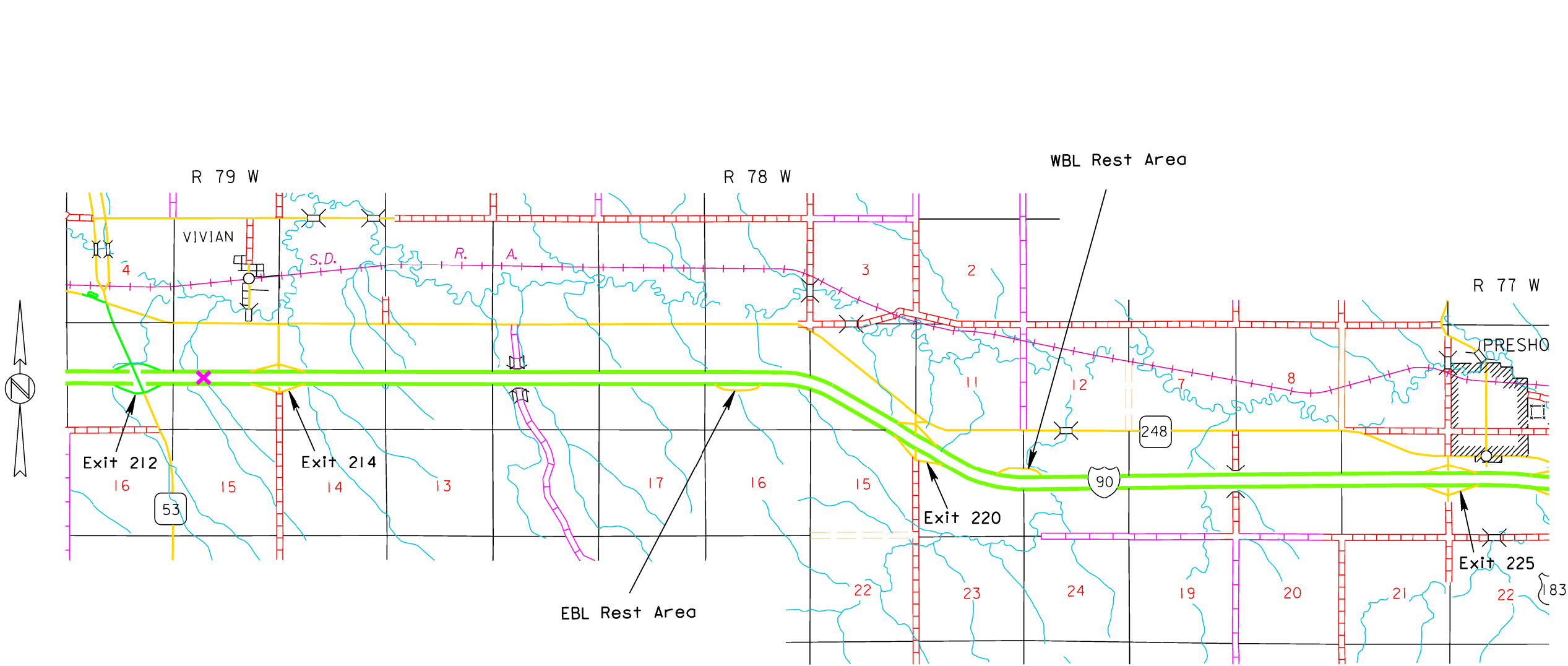


STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L1	L24

Plotting Date: 03/09/2021

SECTION L: LIGHTING PLANS

INDEX OF SHEETS	
L1	General Layout W/Index
L2	Estimate With General Notes & Tables
L3-L4	Conduit & Cable Tables
L5-L19	Conduit Layout
L20-L21	Wiring Diagram
L22-24	Standard Plates



PLOT SCALE - 1:7920

PLOTTED FROM - TRP25289

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PLOT NAME - 1

Plot Scale - 1:200

Plotted From - TRPR17199

SECTION L ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
110E1510	Remove Luminaire Pole	29	Each
110E1540	Remove Luminaire Pole Footing	29	Each
635E0050	Breakaway Base Luminaire Pole with Arm, 50' Mounting Height	40	Each
635E0150	Breakaway Base Luminaire Pole with Twin Arms, 50' Mounting Height	4	Each
635E3700	Roadway Luminaire, LED with Photoelectric Cell	48	Each
635E5020	2' Diameter Footing	352.0	Ft
635E5301	Type 1 Electrical Junction Box	8	Each
635E6200	Miscellaneous, Electrical	Lump Sum	LS
635E8120	2" Rigid Conduit, Schedule 40	10,415	Ft
635E8220	2" Rigid Conduit, Schedule 80	140	Ft
635E9014	1/C #4 AWG Copper Wire	9,640	Ft
635E9016	1/C #6 AWG Copper Wire	25,655	Ft
635E9710	2/C #10 AWG Copper Pole and Bracket Cable	3,120	Ft

SUPPLYING AS BUILT PLANS

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

SHOP DRAWING AND CATALOG CUTS SUBMITTALS

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

Adobe PDF submittals will be sent to the following email addresses:

Ryley.Rapp@state.sd.us
Kelly.VanDeWiele@state.sd.us

SECURITY CAMERAS

Existing security cameras/service cabinet assemblies on EL7, EL11, EL14, EL17, EL18, and EL22 will be carefully taken down and delivered to the Engineer for installation at a later date by others. Any cameras/service cabinet assemblies damaged during removal and delivery will be repaired or replaced at the cost of the Contractor.

All cost associated with removing and delivering the cameras/service cabinet assemblies will be incidental to the contract lump sum price for "Miscellaneous, Electrical".

In poles L6, L12, L13, L31, L33, and L36, the contractor will splice 25' of 2-#10 AWG wires with the luminaire power wires. The end of the wires will be capped off and the wires neatly coiled in the pole base.

All cost associated with supplying and splicing wires will be incidental to the contract lump sum price for "Miscellaneous, Electrical".

REMOVE LUMINAIRE POLE FOOTING

The footings of existing luminaire poles EL1-EL29 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".

LUMINAIRE POLES

Luminaire poles L1-L8, L10, L12, L13-L34, L36, L38-L44 will have a mounting height of 50-feet with 6-feet arms.

Luminaire poles L9, L11, L35, and L37 will have a mounting height of 50-feet with twin 6-feet arms.

LUMINAIRES

The lighting design used the following parameters and provides 0.9 and greater average maintained foot-candles and uniformity ratios of 3:1 (average maintained to minimum maintained foot-candles) and 6:1 (maximum to minimum maintained foot candles:

Pole Setback:	6 Ft.
Lamp Loss Factor (LLF):	0.8
Width of Lighted Area:	Varies
Spacing:	235 Ft. for Ramps Varies for Parking Lots
Configuration:	One-Sided
Mounting Height:	50 Ft.
Arm Length	6 Ft.
Light Source:	LED

The following LED luminaires meet the requirements for this design:

- a.) GE Evolve: ERL2-0-25-B3-40
- b.) AEL Autobahn ATB2-60BLEDE13-MVOLT-R2
- c.) Eaton: NAV-AF-04-D-U-T2A

ELECTRICAL JUNCTION BOX JL4 & JL6

The Contractor will place JL4 and JL6 to intercept existing conduit that goes to electrical service cabinet inside each rest area building. Existing wire will be pulled back prior to cutting existing conduit and adding new junction box then new wire shall be fed from JL4 and JL6 to respective electrical service cabinet. All costs for labor and material to intercept existing conduit at mentioned locations will be incidental to each "Type 1 Electrical Junction Box."

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L2	L24

Plotting Date: 03/12/2021

MISCELLANEOUS, ELECTRICAL

New wires installed with this project shall be connected to the existing electrical panels in each respective Rest Area. All costs for labor and material to disconnect old wires and connect new wires to the existing electrical panels will be incidental to the contract lump sum price for "Miscellaneous, Electrical".

Sequencing of construction will be done in such a way that the rest area will remain illuminated at existing design light levels and security cameras will remain operational while the rest stop is open to the public. Any additional costs associated with this sequencing will be incidental to the contract lump sum price for "Miscellaneous, Electrical".

WIRE SPLICING FOR LIGHTING

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

SUBSURFACE

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

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

TABLE OF FOOTING DATA

Site Designation	Footing Diameter	* Footing Depth	**Spiral Diameter	**Spiral Length	Vertical Reinforcement
L1-L44	2' - 0"	8' - 0"	1' - 8"	54' - 9"	8-#7 x 7' - 6"

* Footing depth will be below ground level.

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

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CONDUIT AND CABLE QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L4	L24

Plotting Date: 03/12/2021

Location to Location		Rigid Conduit				Copper Wire		Pole and Bracket Cable																					
		Schedule 40		Schedule 80																									
		2"		2"		1/C #4 AWG	1/C #6 AWG	2/C #10 AWG																					
Ft		Ft				Ft	Ft	Ft																					
LIGHTING																													
LUMINAIRE POLES																													
LUMINAIRE POLE	L1							65																					
LUMINAIRE POLE	L2							65																					
LUMINAIRE POLE	L3							65																					
LUMINAIRE POLE	L4							65																					
LUMINAIRE POLE	L5							65																					
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LUMINAIRE POLE	L7							65																					
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LUMINAIRE POLE	L9							130																					
LUMINAIRE POLE	L10							65																					
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LUMINAIRE POLE	L40							65																					
LUMINAIRE POLE	L41							65																					
LUMINAIRE POLE	L42							65																					
LUMINAIRE POLE	L43							65																					
LUMINAIRE POLE	L44							65																					
Subtotal:		0	0	0	0	0	0	0	3,120																				
Total:		10,415	0	140	0	0	9,640	25,655	0	3,120																			

