



US HIGHWAY 85 EXPANSION: FAST TRACKING THE CENTRAL CORRIDOR FOR BAKKEN OIL AND GAS DEVELOPMENT



Presentation Overview

» Steve Grabill

- » Project Background & Description
- » Project Management & Coordination

» Mike Huffington

- » Environmental Documentation & Mitigation
- » Public Involvement

» Wade Frank

- » Roadway & Bridge Design
- » Mitigation Structures

» Steve Grabill

- » Summary & Lessons Learned

Oil Activity in Western ND

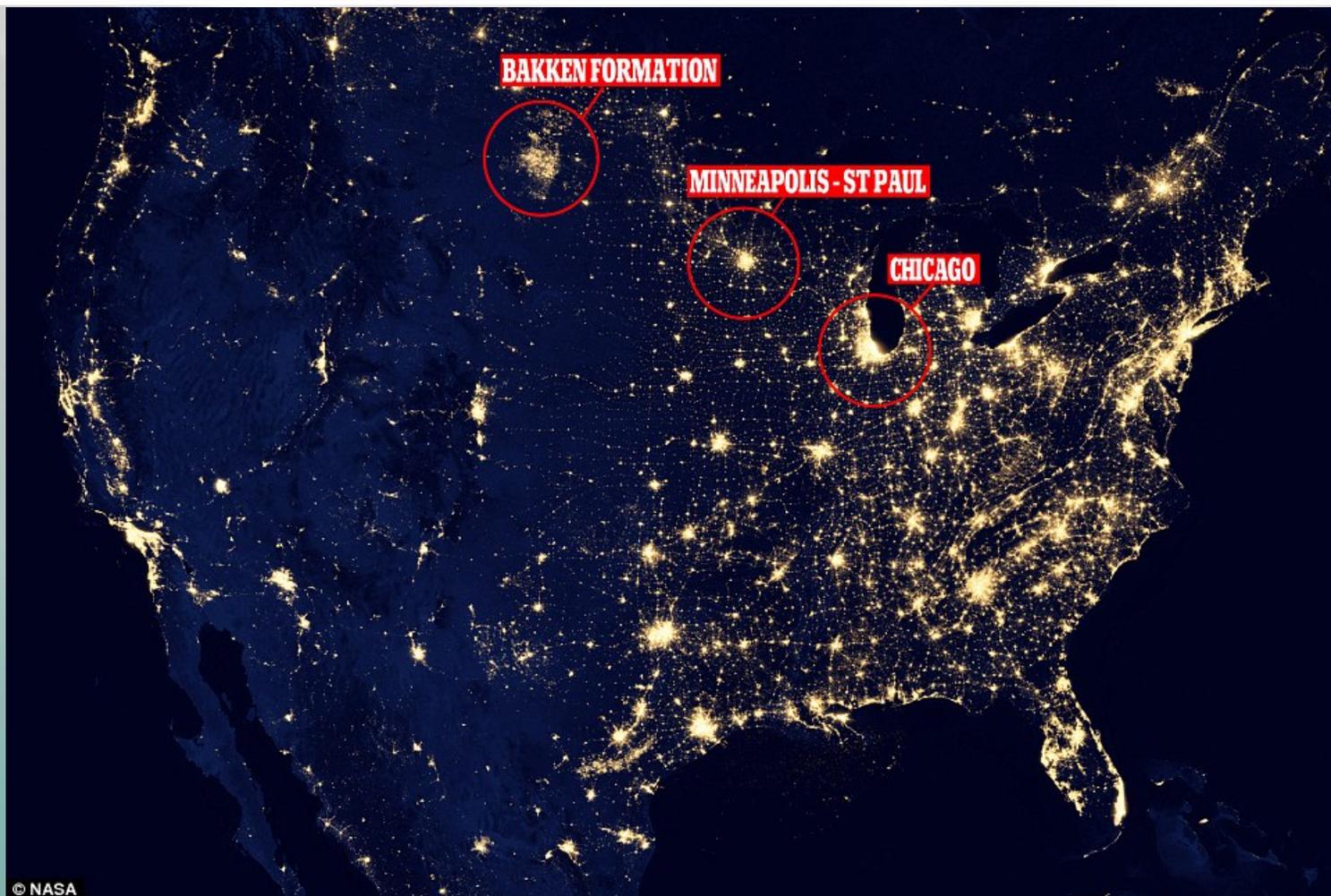
- » First horizontal well in 2004
- » Currently over 16,000 wells
 - » 1.1 million barrels of oil per day
 - » ND became 2nd leading state in oil production behind Texas
 - » 1.1 billion ft³ of natural gas
- » Full development - up to 36,000 more wells
- » Projected 2025 petroleum employment peak at 61,000
- » US 85 from Williston to Watford city
 - » Central corridor for Bakken development

