DESIGN DATA				
Traffic	Average Daily			
Current 2013	Pass: 3,800	Trucks: 1,135	Total: 4,935	
Preventative Maintenance				

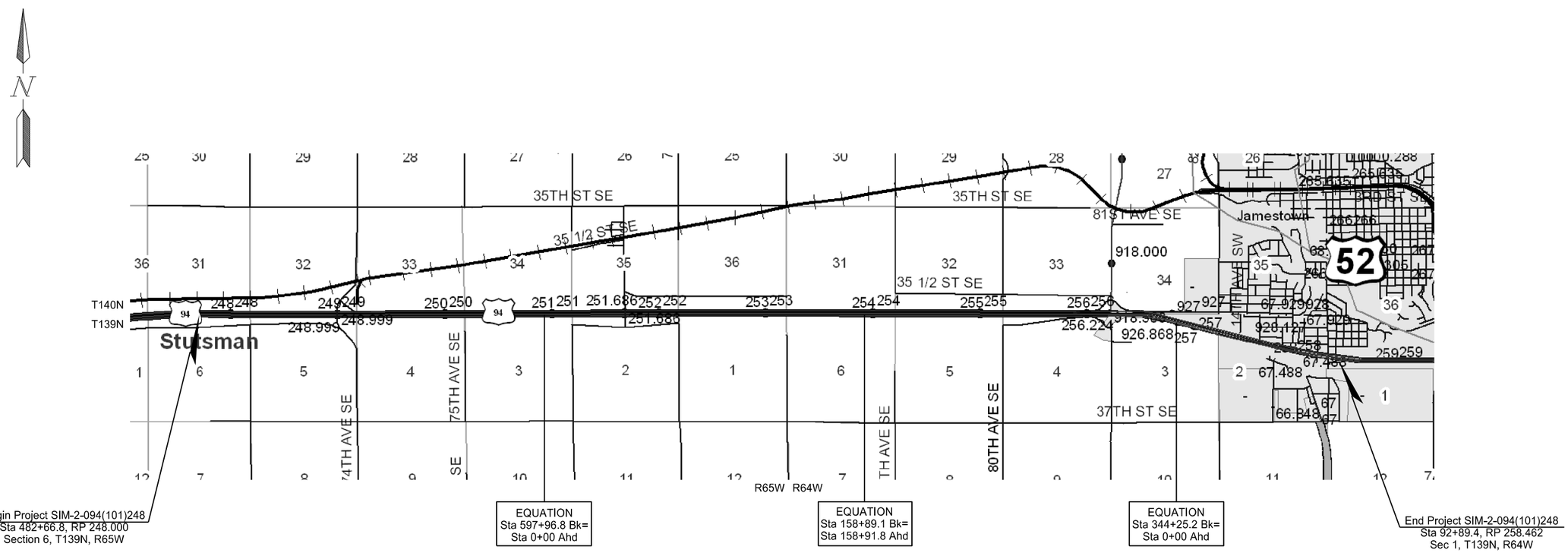
STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	17737	1	1

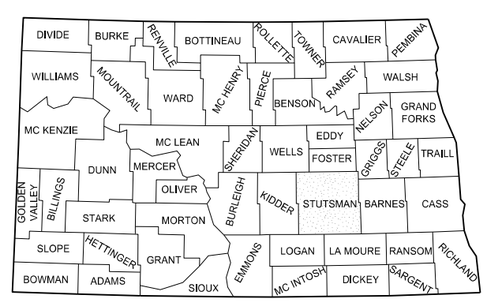
JOB # 7
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

SIM-2-094(101)248
FHWA Full Involvement
Stutsman County
Near Lippert Interchange to Near US 281 - Eastbound
Concrete Pavement Repair, Grinding, and Incidentals

GOVERNING SPECIFICATIONS:
Standard Specifications adopted by the North Dakota Department of Transportation October 2008; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SIM-2-094(101)248	10.462	10.462





STATE COUNTY MAP

DESIGNERS

Scott Woodham /s/

APPROVED DATE 08/27/2013

Roger Weigel /s/
OFFICE OF PROJECT DEVELOPMENT
ND DEPARTMENT OF TRANSPORTATION

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

APPROVED DATE 08/27/2013

James Douglas Rath /s/
NDDOT DESIGN DIVISION

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Section No.	Sheet No.	Description
1	1	Title Sheet
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30	1	Typical Sections
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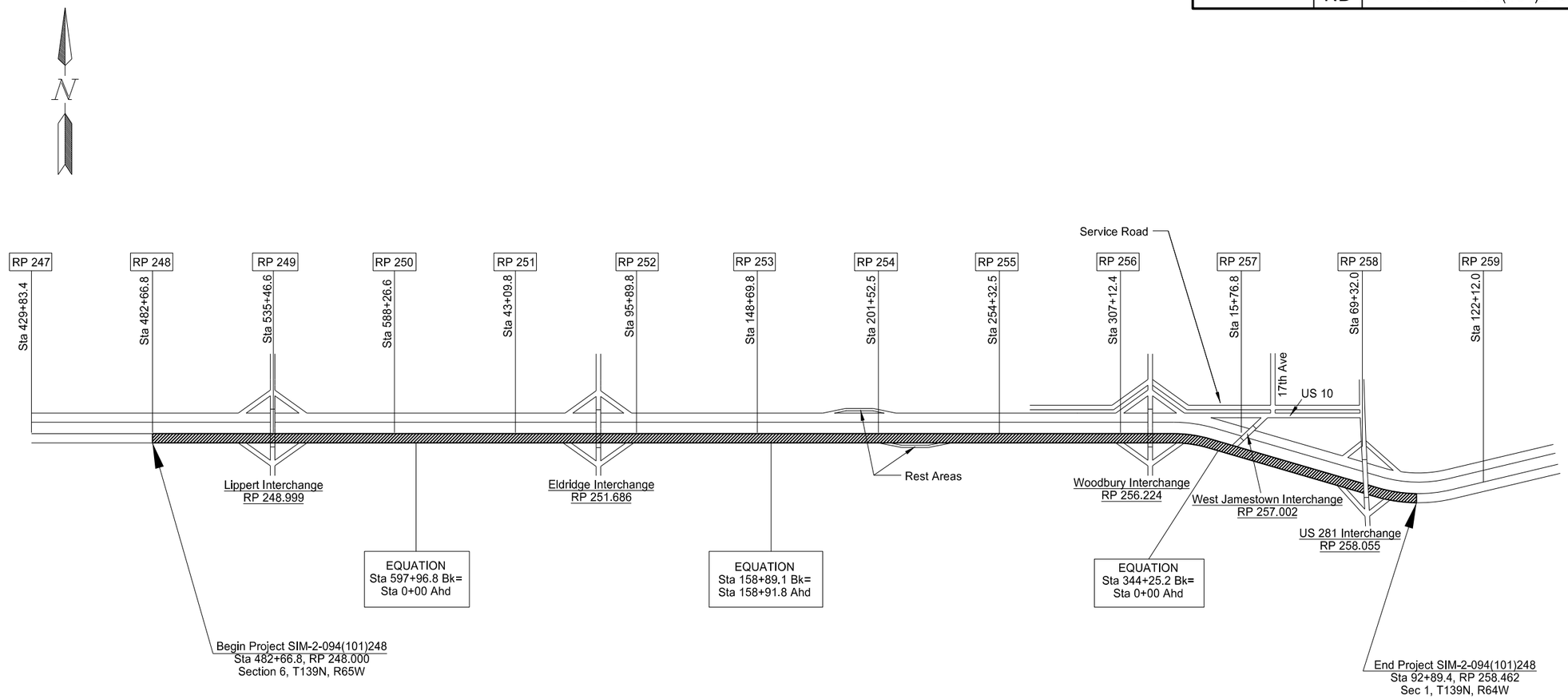
LIST OF STANDARD DRAWINGS

Standard No.	Description
D-20-01	NDDOT Abbreviations
D-20-02	NDDOT Abbreviations
D-20-03	NDDOT Abbreviations
D-20-10	NDDOT Utility Company Abbreviations
D-20-20	Linestyles
D-20-21	Linestyles
D-20-30	Symbols
D-20-31	Symbols
D-20-32	Symbols
D-550-2	Longitudinal Joint Details
D-550-3	Transverse Contraction Joint Details
D-704-5	Contractor Sign Detail
D-704-7	Breakaway System for Construction Zone Signs
D-704-8	Breakaway System for Construction Zone Signs
D-704-9, 10, 11	Construction Sign Details
D-704-13	Barricade Details
D-704-14	Construction Sign and Barricade Assembly Details
D-704-35	Sign Layout for One Lane Closure – Interstate System
D-704-50	Portable Sign Support Assembly
D-762-02	Interstate Pavement Marking 4 Lane Divided Highway
D-762-04	Pavement Marking

Special Provisions:

SP 559(08) – Permanent Pavement Marking Monitoring System

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	4	1



Concrete Pavement Restoration Work Area

- Concrete Pavement Repair - Full Depth
- Spall Repair
- Selected Dowel Bar Retrofit Replacement on 12' Driving Lane Area
- Diamond Grinding on Dowel Bar Retrofit Replacement Areas (1'+12'+1')
- Random Crack Repair
- Clean & Seal Joints in Repair Areas

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SCOPE OF WORK

Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	6	1

NOTES

107-P01 HAUL ROAD RESTRICTIONS: The Contractor shall contact the appropriate State, County,Township, City or Political Subdivision official(s) to determine if the proposed haul road has local load restrictions or is designated as a “No Haul Route” prior to preparing a bid for this project. Paved roads off the state system will not be designated as haul roads by the NDDOT. If the Contractor chooses to use a paved road off the state system for this project, the Contractor shall be responsible for all costs of the inspection, maintenance, restoration, and release of the haul road.

302-P01 SALVAGED BASE COURSE: Salvaged Base Course for leveling the base of full depth repairs shall not be bid separately but included in the price bid for “10 In Concrete Pavement Repair – Full Depth – Doweled.”

570-P01 CONCRETE PAVEMENT REPAIR: An additional 10% has been added to the quantities for: "Saw Concrete", "Doweled Contraction Joint Assembly", "Dowel Bars", "10 IN Concrete Pavement Repair – Full Depth – Doweled", "Random PCC Crack Cleaning and Sealing", and "Spall Repair – Partial Depth" to be used as directed by the Engineer.

570-P02 TRANSVERSE AND LONGITUDINAL JOINTS CLEANING AND SEALING: Silicon sealant with backer rod will be used on smooth doweled transverse joints in the repair areas. The 12’ driving lane transverse joints where dowel bar retrofits are replaced shall be sawed and sealed according to the Dowel Bar Retrofit Silicone Joint Detail. Type 2 Hot Applied Joint Sealant as per NDDOT Standard Specification 826.02 A.2. will be used on longitudinal joints in the repair areas.

All costs for labor, materials, and equipment to form, saw, clean, and seal smooth doweled transverse joints and longitudinal joints in the repair areas and dowel bar retrofit replacement area transverse joints shall be included in the unit price bid for other 570 bid items.

570-P03 DOWEL BAR RETROFIT – TYPE B: The dowel bar retrofit areas that need to be rehabilitated shall require sawing 1/16" wider on each side than the original retrofit slot to a total width of 2 5/8". Locations are listed in the Data Tables.

Any extra work required to saw dowel bar slots shall be included in the unit price bid for “Dowel Bar Retrofit – Type B”.

570-P04 PCC PAVEMENT GRINDING: PCC Pavement Grinding will be required in dowel bar retrofit rehabilitation areas listed below:

RP 253.02 to RP 255.40
RP 255.62 to RP 255.64
RP 257.00 to RP 257.02

2700 SY PCC Pavement Grinding is provided to be used as directed by the Engineer.

704-016 TRAFFIC CONTROL SUPERVISOR: Traffic control supervisor shall be provided on this project.

704-P01 TRAFFIC CONTROL DEVICES: The traffic control devices list has been developed using the following layouts on the Standard Drawing for traffic control:

D-704-5, Contractor sign as applicable

D-704-35, one lane road closure on interstate

The quantities have been developed based on one 5 ¼-mile long one-lane closure. The required traffic control signs and devices are included in the "Traffic Control Devices List" and will be measured and paid at the Contract Unit Price for each device.

Additional devices required to accommodate the Contractor's operation shall be the Contractor's responsibility.

704-P02 MAINTENANCE & PROTECTION OF TRAFFIC FOR CONCRETE PAVEMENT REPAIRS: In full depth removal areas stackable vertical panels shall be spaced at 10 feet on centerline roadway until the concrete has been replaced. A minimum of two stackable vertical panels shall be used at each full depth removal area.

Type I Barricades shall be placed in front of each open area or as directed by the Engineer. The barricades shall not encroach onto the traffic lane.

The concrete pavement repairs and dowel bar retrofits must be completed for the entire length of one lane closure before starting any work in the adjacent lane.

If the Contractor is going to operate in a manner other than as herein provided, a complete traffic control layout and program will be provided to the Engineer for review, and approval will have to be given before any additional work is performed.

704-P03 TRAFFIC ROUTING DURING CONSTRUCTION: The Contractor shall provide one lane for traffic at all times. The Contractor’s traffic shall be in the same direction as public traffic. Ramp traffic shall be maintained at all times during the pavement removal and replacement.

704-P04 CONSTRUCTION TRAFFIC: The Contractor’s construction traffic required for concrete pavement repair shall be limited to access at interchanges only. Construction traffic will not be permitted to operate in the median nor will access from one roadway to the other roadway through the median.

704-P05 STACKABLE VERTICAL PANEL: The stackable vertical panel made of hollow low density polyethylene orange plastic panel which is held in an upright position by a molded rubber base shall be provided.

