

**IOWA DEPARTMENT OF TRANSPORTATION**

**To Office:** District 3

**Date:** April 24, 2019

**Attention:** Shane Tymkowicz

**Ref No.:**500

**From:** Mark Wright

Carroll County  
STPN-141-4(43)--2J-14  
PIN: 18-14-141-020  
PW: [1414102018](#)

**Office:** District 3 Design

**Subject:** FY 2021 3R Project Concept – **FINAL D(0)**

**DATE OF REVIEW:** January 24, 2019

**PARTICIPANTS:** District – Shane Tymkowicz, Darwin Bishop, Todd Huju, Jason Klemme, Mark Wright, Mike Thayer, Mike Malchow; Cherokee RCE Office – Kirk Johnson

**PROJECT DATA:**

ROUTE: Iowa 141 WCL of Manning (MP 76.22) to just E of Manning (MP 78.02)

PROJECT LENGTH: 1.8 miles

MAINTENANCE SERVICE LEVEL: C; NHS: no

TRAFFIC: 2021 --- 2662 ADT with 12% trucks @ West Street  
3961 ADT with 9% trucks @ Center Street  
3442 ADT with 10% trucks @ ECL Manning  
**3400 ADT with 10% trucks (Project Average 2021)**

2041 --- 3083 ADT with 12% trucks @ West Street  
4587 ADT with 9% trucks @ Center Street  
3986 ADT with 10% trucks @ ECL Manning  
**3900 ADT with 10% trucks (Project Average 2041)**

PRESENT PAVEMENT SURFACE: HMA or PCC

PRESENT PAVEMENT WIDTH: 24 ft. rural transition to 45 ft. 4-lane urban section

PRESENT SHOULDER WIDTH: 7 ft., TYPE: granular

PRESENT ROADWAY TOP WIDTH: 44 ft.

2016 PMIS DATA	Dir.	Pav't. Type	Avg. Str. No.	80% Str. No.	Jt. Str. No.	PCI 2 (2017)	IRI (2017)	K Value	Rut
76.59 – 77.33	Both	Comp.	8.02	7.07		52	225.2	114	0.11"
77.33 – 77.91	Both	Comp.	7.64	6.75		76	82.5	176	0.14"

**PAVEMENT HISTORY**

**ORIGINAL PAVEMENT:**

**1940: BOP to W. of West Street:** Pavement is 20' wide, 10"-7½"-10" PCC with curbs and flumes, Aggregate Source: Sacton, Gravel, Cl. 3

**1930: W. of West Street to Elm St. and May St. to East St. (Elm to May in-place brick)** Pavement is 18' wide, 10"-7"-10" PCC with curbs and flumes where noted in the plans

**YEARS WIDENED / RESURFACED:**

**1961: W. of West St. to E. of East St.**

Replaced 1930 pavement with 10" PCC to 45' wide urban cross section, transverse dowel bars only at expansion joints, unknown aggregate source

**1971: W. of West St. to Elm St. and May St. to E. of East St.**

Widened remaining 18' wide pavement to 24' with 10" HMA widening and resurfaced entire pavement in the project with 3" HMA resurfacing (gaps Elm St. to May St.)

**1991: BOP to W. of West Street**

Widened 20' wide pavement to 24' with 8 1/2" HMA widening and resurfaced entire pavement with 3" HMA resurfacing

**1997:** 3" milling / 3" resurfacing all HMA sections in Manning; Gilmore City Limestone

**2015:** double course microsurfacing WCL to W. Nishnabotna River Bridge

**MP WORK LISTING:** 2010: patching; 2018: crack filling of microsurfacing project

**EXISTING CONDITIONS AND CAUSES OF DISTRESS:**

In the rural pavement section west of West Street the microsurfacing is intact and performing well. Surface cracks have been sealed.

