

Project No.

PCN

**Jct. 3 E to W of Wolford**



---

Prepared by

**NORTH DAKOTA DEPARTMENT OF TRANSPORTATION  
BISMARCK, NORTH DAKOTA**

<http://www.dot.nd.gov/>

**DIRECTOR**  
Grant Levi, P.E.

**OFFICE OF TRANSPORTATION PROGRAMS**  
Steve Salwei, P.E.

Principal Author:  
Jared Loegering, E.I.T.  
December 2014

# SCOPING REPORT

Report Completed By: Jared Loegering

## A. GENERAL INFORMATION

**Project Number:**

**District:** Devils Lake

**Location:** Jct. 3 E to West of Wolford

**Reference Point:**

Project 1, Minor Rehabilitation subcut and weather camera installation: RP 0.00 to 11.15, 11.15 miles

Project 2, Major Rehabilitation subcut and in-slope widening with riprap: RP 3.0 to 3.24, 0.24 miles

Project 3, New/Reconstruction grade raise: RP 8.85 to 10.3, 1.45 miles

**Counties:** Pierce

**Legal Description:** T158N, R73W, Sec 13 to T158N, R71W, Sec 15

**Functional and Funding Roadway Classification:** District Collector

**National Highway System:** No

**Project Schedule:** Proposed to be added to the STIP for a 2017 Minor Rehabilitation selective subcut and weather camera installation, a Major Rehabilitation subcut and in-slope widening with riprap to re-establish the clear zone and a New/Reconstruction grade raise.

## B. PURPOSE, NEED, AND IMPROVEMENT

**Purpose and Need of Project:**

The segment of roadway from RP 0.00 to 11.15 was originally part of a Minor Rehabilitation selective subcut project, project No. SS-3-017(028)000, PCN 20285, from RP 0.00 to 53.44 scheduled for 2016. There was a "Change of Project Scope" (dated 8/13/2014) submitted by the district to change the starting point of that project to RP 11.15 and to add 3 tied projects to address RP 0.00 to 11.15. Below are descriptions of the proposed 3 tied projects.

### **Project 1, Minor Rehabilitation subcut and weather camera installation**

There is a frost boil at RP 5.8 that is in need of a subcut and a weather camera is proposed to be installed at the intersection of ND 3 and ND 17.

### **Project 2: Major Rehabilitation subcut and in-slope widening with riprap**

There is a frost boil at RP 3.0 that is in need of a subcut. The in-slope has also eroded on the north side of the roadway from RP 3.1 to 3.24 due to high winds. Precipitation has filled the slough near RP 3 and the wave action has eroded the in-slope to a vertical edge. In-slope widening with riprap is required to re-establish the clear zone and to prevent further damage from the water.

### **Project 3: New/Reconstruction Grade Raise**

The slough near RP 9 has filled due to precipitation and the water has not receded as in years past. Waves have started to undermine the roadway and the water has begun to erode the shoulder slope. A 5' grade raise is estimated to be needed from RP 8.85 to 10.3 to prevent further damage from the water. At this time there has been no hydraulic analysis completed; during the design phase one will need to be completed to determine the required grade raise.

**Proposed Improvements:**

**Project 1:** A Minor Rehabilitation subcut and weather camera installation project is proposed to extend the useful life of the roadway by restoring the pavement structure. The safety items that will be addressed are safety hardware that does not meet NCHRP 230 standards or better. All other safety items will be addressed as part of the Statewide Safety Program.

**Project 2 (tied to Project 1):** A Major Rehabilitation subcut and in-slope widening with riprap to re-establish the clear zone is proposed to extend the service life of the roadway and provide operational improvements for the roadway. The safety items that will be addressed are safety hardware that does not meet NCHRP 350 standards or better and safety items within the clear zone. A 90-1 survey will also be completed and areas needing safety improvements will be addressed.

**Project 3 (tied to Project 1):** A New/Reconstruction grade raise HBP paving project is proposed to build a functionally and operationally adequate and reliable roadway. All safety items within the AASHTO clear zone will meet NCHRP 350 standards.

**C. TRAFFIC AND CRASH ANALYSIS**

**Traffic:**

RP 0.00 to 11.15

	Year	Truck AADT	Total AADT	Flexible ESALs
Current Traffic	2014	95	365	70
Forecast Traffic	2034	130	495	95

**Speed Limit:**

From RP	To RP	Speed Limit
8.850	8.889	65 mph
8.890	9.570	45 mph
9.570	10.300	65 mph

**Crash Analysis:**

There were a total of 4 crashes from 6/1/2009 to 5/31/2014. Animal crashes were not included. The crash rate per 1 million vehicles is 0.6781

No trends were identified and there are no recommendations at this time.