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CONDUIT LAYOUT

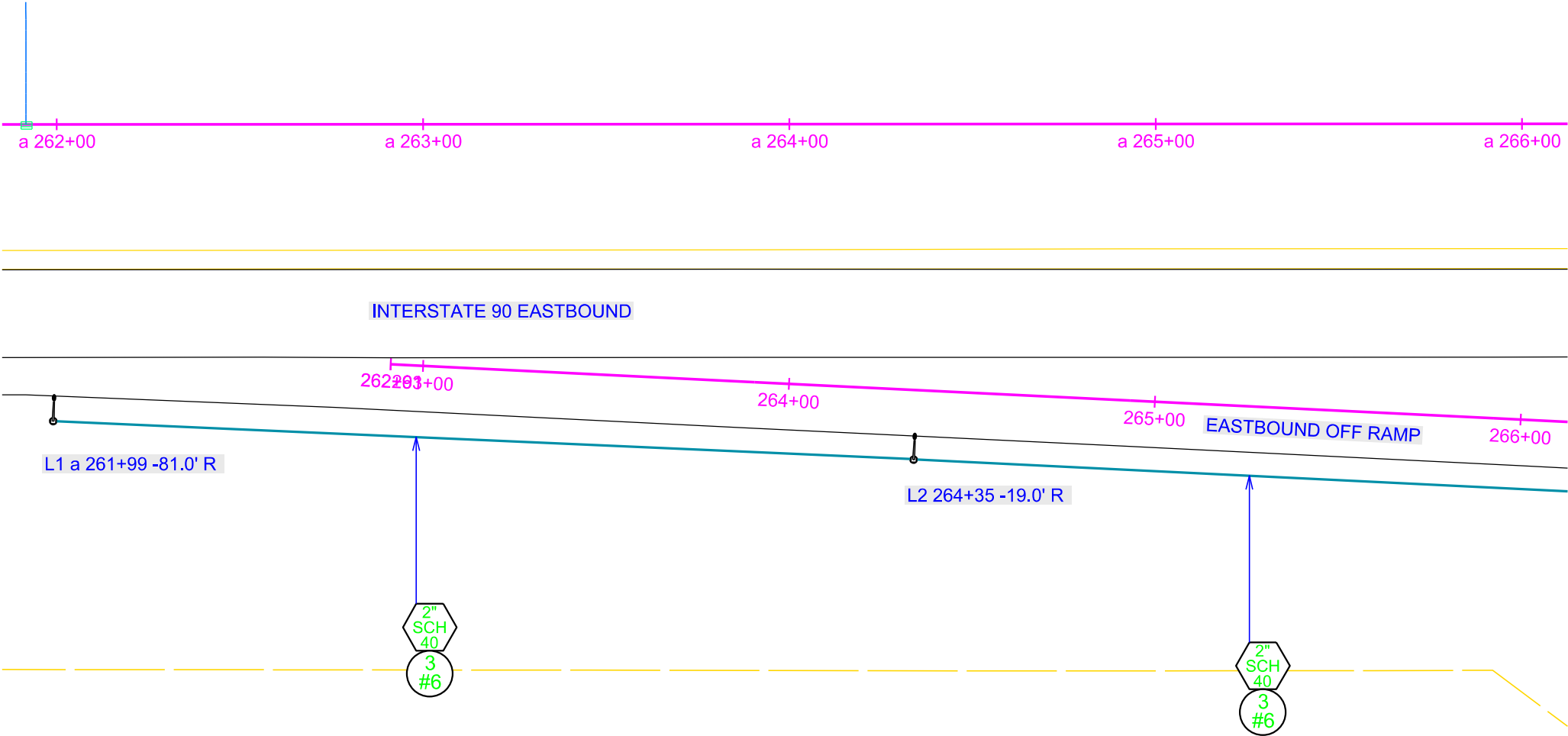
EASTBOUND REST AREA (VIVIAN)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L5	L24

Plotting Date: 03/12/2021



ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
	Remove Luminaire Pole (EL1-EL29)	29	EACH
	Remove Luminaire Pole Footing (EL1-EL29)	29	EACH
	Breakaway Base Luminaire Pole w/Twin 6' Arms 50' Mounting Height (L9,L11,L35,L37)	4	EACH
	Breakaway Base Luminaire Pole w/6' Arm 50' Mounting Height (L1-L8,L10,L12,L13-L34,L36,L38-L44)	40	EACH
	Roadway Luminaire, LED with P.E. (L1-L44)	48	EACH
	2' Diameter Footing (L1-L44)	352	FT
	Type 1 Electrical Junction Box (JL1-JL8)	8	EACH
	2" Rigid Conduit, Schedule 40	10,415	FT
	2" Rigid Conduit, Schedule 80	140	FT
	1/C #4 AWG Copper Wire	9,640	FT
	1/C #6 AWG Copper Wire	25,655	FT
	2/C #10 AWG Copper Pole & Bracket Cable	3,120	FT



CONDUIT LAYOUT

EASTBOUND REST AREA (VIVIAN)

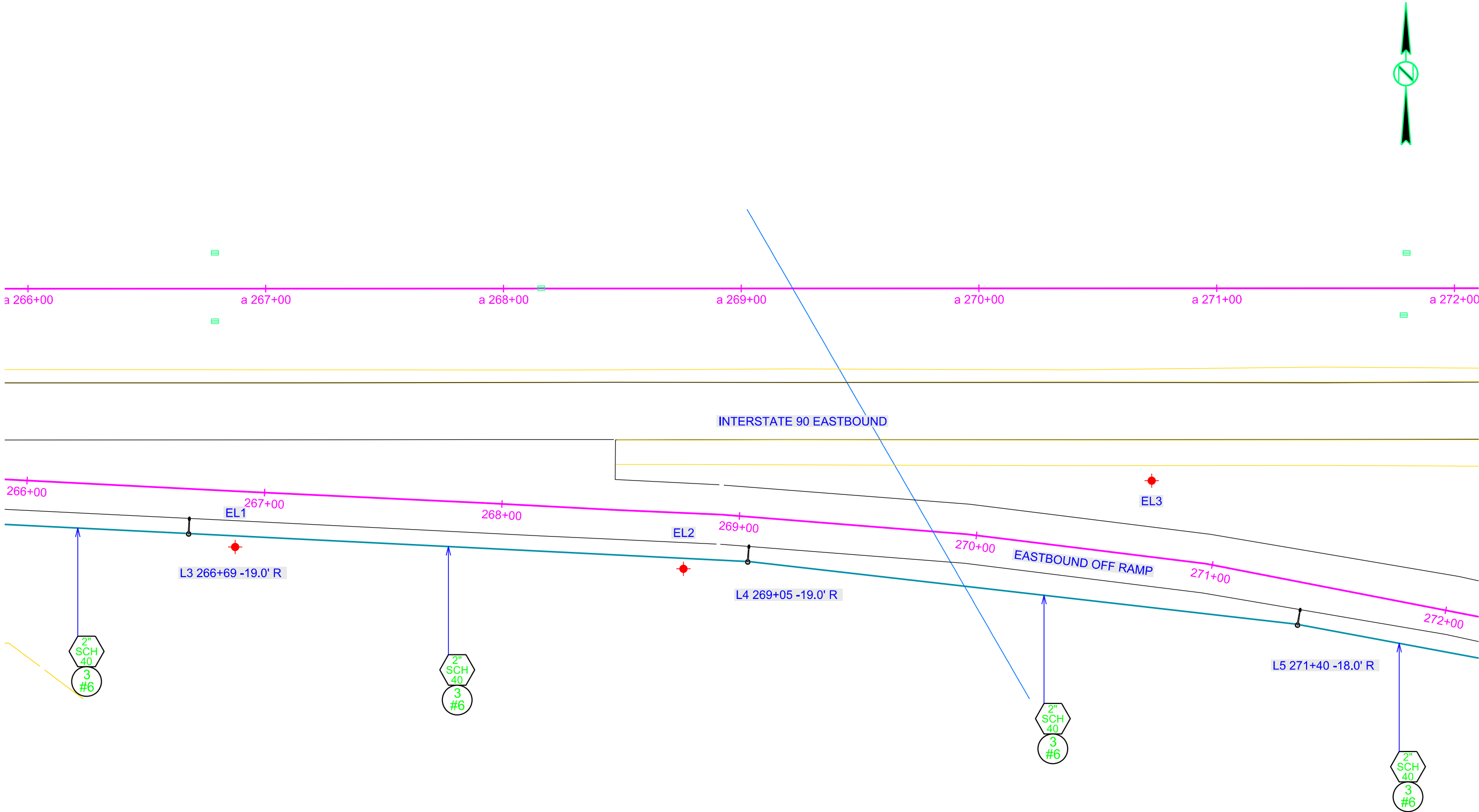
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L6	L24

Plotting Date: 03/12/2021

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CONDUIT LAYOUT

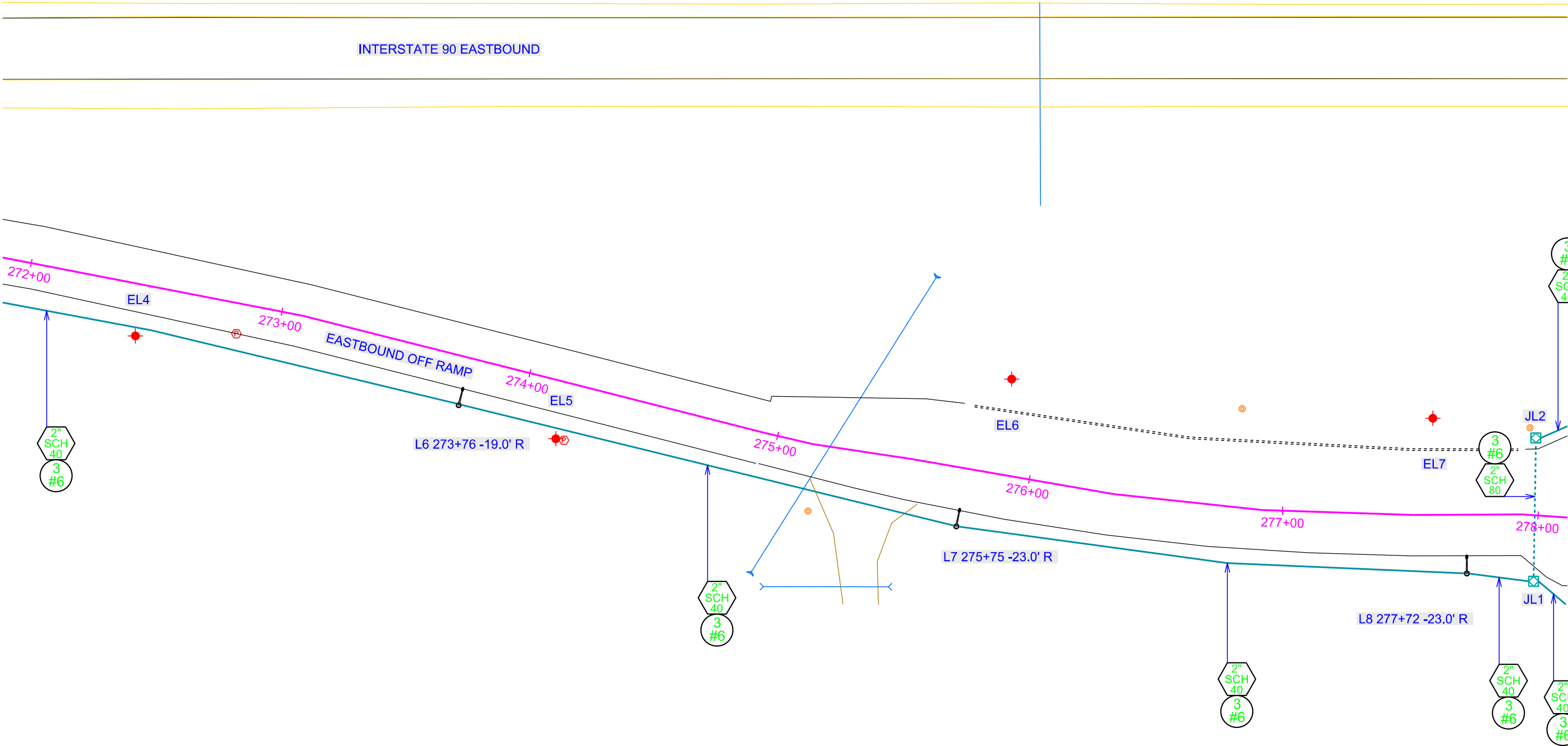
EASTBOUND REST AREA (VIVIAN)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L7	L24

