		15																								
JS5	PB15	20																									
JS5	PB16	30																									
CC2	PB9																										
CC2	PB10																										
CC2	PB11																										
CC2	PB12																										
CC2	PB13																										
CC2	PB14																										
CC2	PB15																										
CC2	PB16																										
CC2	S3																										
CC2	S4																										
CC2	S5																										
CC2	S6																										
	S3																										
	S4																										
	S5																										
	S6																										

1 - All cable quantities shown include 6' of slack/coil installed in each junction box, unless shown otherwise.
2 - Incidental to conduit bid items.
3 - Incidental to "Video Detection System" bid item.



Plotting Date: 3/12/2024

Location to Location		TABLE FOR CONDUIT & CABLE QUANTITIES																									
		Conduit					Innerduct	Cable ¹															Pole & Bracket	PC (EVP & 3c)	24 Strand Fiber Cable	CAT5 ² (video)	Conduit ³ Boring
		Sch 40		Sch 80			Sch 40	2/2/4	1C #4	1C #6	1C #10	2/C #14	4/C #14	5/C #14	7/C #14	12/C #14	19/C #14	24/C #14									
2"	4"	2"	3"	4"	2"	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)					
SIGNALS																											
Broadway Ave & Euclid Ave intersection																											
M3	CC3	20																									
CC3	JS8		30																								
JS8	S9	15																									
JS8	PB21	15																									
JS8	PB22	25																									
JS8	JS9			95																							
JS9	S10	15																									
JS9	PB23	15																									
JS9	PB24	30																									
JS8	JS7			105																							
JS7	S8	15																									
JS7	PB19	15																									
JS7	PB20	25																									
JS7	JB6			70																							
JB6	S7	10																									
JB6	PB17	20																									
JB6	PB18	25																									
CC3	PB17																										
CC3	PB18																										
CC3	PB19																										
CC3	PB20																										
CC3	PB21																										
CC3	PB22																										
CC3	PB23																										
CC3	PB24																										
CC3	S7																										
CC3	S8																										
CC3	S9																										
CC3	S10																										
	S7																										
	S8																										
	S9																										
	S10																										

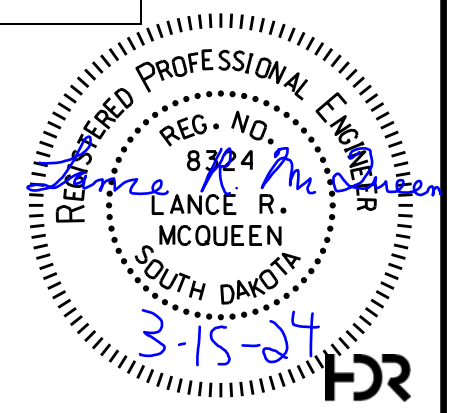
1 - All cable quantities shown include 6' of slack/coil installed in each junction box, unless shown otherwise.
 2 - Incidental to conduit bid items.
 3 - Incidental to "Video Detection System" bid item.



Plotting Date: 3/12/2024

Location to Location		Conduit					Innerduct	Cable ¹															
		Sch 40		Sch 80			Sch 40	2/2/4	1C #4	1C #6	1C #10	2/C #14	4/C #14	5/C #14	7/C #14	12/C #14	19/C #14	24/C #14	Pole & Bracket	PC (EVP & 3c)	24 Strand Fiber Cable	CAT5 ² (video)	Conduit ³ Boring
		2" (Ft)	4" (Ft)	2" (Ft)	3" (Ft)	4" (Ft)	2" (Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)
SIGNALS																							
Elizabeth Street & Euclid Ave intersection																							
M4	CC4	20							150														
CC4	JS10		50																				
JS10	S11	15																					
JS10	PB25	20																					
JS10	PB26	30																					
JS10	JS11				100																		
JS11	S12	15																					
JS11	PB27	20																					
JS11	PB28	15																					
JS10	JS13				100																		
JS13	S14	20																					
JS13	PB31	20																					
JS13	PB32	30																					
JS13	JS12				95																		
JS12	S13	15																					
JS12	PB29	20																					
JS12	PB30	35																					
CC4	PB25									65													
CC4	PB26									80													
CC4	PB27									175													
CC4	PB28									170													
CC4	PB29									275													
CC4	PB30									290													
CC4	PB31									175													
CC4	PB32									185													
CC4	S11													70			70		270			130	
CC4	S12													170			170		440				
CC4	S13													270			270		660				
CC4	S14													180			180		480				
	S11													170	70								
	S12													100	15								
	S13													160	65								
	S14													85	15								

1 - All cable quantities shown include 6' of slack/coil installed in each junction box, unless shown otherwise.
2 - Incidental to conduit bid items.
3 - Incidental to "Video Detection System" bid item.



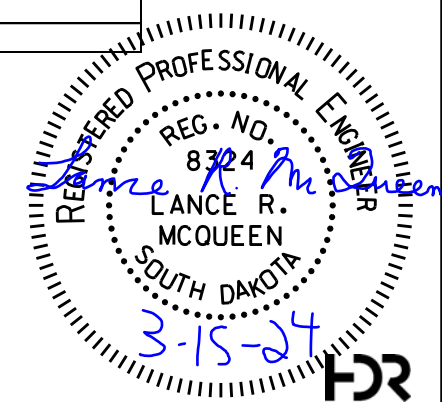
Plotting Date: 3/12/2024

TABLE FOR CONDUIT & CABLE QUANTITIES																							
Location to Location		Conduit					Innerduct	Cable ¹															
		Sch 40		Sch 80			Sch 40	2/2/4	1C #4	1C #6	1C #10	2/C #14	4/C #14	5/C #14	7/C #14	12/C #14	19/C #14	24/C #14	Pole & Bracket	PC (EVP & 3c)	24 Strand Fiber Cable	CAT5 ² (video)	Conduit ³ Boring
		2" (Ft)	4" (Ft)	2" (Ft)	3" (Ft)	4" (Ft)	2" (Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)
SIGNALS																							
Fourth Street & Euclid Ave intersection																							
M5	CC5	20							150														
CC5	JS15		70																				
JS15	S16	15																					
JS15	PB35	25																					
JS15	PB36	10																					
JS15	JS14			95																			
JS14	S15	10																					
JS14	PB33	15																					
JS14	PB34	30																					
JS15	JS16			100																			
JS16	S17	15																					
JS16	PB37	20																					
JS16	PB38	20																					
JS16	JS17			95																			
JS17	S18	10																					
JS17	PB39	30																					
JS17	PB40	25																					
CC5	PB33								175														
CC5	PB34								190														
CC5	PB35								95														
CC5	PB36								75														
CC5	PB37								190														
CC5	PB38								190														
CC5	PB39								300														
CC5	PB40								290														
CC5	S15													180			180		500		240		
CC5	S16													85			85		300				
CC5	S17													190			190		530				
CC5	S18													285			285		740				
	S15													180	75								
	S16													100	15								
	S17													190	80								
	S18													110	15								
Total:		12000	270	6625	2820	240	7095	17220	3840	1485	7210	6935	2550	900	2740	65	255	2740	3430	7840	7320	1150	45

1 - All cable quantities shown include 6' of slack/coil installed in each junction box, unless shown otherwise.

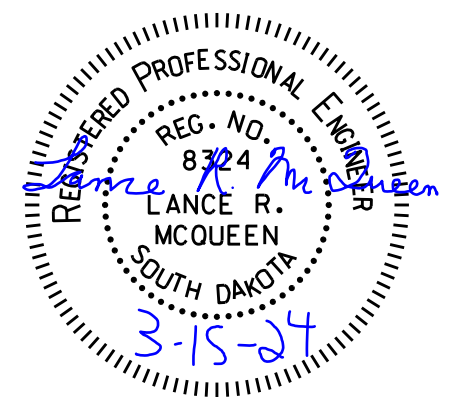
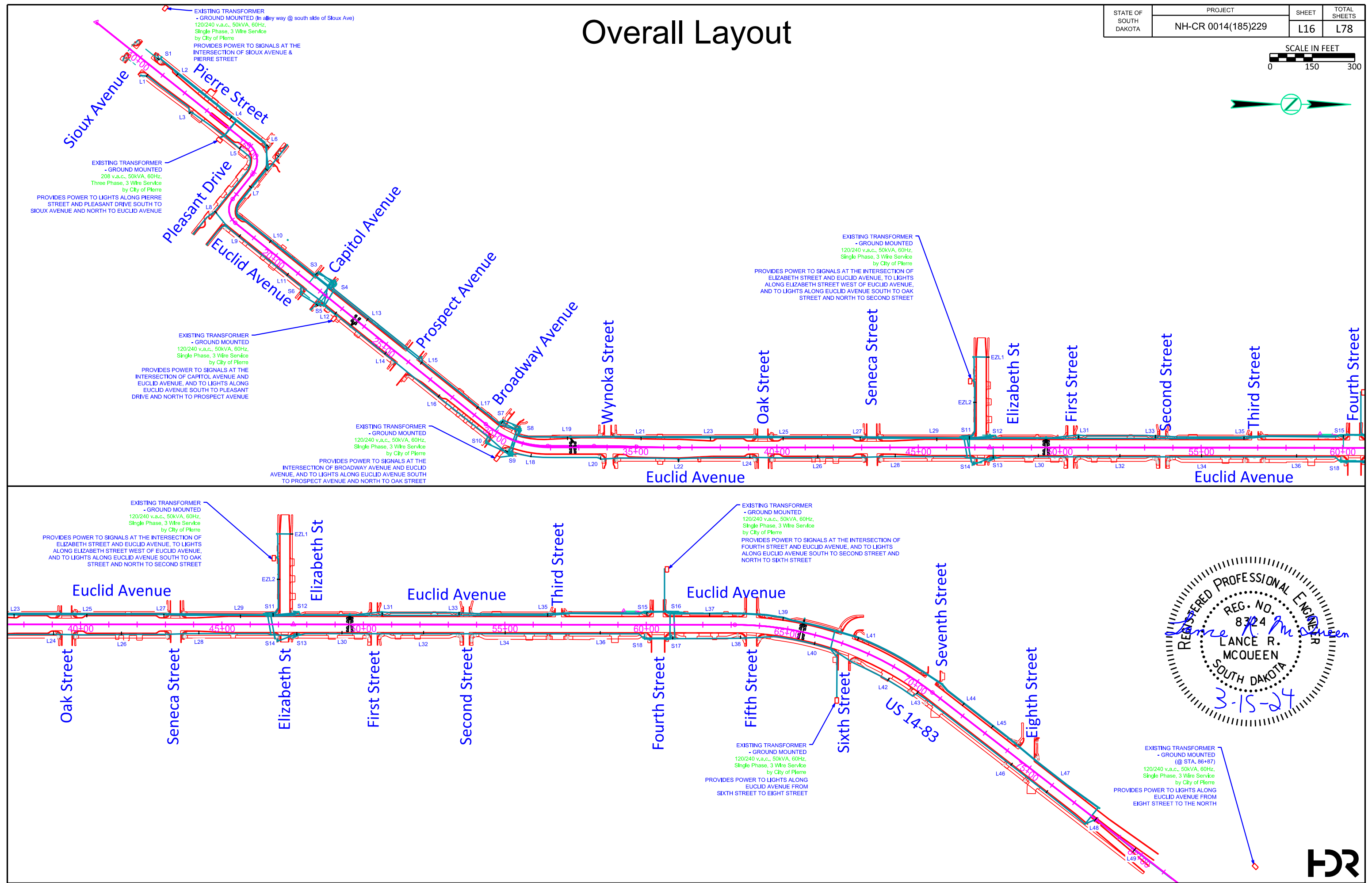
2 - Incidental to conduit bid items.

3 - Incidental to "Video Detection System" bid item.

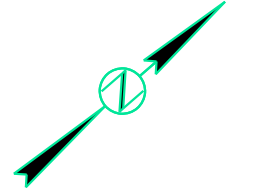


Overall Layout

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0014(185)229	L16	L78

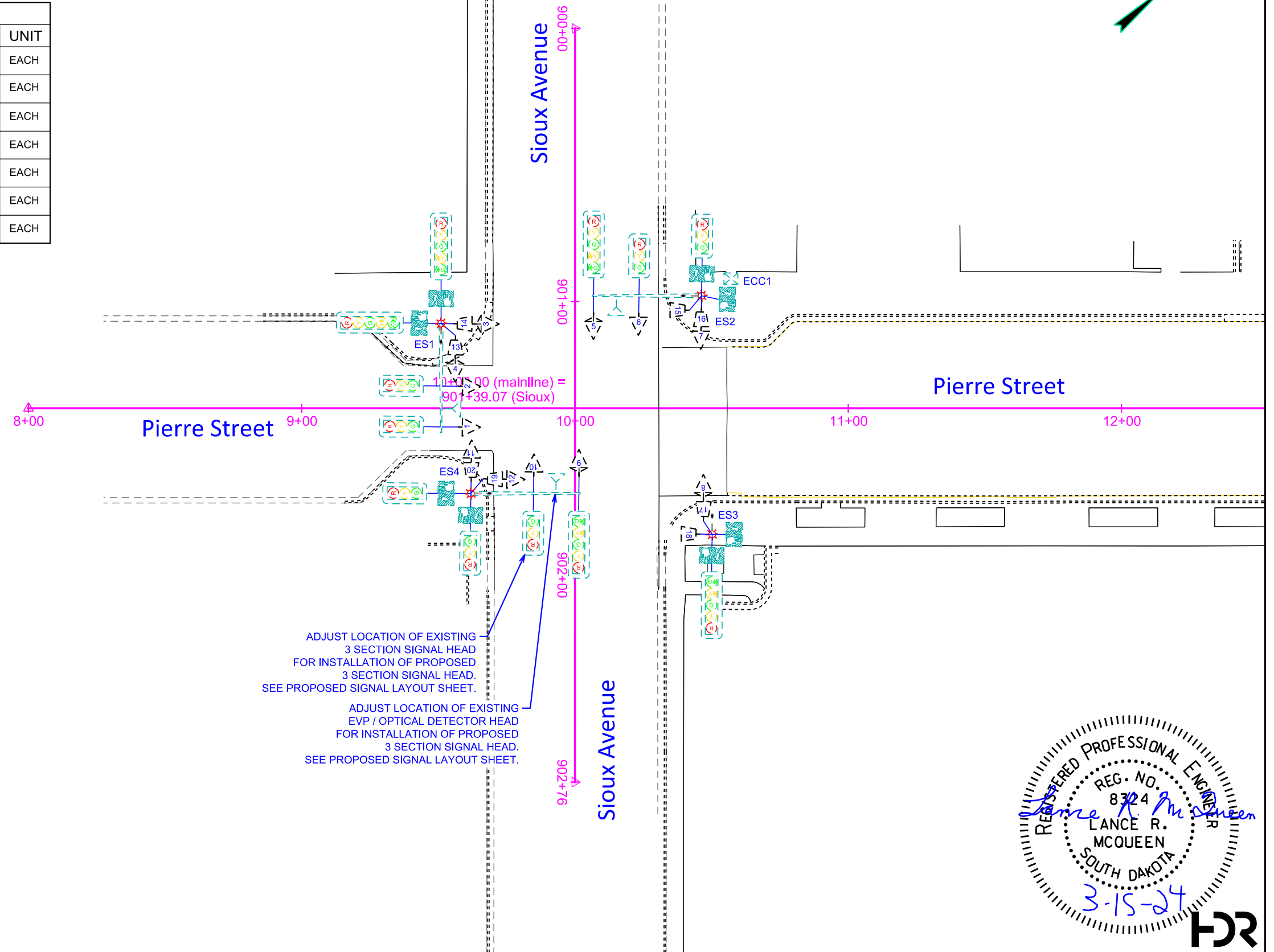


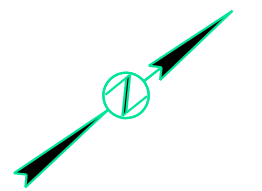
Existing Signal Layout Sioux Avenue & Pierre Street



ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
⊛	REMOVE SIGNAL POLE FOOTING (ES2, ES3)	2	EACH
	SALVAGE SIGNAL EQUIPMENT	LUMP SUM	LS

SALVAGE SIGNAL EQUIPMENT			
KEY	ITEM	QUANTITY	UNIT
⊛	SIGNAL POLE W/ MAST ARM & LUMINAIRE ARM (ES2)	1	EACH
⊛	SIGNAL POLE W/ LUMINAIRE ARM (ES3)	1	EACH
⊖	3 SECTION VEHICLE SIGNAL HEAD (6,7)	2	EACH
⊖	5 SECTION VEHICLE SIGNAL HEAD (4,5,8,9)	4	EACH
⊖	PEDESTRIAN SIGNAL HEAD WITH COUNTDOWN TIMER (13-20)	8	EACH
⊖	OPTICAL DETECTOR	1	EACH
●	ROADWAY LUMINAIRE	2	EACH

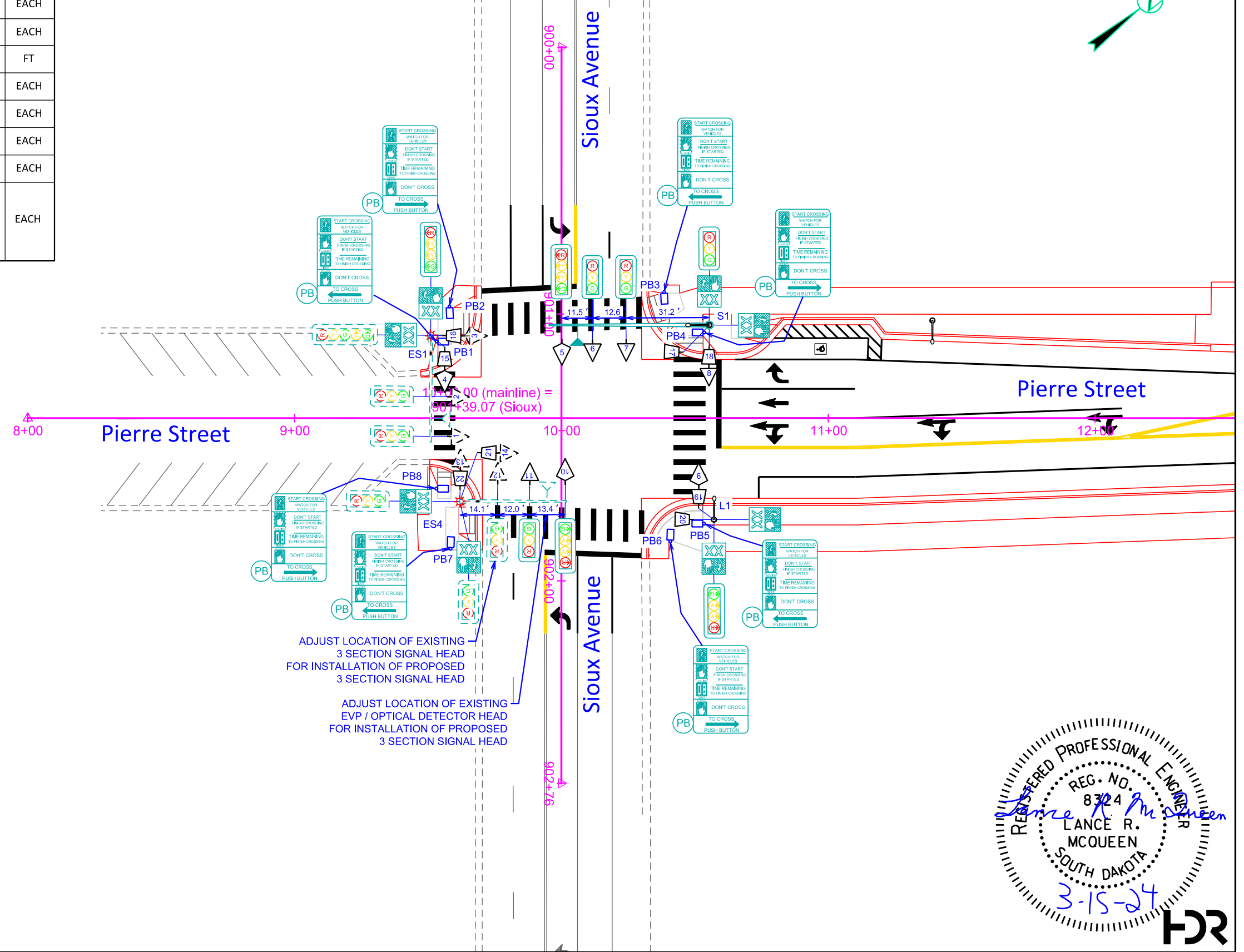




Signal Layout

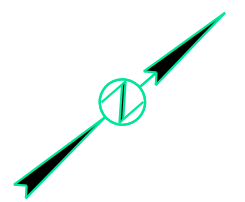
Sioux Avenue & Pierre Street

ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
	SIGNAL POLE WITH 60' MAST ARM & 8' LUMIN ARM, 50' MT HT (S1)	1	EACH
	ROADWAY LUMINAIRE, LED WITH PHOTOELECTRIC CELL (S1)	1	EACH
	3 SECTION VEHICLE SIGNAL HEAD (6,7,8,11)	4	EACH
	4 SECTION VEHICLE SIGNAL HEAD (4,5,9,10)	4	EACH
	3' DIAMETER FOOTING (S1)	14.0	FT
	OPTICAL DETECTOR	1	EACH
	ACCESSIBLE PEDESTRIAN SIGNAL	8	EACH
	PEDESTRIAN PUSH BUTTON POLE (PB1-PB8)	8	EACH
	PEDESTRIAN SIGNAL HEAD W/ COUNTDOWN TIMER (15-22)	8	EACH
	PEDESTRIAN CROSSING SIGN R10-3e (LEFT-4) (RIGHT-4)	8	EACH



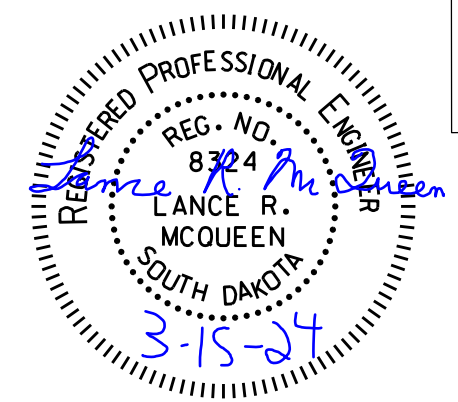
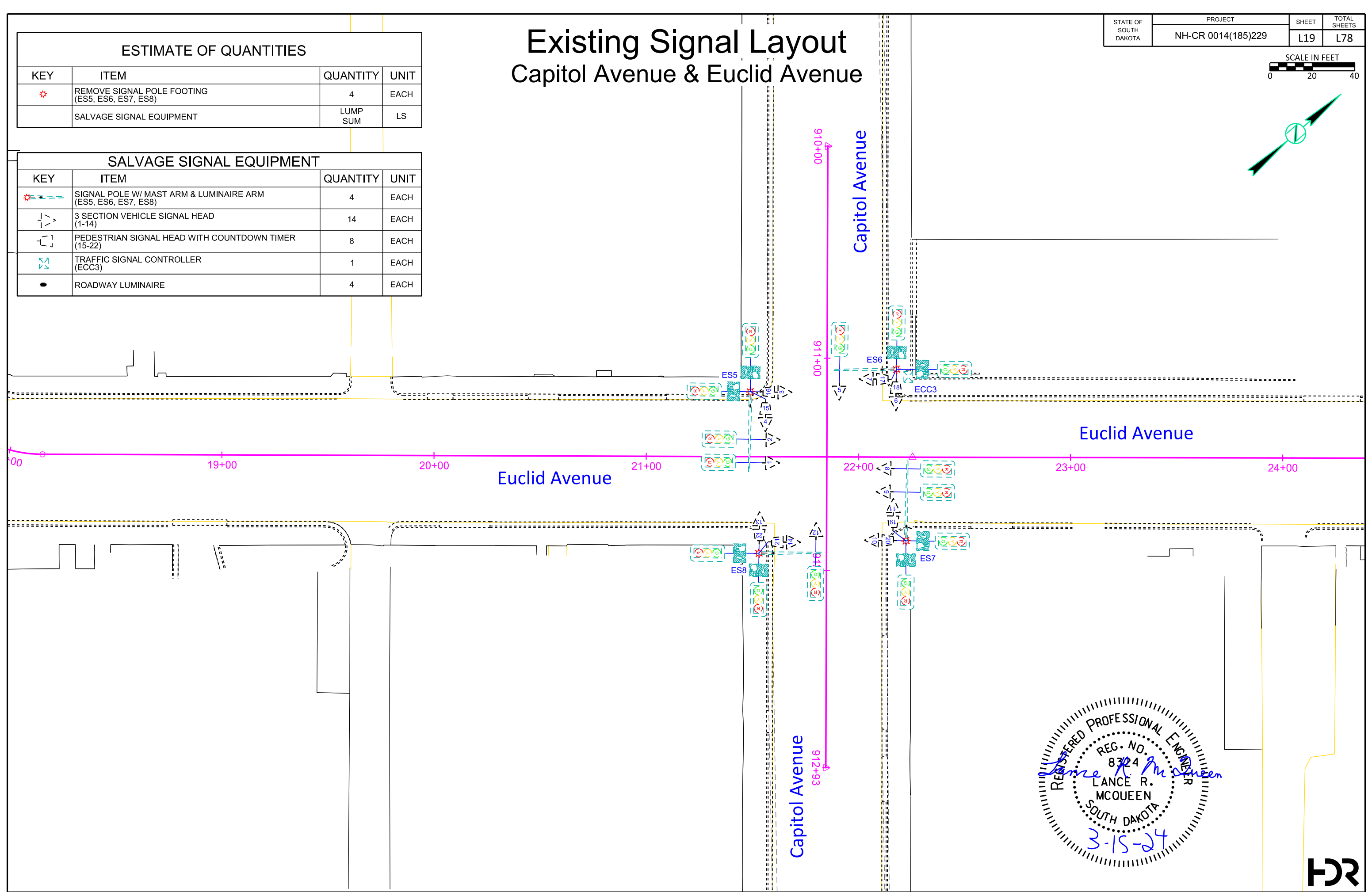
Existing Signal Layout Capitol Avenue & Euclid Avenue

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0014(185)229	SHEET L19	TOTAL SHEETS L78
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ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
⚙️	REMOVE SIGNAL POLE FOOTING (ES5, ES6, ES7, ES8)	4	EACH
	SALVAGE SIGNAL EQUIPMENT	LUMP SUM	LS

SALVAGE SIGNAL EQUIPMENT			
KEY	ITEM	QUANTITY	UNIT
⚙️	SIGNAL POLE W/ MAST ARM & LUMINAIRE ARM (ES5, ES6, ES7, ES8)	4	EACH
⏏	3 SECTION VEHICLE SIGNAL HEAD (1-14)	14	EACH
⏏	PEDESTRIAN SIGNAL HEAD WITH COUNTDOWN TIMER (15-22)	8	EACH
⚙️	TRAFFIC SIGNAL CONTROLLER (ECC3)	1	EACH
●	ROADWAY LUMINAIRE	4	EACH

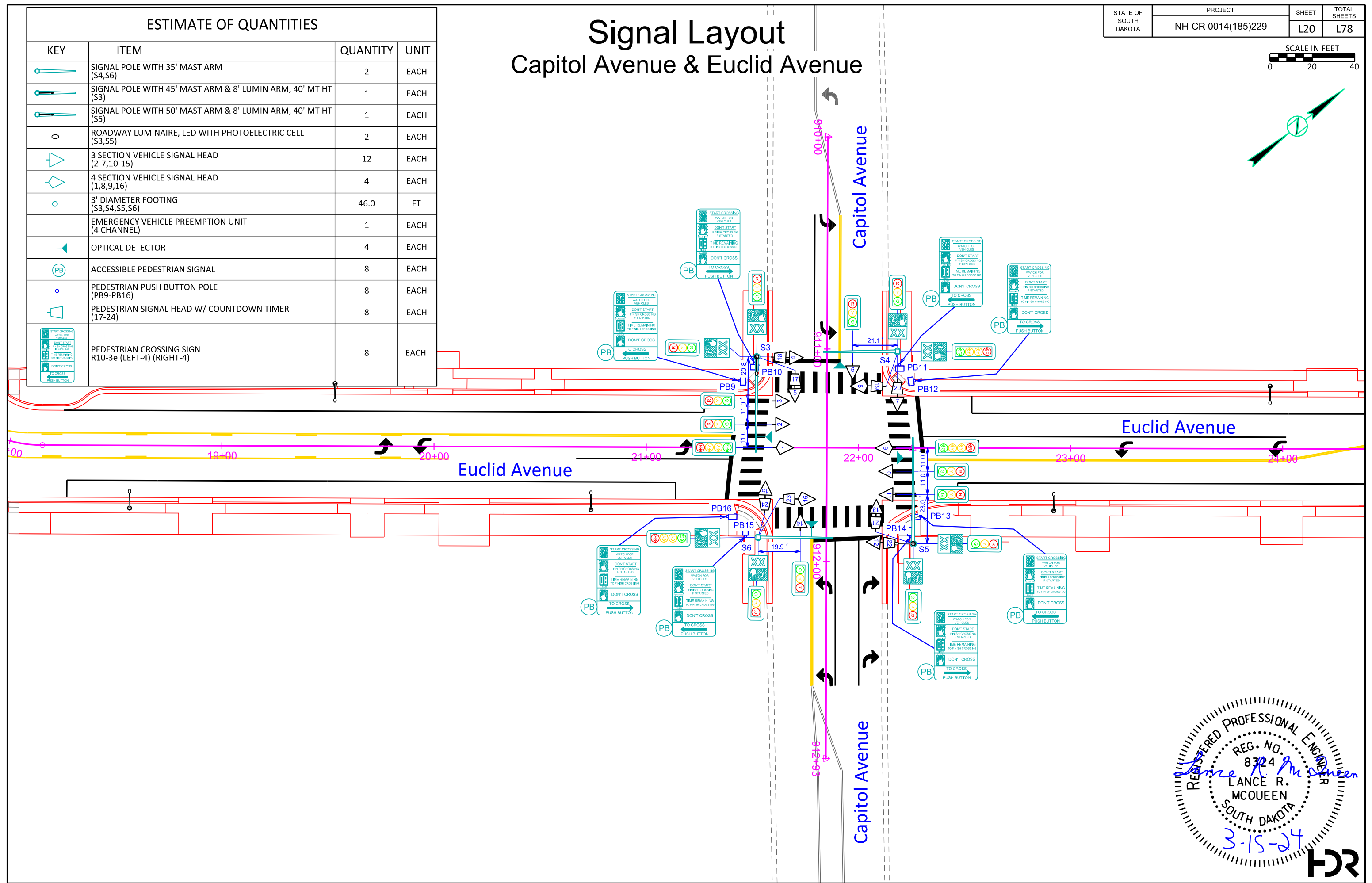
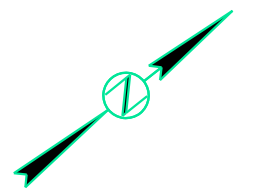


ESTIMATE OF QUANTITIES

KEY	ITEM	QUANTITY	UNIT
	SIGNAL POLE WITH 35' MAST ARM (S4,S6)	2	EACH
	SIGNAL POLE WITH 45' MAST ARM & 8' LUMIN ARM, 40' MT HT (S3)	1	EACH
	SIGNAL POLE WITH 50' MAST ARM & 8' LUMIN ARM, 40' MT HT (S5)	1	EACH
	ROADWAY LUMINAIRE, LED WITH PHOTOELECTRIC CELL (S3,S5)	2	EACH
	3 SECTION VEHICLE SIGNAL HEAD (2-7,10-15)	12	EACH
	4 SECTION VEHICLE SIGNAL HEAD (1,8,9,16)	4	EACH
	3' DIAMETER FOOTING (S3,S4,S5,S6)	46.0	FT
	EMERGENCY VEHICLE PREEMPTION UNIT (4 CHANNEL)	1	EACH
	OPTICAL DETECTOR	4	EACH
	ACCESSIBLE PEDESTRIAN SIGNAL	8	EACH
	PEDESTRIAN PUSH BUTTON POLE (PB9-PB16)	8	EACH
	PEDESTRIAN SIGNAL HEAD W/ COUNTDOWN TIMER (17-24)	8	EACH
	PEDESTRIAN CROSSING SIGN R10-3e (LEFT-4) (RIGHT-4)	8	EACH

Signal Layout

Capitol Avenue & Euclid Avenue



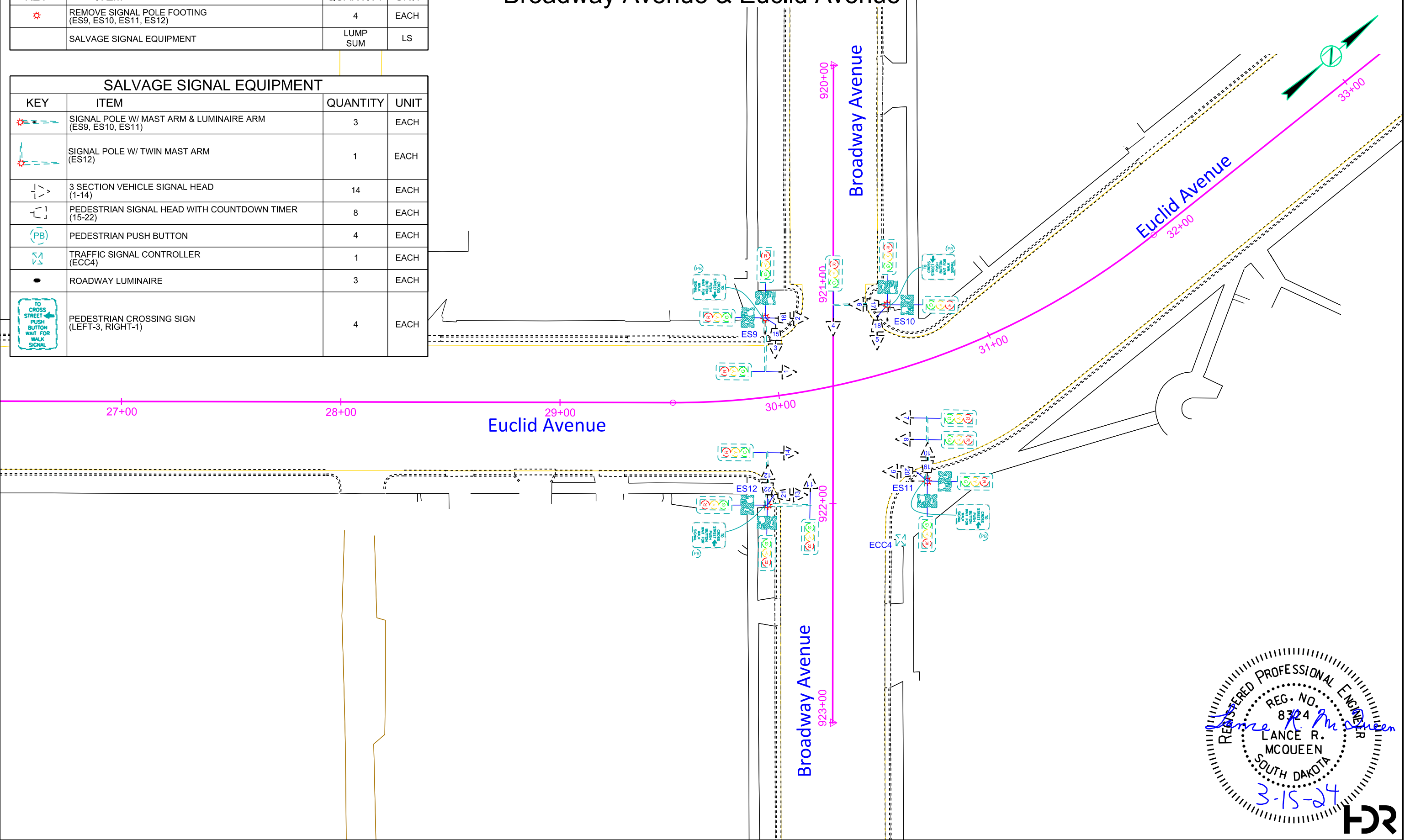
Existing Signal Layout

Broadway Avenue & Euclid Avenue



ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
	REMOVE SIGNAL POLE FOOTING (ES9, ES10, ES11, ES12)	4	EACH
	SALVAGE SIGNAL EQUIPMENT	LUMP SUM	LS

SALVAGE SIGNAL EQUIPMENT			
KEY	ITEM	QUANTITY	UNIT
	SIGNAL POLE W/ MAST ARM & LUMINAIRE ARM (ES9, ES10, ES11)	3	EACH
	SIGNAL POLE W/ TWIN MAST ARM (ES12)	1	EACH
	3 SECTION VEHICLE SIGNAL HEAD (1-14)	14	EACH
	PEDESTRIAN SIGNAL HEAD WITH COUNTDOWN TIMER (15-22)	8	EACH
	PEDESTRIAN PUSH BUTTON	4	EACH
	TRAFFIC SIGNAL CONTROLLER (ECC4)	1	EACH
	ROADWAY LUMINAIRE	3	EACH
	PEDESTRIAN CROSSING SIGN (LEFT-3, RIGHT-1)	4	EACH

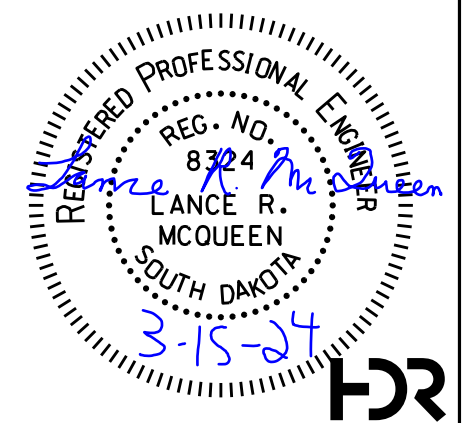
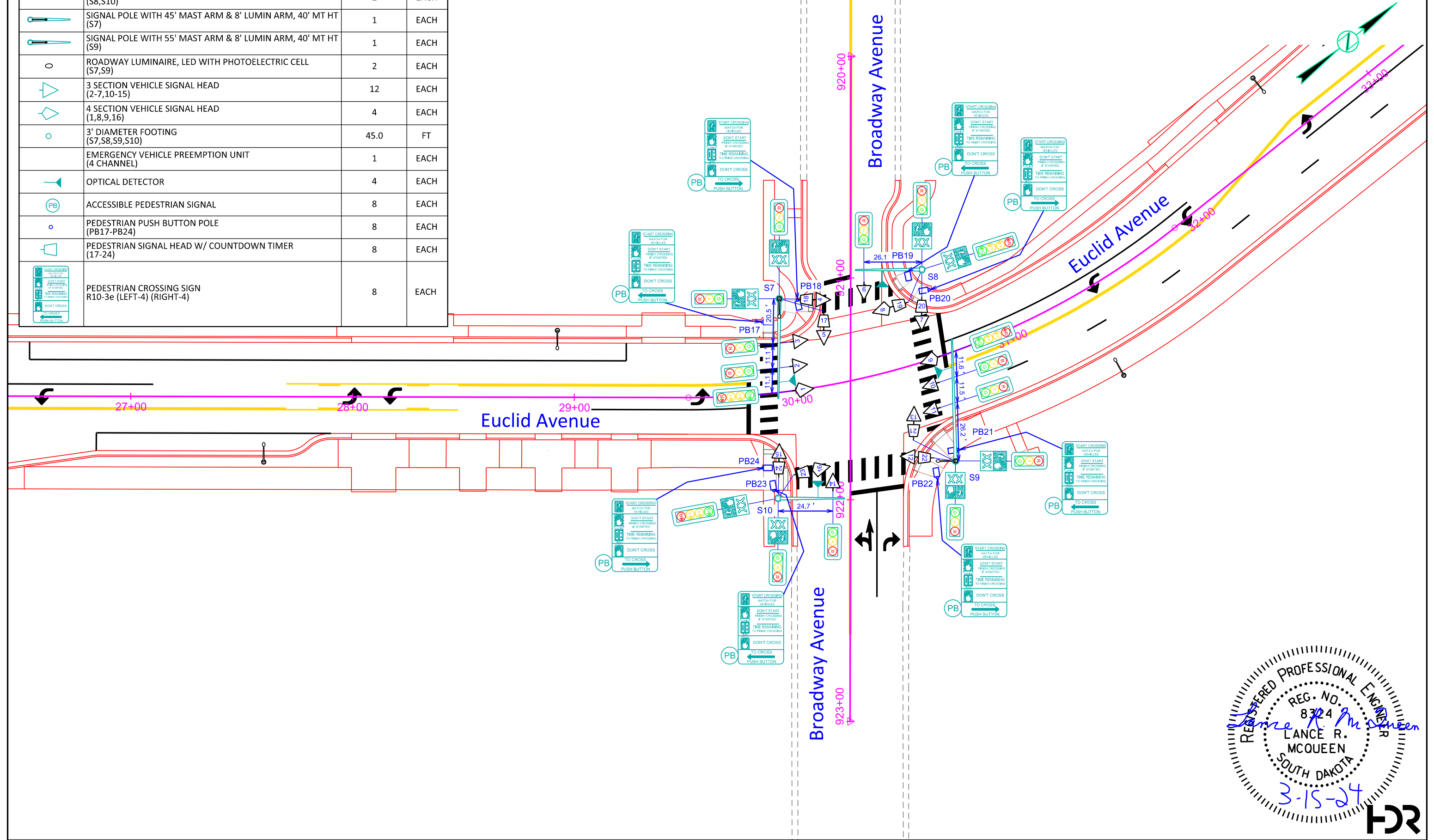


ESTIMATE OF QUANTITIES

KEY	ITEM	QUANTITY	UNIT
	SIGNAL POLE WITH 30' MAST ARM (S8,S10)	2	EACH
	SIGNAL POLE WITH 45' MAST ARM & 8' LUMIN ARM, 40' MT HT (S7)	1	EACH
	SIGNAL POLE WITH 55' MAST ARM & 8' LUMIN ARM, 40' MT HT (S9)	1	EACH
	ROADWAY LUMINAIRE, LED WITH PHOTOELECTRIC CELL (S7,S9)	2	EACH
	3 SECTION VEHICLE SIGNAL HEAD (2-7,10-15)	12	EACH
	4 SECTION VEHICLE SIGNAL HEAD (1,8,9,16)	4	EACH
	3' DIAMETER FOOTING (S7,S8,S9,S10)	45.0	FT
	EMERGENCY VEHICLE PREEMPTION UNIT (4 CHANNEL)	1	EACH
	OPTICAL DETECTOR	4	EACH
	ACCESSIBLE PEDESTRIAN SIGNAL	8	EACH
	PEDESTRIAN PUSH BUTTON POLE (PB17-PB24)	8	EACH
	PEDESTRIAN SIGNAL HEAD W/ COUNTDOWN TIMER (17-24)	8	EACH
	PEDESTRIAN CROSSING SIGN R10-3e (LEFT-4) (RIGHT-4)	8	EACH

Signal Layout

Broadway Avenue & Euclid Avenue



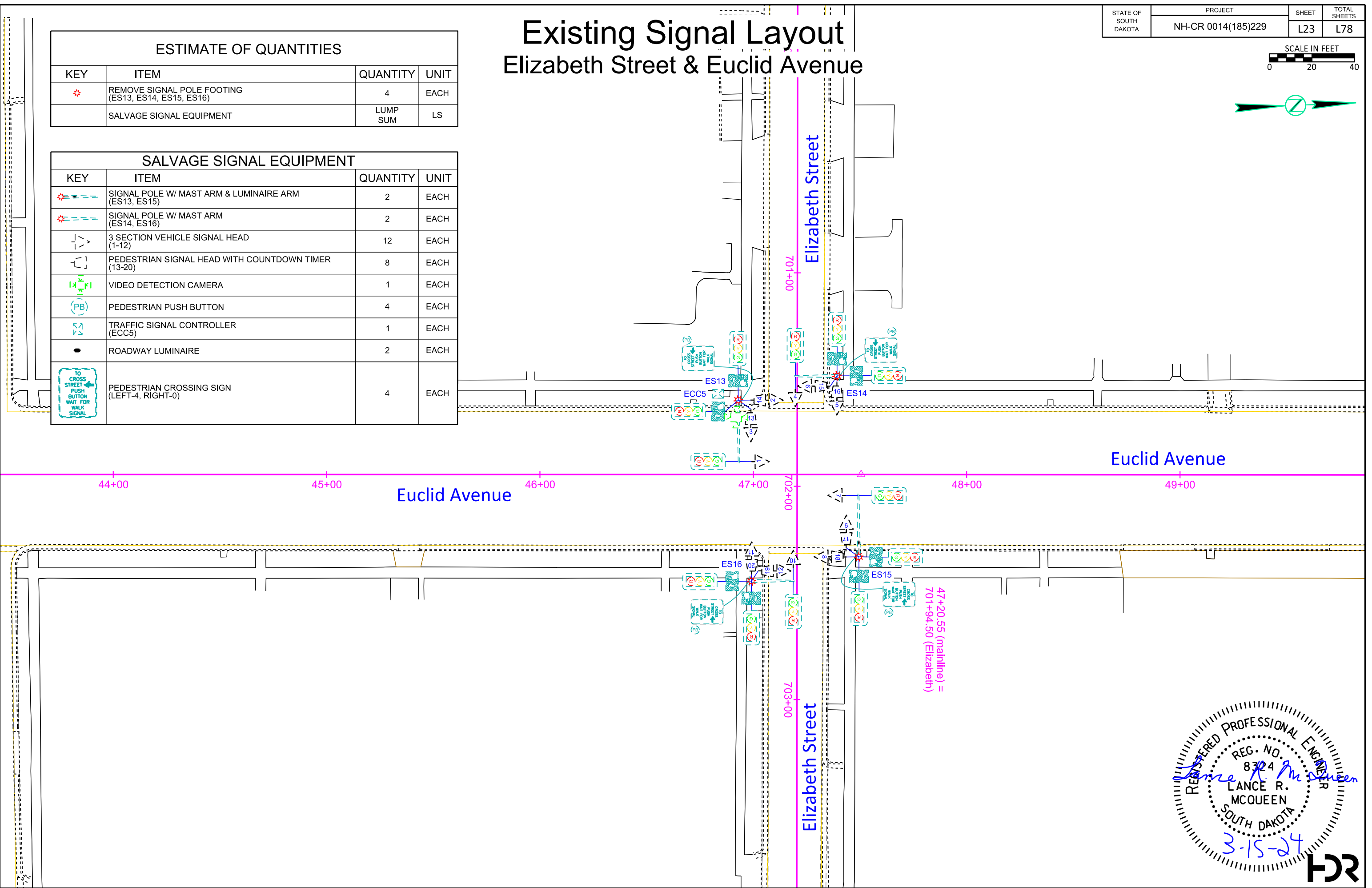


Existing Signal Layout

Elizabeth Street & Euclid Avenue

ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
*	REMOVE SIGNAL POLE FOOTING (ES13, ES14, ES15, ES16)	4	EACH
	SALVAGE SIGNAL EQUIPMENT	LUMP SUM	LS