**D. EXISTING ROADWAY CHARACTERISTICS**

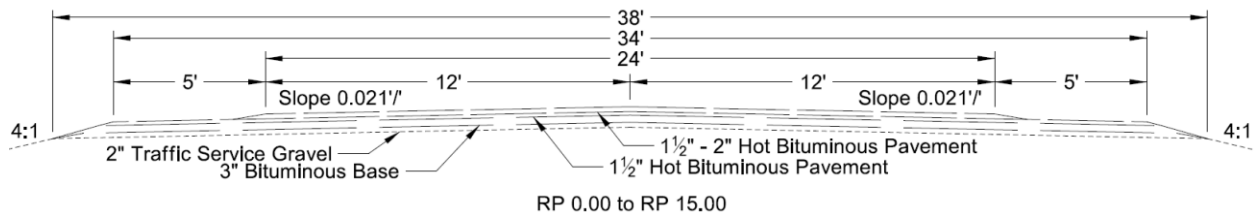
	International Roughness Index (IRI)	Distress Score	Rut
Excellent	< =60	≥ 98	< 0.25"
Good	61 – 99	88 – 97	0.25" to 0.375"
Fair	100 – 145	77 – 87	0.376" to 0.50"
Poor	> 145	≤ 76	> 0.50"

**RP 0.00 to 15.00**

Actual Age	IRI	IRI Rating	SI or SCI	Faulting
40	73	Good	16	N/A
Effective Age	Distress	Distress Score	Rutting	Rutting Score
40	78	Fair	0.09	Excellent

CONSTRUCTION HISTORY				
Year	Construction	Depth (in)	Width (ft)	Oil
1972	GRADE	-	38.0	-
1972	TRAFFIC SERVICE GRAVEL	2.0	36.0	-
1974	BITUMINOUS BASE	3.0	35.0	SC-3000
1974	HOT BIT PAVEMENT	1.5	34.0	SC-3000
1990	CONTRACT CHIP SEAL	-	26.0	MC-3000
2000	CONTRACT CHIP SEAL	-	26.0	MC-3000
2007	INT CONT PATCH-1.5"	-	24.0	PG 58-28
2009	INT CONT PATCH-1.5"	-	24.0	PG 58-28
2011	INT CONT PATCH-2.0"	-	24.0	PG 58-28

**Existing Typical Section, RP 0.00 to 15.00**



**E. EXISTING GEOMETRY**

**Existing Foreslopes: 4:1**

**Horizontal Curves:**

Project 1, Minor Rehabilitation: Use existing.

Project 2, Major Rehabilitation: Use existing, sign when less than posted speed

Project 3, New/Reconstruction: The superelevation of one horizontal curve at RP 9.234 does not meet design requirements and is shown below. The curve should be constructed to meet standards.

Location	Speed (mph)	Radius (ft)		Superelevation (%)	
		Existing	Required	Existing	Required
RP 9.234	65	4407	1657	3.5	3.7

**Vertical Curves:**

Project 1, Minor Rehabilitation: Use existing.

Project 2, Major Rehabilitation: Existing vertical curves should meet a design speed of no less than 20mph below the overall project design speed. The existing vertical curves meet the design requirements.

Project 3, New/Reconstruction: Design proposed grade using stopping sight distance for crest curve and comfort curve design for sag curves. The existing vertical curves meet the design requirements.

**F. EXISTING STRUCTURES**

**Bridges:** None present

**Centerline Pipes:** There are five centerline pipes on the project that will need to be extended or replaced due to the in-slope widening and grade raise. A cost is included in the cost estimate to address the pipes.