The 4-lane urban PCC pavement in Manning (approximately 1400 ft. between west of Elm and east of May Street) is in good condition for a 50-year old pavement. The primary distress is transverse joint cracking. Longitudinal joints are in better condition and very few panels have any random cracks. This pavement has been previously repaired with full depth PCC patches. These patches and the surrounding original pavement is d-cracked and spalled. A significant quantity of transverse joint full depth patching will be required prior to pavement profiling.

The HMA surface east of May Street has intermittent quarter point cracking with the expected reflected cracking from the base pavement. Secondary cracking has begun adjacent to the centerline construction joint. The HMA adjacent to the curb, side streets and entrances is in poor condition with alligator cracking and spalling. Full depth patches have been placed, but they are few in number. Additional full depth patches are needed.

Approximately half of the pavement in the project is a rural cross section. Longitudinal subdrains have not been installed on this roadway. Where possible longitudinal subdrains will be installed.

**SAFETY CONSIDERATIONS:**

There are no horizontal curves in the project.

Transverse slopes at the 14 entrances, dikes, and sideroads in the rural portion of the project appear 6:1 or flatter. For concept purposes none of the slopes will require flattening.

There is one bridge length structure located within the project limits:

Sta. 21+51.5, Br. No. 1477.0S141, a 90' x 48' Concrete Slab Bridge carrying Iowa 141 over the West Nishnabotna River in Manning. This bridge has concrete retrofit barrier rail (H=30") with turned down end sections. This bridge is in a 45-mph posted speed limit.

This bridge is programmed for a deck overlay with an October 22, 2022 letting, therefore there will be no bridge or bridge approach work for this structure on this project.

The project crash rate is 166 crashes / HMVMT for a five-year period. The statewide average is 291 / HMVMT for municipal primary pavements in a five-year period. A review of the crashes for the five-year period January 1, 2014 to December 31, 2018 indicates there were 18 crashes in the project limits. Of these 14 were property damage only crashes and 4 were minor or possible injury crashes. There were no fatal crashes. Six crashes occurred at the West Street intersection. Four of these six crashes involved vehicles either entering or exiting from the state highway.

Two T-intersections in the project limits (Industrial and Commercial) do not have safety ramps. Safety ramps with pipe culverts will be installed on this project at both locations.

Luminaires located between the back of curb and sidewalk in the project have breakaway bases.

The City of Manning has expressed a desire to change the existing 4-lane configuration from two lanes in each direction to one lane in each direction with a center two way left turn lane. The Department concurs with the change and the necessary bid items and details will be incorporated in the plans. This section will begin west of West Street and end east of East Street. The three-lane section will require grading, structural pavement widening and shoulder construction in the existing two-lane pavement sections.

The taper for the three-lane section will begin approximately 1520 ft. west of West Street. When designing the pavement widening west of West Street, the drainage ditch on the left side of Iowa 141 will require special attention. This ditch and the entrance near Station 10+00 Lt. is susceptible to erosion and has been repaired with erosion stone. The inlet end of the 8'x 4' RCB culvert under West Street may need an extension if the ditch needs to be moved. Radius return improvements to accommodate larger truck movements in the NE intersection quadrant will be reviewed.

The WB taper will begin approximately 990 ft. east of East Street. For the 8'x 8' RCB culvert at Station 104+62 this taper will reduce the provided clear zone distance from 30 ft. to 23 ft. The preferred clear zone distance at this location in the speed zone transition from 55 mph to 45 mph is 26 ft. Safety grates will be installed on both ends of this box culvert.

Using NCRHP Report 457 right turn lane warrants (the AM or PM movement for years 2021 or 2041) are met for both directions at West Street and East Street. The eastbound right turn lane to West Street will be constructed on this project. This will require relocation

of a luminaire and utility box and extension of a small pipe culvert. District would like to build this turn lane as an offset turn lane. Additional permanent right of way and temporary easement are needed to construct this improvement.