Plotting Date: 03/12/2021



INTERSTATE 90 EASTBOUND



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CONDUIT LAYOUT

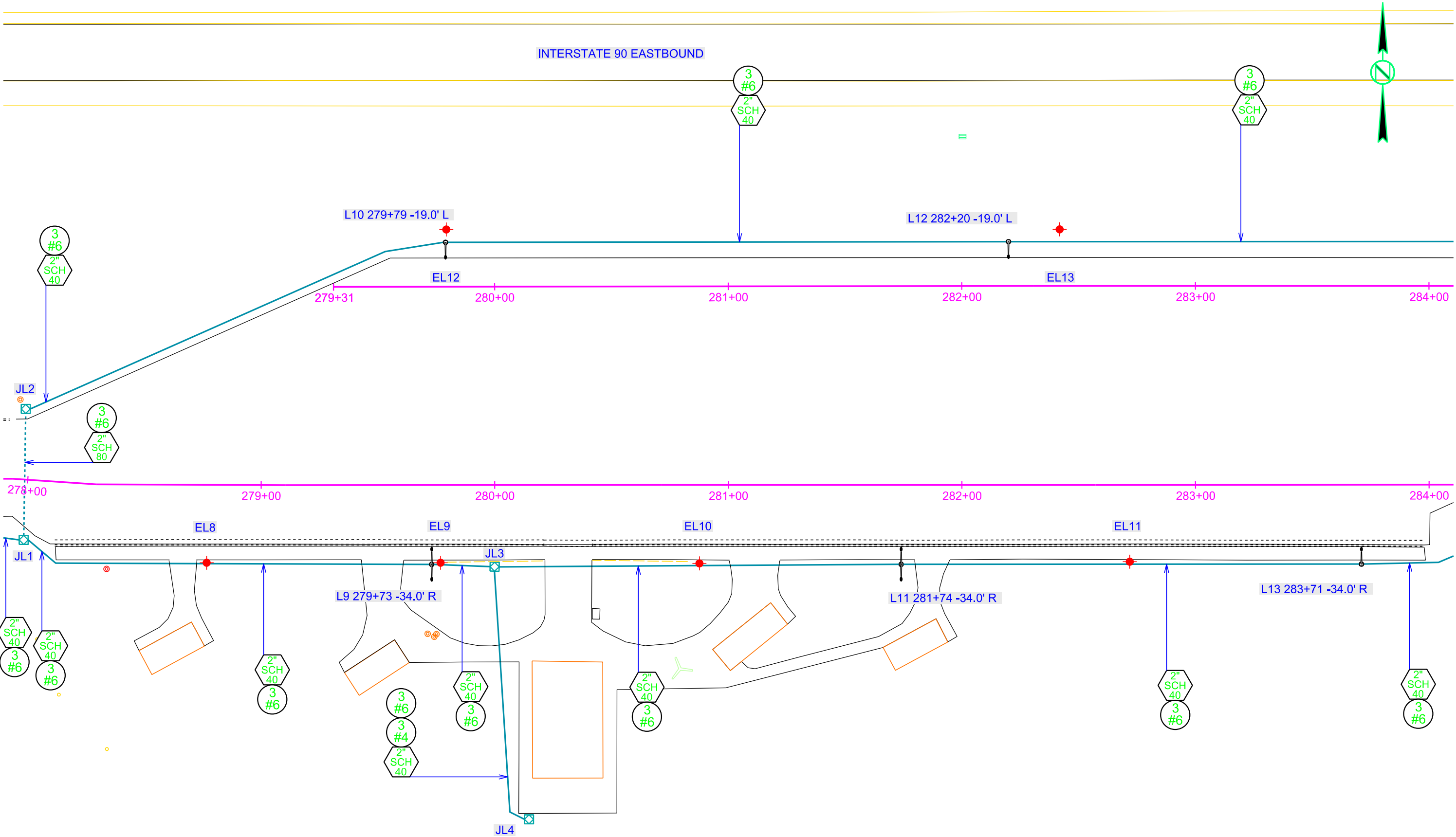
EASTBOUND REST AREA (VIVIAN)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L8	L24

Plotting Date: 03/12/2021

Plot Scale - 1"=40'

Plotted From - TRPR17199



STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L9	L24

INTERSTATE 90 EASTBOUND

Horizontal alignment (magenta line) with stationing: 284+00, 285+00, 286+00, 287+00, 288+00, 289+00, 290+00.

Vertical curves (L14, L15, L16) and their data:

- L14 284+19 -19.0' L
- L15 286+57 -19.0' R
- L16 288+92 -19.0' R

Other features include: EL14, EASTBOUND ON RAMP, and various markers (3 #6, 2" SCH 40).

Plot Scale - 1:40

Plotted From - TRPR17199

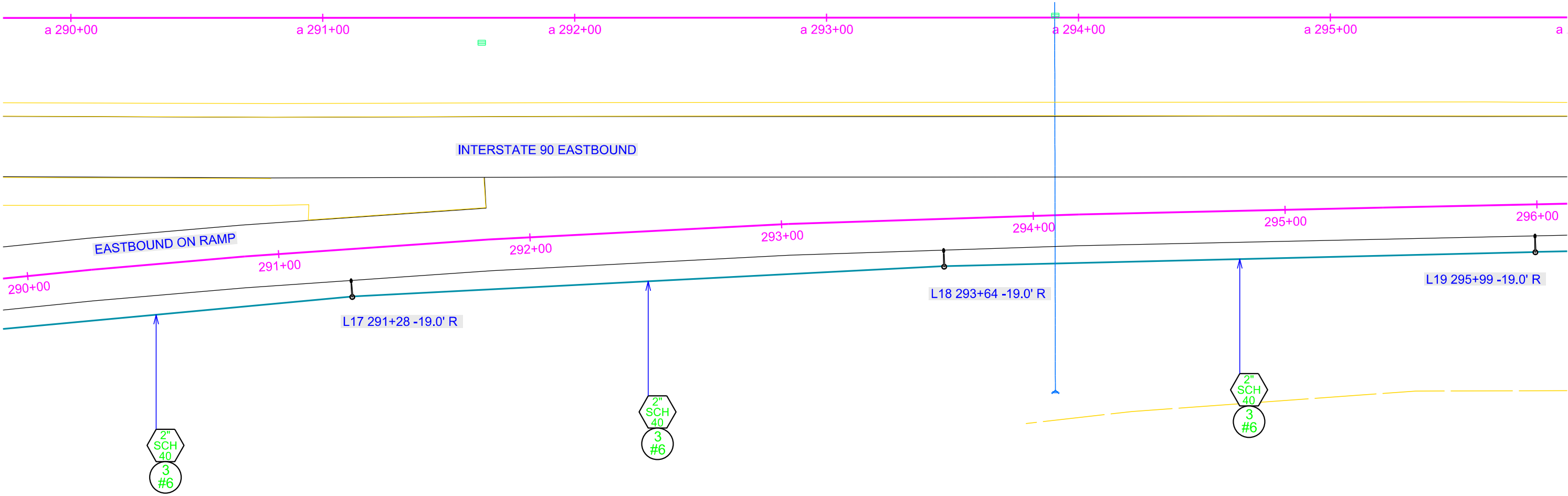
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CONDUIT LAYOUT

EASTBOUND REST AREA (VIVIAN)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L10	L24