## G. LAND INTERESTS

**Communities:**

None

**Reservation:**

None

**Surface Trust Lands:**

RP 3.11 to 4.04

**Waterfowl Management Area**

RP 9.35 to RP 9.68 and RP 9.77 to RP 10.11

**Adjacent Land Usage:**

Agricultural

## H. ISSUES AND APPURTENANCES CHECKLIST

- |   |                              |  |
|---|------------------------------|--|
| 1. Curb and Gutter?                     | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 2. Sidewalk?                            | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 3. Multi-Use Path?                      | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 4. ADA Ramps?                           | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 5. Detectable Warning Panels?           | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 6. Lighting?                            | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 7. Signals?                             | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 8. Storm Sewer?                         | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 9. Manholes?                            | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 10. Other Underground Work?             | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 11. Parking Facilities?                 | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 12. Frontage Roads?                     | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 13. Utility Issues?                     | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 14. Landscaping?                        | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 15. Approach or Ditch Block Flattening? | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 16. T Intersection Recovery Approaches? | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| 17. Fence?                              | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |

18. Railroad Crossings? Yes  No
19. Detours? Yes  No
20. Automatic Traffic Recorder Locations? Yes  No
21. Weigh-In-Motion Sites? Yes  No
22. ITS (Deicing, Snow Gates, VMS, RWIS, etc.)? Yes  No   
 There is a weather camera proposed at the intersection of ND 3 and ND 17. A cost is included in the Minor Rehabilitation estimate to address the weather camera installation.
23. Highway Patrol/Truck Pullouts or Rest Areas? Yes  No
24. Additional Right of Way? Yes  No   
 Possibly need right of way to accommodate widening and riprap.
25. Drainage Issues? Yes  No
26. Snow Impact Areas? Yes  No
27. Subgrade Issues? Yes  No
28. Noise Analysis: Type I Project? Yes  No  Maybe
29. Maintenance Issues? Yes  No
30. Guard Rail? Yes  No
31. Milling? Yes  No

**I. Load Restrictions**

**Travel Information Map Proposed Load Restriction:** 7-ton  
**HPCS Load Restriction:** 6-ton (spring only)  
**Projected load restrictions after project is completed:** 7-ton

**J. PERFORMANCE GUIDELINES**

**Design Speed:** 65 mph  
**Clear Zone (from edge of driving lane):**  
 Project 1, Minor Rehabilitation: Use existing.  
 Project 2, Major Rehabilitation: 20'  
 Project 3, New/Reconstruction Grade Raise: AASHTO

**Ride/Distress Goal:** Good  
**Operational Reliability:** Moderately Reliable  
**Foreslope:** 4:1

**K. Roadway Widths**

Project 1, Minor Rehabilitation: 22'

Project 2, Major Rehabilitation: 26'.  
 Project 3, New/Reconstruction: 36'

## L. PROPOSED IMPROVEMENTS

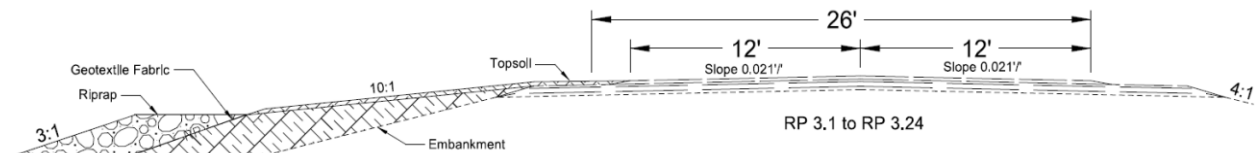
**Project 1:** A Minor Rehabilitation subcut and weather camera installation project is proposed. The safety items that will be addressed are safety hardware that does not meet NCHRP 230 standards or better. All other safety items will be addressed as part of the Statewide Safety Program.

**Project 2 (tied to Project 1):** A Major Rehabilitation subcut and in-slope widening with riprap to re-establish the clear zone is proposed. The safety items that will be addressed are safety hardware that does not meet NCHRP 350 standards or better and safety items within the clear zone. A 90-1 survey will also be completed and areas needing safety improvements will be addressed.

**Project 3 (tied to Project 1):** A New/Reconstruction grade raise HBP paving project is proposed. All safety items within the AASHTO clear zone will meet NCHRP 350 standards.

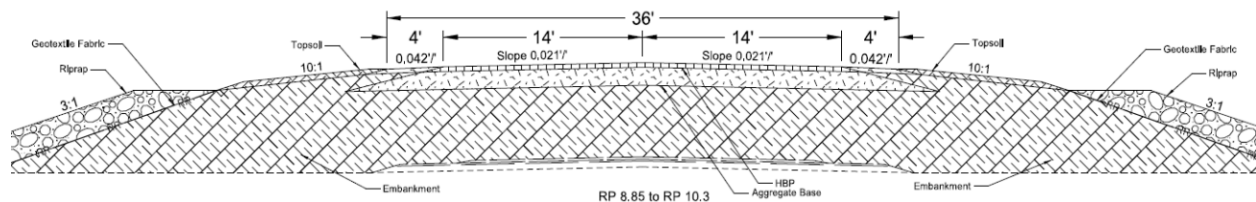
### Proposed Typical Sections:

#### Project 2, In-slope Widening with Riprap:



#### Project 3, Grade Raise:

For this report it was assumed that a 5' grade raise to the top of subgrade will be constructed. A hydraulic analysis should be completed to determine the grade raise. This typical section is for preliminary design purposes only.