ADA compliant pedestrian ramps will be installed from Elm Street to May Street under project number STPN-141-4(44)--2J-14. Temporary construction easements will be required to build these ramps. The concept and supporting documents for this project may be found at: [pw://projectwise.dot.int.lan:PWMain/Documents/Projects/1414102018/Concept/D0Submittal/](http://projectwise.dot.int.lan:PWMain/Documents/Projects/1414102018/Concept/D0Submittal/)

**FEASIBLE ALTERNATIVES:**

To tie-in the finished surface with the storm sewer system, side roads, entrances and pedestrian walkways in the project it would be best to minimize any change in pavement surface elevation. The existing PCC pavement will be patched, transverse joints retrofitted with dowel bars and profiled. The HMA resurfacing will be milled and resurfaced at equal depths. In both cases the pavement surface elevation will be practically unchanged matching these features. HMA mixes shall be HT designation with PG 58-28H binder.

HMA shoulders (4 ft. x 6 in.) shall be placed adjacent to any proposed or existing pavement with a rural cross section. Milled shoulder rumble strips will be placed on these shoulders.

Approximately 2500 lineal feet of 2-lane pavement will be structurally widened 7 ft. left and right for the three-lane configuration. The proposed roadway cross section will be graded with 4:1 foreslopes, open ditches and 2 ½ :1 backslopes. Due to right of way constraints closed ditch sections may be necessary on the right side between Industrial and Commercial and on the left side ditch west of West Street.

HMA resurfacing prices are based on an average \$60 / ton for mix and \$600 / ton for asphalt binder for HT mixes. Milling is estimated at \$20 / ton. Granular shoulders are estimated at \$18 / ton. The project’s length is 1.8 miles of which 1.4 will have HMA resurfacing.

Traffic will be maintained on Iowa 141 during the project.

**ESTIMATED COST:**

Grading for pavement widening -----	\$80,000
HMA pavement widening (10 in. HMA / 6 in. special backfill)	\$150,000
PCC pavement dowel bar retrofit and profiling -----	\$170,000
Milling and resurfacing existing HMA surfaces -----	\$480,000
Safety grates -----	\$8,000
Safety ramps -----	\$12,000
Milled shoulder rumble strips -----	\$6,000
Erosion control -----	\$50,000
Clearing and Grubbing -----	\$10,000
	=====
Subtotal -----	\$971,000
Mobilization and Traffic Control (20%) -----	\$194,200
	=====
<b>PROJECT TOTAL</b>	<b>\$1,165,200</b>

Additional right of way will be required.

The Manning Commercial Historic District (14-00750) is located in the project limits. This shall be noted in the plans. The building at 503 Main Street may need vibration monitoring if pavement is removed within 100 ft. of this structure. This building and surrounding infrastructure may have National Register (NR) needs to address as ADA design moves forward.

**FUNDS PROGRAMMED:** This proposed 3R project is a District 3 priority for FY 2021. Following approval of a Final Project Concept a schedule of events for plan development will be determined based on a letting date of December 15, 2020. This project will be consultant designed.

cc:	J. R. Selmer	M. J. Kennerly	K. D. Nicholson
	C. B. Brakke	W. Musgrove	R.A Younie
	S. K. Godbold	M. L. Hobbs	E. J. Engle
	M. J. Sankey	M. Nop	M. A. Swenson
	F. W. Todey	D. E. Sprengeler	Mike Ross
	C. Poole	D. L. Maifield	V. Brewer
	S. S. Neilson	S. P. Anderson	Donna Matulac
	T. D. Hanson	M. Ortiz-Pagan	D. R. Tebben
	D. L. Newell	B. D. Hofer	D. A. Popp
	B. E. Carlson	B. Dolan	D. R. Claman
	J. E. Bartholomew	M. Carlson	M. K. Solberg
	B. Azeltine	J. Laaser-Webb	T. Lazarowicz
	D. Bishop	S. McElmeel	T. Huju
	J. Klemme	D. Schultz	R. Wortman
	M. Thayer	M. Malchow	J. Jepsen
	R. Seward	T. Dibble	R. Gleiser
	K. Johnson	N. Westphal	Roger Larsen
	K. Mulvihill		