The panel shall be a minimum 43 inches high with a minimum bottom dimension 15 inches x 9 inches. The panel shall be held down with a molded rubber base. The minimum weight of the panel shall be 4 pounds. The minimum weight of the molded rubber base shall be 30 pounds.

The reflective sheeting shall have a minimum width of 8 inches and 36 inches long. The reflective sheeting shall be as specified for vertical panel and shall have 6" wide stripes sloping downward at an angle of 45 degrees in the direction vehicular traffic is to pass. The reflective sheeting shall be on both sides of the Stackable Vertical Panels. The Stackable Vertical Panel shall meet the requirements of NCHRP Report 350 as a Category II Traffic Control Device.

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NOTES

The item "Stackable Vertical Panel" shall be measured by the number of each installed. The quantities measured will be paid for at the contract price and shall be full compensation for all labor, equipment, materials, relocation and removal, necessary to complete the installation.

762-P01 PERMANENT STRIPING: The Contractor shall groove over existing centerline striping to install new Preformed Patterned Pavement Mk 4IN Line – Grooved centerline striping after grinding operations have been completed. If the Contractor's operation moves forward without permanent striping installed, it will be necessary to install temporary striping (centerline only) prior to moving the lane closure. This temporary striping will be paid for under the bid item "Short Term 4IN Line – Type NR."

All permanent striping shall be along the same alignment and offset as the temporary striping to ensure all temporary striping is obliterated. Any temporary striping remaining after the grooving operation for permanent striping has been completed shall be obliterated at the Contractor's expense. All labor, materials, and equipment used to install new centerline striping in this manner shall be included in the unit bid price for "Preformed Patterned Pvmt Mk 4IN Line – Grooved."

802-P01 CONTRACTOR DEVELOPED CONCRETE MIX DESIGN: The Contractor shall develop a final mix design based on the requirements of section 802. The mix design shall be submitted for approval seven days before the material is used.

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ENVIRONMENTAL COMMITMENTS

Based on the NEPA documentation, no additional permits or environmental commitments have been identified beyond what is covered by the NDDOT's Standard Specifications for Road and Bridge Construction.

Wetland Number	Cowardin Classification	Wetland Type	Wetland Size (acres)	Wetland Feature	USACE Jurisdictional Wetlands	Impacts to Wetlands	
						Temp.	Perm.
There are a number of adjacent wetlands; however, no impacts are anticipated within the limits of construction.							
TOTALS:				**0.00**		**0.00**	**0.00**

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ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
570	0095	SAW CONCRETE	LF	6,609	6,609
570	0210	PCC PAVEMENT GRINDING	SY	22,576	22,576
570	0240	DOWELED CONTRACTION JOINT ASSEMBLY	LF	660	660
570	0424	DOWEL BARS	EA	2,464	2,464
570	0431	DOWEL BAR RETROFIT-TYPE B	EA	865	865
570	0710	10IN CONC PVMT REPAIR-FULL DEPTH-DOWELED	SY	2,501.6	2,501.6
570	0966	RANDOM PCC CRACK CLEANING & SEALING	LF	3,136.1	3,136.1
570	1512	SPALL REPAIR-PARTIAL DEPTH	SF	1,865.6	1,865.6
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	400	400
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1,461	1,461
704	1050	TYPE I BARRICADE	EA	35	35
704	1052	TYPE III BARRICADE	EA	11	11
704	1060	DELINEATOR DRUMS	EA	76	76
704	1067	TUBULAR MARKERS	EA	195	195
704	1080	STACKABLE VERTICAL PANELS	EA	75	75
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	1	1
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	3,630	3,630
762	1104	PVMT MK PAINTED 4IN LINE	LF	110,479	110,479
762	1305	PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	LF	3,630	3,630

BASIS OF ESTIMATE

Permanent Pavement Marking

Eastbound 2 Lanes		
Location - Type	Basis	Quantity
Short Term 4IN Line – Type NR	Centerline Skips 1,320 LF/Mile *2.750 Miles	3,630 LF
Centerline – Preformed Patterned Pvmt MK 4 IN Line - Grooved	Centerline Skips 1,320 LF/Mile *2.750 Miles	3,630 LF
Edge Lines – Pavement marking 4 IN Painted Line	10,560 LF/Mile 10.462 Miles	110,479 LF

*RP 253.02 to RP 255.40
RP 255.62 to RP 255.64
RP 257.00 to RP 257.02 plus 0.33 miles in areas of full depth repairs

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	1

Reference Point	Lane	Full Depth Repair						Spall Repair			Random Crack Repair
		Dimensions		Area	Sawcut	Dowel Bars	Doweled Contraction Joint Assembly	Dimensions		Area	
		Length	Width					Length	Width		
(RP)		Ft	Ft	SY	LF	Ea	LF	Ft	Ft	SF	LF
248.136	D	12	12	16.00	48	20					
248.140	D										3
248.224	D	6	12	8.00	36	20					4
248.248	D	8	12	10.67	40	20					
248.251	D							6	2	12	5
248.323	D	6	12	8.00	36	20					3
248.349	D							2	2	4	
248.357	D							2	2	4	
248.403	DP							2	4	8	
248.464	D	18	12	24.00	60	20					45
248.524											10
248.530	DP							2	4	8	
248.533	DP							2	4	8	
248.587											15
248.618	D							2	2	4	
248.621											10
248.656											120
248.666	DP							2	4	8	
248.669	DP							2	4	8	
248.671	P							2	2	4	
248.710											5
248.789	D							4	2	8	
248.807	D	6	12	8.00	36	20					
248.827	D	6	12	8.00	36	20					12
248.914	P							2	2	4	
248.947											17
248.951	DP							2	4	8	
248.953	DP							2	4	8	
248.957	P							2	2	4	
248.957	D							4	2	8	
248.981	D	8	12	10.67	40	20		2	2	4	11
248.994											10

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CPR DATA
RP 248
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	2

Reference Point	Lane	Full Depth Repair						Spall Repair			Random Crack Repair
		Dimensions		Area	Sawcut	Dowel Bars	Doweled Contraction Joint Assembly	Dimensions		Area	
		Length	Width					Length	Width		
(RP)		Ft	Ft	SY	LF	Ea	LF	Ft	Ft	SF	LF
249.002											45
249.025	D	32	12	42.67	88	20	12				
249.031	D							2	2	4	
249.053	D							2	2	4	
249.130	P							2	2	4	
249.163											28
249.180	P							2	2	4	
249.187	P							2	2	4	
249.197		6	12	8.00	36	20					
249.217	D							4	4	16	
249.233		6	12	8.00	36	20					
249.238		6	12	8.00	36	20					
249.259	D							4	4	16	
249.272	D	6	12	8.00	36	20					
249.323	P							2	2	4	
249.326	D							2	2	4	
249.362	D							4	2	8	
249.371	D							2	2	4	
249.372											3
249.453	D	18	12	24.00	60	20					
249.554	P							2	2	4	
249.570	D							2	2	4	
249.584											14
249.587	D	28	12	37.33	80	20	12				
249.599											15
249.628	D	18	12	24.00	60	20					
249.633											4
249.674	D							2	2	4	
249.677	DP							4	4	16	
249.680	DP							2	4	8	
249.682	DP							2	4	8	
249.710											75
249.717	DP							2	4	8	
249.719											12
249.722	D							2	2	4	
249.726	P							2	2	4	
249.732	D							2	2	4	
249.733	DP							2	4	8	
249.735	DP							2	4	8	
249.737	DP							2	4	8	
249.739	DP							2	4	8	
249.740	D							2	2	4	
249.743	D							2	2	4	
249.744	DP							4	4	16	
249.780											45
249.813	D	6	12	8.00	36	20					
249.816	D	6	12	8.00	36	20					
249.901	D							2	2	4	
249.902	DP							2	4	8	
249.946	P							2	4	8	
249.968	D							2	2	4	
249.996	D							2	2	4	

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CPR DATA
RP 249
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	3

Reference Point	Lane	Full Depth Repair						Spall Repair			Random Crack Repair
		Dimensions		Area	Sawcut	Dowel Bars	Doweled Contraction Joint Assembly	Dimensions		Area	
		Length	Width					Length	Width		
(RP)		Ft	Ft	SY	LF	Ea	LF	Ft	Ft	SF	LF
250.082											75
250.088	D	8	12	10.67	40	20					
250.097	D	12	12	16.00	48	20					
250.100	P	10	16	17.78	52	20					
250.101											45
250.110											9
250.113											45
250.140											150
250.224	D							2	2	4	
250.227	D							2	2	4	
250.227	D							2	2	4	
250.229	D							2	2	4	
250.257	D							2	2	4	
250.445											90
250.460											225
250.500	P							2	2	4	
250.575											28
250.600	DP							2	4	8	
250.815											45
250.854	D							4	4	16	
250.858	D	172	12	229.33	368	20	156				
250.858	D							2	2	4	
250.862											35
250.869											135
250.985											16

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CPR DATA
RP 250
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	4

Reference Point	Lane	Full Depth Repair						Spall Repair			Random Crack Repair
		Dimensions		Area	Sawcut	Dowel Bars	Doweled Contraction Joint Assembly	Dimensions		Area	
		Length	Width					Length	Width		
(RP)		Ft	Ft	SY	LF	Ea	LF	Ft	Ft	SF	LF
251.008	D	12	12	16.00	48	20					
251.034	D	80	12	106.67	184	20	60				
251.070											4
251.084	DP							2	4	8	
251.091	P	27	12	36.00	78	20	12				
251.376	D	12	12	16.00	48	20					16
251.380	D	10	12	13.33	44	20					
251.393	D	20	12	26.67	64	20	12				
251.398	D							2	2	4	20
251.402	D							2	2	4	
251.520											15
251.528	D							2	2	4	
251.561	D							2	2	4	30
251.587	D							2	2	4	
251.590											12
251.595	D							2	2	4	
251.637											20
251.664											4
251.678	D							2	2	4	
251.692											25
251.701	D	6	12	8.00	36	20					
251.800	D							2	2	4	
251.845	D							4	2	8	
251.850	D							2	2	4	
251.924											30
251.935	D							2	2	4	

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CPR DATA
RP 251
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	5

Reference Point	Lane	Full Depth Repair						Spall Repair			Random Crack Repair
		Dimensions		Area	Sawcut	Dowel Bars	Doweled Contraction Joint Assembly	Dimensions		Area	
		Length	Width					Length	Width		
(RP)		Ft	Ft	SY	LF	Ea	LF	Ft	Ft	SF	LF
252.05											165
252.078	D	6	12	8.00	36	20					
252.261	D							2	2	4	6
252.379	D	70	12	93.33	164	20	60				
252.698	DP							2	4	8	
252.732											12
252.738											30
252.800	D	6	12	8.00	36	20					

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CPR DATA
RP 252
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	6

Reference Point	Lane	Full Depth Repair						Spall Repair			Random Crack Repair
		Dimensions		Area	Sawcut	Dowel Bars	Doweled Contraction Joint Assembly	Dimensions		Area	
		Length	Width					Length	Width		
(RP)		Ft	Ft	SY	LF	Ea	LF	Ft	Ft	SF	LF
253.006											105
253.024	P	48	16	85.33	128	20	36				
253.033											45
253.092	P	37	16	65.78	106	20	24				
253.102											15
253.144											12
253.148	D	32	12	42.67	88	20	12				
253.150	P	6	16	10.67	44	20					
253.154											42
253.159	D	12	12	16.00	48	20					
253.164											24
253.183	D							2	2	4	
253.193								4	4	16	
253.195	D	6	12	8.00	36	20					
253.302	D							2	2	4	
253.309	D							4	2	8	
253.374	D							2	2	4	
253.381	D							2	2	4	
253.424											12
253.484	D							4	2	8	
253.490	D							4	2	8	
253.492	D							4	2	8	
253.495	D							4	2	8	
253.581	D							2	2	4	
253.608											120
253.684	D							4	3	12	
253.686	D							4	2	8	
253.718	D							4	2	8	
253.751	D							2	2	4	
253.753	D							2	2	4	
253.756	D							4	2	8	
253.759	D	18	12	24.00	60	20					
253.775	D							2	2	4	
253.775	D							2	2	4	
253.776	D							2	2	4	
253.776	D							4	2	8	
253.808	D							2	2	4	
253.818	D							4	2	8	
253.862	D							4	3	12	
253.867	D							4	3	12	
253.888	D							4	2	8	
253.898	D							2	2	4	

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CPR DATA
RP 253
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	7

Reference Point	Lane	Full Depth Repair						Spall Repair			Random Crack Repair
		Dimensions		Area	Sawcut	Dowel Bars	Doweled Contraction Joint Assembly	Dimensions		Area	
		Length	Width					Length	Width		
(RP)		Ft	Ft	SY	LF	Ea	LF	Ft	Ft	SF	LF
254.041	D							4	2	8	
254.203											12
254.604											28
254.622	D							2	2	4	
254.624	D							2	2	4	
254.654	DP							2	2	4	
254.701	P	30	12	40.00	84	20	12				
254.791	P							2	2	4	
254.942	P							2	2	4	
254.944	P							2	2	4	
254.970	D	6	12	8.00	36	20					

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CPR DATA
RP 254
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	8