SALVAGE SIGNAL EQUIPMENT			
KEY	ITEM	QUANTITY	UNIT
	SIGNAL POLE W/ MAST ARM & LUMINAIRE ARM (ES13, ES15)	2	EACH
	SIGNAL POLE W/ MAST ARM (ES14, ES16)	2	EACH
	3 SECTION VEHICLE SIGNAL HEAD (1-12)	12	EACH
	PEDESTRIAN SIGNAL HEAD WITH COUNTDOWN TIMER (13-20)	8	EACH
	VIDEO DETECTION CAMERA	1	EACH
	PEDESTRIAN PUSH BUTTON	4	EACH
	TRAFFIC SIGNAL CONTROLLER (ECC5)	1	EACH
	ROADWAY LUMINAIRE	2	EACH
	PEDESTRIAN CROSSING SIGN (LEFT-4, RIGHT-0)	4	EACH

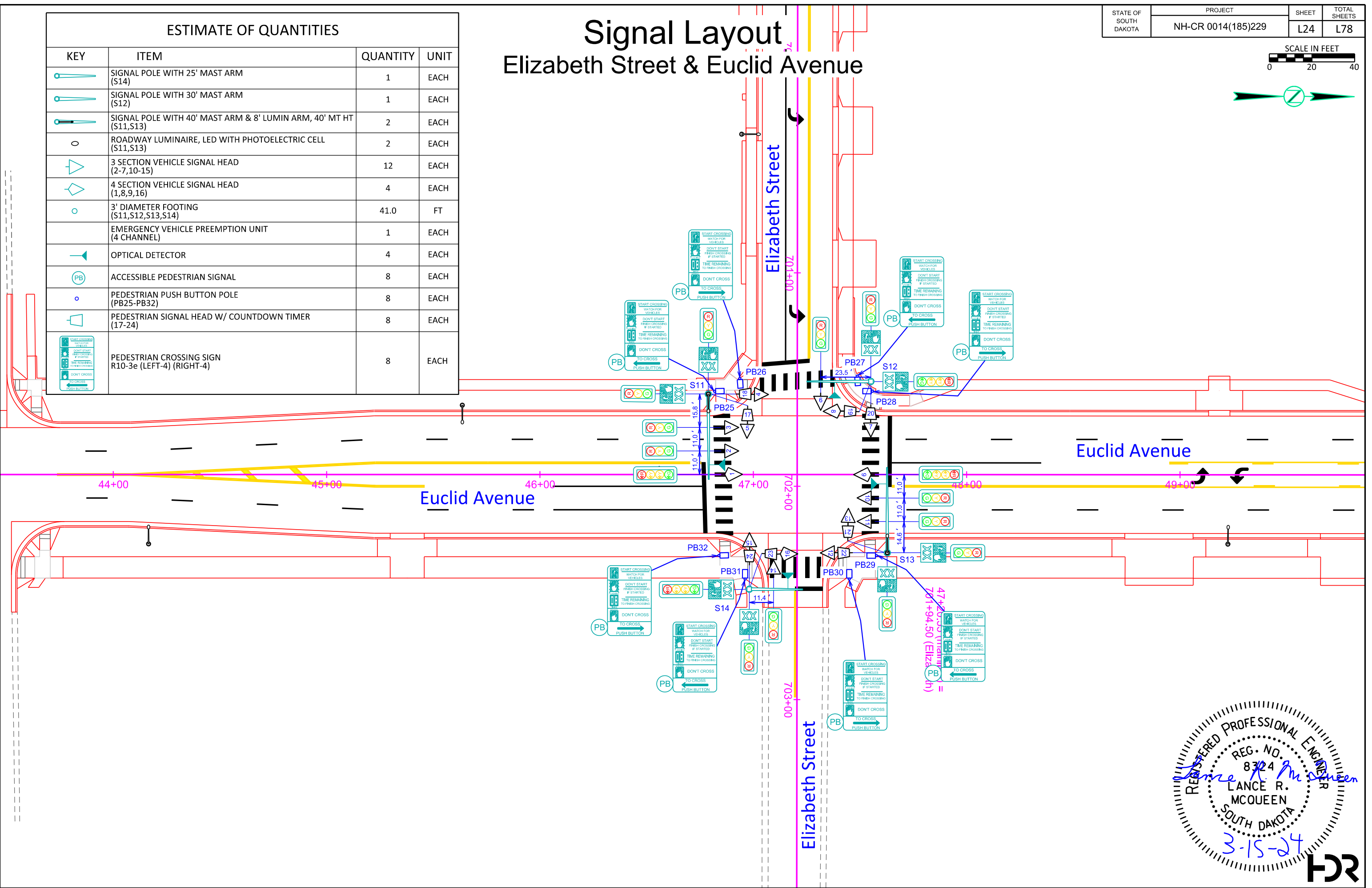


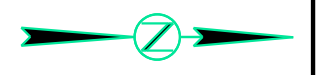


Signal Layout

Elizabeth Street & Euclid Avenue

ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
	SIGNAL POLE WITH 25' MAST ARM (S14)	1	EACH
	SIGNAL POLE WITH 30' MAST ARM (S12)	1	EACH
	SIGNAL POLE WITH 40' MAST ARM & 8' LUMIN ARM, 40' MT HT (S11,S13)	2	EACH
	ROADWAY LUMINAIRE, LED WITH PHOTOELECTRIC CELL (S11,S13)	2	EACH
	3 SECTION VEHICLE SIGNAL HEAD (2-7,10-15)	12	EACH
	4 SECTION VEHICLE SIGNAL HEAD (1,8,9,16)	4	EACH
	3' DIAMETER FOOTING (S11,S12,S13,S14)	41.0	FT
	EMERGENCY VEHICLE PREEMPTION UNIT (4 CHANNEL)	1	EACH
	OPTICAL DETECTOR	4	EACH
	ACCESSIBLE PEDESTRIAN SIGNAL	8	EACH
	PEDESTRIAN PUSH BUTTON POLE (PB25-PB32)	8	EACH
	PEDESTRIAN SIGNAL HEAD W/ COUNTDOWN TIMER (17-24)	8	EACH
	PEDESTRIAN CROSSING SIGN R10-3e (LEFT-4) (RIGHT-4)	8	EACH

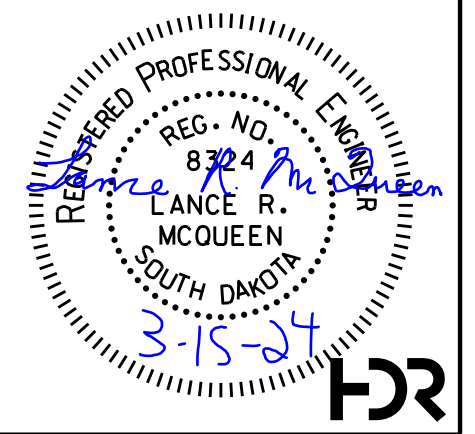
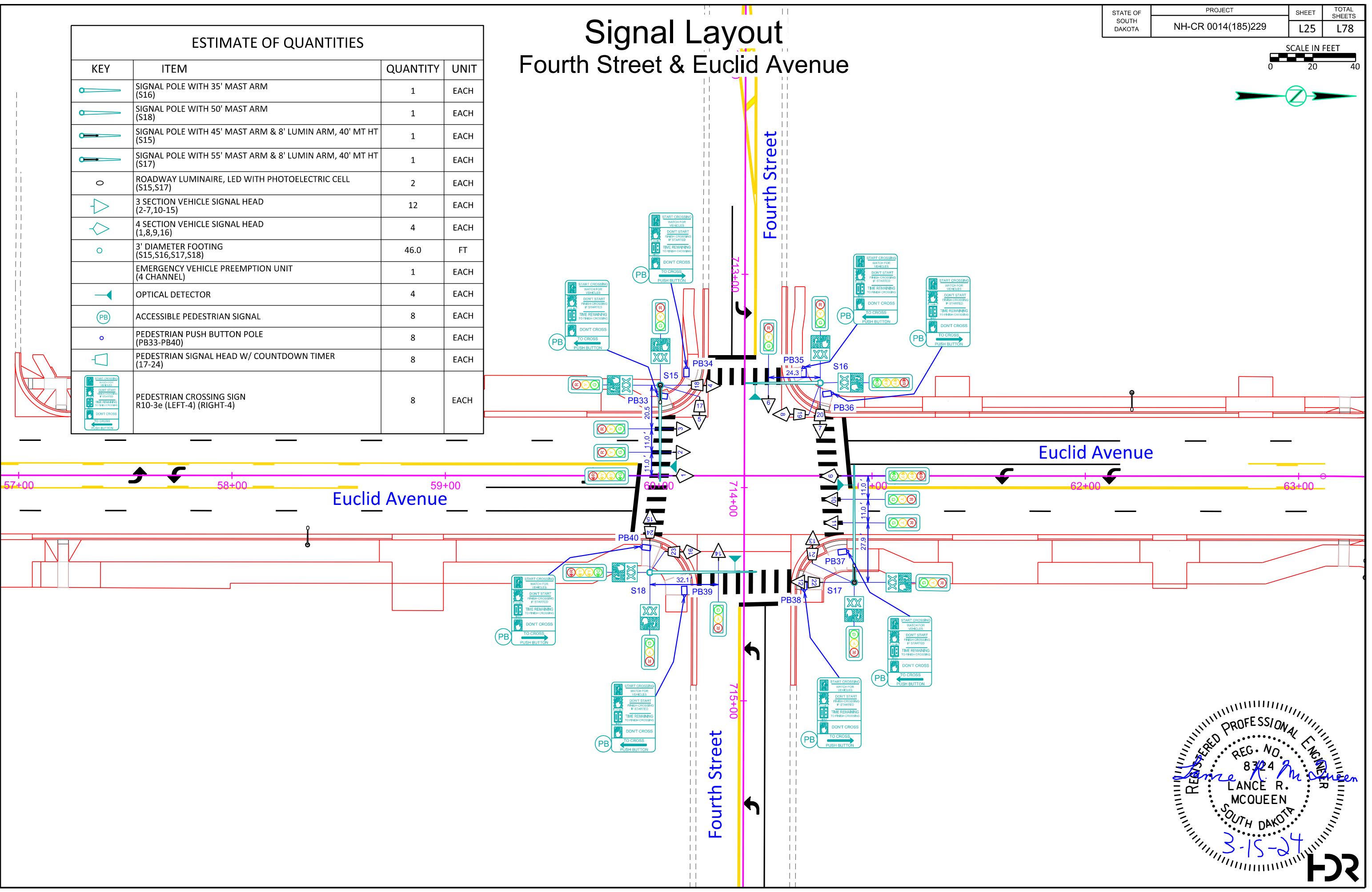




Signal Layout

Fourth Street & Euclid Avenue

ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
	SIGNAL POLE WITH 35' MAST ARM (S16)	1	EACH
	SIGNAL POLE WITH 50' MAST ARM (S18)	1	EACH
	SIGNAL POLE WITH 45' MAST ARM & 8' LUMIN ARM, 40' MT HT (S15)	1	EACH
	SIGNAL POLE WITH 55' MAST ARM & 8' LUMIN ARM, 40' MT HT (S17)	1	EACH
	ROADWAY LUMINAIRE, LED WITH PHOTOELECTRIC CELL (S15,S17)	2	EACH
	3 SECTION VEHICLE SIGNAL HEAD (2-7,10-15)	12	EACH
	4 SECTION VEHICLE SIGNAL HEAD (1,8,9,16)	4	EACH
	3' DIAMETER FOOTING (S15,S16,S17,S18)	46.0	FT
	EMERGENCY VEHICLE PREEMPTION UNIT (4 CHANNEL)	1	EACH
	OPTICAL DETECTOR	4	EACH
	ACCESSIBLE PEDESTRIAN SIGNAL	8	EACH
	PEDESTRIAN PUSH BUTTON POLE (PB33-PB40)	8	EACH
	PEDESTRIAN SIGNAL HEAD W/ COUNTDOWN TIMER (17-24)	8	EACH
	PEDESTRIAN CROSSING SIGN R10-3e (LEFT-4) (RIGHT-4)	8	EACH



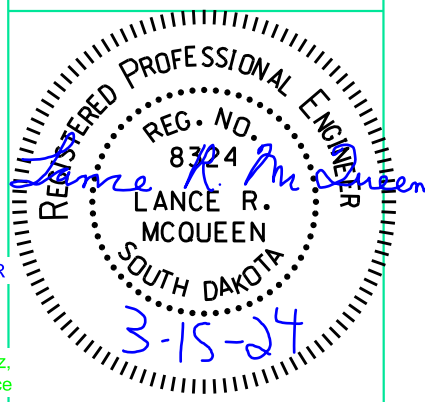
ESTIMATE OF QUANTITIES

KEY	ITEM	QUANTITY	UNIT
⚡	BREAKAWAY BASE LUMINAIRE POLE, 40' MOUNTING HEIGHT W/ 8' ARM (L2-L47, ELZ1, ELZ2)	48	EACH
⚡	BREAKAWAY BASE LUMINAIRE POLE, 40' MOUNTING HEIGHT W/ TWIN 8' ARM (L48-L49)	2	EACH
⚡	BREAKAWAY BASE LUMINAIRE POLE, 50' MOUNTING HEIGHT W/ 8' ARM (L1)	1	EACH
○	ROADWAY LUMINAIRE, LED WITH P.E. (L1-L49, ELZ1, ELZ2)	53	EACH
○	2' DIAMETER FOOTING (L1-L49, ELZ1, ELZ2, PLL1, PLL2)	376.0	FT
⊠	TYPE 2 ELECTRICAL JUNCTION BOX (JL: 3,3A,4,5,5A,5B,5C,6-8,10-15,17-19,21-25,27-36) (JS: 1,6,9,11,12,14,17)	41	EACH
⊠	TYPE 3 ELECTRICAL JUNCTION BOX (JF: 1,2,3,5,6,8,9,10,12,13,15-18)	14	EACH
⊠	TYPE 4 ELECTRICAL JUNCTION BOX (JL: 1,2,9,16,20,26) (JS: 2,3,4,5,7,8,10,13,15,16) (JF: 4,7,11,14)	20	EACH
▲	ELECTRICAL SERVICE CABINET (M1, M2, M3, M4, M5, M6)	6	EACH
□	PREFORMED DETECTOR LOOP (C1-C30)	30	EACH
Ⓜ	METER SOCKET (NOT A BID ITEM)	6	EACH
⬡	2" RIGID CONDUIT, SCHEDULE 40	12,000	FT
⬡	4" RIGID CONDUIT, SCHEDULE 40	270	FT
⬡	2" RIGID CONDUIT, SCHEDULE 80	6625	FT
⬡	3" RIGID CONDUIT, SCHEDULE 80	2820	FT
⬡	4" RIGID CONDUIT, SCHEDULE 80	240	FT
⬡	2" INNERDUCT, SCH 40	7095	FT
⦶	2/2/4 ALUMINUM WIRE	17,220	FT
⦶	1/C #4 AWG COPPER WIRE	3840	FT
⦶	1/C #6 AWG COPPER WIRE	1485	FT
⦶	1/C #10 AWG COPPER WIRE	7210	FT
⦶	2/C #10 AWG COPPER POLE AND BRACKET CABLE	3430	FT
⦶	24 STRAND FIBER OPTIC CABLE	7320	FT
⊠	TRAFFIC COUNTER SURFACE UTILITY BOX (TCB1-TCB4)	4	EACH
⦶	CONDUIT BORING (NOT A BID ITEM)	45	FT
⦶	CABLES / WIRING FOR THE PROPOSED OVER-HEIGHT DETECTION SYSTEM FOR THE EXISTING RAILROAD BRIDGE STRUCTURE. CABLES / WIRING QUANTITY WILL BE DETERMINED BY THE SUPPLIER OF THE OVER-HEIGHT DETECTION SYSTEM. SEE THE SHEET FOR THE OVER-HEIGHT DETECTION SYSTEM WITHIN THESE PLANS FOR FURTHER DETAILS AND INFORMATION.		

KEY	ITEM	QUANTITY	UNIT
⚡	SALVAGE EXISTING LUMINAIRE POLE (30' MOUNTING HEIGHT W/ ARM AND LUMINAIRE) (EL1-EL60, EL64)	61	EACH
⚡	REMOVE EXISTING LUMINAIRE POLE FOOTING (EL1-EL60, EL64, EPLL1, EPLL2)	63	EACH
⚡	REMOVE AND RESET LUMINAIRE POLE (PLL1, PLL2)	2	EACH
⊠	REMOVE EXISTING ELECTRICAL JUNCTION BOX (EJS5-EJS20)	16*	EACH
Ⓜ	REMOVE EXISTING ELECTRICAL SERVICE CABINET / METER (EM1-EM3)	3*	EACH

*INCLUDED IN THE BID ITEM "MISCELLANEOUS, ELECTRICAL"

Conduit Layout - Pierre Street

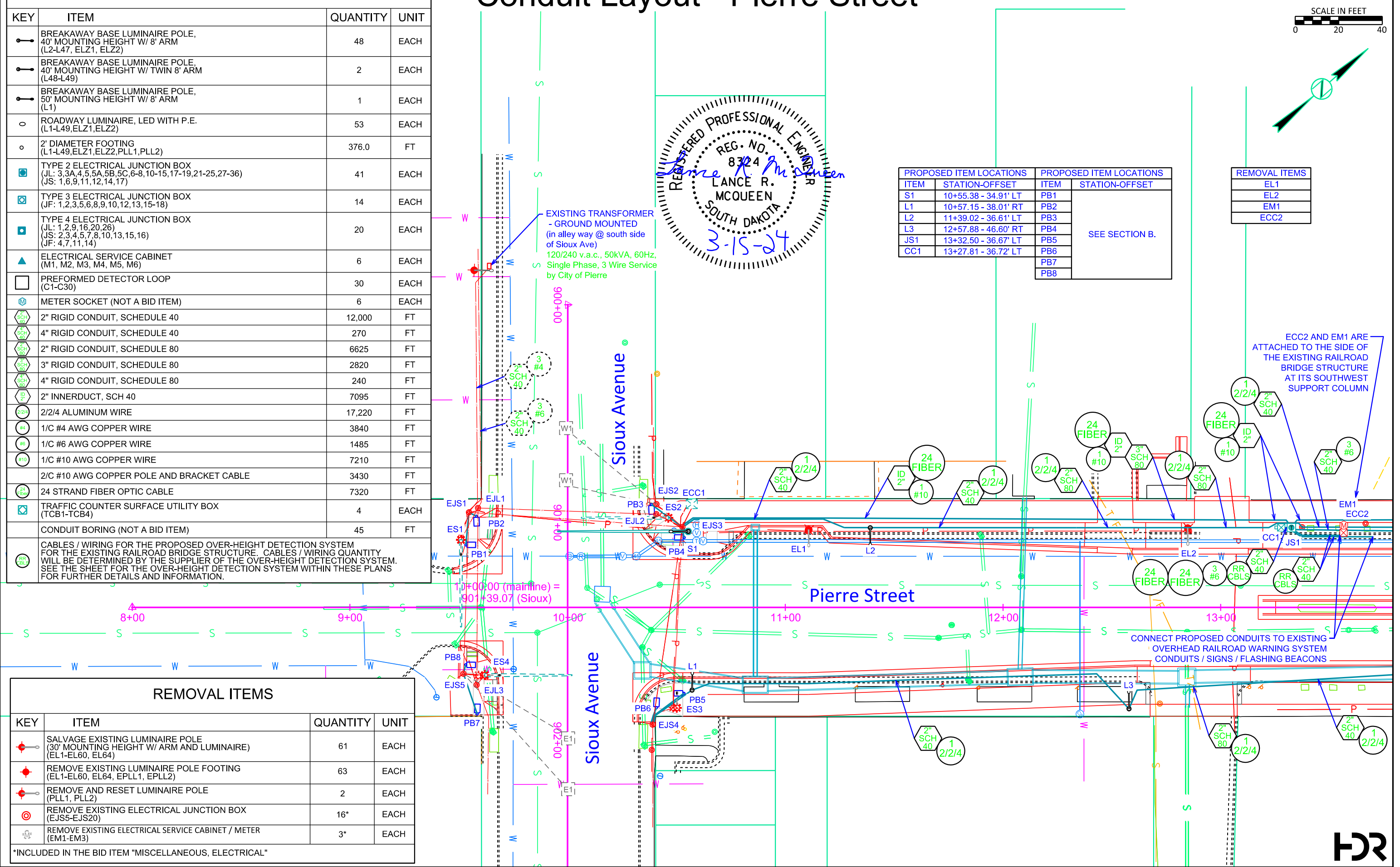


EXISTING TRANSFORMER - GROUND MOUNTED (in alley way @ south side of Sioux Ave)
120/240 v.a.c., 50kVA, 60Hz.
Single Phase, 3 Wire Service by City of Pierre

PROPOSED ITEM LOCATIONS		PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET	ITEM	STATION-OFFSET
S1	10+55.38 - 34.91' LT	PB1	
L1	10+57.15 - 38.01' RT	PB2	
L2	11+39.02 - 36.61' LT	PB3	
L3	12+57.88 - 46.60' RT	PB4	
JS1	13+32.50 - 36.67' LT	PB5	
CC1	13+27.81 - 36.72' LT	PB6	
		PB7	
		PB8	

SEE SECTION B.

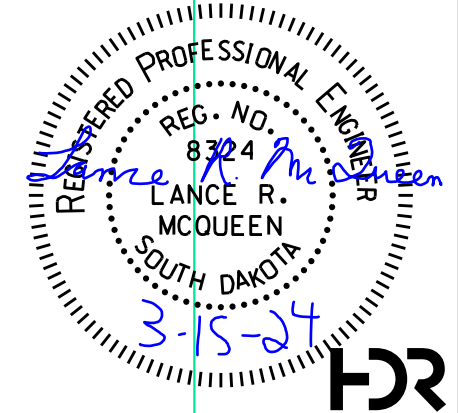
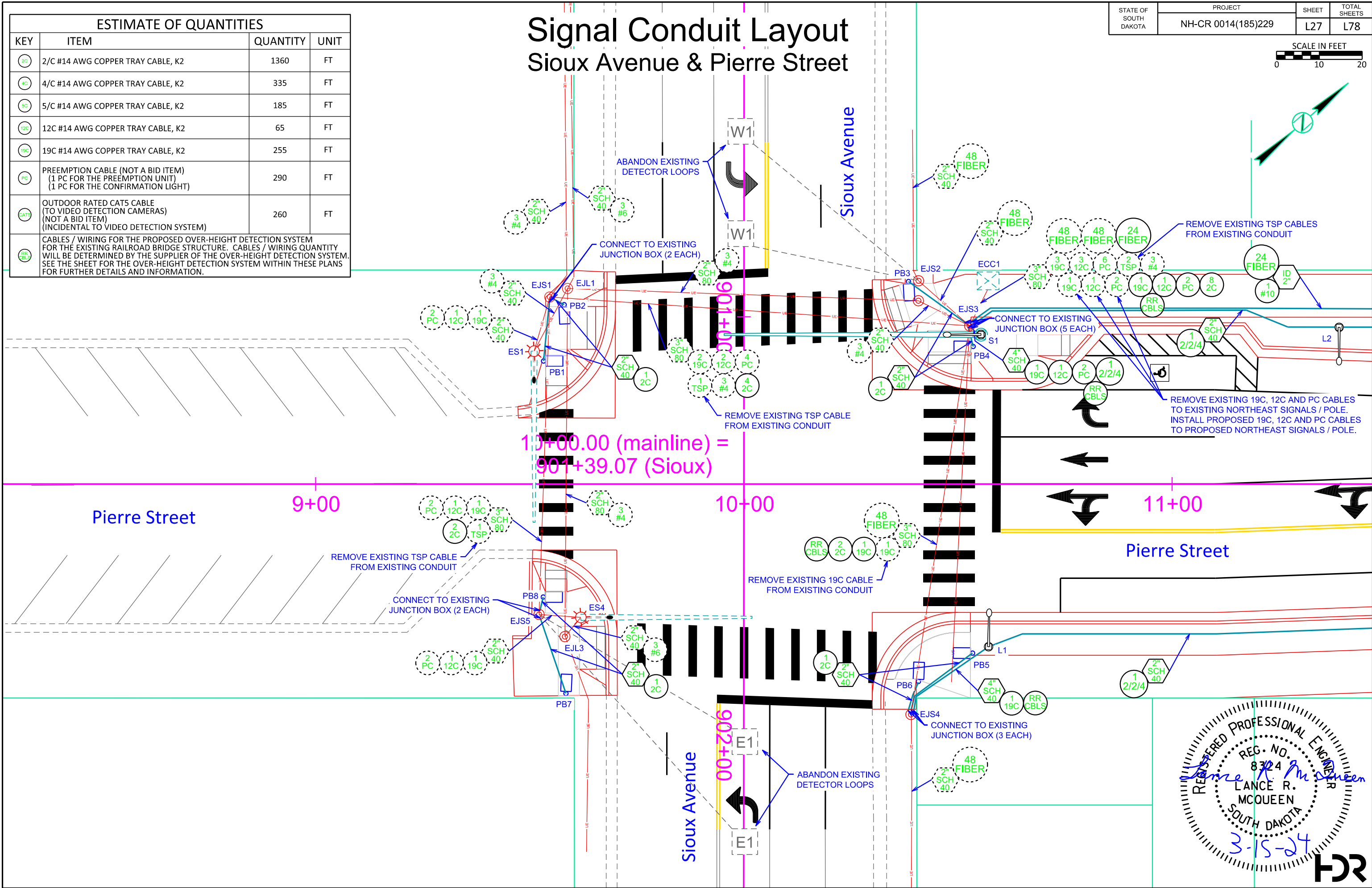
REMOVAL ITEMS
EL1
EL2
EM1
ECC2



Signal Conduit Layout Sioux Avenue & Pierre Street



ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
2C	2/C #14 AWG COPPER TRAY CABLE, K2	1360	FT
4C	4/C #14 AWG COPPER TRAY CABLE, K2	335	FT
5C	5/C #14 AWG COPPER TRAY CABLE, K2	185	FT
12C	12C #14 AWG COPPER TRAY CABLE, K2	65	FT
19C	19C #14 AWG COPPER TRAY CABLE, K2	255	FT
PC	PREEMPTION CABLE (NOT A BID ITEM) (1 PC FOR THE PREEMPTION UNIT) (1 PC FOR THE CONFIRMATION LIGHT)	290	FT
CAT5	OUTDOOR RATED CAT5 CABLE (TO VIDEO DETECTION CAMERAS) (NOT A BID ITEM) (INCIDENTAL TO VIDEO DETECTION SYSTEM)	260	FT
RR-CBLS	CABLES / WIRING FOR THE PROPOSED OVER-HEIGHT DETECTION SYSTEM FOR THE EXISTING RAILROAD BRIDGE STRUCTURE. CABLES / WIRING QUANTITY WILL BE DETERMINED BY THE SUPPLIER OF THE OVER-HEIGHT DETECTION SYSTEM. SEE THE SHEET FOR THE OVER-HEIGHT DETECTION SYSTEM WITHIN THESE PLANS FOR FURTHER DETAILS AND INFORMATION.		



Conduit Layout - Pleasant Dr



PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
L4	13+82.30 - 36.67' LT
L5	14+74.42 - 32.49' RT
L6	15+23.46 - 47.68' LT
L7	16+48.42 - 25.53' LT
L8	17+65.45 - 49.85' RT
L9	18+56.58 - 29.50' RT
L10	19+53.30 - 29.50' LT
JL1	14+03.86 - 36.67' LT
JL2	14+03.64 - 29.50' RT
JL3	15+76.68 - 36.29' LT
JL3A	15+36.08 - 114.67' LT
JL4	15+93.80 - 24.05' RT
JL5	18+08.37 - 22.12' LT
JL5A	18+10.09 - 29.77' RT
JL5B	18+05.89 - 125.04' RT
JL5C	17+87.82 - 144.13' RT
JF1	15+22.61 - 43.28' LT
JF2	15+73.59 - 41.94' LT
JF3	18+07.21 - 27.47' LT

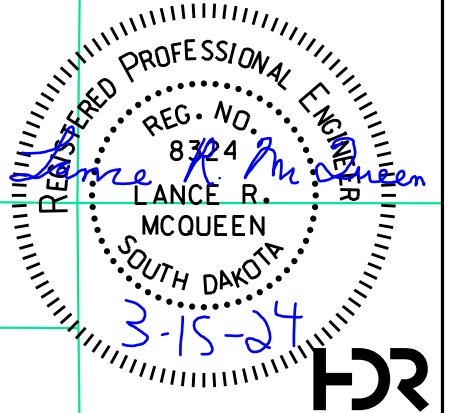
REMOVAL ITEMS	
ITEM	STATION-OFFSET
EL3	
EL4	
EL5	
EL6	
EL7	
EL8	
EL9	
EM2	

PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
PLL1	VERIFY WITH OWNER
PLL2	VERIFY WITH OWNER

CONTRACTOR WILL VERIFY THE LOCATION OF THE EXISTING CONDUIT / WIRE THAT FEEDS THE EXISTING PARKING LOT LIGHTS

COIL 200' OF FIBER CABLE WITHIN JUNCTION BOX

EXISTING TRANSFORMER - GROUND MOUNTED
208 v.a.c., 50kVA, 60Hz,
Three Phase, 3 Wire Service
by City of Pierre

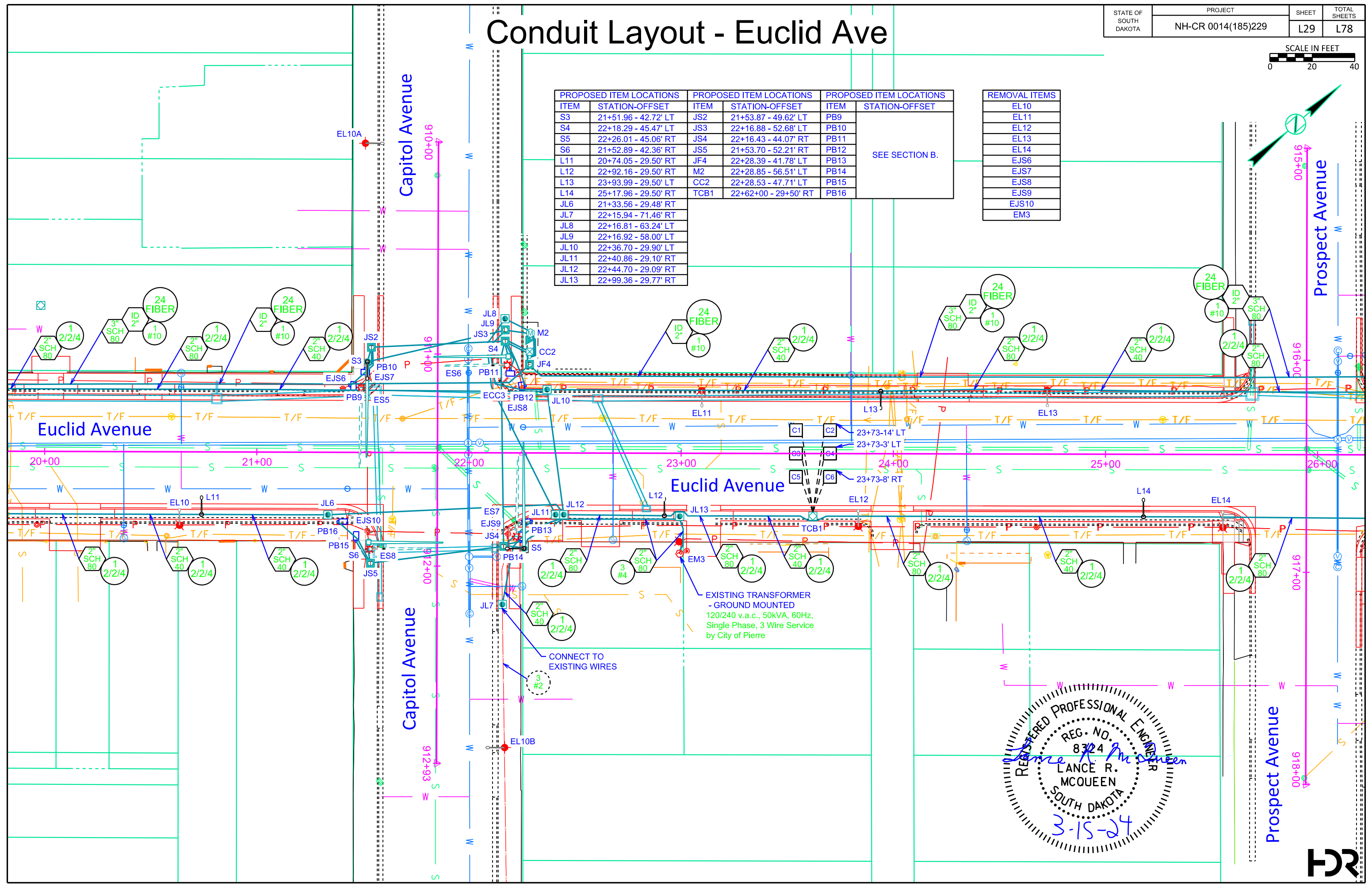


Conduit Layout - Euclid Ave



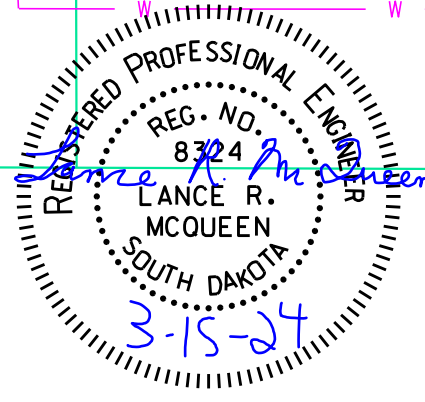
PROPOSED ITEM LOCATIONS		PROPOSED ITEM LOCATIONS		PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET	ITEM	STATION-OFFSET	ITEM	STATION-OFFSET
S3	21+51.96 - 42.72' LT	JS2	21+53.87 - 49.62' LT	PB9	SEE SECTION B.
S4	22+18.29 - 45.47' LT	JS3	22+16.88 - 52.68' RT	PB10	
S5	22+26.01 - 45.06' RT	JS4	22+16.43 - 44.07' RT	PB11	
S6	21+52.89 - 42.36' RT	JS5	21+53.70 - 52.21' RT	PB12	
L11	20+74.05 - 29.50' RT	JF4	22+28.39 - 41.78' LT	PB13	
L12	22+92.16 - 29.50' RT	M2	22+28.85 - 56.51' LT	PB14	
L13	23+93.99 - 29.50' LT	CC2	22+28.53 - 47.71' LT	PB15	
L14	25+17.96 - 29.50' RT	TCB1	22+62+00 - 29+50' RT	PB16	
JL6	21+33.56 - 29.48' RT				
JL7	22+15.94 - 71.46' RT				
JL8	22+16.81 - 63.24' LT				
JL9	22+16.92 - 58.00' LT				
JL10	22+36.70 - 29.90' LT				
JL11	22+40.86 - 29.10' RT				
JL12	22+44.70 - 29.09' RT				
JL13	22+99.36 - 29.77' RT				

REMOVAL ITEMS
EL10
EL11
EL12
EL13
EL14
EJS6
EJS7
EJS8
EJS9
EJS10
EM3



EXISTING TRANSFORMER
- GROUND MOUNTED
120/240 v.a.c., 50kVA, 60Hz,
Single Phase, 3 Wire Service
by City of Pierre

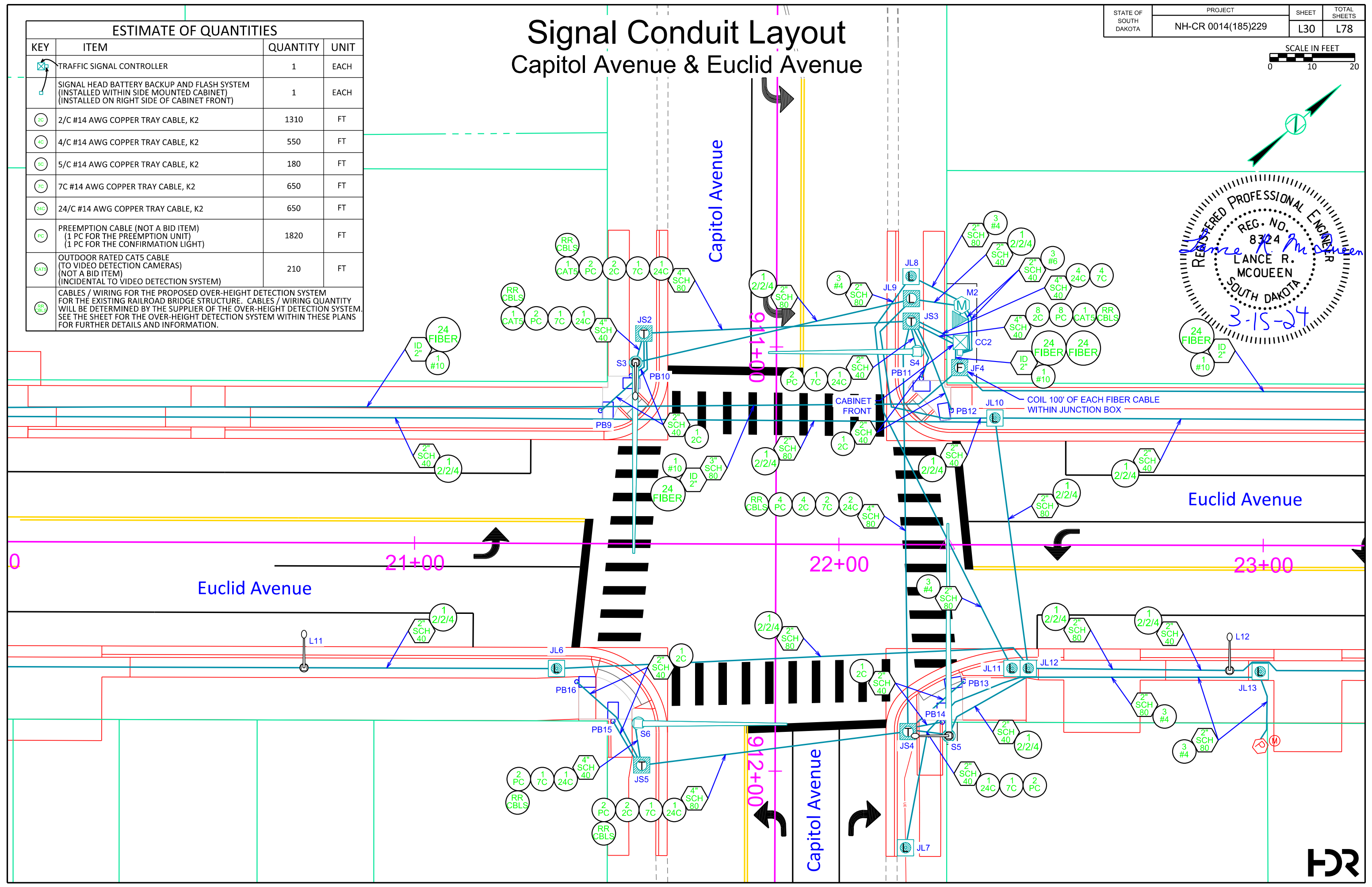
CONNECT TO
EXISTING WIRES





Signal Conduit Layout Capitol Avenue & Euclid Avenue

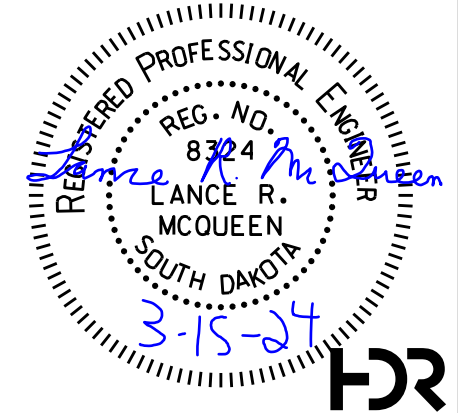
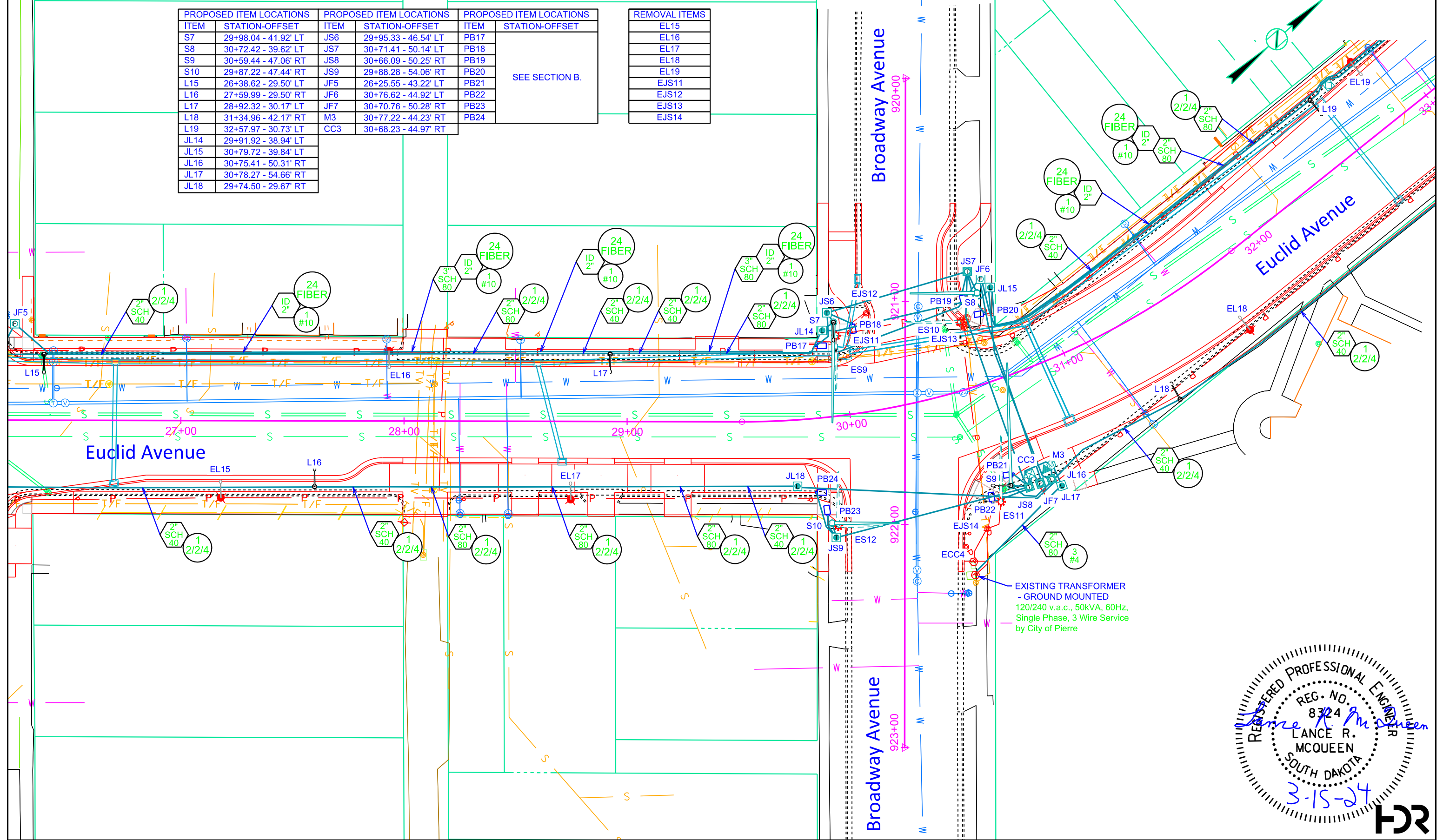
ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
TS	TRAFFIC SIGNAL CONTROLLER	1	EACH
	SIGNAL HEAD BATTERY BACKUP AND FLASH SYSTEM (INSTALLED WITHIN SIDE MOUNTED CABINET) (INSTALLED ON RIGHT SIDE OF CABINET FRONT)	1	EACH
2C	2/C #14 AWG COPPER TRAY CABLE, K2	1310	FT
4C	4/C #14 AWG COPPER TRAY CABLE, K2	550	FT
5C	5/C #14 AWG COPPER TRAY CABLE, K2	180	FT
7C	7C #14 AWG COPPER TRAY CABLE, K2	650	FT
24C	24/C #14 AWG COPPER TRAY CABLE, K2	650	FT
PC	PREEMPTION CABLE (NOT A BID ITEM) (1 PC FOR THE PREEMPTION UNIT) (1 PC FOR THE CONFIRMATION LIGHT)	1820	FT
CAT5	OUTDOOR RATED CAT5 CABLE (TO VIDEO DETECTION CAMERAS) (NOT A BID ITEM) (INCIDENTAL TO VIDEO DETECTION SYSTEM)	210	FT
RR CBL	CABLES / WIRING FOR THE PROPOSED OVER-HEIGHT DETECTION SYSTEM FOR THE EXISTING RAILROAD BRIDGE STRUCTURE. CABLES / WIRING QUANTITY WILL BE DETERMINED BY THE SUPPLIER OF THE OVER-HEIGHT DETECTION SYSTEM. SEE THE SHEET FOR THE OVER-HEIGHT DETECTION SYSTEM WITHIN THESE PLANS FOR FURTHER DETAILS AND INFORMATION.		