Bakken Map



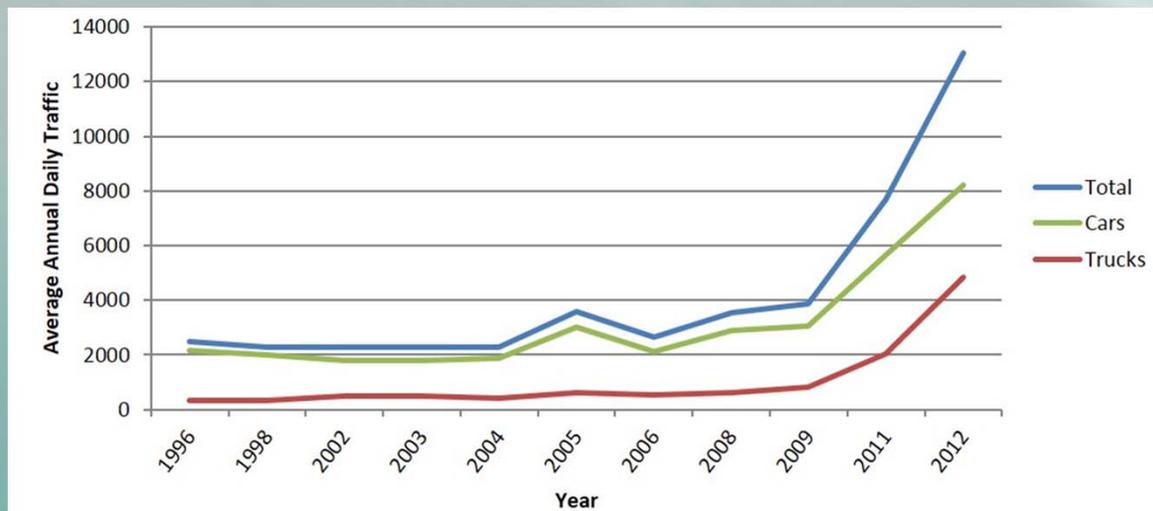
MOLLY QUINN mollyq@spokesman.com

Night View



Reasons for the Project

- » AADT increased from 3800 in 2009 to 17,800 in 2014
- » Projected: 22,000 by 2035
- » 150 truckloads for drilling operations at each well
- » 40% trucks along the corridor