Reference Point	Lane	Full Depth Repair						Spall Repair			Random Crack Repair
		Dimensions		Area	Sawcut	Dowel Bars	Doweled Contraction Joint Assembly	Dimensions		Area	
		Length	Width					Length	Width		
(RP)		Ft	Ft	SY	LF	Ea	LF	Ft	Ft	SF	LF
255.035	P							2	2	4	
255.038	D							2	2	4	
255.045	DP							2	4	8	
255.050	P							2	2	4	
255.054	P							2	2	4	
255.055	D							2	2	4	
255.076	P							2	2	4	
255.091	P							2	2	4	
255.092	DP							2	4	8	
255.094	P							2	2	4	
255.099	P							2	2	4	
255.101	P							2	2	4	
255.105	P							2	2	4	
255.119	P							2	2	4	
255.124	P							2	2	4	
255.129	P							2	2	4	
255.138	P							4	2	8	
255.166	P							4	2	8	
255.168	P							2	2	4	
255.236	D							2	2	4	
255.236	P							2	2	4	
255.283	P							2	2	4	
255.284	DP							2	4	8	
255.284	P							2	2	4	
255.285	P							2	2	4	
255.287	D							2	2	4	
255.292	D							2	2	4	
255.293	D							2	2	4	
255.293	P							2	2	4	
255.294	D							2	2	4	
255.295	D							2	2	4	
255.298	DP							2	4	8	
255.323											4
255.359	D							2	2	4	
255.389	D							2	2	4	
255.556	P	6	12	8.00	36	20					13
255.607	P							2	2	4	15
255.650	D	42	12	56.00	108	20	24				
255.673	D							4	3	12	
255.676	D							2	3	6	
255.708	D							4	3	12	
255.708	D							2	2	4	
255.712	D							4	2	8	
255.717	D							2	2	4	
255.717	D							2	2	4	
255.722	D							2	2	4	
255.722	D							2	2	4	
255.722	D							2	2	4	
255.732	D							4	2	8	
255.732	D							2	2	4	
255.735	D							4	2	8	
255.735	D							4	2	8	

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CPR DATA
RP 255 1 of 2
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	9

Reference Point	Lane	Full Depth Repair						Spall Repair			Random Crack Repair
		Dimensions		Area	Sawcut	Dowel Bars	Doweled Contraction Joint Assembly	Dimensions		Area	
		Length	Width					Length	Width		
(RP)		Ft	Ft	SY	LF	Ea	LF	Ft	Ft	SF	LF
255.740	D							4	4	16	
255.740	D							4	4	16	
255.741	DP							2	4	8	
255.746	D							4	3	12	
255.763	D							4	4	16	
255.763	D							2	2	4	
255.770	D							4	4	16	
255.770	D							4	3	12	
255.787	D							4	2	8	
255.787	D							2	2	4	
255.832	D							4	2	8	
255.832	D							4	4	16	
255.868											10
255.884	D							2	2	4	
255.884	D							2	2	4	
255.920	D							2	3	6	
255.920	D							2	4	8	
255.924	P							2	2	4	
255.933	D							4	2	8	

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CPR DATA
RP 255 2 of 2
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	10

Reference Point	Lane	Full Depth Repair						Spall Repair			Random Crack Repair
		Dimensions		Area	Sawcut	Dowel Bars	Doweled Contraction Joint Assembly	Dimensions		Area	
		Length	Width					Length	Width		
(RP)		Ft	Ft	SY	LF	Ea	LF	Ft	Ft	SF	LF
256.058	P	15	12	20.00	54	20					
256.181	D	100	12	133.33	224	20	84				
256.194	P	42	12	56.00	108	20	24				
256.210	D	16	12	21.33	56	20					
256.216	D	16	12	21.33	56	20					
256.230											80
256.239	P							8	2	16	
256.245	P							2	2	4	
256.395											6
256.496											3
256.501	D							4	2	8	
256.541	D							4	4	16	
256.549	D	6	12	8.00	36	20		4	4	16	
256.552	D	6	12	8.00	36	20					
256.555	D	6	12	8.00	36	20					
256.558	D	6	12	8.00	36	20					
256.575	D	6	12	8.00	36	20					
256.603											10
256.622	D							2	2	4	
256.622	D							2	2	4	
256.629											40
256.642	D							2	2	4	
256.650	D							2	3	6	
256.650	D							2	2	4	
256.681	D							2	2	4	
256.815	D	6	12	8.00	36	20					
256.854	D							4	2	8	
256.956	D							2	2	4	
256.956	D							2	2	4	
256.958	P							2	2	4	
256.958	P							2	2	4	
256.992	D							4	4	16	
256.992	D							4	4	16	
256.999	D	6	12	8.00	36	20					

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CPR DATA
RP 256
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	11

Reference Point	Lane	Full Depth Repair						Spall Repair			Random Crack Repair
		Dimensions		Area	Sawcut	Dowel Bars	Doweled Contraction Joint Assembly	Dimensions		Area	
		Length	Width					Length	Width		
(RP)		Ft	Ft	SY	LF	Ea	LF	Ft	Ft	SF	LF
257.002	D							4	2	8	
257.010	D							4	2	8	
257.010	D							4	2	8	
257.018	P							2	2	4	
257.020	D							4	4	16	
257.020	D							2	3	6	
257.026	D							2	2	4	
257.026	D							2	2	4	
257.026	D							2	2	4	
257.036	D	6	12	8.00	36	20					
257.038	D							2	2	4	
257.041	D							2	2	4	
257.041	D							2	2	4	
257.041	D							2	2	4	
257.043	D	6	12	8.00	36	20					
257.051	D	6	12	8.00	36	20					
257.059	D							2	2	4	
257.061	D	6	12	8.00	36	20					
257.069	D	6	12	8.00	36	20					
257.072	D							2	2	4	
257.072	D							2	2	4	
257.072	D							2	2	4	
257.080	D	6	12	8.00	36	20					
257.090	D							4	2	8	
257.092	D							4	4	16	
257.092	D							4	4	16	
257.095	D	6	12	8.00	36	20					
257.098	D	6	12	8.00	36	20					
257.103	D	6	12	8.00	36	20					
257.111	D							2	2	4	
257.111	D							2	2	4	
257.113	D							4	3	12	
257.116	D							2	2	4	
257.123	P	6	12	8.00	36	20					
257.131	D							2	2	4	
257.131	D							2	2	4	
257.131	D							2	2	4	
257.136	D							2	2	4	
257.136	D							2	2	4	
257.136	D							2	2	4	
257.138	D	6	12	8.00	36	20					
257.142	D	6	12	8.00	36	20					
257.142	P							2	4	8	
257.143	P							2	2	4	
257.144											8
257.148	DP							2	4	8	
257.152	D	6	12	8.00	36	20					
257.160	D							4	2	8	
257.165	D							2	2	4	
257.170	P							2	2	4	
257.187	D	18	12	24.00	60	20					
257.192	P							2	2	4	

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RP 257 1 of 3
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	12

Reference Point	Lane	Full Depth Repair						Spall Repair			Random Crack Repair
		Dimensions		Area	Sawcut	Dowel Bars	Doweled Contraction Joint Assembly	Dimensions		Area	
		Length	Width					Length	Width		
(RP)		Ft	Ft	SY	LF	Ea	LF	Ft	Ft	SF	LF
257.208	D	6	12	8.00	36	20					
257.219											12
257.226	D							2	2	4	
257.232	D	6	12	8.00	36	20					
257.234	D	6	12	8.00	36	20					
257.237	D	6	12	8.00	36	20					
257.239	D	6	12	8.00	36	20					
257.242	D	6	12	8.00	36	20					
257.247	D							2	2	4	
257.247								2	2	4	
257.283	D	6	12	8.00	36	20					
257.301	D							2	2	4	90
257.311	D							2	2	4	
257.346											40
257.383	D	16	12	21.33	56	20					
257.406	D	16	12	21.33	56	20					
257.432	D	6	12	8.00	36	20					
257.443	D							4	2	8	12
257.445											12
257.455	D	6	12	8.00	36	20					
257.465	D	6	12	8.00	36	20					
257.496	D							4	2	8	
257.515		10	24	26.67	68	40					
257.523	D	6	12	8.00	36	20					
257.527	D							2	2	4	
257.583		18	24	48.00	84	40					
257.588	D	6	12	8.00	36	20					
257.590	D							2	2	4	
257.596	D							2	2	4	
257.596	D							2	2	4	
257.596	D							2	2	4	
257.600	D	6	12	8.00	36	20					
257.604	D	6	12	8.00	36	20					
257.607	D							2	2	4	
257.611	D							2	2	4	
257.614	D							2	3	6	
257.617	D							4	4	16	
257.621	D							2	2	4	
257.627	D							2	2	4	
257.630	D							2	2	4	
257.634	D							2	2	4	
257.637											6
257.640	D	6	12	8.00	36	20					
257.648	D							2	2	4	
257.648	D							2	2	4	
257.648	D							2	2	4	
257.658											3
257.663	D							2	2	4	
257.678	D	6	12	8.00	36	20					
257.686	D							4	2	8	
257.691	D	6	12	8.00	36	20		2	2	4	
257.691	P							2	2	4	

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CPR DATA
RP 257 2 of 3
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	13

Reference Point	Lane	Full Depth Repair						Spall Repair			Random Crack Repair
		Dimensions		Area	Sawcut	Dowel Bars	Doweled Contraction Joint Assembly	Dimensions		Area	
		Length	Width					Length	Width		
(RP)		Ft	Ft	SY	LF	Ea	LF	Ft	Ft	SF	LF
257.708	D	32	12	42.67	88	20	12				12
257.710	P	14	12	18.67	52	20					
257.714											40
257.722	P	6	12	8.00	36	20					
257.723											10
257.726	P	16	12	21.33	56	20					
257.731	D	21	12	28.00	66	20	12				8
257.745	D	6	12	8.00	36	20					
257.755	P							2	2	4	
257.761											20
257.765	P							2	2	4	
257.773	P							4	2	8	
257.798	D							2	2	4	
257.798	D							2	2	4	
257.798	D							2	2	4	
257.802	P							2	2	4	
257.802	P							3	2	6	
257.804	P							4	4	16	
257.806	D							2	2	4	
257.806	D							2	2	4	
257.806	D							2	2	4	
257.814	P							2	2	4	
257.833											40
257.837	P							4	2	8	
257.857											12
257.860	P							2	2	4	
257.872	P	6	12	8.00	36	20					
257.888	D	16	12	21.33	56	20					
257.890	P	6	12	8.00	36	20					
257.930											8
257.947											12
257.957											20
257.972	D	6	12	8.00	36	20					
257.983	D	6	12	8.00	36	20					
257.990	D							4	2	8	

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CPR DATA
RP 257 3 of 3
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

258.010	D	6	12	8.00	36	20					
258.051	D	14	12	18.67	52	20					
258.074	D	6	12	8.00	36	20					
258.079	D	6	12	8.00	36	20					
258.107											40
258.141	P	68	12	90.67	160	20	36				
258.150											12
258.183											16
258.256	D	6	12	8.00	36	20					
258.256	D	6	12	8.00	36	20					
258.274											24
258.277	D							2	2	4	
258.279	D	6	12	8.00	36	20					
258.290	D							2	2	4	
258.331	D							2	2	4	
258.386	D	6	12	8.00	36	20					
TOTAL		1644		2274.22	6008	2240	600			1696	2851
TOTAL plus 10%				2501.64	6609	2464	660			1865.6	3136.1

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CPR DATA
RP 258
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	15

Reference Point	Ft from RP	Joint # from RP	Dowel Bar Retrofit Repair	
			# Left of SHDR	Quantity
(RP)			1,2,3,4,5,6	EA
253	160	12	2,3	2
253	376	28	6	1
253	552	41	1	1
253	769	57	6	1
253	1220	90	2	1
253	1301	96	2	1
253	1406	105	2	1
253	1487	110	2	1
253	1541	114	2,3,6	3
253	1582	117	5,6	2
253	1620	120	5,6	2
253	1635	121	6	1
253	1660	123	3,6	2
253	1743	129	2,6	2
253	1768	131	3	1
253	1809	134	3,6	2
253	1850	137	5	1
253	1875	139	3,4,5	3
253	1902	141	2,6	2
253	1957	145	6	1
253	1970	146	3	1
253	1982	147	1	1
253	2035	151	3,6	2
253	2049	152	3,6	2
253	2077	154	3	1
253	2159	160	1	1
253	2185	162	3	1
253	2249	167	6	1
253	2263	168	6	1
253	2318	172	3	1
253	2333	173	6	1
253	2345	174	6	1
253	2359	175	6	1
253	2533	188	6	1
253	2548	189	6	1
253	2561	190	4,6	2
253	2572	191	5,6	2
253	2585	192	5,6	2
253	2696	200	2	1
253	2805	208	4	1
253	2994	222	3	1
253	3141	233	4,5,6	3
253	3154	234	4	1
253	3166	235	5,6	2
253	3180	236	6	1
253	3250	241	3,6	2
253	3262	242	1	1
253	3304	245	4	1
253	3315	246	3,4	2
253	3326	247	3,5	2
253	3341	248	2	1
253	3389	251	3	1
253	3393	252	3	1
253	3421	254	3	1
253	3486	259	3	1
253	3499	260	3	1
253	3514	261	3,4,5	3
253	3553	264	3	1
253	3567	265	1,2,3	3
253	3580	266	2,3	2