Conduit Layout - Euclid Ave



PROPOSED ITEM LOCATIONS		PROPOSED ITEM LOCATIONS		PROPOSED ITEM LOCATIONS		REMOVAL ITEMS	
ITEM	STATION-OFFSET	ITEM	STATION-OFFSET	ITEM	STATION-OFFSET		
S7	29+98.04 - 41.92' LT	JS6	29+95.33 - 46.54' LT	PB17			EL15
S8	30+72.42 - 39.62' LT	JS7	30+71.41 - 50.14' LT	PB18			EL16
S9	30+59.44 - 47.06' RT	JS8	30+66.09 - 50.25' RT	PB19			EL17
S10	29+87.22 - 47.44' RT	JS9	29+88.28 - 54.06' RT	PB20			EL18
L15	26+38.62 - 29.50' LT	JF5	26+25.55 - 43.22' LT	PB21		SEE SECTION B.	EL19
L16	27+59.99 - 29.50' RT	JF6	30+76.62 - 44.92' LT	PB22			EJS11
L17	28+92.32 - 30.17' LT	JF7	30+70.76 - 50.28' RT	PB23			EJS12
L18	31+34.96 - 42.17' RT	M3	30+77.22 - 44.23' RT	PB24			EJS13
L19	32+57.97 - 30.73' LT	CC3	30+68.23 - 44.97' RT				EJS14
JL14	29+91.92 - 38.94' LT						
JL15	30+79.72 - 39.84' LT						
JL16	30+75.41 - 50.31' RT						
JL17	30+78.27 - 54.66' RT						
JL18	29+74.50 - 29.67' RT						

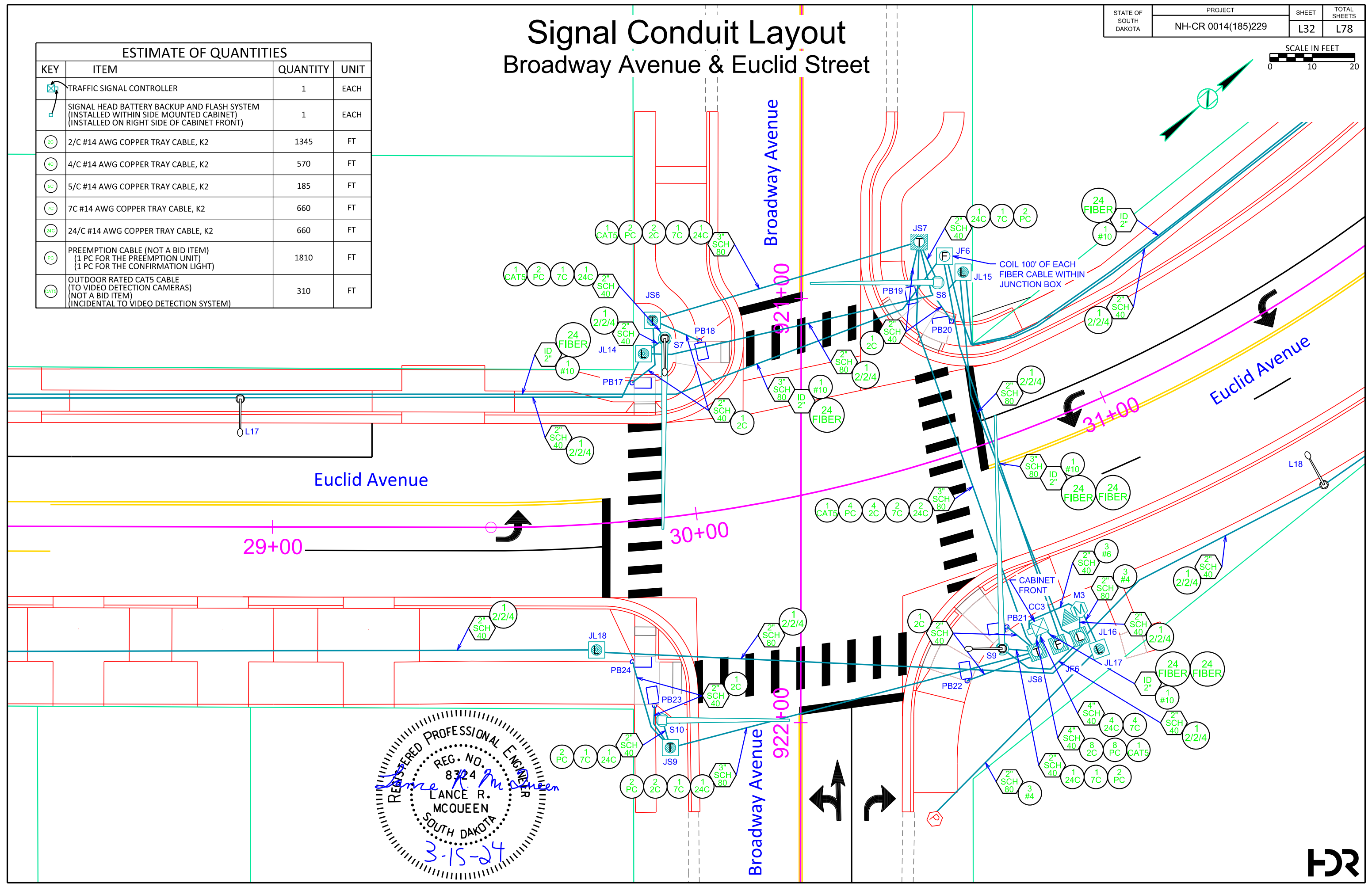


Signal Conduit Layout

Broadway Avenue & Euclid Street



ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
	TRAFFIC SIGNAL CONTROLLER	1	EACH
	SIGNAL HEAD BATTERY BACKUP AND FLASH SYSTEM (INSTALLED WITHIN SIDE MOUNTED CABINET) (INSTALLED ON RIGHT SIDE OF CABINET FRONT)	1	EACH
	2/C #14 AWG COPPER TRAY CABLE, K2	1345	FT
	4/C #14 AWG COPPER TRAY CABLE, K2	570	FT
	5/C #14 AWG COPPER TRAY CABLE, K2	185	FT
	7C #14 AWG COPPER TRAY CABLE, K2	660	FT
	24/C #14 AWG COPPER TRAY CABLE, K2	660	FT
	PREEMPTION CABLE (NOT A BID ITEM) (1 PC FOR THE PREEMPTION UNIT) (1 PC FOR THE CONFIRMATION LIGHT)	1810	FT
	OUTDOOR RATED CAT5 CABLE (TO VIDEO DETECTION CAMERAS) (NOT A BID ITEM) (INCIDENTAL TO VIDEO DETECTION SYSTEM)	310	FT



REGISTERED PROFESSIONAL ENGINEER
 REG. NO. 8324
Lance R. McQueen
 LANCE R. MCQUEEN
 SOUTH DAKOTA
 3-15-24

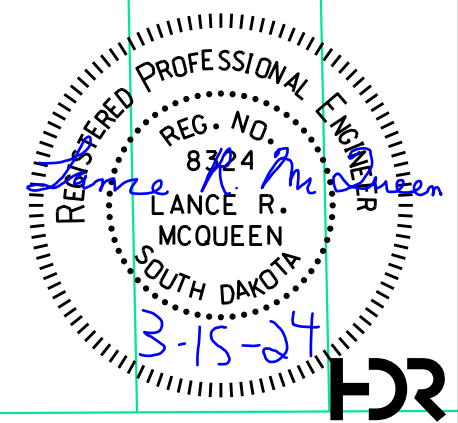
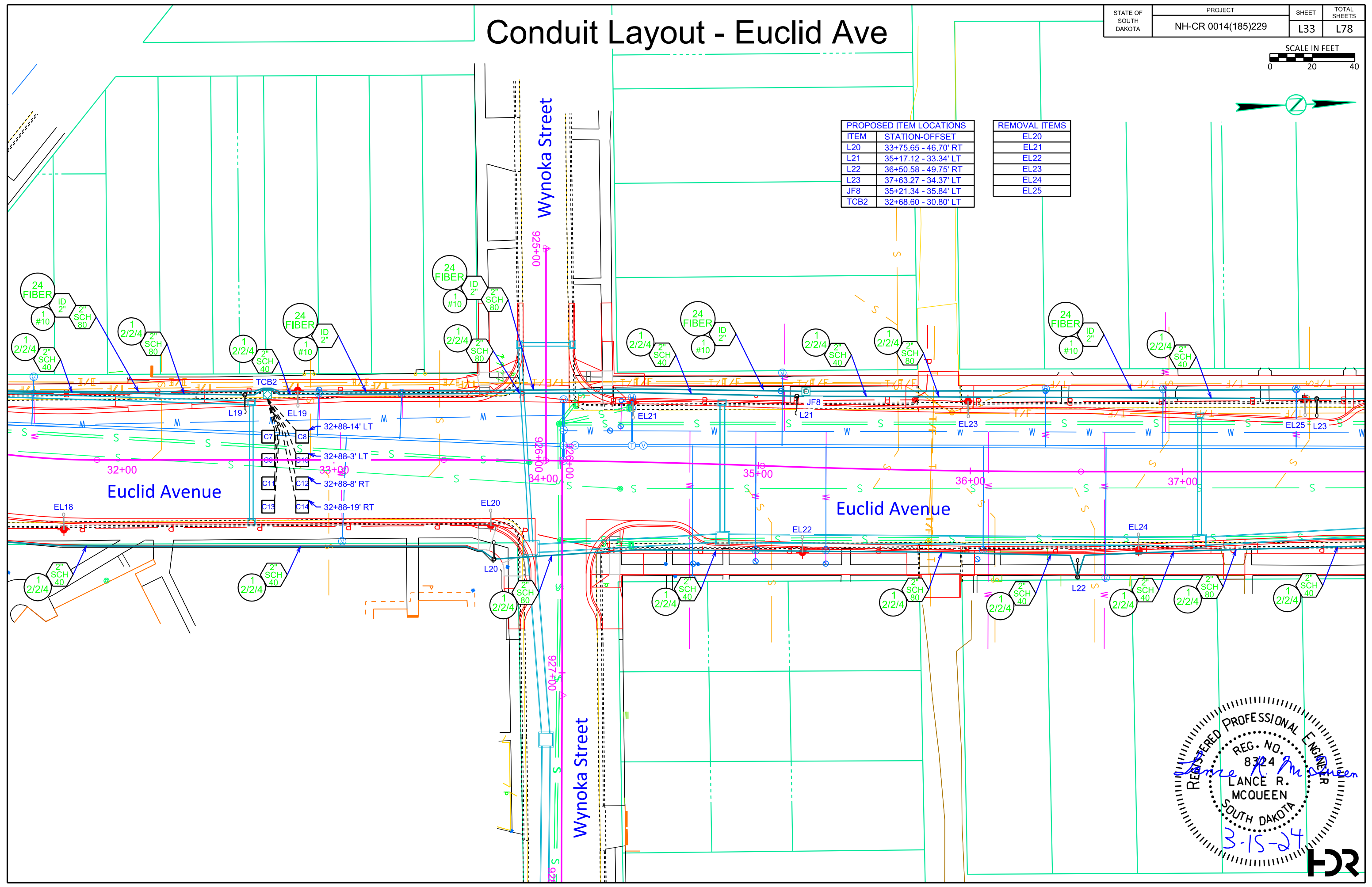


Conduit Layout - Euclid Ave



PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
L20	33+75.65 - 46.70' RT
L21	35+17.12 - 33.34' LT
L22	36+50.58 - 49.75' RT
L23	37+63.27 - 34.37' LT
JF8	35+21.34 - 35.84' LT
TCB2	32+68.60 - 30.80' LT

REMOVAL ITEMS	
EL20	
EL21	
EL22	
EL23	
EL24	
EL25	

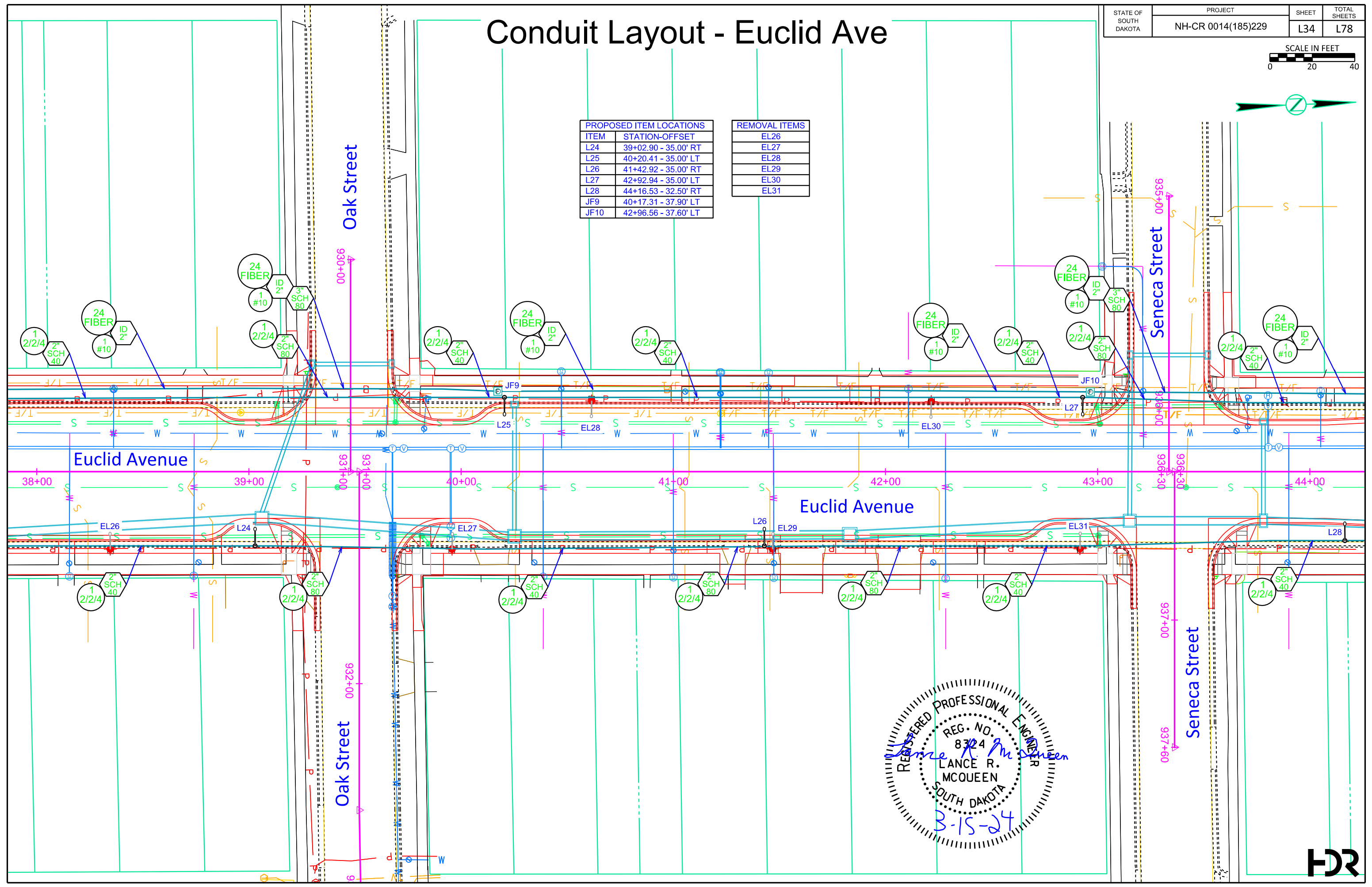


Conduit Layout - Euclid Ave



PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
L24	39+02.90 - 35.00' RT
L25	40+20.41 - 35.00' LT
L26	41+42.92 - 35.00' RT
L27	42+92.94 - 35.00' LT
L28	44+16.53 - 32.50' RT
JF9	40+17.31 - 37.90' LT
JF10	42+96.56 - 37.60' LT

REMOVAL ITEMS	
EL26	
EL27	
EL28	
EL29	
EL30	
EL31	



REGISTERED PROFESSIONAL ENGINEER
 REG. NO. 8324
 Lance R. McQueen
 SOUTH DAKOTA
 3-15-24



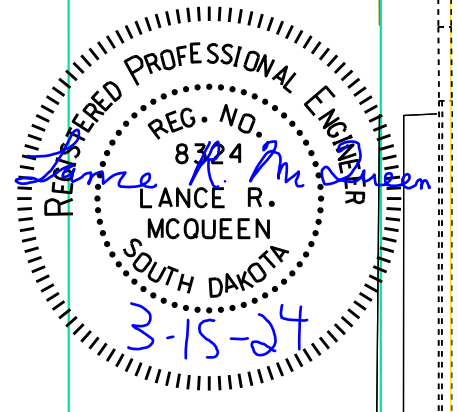
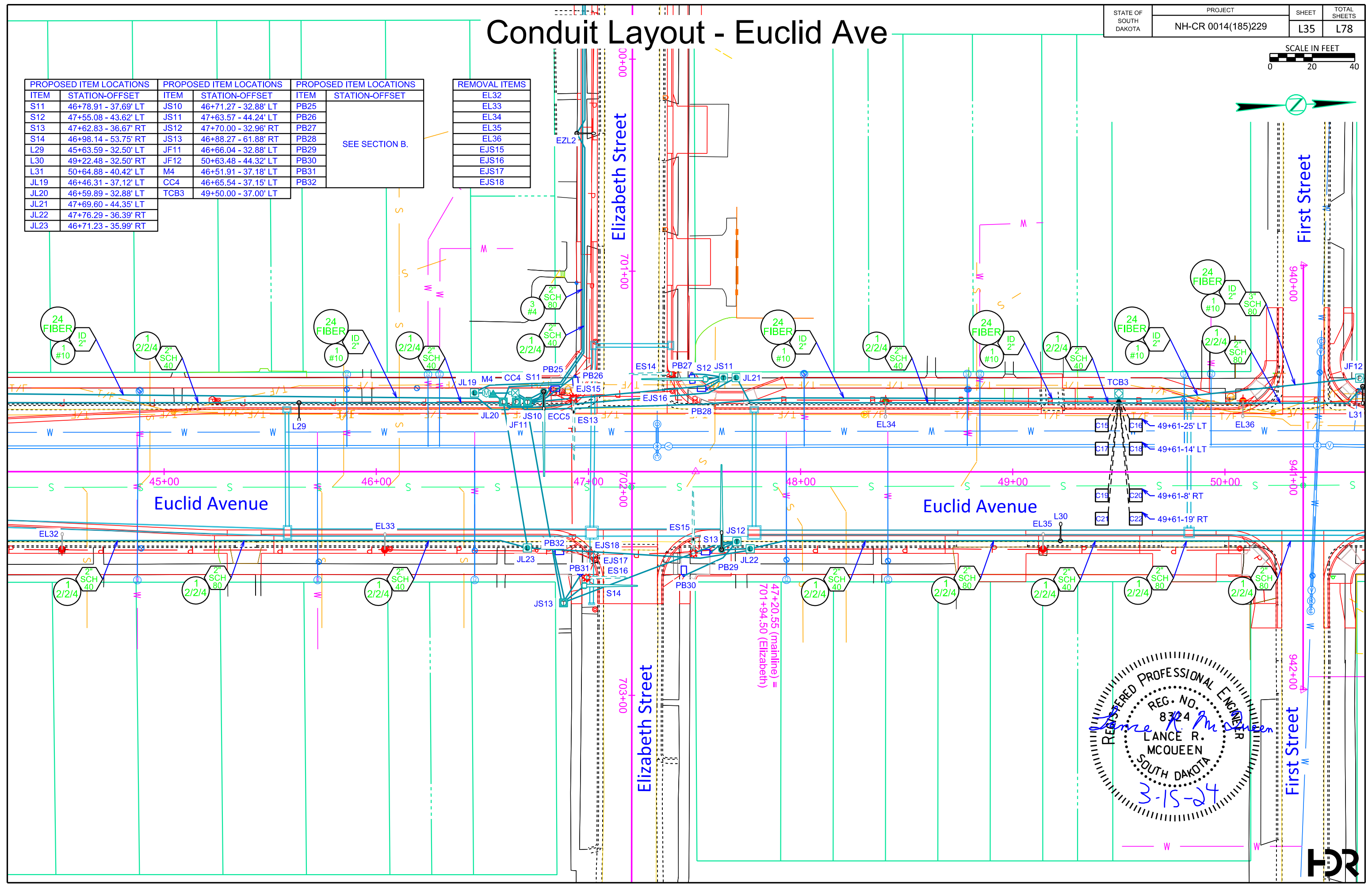
Conduit Layout - Euclid Ave



PROPOSED ITEM LOCATIONS		PROPOSED ITEM LOCATIONS		PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET	ITEM	STATION-OFFSET	ITEM	STATION-OFFSET
S11	46+78.91 - 37.69' LT	JS10	46+71.27 - 32.88' LT	PB25	
S12	47+55.08 - 43.62' LT	JS11	47+63.57 - 44.24' LT	PB26	
S13	47+62.83 - 36.67' RT	JS12	47+70.00 - 32.96' RT	PB27	
S14	46+98.14 - 53.75' RT	JS13	46+88.27 - 61.88' RT	PB28	
L29	45+63.59 - 32.50' LT	JF11	46+66.04 - 32.88' LT	PB29	
L30	49+22.48 - 32.50' RT	JF12	50+63.48 - 44.32' LT	PB30	
L31	50+64.88 - 40.42' LT	M4	46+51.91 - 37.18' LT	PB31	
JL19	46+46.31 - 37.12' LT	CC4	46+65.54 - 37.15' LT	PB32	
JL20	46+59.89 - 32.88' LT	TCB3	49+50.00 - 37.00' LT		
JL21	47+69.60 - 44.35' LT				
JL22	47+76.29 - 36.39' RT				
JL23	46+71.23 - 35.99' RT				

REMOVAL ITEMS	
ITEM	STATION-OFFSET
EL32	
EL33	
EL34	
EL35	
EL36	
EJS15	
EJS16	
EJS17	
EJS18	

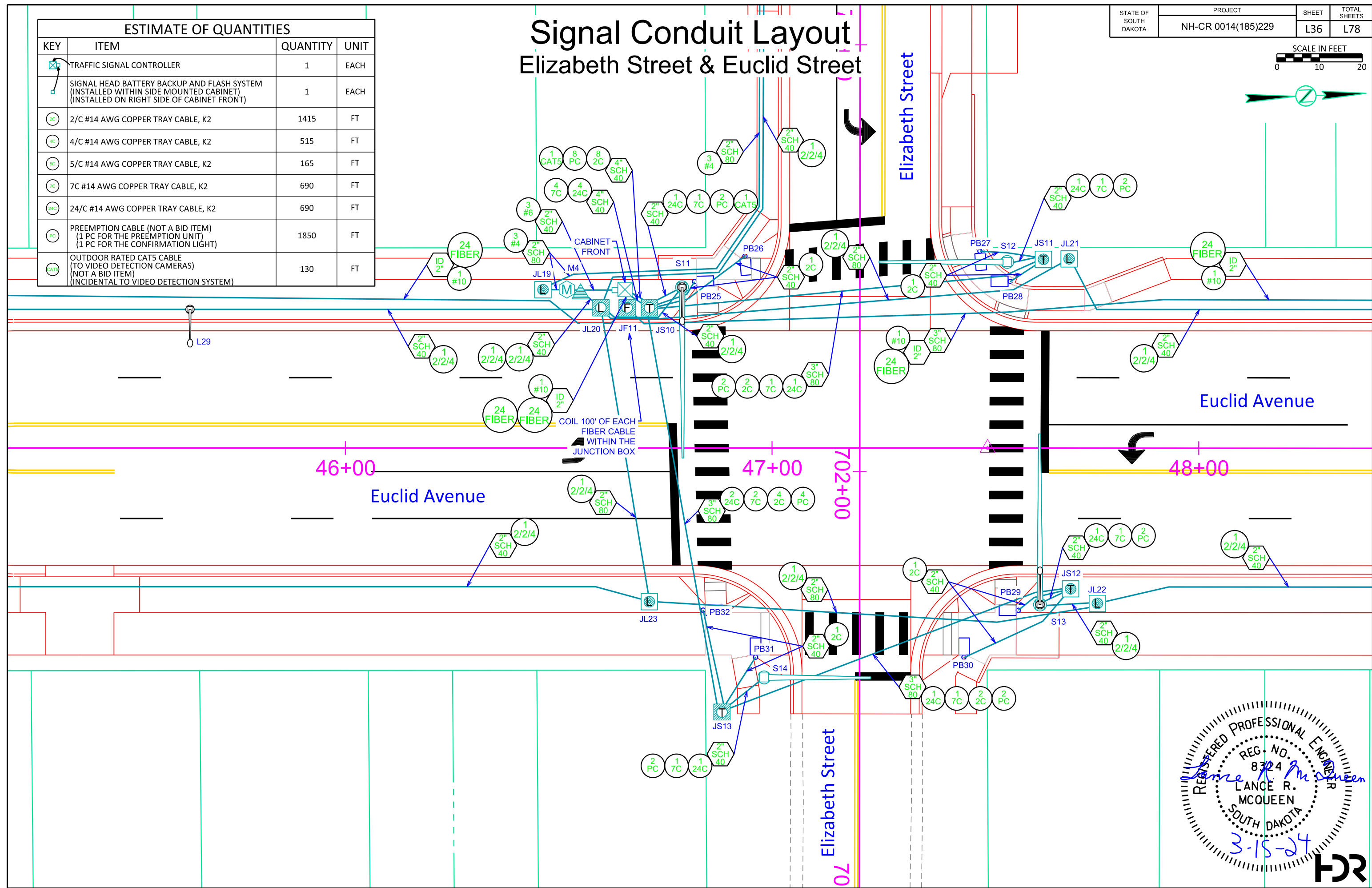
SEE SECTION B.



ESTIMATE OF QUANTITIES

KEY	ITEM	QUANTITY	UNIT
TS	TRAFFIC SIGNAL CONTROLLER	1	EACH
	SIGNAL HEAD BATTERY BACKUP AND FLASH SYSTEM (INSTALLED WITHIN SIDE MOUNTED CABINET) (INSTALLED ON RIGHT SIDE OF CABINET FRONT)	1	EACH
2C	2/C #14 AWG COPPER TRAY CABLE, K2	1415	FT
4C	4/C #14 AWG COPPER TRAY CABLE, K2	515	FT
5C	5/C #14 AWG COPPER TRAY CABLE, K2	165	FT
7C	7/C #14 AWG COPPER TRAY CABLE, K2	690	FT
24C	24/C #14 AWG COPPER TRAY CABLE, K2	690	FT
PC	PREEMPTION CABLE (NOT A BID ITEM) (1 PC FOR THE PREEMPTION UNIT) (1 PC FOR THE CONFIRMATION LIGHT)	1850	FT
CAT5	OUTDOOR RATED CAT5 CABLE (TO VIDEO DETECTION CAMERAS) (NOT A BID ITEM) (INCIDENTAL TO VIDEO DETECTION SYSTEM)	130	FT

Signal Conduit Layout Elizabeth Street & Euclid Street



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 8324
Lance R. McQueen
LANCE R. MCOUEN
SOUTH DAKOTA
3-15-24
HR

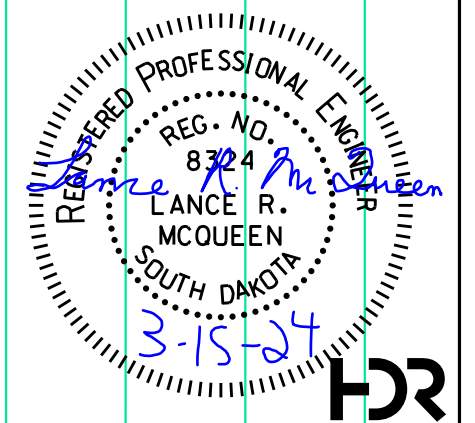
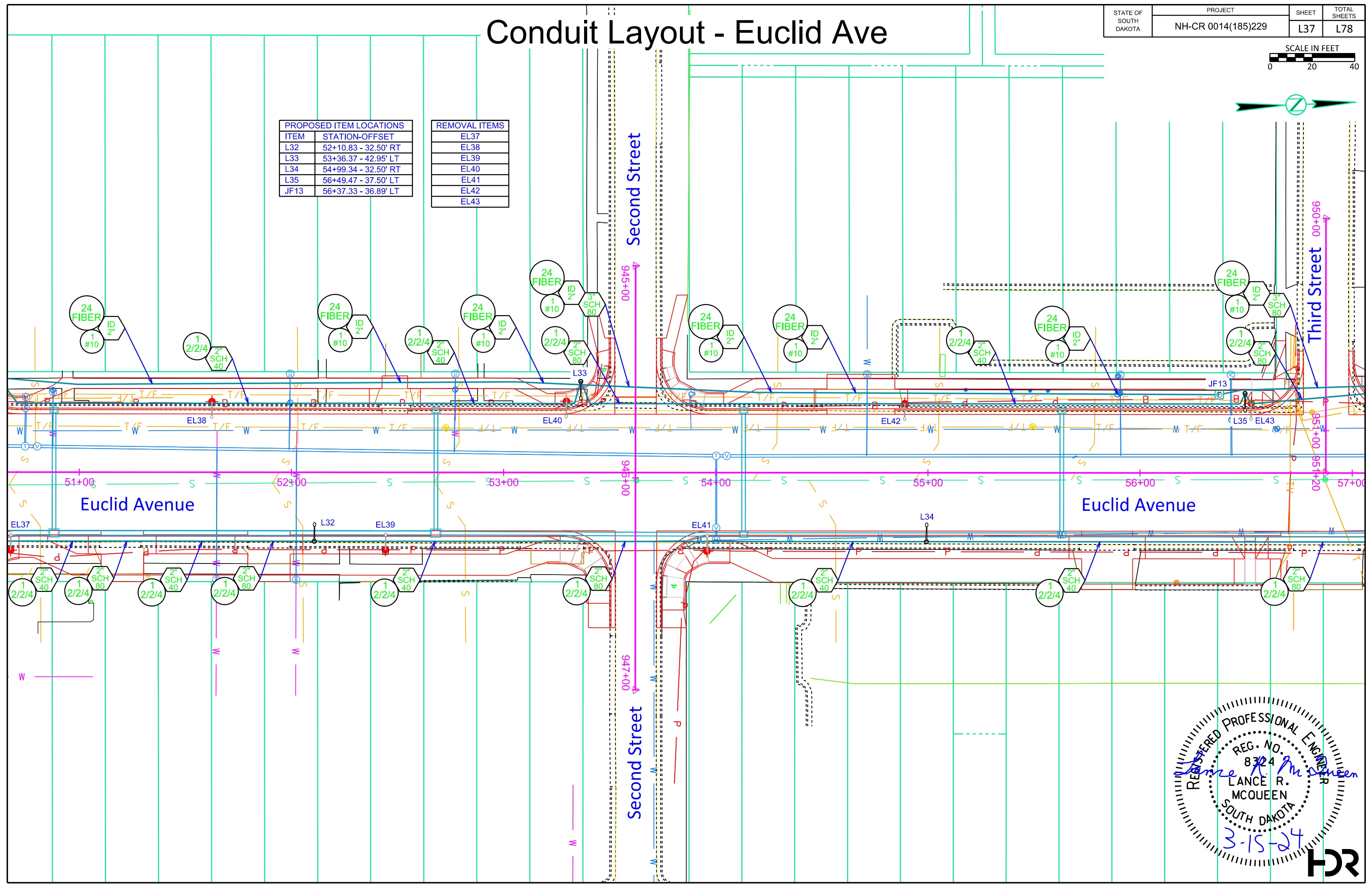
Conduit Layout - Euclid Ave

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0014(185)229	SHEET L37	TOTAL SHEETS L78
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PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
L32	52+10.83 - 32.50' RT
L33	53+36.37 - 42.95' LT
L34	54+99.34 - 32.50' RT
L35	56+49.47 - 37.50' LT
JF13	56+37.33 - 36.89' LT

REMOVAL ITEMS	
EL37	
EL38	
EL39	
EL40	
EL41	
EL42	
EL43	



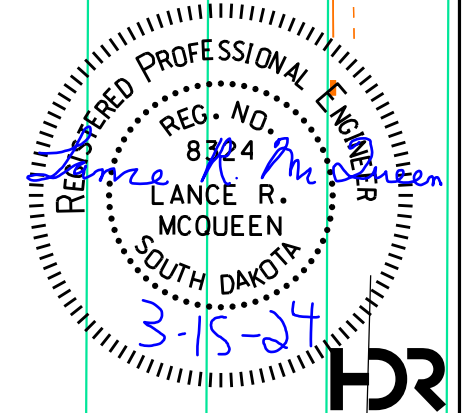
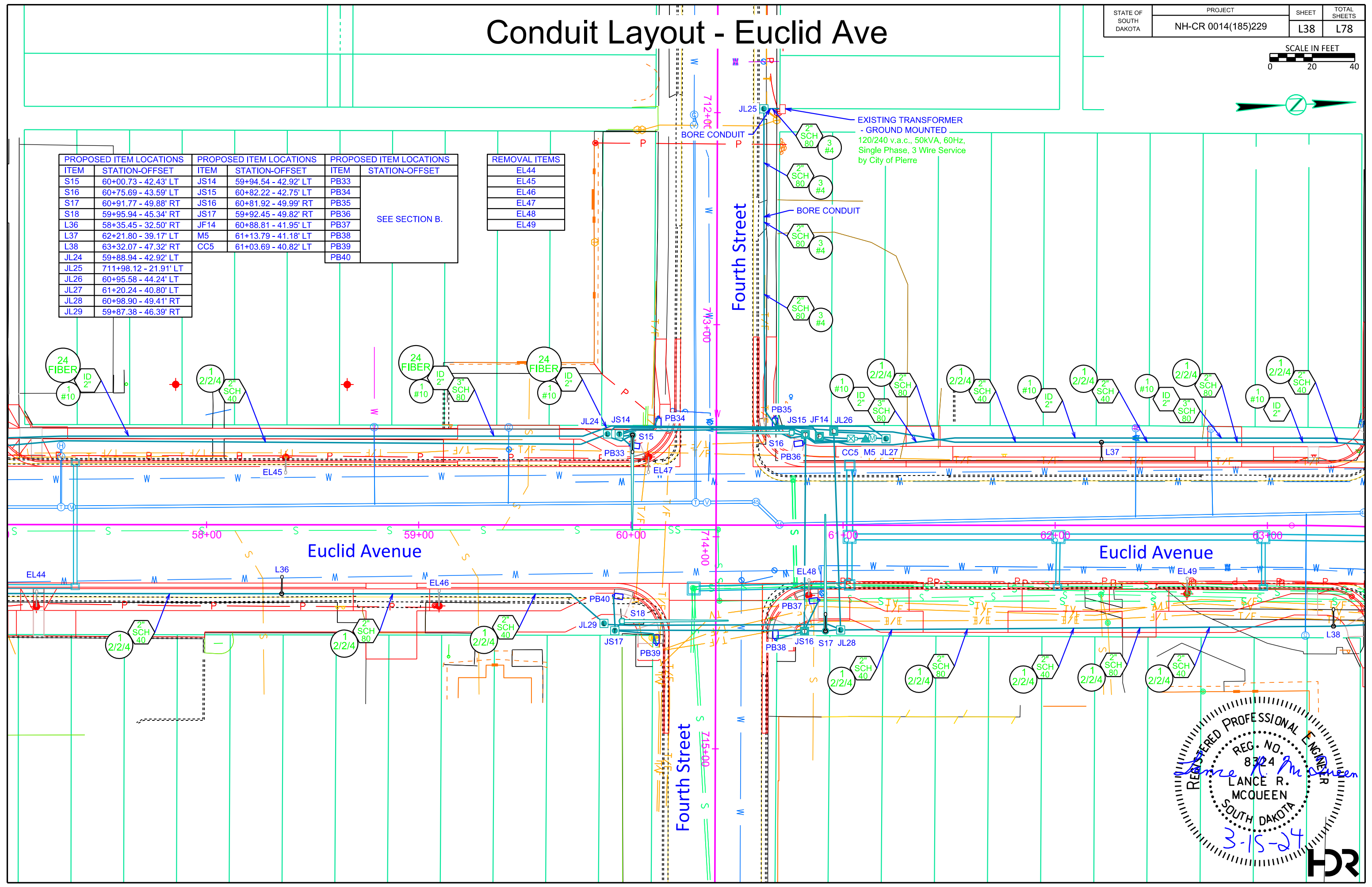
Conduit Layout - Euclid Ave

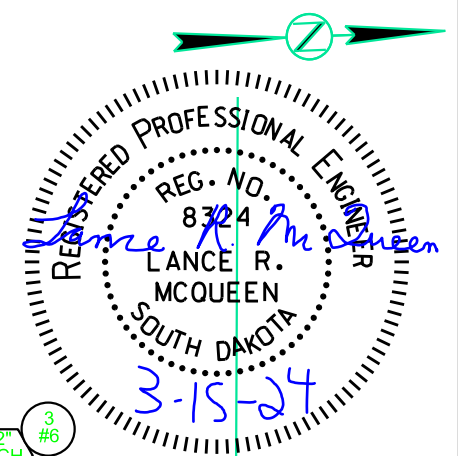


PROPOSED ITEM LOCATIONS		PROPOSED ITEM LOCATIONS		PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET	ITEM	STATION-OFFSET	ITEM	STATION-OFFSET
S15	60+00.73 - 42.43' LT	JS14	59+94.54 - 42.92' LT	PB33	
S16	60+75.69 - 43.59' LT	JS15	60+82.22 - 42.75' LT	PB34	
S17	60+91.77 - 49.88' RT	JS16	60+81.92 - 49.99' RT	PB35	
S18	59+95.94 - 45.34' RT	JS17	59+92.45 - 49.82' RT	PB36	
L36	58+35.45 - 32.50' RT	JF14	60+88.81 - 41.95' LT	PB37	
L37	62+21.80 - 39.17' LT	M5	61+13.79 - 41.18' LT	PB38	
L38	63+32.07 - 47.32' RT	CC5	61+03.69 - 40.82' LT	PB39	
JL24	59+88.94 - 42.92' LT			PB40	
JL25	711+98.12 - 21.91' LT				
JL26	60+95.58 - 44.24' LT				
JL27	61+20.24 - 40.80' LT				
JL28	60+98.90 - 49.41' RT				
JL29	59+87.38 - 46.39' RT				

REMOVAL ITEMS
EL44
EL45
EL46
EL47
EL48
EL49

SEE SECTION B.

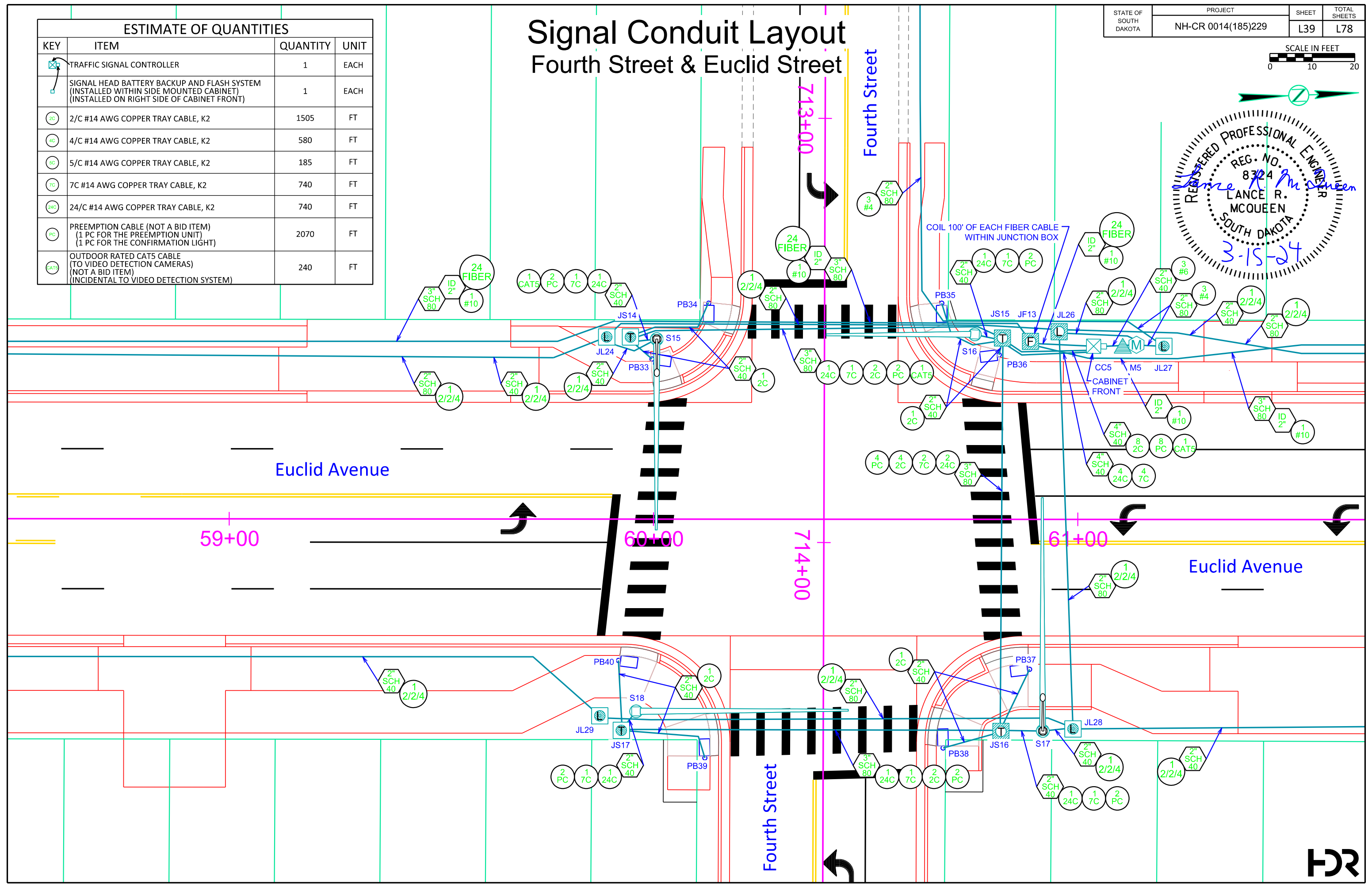




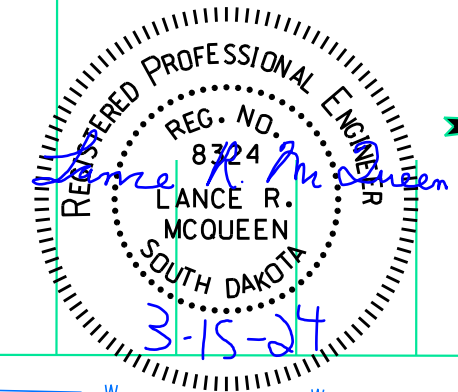
ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
TS	TRAFFIC SIGNAL CONTROLLER	1	EACH
	SIGNAL HEAD BATTERY BACKUP AND FLASH SYSTEM (INSTALLED WITHIN SIDE MOUNTED CABINET) (INSTALLED ON RIGHT SIDE OF CABINET FRONT)	1	EACH
2C	2/C #14 AWG COPPER TRAY CABLE, K2	1505	FT
4C	4/C #14 AWG COPPER TRAY CABLE, K2	580	FT
5C	5/C #14 AWG COPPER TRAY CABLE, K2	185	FT
7C	7/C #14 AWG COPPER TRAY CABLE, K2	740	FT
24C	24/C #14 AWG COPPER TRAY CABLE, K2	740	FT
PC	PREEMPTION CABLE (NOT A BID ITEM) (1 PC FOR THE PREEMPTION UNIT) (1 PC FOR THE CONFIRMATION LIGHT)	2070	FT
CAT5	OUTDOOR RATED CAT5 CABLE (TO VIDEO DETECTION CAMERAS) (NOT A BID ITEM) (INCIDENTAL TO VIDEO DETECTION SYSTEM)	240	FT

Signal Conduit Layout

Fourth Street & Euclid Street

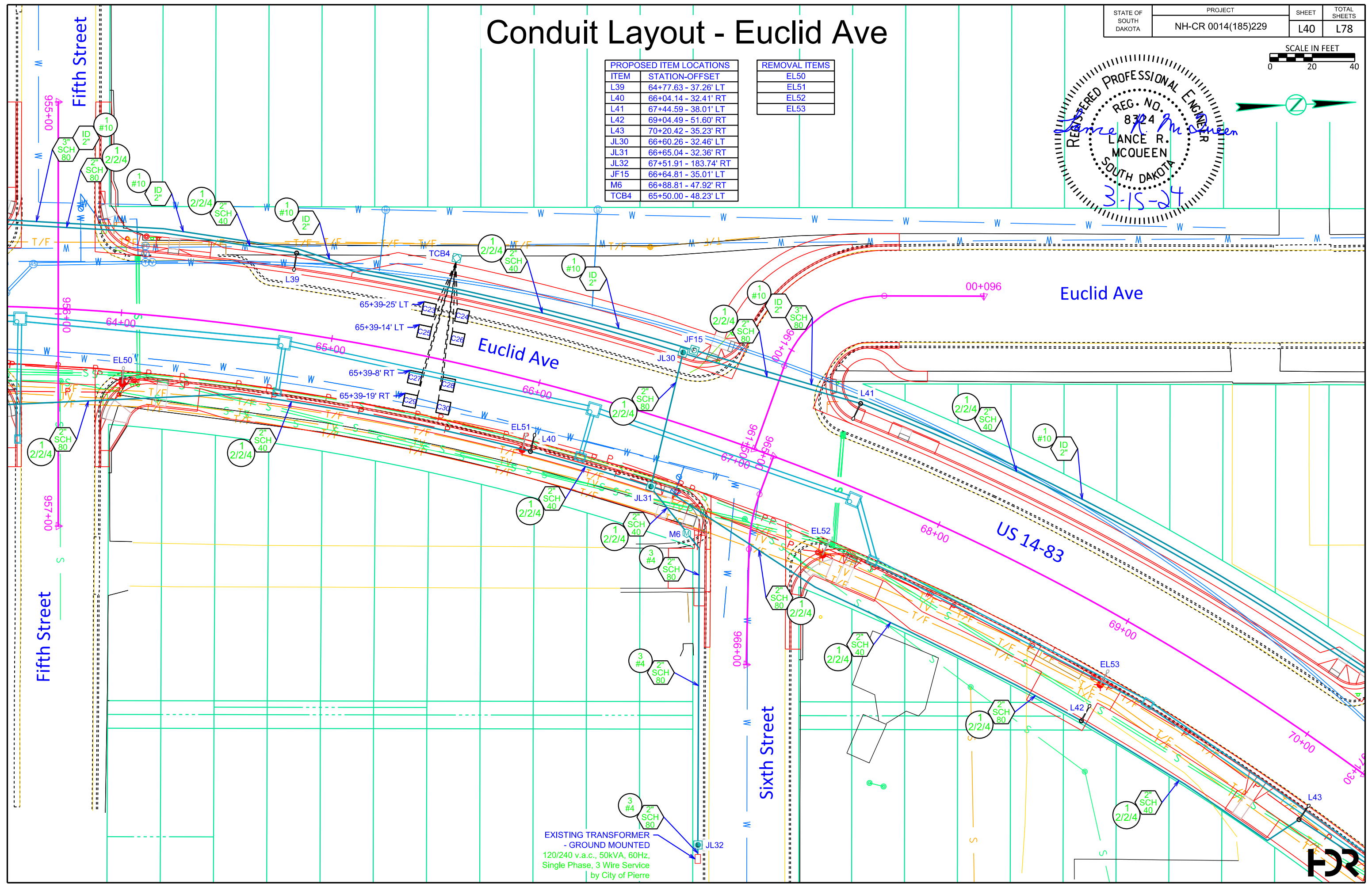


Conduit Layout - Euclid Ave



PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
L39	64+77.63 - 37.26' LT
L40	66+04.14 - 32.41' RT
L41	67+44.59 - 38.01' LT
L42	69+04.49 - 51.60' RT
L43	70+20.42 - 35.23' RT
JL30	66+60.26 - 32.46' LT
JL31	66+65.04 - 32.36' RT
JL32	67+51.91 - 183.74' RT
JF15	66+64.81 - 35.01' LT
M6	66+88.81 - 47.92' RT
TCB4	65+50.00 - 48.23' LT