## M. ADDITIONAL COMMENTS

### District Engineer:

The water has risen in the area of mile 3 and 9 creating larger fetches such that waves are eroding the inslope of the roads, as they are not armored. At mile 9 the water is within a foot of the top of the road. Being that close it has saturated the road which has deteriorated the road surface and forced the load restriction to stay in place longer in this area. Originally the highway 17 project included this area of mile 9 which was identified to do a subcut to repair the load capacity of this area. The subcut would not work since the water would have been above the bottom of the subcut. A grade raise is now required to get the road surface above the water to maintain the load carrying capacity of this section of highway. The slopes should also be laid back to something greater than a 3:1 within the right of way to lessen the force of the waves and armor the slope.

Districts choices are Option 1, Option 2, and Option 3

**Safety Division Director:**

No comments

**N. COST ESTIMATE**

(Inflation factor of 4% was used to estimate costs for bid year 2017)

**Project 1, Minor Rehabilitation Subcut and Weather Camera Installation**

ITEM	ESTIMATED COST
Contract Bond	\$1,000
Mobilization	\$3,000
HBP	\$14,000
Traffic Control	\$10,000
Aggregate Base	\$22,000
Seeding, Mulching, and Erosion Control	\$3,000
Common Excavation and Water	\$4,000
Saw and Remove Pavement	\$7,000
Topsoil	\$1,000
Painting and Rumble Strips	\$2,000
Geotextile Fabric	\$10,000
Weather Camera	\$10,000
Subtotal	\$87,000
20% Engineering	\$17,000
Construction and CE Total Cost	\$104,000

**Project 2, Major Rehabilitation Subcut and In-slope Widening**

ITEM	ESTIMATED COST
Contract Bond	\$1,000
Mobilization	\$6,000
HBP	\$14,000
Traffic Control	\$10,000
Aggregate Base	\$22,000
Borrow	\$27,000
Geotxtile Fabric and Riprap	\$40,000
Seeding, Mulching, and Erosion Control	\$5,000
Common Excavation and Water	\$4,000
Saw and Remove Pavement	\$7,000
Topsoil	\$2,000
Painting and Rumble Strips	\$4,000
Centerline Pipe	\$5,000
Subtotal	\$147,000
20% Engineering	\$29,000
Construction and CE Total Cost	\$176,000

**Project 3, New/Reconstruction Grade Raise**

ITEM	ESTIMATED COST
Contract Bond	\$20,000
Mobilization	\$109,000
Hot Bit Pavement (4" HBP, Includes AC, Tack, Prime and cores)	\$383,000
Aggregate Base (based on 15")	\$385,000
Geotextile Fabric and Riprap	\$287,000



ITEM	ESTIMATED COST
Borrow and Water	\$1,215,000
Topsoil	\$8,000
Erosion and Sediment Control	\$86,000
Field Lab and Office	\$10,000
Traffic Control	\$100,000
Pavement Markings and Rumble Strips	\$85,000
Centerline Pipes	\$39,000
Subtotal	\$2,727,000
20% Engineering	\$545,000
Total Cost	\$3,272,000

## O. DECISIONS

1. Which advancement option(s) should be chosen for this project?

- Option 1: Minor Rehabilitation subcut and weather camera installation.  
**Estimated Cost: \$104,000**
- Option 2: Major Rehabilitation subcut and in-slope widening with riprap.  
**Estimated Cost: \$176,000**
- Option 3: New/Reconstruction Grade Raise. **Estimated Cost: \$3,272,000**
- Option 4: Do nothing
- Option 5: Advance all options to the Environmental Document phase

DDE Comments: The weather camera should be part of the ITS project and not part of this one. These should be three stand alone projects with separate environmental documents. It may make sense to tie at the bid opening.

[Signature]  
Deputy Director for Engineering

12/29/14  
Date