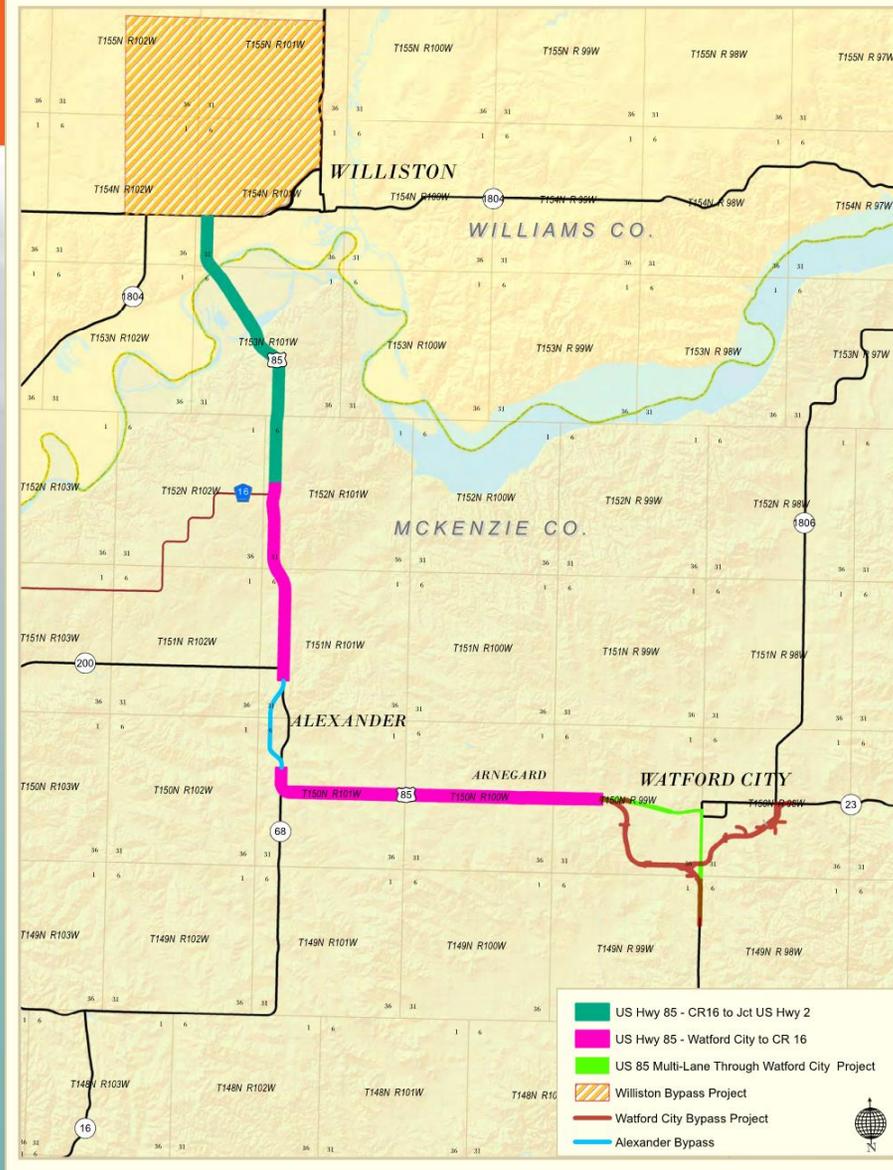
Reasons for the Project

- » Inadequate passing and turn lanes
 - » Slow moving vehicles
 - » Long lines of vehicles form
 - » Increased travel times
- » Safety
- » Congestion
- » Quality of life
- » Parking in urban areas

Projects - Est. \$350 Million Improvements

- » 4-lane US 85
 - » Williston to Watford City (40 miles)
 - » \$186 Million bid for construction
- » Alexander Bypass
- » Watford City Bypass
 - » East and West Bypasses
 - » Potential future interchange
- » Full reconstruction through Watford City
 - » 3 miles of urban roadway
 - » 3-lane section
 - » Potential future roundabouts

Projects





Project Management and Coordination

Fast Track Process Needed

- » Heavy traffic and safety concerns
- » Intense public and political pressure
- » Design-build not an option
 - » Currently not legal in ND on public projects
 - » Minimal benefit since Environmental & ROW were critical path
- » State funds designated
- » MAP-21
 - » Allows design, ROW and environmental concurrently

Scope of Services - All Tasks Concurrent

- » **Environmental Clearance**
 - » Biological Assessments
 - » Environmental Assessments & CATEX's
 - » Wetlands and Cultural Resources
 - » Permitting and Mitigation
- » Public Involvement
- » Bridge and Roadway Design
- » Right of Way
- » Utility Coordination

Consultant Team

- » KLJ
- » Apex Engineering Group
- » Braun Intertec
- » Dakota Appraisal & Consulting
- » FIGG Bridge Engineers
- » Fugro Earthdata, Inc.
- » MFRA
- » Other Specialists

Special Project Manager

- » New position created by NDDOT
 - » Direct access to Department Heads
 - » Streamlined communications
 - » Building key and office
- » Designated fulltime to the project
 - » Responsive to team and client needs
- » Serve as NDDOT's Project Manager
 - » Project filing in NDDOT's FileNet system
 - » Meeting coordination

Senior Management Team



Resource Agency Team



Steve Grabill, PE,
PTOE, LSIT
Special Project Manager



NDDOT
Departments
and Staff

Senior Management Team



Jennifer Turnbow
Environmental Team
Leader



Troy Ripplinger, PE
Highway Design Team
Leader

Apex Team
Matt Kinsella, PE
Design Manager



Wade Frank, PE
Bridge Design Team
Leader

Concrete Bridge
Concepts
Russ Call, PE, SE
Lead Designer

Steel Bridge
Concepts
Michael Marks, PE
Lead Designer



Jim Jung, PLS
Survey Team Leader



Stephen Miller,
SR/WA, AICP
Right-of-Way Team
Leader

Appraisals
Joseph Ibach, MAI
Dakota Appraisals
and Consulting



Mark Anderson, PE
QA/QC and Value
Engineering Team
Leader

Project Management Documents

PROJECT MANAGEMENT PLAN

Project No. 7-085(078)146

PCN 19971

US Hwy 85 – Watford City to Jct US Hwy 2

September 2012

COMMUNICATIONS PLAN

Project No. 7-085(078)146

PCN 19971

US Hwy 85 – Watford City to Jct US Hwy 2

November 2012

Quality Management Plan (QA / QC Procedures)