Reference Point	Ft from RP	Joint # from RP	Dowel Bar Retrofit Repair	
			# Left of SHDR	Quantity
(RP)			1,2,3,4,5,6	EA
253	3702	275	2	1
253	3715	276	2,3	2
253	3743	278	3	1
253	3754	279	2	1
253	3810	283	2	1
253	3823	284	2,3	2
253	3838	285	1,2,3	3
253	3851	286	1,2,3	3
253	3863	287	1,2	2
253	3876	288	1	1
253	3902	290	2,3,5	3
253	3914	291	3	1
253	3926	292	2,3	2
253	3941	293	2,3	2
253	3955	294	1,2,3,5	4
253	3966	295	1,2,3	3
253	3981	296	2,3,4,5,6	5
253	3995	297	2,3	2
253	4007	298	2,3	2
253	4019	299	1,2,3,5	4
253	4033	300	1,2,3,6	4
253	4046	301	2,3,4	3
253	4058	302	2,3,5,6	4
253	4071	303	2,3	2
253	4085	304	2,3,5	3
253	4100	305	2,3,5	3
253	4133	306	1,2,3	3
253	4125	307	1,2,3	3
253	4138	308	1,2,3	3
253	4152	309	1,2,3	3
253	4166	310	1,2,5	3
253	4178	311	2,3	2
253	4191	312	1,2	2
253	4205	313	1,2,3	3
253	4218	314	3	1
253	4230	315	1,2	2
253	4244	316	2	1
253	4259	317	2,3	2
253	4283	319	2	1
253	4297	320	1,2,3	3
253	4310	321	1,2,3	3
253	4323	322	1,2	2
253	4336	323	1,2,3	3
253	4349	324	1,2,3	3
253	4363	325	2,3	2
253	4376	326	1,2,3	3
253	4388	327	1,2,3,5	4
253	4401	328	2,3	2
253	4416	329	1,2,3	3
253	4430	330	2,3	2
253	4453	332	2,3	2
253	4468	333	1,2,3	3
253	4481	334	1,2,3	3
253	4492	335	2,3	2
253	4507	336	1,2,3	3
253	4521	337	2	1
253	4574	341	1,2,3	3
253	4587	342	2,3	2
253	4599	343	1,2,3	3
253	4612	344	2,3	2

Reference Point	Ft from RP	Joint # from RP	Dowel Bar Retrofit Repair	
			# Left of SHDR	Quantity
(RP)			1,2,3,4,5,6	EA
253	4626	345	2,3	2
253	4638	346	1,2,3	3
253	4651	347	1,2,3	3
253	4665	348	2,3	2
253	4679	349	1,2,3	3
253	4692	350	2,3	2
253	4704	351	2,3	2
253	4732	353	1,2	2
253	4744	354	1,2,3	3
253	4757	355	1,2,3	3
253	4770	356	1,2,3	3
253	4785	357	1,2,3	3
253	4797	358	2	1
253	4827	361	1,2,3	3
253	4839	362	1,2,3	3
253	4866	364	1,2,3	3
253	4879	365	1,2,3	3
253	4944	370	2	1
253	4985	373	3	1
253	5150	385	1,2	2
253	5160	386	1,2	2
254		1	1,2	2
254	14	2	2	1
254	28	3	1,2	2
254	43	4	2	1
254	54	5	1,2	2
254	69	6	1,2	2
254	96	8	1,2,3	3
254	107	9	3	1
254	122	10	1,2	2
254	137	11	1,3	2
254	150	12	3	1
254	162	13	3	1
254	176	14	1,2	2
254	192	15	3	1
254	205	16	3	1
254	216	17	1	1
254	231	18	1,3	2
254	246	19	3	1
254	259	20	2	1
254	271	21	3	1
254	285	22	3	1
254	299	23	3	1
254	312	24	1,3	2
254	325	25	1	1
254	339	26	3,6	2
254	354	27	2,3	2
254	366	28	2,3	2
254	379	29	1,2	2
254	392	30	1,2,3	3
254	408	31	1,2	2
254	421	32	1,2,3	3
254	433	33	1	1
254	447	34	1,2,3	3
254	462	35	2,3	2
254	488	37	2	1
254	501	38	1,2	2
254	517	39	1,2,3	3

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Dowel Bar Retrofit Repair Locations

Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	16

Reference Point	Ft from RP	Joint # from RP	Dowel Bar Retrofit Repair	
			# Left of SHDR	Quantity
(RP)			1,2,3,4,5,6	EA
254	530	40	1,2,3	3
254	541	41	1,2,3	3
254	557	42	2,3	2
254	570	43	1,2,3	3
254	597	45	1,2,3	3
254	609	46	1,2	2
254	625	47	1,2,3	3
254	638	48	1,2	2
254	650	49	2	1
254	693	52	1,2,3	3
254	704	53	2	1
254	719	54	1,2	2
254	733	55	1	1
254	746	56	2	1
254	759	57	1,2,3	3
254	773	58	1	1
254	787	59	2	1
254	800	60	1	1
254	826	62	1,2,3	3
254	855	64	1,2,3	3
254	868	65	1,2,3	3
254	882	66	1,2	2
254	896	67	1,2,3	3
254	909	68	1,2,3	3
254	922	69	1,2	2
254	935	70	2,3	2
254	951	71	2	1
254	965	72	2	1
254	976	73	2,3	2
254	991	74	2	1
254	1005	75	3	1
254	1018	76	1,2	2
254	1030	77	2	1
254	1072	80	3	1
254	1114	83	2	1
254	1208	90	2	1
254	1261	94	3	1
254	1277	95	3	1
254	1290	96	2,3	2
254	1301	97	3	1
254	1344	100	2	1
254	1384	103	2,3	2
254	1409	105	3	1
254	1425	106	1,2,3	3
254	1439	107	1	1
254	1463	109	3	1
254	1493	111	3	1
254	1507	112	3	1
254	1548	115	2,3	2
254	1560	116	2,3	2
254	1573	117	2,3	2
254	1586	118	1,2,3	3
254	1602	119	1,2	2
254	1628	121	3	1
254	1656	123	3	1
254	1681	125	1,3	2
254	1804	134	2	1
254	1818	135	3	1
254	1831	136	2	1
254	1874	139	6	1

Reference Point	Ft from RP	Joint # from RP	Dowel Bar Retrofit Repair	
			# Left of SHDR	Quantity
(RP)			1,2,3,4,5,6	EA
254	1887	140	2	1
254	1967	146	1,2	2
254	1981	147	4	1
254	2130	158	1,3	2
254	2145	159	1,2	2
254	2159	160	1,3	2
254	2212	164	1	1
254	2293	170	2	1
254	2308	171	1,3	2
254	2348	174	3	1
254	2362	175	2	1
254	2402	178	6	1
254	2416	179	1,2,3	3
254	2471	183	1,4	2
254	2525	187	3	1
254	2606	193	3,4	2
254	2647	196	6	1
254	2690	199	3,5,6	3
254	2703	200	3	1
254	2714	201	1,2	2
254	2743	203	3,4,5,6	4
254	2769	205	3,6	2
254	2837	210	5	1
254	2852	211	1	1
254	2865	212	3	1
254	2877	213	3,6	2
254	2892	214	2,6	2
254	2919	216	6	1
254	2932	217	3,6	2
254	2960	217	5	1
254	2973	220	3	1
254	2985	221	2	1
254	2999	222	6	1
254	3015	223	3,6	2
254	3029	224	3	1
254	3055	226	1	1
254	3083	228	2,6	2
254	3109	230	1	1
254	3149	233	3	1
254	3164	234	3	1
254	3239	239	3	1
254	3252	240	2	1
254	3359	248	1	1
254	3372	249	2	1
254	3386	250	5	1
254	3425	253	6	1
254	3440	254	2	1
254	3534	261	1,2	2
254	3548	262	6	1
254	3577	264	1	1
254	3588	265	1	1
254	3643	269	2	1
254	3657	270	2	1
254	3673	271	1	1
254	3752	277	2,5	2
254	3766	278	1,4,5	3
254	3780	279	5	1
254	3794	280	2,6	2
254	3806	281	1,2,3,6	4
254	3849	284	3	1

Reference Point	Ft from RP	Joint # from RP	Dowel Bar Retrofit Repair	
			# Left of SHDR	Quantity
(RP)			1,2,3,4,5,6	EA
254	3862	285	2,6	2
254	3889	287	1,3,5,6	4
254	3902	288	2	1
254	3915	289	3,6	2
254	3929	290	1,3	2
254	3943	291	3	1
254	3956	292	3	1
254	3969	293	1,3	2
254	3983	294	2,3	2
254	3958	295	2,3,5,6	4
254	4012	296	2	1
254	4024	297	1,3,6	3
254	4052	299	6	1
254	4065	300	3	1
254	4078	301	3	1
254	4091	302	2	1
254	4106	303	2,5	2
254	4119	304	5	1
254	4132	305	4,6	2
254	4145	306	3,4	2
254	4161	307	1,4,5,6	4
254	4200	310	2	1
254	4215	311	2,3	2
254	4271	315	2,3	2
254	4283	316	2,3	2
254	4296	317	1,2,3,4	4
254	4324	319	2,3,4,5	4
254	4337	320	1,2,3	3
254	4349	321	1	1
254	4364	322	3	1
254	4378	323	2,3,5	3
254	4391	324	2,3	2
254	4404	325	2	1
254	4417	326	2,3	2
254	4433	327	2,3	2
254	4446	328	1,2,3	3
254	4457	329	1,2,3	3
254	4473	330	1,2,3	3
254	4487	331	2	1
254	4513	333	3	1
254	4527	334	1,2,3,5,6	5
254	4542	335	1,2,3	3
254	4555	336	1,2	2
254	4567	337	1,2,3	3
254	4589	338	2,3,4	3
254	4596	339	1,2,3,4	4
254	4609	340	1,2,3	3
254	4636	342	2,3	2
254	4650	343	2,3	2
254	4663	344	2	1
254	4676	345	2	1
254	4690	346	2	1
254	4705	347	1,2	2
254	4718	348	1,2,4,5,6	5
254	4744	350	2,3	2
254	4759	351	1,2	2
254	4772	352	2	1
254	4784	353	4	1
254	4798	354	1,2	2
254	4814	355	3	1

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Dowel Bar Retrofit Repair Locations

Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	011	17

Reference Point	Ft from RP	Joint # from RP	Dowel Bar Retrofit Repair	
			# Left of SHDR	Quantity
(RP)			1,2,3,4,5,6	EA
254	4826	356	2,3,4	3
254	4838	357	1,2,3,5	4
254	4852	358	2,3,4	3
254	4881	360	2	1
254	4894	361	1,2	2
254	4907	362	1,2,3	3
254	4922	363	2,3	2
254	4935	364	1,2	2
254	4947	365	1,2	2
254	4961	366	1,3,4	3
254	4977	367	2	1
254	4990	368	1,2	2
254	5003	369	1,2,3,6	4
254	5017	370	1,2	2
254	5032	371	5	1
254	5045	372	1,2,3	3
254	5057	373	4,5,6	3
254	5071	374	1,2,3,5	4
254	5087	375	1,2,3,5	4
254	5100	376	2	1
254	5111	377	1,3	2
254	5126	378	1,2,3	3
254	5140	379	2,4	2
254	5154	380	1,2,3	3
254	5166	381	2,3,4,5	4
254	5196	383	1	1
254	5208	384	2	1
254	5220	385	4,5,6	3
254	5234	386	1,3	2
254	5250	387	1,2,5	3
255	26	3	2,5	2
255	67	6	1,2,5	3
255	78	7	2	1
255	89	8	1,2	2
255	103	9	1	1
255	160	13	2	1
255	173	14	1,5	2
255	186	15	2,3,5	5
255	198	16	6	1
255	211	17	2	1
255	266	21	2,5	2
255	292	23	2,3	2
255	303	24	2,3,4,5	4
255	317	25	2	1
255	332	26	2,5	2
255	385	30	2	1
255	477	37	3	1
255	531	41	2,3	2
255	652	50	1,2,5	3
255	692	53	2	1
255	705	54	1,2,3	3
255	731	56	2	1
255	744	57	1,2,3,4,5	5
255	785	60	1,2,5	3
255	798	61	1	1
255	812	62	1,2	2
255	882	67	3	1
255	1177	90	2,3,6	3

Reference Point	Ft from RP	Joint # from RP	Dowel Bar Retrofit Repair	
			# Left of SHDR	Quantity
(RP)			1,2,3,4,5,6	EA
255	1229	94	1,2	2
255	1298	98	2	1
255	1322	100	2,3	2
255	1335	101	1,2,6	3
255	1366	103	1,3,5	3
255	1375	104	1,3,4	3
255	1389	105	3	1
255	1442	109	2,3,4,5,6	5
255	1513	114	2,3,4	3
255	1592	120	2,3,4,5,6	5
255	1605	121	1,2,3	3
255	1619	122	2,3,5	5
255	1631	123	2,3	2
255	1642	124	1,3	2
255	1657	125	1,3	2
255	1683	127	2,3,5,6	4
255	1925	145	1,2,4,5,6	5
255	2101	157	1,2,3,6	4
255	3342	250	4,5	2
257	40	3	1,2,3	3
257	51	4	1,2,3	3
257	65	5	1,2,3,4	4
TOTAL				865