REMOVAL ITEMS	
EL50	
EL51	
EL52	
EL53	

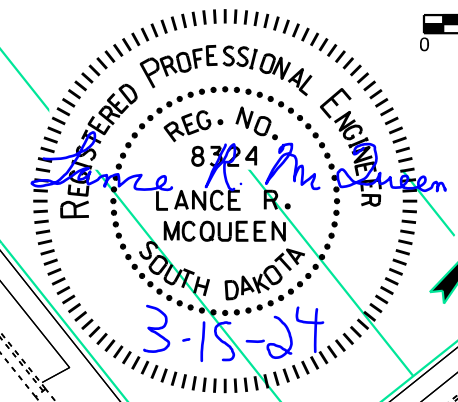


EXISTING TRANSFORMER
- GROUND MOUNTED
120/240 v.a.c., 50kVA, 60Hz,
Single Phase, 3 Wire Service
by City of Pierre



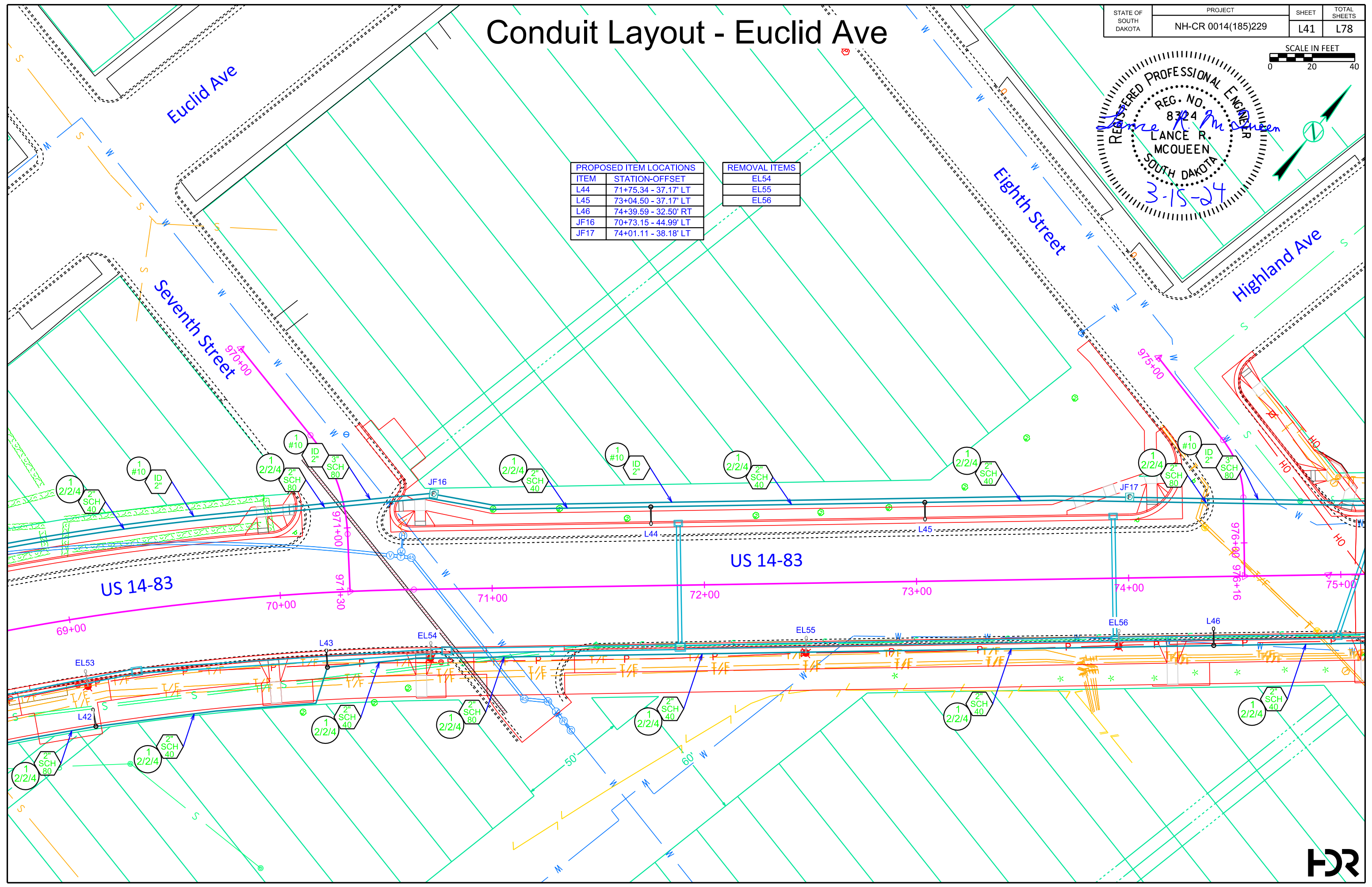
Conduit Layout - Euclid Ave

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0014(185)229	SHEET L41	TOTAL SHEETS L78
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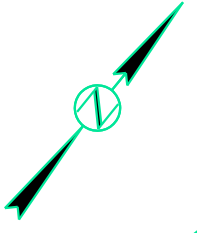
PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
L44	71+75.34 - 37.17' LT
L45	73+04.50 - 37.17' LT
L46	74+39.59 - 32.50' RT
JF16	70+73.15 - 44.99' LT
JF17	74+01.11 - 38.18' LT

REMOVAL ITEMS
EL54
EL55
EL56

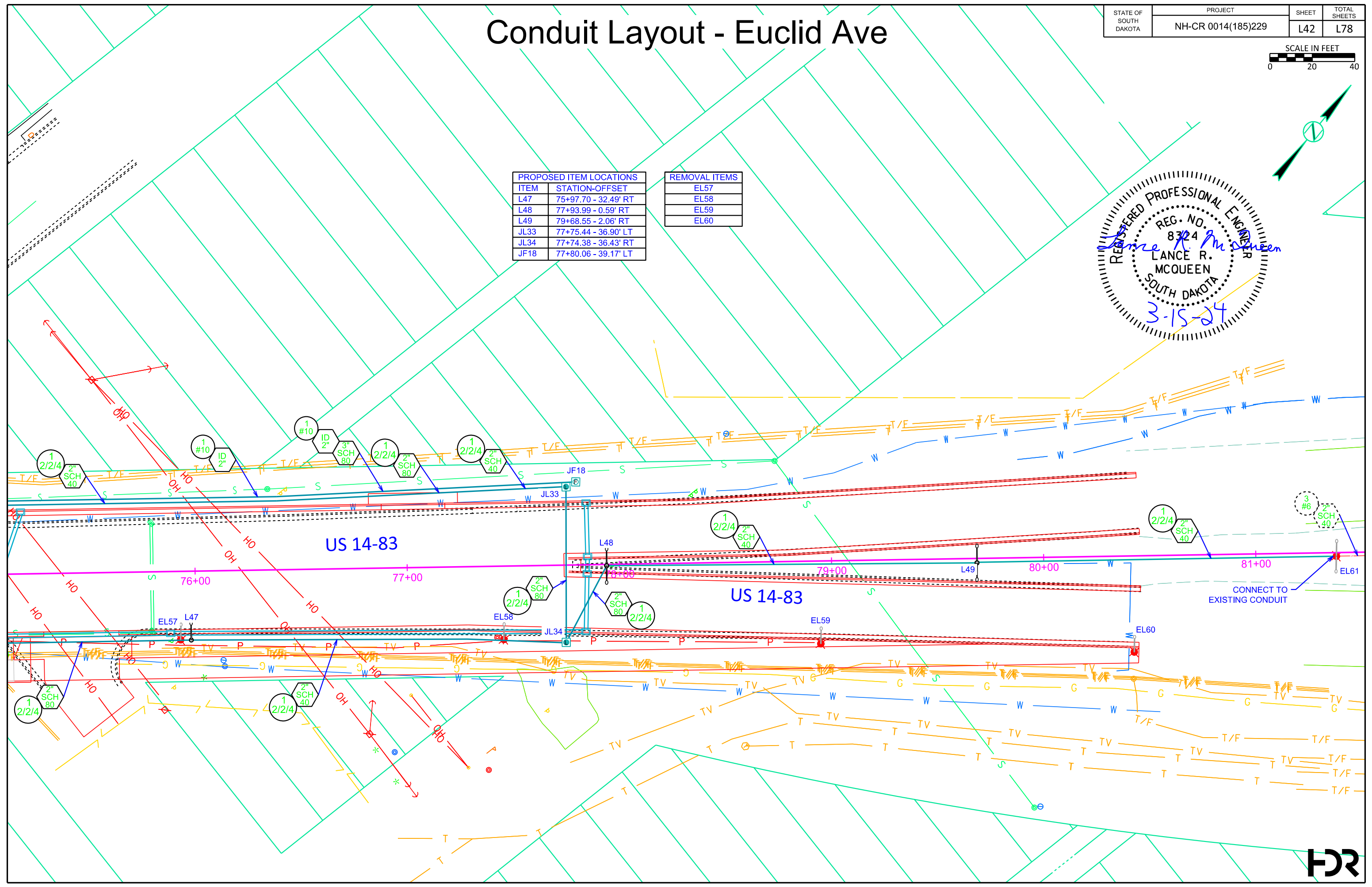
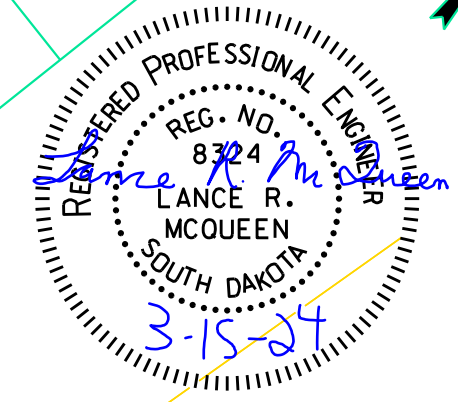


Conduit Layout - Euclid Ave

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0014(185)229	SHEET L42	TOTAL SHEETS L78
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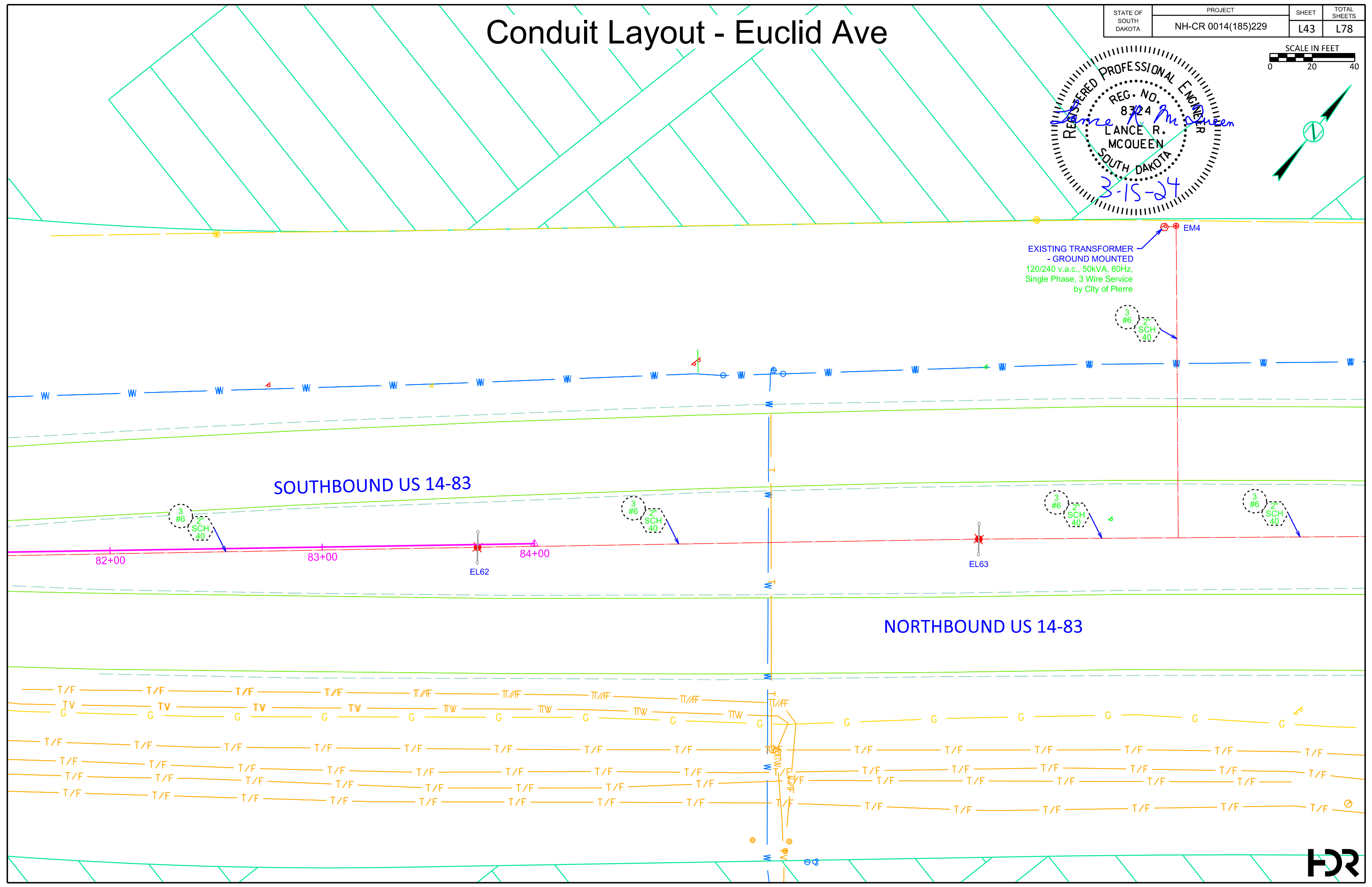
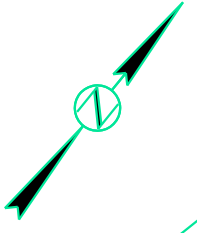
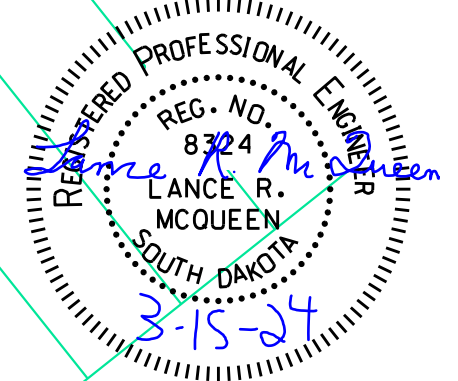


PROPOSED ITEM LOCATIONS		REMOVAL ITEMS	
ITEM	STATION-OFFSET	EL57	
L47	75+97.70 - 32.49' RT	EL58	
L48	77+93.99 - 0.59' RT	EL59	
L49	79+68.55 - 2.06' RT	EL60	
JL33	77+75.44 - 36.90' LT		
JL34	77+74.38 - 36.43' RT		
JF18	77+80.06 - 39.17' LT		



Conduit Layout - Euclid Ave

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0014(185)229	L43	L78

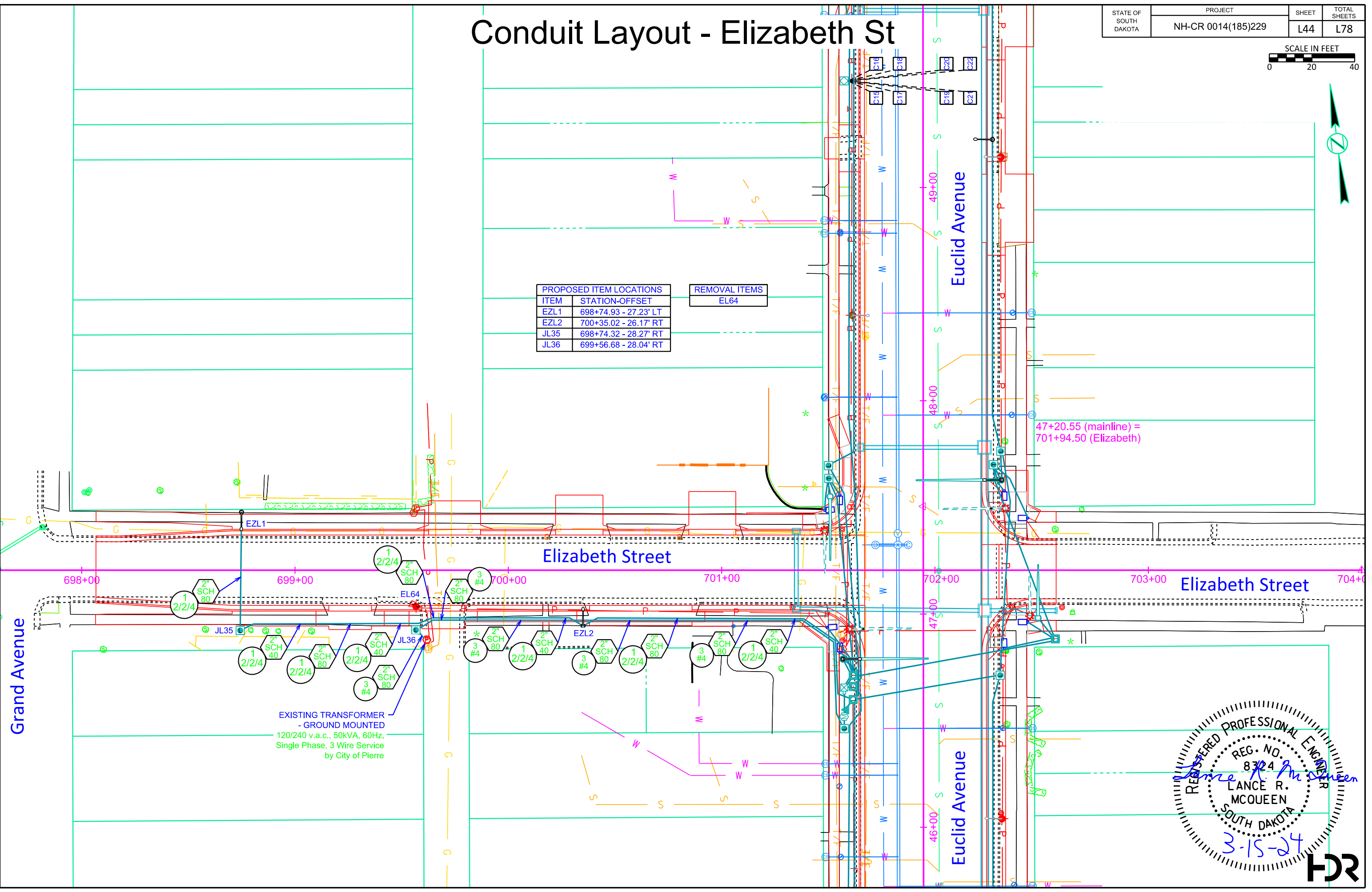


Conduit Layout - Elizabeth St

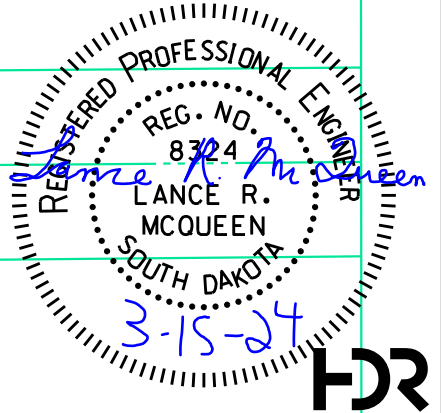


PROPOSED ITEM LOCATIONS		REMOVAL ITEMS
ITEM	STATION-OFFSET	EL64
EZL1	698+74.93 - 27.23' LT	
EZL2	700+35.02 - 26.17' RT	
JL35	698+74.32 - 28.27' RT	
JL36	699+56.68 - 28.04' RT	

47+20.55 (mainline) =
701+94.50 (Elizabeth)

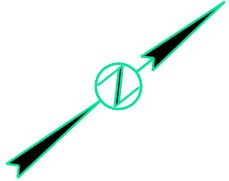


EXISTING TRANSFORMER
- GROUND MOUNTED
120/240 v.a.c., 50kVA, 60Hz,
Single Phase, 3 Wire Service
by City of Pierre

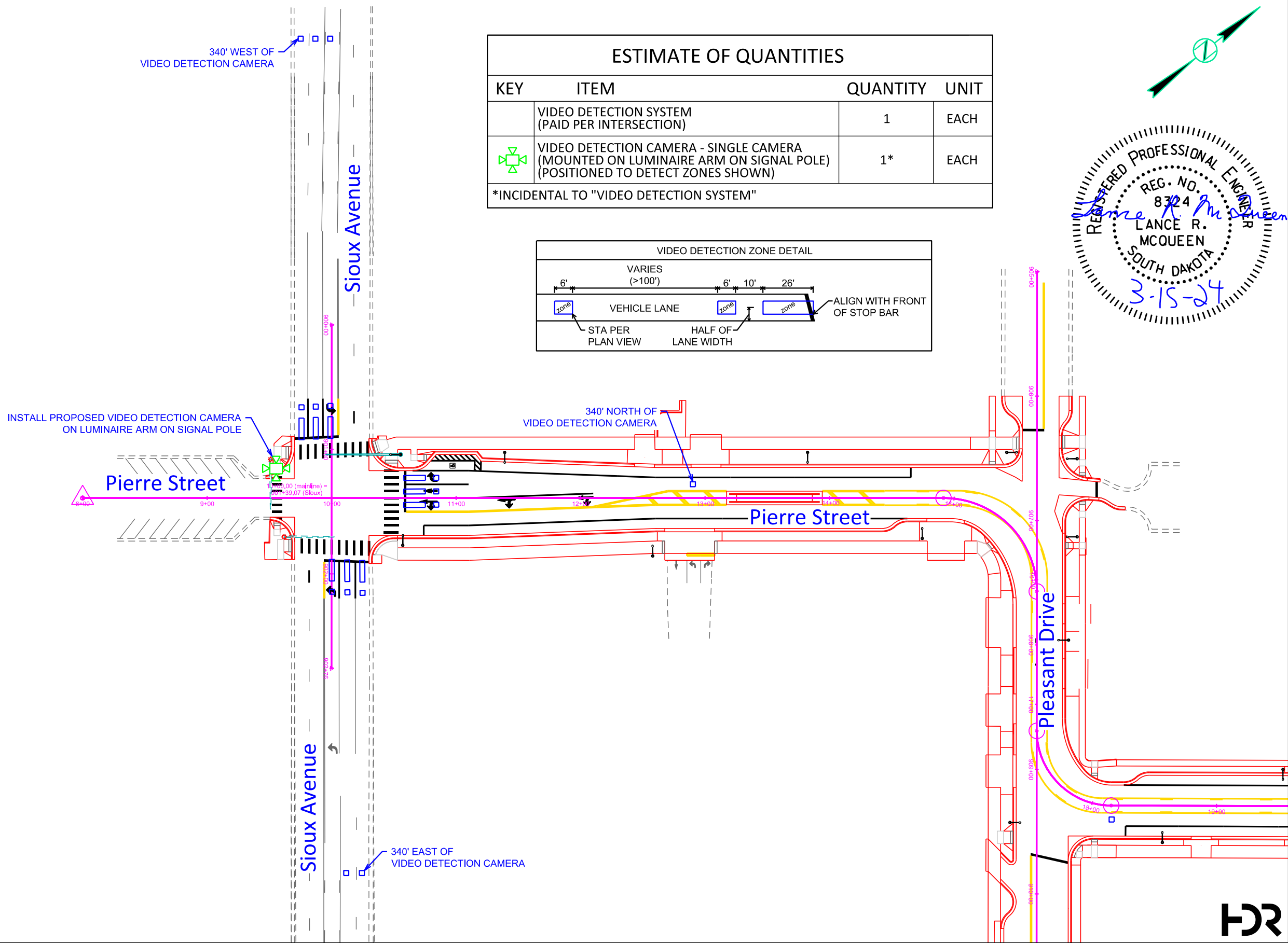
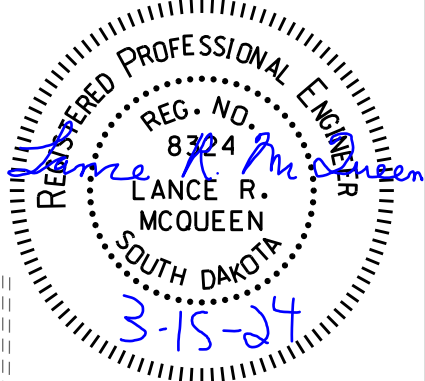
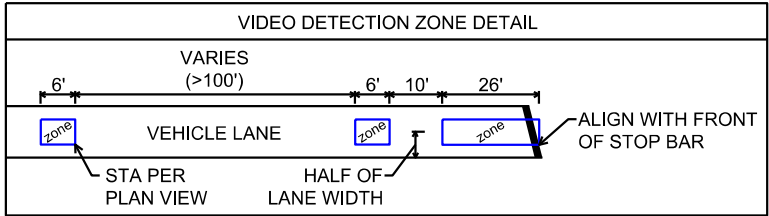


Video Detection Layout

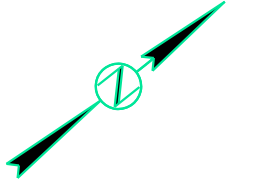
Sioux Avenue & Pierre Street



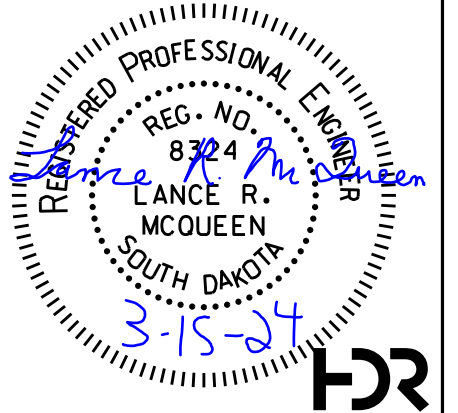
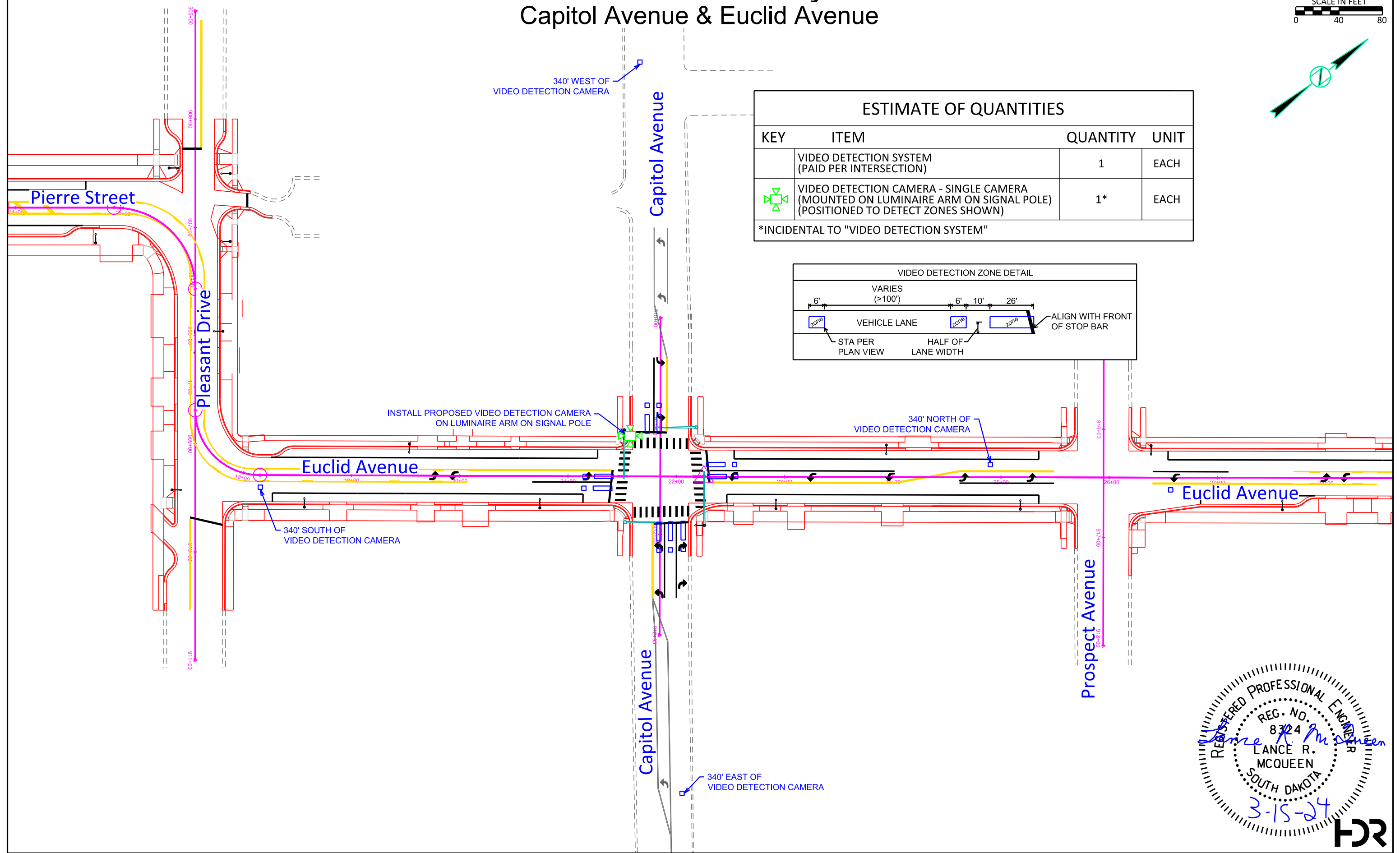
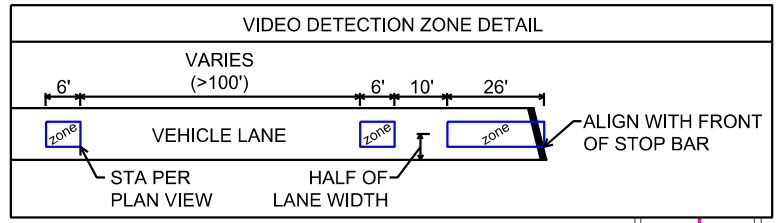
ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
	VIDEO DETECTION SYSTEM (PAID PER INTERSECTION)	1	EACH
	VIDEO DETECTION CAMERA - SINGLE CAMERA (MOUNTED ON LUMINAIRE ARM ON SIGNAL POLE) (POSITIONED TO DETECT ZONES SHOWN)	1*	EACH
*INCIDENTAL TO "VIDEO DETECTION SYSTEM"			



Video Detection Layout Capitol Avenue & Euclid Avenue



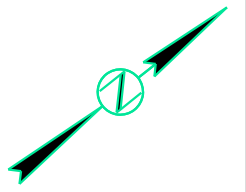
ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
	VIDEO DETECTION SYSTEM (PAID PER INTERSECTION)	1	EACH
	VIDEO DETECTION CAMERA - SINGLE CAMERA (MOUNTED ON LUMINAIRE ARM ON SIGNAL POLE) (POSITIONED TO DETECT ZONES SHOWN)	1*	EACH
*INCIDENTAL TO "VIDEO DETECTION SYSTEM"			



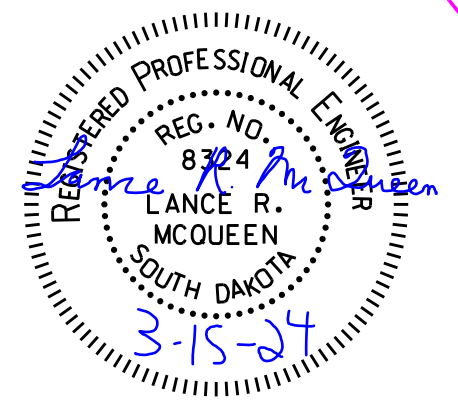
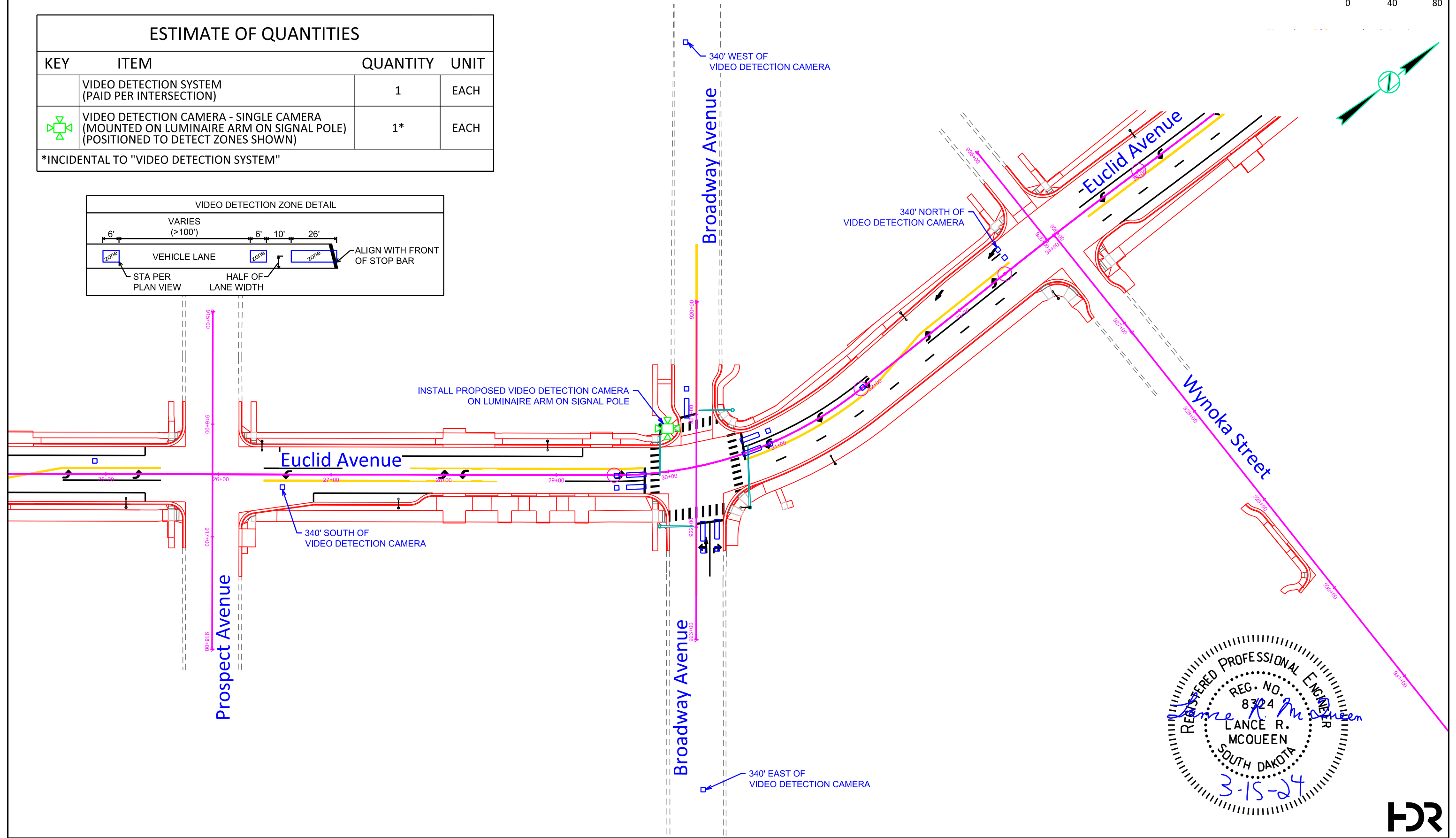
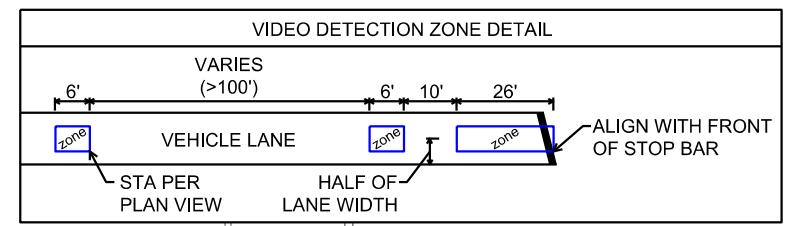
Video Detection Layout

Broadway Avenue & Euclid Avenue

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0014(185)229	SHEET L47	TOTAL SHEETS L78
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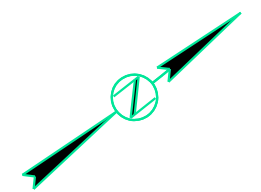
ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
	VIDEO DETECTION SYSTEM (PAID PER INTERSECTION)	1	EACH
	VIDEO DETECTION CAMERA - SINGLE CAMERA (MOUNTED ON LUMINAIRE ARM ON SIGNAL POLE) (POSITIONED TO DETECT ZONES SHOWN)	1*	EACH
*INCIDENTAL TO "VIDEO DETECTION SYSTEM"			



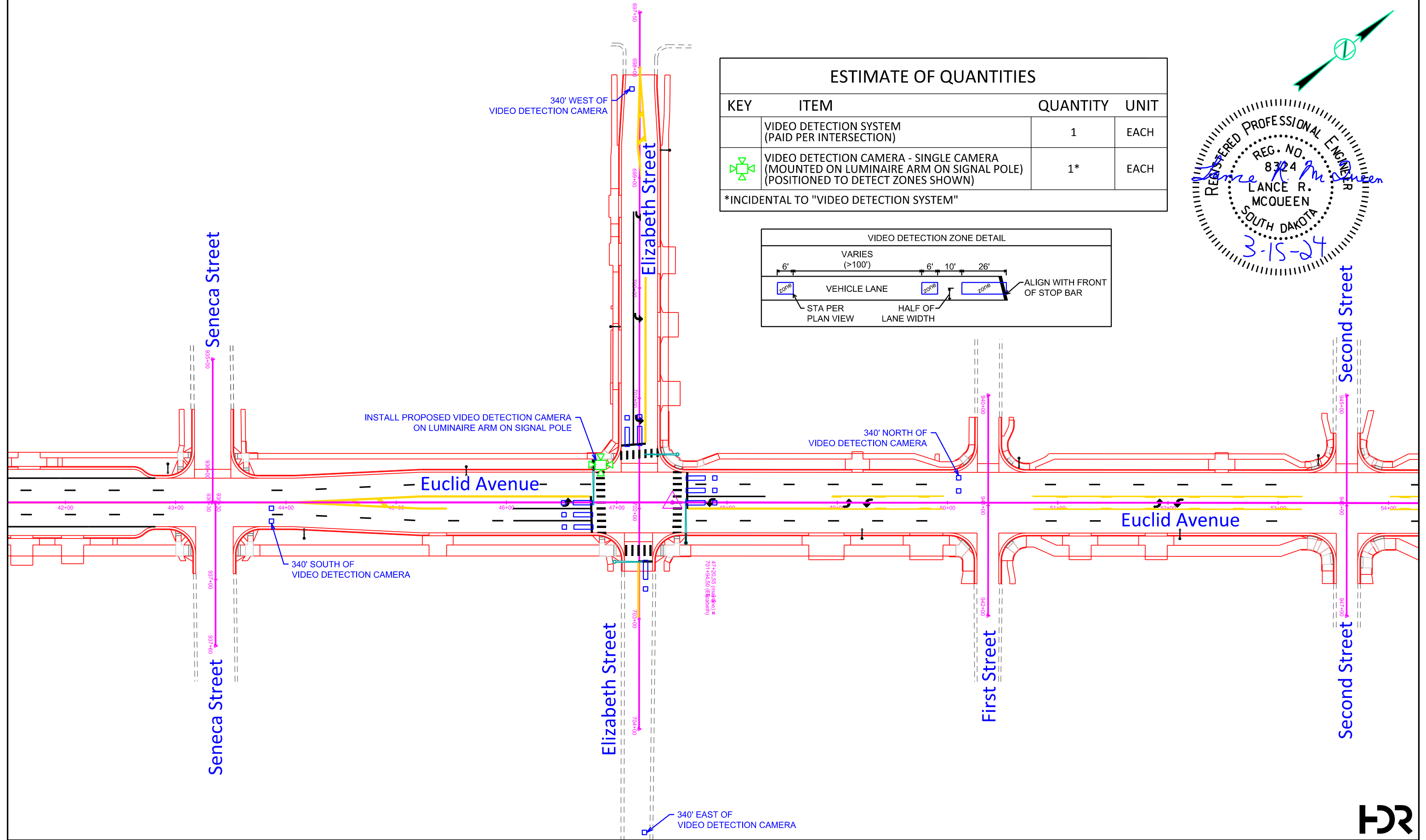
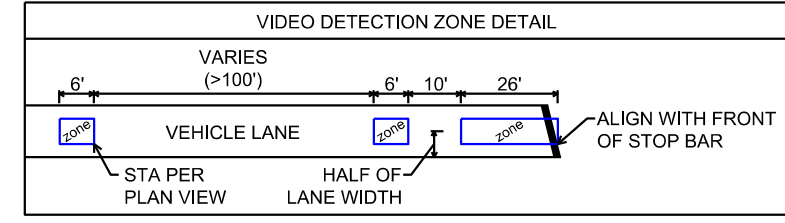
Video Detection Layout

Elizabeth Street & Euclid Avenue

STATE OF SOUTH DAKOTA	PROJECT NH-CR 0014(185)229	SHEET L48	TOTAL SHEETS L78
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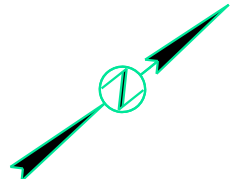


ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
	VIDEO DETECTION SYSTEM (PAID PER INTERSECTION)	1	EACH
	VIDEO DETECTION CAMERA - SINGLE CAMERA (MOUNTED ON LUMINAIRE ARM ON SIGNAL POLE) (POSITIONED TO DETECT ZONES SHOWN)	1*	EACH
*INCIDENTAL TO "VIDEO DETECTION SYSTEM"			

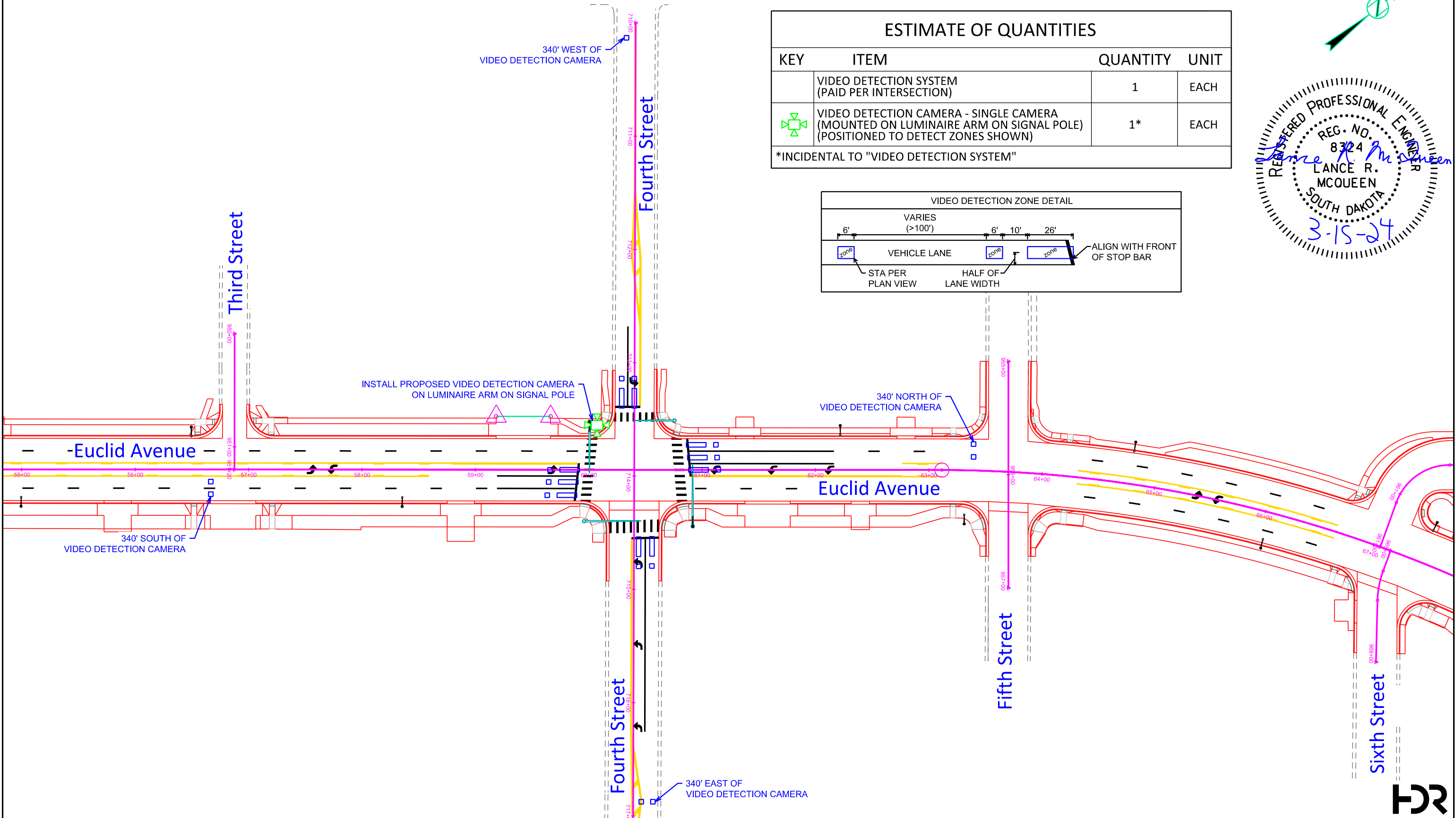
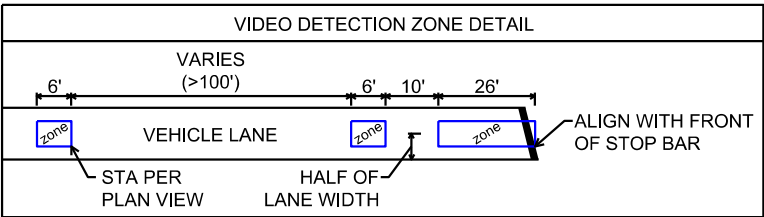
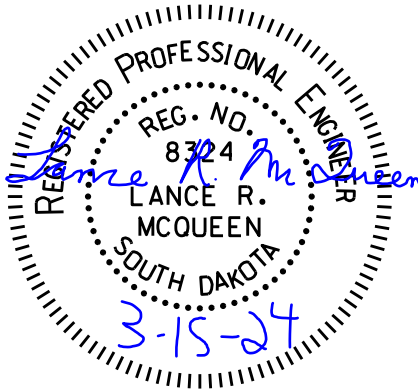


Video Detection Layout

Fourth Street & Euclid Avenue



ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANTITY	UNIT
	VIDEO DETECTION SYSTEM (PAID PER INTERSECTION)	1	EACH
	VIDEO DETECTION CAMERA - SINGLE CAMERA (MOUNTED ON LUMINAIRE ARM ON SIGNAL POLE) (POSITIONED TO DETECT ZONES SHOWN)	1*	EACH
*INCIDENTAL TO "VIDEO DETECTION SYSTEM"			



Over-Height Detection System



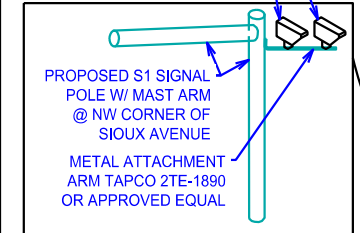
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0014(185)229	L50	L78

WITHIN THE EXISTING SIGNAL CABINET @ THE NW CORNER OF SIOUX AVE, INSTALL THE FOLLOWING:

- 1 WIRELESS COMMUNICATIONS RADIO (TAPCO BLINKERBEAM OR APPROVED EQUAL)
- 1 WIRELESS TRANSCEIVER (INTUICOM DIO OR APPROVED EQUAL)
- 1 WEB-ENABLED PROGRAMMABLE CONTROLLER (CONTROL BY WEB X-310 OR APPROVED EQUAL)
- 1 POWER SUPPLY - 120W (TDK-LAMBA DIN RAIL OR APPROVED EQUAL)
- 1 THERMAL MAGNETIC CIRCUIT BREAKER (PHOENIX CONTACT TMC 8 OR APPROVED EQUAL)
- 1 SINGLE PHASE SURGE PROTECTOR (CITEL DS240 SERIES OR APPROVED EQUAL)
- ALL WIRING FOR A 120V AND 10AMP SYSTEM

Sioux Avenue

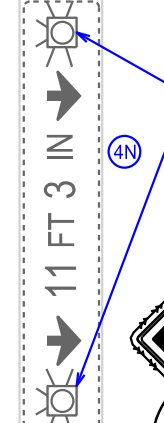
TWO PROPOSED DETECTION HEADS INSTALLED ON ATTACHMENT ARM, INSTALLED ON SIGNAL POLE. HEADS TO FACE NORTH. HEADS TO BE SICK HISIC450 SENSOR INTELLIGENCE OR APPROVED EQUAL.