Plotting Date: 03/12/2021



Plot Scale - 1:40

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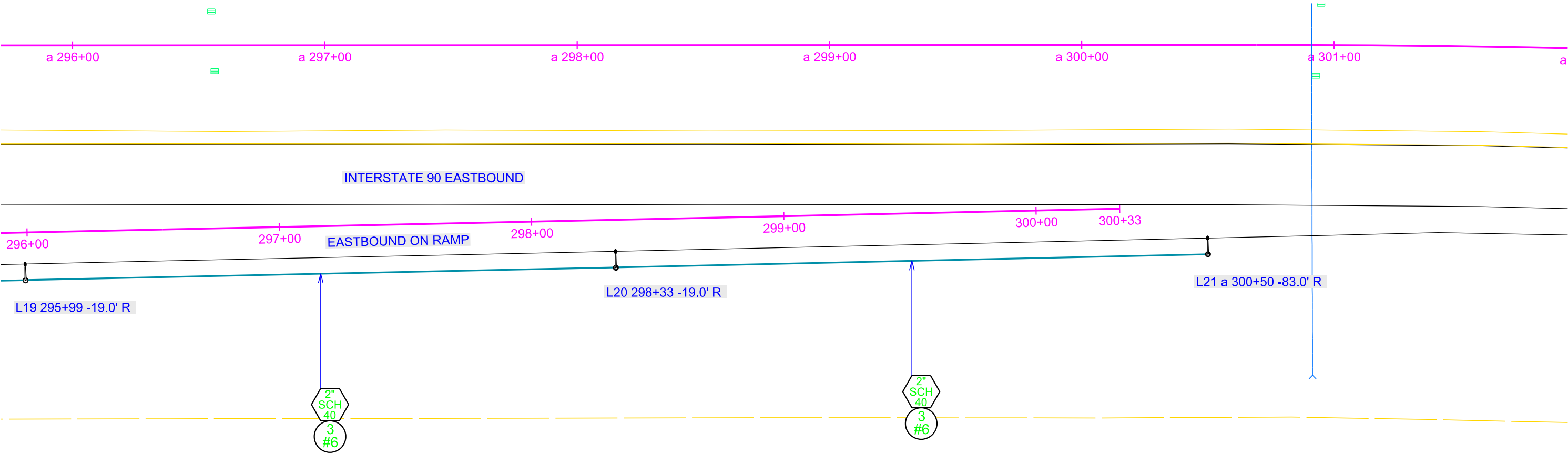
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CONDUIT LAYOUT

EASTBOUND REST AREA (VIVIAN)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L11	L24

Plotting Date: 03/12/2021



CONDUIT LAYOUT

WESTBOUND REST AREA (VIVIAN)

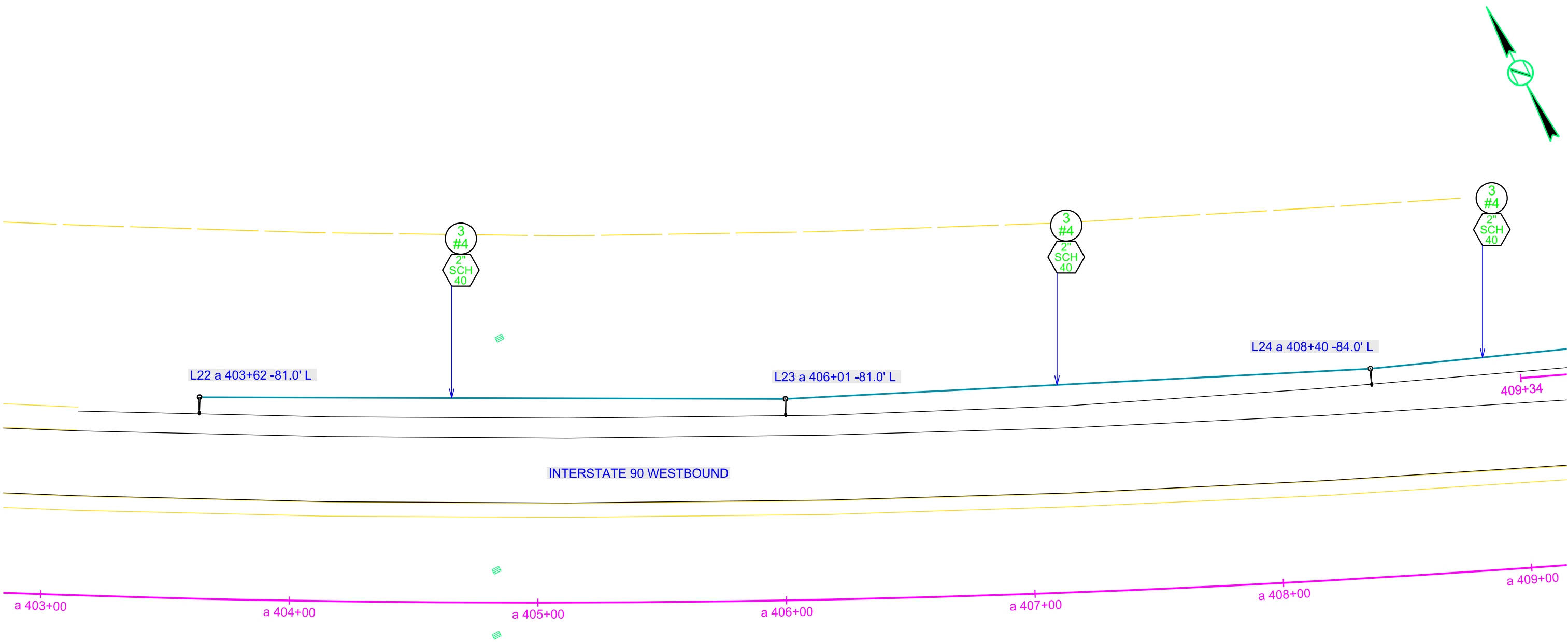
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L12	L24

Plotting Date: 03/12/2021

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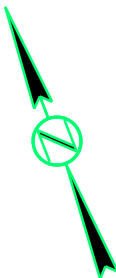


CONDUIT LAYOUT

WESTBOUND REST AREA (VIVIAN)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
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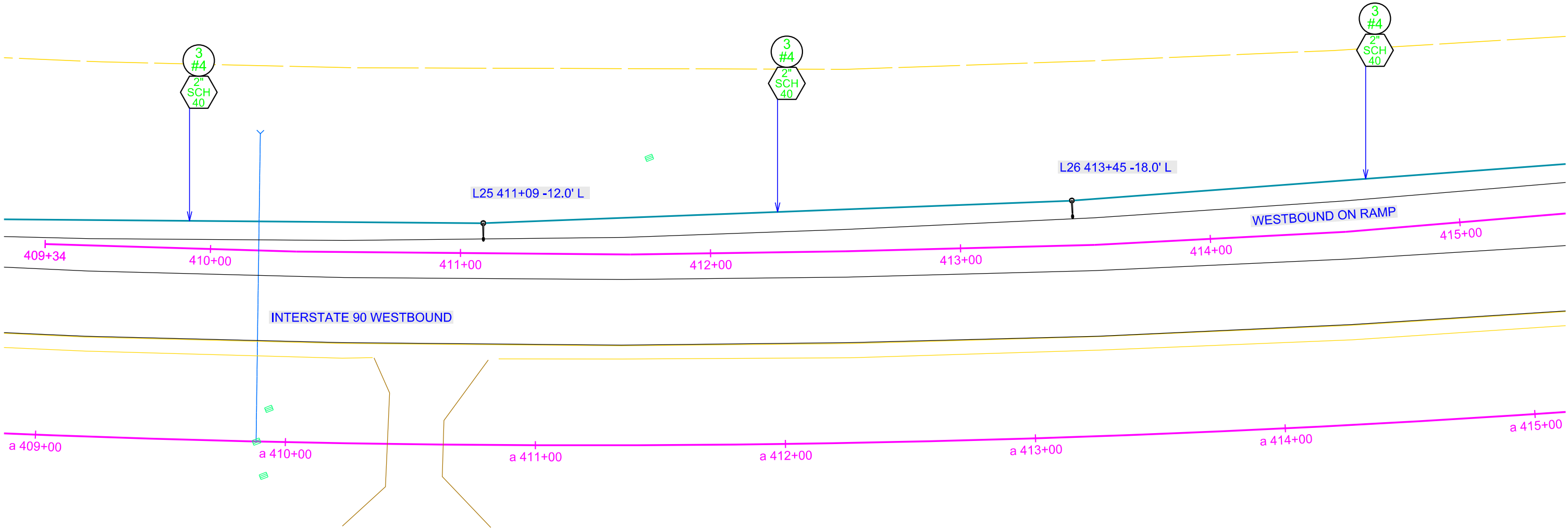
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CONDUIT LAYOUT

WESTBOUND REST AREA (VIVIAN)

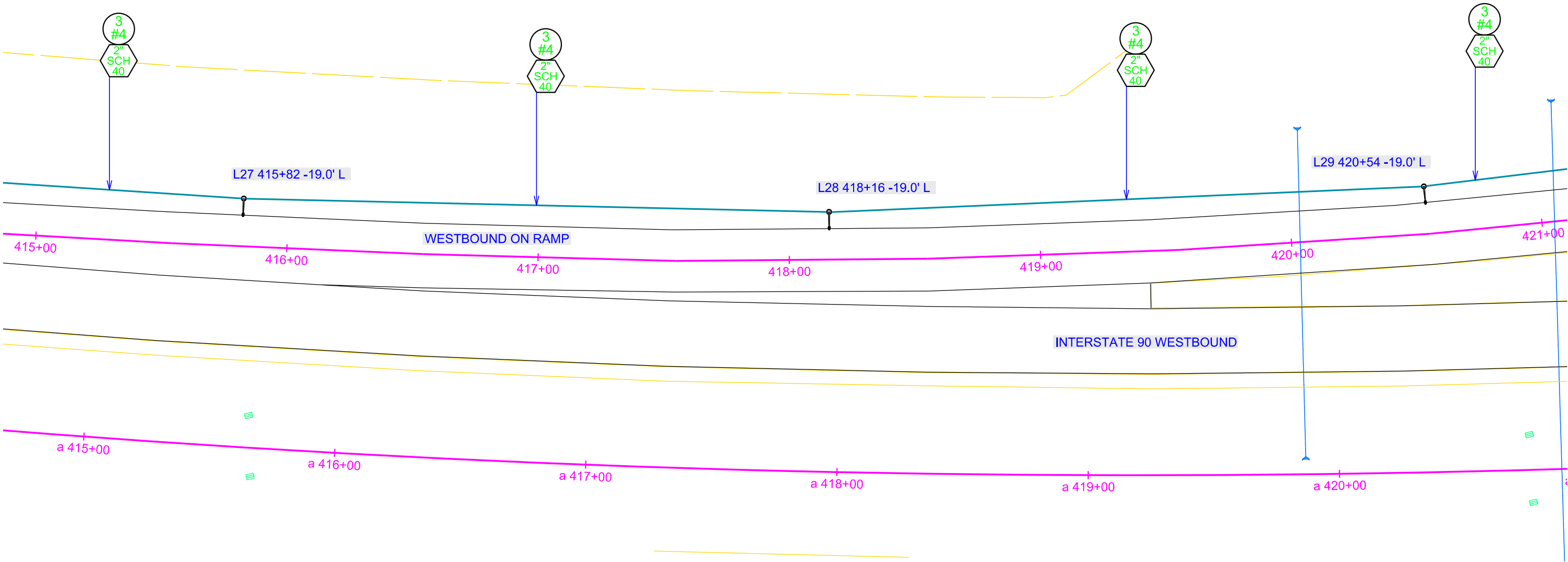
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Plotting Date: 03/12/2021