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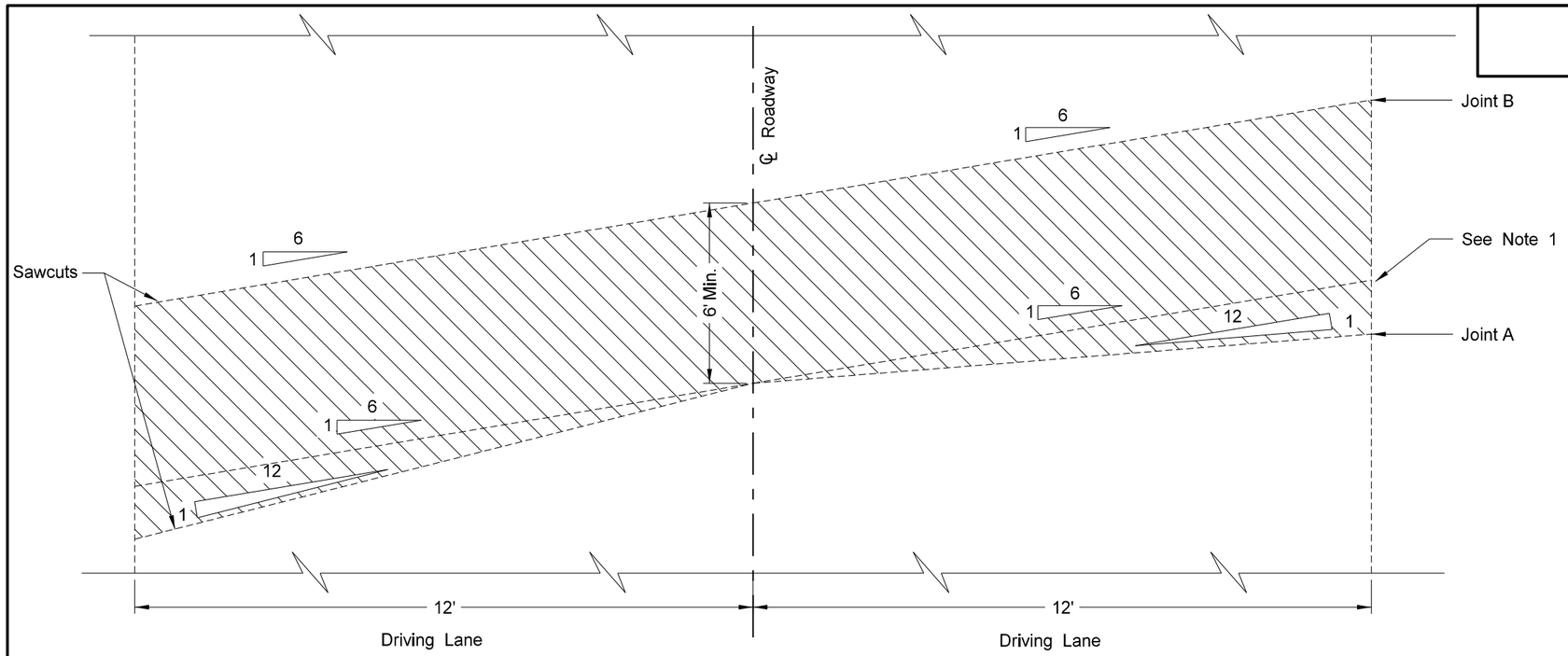
Dowel Bar Retrofit Repair Locations

Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	20	1



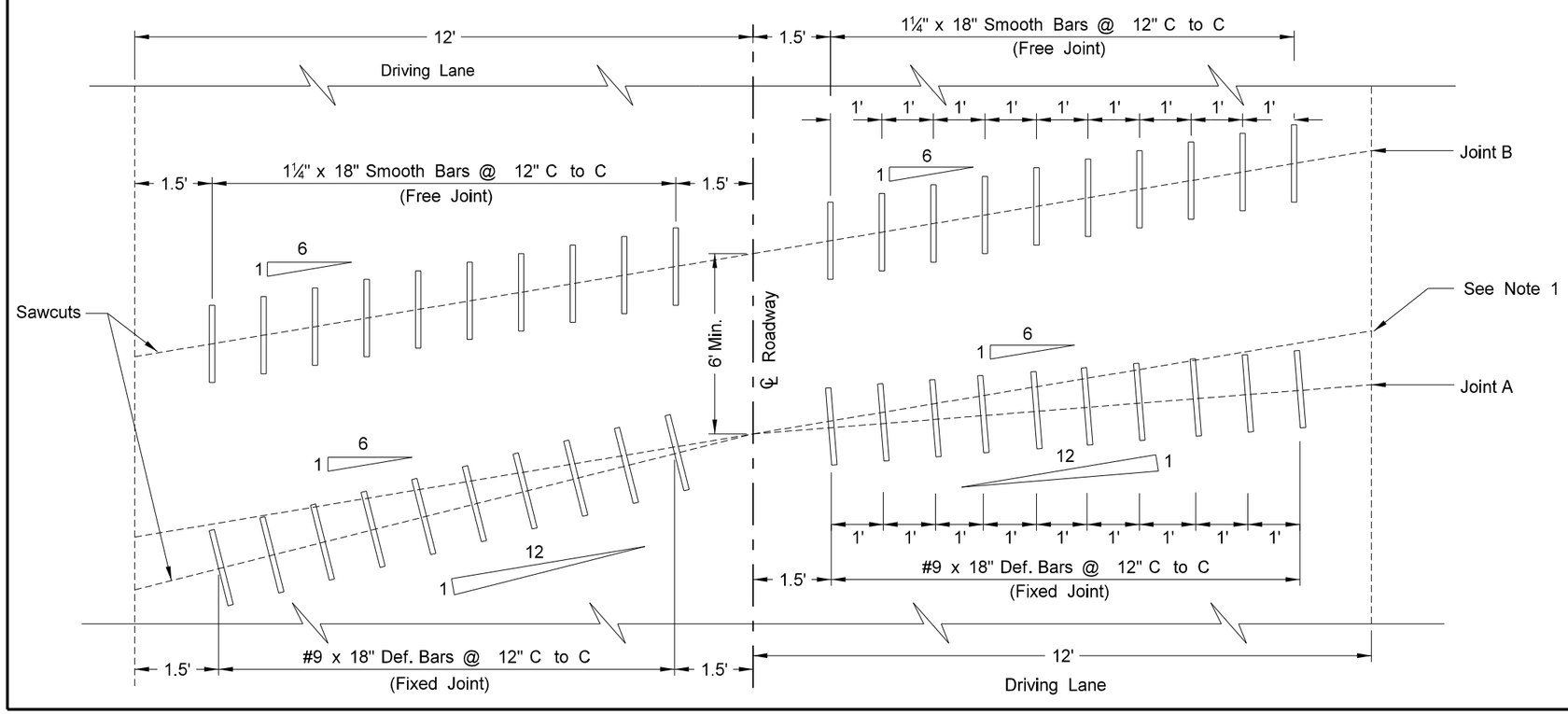
PCC Removal

Notes:

1. Joint A (fixed joint) shall be the new joint with the shortest distance to the next transverse joint or working random crack. The saw cut may be made at a 1 to 6 skew, or up to a maximum of a 1 to 12 skew, referenced off the 1 to 6 skewed transverse joints. The deformed bars shall be placed perpendicular to the face of the saw cut.

2. Joint B (free joint) shall be the new joint with the greatest distance to the next transverse joint or working random crack. The smooth bars shall be installed within the tolerances shown on the "Dowel Bar Placement - Full Depth Repair" detail sheet.

3. When the distance to the next transverse joint or working random crack is equal for both new joints, the free joint (joint B) shall be placed on the approach side of the repair.



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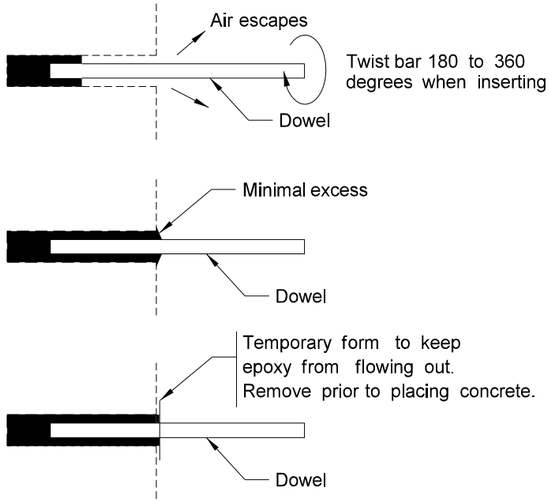
Removal of Concrete & Dowel Bar Placement
Full Depth Repair
(Longitudinal Length Less Than One Panel)

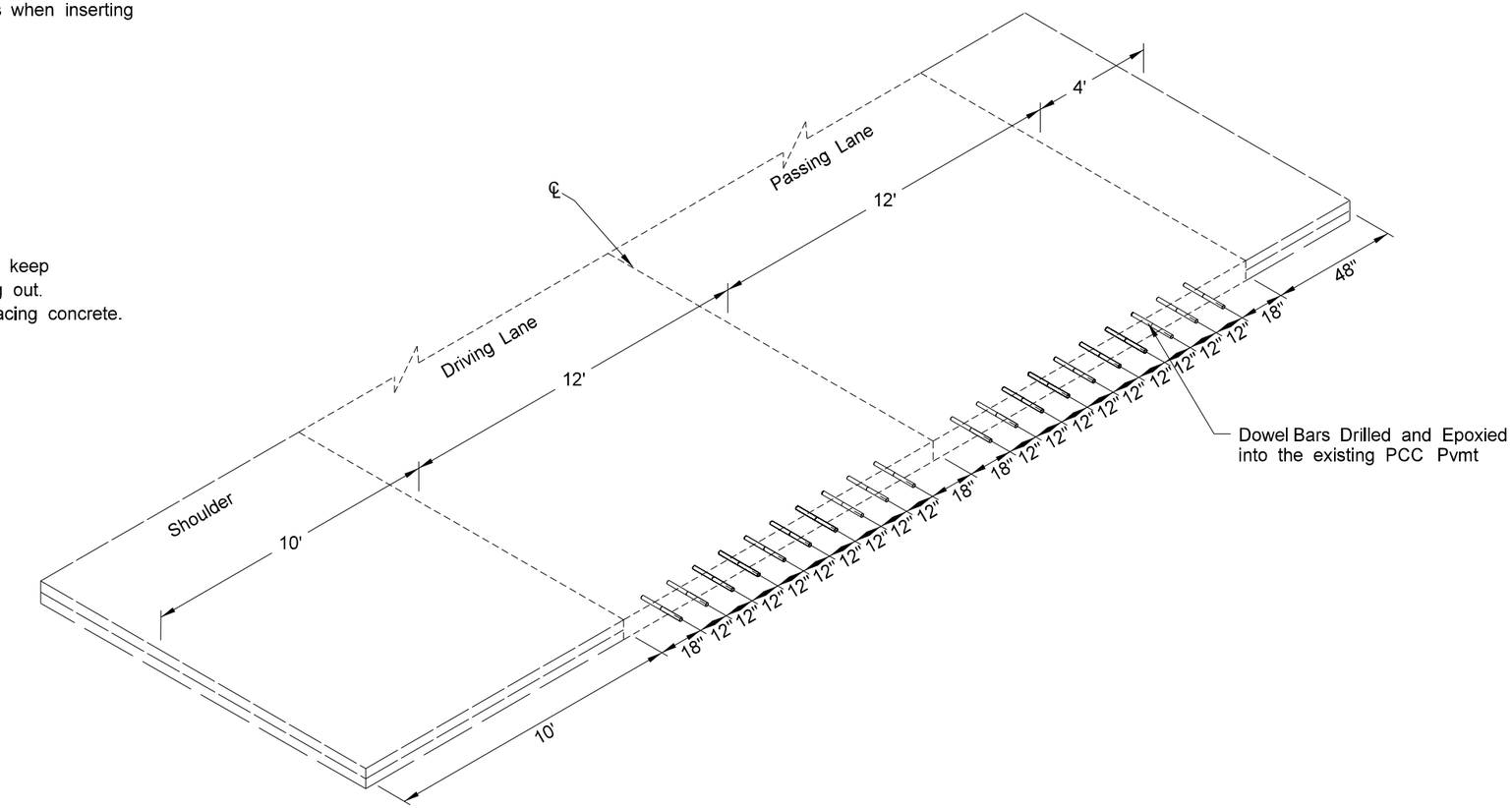
Concrete Pavement Repair

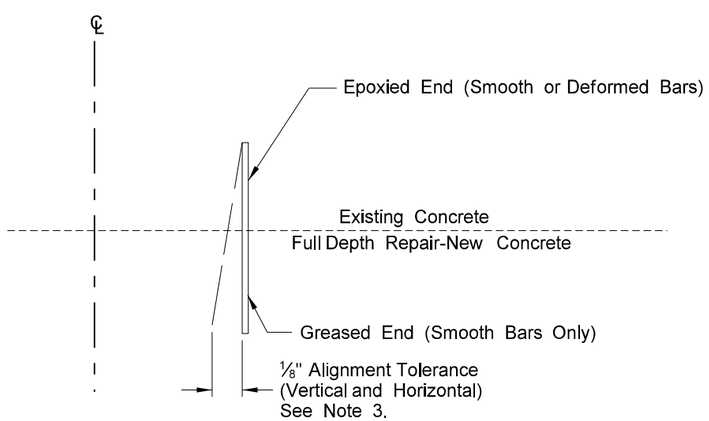
Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	20	2



Dowel & Epoxy Installation
(Smooth or Deformed Bars)





Dowel Alignment Tolerance

NOTES:

1. Use 10 bars spaced at 12" C to C for full depth repairs.
2. Dowel bars shall be placed at the vertical midpoint of the existing PCC pavement.
3. Deformed bars shall be aligned parallel to the roadway surface and perpendicular to the joint face.

   Smooth bars and dowel bar assemblies shall be aligned parallel to the roadway centerline and pavement surface.