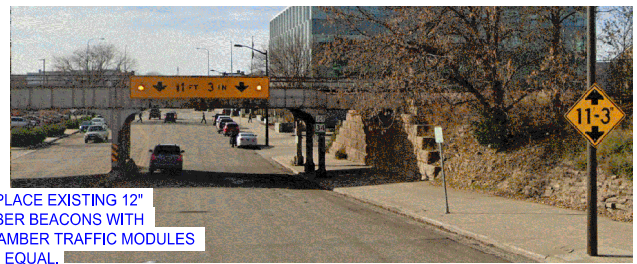
INSTALL PROPOSED CONTROLLER CABINET ON A CONCRETE FOOTING @ THE WEST SIDE BOULEVARD @ SOUTH SIDE OF EXISTING RAILROAD BRIDGE STRUCTURE. PROPOSED CABINET SIZE WILL HAVE NOMINAL DIMENSIONS OF 17" WIDTH, 11" DEPTH, 21" HEIGHT. WITHIN THE PROPOSED CABINET, INSTALL THE FOLLOWING:

- 2 OMNI-DIRECTIONAL ANTENNAS (LAIRD OR APPROVE EQUAL)
- 2 CONTROLLERS (TAPCO IWS OR APPROVED EQUAL)
- 2 WIRELESS COMMUNICATIONS RADIOS (TAPCO BLINKERBEAM OR APPROVED EQUAL)
- 1 POWER SUPPLY - 120W (TDK-LAMBA DIN RAIL OR APPROVED EQUAL)
- 1 THERMAL MAGNETIC CIRCUIT BREAKER (PHOENIX CONTACT TMC 8 OR APPROVED EQUAL)
- 1 BULKHEAD LIGHTNING PROTECTOR (L-COM GLOBAL CONNECTIVITY OR APPROVED EQUAL)
- 1 SINGLE PHASE SURGE PROTECTOR (CITEL DS240 SERIES OR APPROVED EQUAL)
- ALL WIRING FOR A 120V AND 10AMP SYSTEM

DUAL ANTENNAS, CONTROLLERS AND RADIOS WITHIN THE PROPOSED CABINET ARE REQUIRED, TO COMMUNICATE WITH BOTH THE SOUTH AND NORTH DETECTION SYSTEMS.

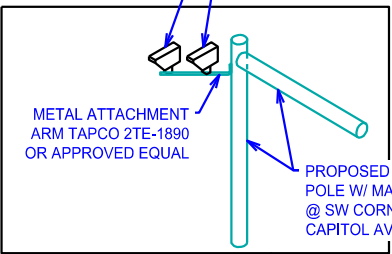


REMOVE & REPLACE EXISTING 12" DIAMETER AMBER BEACONS WITH DIALIGHT LED AMBER TRAFFIC MODULES OR APPROVED EQUAL.



PROPOSED SOLAR POWERED FLASHING BEACON / SIGN. SIGN = R12-2, 36"X36". ACTIVATED FROM CAPITOL AVENUE DETECTION HEADS. FLASHING LED'S PROGRAMMED TO FLASH 15-20 TO 50-60 TIMES PER MINUTE. SIGN WILL BE TAPCO BLINKERSIGN OR APPROVED EQUAL. SIGN WILL INCLUDE ALL WIRELESS RADIOS. INSTALL ON STEEL POLE.

TWO PROPOSED DETECTION HEADS INSTALLED ON ATTACHMENT ARM, INSTALLED ON SIGNAL POLE. HEADS TO FACE SOUTH. HEADS TO BE SICK HISIC450 SENSOR INTELLIGENCE OR APPROVED EQUAL.



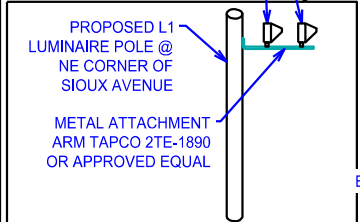
ESTIMATE OF QUANTITIES

KEY	ITEM	QUANTITY	UNIT
	SALVAGE SIGNAL EQUIPMENT (REMOVE EXISTING CABINET ECC2 @ EXISTING RAILROAD BRIDGE STRUCTURE) (REMOVE EXISTING TRAFFIC SIGN @ STA. 14+50, LT)	1	LS
	SIGNAL FLASHER UNIT (CC1 (LARGE) CABINET @ EXISTING RAILROAD BRIDGE STRUCTURE) (SMALL CABINET @ EXISTING POST ON DETOUR SIGN @ PLEASANT DRIVE)	2	EACH
	SIGNAL HEAD BATTERY BACKUP AND FLASH SYSTEM (1 EACH @ CC1 CABINET @ EXISTING RAILROAD BRIDGE STRUCTURE) (INSTALLED WITHIN SIDE MOUNTED CABINET) (INSTALLED ON RIGHT SIDE OF CABINET FRONT)	1	EACH
	WIRELESS INTERCONNECT SYSTEM (1 EACH @ SIOUX AVE, 2 EACH @ EXISTING RR BRIDGE, 1 EACH @ CAPITOL AVE)	4	EACH
	MISCELLANEOUS SIGNAL PARTS (REPLACEMENT OF 6 EXISTING AMBER BEACONS)	1	LS
	SOLAR POWERED FLASHING BEACON (1 EACH @ STA. 11+60, 1 EACH @ STA. 14+50, 1 EACH @ STA. 20+30)	3	EACH
	OVER-HEIGHT VEHICLE DETECTION SYSTEM (1 EACH @ SIOUX AVE, 1 EACH @ CAPITOL AVE)	2	EACH

ALL MISCELLANEOUS EQUIPMENT DISCUSSED ON THIS SHEET TO MAKE THE PROPOSED SYSTEMS FULLY FUNCTIONAL, BUT NOT STATED TO BE INCLUDED IN A SPECIFIC BID ITEM, WILL BE INCIDENTAL TO THE APPROPRIATE BID ITEM(S) LISTED ABOVE. THIS WILL INCLUDE, BUT NOT LIMITED TO; ALL ANTENNAS, RADIOS, TRANSCEIVERS, CONTROLLERS, SOLAR PANELS, BATTERIES, POWER SUPPLIES, CIRCUIT BREAKERS, SURGE PROTECTORS, LIGHTNING PROTECTORS, WIRING, CABLES, ETC.

Pierre Street

TWO PROPOSED DETECTION HEADS INSTALLED ON ATTACHMENT ARM, INSTALLED ON LUMINAIRE POLE. HEADS TO FACE SOUTH. HEADS TO BE SICK HISIC450 SENSOR INTELLIGENCE OR APPROVED EQUAL.

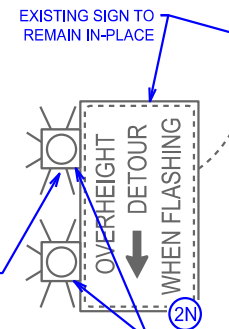
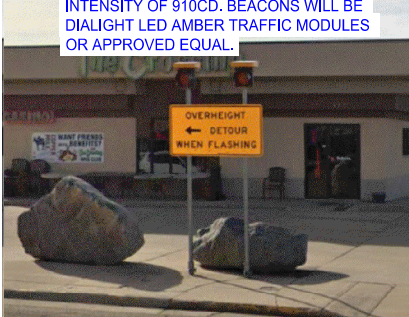


PROPOSED SOLAR POWERED FLASHING BEACON / SIGN. SIGN = R12-2, 36"X36". ACTIVATED FROM SIOUX AVENUE DETECTION HEADS. FLASHING LED'S PROGRAMMED TO FLASH 15-20 TO 50-60 TIMES PER MINUTE. SIGN WILL BE TAPCO BLINKERSIGN OR APPROVED EQUAL. SIGN WILL INCLUDE ALL WIRELESS RADIOS. INSTALL ON STEEL POLE.

REMOVE & REPLACE EXISTING 12" DIAMETER AMBER BEACONS WITH HIGH BRIGHTNESS / LOW VOLTAGE 12" AMBER BEACONS, WITH A MINIMUM LUMINOUS INTENSITY OF 910CD. BEACONS WILL BE DIALIGHT LED AMBER TRAFFIC MODULES OR APPROVED EQUAL.

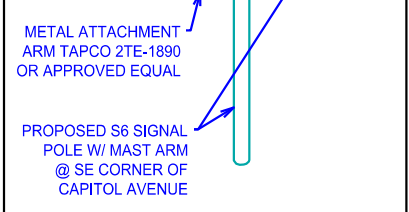
INSTALL PROPOSED CONTROLLER CABINET ON WEST SUPPORT POST OF EXISTING SIGN. PROPOSED CABINET SIZE WILL HAVE NOMINAL DIMENSIONS OF 7" WIDTH, 7" DEPTH, 12" HEIGHT. USE TAPCO CABINET BRACKETS OR APPROVED EQUAL, TO MOUNT CABINET TO EXISTING POST. WITHIN THE PROPOSED CABINET, INSTALL THE FOLLOWING:

- 1 OMNI-DIRECTIONAL ANTENNA (LAIRD OR APPROVE EQUAL)
- 1 NIMH RECHARGEABLE CYLINDRICAL BATTERY (WELL LINK OR APPROVED EQUAL)
- 26 WATT SOLAR PANEL (TAPCO OR APPROVED EQUAL)
- 1 CONTROLLER (TAPCO IWS OR APPROVED EQUAL)
- 1 WIRELESS COMMUNICATIONS RADIO (TAPCO BLINKERBEAM OR APPROVED EQUAL)
- 1 BULKHEAD LIGHTNING PROTECTOR (L-COM GLOBAL CONNECTIVITY OR APPROVED EQUAL)
- 1 SINGLE PHASE SURGE PROTECTOR (CITEL DS240 SERIES OR APPROVED EQUAL)
- ALL WIRING FOR A 120V AND 10AMP SYSTEM



REMOVE & REPLACE EXISTING 12" DIAMETER AMBER BEACONS WITH HIGH BRIGHTNESS / LOW VOLTAGE 12" AMBER BEACONS, WITH A MINIMUM LUMINOUS INTENSITY OF 910CD. BEACONS WILL BE DIALIGHT LED AMBER TRAFFIC MODULES OR APPROVED EQUAL.

TWO PROPOSED DETECTION HEADS INSTALLED ON ATTACHMENT ARM, INSTALLED ON SIGNAL POLE. HEADS TO FACE SOUTH. HEADS TO BE SICK HISIC450 SENSOR INTELLIGENCE OR APPROVED EQUAL.



PROPOSED SOLAR POWERED FLASHING BEACON / SIGN. SIGN = R12-2, 36"X36". ACTIVATED FROM CAPITOL AVENUE DETECTION HEADS. FLASHING LED'S PROGRAMMED TO FLASH 15-20 TO 50-60 TIMES PER MINUTE. SIGN WILL BE TAPCO BLINKERSIGN OR APPROVED EQUAL. SIGN WILL INCLUDE ALL WIRELESS RADIOS. INSTALL ON STEEL POLE.



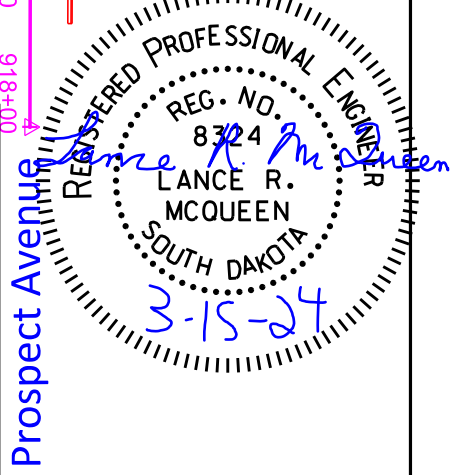
Pleasant Drive

WITHIN THE PROPOSED SIGNAL CABINET @ THE NW CORNER OF CAPITOL AVE, INSTALL THE FOLLOWING:

- 1 WIRELESS COMMUNICATIONS RADIO (TAPCO BLINKERBEAM OR APPROVED EQUAL)
- 1 WIRELESS TRANSCEIVER (INTUICOM DIO OR APPROVED EQUAL)
- 1 WEB-ENABLED PROGRAMMABLE CONTROLLER (CONTROL BY WEB X-310 OR APPROVED EQUAL)
- 1 POWER SUPPLY - 120W (TDK-LAMBA DIN RAIL OR APPROVED EQUAL)
- 1 THERMAL MAGNETIC CIRCUIT BREAKER (PHOENIX CONTACT TMC 8 OR APPROVED EQUAL)
- 1 SINGLE PHASE SURGE PROTECTOR (CITEL DS240 SERIES OR APPROVED EQUAL)
- ALL WIRING FOR A 120V AND 10AMP SYSTEM




Euclid Avenue

- OVER-HEIGHT DETECTION SYSTEM FUNCTIONALITY:
- IF THE 4 DETECTION HEADS @ CAPITOL AVENUE DETECT AN OVER-HEIGHT SOUTHBOUND VEHICLE, THE FOLLOWING IS TRIGGERED:
 - (1N) SOLAR POWERED FLASHING BEACON SOUTH OF CAPITOL AVE
 - (2N) BEACONS ON EXISTING DETOUR SIGN @ PLEASANT DR
 - (3N) SOLAR POWERED FLASHING BEACON / SIGN SOUTH OF PLEASANT DR
 - (4N) OVER-HEIGHT FLASHING BEACONS MOUNTED TO NORTH SIDE OF THE EXISTING RAILROAD BRIDGE STRUCTURE
 - IF THE 4 DETECTION HEADS @ SIOUX AVENUE DETECT AN OVER-HEIGHT NORTHBOUND VEHICLE, THE FOLLOWING IS TRIGGERED:
 - (1S) SOLAR POWERED FLASHING BEACON / SIGN NORTH OF SIOUX AVE
 - (2S) OVER-HEIGHT FLASHING BEACONS MOUNTED TO SOUTH SIDE OF THE EXISTING RAILROAD BRIDGE STRUCTURE

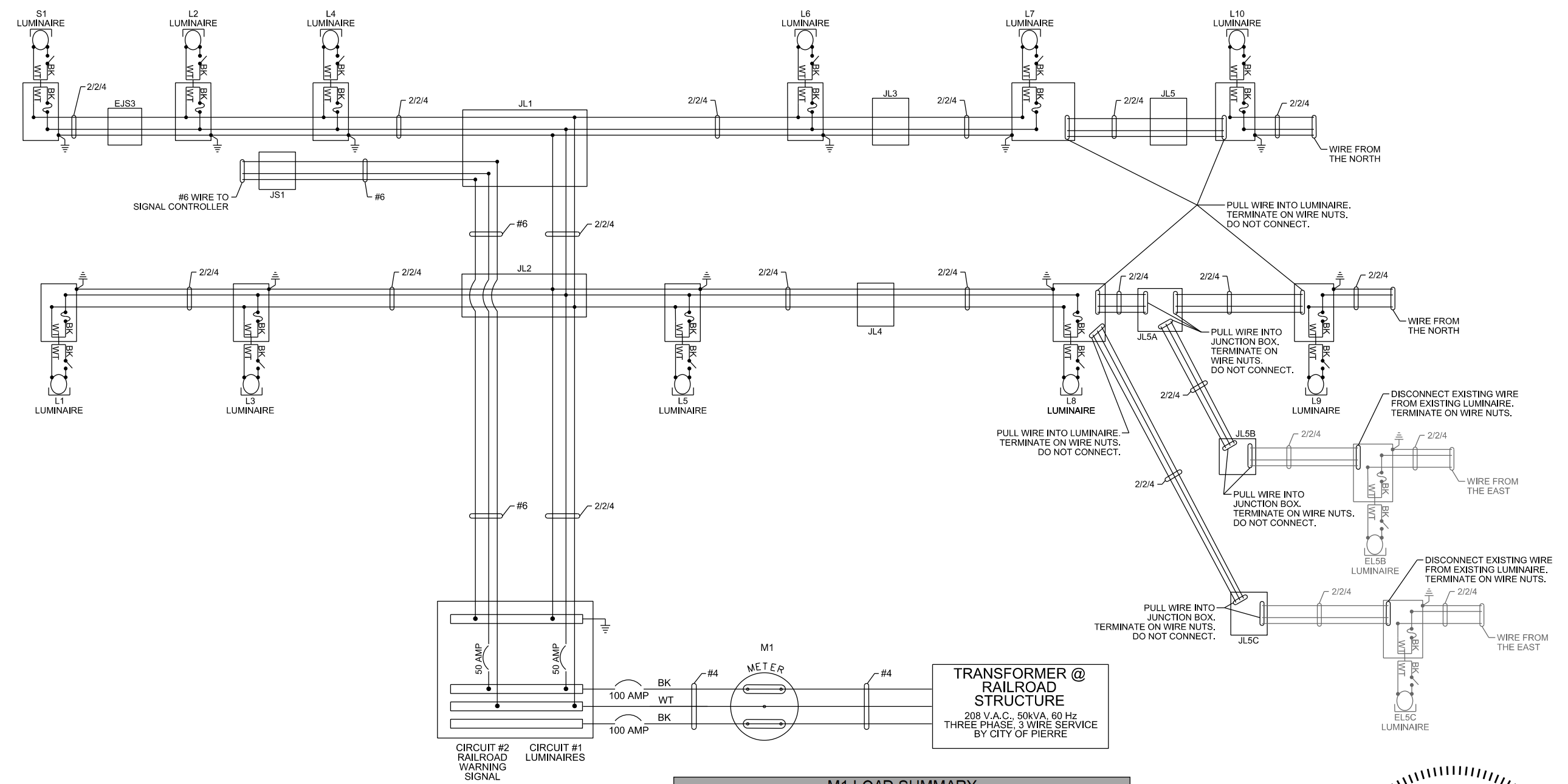


Lighting Wiring Diagram

Railroad Structure & Pierre Street

- LEGEND:**
-  LUMINAIRE: 106 WATT LED LAMP
 -  TERMINATE ON WIRE NUTS
 -  10AMP FUSE

NOTE:
ALL CIRCUITS WILL BE BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. QUANTITIES FOR BONDING CONDUCTORS ARE NOT INCLUDED IN THESE PLANS.



M1 LOAD SUMMARY				
Circuit #	No. of 106W Luminaires	Signals	ID	Load (Amps)
1	9		L1-L8,S1	4.38
2		1	RR Warning Signal	3.00
Total:				7.38
Total KVA:				1.77

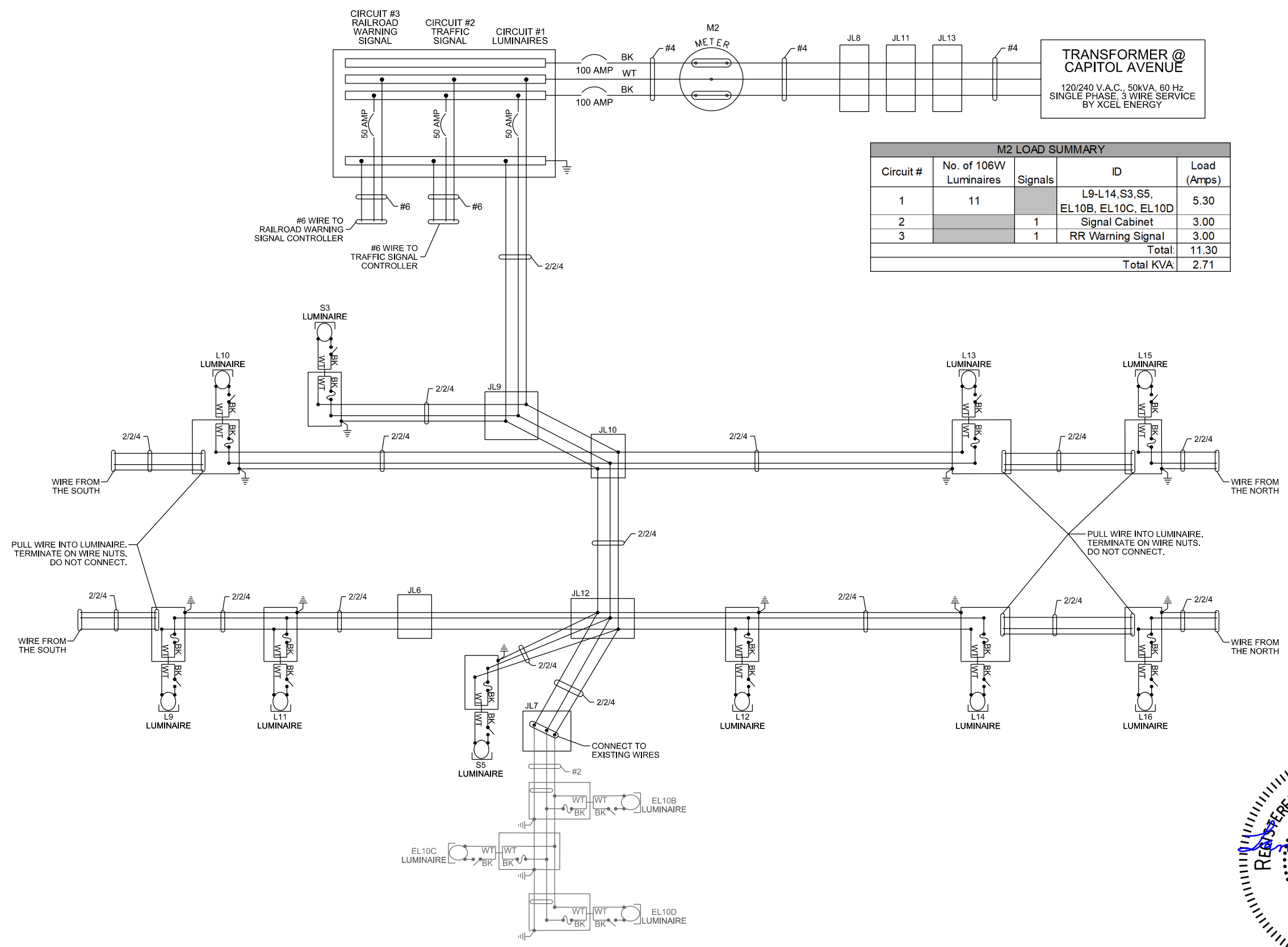


Lighting Wiring Diagram

Capitol Avenue & Euclid Avenue

- LEGEND:
- LUMINAIRE: 106 WATT LED LAMP
 - TERMINATE ON WIRE NUTS
 - 10AMP FUSE

NOTE:
ALL CIRCUITS WILL BE BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. QUANTITIES FOR BONDING CONDUCTORS ARE NOT INCLUDED IN THESE PLANS.






Circuit #	No. of 106W Luminaires	Signals	ID	Load (Amps)
1	11		L9-L14, S3, S5, EL10B, EL10C, EL10D	5.30
2		1	Signal Cabinet	3.00
3		1	RR Warning Signal	3.00
Total:				11.30
Total KVA:				2.71

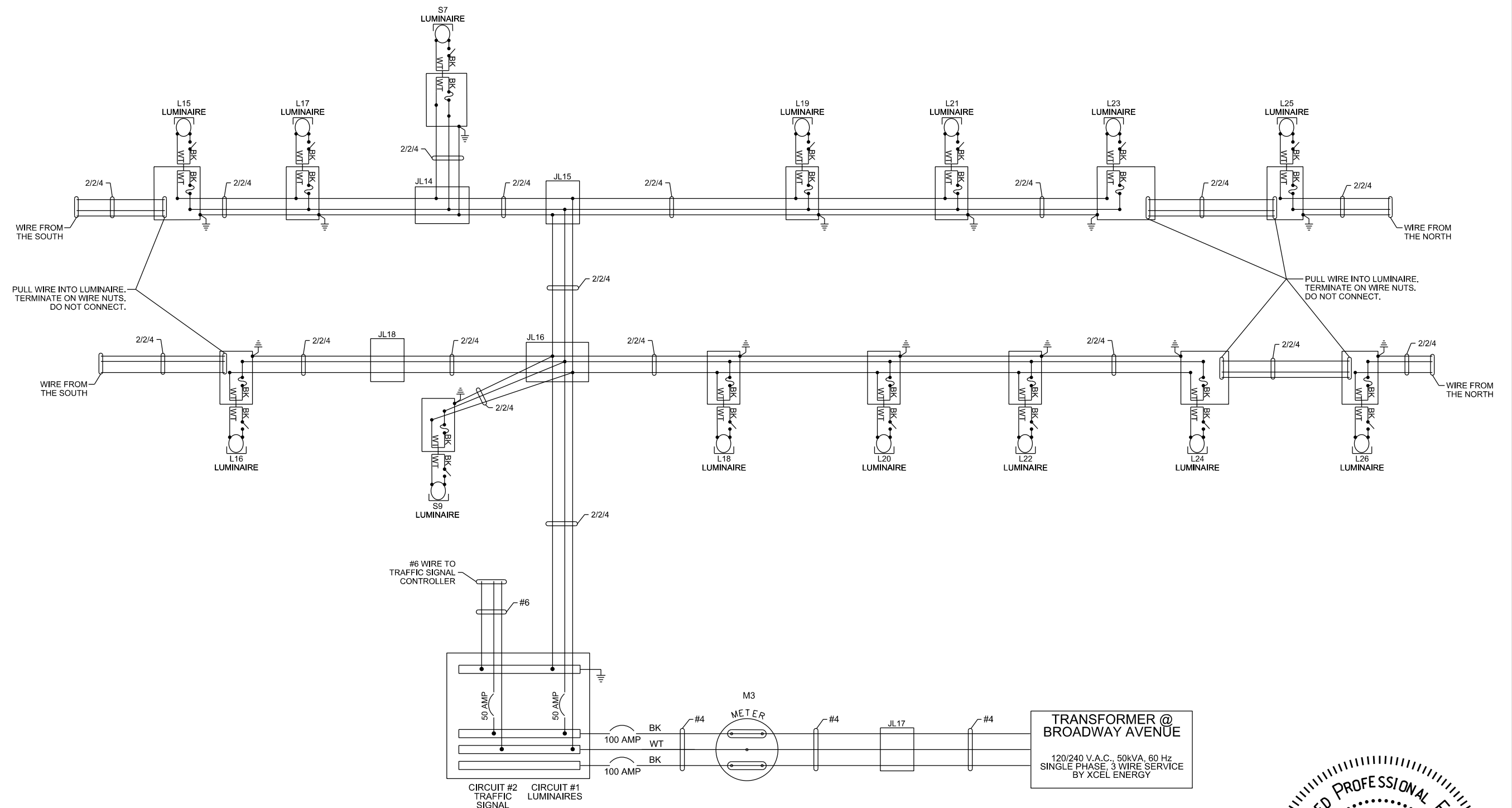


Lighting Wiring Diagram

Broadway Avenue & Euclid Avenue

- LEGEND:**
-  LUMINAIRE: 106 WATT LED LAMP
 -  TERMINATE ON WIRE NUTS
 -  10AMP FUSE

NOTE:
ALL CIRCUITS WILL BE BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. QUANTITIES FOR BONDING CONDUCTORS ARE NOT INCLUDED IN THESE PLANS.



M3 LOAD SUMMARY				
Circuit #	No. of 106W Luminaires	Signals	ID	Load (Amps)
1	12		L15-L24, S7, S9	5.30
2		1	Signal Cabinet	3.00
Total:				8.30
Total KVA:				1.99



Lighting Wiring Diagram

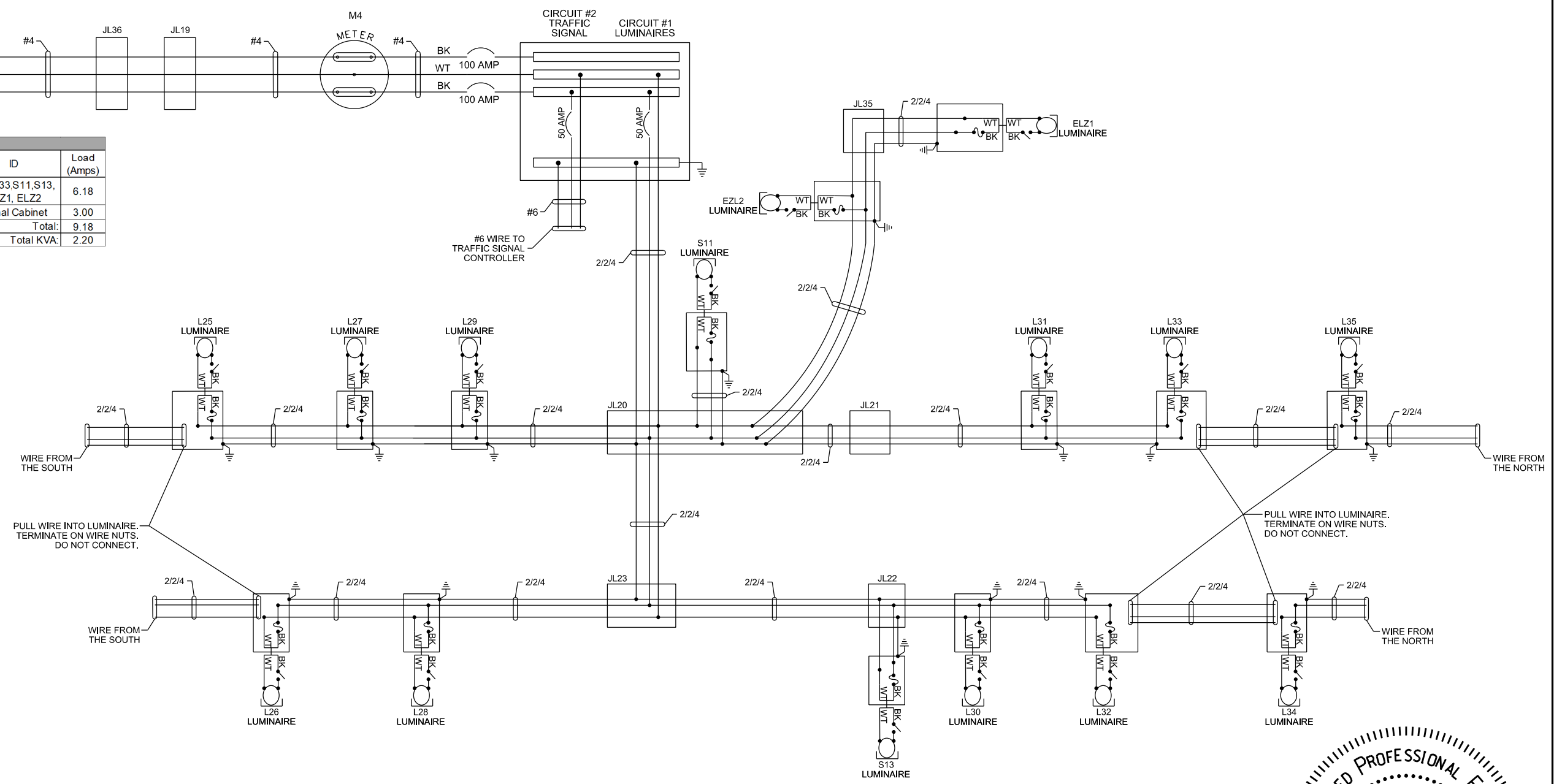
Elizabeth Street & Euclid Avenue

- LEGEND:
- LUMINAIRE: 106 WATT LED LAMP
 - TERMINATE ON WIRE NUTS
 - 10AMP FUSE

NOTE:
 ALL CIRCUITS WILL BE BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
 QUANTITIES FOR BONDING CONDUCTORS ARE NOT INCLUDED IN THESE PLANS.

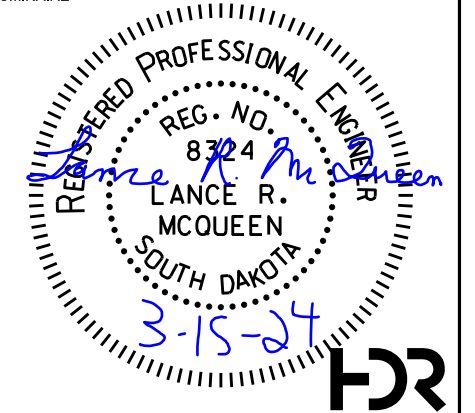
TRANSFORMER @ ELIZABETH STREET
 120/240 V.A.C., 50KVA, 60 Hz
 SINGLE PHASE, 3 WIRE SERVICE
 BY XCEL ENERGY

M4 LOAD SUMMARY				
Circuit #	No. of 106W Luminaires	Signals	ID	Load (Amps)
1	13		L25-L33 S11, S13, ELZ1, ELZ2	6.18
2		1	Signal Cabinet	3.00
Total:				9.18
Total KVA:				2.20



PULL WIRE INTO LUMINAIRE. TERMINATE ON WIRE NUTS. DO NOT CONNECT.

PULL WIRE INTO LUMINAIRE. TERMINATE ON WIRE NUTS. DO NOT CONNECT.

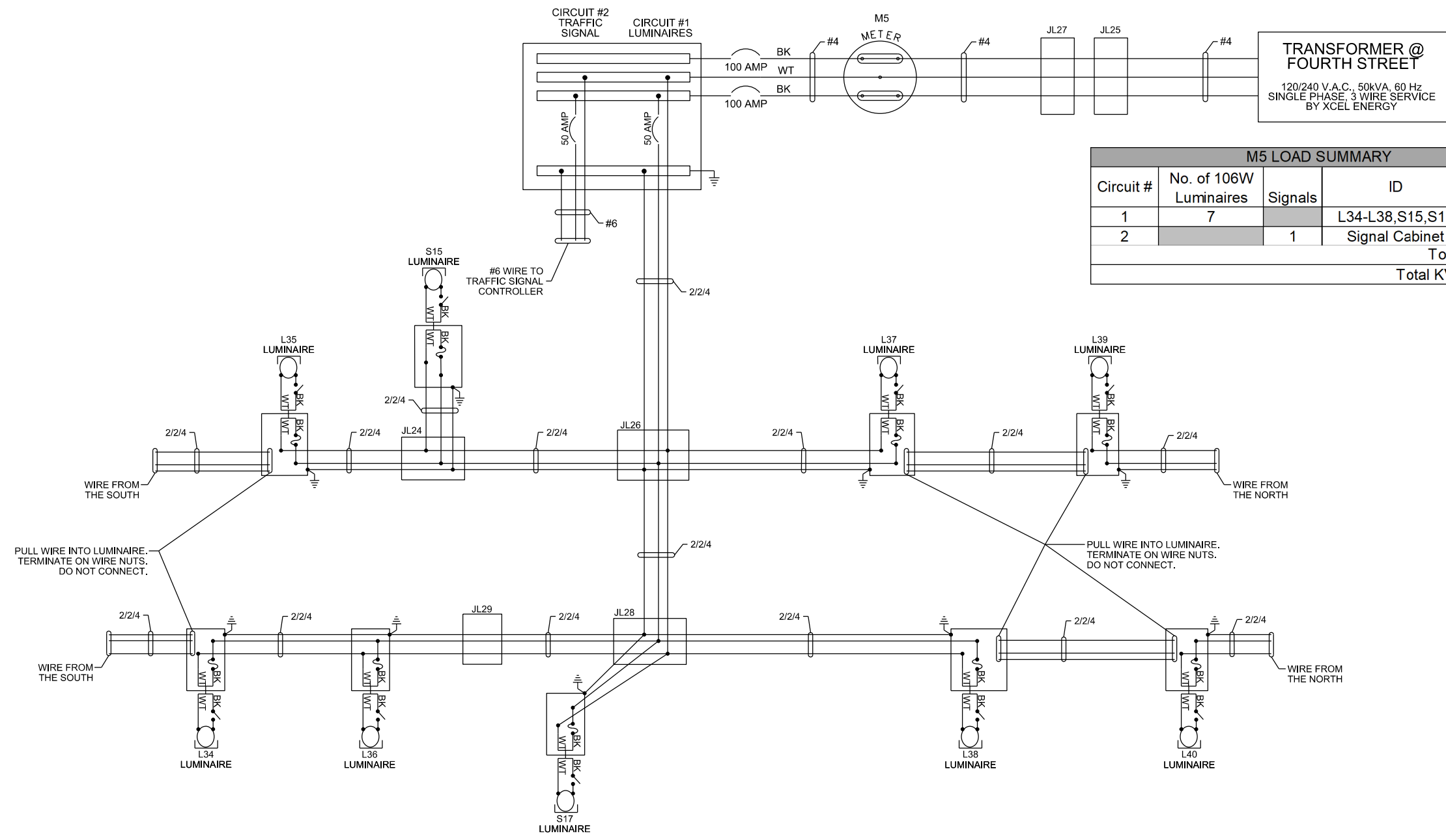


Lighting Wiring Diagram

Fourth Street & Euclid Avenue

- LEGEND:
- LUMINAIRE: 106 WATT LED LAMP
 - TERMINATE ON WIRE NUTS
 - 10AMP FUSE

NOTE:
 ALL CIRCUITS WILL BE BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. QUANTITIES FOR BONDING CONDUCTORS ARE NOT INCLUDED IN THESE PLANS.






TRANSFORMER @ FOURTH STREET
 120/240 V.A.C., 50KVA, 60 Hz
 SINGLE PHASE, 3 WIRE SERVICE
 BY XCEL ENERGY

M5 LOAD SUMMARY				
Circuit #	No. of 106W Luminaires	Signals	ID	Load (Amps)
1	7		L34-L38,S15,S17	3.53
2		1	Signal Cabinet	3.00
Total:				6.53
Total KVA:				1.57

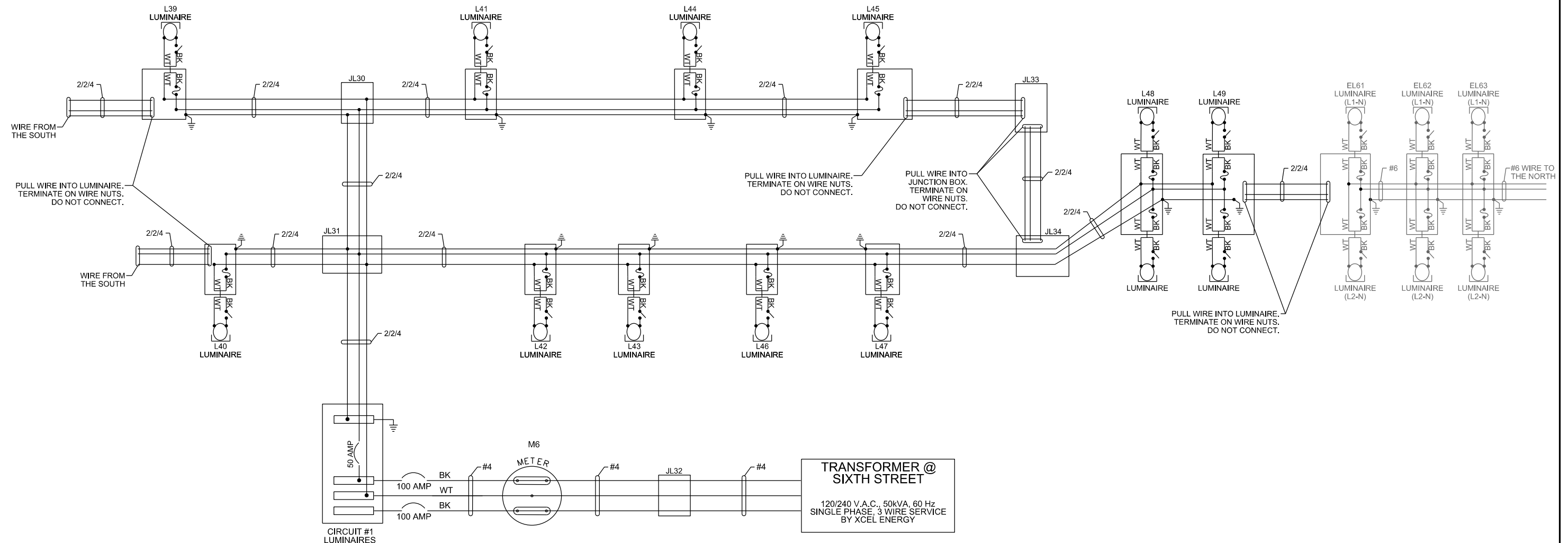


Lighting Wiring Diagram

Sixth Street & Euclid Avenue

- LEGEND:
-  LUMINAIRE: 106 WATT LED LAMP
 -  TERMINATE ON WIRE NUTS
 -  10AMP FUSE

NOTE:
ALL CIRCUITS WILL BE BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. QUANTITIES FOR BONDING CONDUCTORS ARE NOT INCLUDED IN THESE PLANS.