PROJECT: NH-7-085(078)146

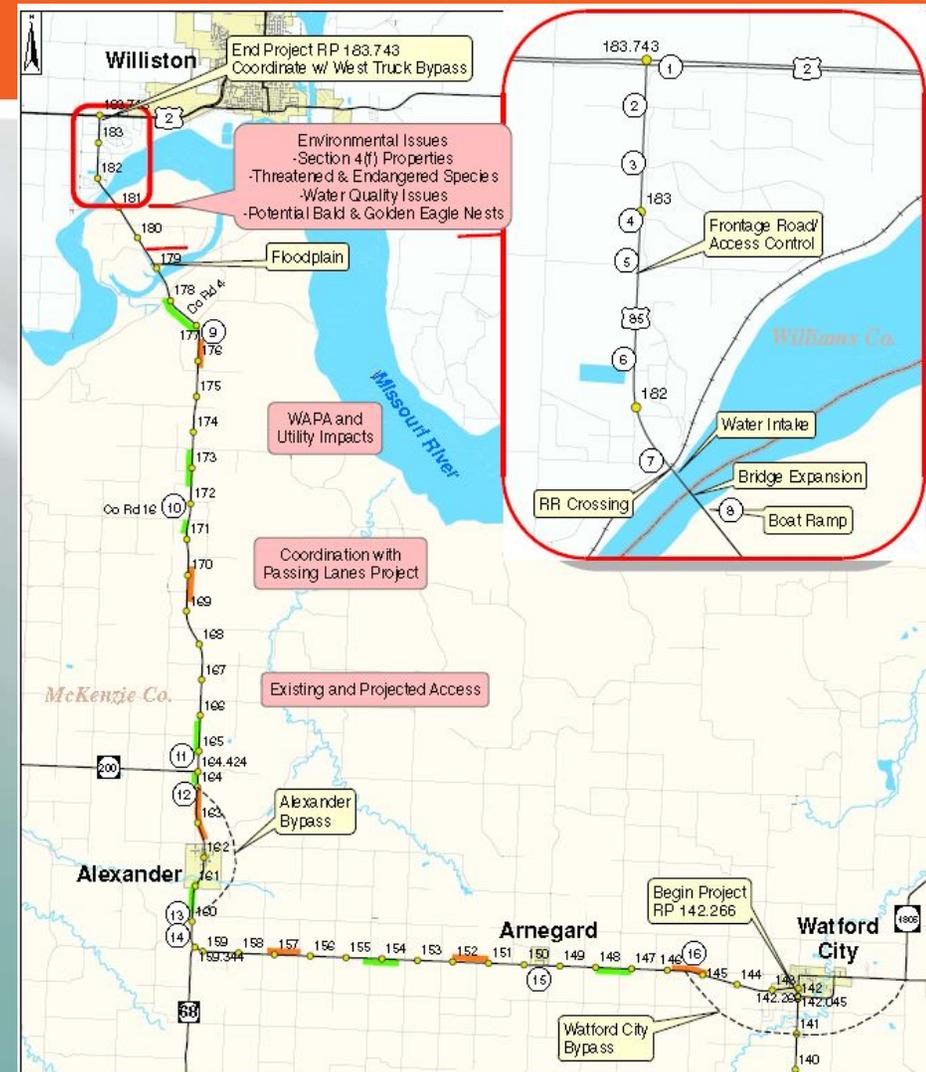
PCN 19971

US Hwy 85 – Watford City to Jct. US Hwy 2

June 2012

Communication Methods

- » Scoping Trip
- » Biweekly progress meetings
- » Agency/permitting meetings
- » Right of way meetings
- » Utility coordination meetings
- » BNSF coordination
- » Decision documents