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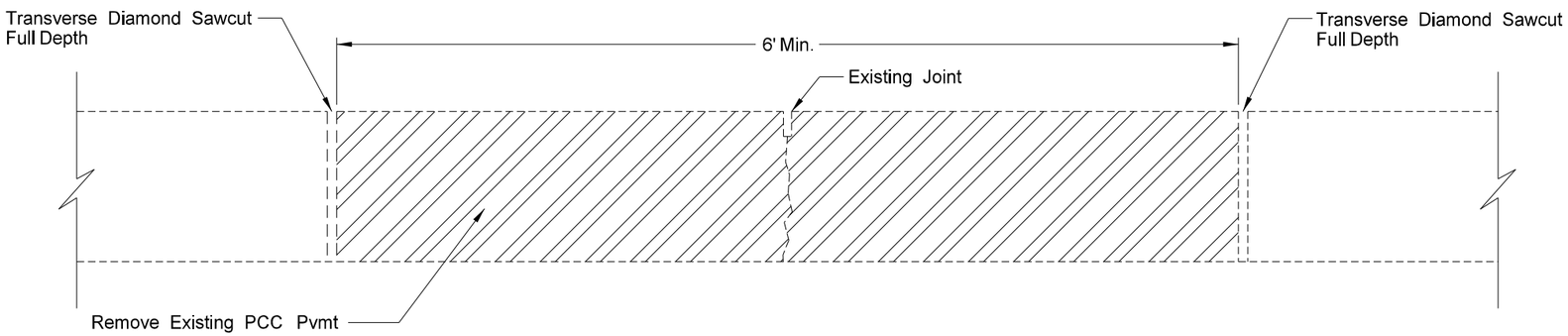
Dowel Bar Placement - Full Depth Repairs
(Smooth or Deformed Bars)

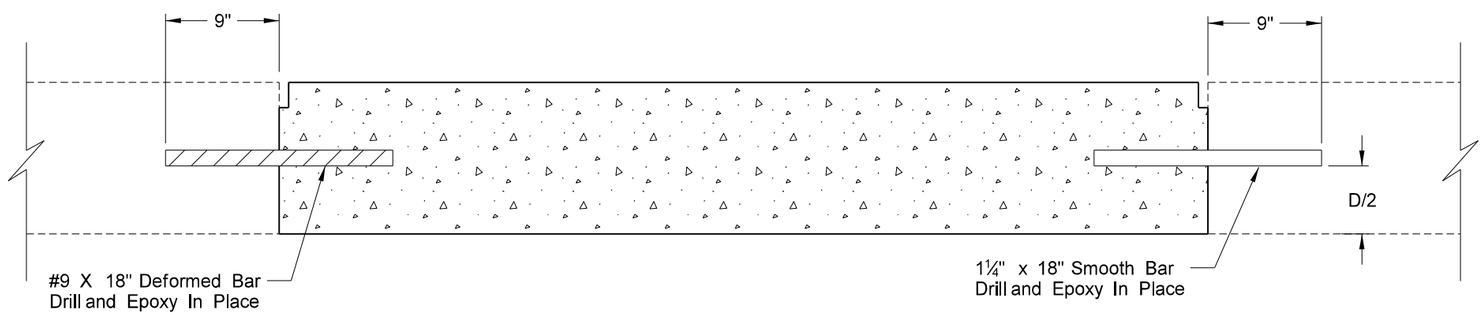
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	20	3



FULL DEPTH PAVEMENT REMOVAL



FULL DEPTH PAVEMENT REPLACEMENT

Notes:

1. Variables: D = Depth of Pavement
2. Removal and replacement also applies to full depth repairs at cracks.
3. Place smooth dowel bars in repair joint which is farthest away from the next transverse joint or working random crack. If distance is equal for both repair joints, place smooth dowels on approach side of patch.
4. Exposed end of 1¼" x 18" smooth bar will be greased.

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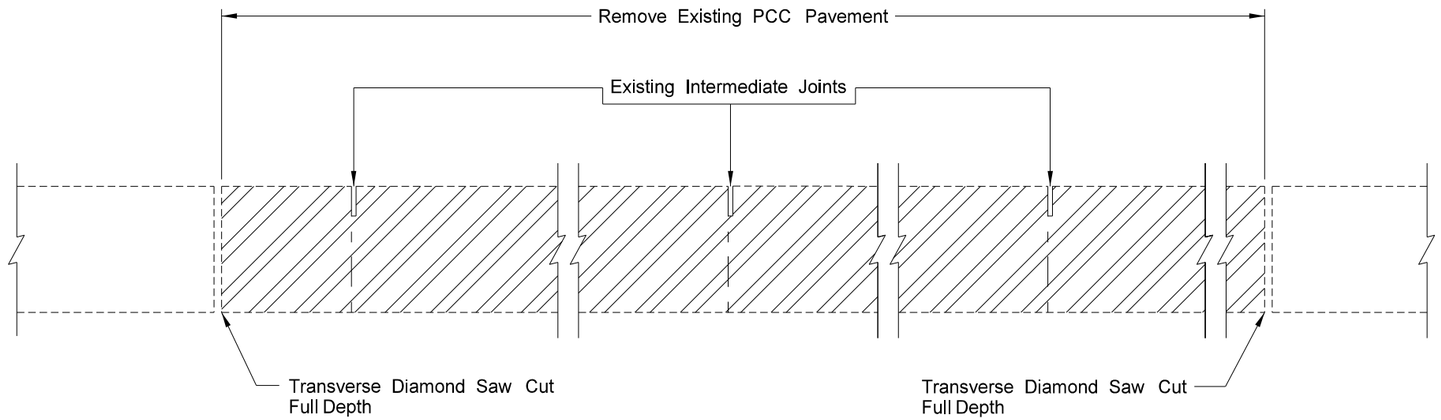
Concrete Pavement Repair
Full-Depth, Non-Reinforced PCC Pavement
(Longitudinal Length Less Than One Panel)

Concrete Pavement Repair

Near Lippert Interchange to Near US 281

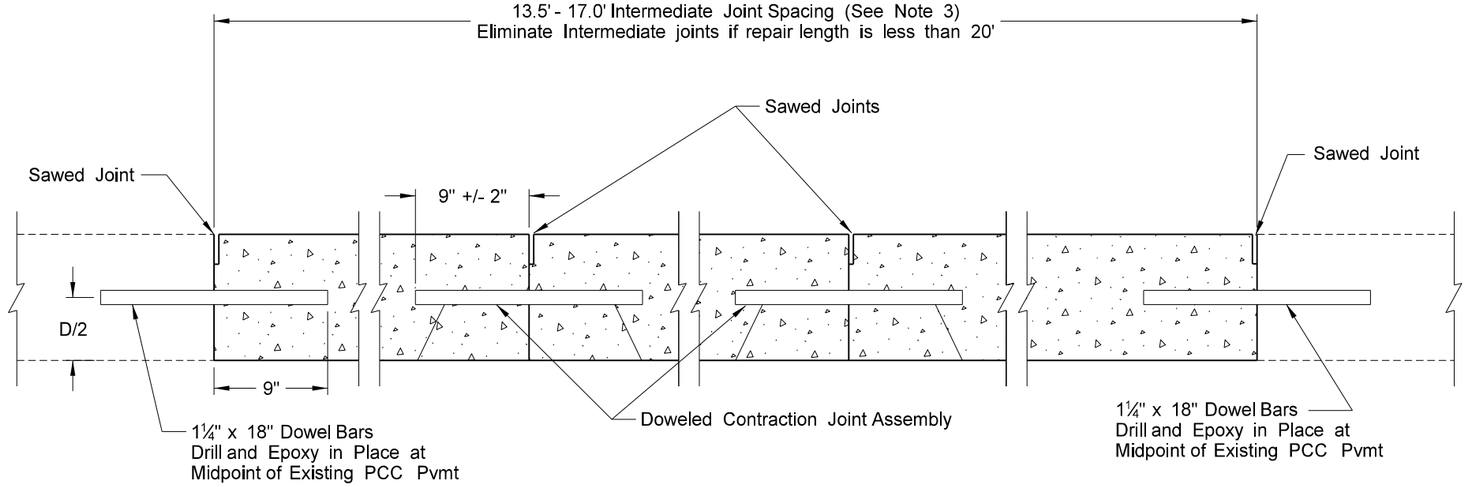
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	20	4



PCC Pavement Removal

Notes:

1. Variables: D = Pavement Depth
2. A saw cut shall always be made at the beginning and end of the repair area.
3. Joint spacing shall be 13.5' to 17.0'. Where repair length does not allow even spacing of this length, a minimum of 10 foot spacing is required.
4. In repair areas which are not the entire roadway width, joints shall be placed to match the existing pavement wherever possible.
5. Doweled Contraction Joint Assemblies shall be paid for at the rate of 12 LF/12 foot lane width when installed.
6. Exposed end of 1¼" x 18" Dowel Bars shall be greased.



PCC Pavement Replacement

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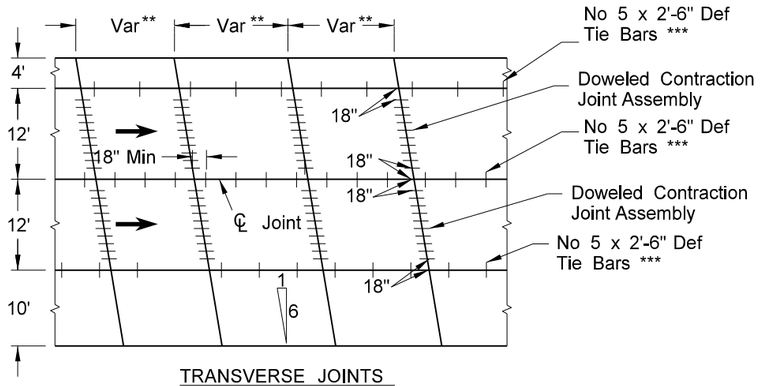
Concrete Pavement Repair
Full-Depth, Non-Reinforced PCC Pavement
(Longitudinal Length One Panel or More)

Concrete Pavement Repair

Near Lippert Interchange to Near US 281

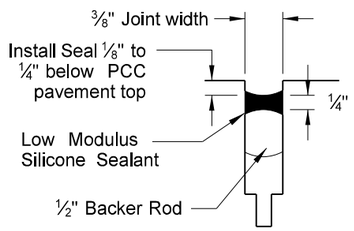
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	20	5



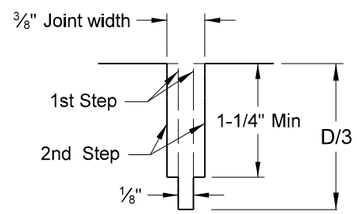
TRANSVERSE JOINTS

** Existing joint spacing is repetitive at spacings of 12', 13', 15' and 14'

*** Existing ℄ tie bars spaced @ 3.82' average c to c.
Existing 4' median shoulder tie bars spaced @ 6' c to c.
Existing 10' outside shoulder tie bars spaced @ 5' c to c.

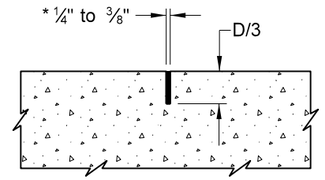


TRANSVERSE JOINT SEAL

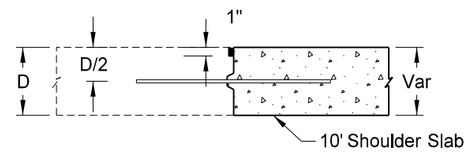


TRANSVERSE JOINT SAWING

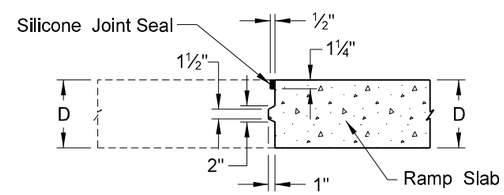
SILICONE SEAL



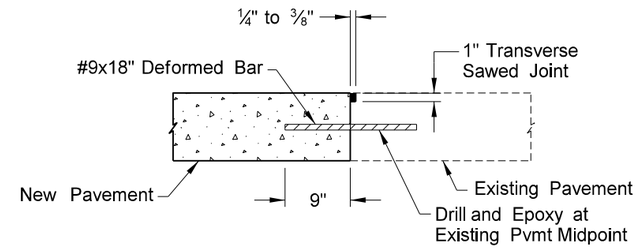
SAWED, TIED LONGITUDINAL JOINTS
(Mainline and ramps)



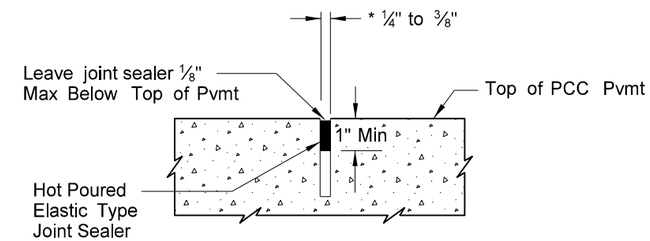
LONGITUDINAL CONSTRUCTION JOINT
(at 10' Shoulder - Keyed & Tied)



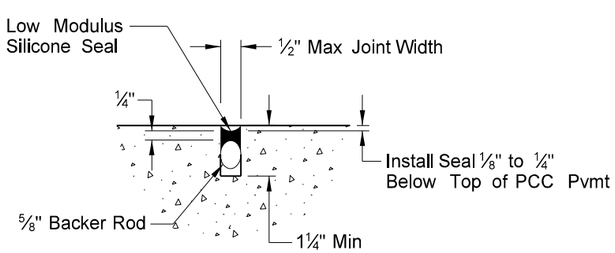
LONGITUDINAL CONSTRUCTION JOINT
(at Ramps - Keyed)



DEFORMED BAR INSTALLATION
(Spaced at 2'-0" C to C)



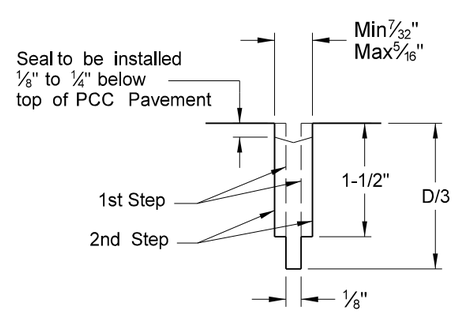
(Applies to all Sawed and Tied Joints)
JOINT SEALER DETAIL



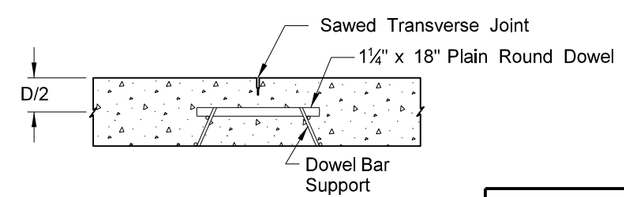
LONGITUDINAL JOINT SILICONE SEAL
(Non-Tied Joint)

D = Depth of Pvmt

*Width requirement for top 1" only, bottom portion of sawcut may be narrower.