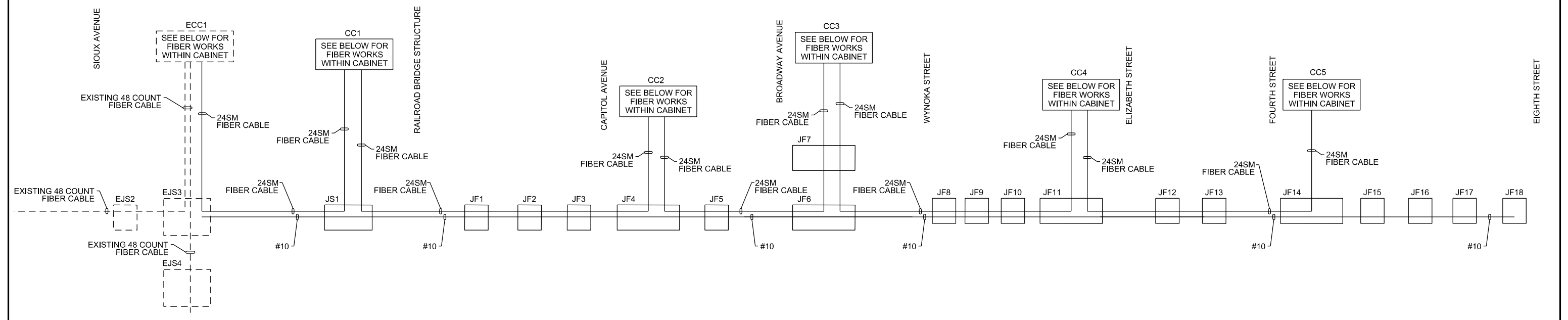
M6 LOAD SUMMARY			
Circuit #	No. of 106W Luminaires	ID	Load (Amps)
1	13	L39-L49	6.18
		Total:	6.18
		Total KVA:	1.48



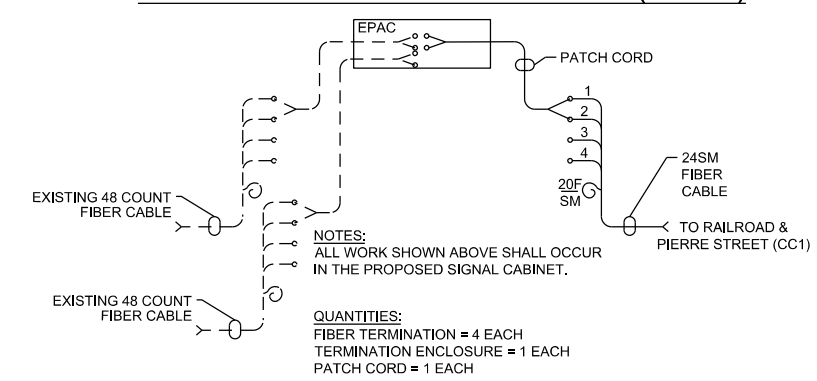
Fiber Optic Cable Diagram

Euclid Avenue

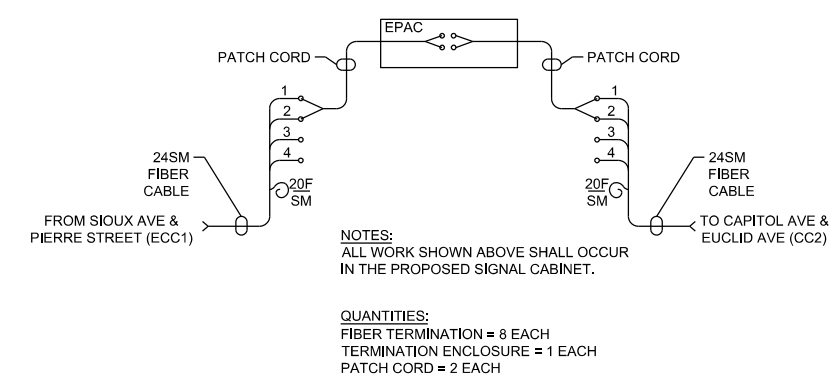
STATE OF SOUTH DAKOTA	PROJECT NH-CR 0014(185)229	SHEET L57	TOTAL SHEETS L78
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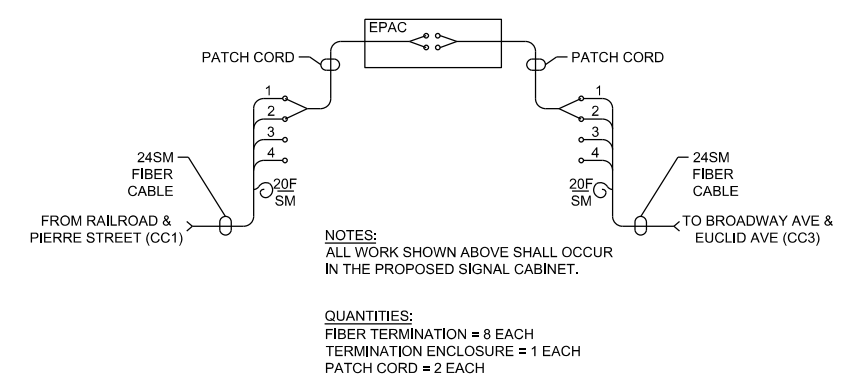
SIoux AVE & PIERRE STREET (ECC1)



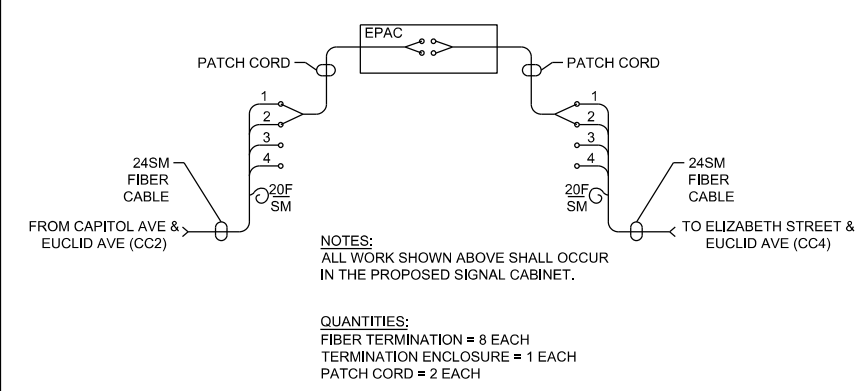
RAILROAD & PIERRE STREET (CC1)



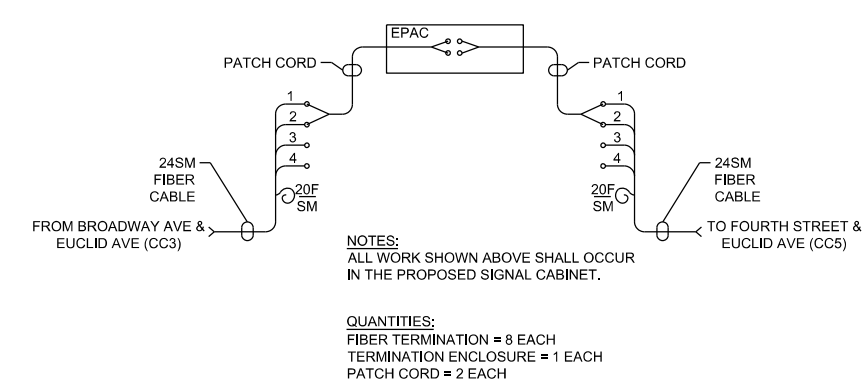
CAPITOL AVE & EUCLID AVE (CC2)



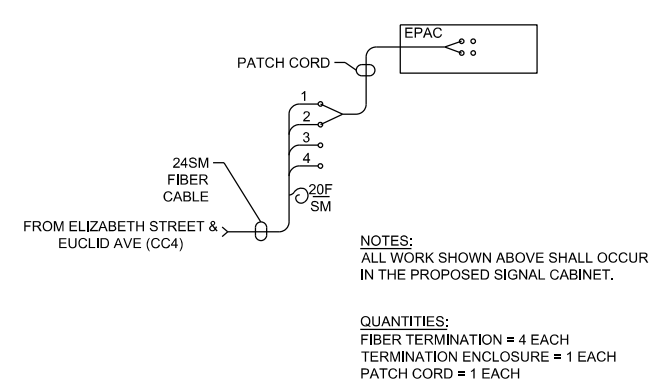
BROADWAY AVE & EUCLID AVE (CC3)



ELIZABETH STREET & EUCLID AVE (CC4)



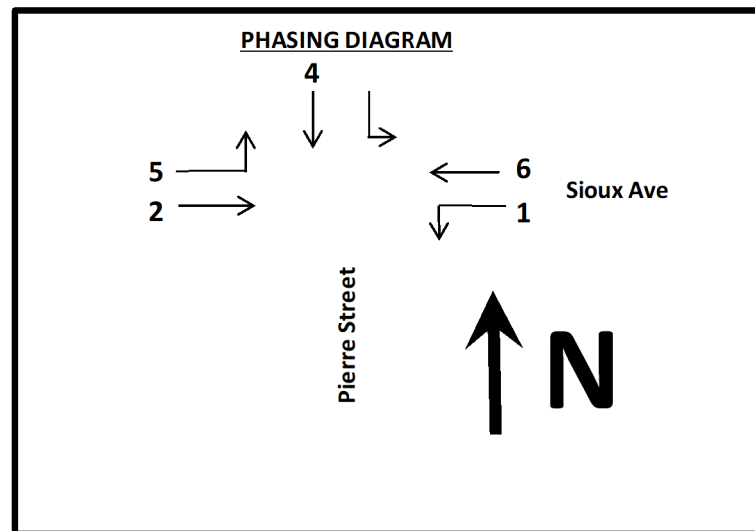
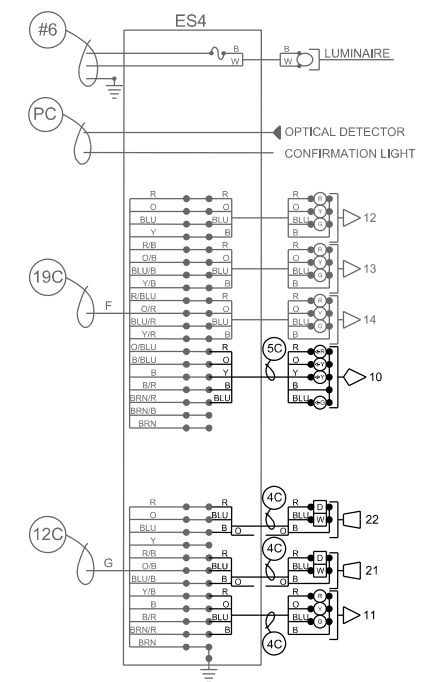
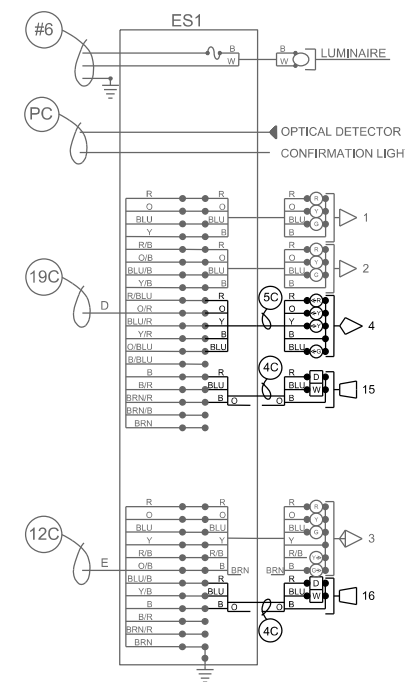
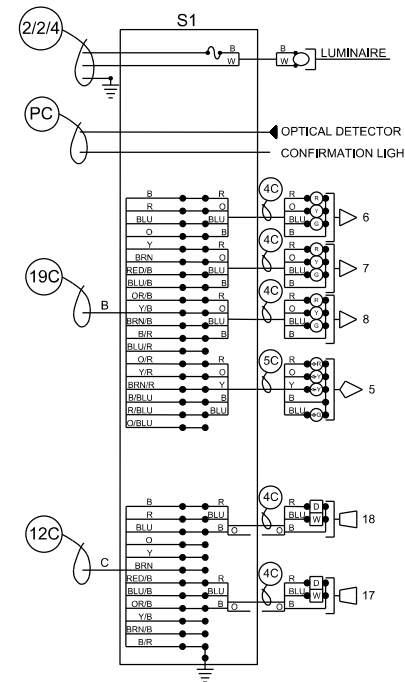
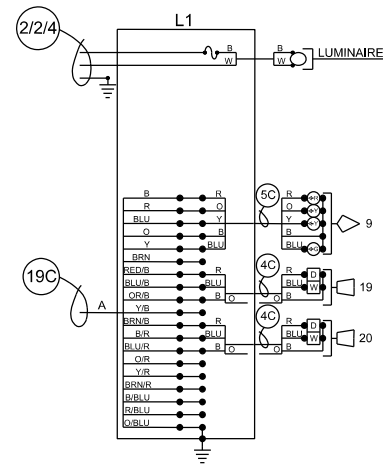
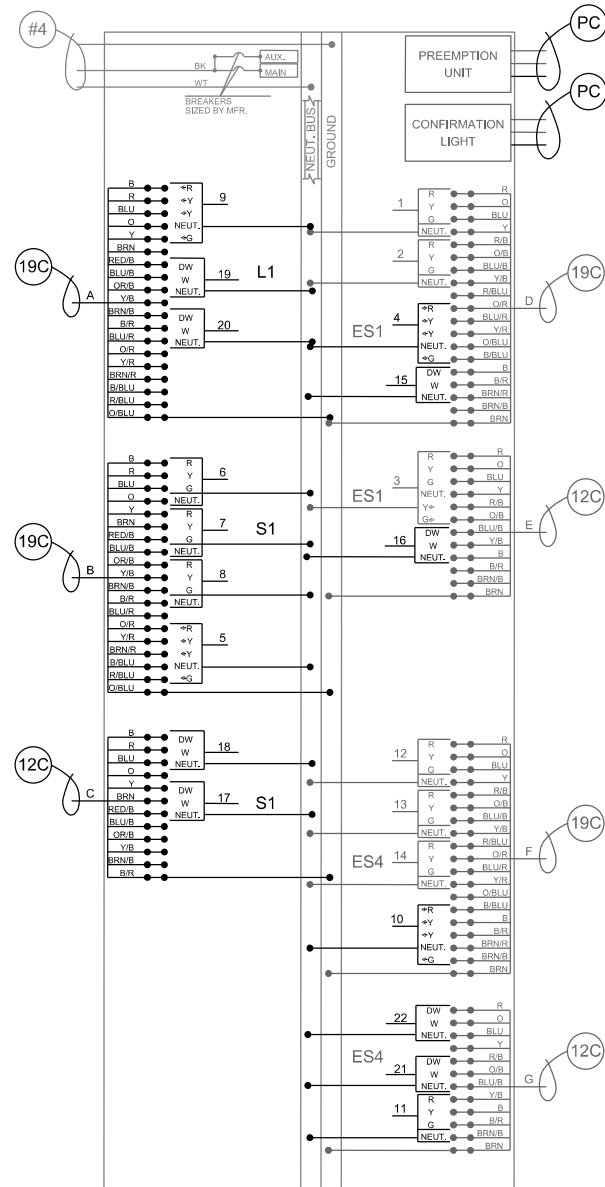
FOURTH STREET & EUCLID AVE (CC5)



Signal Wiring Diagram

Sioux Avenue & Pierre Street

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR 0014(185)229	L58	L78



Signal Wiring Diagram

Capitol Avenue & Euclid Avenue

POLE: S3 CABLE SIZE: 24/C

POLE: S4 CABLE SIZE: 24/C

POLE: S5 CABLE SIZE: 24/C

POLE: S6 CABLE SIZE: 24/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
N	Black	Black	N	1	1
1R	Red	Red	R	1	1
1G	Blue	Blue	G	1	1
1Y	Orange	Orange	Y	1	1
9Y	Yellow	Yellow	FYA	1	1
	Brown				
6R	Red/Black	Red	R	2	6
6G	Blue/Black	Blue	G	2	6
6Y	Orange/Black	Orange	Y	2	6
N	Yellow/Black	Black	N	2	6
	Brown/Black				
N	Black/Red	Black	N	3	6
6G	Blue/Red	Blue	G	3	6
6Y	Orange/Red	Orange	Y	3	6
6R	Yellow/Red	Red	R	3	6
	Brown/Red				
N	Black/Blue	Black	N	4	6
6G	Red/Blue	Blue	G	4	6
6Y	Orange/Blue	Orange	Y	4	6
6R	Yellow/Blue	Red	R	4	6
8G	Brown/Blue	Blue	G	5	8
N	Black/Orange	Black	N	5	8
8Y	Red/Orange	Orange	Y	5	8
8R	Blue/Orange	Red	R	5	8

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
	Black				
	Red				
	Blue				
	Orange				
	Yellow				
	Brown				
8R	Red/Black	Red	R	6	8
8G	Blue/Black	Blue	G	6	8
8Y	Orange/Black	Orange	Y	6	8
N	Yellow/Black	Black	N	6	8
	Brown/Black				
N	Black/Red	Black	N	7	8
8G	Blue/Red	Blue	G	7	8
8Y	Orange/Red	Orange	Y	7	8
8R	Yellow/Red	Red	R	7	8
	Brown/Red				
N	Black/Blue	Black	N	8	5
5R	Red/Blue	Red	R	8	5
5G	Orange/Blue	Blue	G	8	5
5Y	Yellow/Blue	Orange	Y	8	5
11Y	Brown/Blue	Yellow	FYA	8	5
	Black/Orange				
	Red/Orange				
	Blue/Orange				

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
N	Black	Black	N	9	5
5R	Red	Red	R	9	5
5G	Blue	Blue	G	9	5
5Y	Orange	Orange	Y	9	5
11Y	Yellow	Yellow	FYA	9	5
	Brown				
2R	Red/Black	Red	R	10	2
2G	Blue/Black	Blue	G	10	2
2Y	Orange/Black	Orange	Y	10	2
N	Yellow/Black	Black	N	10	2
	Brown/Black				
N	Black/Red	Black	N	11	2
2G	Blue/Red	Blue	G	11	2
2Y	Orange/Red	Orange	Y	11	2
2R	Yellow/Red	Red	R	11	2
	Brown/Red				
N	Black/Blue	Black	N	12	2
2G	Red/Blue	Blue	G	12	2
2Y	Orange/Blue	Orange	Y	12	2
2R	Yellow/Blue	Red	R	12	2
4G	Brown/Blue	Blue	G	13	4
N	Black/Orange	Black	N	13	4
4Y	Red/Orange	Orange	Y	13	4
4R	Blue/Orange	Red	R	13	4

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
	Black				
	Red				
	Blue				
	Orange				
	Yellow				
	Brown				
4R	Red/Black	Red	R	14	4
4G	Blue/Black	Blue	G	14	4
4Y	Orange/Black	Orange	Y	14	4
N	Yellow/Black	Black	N	14	4
	Brown/Black				
N	Black/Red	Black	N	15	4
4G	Blue/Red	Blue	G	15	4
4Y	Orange/Red	Orange	Y	15	4
4R	Yellow/Red	Red	R	15	4
	Brown/Red				
N	Black/Blue	Black	N	16	1
1R	Red/Blue	Red	R	16	1
1G	Orange/Blue	Blue	G	16	1
1Y	Yellow/Blue	Orange	Y	16	1
9Y	Brown/Blue	Yellow	FYA	16	1
	Black/Orange				
	Red/Orange				
	Blue/Orange				

POLE: S3 CABLE SIZE: 7/C

POLE: S4 CABLE SIZE: 7/C

POLE: S5 CABLE SIZE: 7/C

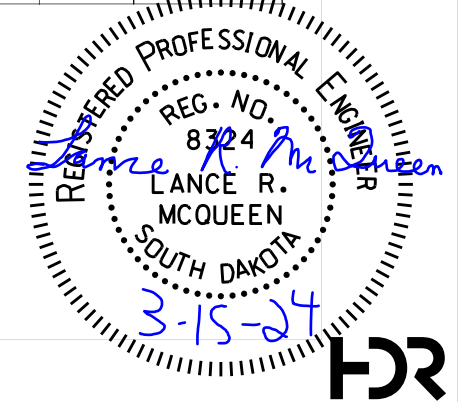
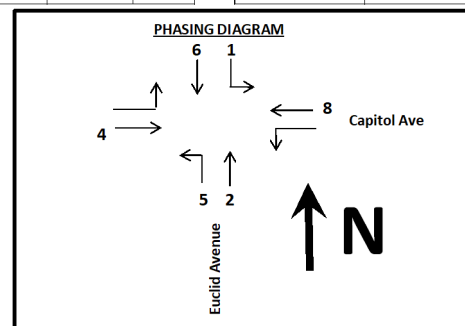
POLE: S6 CABLE SIZE: 7/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
N	Black	Black	N	18	6P
11R	Red	Red	DW	18	6P
11G	Blue	Blue	W	18	6P
10R	Orange	Red	DW	17	4P
	Yellow				
10G	Brown	Blue	W	17	4P
N	Red/Black	Black	N	17	4P

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
N	Black	Black	N	20	8P
12R	Red	Red	DW	20	8P
12G	Blue	Blue	W	20	8P
11R	Orange	Red	DW	19	6P
	Yellow				
11G	Brown	Blue	W	19	6P
N	Red/Black	Black	N	19	6P

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
N	Black	Black	N	22	2P
9R	Red	Red	DW	22	2P
9G	Blue	Blue	W	22	2P
12R	Orange	Red	DW	21	8P
	Yellow				
12G	Brown	Blue	W	21	8P
N	Red/Black	Black	N	21	8P

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
N	Black	Black	N	24	4P
10R	Red	Red	DW	24	4P
10G	Blue	Blue	W	24	4P
9R	Orange	Red	DW	23	2P
	Yellow				
9G	Brown	Blue	W	23	2P
N	Red/Black	Black	N	23	2P



Signal Wiring Diagram

Broadway Avenue & Euclid Avenue

POLE: S7 CABLE SIZE: 24/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	1	1
1R	Red	Red	R	1	1
1G	Blue	Blue	G	1	1
1Y	Orange	Orange	Y	1	1
9Y	Yellow	Yellow	FYA	1	1
	Brown				
6R	Red/Black	Red	R	2	6
6G	Blue/Black	Blue	G	2	6
6Y	Orange/Black	Orange	Y	2	6
N	Yellow/Black	Black	N	2	6
	Brown/Black				
N	Black/Red	Black	N	3	6
6G	Blue/Red	Blue	G	3	6
6Y	Orange/Red	Orange	Y	3	6
6R	Yellow/Red	Red	R	3	6
	Brown/Red				
N	Black/Blue	Black	N	4	6
6G	Red/Blue	Blue	G	4	6
6Y	Orange/Blue	Orange	Y	4	6
6R	Yellow/Blue	Red	R	4	6
8G	Brown/Blue	Blue	G	5	8
N	Black/Orange	Black	N	5	8
8Y	Red/Orange	Orange	Y	5	8
8R	Blue/Orange	Red	R	5	8

POLE: S8 CABLE SIZE: 24/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
	Black				
	Red				
	Blue				
	Orange				
	Yellow				
	Brown				
8R	Red/Black	Red	R	6	8
8G	Blue/Black	Blue	G	6	8
8Y	Orange/Black	Orange	Y	6	8
N	Yellow/Black	Black	N	6	8
	Brown/Black				
N	Black/Red	Black	N	7	8
8G	Blue/Red	Blue	G	7	8
8Y	Orange/Red	Orange	Y	7	8
8R	Yellow/Red	Red	R	7	8
	Brown/Red				
N	Black/Blue	Black	N	8	5
5R	Red/Blue	Red	R	8	5
5G	Orange/Blue	Blue	G	8	5
5Y	Yellow/Blue	Orange	Y	8	5
11Y	Brown/Blue	Yellow	FYA	8	5
	Black/Orange				
	Red/Orange				
	Blue/Orange				

POLE: S9 CABLE SIZE: 24/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	9	5
5R	Red	Red	R	9	5
5G	Blue	Blue	G	9	5
5Y	Orange	Orange	Y	9	5
11Y	Yellow	Yellow	FYA	9	5
	Brown				
2R	Red/Black	Red	R	10	2
2G	Blue/Black	Blue	G	10	2
2Y	Orange/Black	Orange	Y	10	2
N	Yellow/Black	Black	N	10	2
	Brown/Black				
N	Black/Red	Black	N	11	2
2G	Blue/Red	Blue	G	11	2
2Y	Orange/Red	Orange	Y	11	2
2R	Yellow/Red	Red	R	11	2
	Brown/Red				
N	Black/Blue	Black	N	12	2
2G	Red/Blue	Blue	G	12	2
2Y	Orange/Blue	Orange	Y	12	2
2R	Yellow/Blue	Red	R	12	2
4G	Brown/Blue	Blue	G	13	4
N	Black/Orange	Black	N	13	4
4Y	Red/Orange	Orange	Y	13	4
4R	Blue/Orange	Red	R	13	4

POLE: S10 CABLE SIZE: 24/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
	Black				
	Red				
	Blue				
	Orange				
	Yellow				
	Brown				
4R	Red/Black	Red	R	14	4
4G	Blue/Black	Blue	G	14	4
4Y	Orange/Black	Orange	Y	14	4
N	Yellow/Black	Black	N	14	4
	Brown/Black				
N	Black/Red	Black	N	15	4
4G	Blue/Red	Blue	G	15	4
4Y	Orange/Red	Orange	Y	15	4
4R	Yellow/Red	Red	R	15	4
	Brown/Red				
N	Black/Blue	Black	N	16	1
1R	Red/Blue	Red	R	16	1
1G	Orange/Blue	Blue	G	16	1
1Y	Yellow/Blue	Orange	Y	16	1
9Y	Brown/Blue	Yellow	FYA	16	1
	Black/Orange				
	Red/Orange				
	Blue/Orange				

POLE: S7 CABLE SIZE: 7/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	18	6P
11R	Red	Red	DW	18	6P
11G	Blue	Blue	W	18	6P
10R	Orange	Red	DW	17	4P
	Yellow				
10G	Brown	Blue	W	17	4P
N	Red/Black	Black	N	17	4P

POLE: S8 CABLE SIZE: 7/C

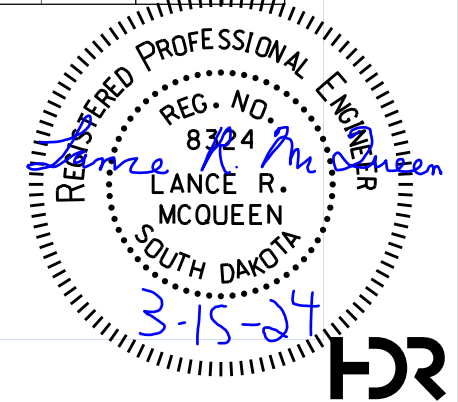
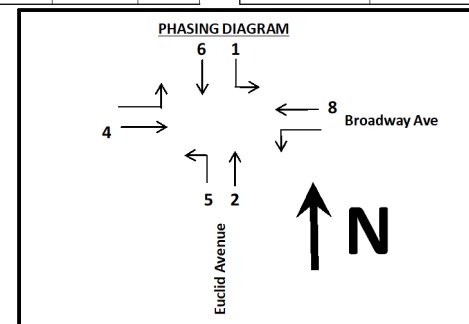
CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	20	8P
12R	Red	Red	DW	20	8P
12G	Blue	Blue	W	20	8P
11R	Orange	Red	DW	19	6P
	Yellow				
11G	Brown	Blue	W	19	6P
N	Red/Black	Black	N	19	6P

POLE: S9 CABLE SIZE: 7/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	22	2P
9R	Red	Red	DW	22	2P
9G	Blue	Blue	W	22	2P
12R	Orange	Red	DW	21	8P
	Yellow				
12G	Brown	Blue	W	21	8P
N	Red/Black	Black	N	21	8P

POLE: S10 CABLE SIZE: 7/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	24	4P
10R	Red	Red	DW	24	4P
10G	Blue	Blue	W	24	4P
9R	Orange	Red	DW	23	2P
	Yellow				
9G	Brown	Blue	W	23	2P
N	Red/Black	Black	N	23	2P



Signal Wiring Diagram

Elizabeth Street & Euclid Avenue

POLE: S11 CABLE SIZE: 24/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	1	1
1R	Red	Red	R	1	1
1G	Blue	Blue	G	1	1
1Y	Orange	Orange	Y	1	1
9Y	Yellow	Yellow	FYA	1	1
	Brown				
6R	Red/Black	Red	R	2	6
6G	Blue/Black	Blue	G	2	6
6Y	Orange/Black	Orange	Y	2	6
N	Yellow/Black	Black	N	2	6
	Brown/Black				
N	Black/Red	Black	N	3	6
6G	Blue/Red	Blue	G	3	6
6Y	Orange/Red	Orange	Y	3	6
6R	Yellow/Red	Red	R	3	6
	Brown/Red				
N	Black/Blue	Black	N	4	6
6G	Red/Blue	Blue	G	4	6
6Y	Orange/Blue	Orange	Y	4	6
6R	Yellow/Blue	Red	R	4	6
8G	Brown/Blue	Blue	G	5	8
N	Black/Orange	Black	N	5	8
8Y	Red/Orange	Orange	Y	5	8
8R	Blue/Orange	Red	R	5	8

POLE: S12 CABLE SIZE: 24/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
	Black				
	Red				
	Blue				
	Orange				
	Yellow				
	Brown				
8R	Red/Black	Red	R	6	8
8G	Blue/Black	Blue	G	6	8
8Y	Orange/Black	Orange	Y	6	8
N	Yellow/Black	Black	N	6	8
	Brown/Black				
N	Black/Red	Black	N	7	8
8G	Blue/Red	Blue	G	7	8
8Y	Orange/Red	Orange	Y	7	8
8R	Yellow/Red	Red	R	7	8
	Brown/Red				
N	Black/Blue	Black	N	8	5
5R	Red/Blue	Red	R	8	5
5G	Orange/Blue	Blue	G	8	5
5Y	Yellow/Blue	Orange	Y	8	5
11Y	Brown/Blue	Yellow	FYA	8	5
	Black/Orange				
	Red/Orange				
	Blue/Orange				

POLE: S13 CABLE SIZE: 24/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	9	5
5R	Red	Red	R	9	5
5G	Blue	Blue	G	9	5
5Y	Orange	Orange	Y	9	5
11Y	Yellow	Yellow	FYA	9	5
	Brown				
2R	Red/Black	Red	R	10	2
2G	Blue/Black	Blue	G	10	2
2Y	Orange/Black	Orange	Y	10	2
N	Yellow/Black	Black	N	10	2
	Brown/Black				
N	Black/Red	Black	N	11	2
2G	Blue/Red	Blue	G	11	2
2Y	Orange/Red	Orange	Y	11	2
2R	Yellow/Red	Red	R	11	2
	Brown/Red				
N	Black/Blue	Black	N	12	2
2G	Red/Blue	Blue	G	12	2
2Y	Orange/Blue	Orange	Y	12	2
2R	Yellow/Blue	Red	R	12	2
4G	Brown/Blue	Blue	G	13	4
N	Black/Orange	Black	N	13	4
4Y	Red/Orange	Orange	Y	13	4
4R	Blue/Orange	Red	R	13	4

POLE: S14 CABLE SIZE: 24/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
	Black				
	Red				
	Blue				
	Orange				
	Yellow				
	Brown				
4R	Red/Black	Red	R	14	4
4G	Blue/Black	Blue	G	14	4
4Y	Orange/Black	Orange	Y	14	4
N	Yellow/Black	Black	N	14	4
	Brown/Black				
N	Black/Red	Black	N	15	4
4G	Blue/Red	Blue	G	15	4
4Y	Orange/Red	Orange	Y	15	4
4R	Yellow/Red	Red	R	15	4
	Brown/Red				
N	Black/Blue	Black	N	16	1
1R	Red/Blue	Red	R	16	1
1G	Orange/Blue	Blue	G	16	1
1Y	Yellow/Blue	Orange	Y	16	1
9Y	Brown/Blue	Yellow	FYA	16	1
	Black/Orange				
	Red/Orange				
	Blue/Orange				

POLE: S11 CABLE SIZE: 7/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	18	6P
11R	Red	Red	DW	18	6P
11G	Blue	Blue	W	18	6P
10R	Orange	Red	DW	17	4P
	Yellow				
10G	Brown	Blue	W	17	4P
N	Red/Black	Black	N	17	4P

POLE: S12 CABLE SIZE: 7/C

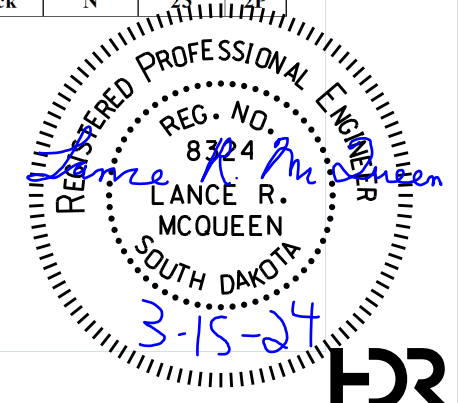
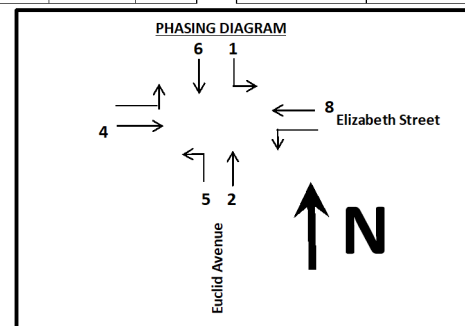
CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	20	8P
12R	Red	Red	DW	20	8P
12G	Blue	Blue	W	20	8P
11R	Orange	Red	DW	19	6P
	Yellow				
11G	Brown	Blue	W	19	6P
N	Red/Black	Black	N	19	6P

POLE: S13 CABLE SIZE: 7/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	22	2P
9R	Red	Red	DW	22	2P
9G	Blue	Blue	W	22	2P
12R	Orange	Red	DW	21	8P
	Yellow				
12G	Brown	Blue	W	21	8P
N	Red/Black	Black	N	21	8P

POLE: S14 CABLE SIZE: 7/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	24	4P
10R	Red	Red	DW	24	4P
10G	Blue	Blue	W	24	4P
9R	Orange	Red	DW	23	2P
	Yellow				
9G	Brown	Blue	W	23	2P
N	Red/Black	Black	N	23	2P



Signal Wiring Diagram

Fourth Street & Euclid Avenue

POLE: S15 CABLE SIZE: 24/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	1	1
1R	Red	Red	R	1	1
1G	Blue	Blue	G	1	1
1Y	Orange	Orange	Y	1	1
9Y	Yellow	Yellow	FYA	1	1
	Brown				
6R	Red/Black	Red	R	2	6
6G	Blue/Black	Blue	G	2	6
6Y	Orange/Black	Orange	Y	2	6
N	Yellow/Black	Black	N	2	6
	Brown/Black				
N	Black/Red	Black	N	3	6
6G	Blue/Red	Blue	G	3	6
6Y	Orange/Red	Orange	Y	3	6
6R	Yellow/Red	Red	R	3	6
	Brown/Red				
N	Black/Blue	Black	N	4	6
6G	Red/Blue	Blue	G	4	6
6Y	Orange/Blue	Orange	Y	4	6
6R	Yellow/Blue	Red	R	4	6
8G	Brown/Blue	Blue	G	5	8
N	Black/Orange	Black	N	5	8
8Y	Red/Orange	Orange	Y	5	8
8R	Blue/Orange	Red	R	5	8

POLE: S16 CABLE SIZE: 24/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
	Black				
	Red				
	Blue				
	Orange				
	Yellow				
	Brown				
8R	Red/Black	Red	R	6	8
8G	Blue/Black	Blue	G	6	8
8Y	Orange/Black	Orange	Y	6	8
N	Yellow/Black	Black	N	6	8
	Brown/Black				
N	Black/Red	Black	N	7	8
8G	Blue/Red	Blue	G	7	8
8Y	Orange/Red	Orange	Y	7	8
8R	Yellow/Red	Red	R	7	8
	Brown/Red				
N	Black/Blue	Black	N	8	5
5R	Red/Blue	Red	R	8	5
5G	Orange/Blue	Blue	G	8	5
5Y	Yellow/Blue	Orange	Y	8	5
11Y	Brown/Blue	Yellow	FYA	8	5
	Black/Orange				
	Red/Orange				
	Blue/Orange				

POLE: S17 CABLE SIZE: 24/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	9	5
5R	Red	Red	R	9	5
5G	Blue	Blue	G	9	5
5Y	Orange	Orange	Y	9	5
11Y	Yellow	Yellow	FYA	9	5
	Brown				
2R	Red/Black	Red	R	10	2
2G	Blue/Black	Blue	G	10	2
2Y	Orange/Black	Orange	Y	10	2
N	Yellow/Black	Black	N	10	2
	Brown/Black				
N	Black/Red	Black	N	11	2
2G	Blue/Red	Blue	G	11	2
2Y	Orange/Red	Orange	Y	11	2
2R	Yellow/Red	Red	R	11	2
	Brown/Red				
N	Black/Blue	Black	N	12	2
2G	Red/Blue	Blue	G	12	2
2Y	Orange/Blue	Orange	Y	12	2
2R	Yellow/Blue	Red	R	12	2
4G	Brown/Blue	Blue	G	13	4
N	Black/Orange	Black	N	13	4
4Y	Red/Orange	Orange	Y	13	4
4R	Blue/Orange	Red	R	13	4

POLE: S18 CABLE SIZE: 24/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
	Black				
	Red				
	Blue				
	Orange				
	Yellow				
	Brown				
4R	Red/Black	Red	R	14	4
4G	Blue/Black	Blue	G	14	4
4Y	Orange/Black	Orange	Y	14	4
N	Yellow/Black	Black	N	14	4
	Brown/Black				
N	Black/Red	Black	N	15	4
4G	Blue/Red	Blue	G	15	4
4Y	Orange/Red	Orange	Y	15	4
4R	Yellow/Red	Red	R	15	4
	Brown/Red				
N	Black/Blue	Black	N	16	1
1R	Red/Blue	Red	R	16	1
1G	Orange/Blue	Blue	G	16	1
1Y	Yellow/Blue	Orange	Y	16	1
9Y	Brown/Blue	Yellow	FYA	16	1
	Black/Orange				
	Red/Orange				
	Blue/Orange				

POLE: S15 CABLE SIZE: 7/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	18	6P
11R	Red	Red	DW	18	6P
11G	Blue	Blue	W	18	6P
10R	Orange	Red	DW	17	4P
	Yellow				
10G	Brown	Blue	W	17	4P
N	Red/Black	Black	N	17	4P

POLE: S16 CABLE SIZE: 7/C

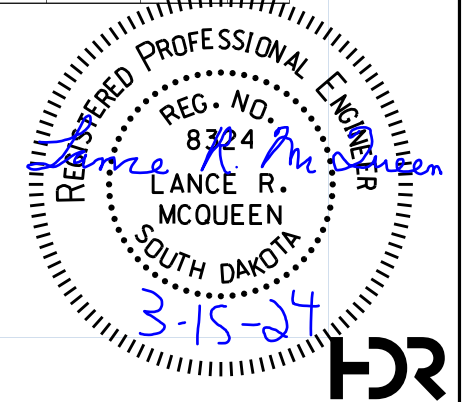
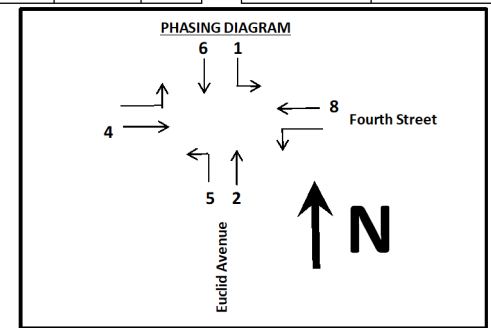
CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	20	8P
12R	Red	Red	DW	20	8P
12G	Blue	Blue	W	20	8P
11R	Orange	Red	DW	19	6P
	Yellow				
11G	Brown	Blue	W	19	6P
N	Red/Black	Black	N	19	6P

POLE: S17 CABLE SIZE: 7/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	22	2P
9R	Red	Red	DW	22	2P
9G	Blue	Blue	W	22	2P
12R	Orange	Red	DW	21	8P
	Yellow				
12G	Brown	Blue	W	21	8P
N	Red/Black	Black	N	21	8P

POLE: S18 CABLE SIZE: 7/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	Ø
N	Black	Black	N	24	4P
10R	Red	Red	DW	24	4P
10G	Blue	Blue	W	24	4P
9R	Orange	Red	DW	23	2P
	Yellow				
9G	Brown	Blue	W	23	2P
N	Red/Black	Black	N	23	2P



Signal Timing Diagram

Sioux Avenue & Pierre Street

BASIC INTERVALS								
Phase	1	2	3	4	5	6	7	8
Movement	WBLT	EBT		SB	EBLT	WBT		
Lag		X				X		
Min Green	4	10		10	4	10		
Extension	3	3		3	3	3		
Max 1	10	55		20	10	55		
Max 2	20	55		20	20	55		
Time Before								
Time to Reduce								
Minimum Gap								
Yellow	3	3.5		3	3	3.5		
All Red	3	1.5		2	3	1.5		
Walk		7		7		7		
Ped Clearance		14		15		14		
Recall		SOFT				SOFT		
Prog Flash Display	R	Y		R	R	Y		
Start Up \emptyset		X				X		
LPI		3		3		3		

PREEMPTION				
Plan	3	4	5	6
Calls \emptyset		4 & 7	5 & 2	1 & 6
Output		CH14R	CH15R	CH16R

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

SPLIT PATTERNS										
	$\Phi 1$	$\Phi 2$	$\Phi 3$	$\Phi 4$	$\Phi 5$	$\Phi 6$	$\Phi 7$	$\Phi 8$		
Coord Phase		X				X				
Pattern (C/S/O)	Split	Split	Split	Split	Split	Split	Split	Split	Cycle Length	Offset
1/1/1	11	31		24	11	31			65	4
2/1/1	12	37		24	12	37			73	1
2/1/2	12	37		24	12	37			73	5
2/1/3	12	37		24	12	37			73	8

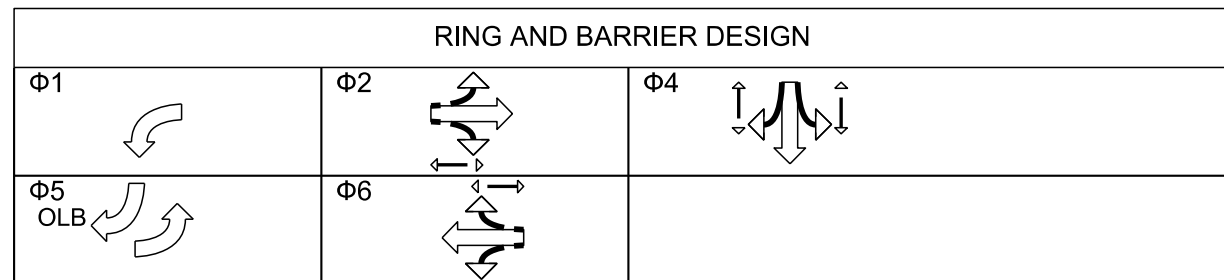
TIMING PLAN 1	
Time of Day (TOD)	Pattern (C/S/O)
6:00 - 7:30	1/1/1
7:30 - 8:15	2/1/1
8:15 - 11:30	1/1/1
11:30 - 13:15	2/1/2
13:15 - 16:45	1/1/1
16:45 - 17:30	2/1/3
17:30 - 23:00	1/1/1
23:00 - 6:00	FLASH

TIMING PLAN 2	
Time of Day (TOD)	Pattern (C/S/O)
6:00 - 23:00	1/1/1
23:00 - 6:00	FLASH

LEADING PEDESTRIAN INTERVAL (LPI) NOTES

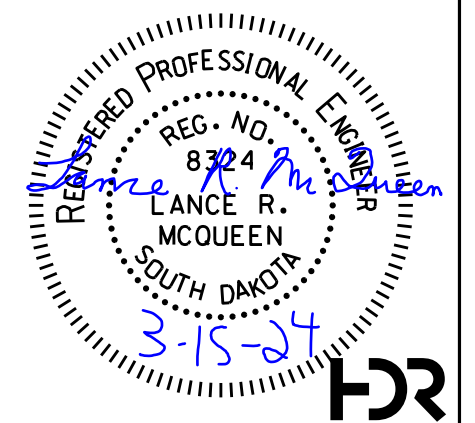
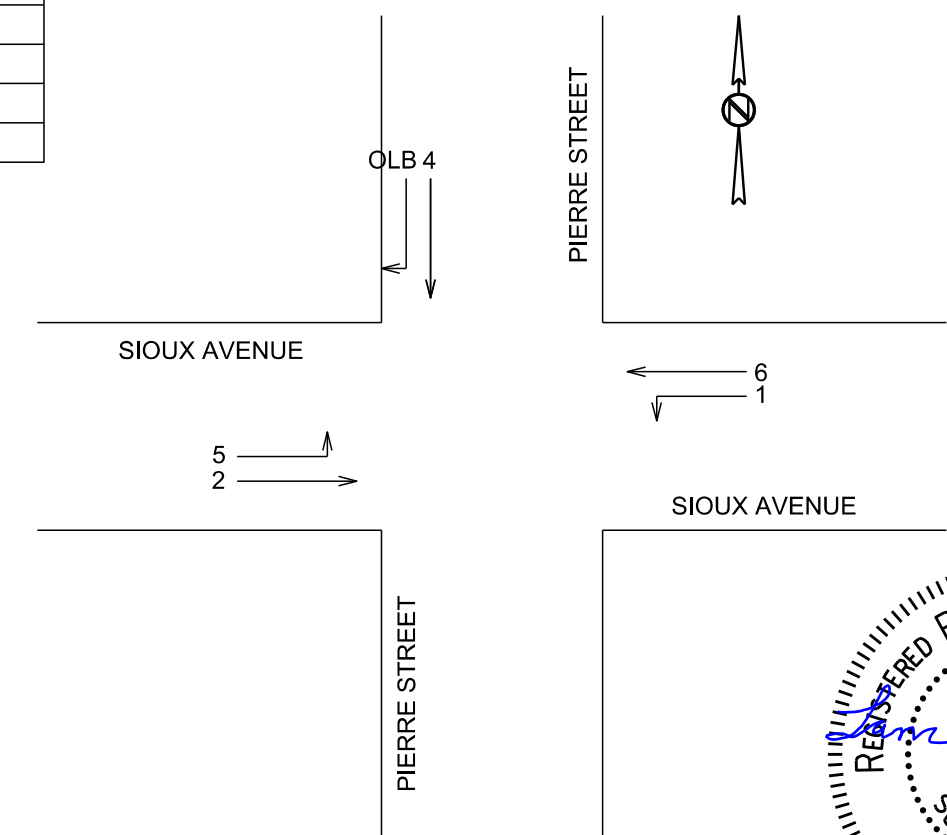
3 second leading pedestrian interval included in Phase 2, 4, and 6 split times.

Phases 1 and 5 split times include 1 second all-red before the Phases 2 and 6 leading pedestrian interval.