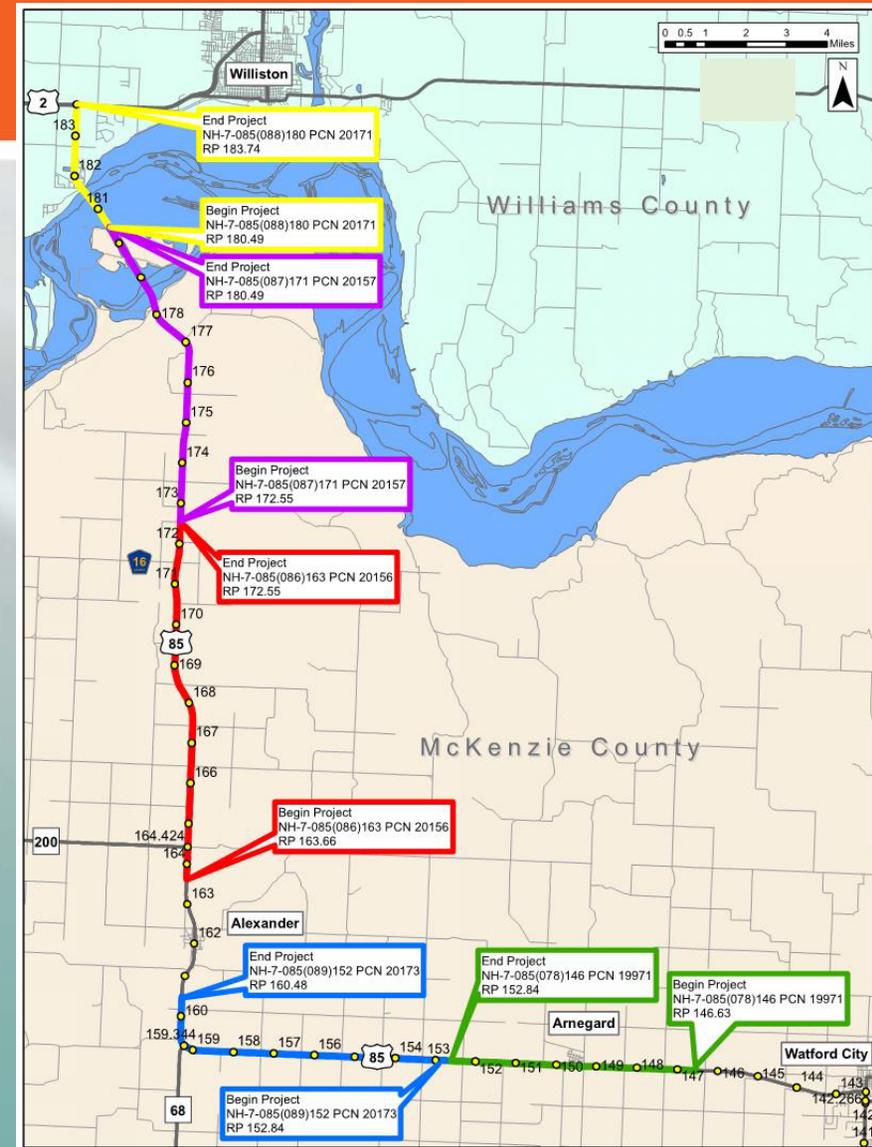


Communication Methods

<i>Project Decision</i>	<i>Decision Type</i>	<i>Date</i>	<i>Impacts Scope or Schedule?</i>
Bridge alignment concepts will be located close to ex. bridge	Minor	8/2/2012	No
EA limits to extend to Hwy 2. Hwy 2 analysis by others	Minor	8/2/2012	No
Submit value engineering scope w/ Phase IV/V Scope	Minor	8/16/2012	No
Only limited geotechnical will be done on ex. Roadway	Minor	8/20/2012	No
Won't redo wetland delineation, only supplement it	Minor	9/26/2012	No
Using available traffic projections for all analysis	Minor	10/1/2012	No
Typical section set with 16 or 20 foot median	Minor	11/1/2012	No
Project limits split at County Rd 16 for EA and PCR	Minor	11/2/2012	No
Decision Document 1 - Construct new 4 lane bridge	Major	12/6/2012	No
Decision Document 2 - Typ. Section, Turn Lanes, Conc. Int.	Major	12/12/2012	No
Bridge Tech Memo - Selection of Conc and Steel Alternates	Major	12/28/2012	No
Decision Document 3 - Bridge aesthetics, sidewalk, lighting	Major	2/21/2013	No
Decision Document 4 - Highway 200 int. traffic control	Major	1/14/2013	No
Decision Document 5 - Wildlife Crossings	Major	4/18/2013	No
Use Narrowed Section for Tree Shelter Belts	Minor	6/10/2013	No
Decision Document 6 - Access North of Missouri River Bridge	Minor	9/3/2013	No
Decision Document 7 - 45th Street Alignment	Minor	9/3/2013	No
Decision Document 8 - Pavement Design	Major	10/1/2013	Yes
Decision Document 9 - Weigh Station Design	Major	12/10/2013	Yes
Change to 3:1 slopes through Segment 4 hills	Major	2/3/2014	No