SAWED TRANSVERSE JOINT



DOWELED TRANSVERSE JOINT

NOTE: Tie bars shall not be placed within 18 inches of a transverse joint.

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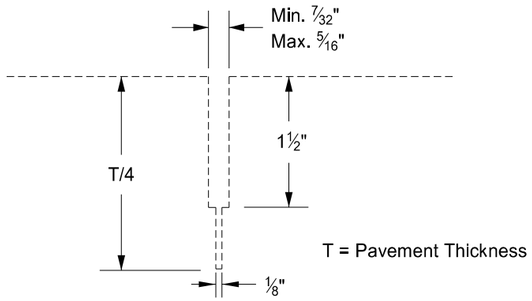
Joint Details for Repairs
(One Panel or More in Length)

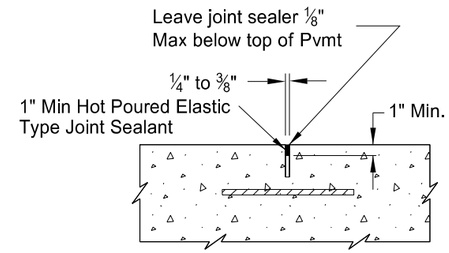
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

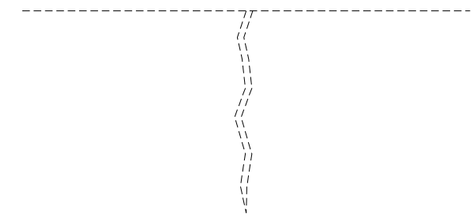
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	20	6



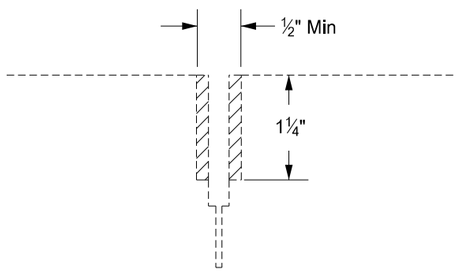
Existing Transverse Joint



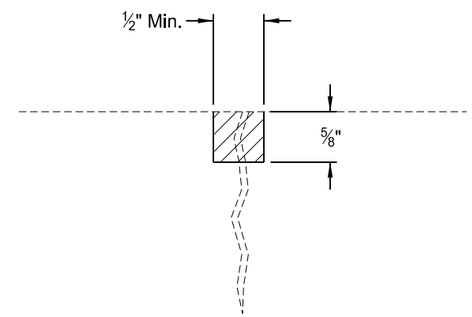
Longitudinal Joint Sealing



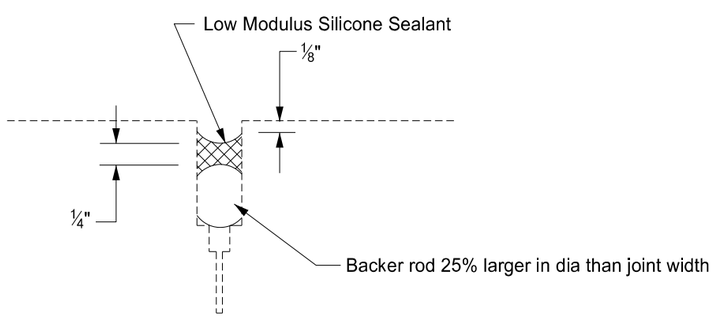
Existing Random Crack



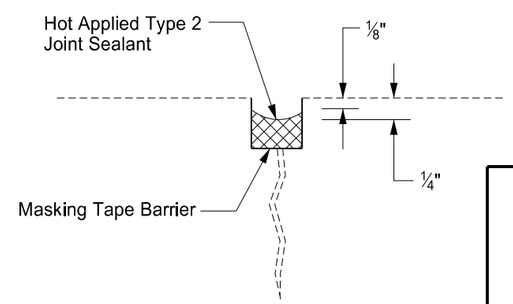
Transverse Joint Sawing



Random Crack Sawing



Transverse Joint Sealing



Random Crack Sealing

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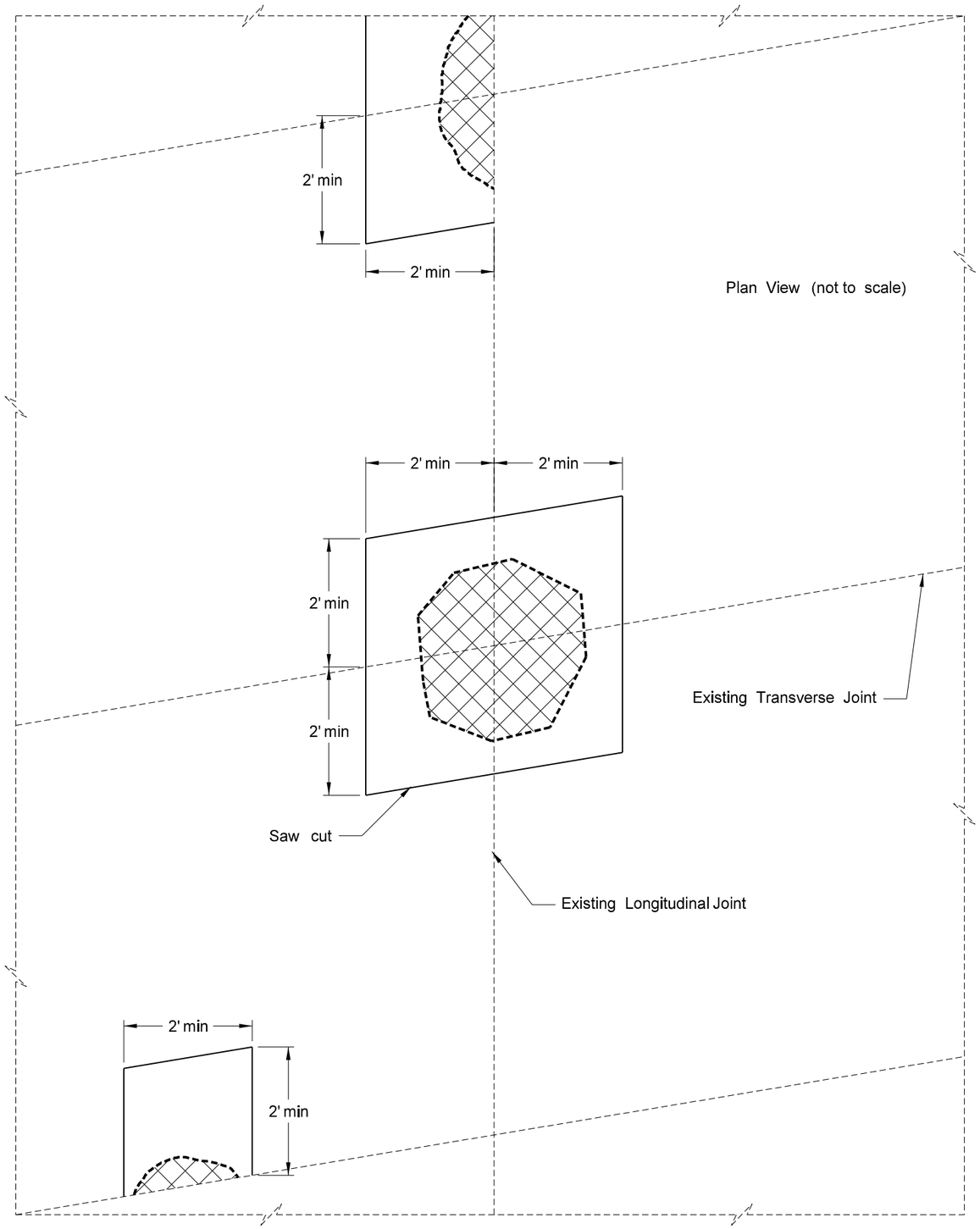
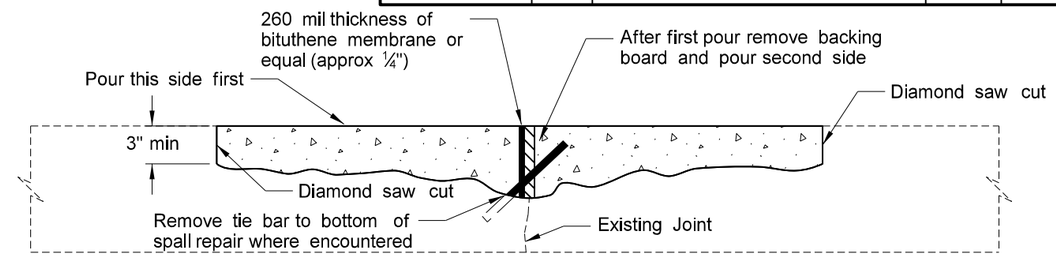
TRANSVERSE AND LONGITUDINAL JOINT AND RANDOM CRACK CLEANING AND SEALING

Concrete Pavement Repair
Near Lippert Interchange to Near US 281

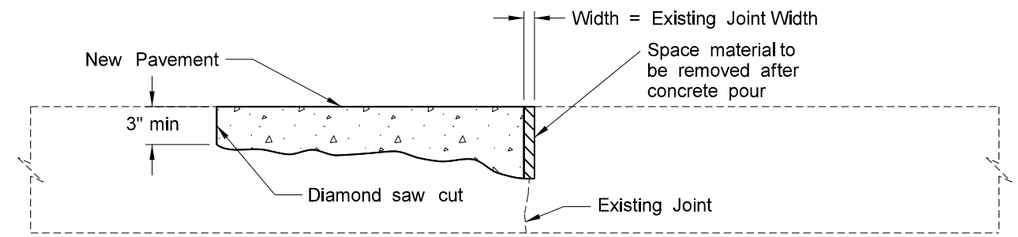
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	20	7



Spall Repair



Cross Section - Repair Area on Both Sides of the Joint



Cross Section - Repair Area on One Side of the Joint

Notes:

1. Existing concrete shall be removed with a chipping hammer or other methods as approved by the Engineer. A milling machine may be used, as approved by the Engineer, but sawing and chipping will still be required to finish the removal. All costs to remove exposed tie bars shall be included in the unit price bid for "Spall Repair-Partial Depth."

2. Grout shall be applied to the sides, excluding joint faces, and bottom of the repair area.

3. A spacer material, as approved by the Engineer, shall be placed on the joint face to maintain the joint during repair. The material shall have the capability of maintaining a width equal to that of the existing joint, and being easily removed after the pour. In the case of repair on both sides of the transverse joint each side shall be poured separately.

4. In the case of repair on both sides of the joint, if deemed necessary by the Engineer, a bituthene waterproofing membrane will be placed on the face of the newly poured joint in lieu of the spacer material prior to the concrete pour. The material shall be a minimum of 260 Mil (approximately ¼") thick or equal to the width of the existing joint, whichever is larger. The material shall be cut to fit over the entire face of the existing joint. The material shall be placed to provide for expansion and to prevent water from entering the existing joint through the sides or bottom. The material shall be hand pressed into place to conform to the face of the existing joint. In the case of repair on both sides of the joint a backer board material, as approved by the Engineer shall be placed over the bituthene material on the side facing the second pour prior to the 2nd pour. The backer board shall be removed after the repair is completed.

In the case of repair on one side of the joint, if deemed necessary by the Engineer, a bituthene waterproofing membrane will be placed on the face of the existing joint in lieu of the spacer material and prior to the concrete pour.

5. All joints shall be sealed according to NDDOT specifications.

6. All costs for cleaning and sealing joints and any bituthene installment shall be covered under the bid item " Spall Repair - Partial Depth."