OVERLAP DEFINITIONS
OLB = 5 + 4 - 4P

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
EB T, RT	2		C/E												
EB LT	5				C/E										
SB RT	7				C/E									10	
SB LT, T	4				C/E										
WB T, RT	6					C/E									
WB LT	1	C/E													



Signal Timing Diagram

Capitol Avenue & Euclid Avenue

BASIC INTERVALS								
Phase	1	2	3	4	5	6	7	8
Movement	SBLT	NBT		EB	NBLT	SBT		WB
Lag		X				X		
Min Green	4	10		7	4	10		7
Extension	3	3		3	3	3		3
Max 1	16	30		26	10	36		26
Max 2	11	26		23	10	27		23
Time Before								
Time to Reduce								
Minimum Gap								
Yellow	3	4		4	3	4		4
All Red	3	1		2.5	3	1		2.5
Walk		7		7		7		7
Ped Clearance		20		13		20		19
Recall		SOFT				SOFT		
Prog Flash Display	R	Y		R	R	Y		R
Start Up \emptyset		X				X		

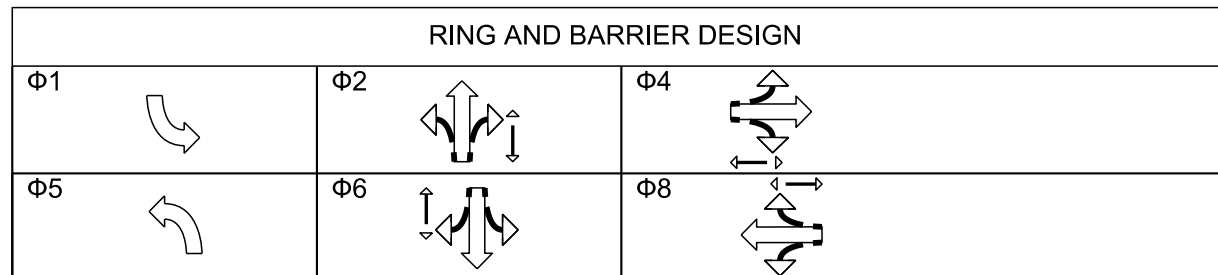
PREEMPTION				
Plan	3	4	5	6
Calls \emptyset	8	4	5 & 2	1 & 6
Output	CH13R	CH14R	CH15R	CH16R

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

TIMING PLAN 1	
Time of Day (TOD)	Pattern (C/S/O)
06:00 - 07:00	2/1/1
07:00 - 08:30	1/1/1
08:30 - 16:30	2/1/1
16:30 - 18:00	1/2/2
18:00 - 23:00	2/1/1
23:00 - 06:00	FLASH

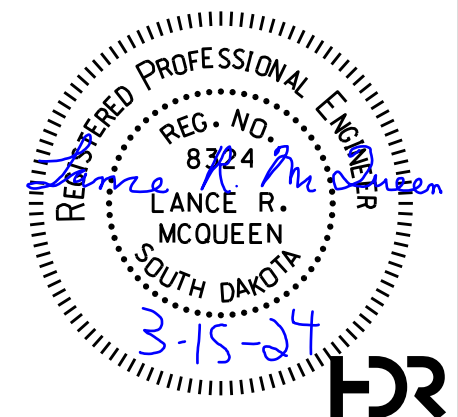
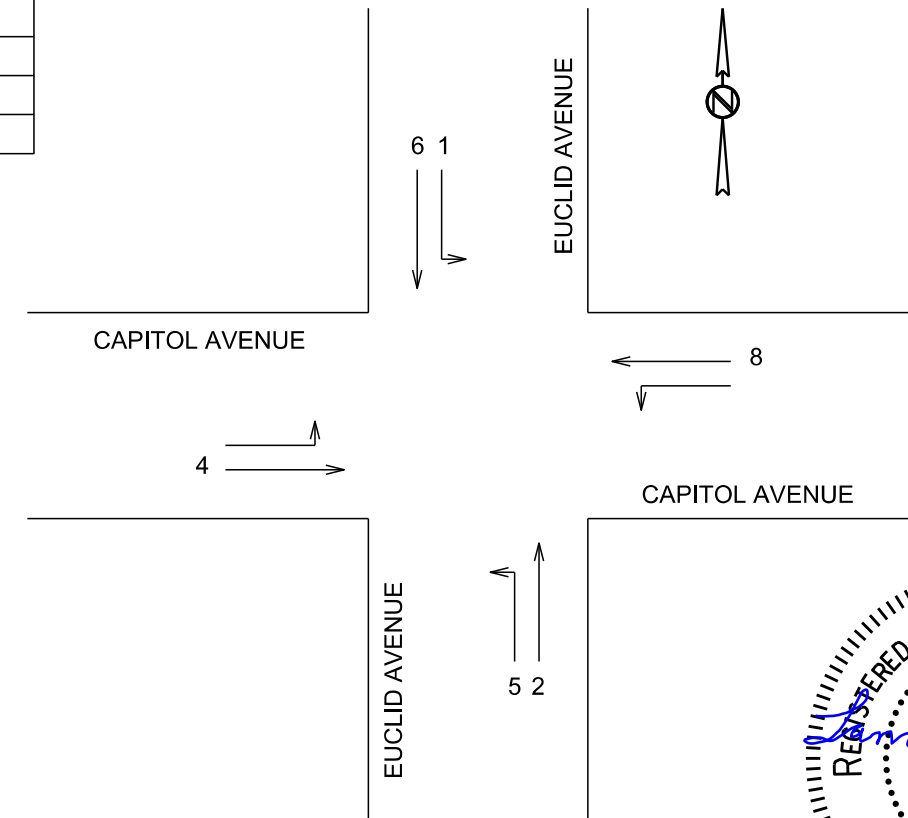
TIMING PLAN 2	
Time of Day (TOD)	Pattern (C/S/O)
06:00 - 23:00	2/1/1
23:00 - 06:00	FLASH

SPLIT PATTERNS										
	Φ 1	Φ 2	Φ 3	Φ 4	Φ 5	Φ 6	Φ 7	Φ 8		
Coord Phase		X				X				
Pattern (C/S/O)	Split	Split	Split	Split	Split	Split	Split	Split	Cycle Length	Offset
1/1/1	10	26		26	10	30		26	66	0
2/1/1	10	26		24	10	26		24	60	0
1/2/2	10	30		26	10	30		26	66	0



OVERLAP DEFINITIONS

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
NB T, RT	2		C/E												
NB LT	5				C/E										
EB T, RT	4				C/E									8	
EB LT	7				C/E										
SB T, RT	6					C/E									
SB LT	1	C/E													
WB RT	9												C/E	8	
WB T	8												C/E		
WB LT	3												C/E		



Signal Timing Diagram

Broadway Avenue & Euclid Avenue

BASIC INTERVALS								
Phase	1	2	3	4	5	6	7	8
Movement	SBLT	NBT		EB	NBLT	SBT		WB
Lag		X				X		
Min Green	4	10		7	4	10		7
Extension	3	3		3	3	3		3
Max 1	13	38		21	10	41		21
Max 2	10	32		18	10	32		18
Time Before								
Time to Reduce								
Minimum Gap								
Yellow	3	4		4	3	4		4
All Red	3	1		3	3	1		3
Walk		7		7		7		7
Ped Clearance		18		15		12		18
Recall		SOFT				SOFT		
Prog Flash Display	R	Y		R	R	Y		R
Start Up Ø		X				X		

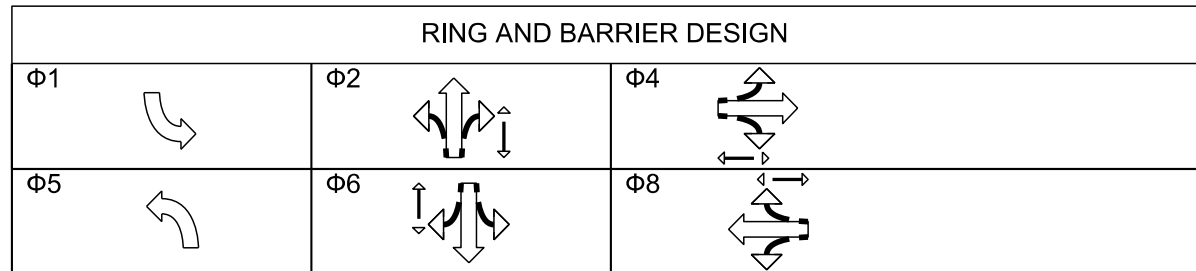
PREEMPTION				
Plan	3	4	5	6
Calls Ø	8	4	5 & 2	1 & 6
Output	CH13R	CH14R	CH15R	CH16R

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

TIMING PLAN 1	
Time of Day (TOD)	Pattern (C/S/O)
06:00 - 07:00	2/1/1
07:00 - 08:30	1/1/1
08:30 - 16:30	2/1/1
16:30 - 18:00	1/2/2
18:00 - 23:00	2/1/1
23:00 - 06:00	FLASH

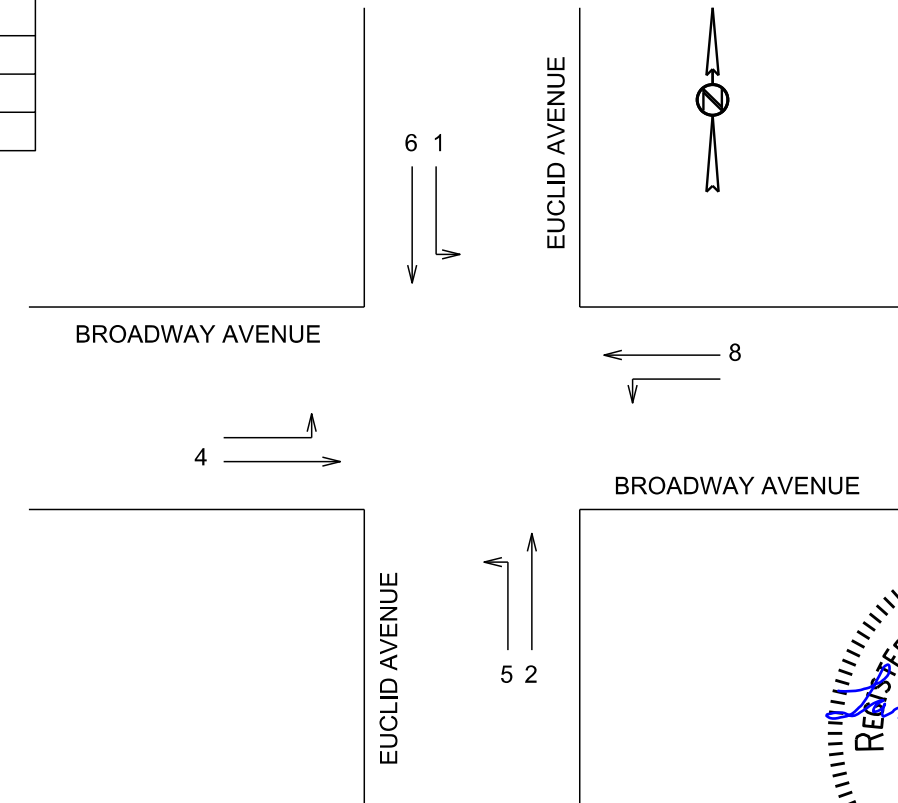
TIMING PLAN 2	
Time of Day (TOD)	Pattern (C/S/O)
06:00 - 23:00	2/1/1
23:00 - 06:00	FLASH

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	32		24	10	32		24	66	27
2/1/1	10	34		16	10	34		16	60	33
1/2/2	10	35		21	10	35		21	66	28



OVERLAP DEFINITIONS

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
NB T, RT	2		C/E												
NB LT	5				C/E										
EB LT, T, RT	4			C/E										8	
SB T, RT	6					C/E									
SB LT	1	C/E													
WB RT	9												C/E	8	
WB LT, T	8												C/E		



Signal Timing Diagram

Elizabeth Street & Euclid Avenue

BASIC INTERVALS								
Phase	1	2	3	4	5	6	7	8
Movement	SBLT	NBT		EB	NBLT	SBT		WB
Lag		X				X		
Min Green	4	10		7	4	10		7
Extension	3	3		3	3	3		3
Max 1	10	31		31	10	31		31
Max 2	10	28		22	10	28		22
Time Before								
Time to Reduce								
Minimum Gap								
Yellow	3	4		4	3	4		4
All Red	3	1		3	3	1		3
Walk		7		7		7		7
Ped Clearance		12		19		13		19
Recall		SOFT				SOFT		
Prog Flash Display	R	Y		R	R	Y		R
Start Up Ø		X				X		

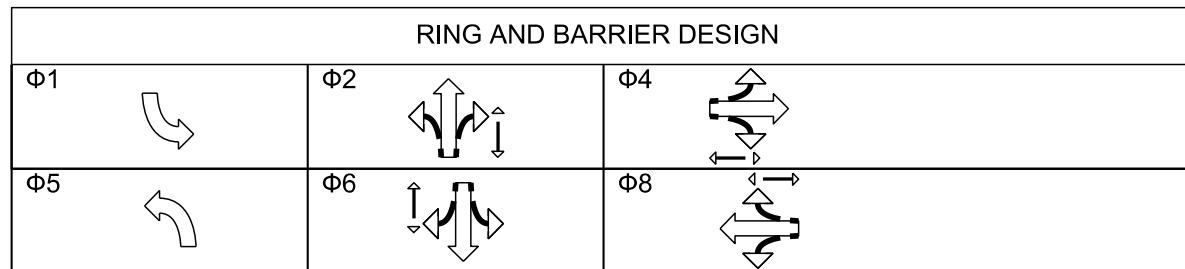
PREEMPTION				
Plan	3	4	5	6
Calls Ø	8	4	5 & 2	1 & 6
Output	CH13R	CH14R	CH15R	CH16R

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

TIMING PLAN 1	
Time of Day (TOD)	Pattern (C/S/O)
06:00 - 07:00	2/1/1
07:00 - 08:30	1/1/1
08:30 - 16:30	2/1/1
16:30 - 18:00	1/2/2
18:00 - 23:00	2/1/1
23:00 - 06:00	FLASH

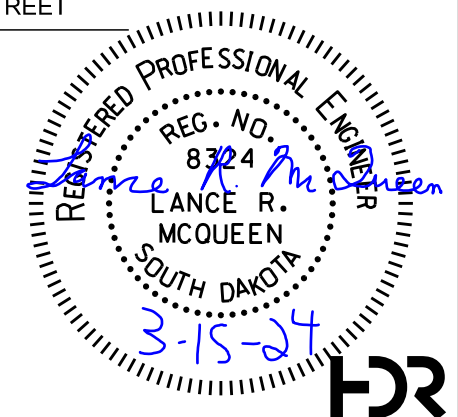
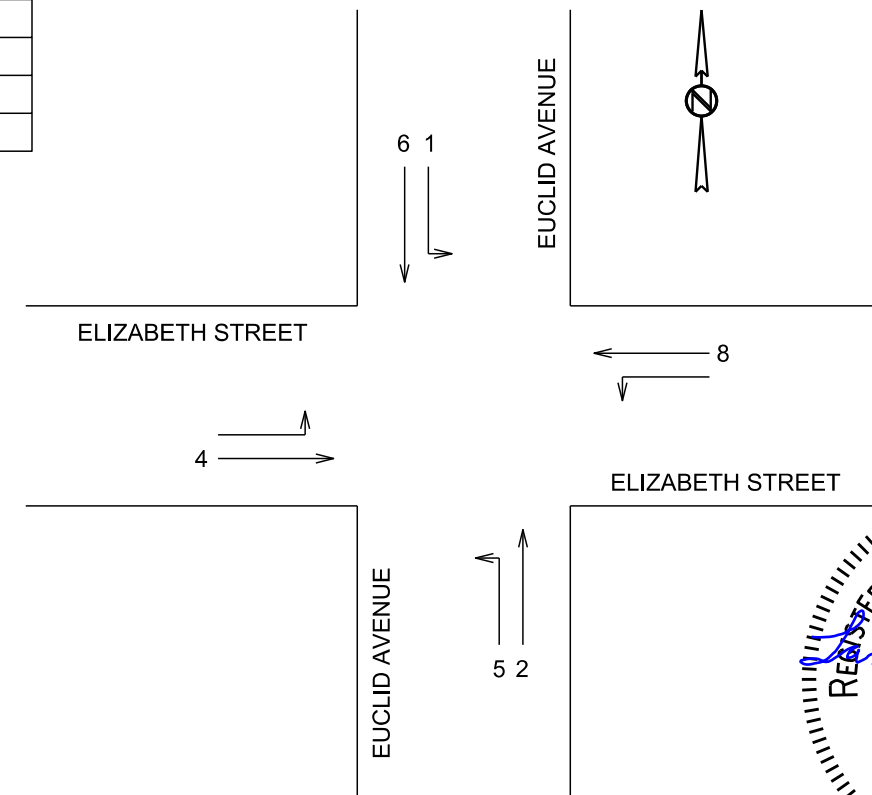
TIMING PLAN 2	
Time of Day (TOD)	Pattern (C/S/O)
06:00 - 23:00	2/1/1
23:00 - 06:00	FLASH

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	26		30	10	26		30	66	65
2/1/1	12	28		22	10	28		22	60	9
1/2/2	10	32		24	10	32		24	66	2



OVERLAP DEFINITIONS

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
NB T, RT	2		C/E												
NB LT	5					C/E									
EB T, RT	4				C/E									8	
EB LT	7				C/E										
SB T, RT	6						C/E								
SB LT	1	C/E					C/E								
WBLT, T, RT	8								C/E					8	



Signal Timing Diagram

Fourth Street & Euclid Avenue

BASIC INTERVALS								
Phase	1	2	3	4	5	6	7	8
Movement	SBLT	NBT		EB	NBLT	SB		WB
Lag		X				X		
Min Green	4	10		7	4	10		7
Extension	3	3		3	3	3		3
Max 1	16	36		20	16	36		20
Max 2	10	25		25	10	25		25
Time Before								
Time to Reduce								
Minimum Gap								
Yellow	3	4		4	3	4		4
All Red	3	1.5		2.5	3	1.5		2.5
Walk		7		7		7		7
Ped Clearance		15		19		13		19
Recall		SOFT				SOFT		
Prog Flash Display	R	Y		R	R	Y		R
Start Up \emptyset		X				X		

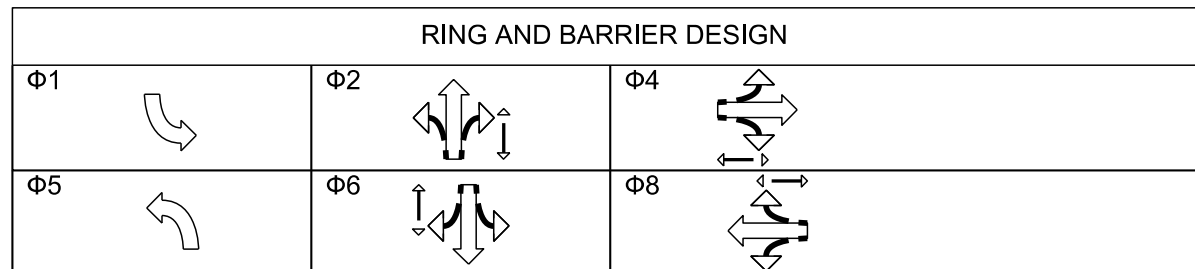
PREEMPTION				
Plan	3	4	5	6
Calls \emptyset	8	4	5 & 2	1 & 6
Output	CH13R	CH14R	CH15R	CH16R

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

TIMING PLAN 1	
Time of Day (TOD)	Pattern (C/S/O)
06:00 - 07:00	2/1/1
07:00 - 08:30	1/1/1
08:30 - 16:30	2/1/1
16:30 - 18:00	1/2/2
18:00 - 23:00	2/1/1
23:00 - 06:00	FLASH

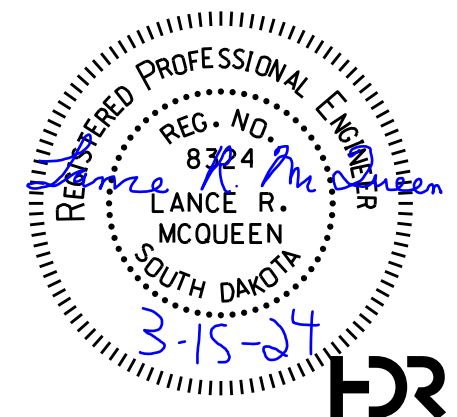
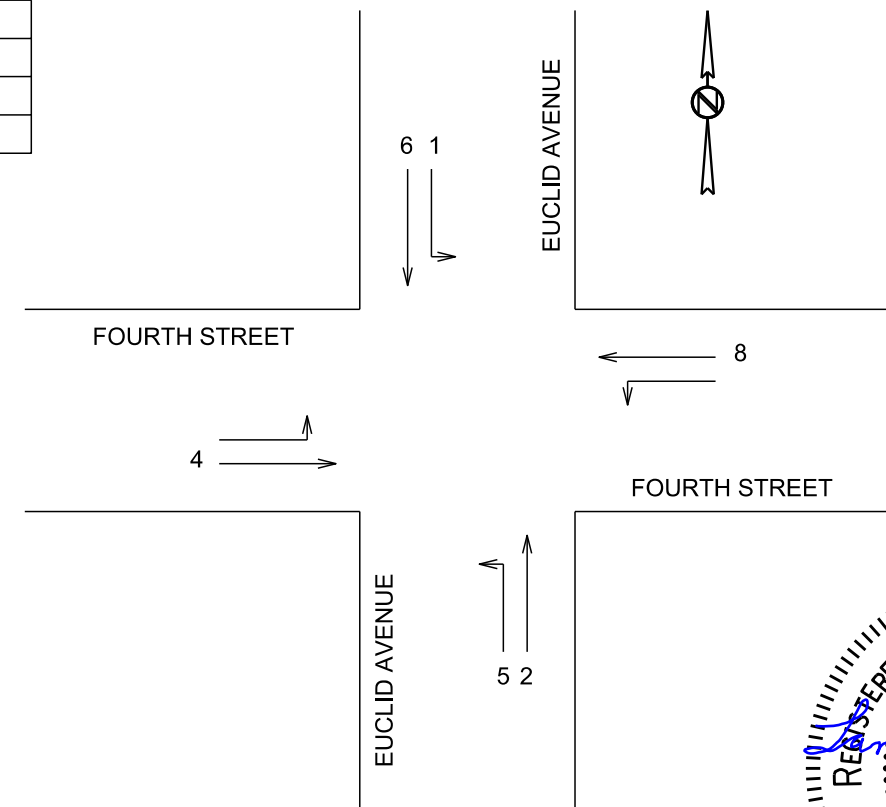
TIMING PLAN 2	
Time of Day (TOD)	Pattern (C/S/O)
06:00 - 23:00	2/1/1
23:00 - 06:00	FLASH

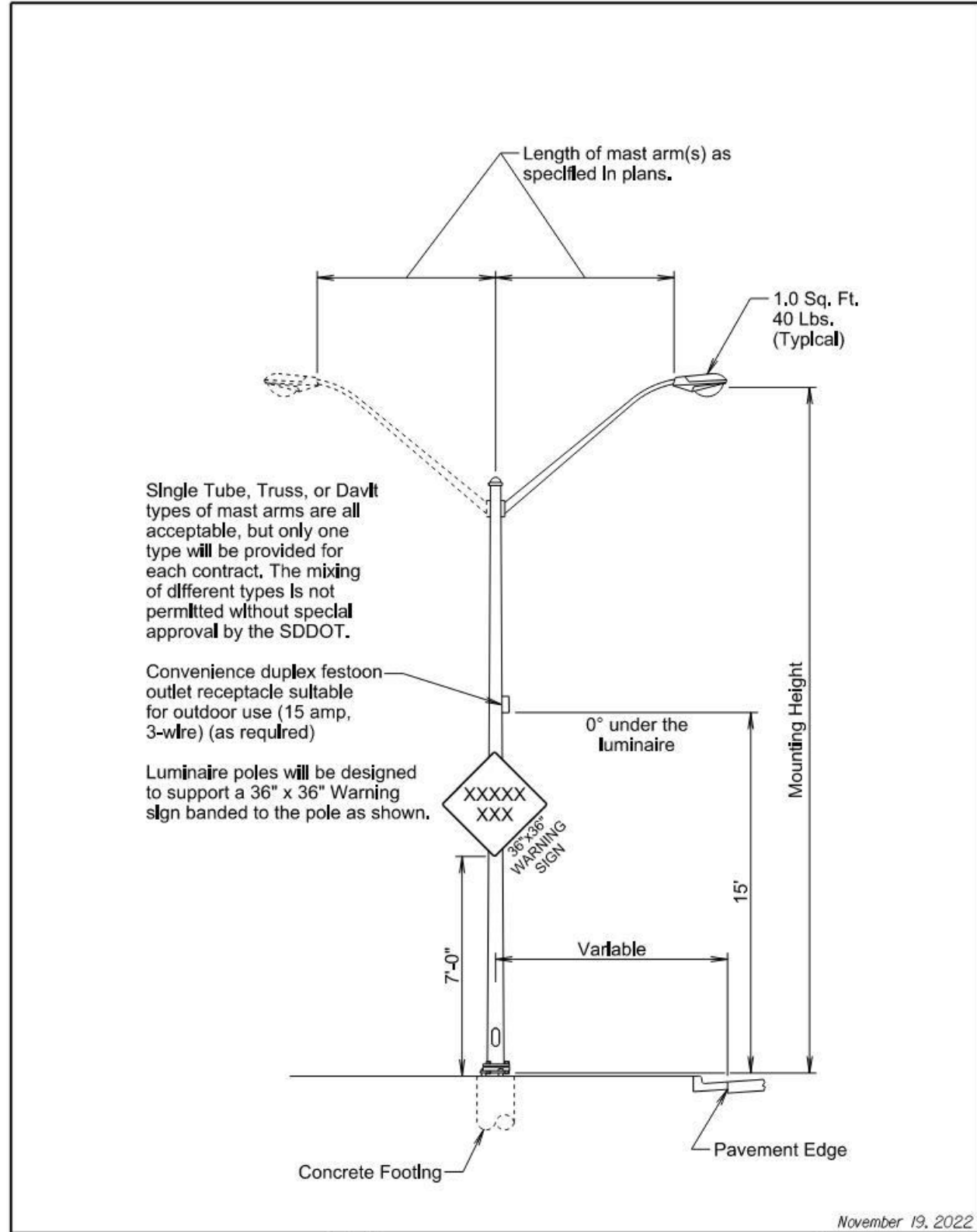
SPLIT PATTERNS										
	Φ 1	Φ 2	Φ 3	Φ 4	Φ 5	Φ 6	Φ 7	Φ 8		
Coord Phase		X				X				
Pattern (C/S/O)	Split	Split	Split	Split	Split	Split	Split	Split	Cycle Length	Offset
1/1/1	17	31		18	16	32		18	66	35
2/1/1	10	27		23	16	21		23	60	47
1/2/2	10	28		28	10	28		28	66	48



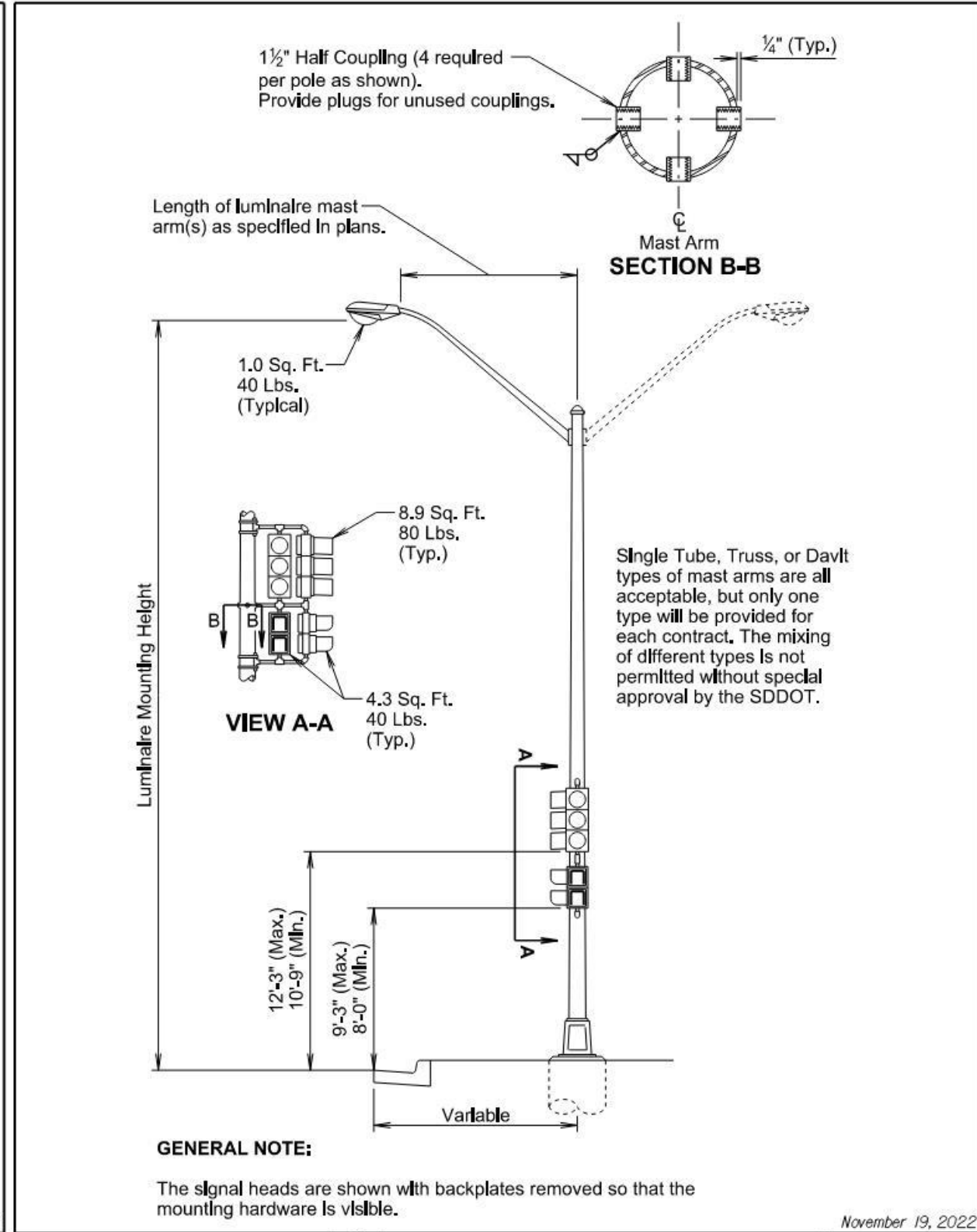
OVERLAP DEFINITIONS	

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
NB T, RT	2		C/E												
NB LT	5					C/E									
EB T, RT	4				C/E									8	
EB LT	7				C/E										
SB T, RT	6						C/E								
SB LT	1	C/E													
WB T, RT	8												C/E	8	
WB LT	3												C/E		

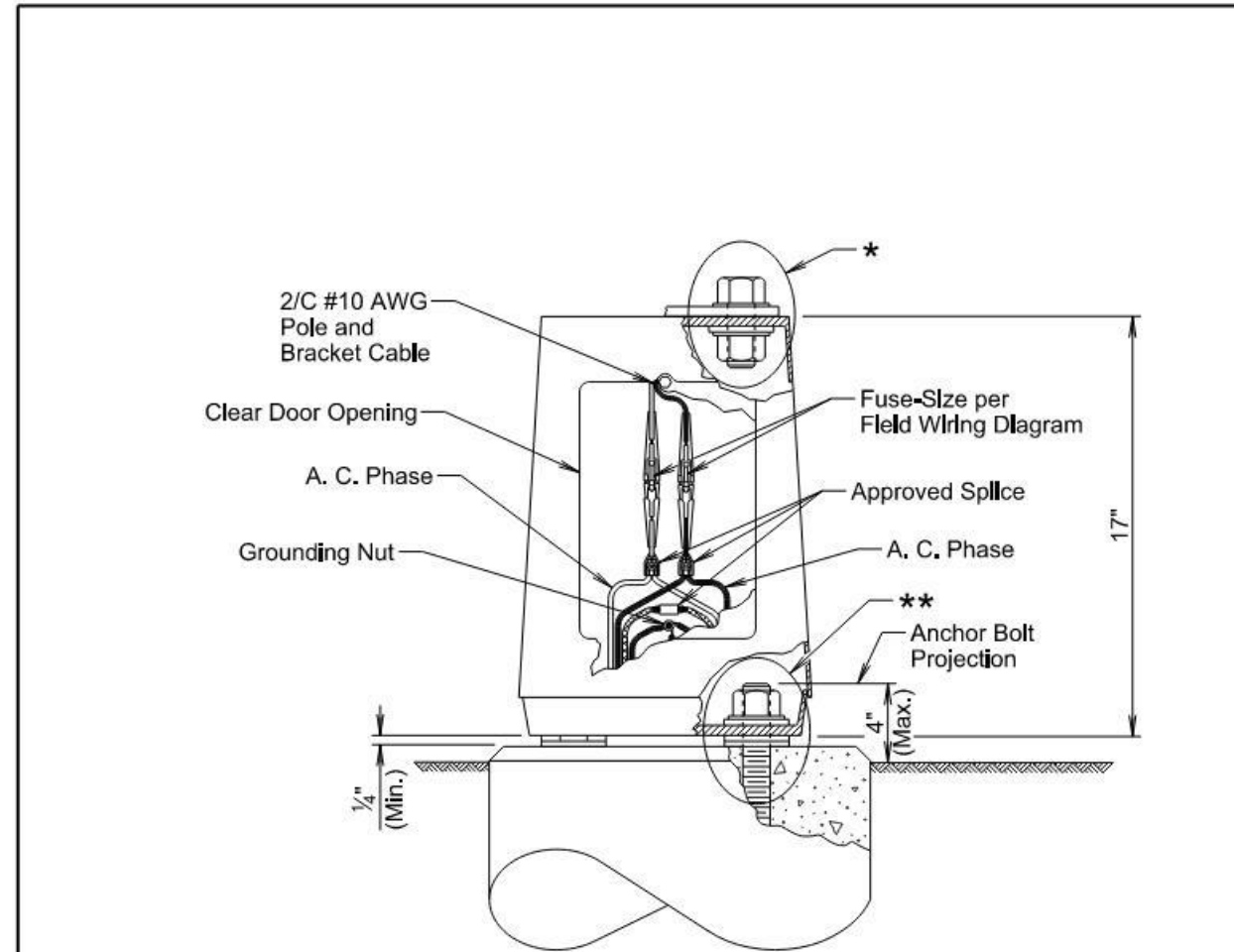




Published Date: 2024	S D D O T	STEEL ROADWAY LUMINAIRE POLE WITH MAST ARM(S)	PLATE NUMBER 635.01
			Sheet 1 of 1



Published Date: 2024	S D D O T	ROADWAY LUMINAIRE POLE (SIGNALS BANDED TO LUMINAIRE POLE)	PLATE NUMBER 635.06
			Sheet 1 of 1



GENERAL NOTES:

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

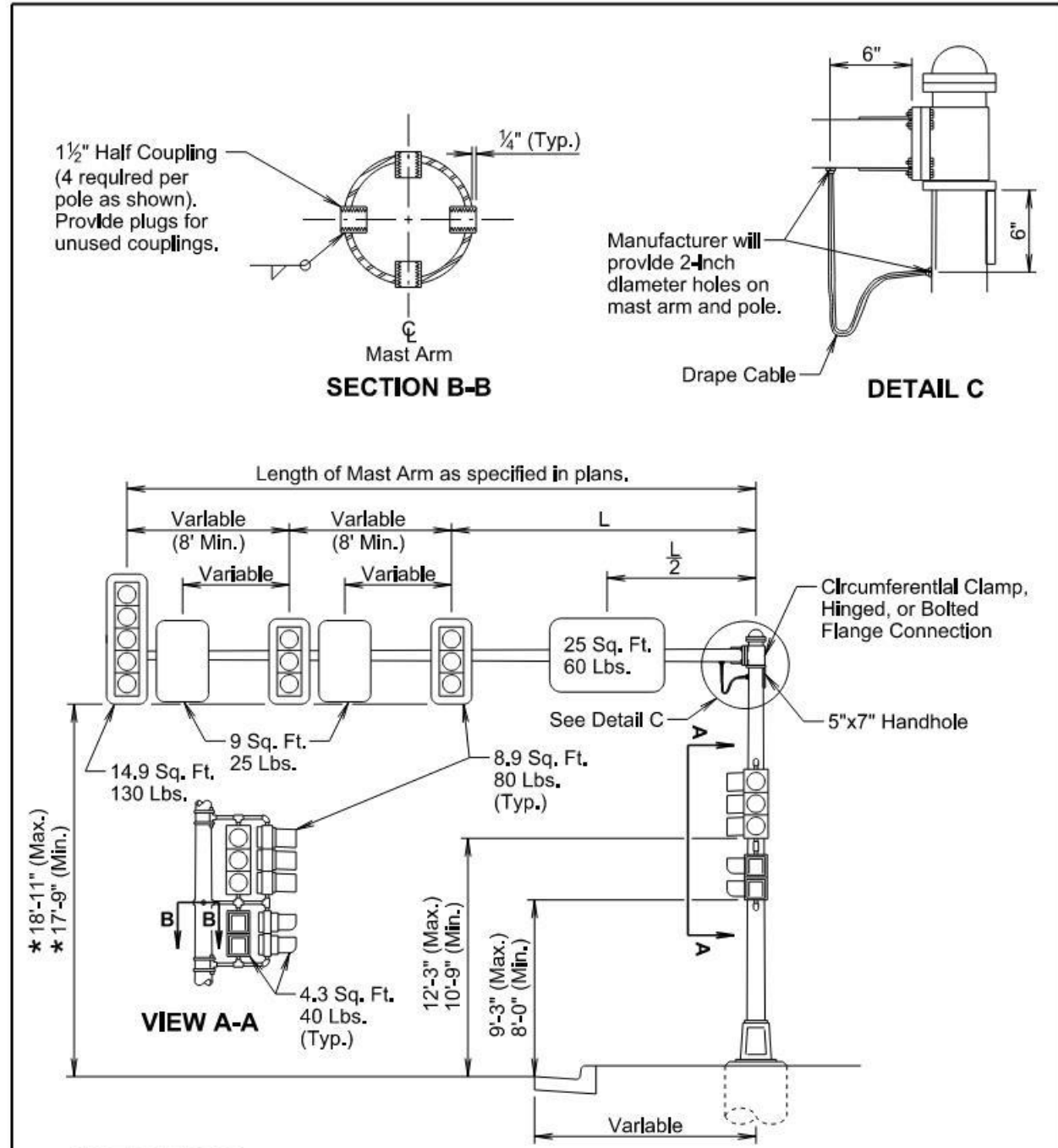
Fused connectors will be breakaway type.

* 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

Published Date: 2024	S D D O T	ROADWAY LUMINAIRE POLE BREAKAWAY TRANSFORMER BASE	PLATE NUMBER 635.21
			Sheet 1 of 1



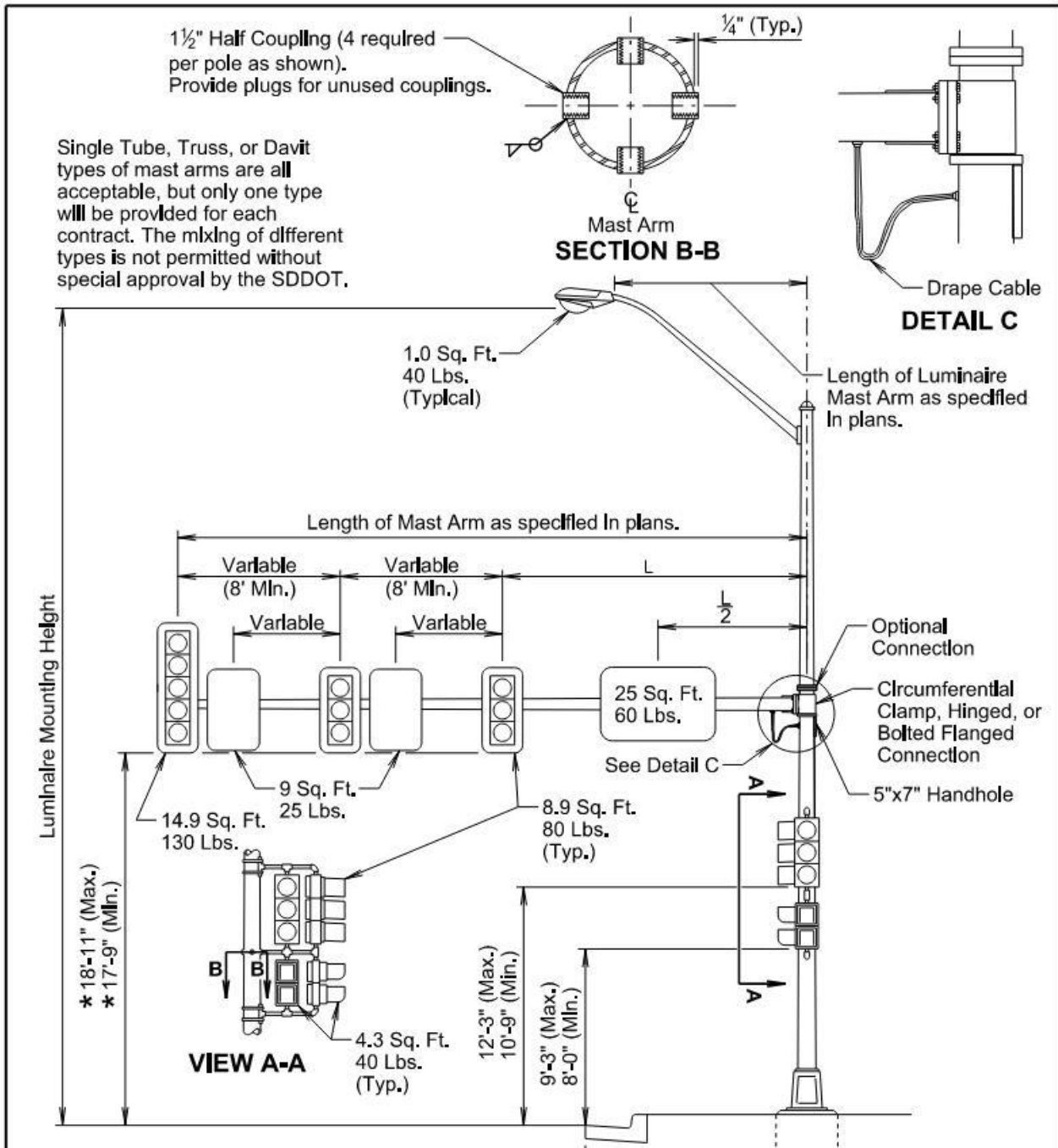
GENERAL NOTES:

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

Published Date: 2024	S D D O T	SIGNAL POLE (WITH MAST ARM)	PLATE NUMBER 635.31
			Sheet 1 of 1



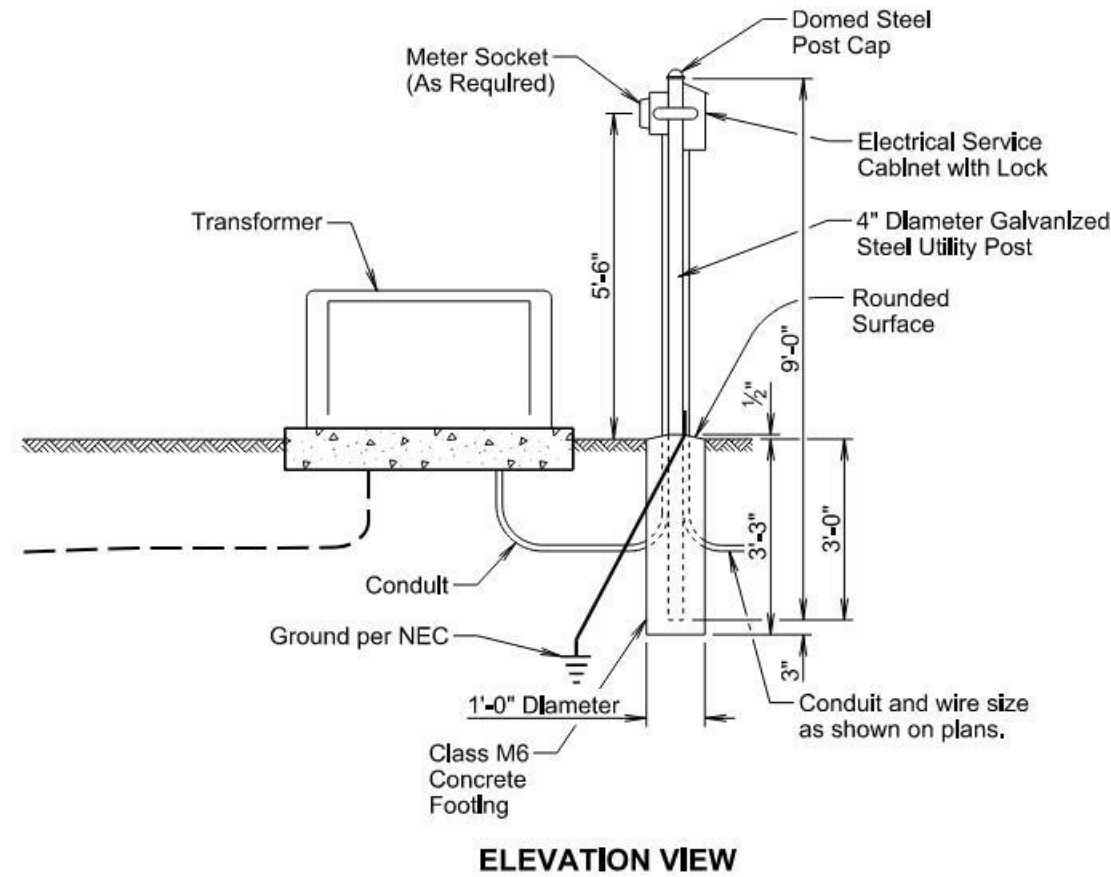
GENERAL NOTES:

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

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



ELEVATION VIEW

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.

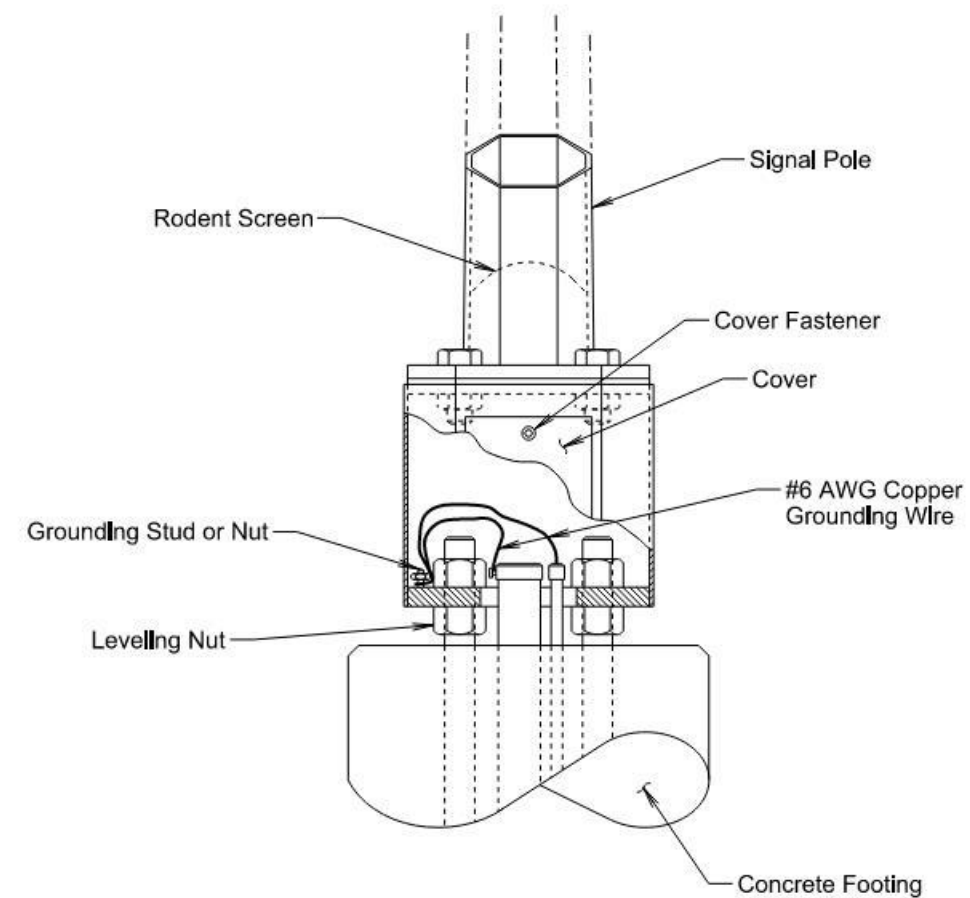
The 4" diameter galvanized steel utility post will be 9' long and will be in conformance with AASHTO Standard Specifications M181. The post will be Type 1 and either Grade 1 or Grade 2. The domed steel post cap will be in conformance with AASHTO Standard Specifications M181 and will be Type 1.