Fast Tracking Challenges

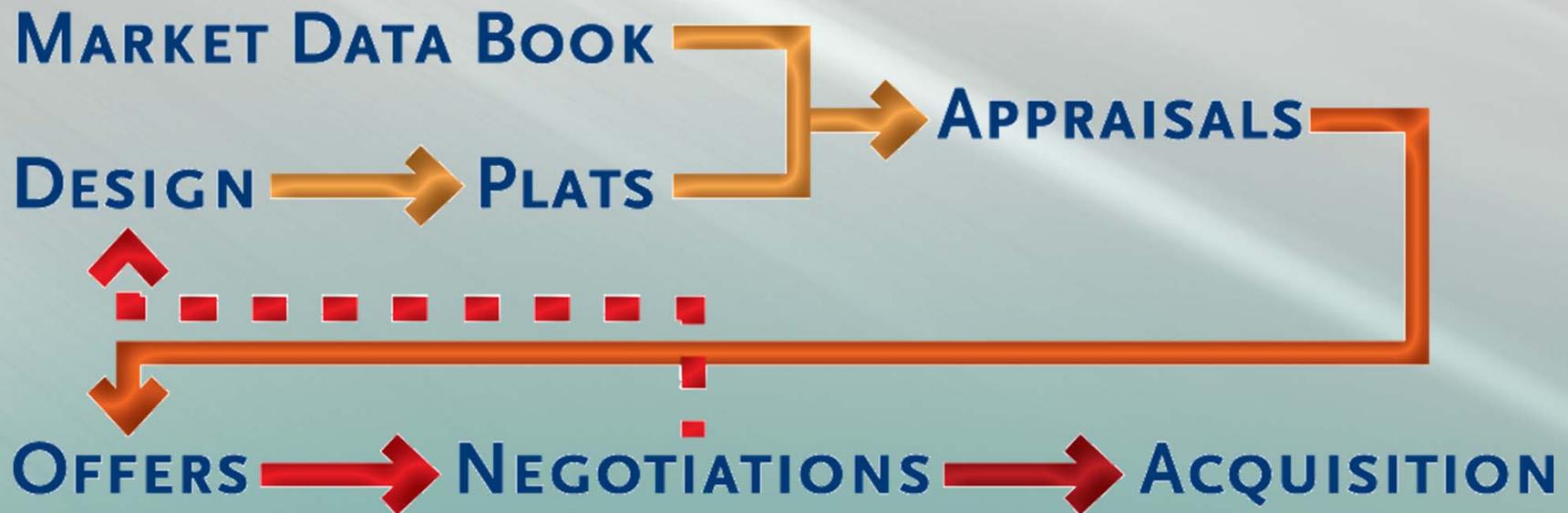
- » Split into 5 Segments
 - » 2 environmental docs
 - » 2 schedules
- » Added features
 - » Weight station
 - » High flow structure
 - » Wildlife crossing
- » Concurrent environmental, design and ROW processes



Fast Tracking Challenges



Fast Tracking Challenges



Fast Tracking Challenges





Environmental & Public Involvement



Environmental Documents

- » Four Environmental Assessments
 - » Watford City Bypass
 - » Alexander Bypass
 - » Williston Bypass
 - » US 85—CR 16 to Junction of US 2 in Williston
- » Two Categorical Exclusions
 - » US 85—Multi-Lane through Watford City
 - » US 85—Watford City to CR 16
- » Five Biological Assessments
 - » Geotechnical investigation



US 85

- » Class of Action initially was EA for whole project
- » Change in Class of Action
 - » Scoping meeting
 - » Two Public Meetings
 - » Field Review
 - » Data Collection/Field Studies
 - » Logical Termini
 - » Independent Utility
- » CAT EX and EA



Challenges

- » Threatened and Endangered Species
- » Wetlands
- » Cultural Resources
- » Wildlife
- » Section 4(f) Properties
- » Numerous State and Federal Agencies Involved

Threatened and Endangered Species

- » Endangered Species
 - » Black-footed Ferret
 - » Gray Wolf
 - » Interior Least Tern
 - » Pallid Sturgeon
 - » Whooping Crane
- » Threatened Species
 - » Piping Plover/Critical Habitat
- » Candidate Species
 - » Dakota Skipper
 - » Sprague's Pipit