Plot Scale - 1"=40'

Plotted From - TRPR17199



CONDUIT LAYOUT

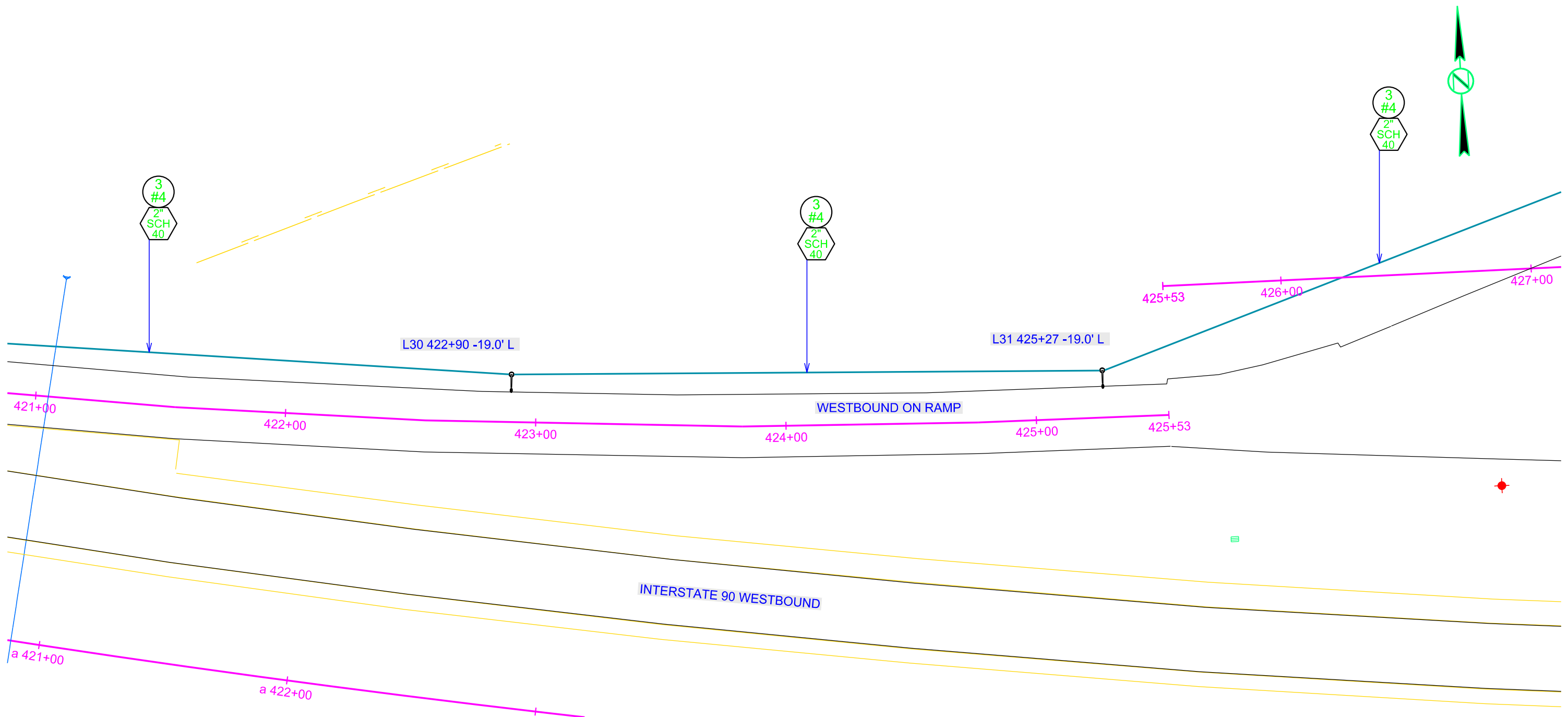
WESTBOUND REST AREA (VIVIAN)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L15	L24

Plotting Date: 03/12/2021

Plot Scale - 1"=40'

Plotted From - TRPR17199



CONDUIT LAYOUT

WESTBOUND REST AREA (VIVIAN)

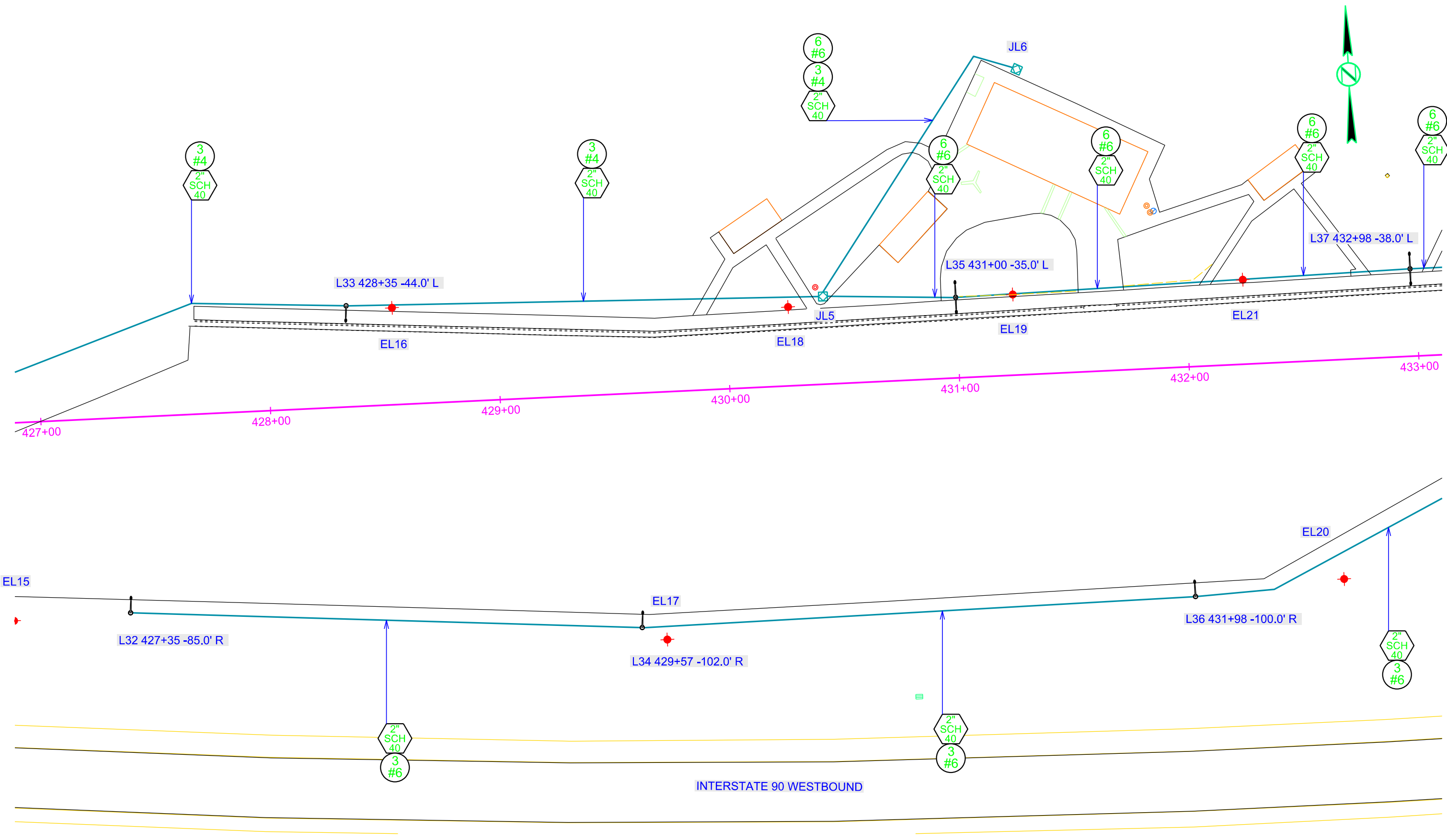
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L16	L24

Plotting Date: 03/12/2021

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Plotted From - TRPR17199

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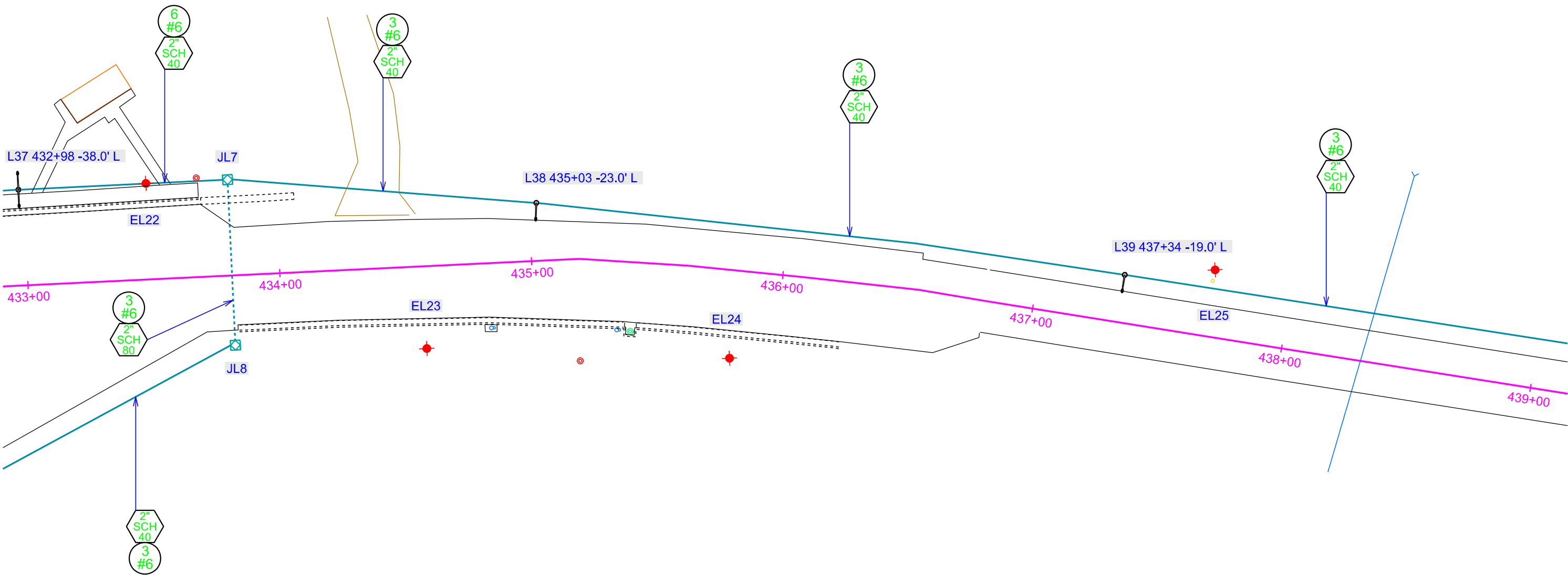