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

Published Date: 2024	S D D O T	SERVICE FROM PAD MOUNTED TRANSFORMER WITH METER ON A GALVANIZED STEEL UTILITY POST	PLATE NUMBER 635.41
			Sheet 1 of 1



GENERAL NOTES:

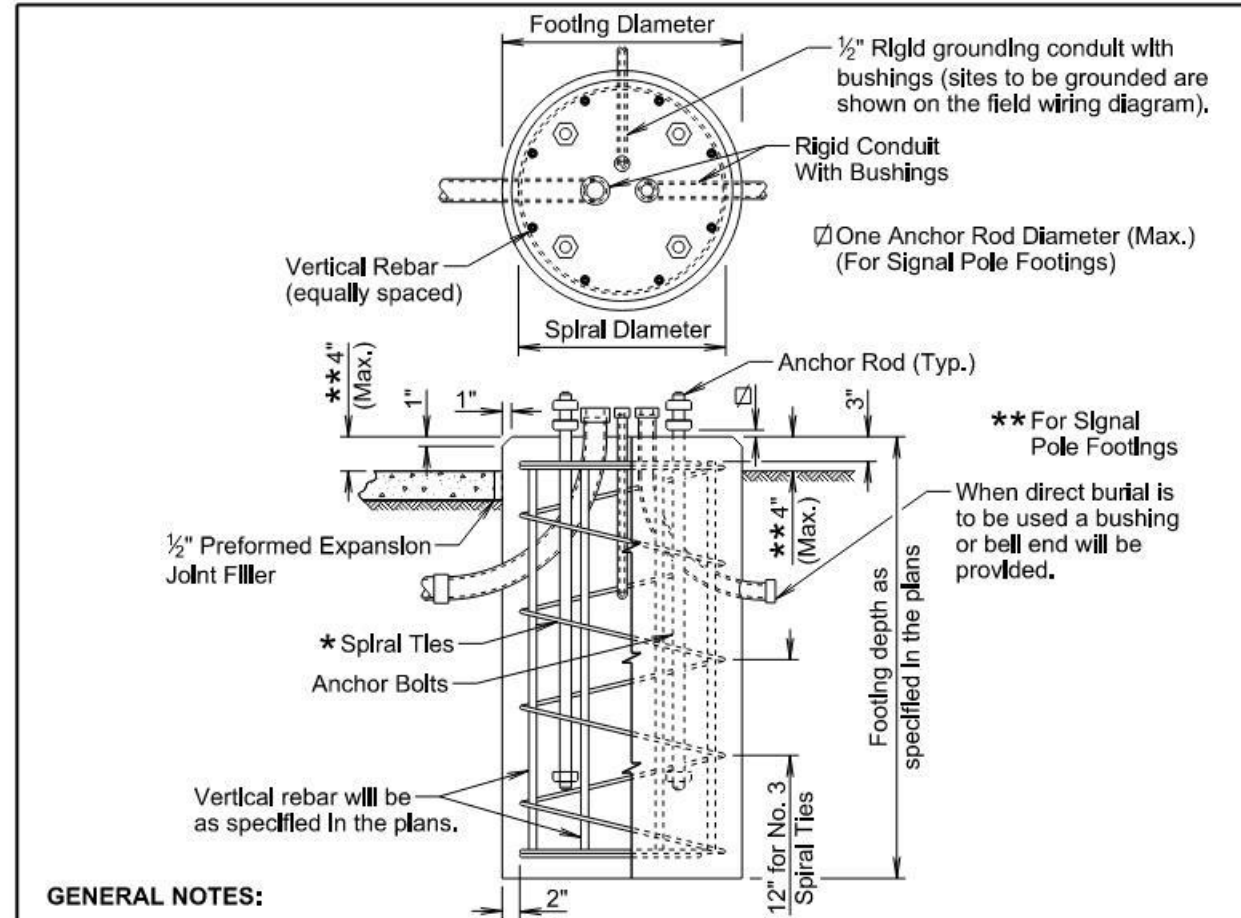
Base details are provided for example only and are not intended to be a complete design.

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

Published Date: 2024	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.

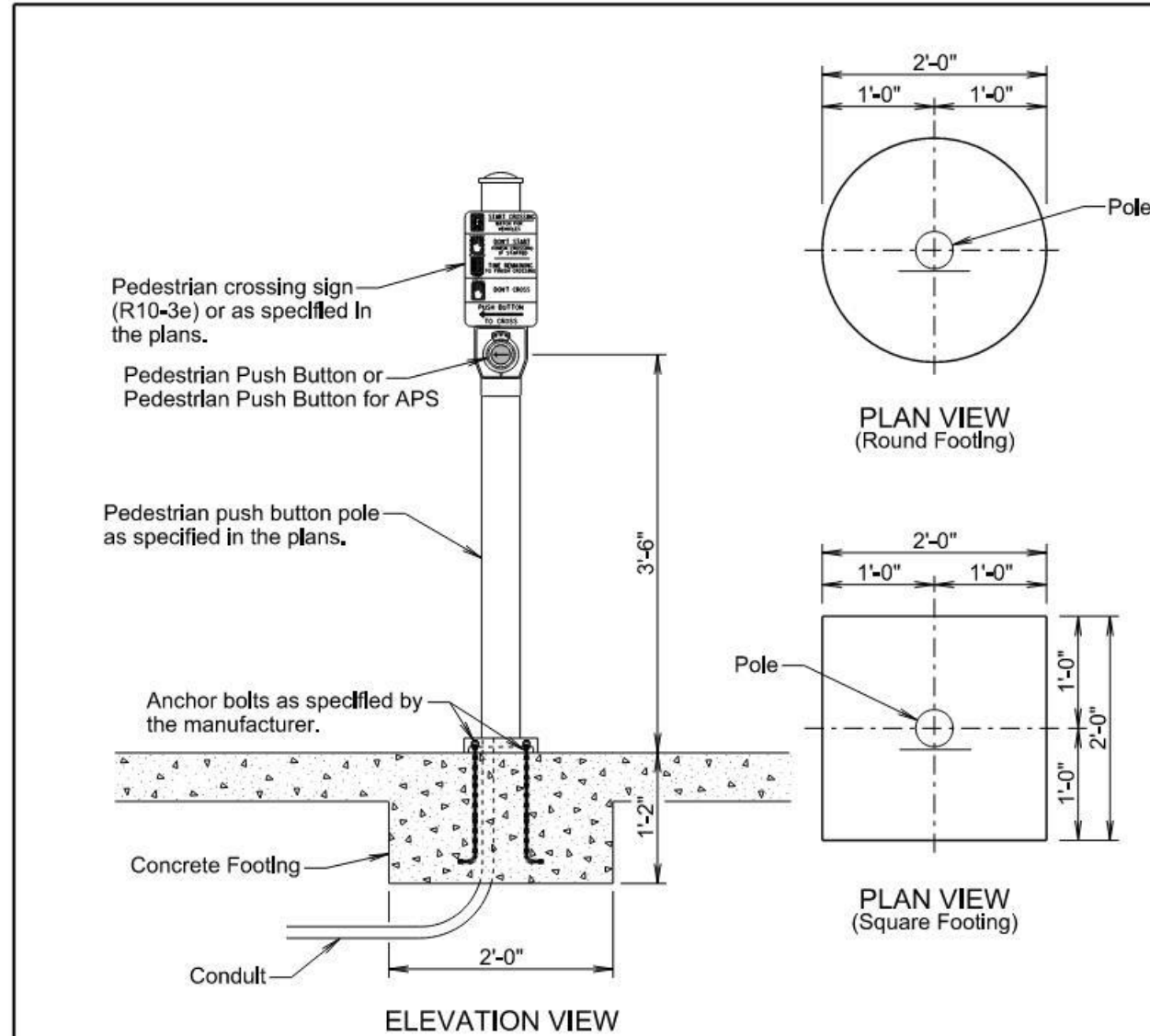
Costs of conduit and conduit bushings shown on footing detail will be incidental to the footing bid item(s).

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

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

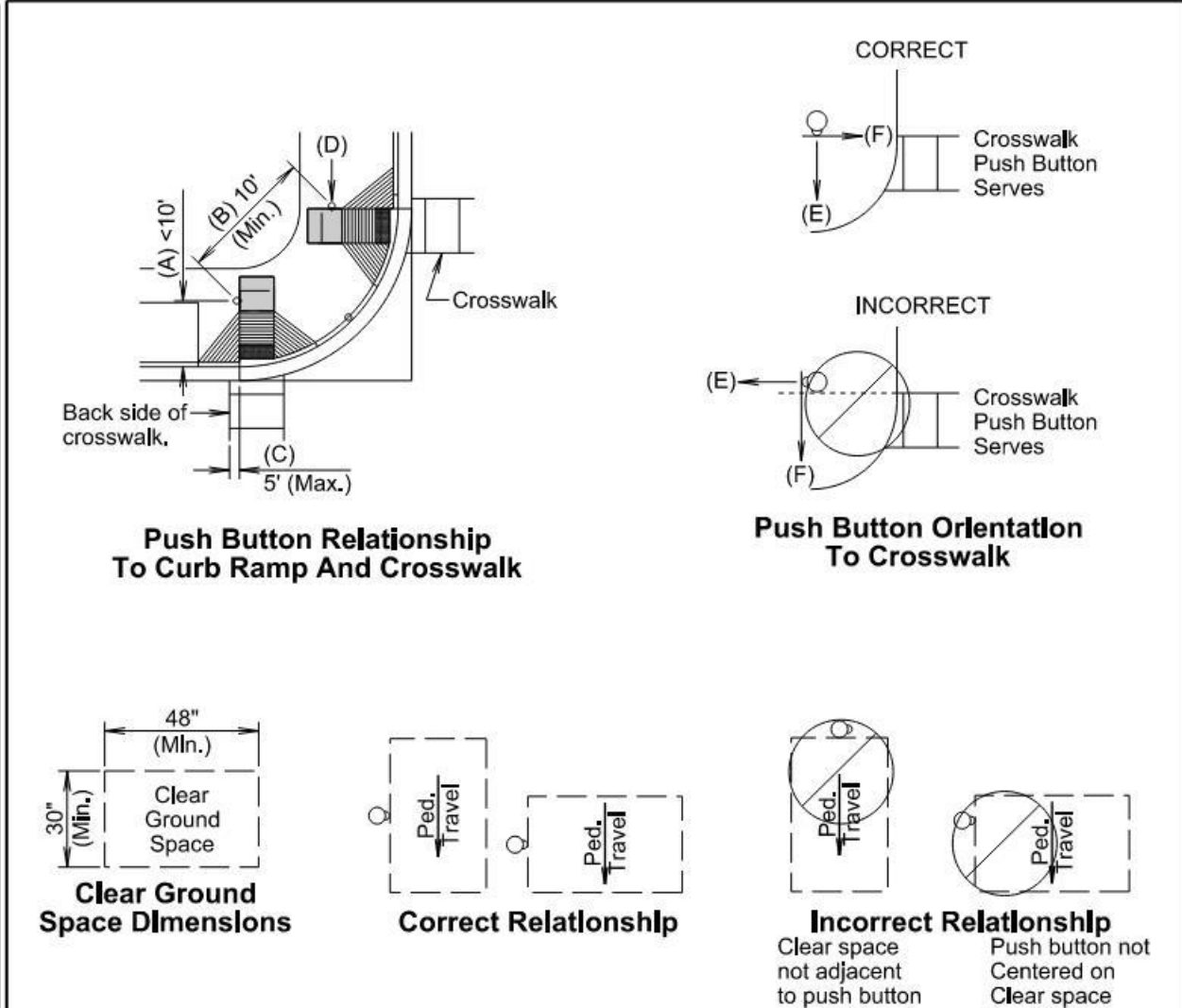


GENERAL NOTES:

- 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

Published Date: 2024	S D D O T	PEDESTRIAN PUSH BUTTON POLE	PLATE NUMBER
			635.57
			Sheet 1 of 2



General Notes:

Pedestrian Push Buttons Location and Orientation Requirements:

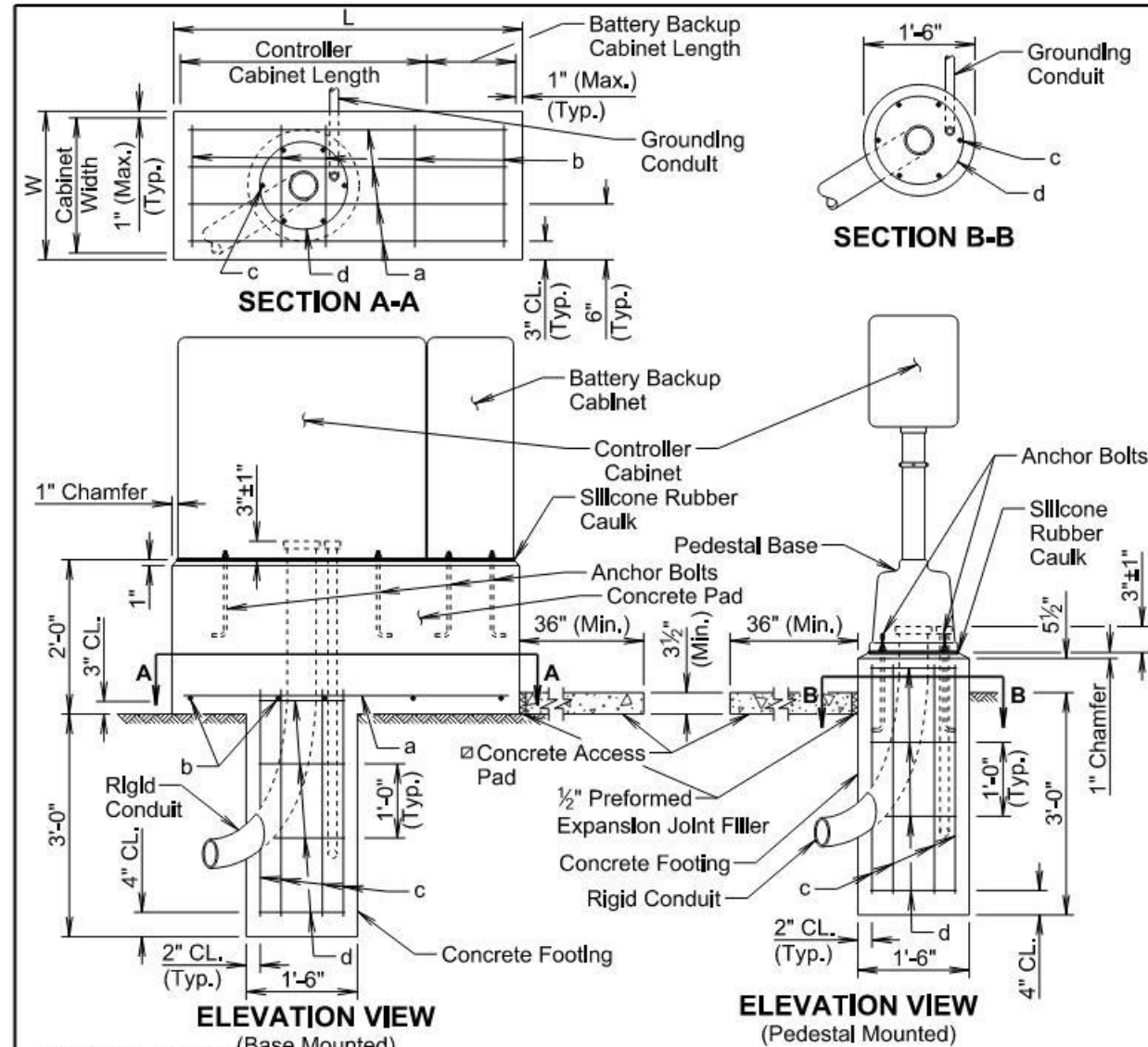
- (A) Within 10 feet from the front face of curb.
- (B) Where two push buttons are provided, the push buttons should have at least 10 feet of separation from each other.
- (C) If two curb ramps are used, the push button should be within 5 feet of the backside of the crosswalk.
- (D) The push button should 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

Published Date: 2024	S D D O T	PEDESTRIAN PUSH BUTTON POLE	PLATE NUMBER
			635.57
			Sheet 2 of 2

Plotting Date: 3/12/2024



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

Published Date: 2024

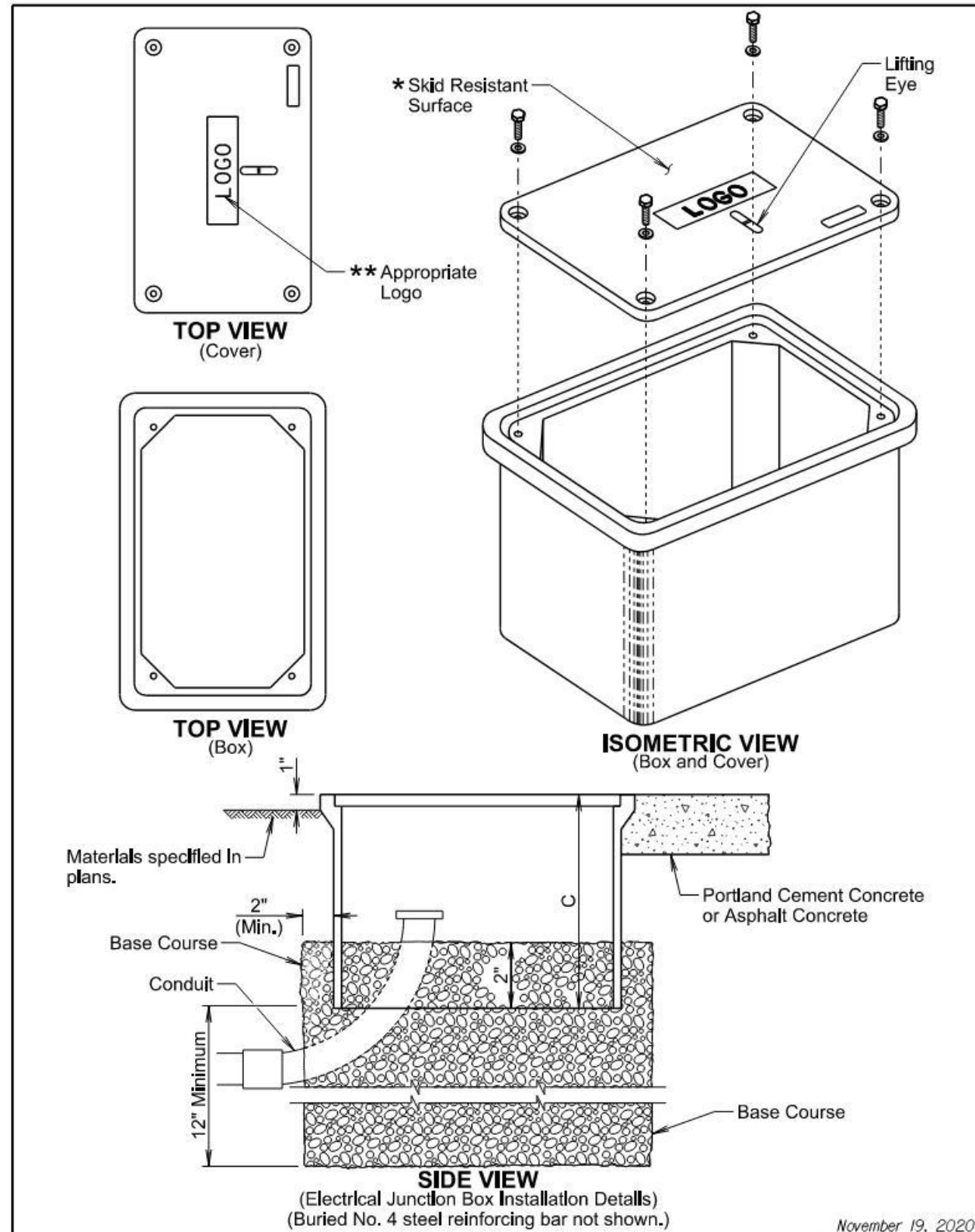
S
D
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T

CONTROLLER CABINET AND FOOTING

PLATE NUMBER
635.60

Sheet 1 of 1

Plotting Date: 3/12/2024



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".

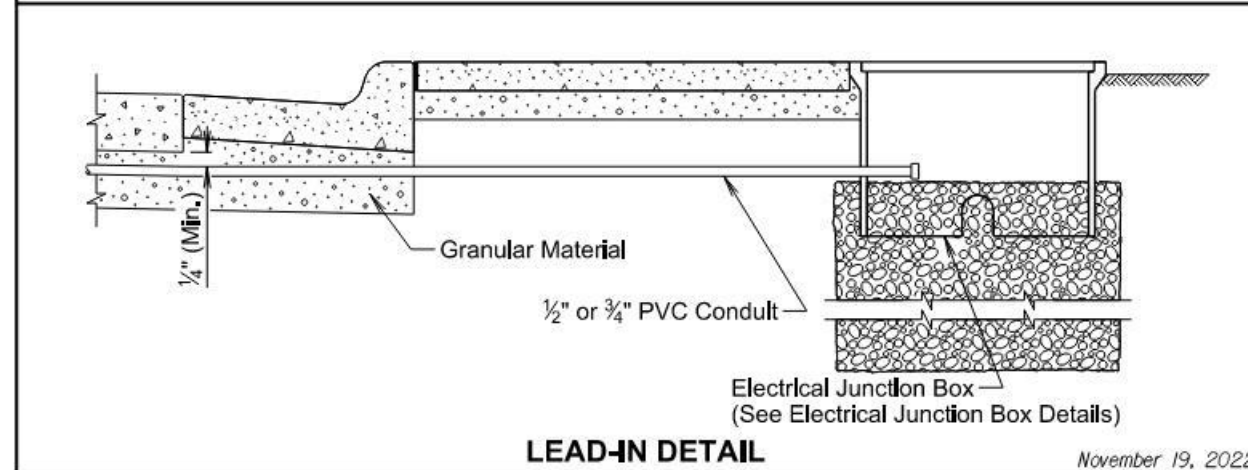
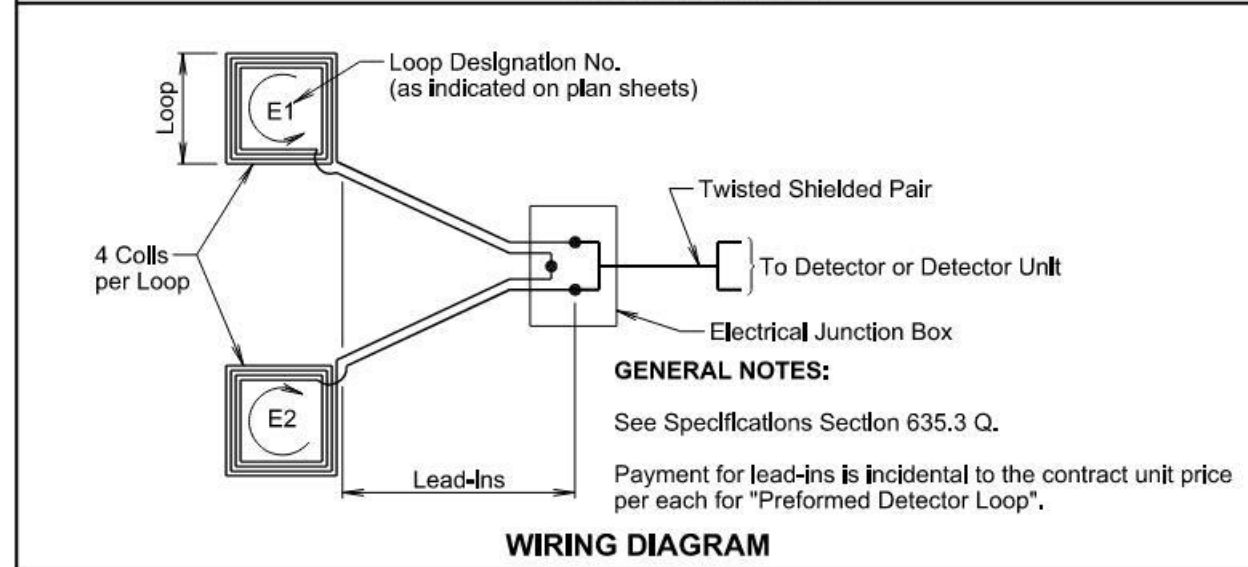
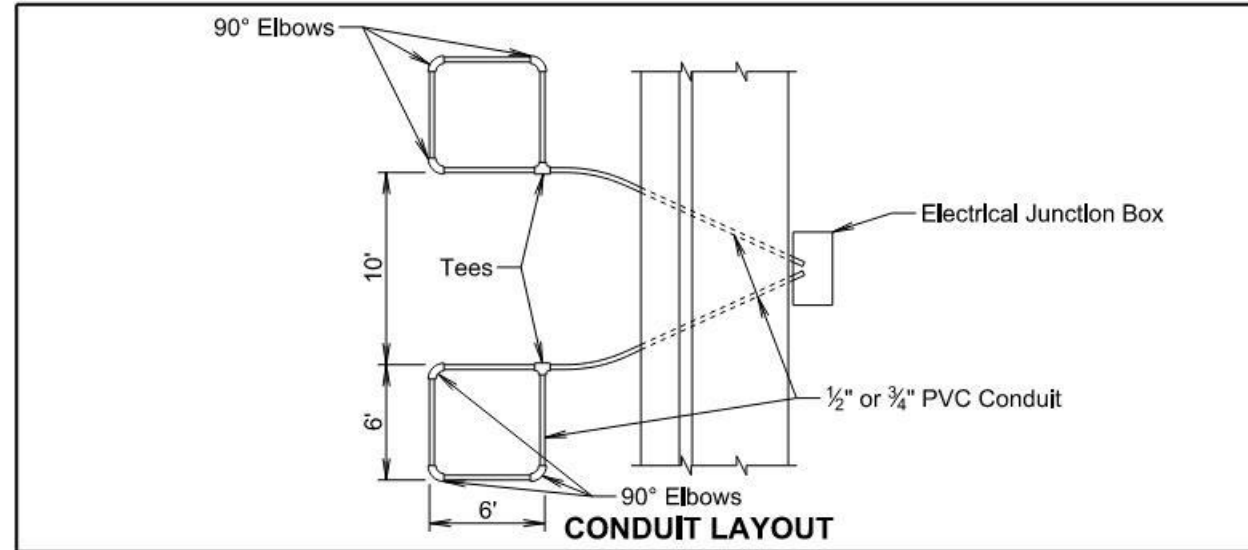
November 19, 2020

November 19, 2020

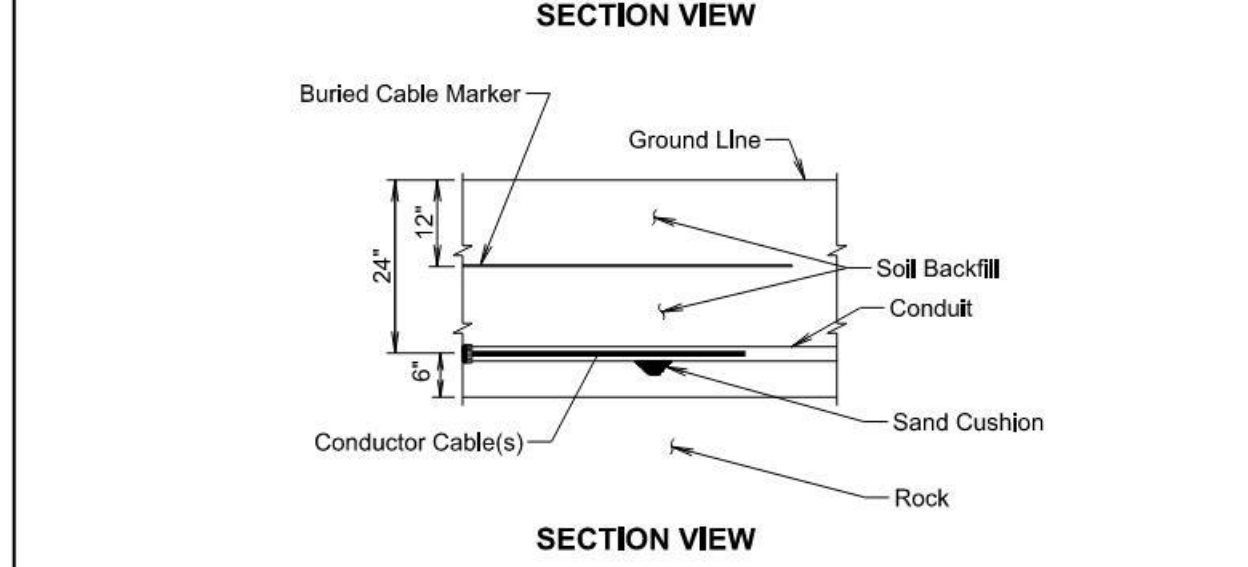
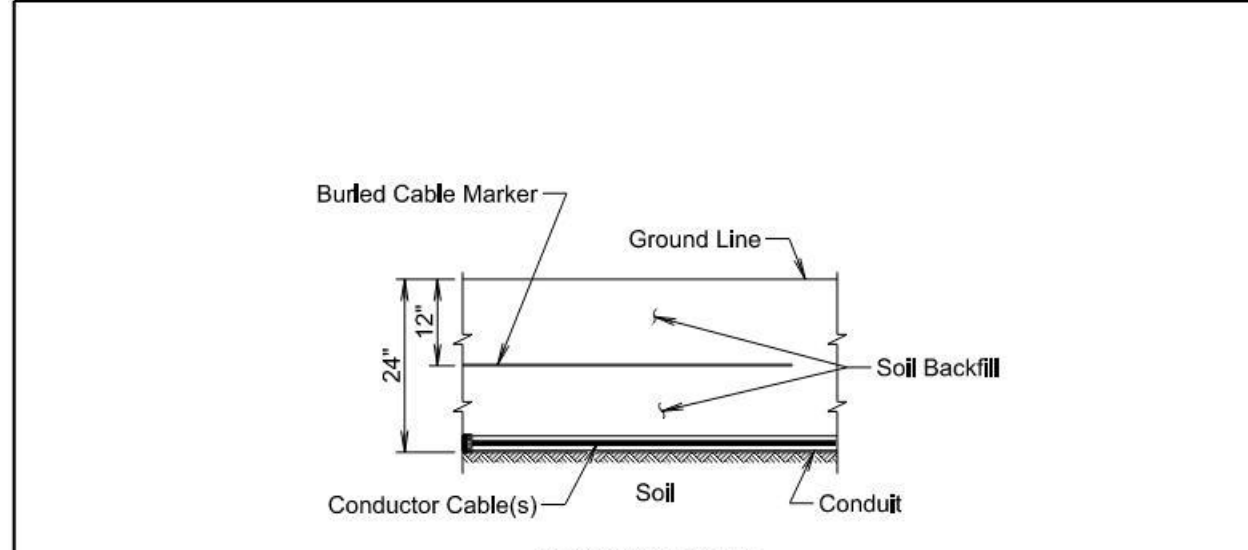
Published Date: 2024	S D D O T	ELECTRICAL JUNCTION BOXES TYPE 1 THROUGH TYPE 4	PLATE NUMBER 635.65
			Sheet 1 of 2

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

Plotting Date: 3/12/2024



Published Date: 2024	S D D O T	PREFORMED DETECTOR LOOP	November 19, 2022
			PLATE NUMBER 635.70 Sheet 1 of 1

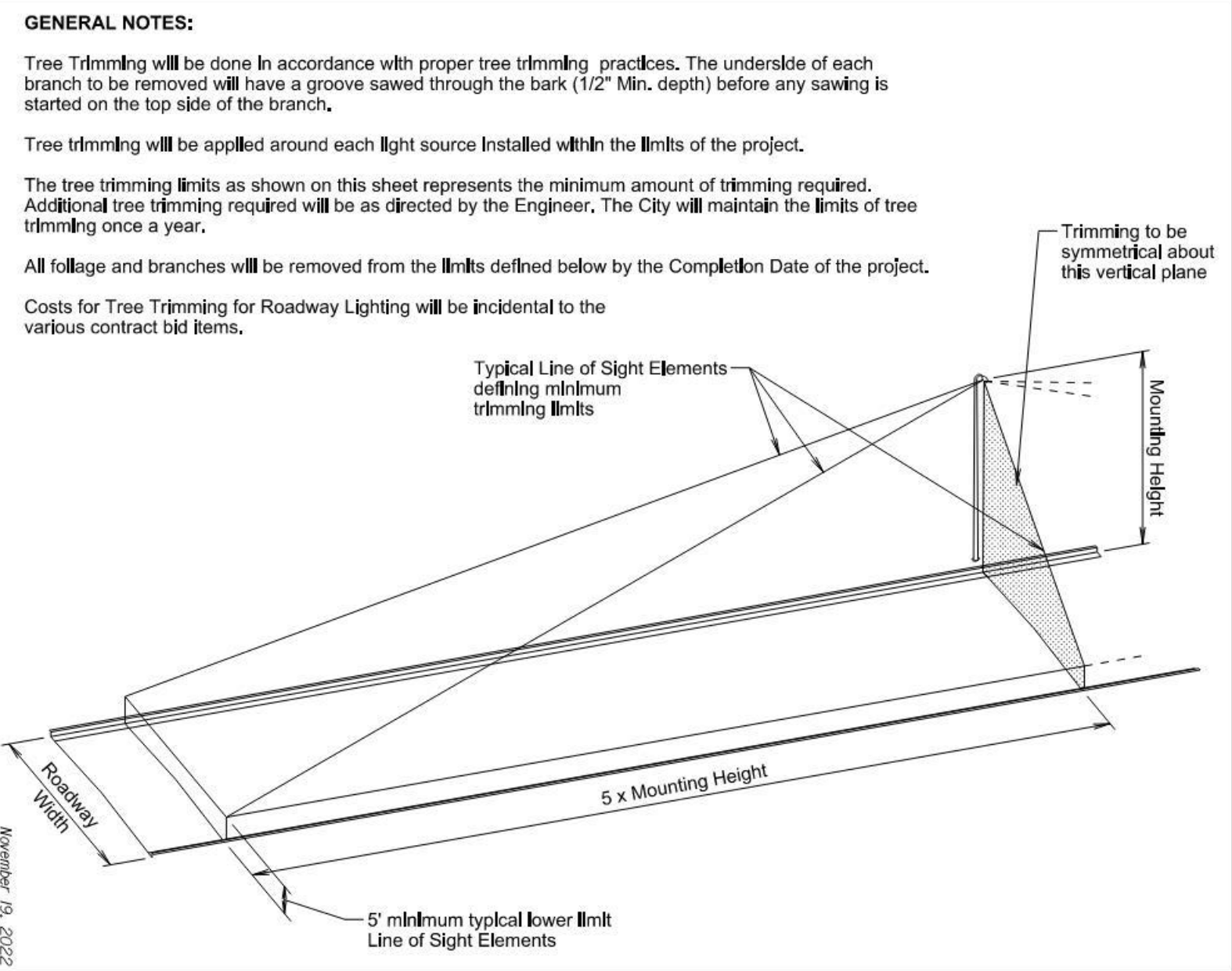


GENERAL NOTE:
The Buried Cable Marker will be plastic, approximately 6" wide, and will be capable of sustaining a minimum of a 350% tolerance of elongation without tearing. The Buried Cable Marker will have a life expectancy approximately equal to that of the conductor(s) beneath it. A phrase indicating 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 bld item used for the electrical conductor.

Published Date: 2024	S D D O T	CONDUIT INSTALLATION	November 19, 2022
			PLATE NUMBER 635.76 Sheet 1 of 1

STATE OF SOUTH DAKOTA	PROJECT	TOTAL SHEETS
	NH 0014(185)229	L78
		L77

Plotting Date: 3/12/2024



GENERAL NOTES:

Tree Trimming will be done in accordance with proper tree trimming practices. The underside of each branch to be removed will have a groove sawed through the bark (1/2" Min. depth) before any sawing is started on the top side of the branch.

Tree trimming will be applied around each light source installed within the limits of the project.

The tree trimming limits as shown on this sheet represents the minimum amount of trimming required. Additional tree trimming required will be as directed by the Engineer. The City will maintain the limits of tree trimming once a year.

All foliage and branches will be removed from the limits defined below by the Completion Date of the project.

Costs for Tree Trimming for Roadway Lighting will be incidental to the various contract bid items.

Published Date: 2024

SD DOT

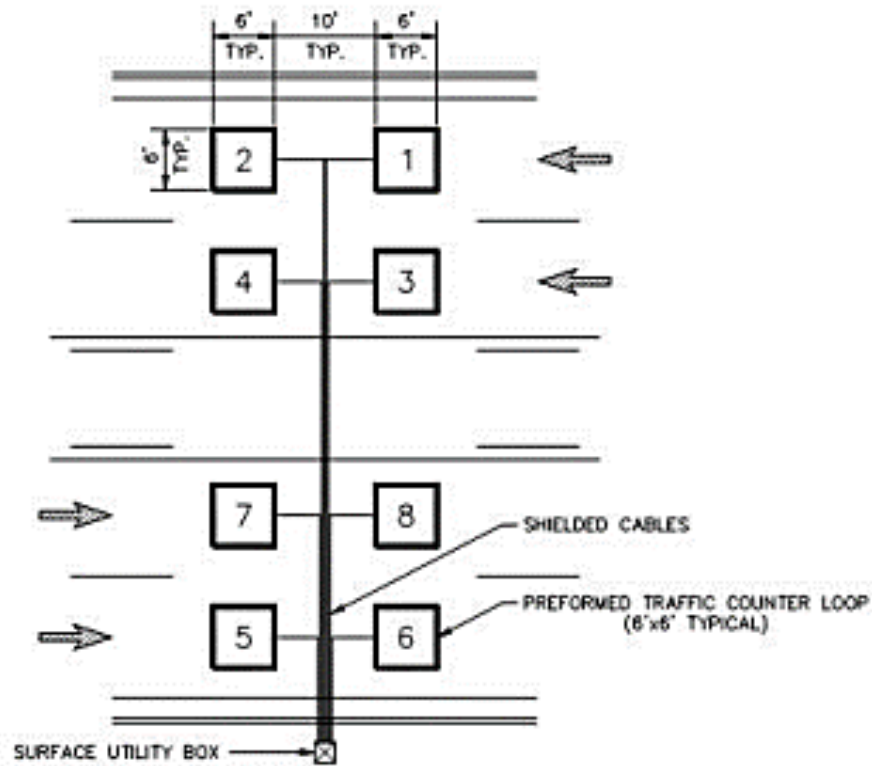
TREE TRIMMING FOR ROADWAY LIGHTING

November 19, 2022
 PLATE NUMBER
 635.99

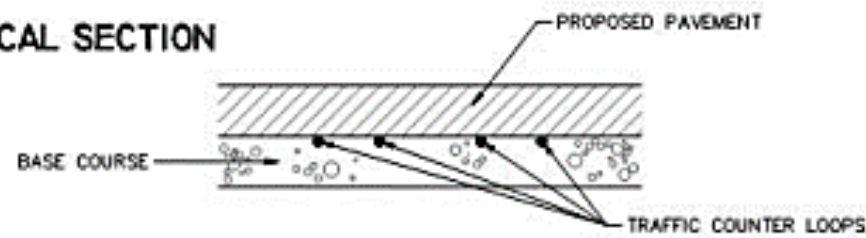
Sheet 1 of 1

PLAN VIEW

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

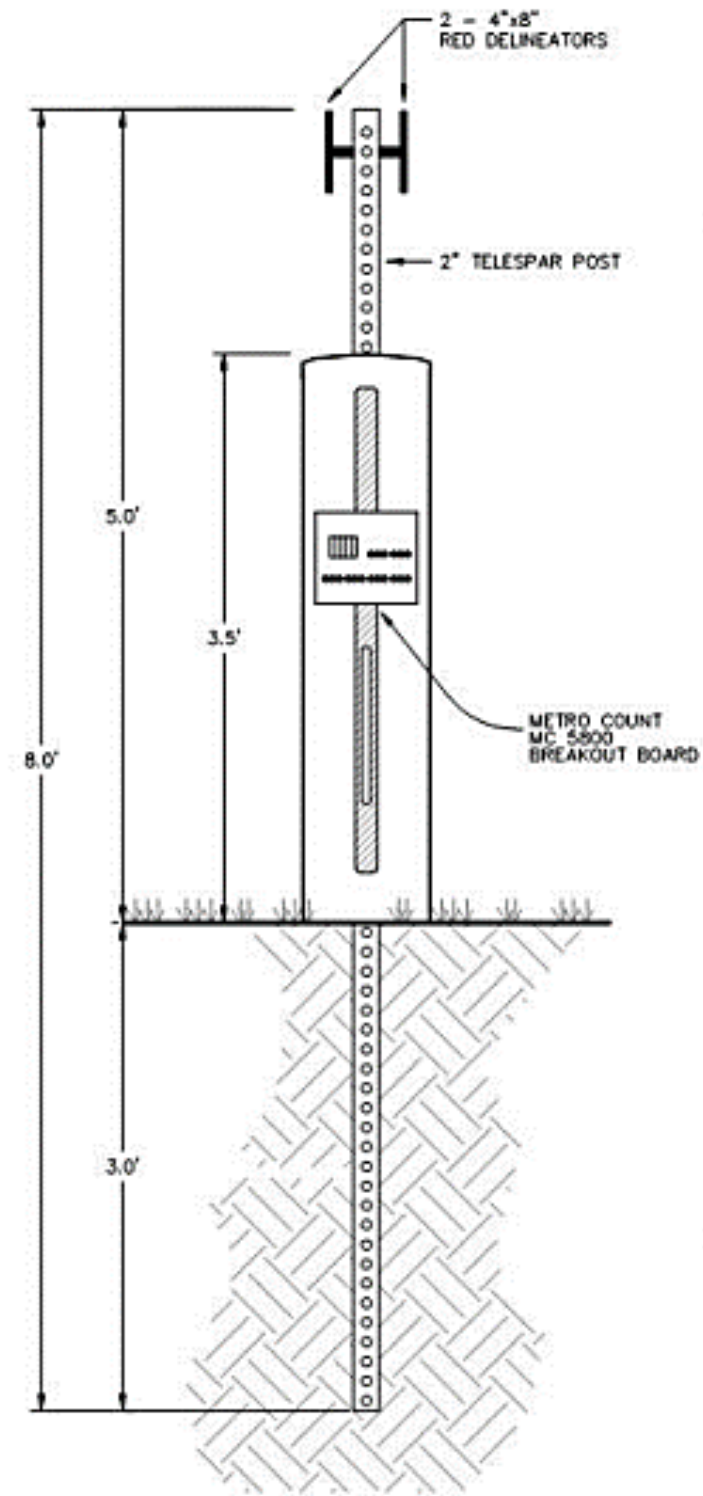


TYPICAL SECTION



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.

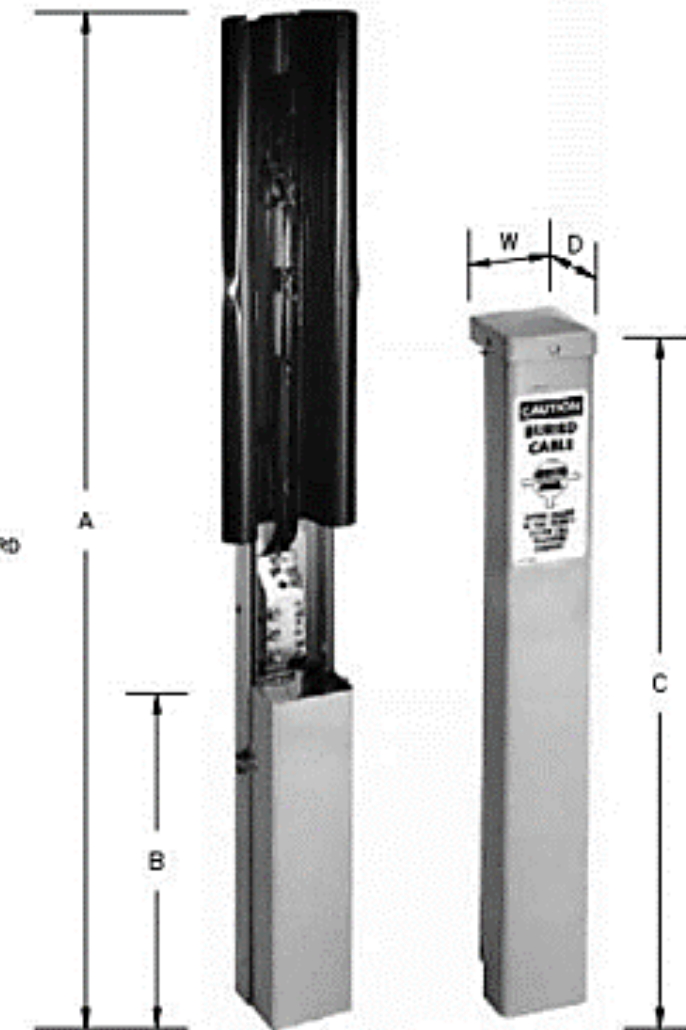


NOTES

THE PERMANENT TRAFFIC COUNTER SURFACE UTILITY BOX SHALL BE EMERSON NETWORK POWER - UPCBD3.

BOLT BOX TO TELES PAR 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