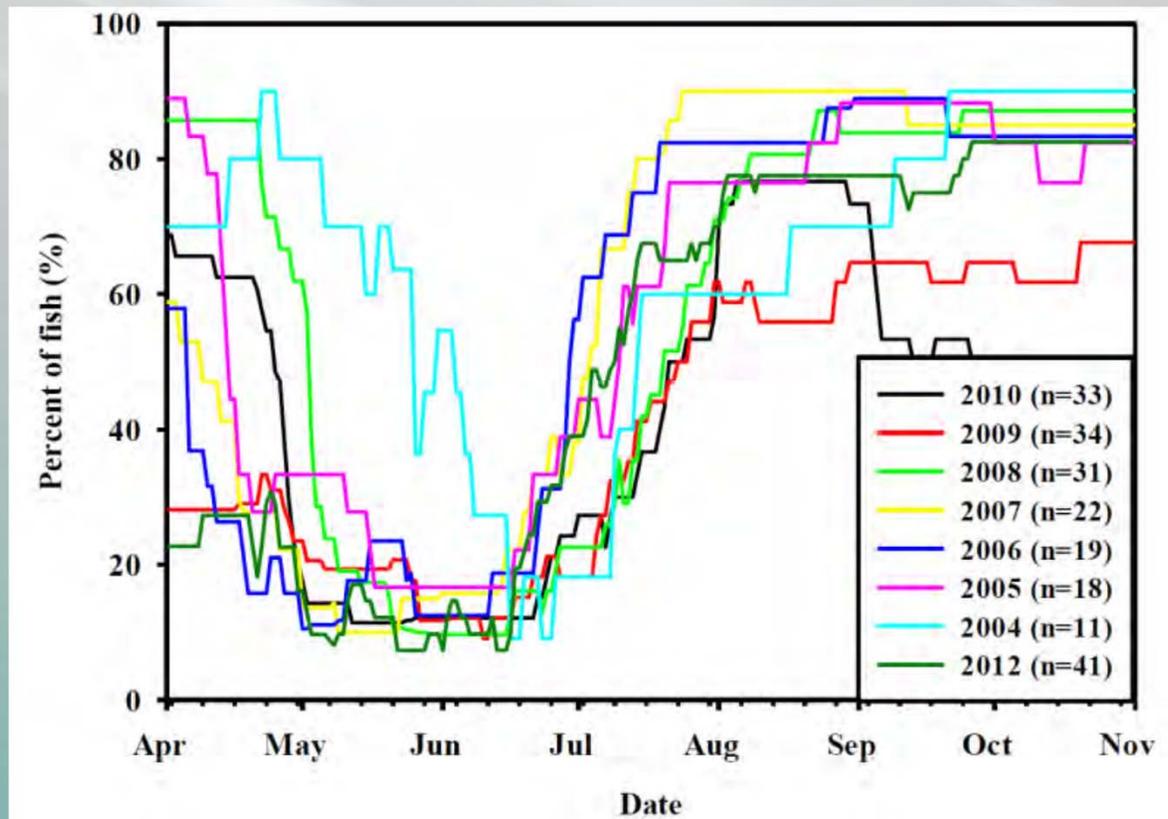


© Richard Kuzminski

Action Area



Traceable, Wild, Adult Pallid Sturgeon within the Missouri River near the Lewis & Clark Bridge



Pallid Sturgeon

- » Biological Assessment
 - » Deconstruction Matrix
 - » Stressors
- » Noise
 - » Percussive impacts from pile driving
 - » Dr. Arthur N. Popper
 - » Hydro acoustic specialist
- » Loss of Habitat
 - » Nutrient and sediment transfer

Tern/Plover Habitat

Exposed Sandbar (Facing Southwest,
5/7/13)



Inundated Sandbar (Facing
Southwest, 5/22/13)



T&E Commitments

- » Highflow structure
- » No work in water April 15st to June 1st
- » Daily Tern/Plover monitoring from April 15th to July 15th
- » Stop work if listed species identified onsite
- » Bird diverters installed on overhead lines
- » Pile driving restrictions
- » No explosives during bridge demolition

Wetlands

- » Permanent impact to 2.89 acres of wetlands
- » Temporary impact to 16.76 acres of wetlands
- » Permanent impact 0.02 acres (53 linear feet) of Missouri River
- » Individual Section 404 Permit and Nationwide 15 Permit acquired



- » Mitigation via onsite wetland creation and high flow structure

Cultural Resources

- » Class III Inventory
- » Pre- and Post- Monitoring Reports
- » Tribal Monitors
- » Special Provisions