CONDUIT LAYOUT

WESTBOUND REST AREA (VIVIAN)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L17	L24

Plotting Date: 03/12/2021



Plot Scale - 1:40

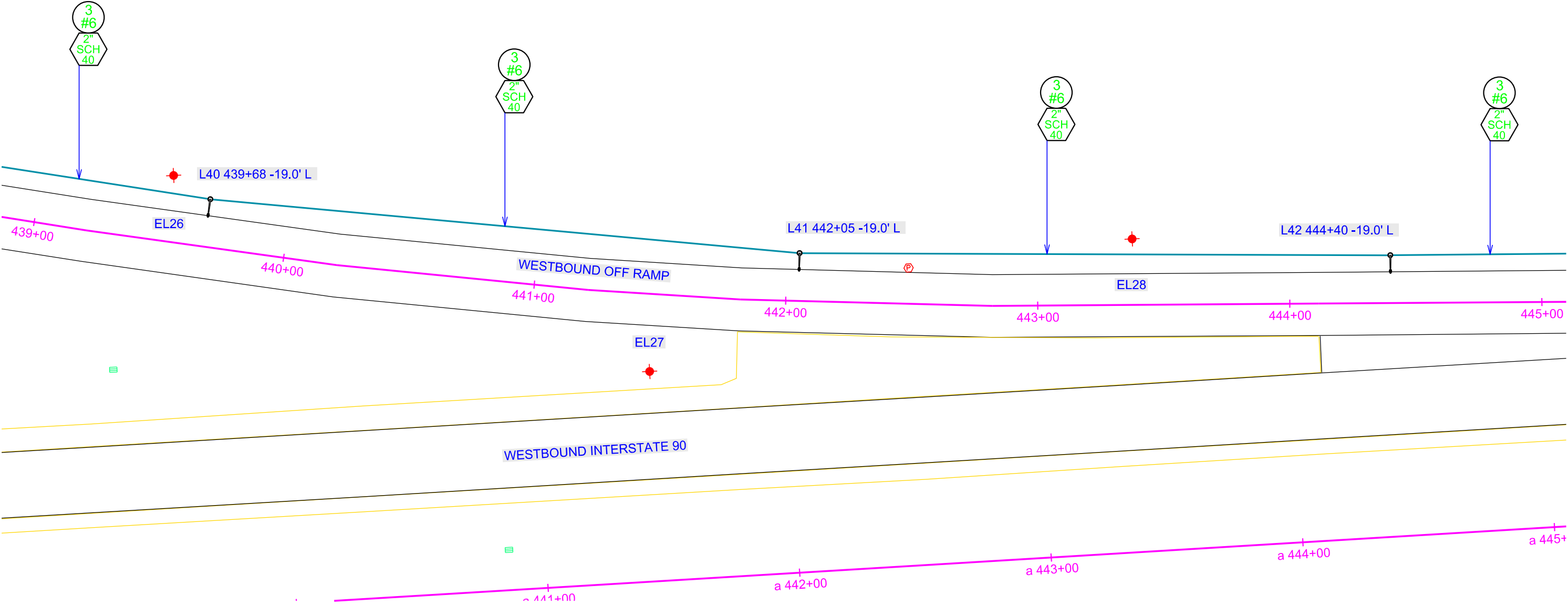
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CONDUIT LAYOUT

WESTBOUND REST AREA (VIVIAN)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L18	L24

Plotting Date: 03/12/2021



Plot Scale - 1:40

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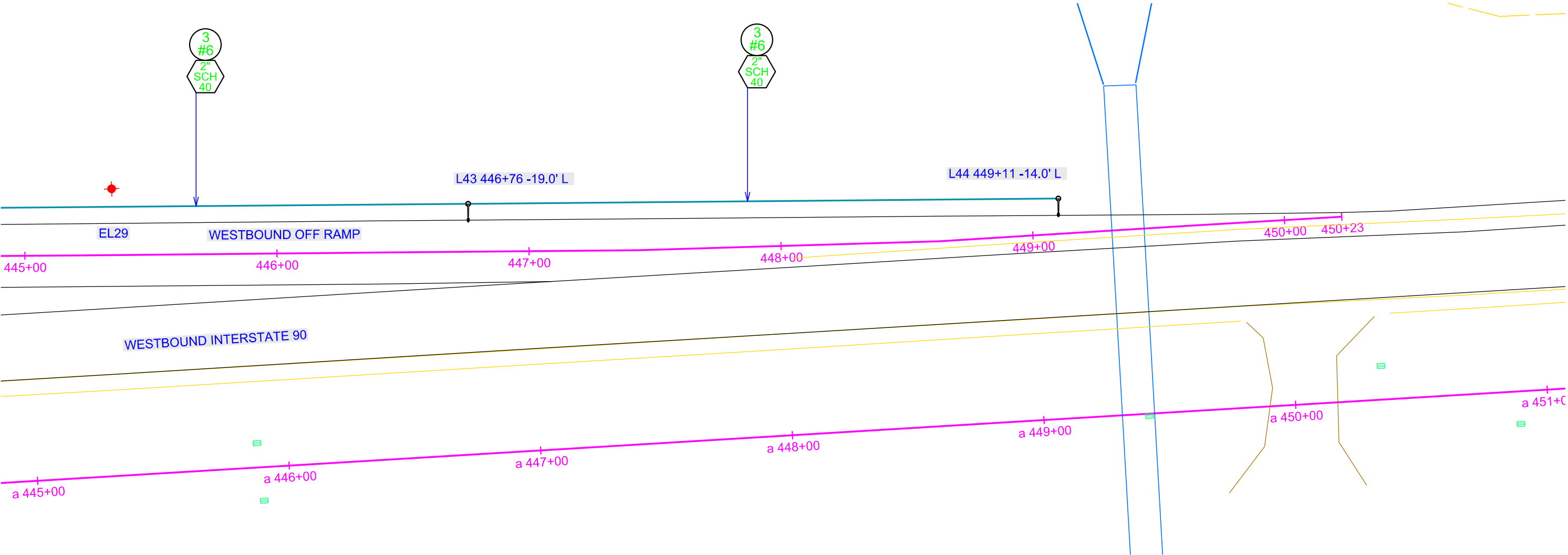
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CONDUIT LAYOUT

WESTBOUND REST AREA (VIVIAN)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L19	L24

Plotting Date: 03/12/2021



Plot Scale - 1:40

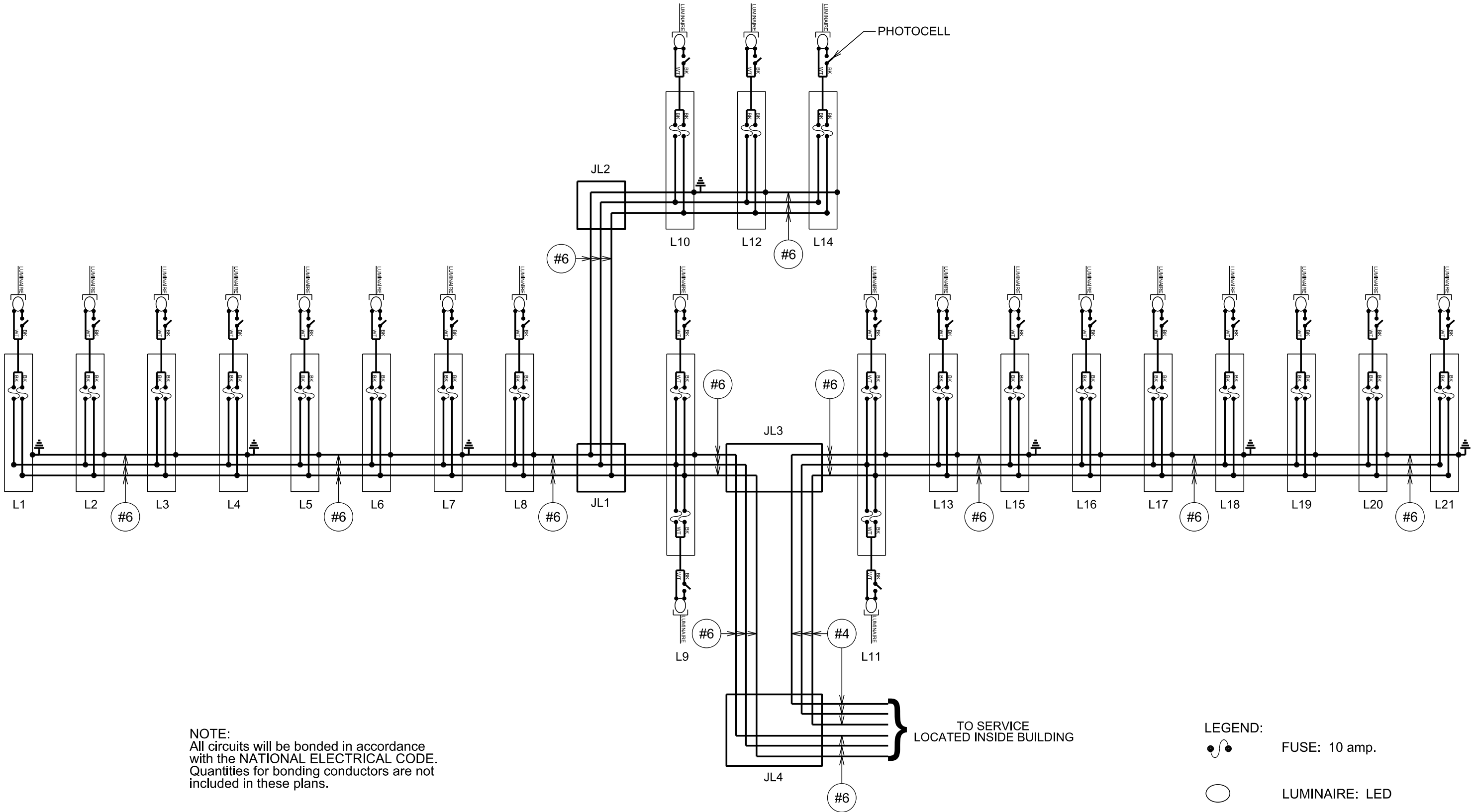
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WIRING DIAGRAM EASTBOUND REST AREA