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Spall

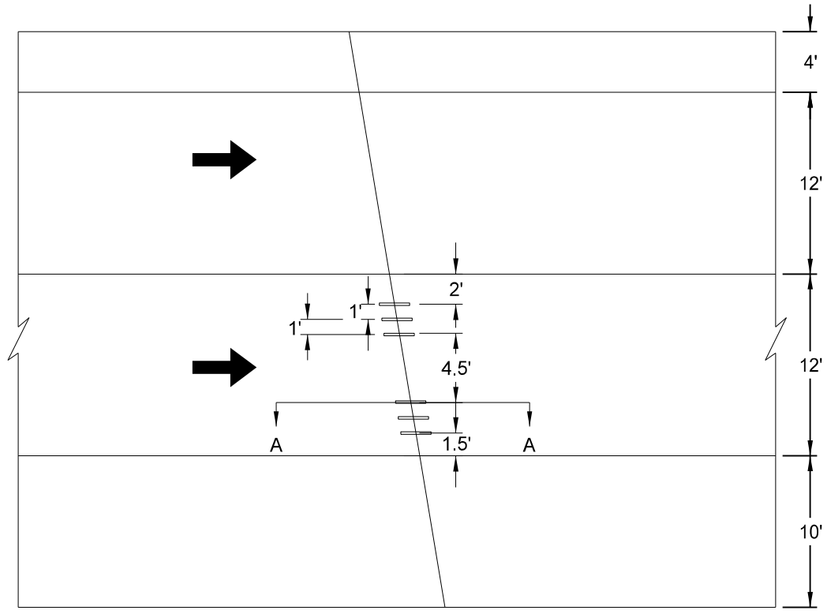
Concrete Removal Area

SPALL REPAIR DETAILS

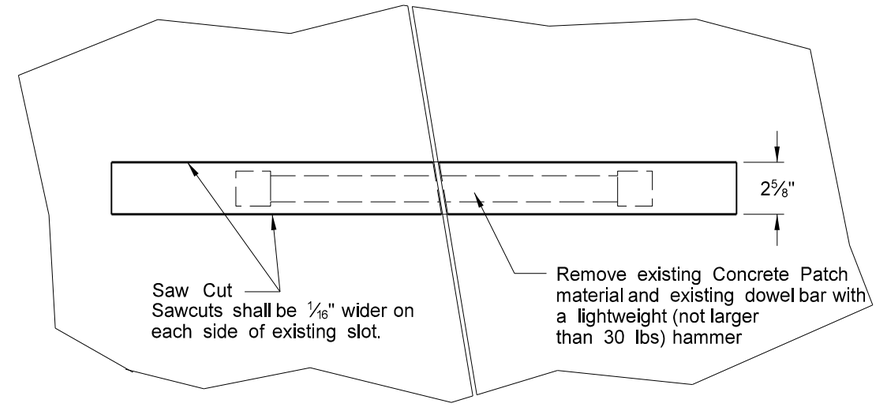
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

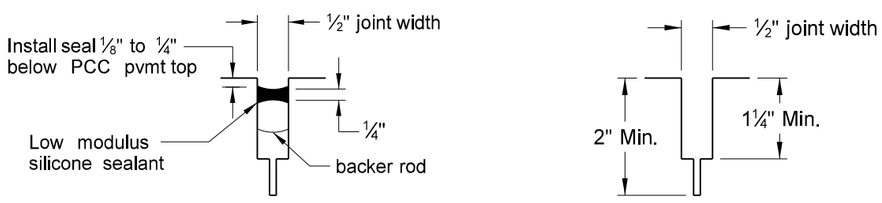
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	20	8



Dowel Bar Retrofit Spacing



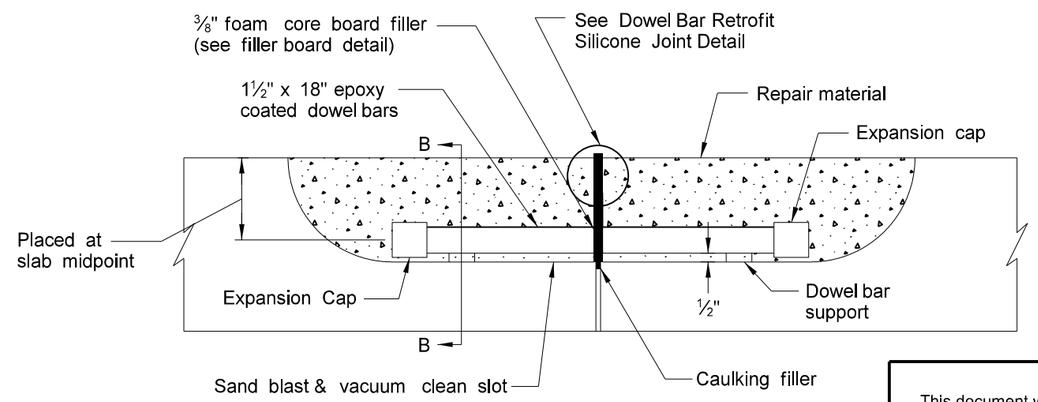
Plan View Dowel Bar Retrofit Slot Material Removal



Transverse Joint Seal

Transverse Joint Sawing

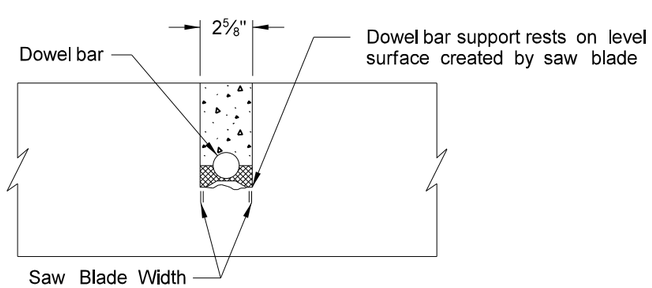
Dowel Bar Retrofit Silicone Joint Detail



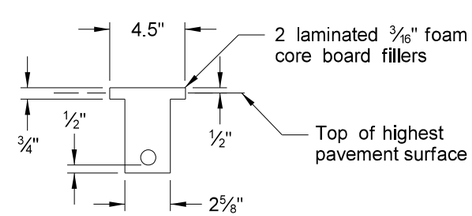
Section A-A

Dowel Bar Installation Detail

NOTE: Repair material shall be placed above the existing PCC pavement (a maximum of ¼".)



Section B-B



Filler Board Detail

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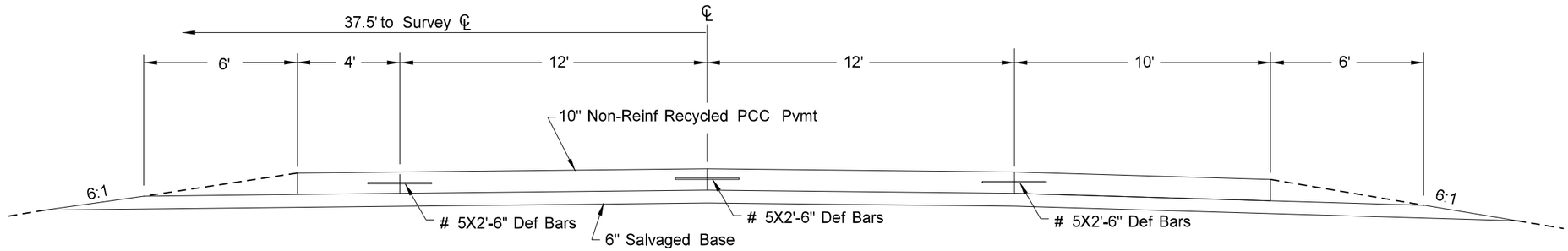
Proposed Dowel Bar Retrofit Installation Detail

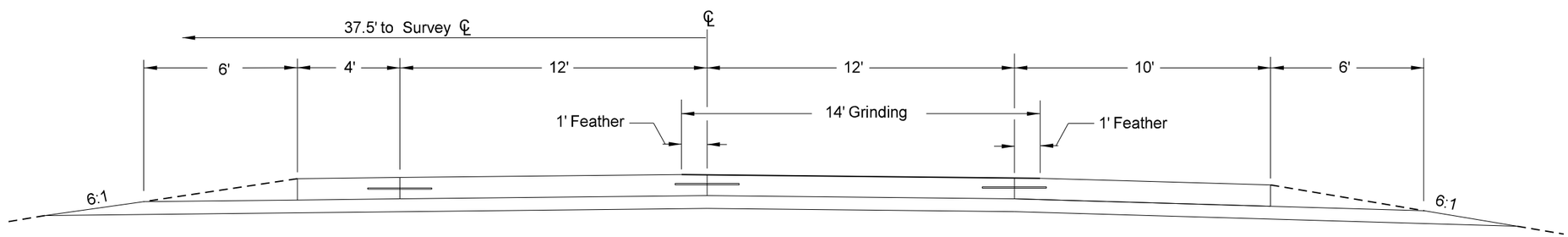
Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	030	1



EXISTING MAINLINE TYPICAL SECTION



GRINDING-MAINLINE
RP 253.02 to 255.40
RP 255.62 to 255.64
RP 257.00 to 257.02

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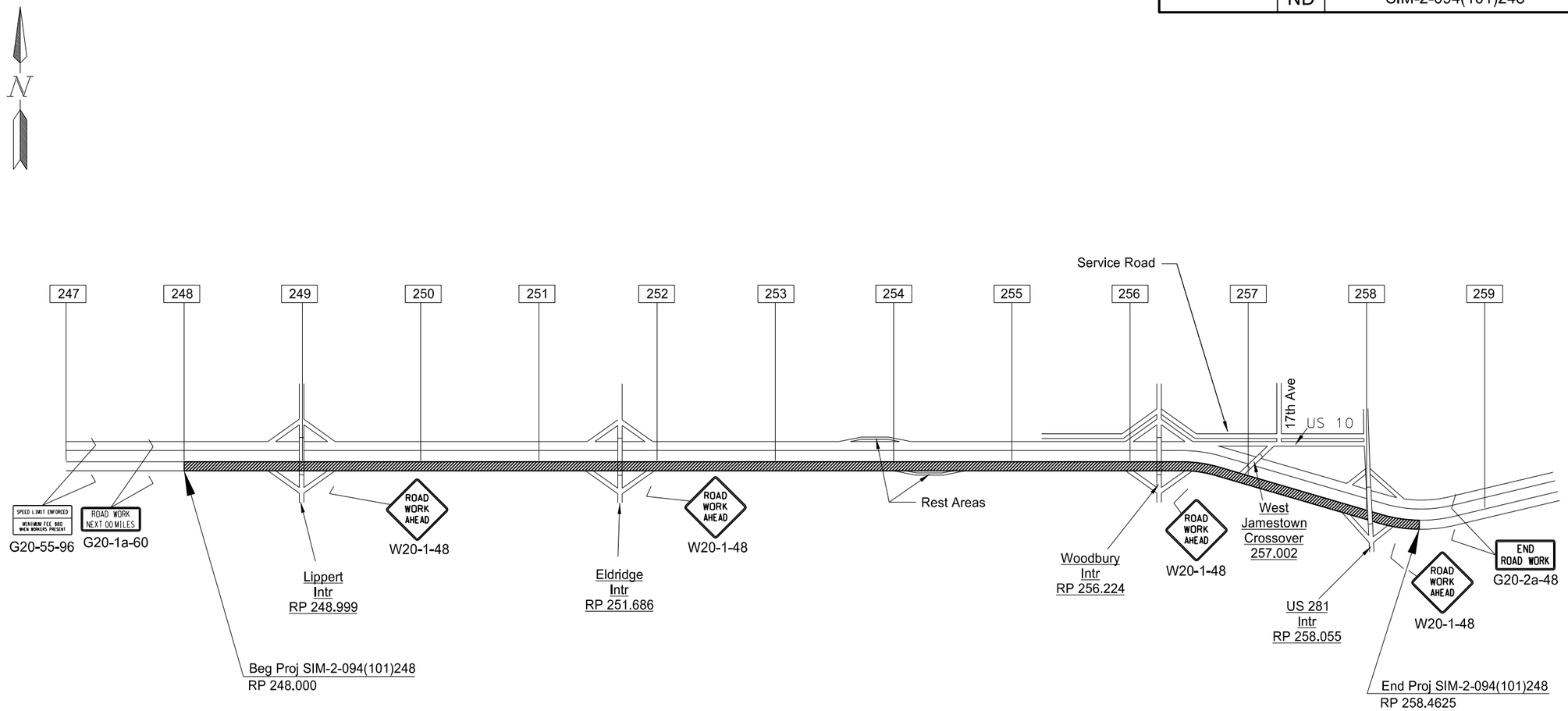
EXISTING TYPICAL SECTION

Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	100	1



WORK AREA

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WORK ZONE TRAFFIC CONTROL

Concrete Pavement Repair

Near Lippert Interchange to Near US 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-2-094(101)248	100	2

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)		6	
G20-1a-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**2**	**34**	**68**
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)		26	
G20-2a-48	**48"x24"**	**END ROAD WORK**	**2**	**19**	**38**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME		18	
G20-10-108	**108"x48"**	**CONTRACTOR SIGN**	**1**	**64**	**64**
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		37	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW		30	
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT**	**2**	**59**	**118**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT		23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT(Mounted on route marker post)		7	
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)		7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)		7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)		7	
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-1a-18	**18"x18"**	**STOP and SLOW PADDLE Back to Back**	**2**	**5**	**10**
R1-2-60	**60"x60"**	**YIELD**	**3**	**29**	**87**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**9**	**39**	**351**
R2-1a-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**4**	**10**	**40**
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT		35	
R4-1-48	**48"x60"**	**DO NOT PASS**	**2**	**39**	**78**
R4-7-48	48"x60"	KEEP RIGHT SYMBOL		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT		13	
R7-1-12	12"x18"	NO PARKING		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED		28	
R11-2a-48	48"x30"	STREET CLOSED		28	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC		31	
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	48"x24"	LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD SYMBOL		35	
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**2**	**35**	**70**
W4-2-48	**48"x48"**	**RIGHT or LEFT LANE TRANSITION SYMBOL**	**2**	**35**	**70**
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL		35	
W8-1-48	48"x48"	BUMP		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER STRIPE		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __ FT.		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT.		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL		35	
W13-1-24	24"x24"	__ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)		11	
W13-4-48	**48"x60"**	**RAMP ARROW**	**3**	**39**	**117**
W14-3-48	48"x36"	NO PASSING ZONE		23	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**6**	**35**	**210**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT.		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT.		35	
W20-5-48	**48"x48"**	**RIGHT or LEFT LANE CLOSED AHEAD or __ FT.**	**2**	**35**	**70**
W20-7a-48	**48"x48"**	**FLAGGING SYMBOL**	**2**	**35**	**70**
W20-7k-24	24"x18"	__ FEET (Mounted on warning sign post)		10	
W20-8-48	48"x48"	STREET CLOSED		35	
W20-51-48	48"x48"	EQUIPMENT WORKING		35	
W20-52-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1a-48	48"x48"	WORKERS SYMBOL		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5-48	48"x48"	SHOULDER WORK		35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT.		35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT.		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)		11	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**1461**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**400**
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH	
704-1050	**TYPE I BARRICADES**	**EACH**	**35**
704-1051	TYPE II BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**11**
704-1060	**DELINEATOR DRUMS**	**EACH**	**76**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**195**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	**STACKABLE VERTICAL PANELS**	**EACH**	**75**
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	**SEQUENCING ARROW PANEL - TYPE C**	**EACH**	**1**
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	
704-1095	TYPE B FLASHERS	EACH	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	
762-1500	OBLITERATION OF PVMT MK	SF	
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-19.06 of the Design Manual.
http://www.dot.nd.gov/

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Traffic Control Devices List