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L20	L24

Plotting Date: 03/12/2021



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

- LEGEND:
- FUSE: 10 amp.
 - LUMINAIRE: LED

WIRING DIAGRAM
WESTBOUND REST AREA

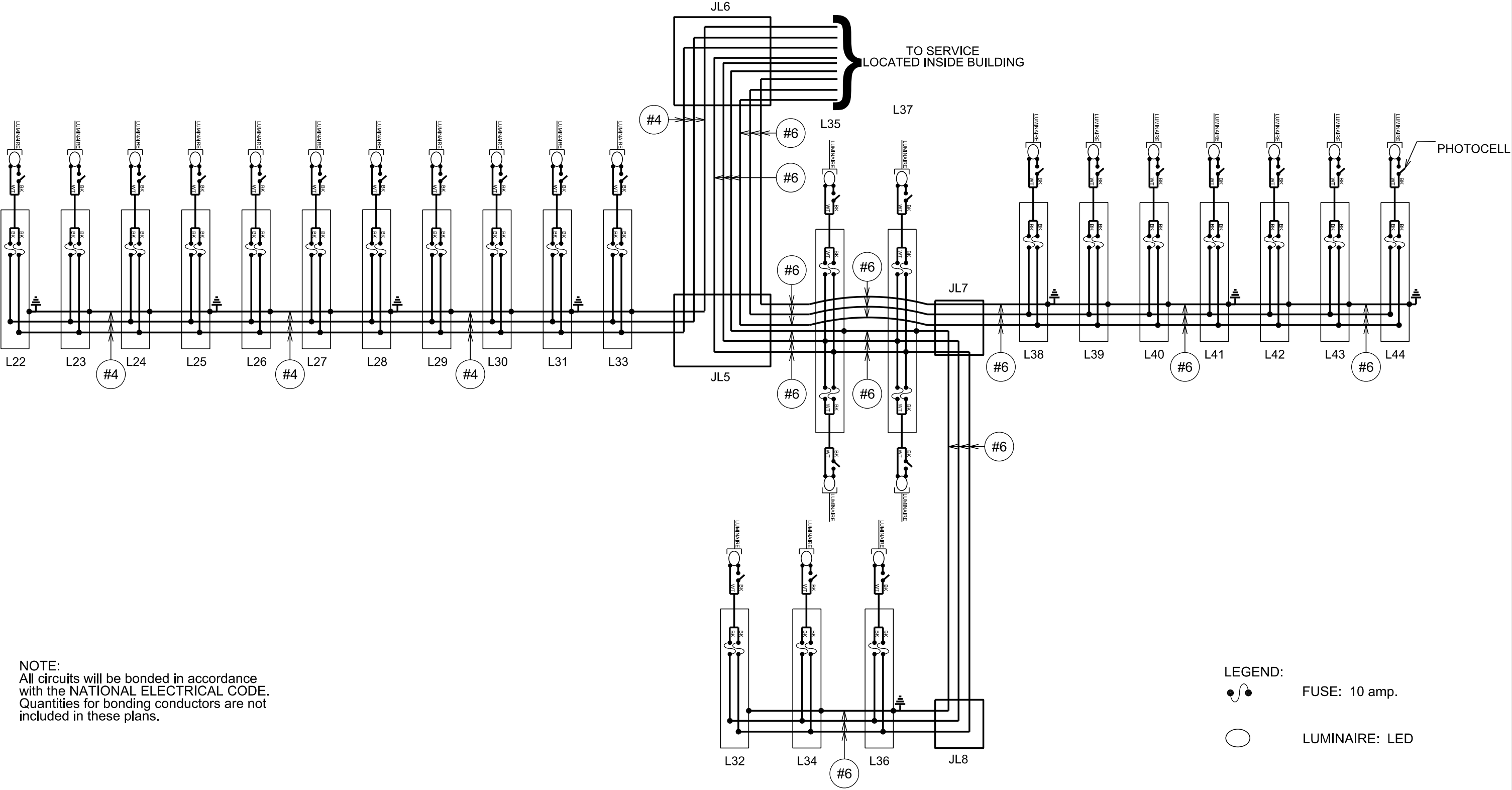
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
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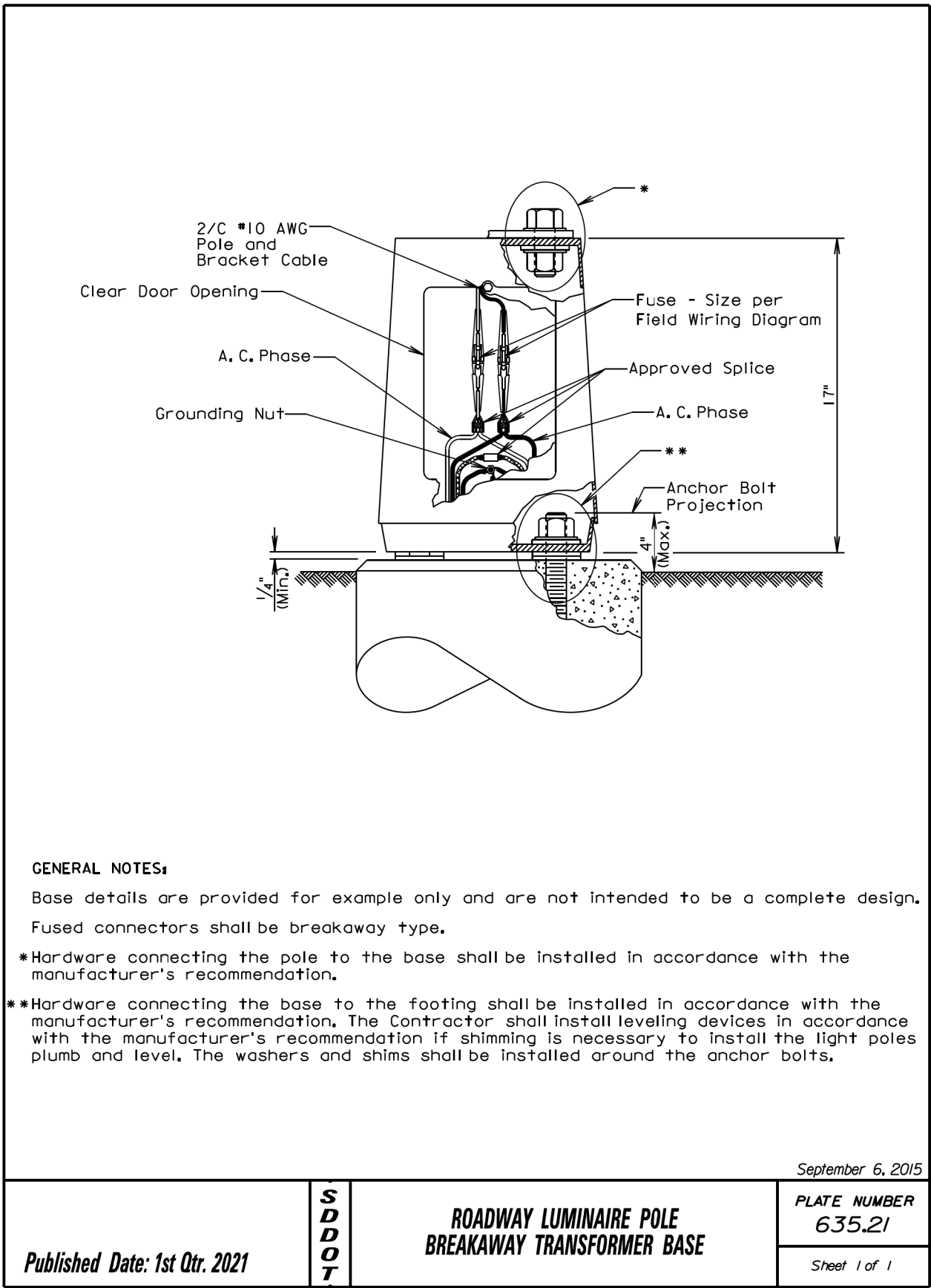
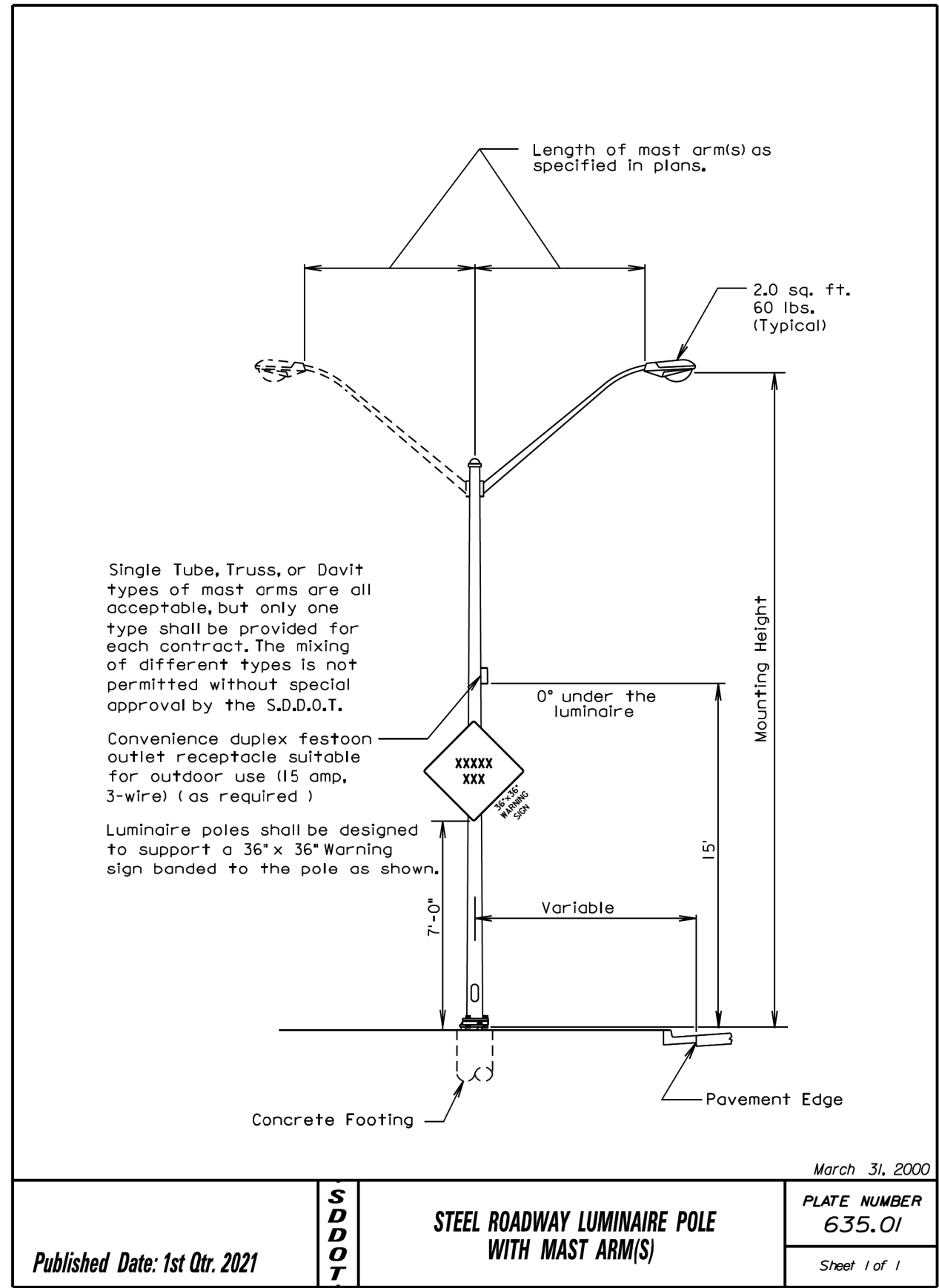
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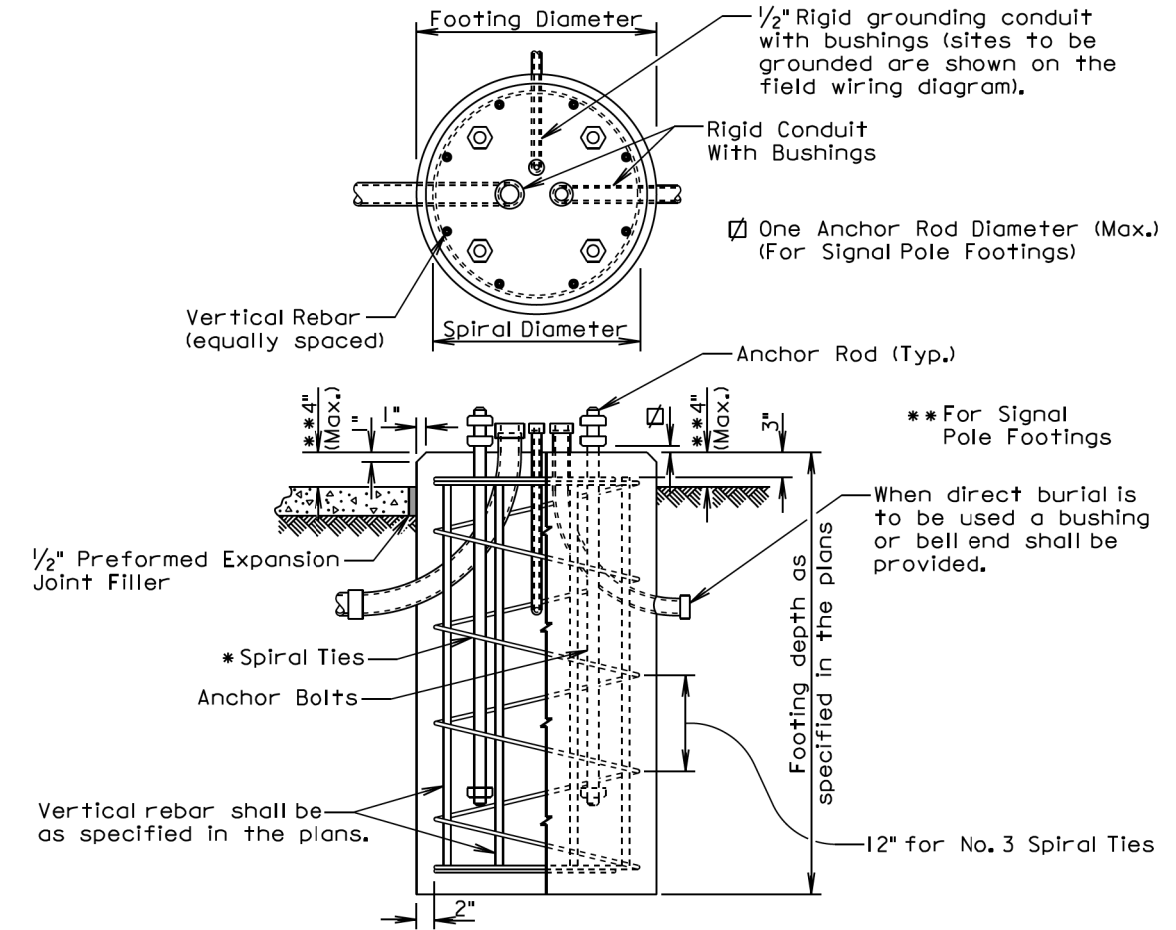
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GENERAL NOTES:

- * Circular ties may be used in lieu of the spiral ties. The No. 3 ties shall be spaced 12 inches apart except for the top two which shall be spaced 6 inches apart. The ties shall be lapped 18 inches and the laps shall be staggered around the cage.
- Spiral ties shall 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 shall not project above the slip plane or fracture plane for breakaway poles.
- Conduits shall be sealed water-tight during all phases of construction until poles are in place.
- The anchor rods shall 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 shall be incidental to the footing bid item(s).
- The pole shall not be installed until the concrete has attained design strength (4000 psi).
- The contour of the area surrounding the breakaway pole shall 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.

June 26, 2015

Published Date: 1st Qtr. 2021	S D D O T	POLE FOOTING	PLATE NUMBER 635.55
			Sheet 1 of 1

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

GENERAL NOTES:

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

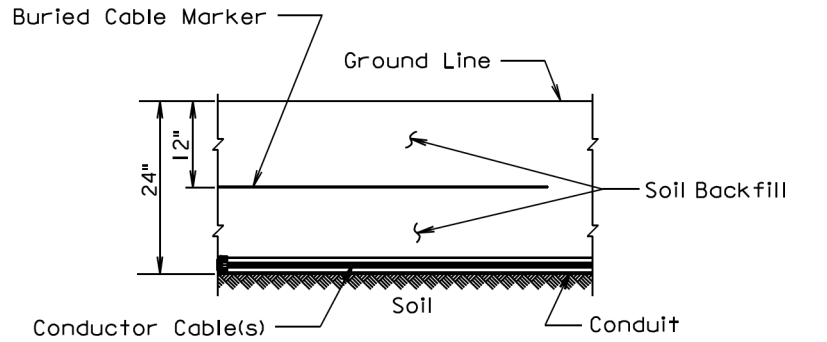
November 19, 2020

Published Date: 1st Qtr. 2021	S D D O T	ELECTRICAL JUNCTION BOXES TYPE 1 THROUGH TYPE 4	PLATE NUMBER 635.65
			Sheet 2 of 2

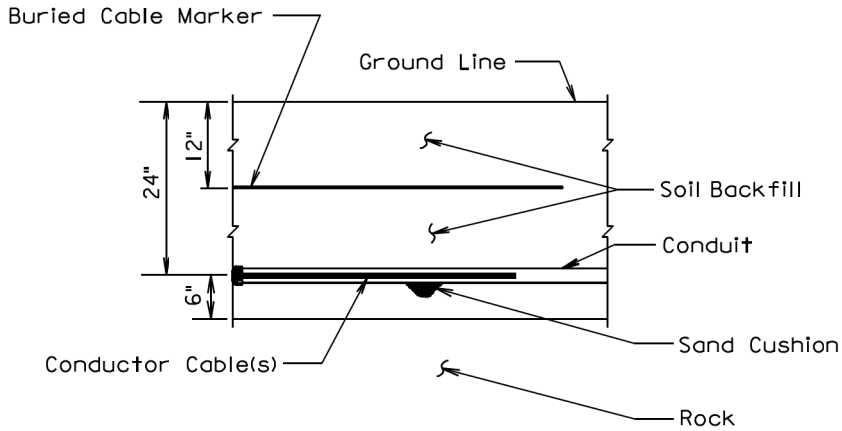
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Plotted From - TRPR17199

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0905(115)218	L24	L24

Plotting Date: 03/12/2021



SECTION VIEW



SECTION VIEW

GENERAL NOTE:

The Buried Cable Marker shall be plastic, approximately 6" wide, and shall be capable of sustaining a minimum of a 350% tolerance of elongation without tearing. The Buried Cable Marker shall 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 shall be printed in a contrasting color on the cable marker. The Buried Cable Marker shall be subject to approval by the Engineer. All costs associated with furnishing and installing the Buried Cable Marker shall be incidental to the contract unit price per Foot for the bid item used for the electrical conductor.

March 31, 2000

<i>Published Date: 1st Qtr. 2021</i>	S D D O T	CONDUIT INSTALLATION	PLATE NUMBER 635.76
			Sheet 1 of 1