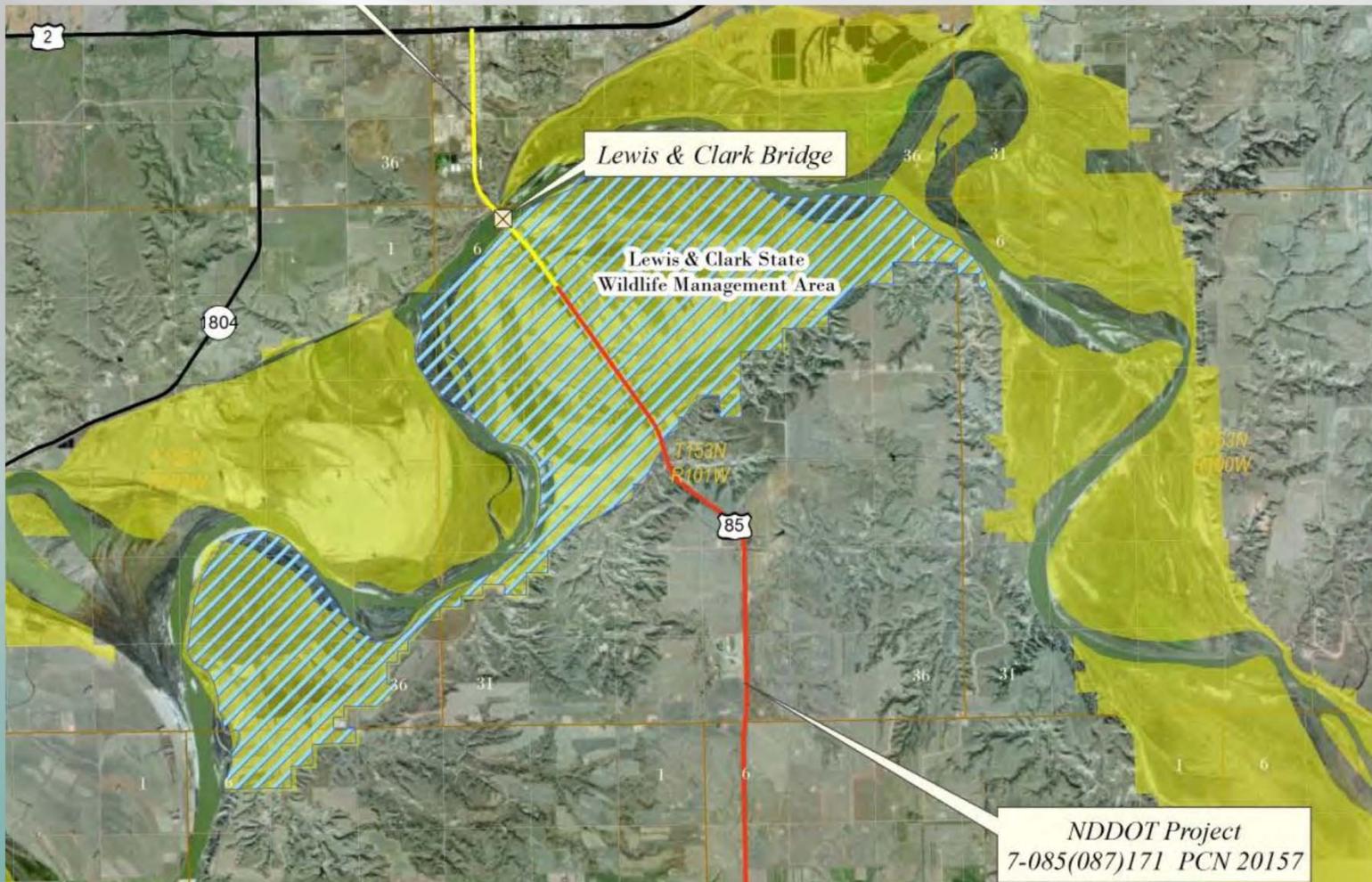


Wildlife

- » Missouri River bottoms major corridor for moose, deer, etc.
- » 60 moose near Lewis & Clark Bridge
- » Habitat fragmentation
- » 2008-2012, NDDOT reported 12 wildlife collisions near this area
- » Mitigation



Section 4(f)—Lewis & Clark WMA



Permits

- » US Army Corps of Engineers
 - » *Section 404 Individual Permit*
 - » *Section 404 Nationwide 15*
 - » *Section 10 Permit*
 - » *Temporary Construction License and Permanent Easement*
 - » *Cut/Fill Balance Approval*
- » US Coast Guard
 - » *Coast Guard Bridge Permit*
- » Environmental Protection Agency
 - » *Vessel General Permit*
 - » *General Permit for Biosolids*
- » North Dakota State Water Commission
 - » *Sovereign Lands Permit*
 - » *Temporary Water Permit*
- » North Dakota Department of Health
 - » *Section 401 Certification*
 - » *Asbestos Notification of Demolition and Renovation*
 - » *North Dakota Pollutant Discharge Elimination System Permit*
- » North Dakota Game and Fish Department
 - » *Special Use Permit*

Agency and Public Involvement

» Weekly Meetings

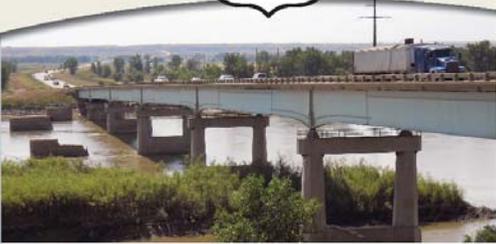
- » FHWA
- » USACE
- » USCG
- » USFWS
- » NDDH
- » NDGF
- » NDDOT
- » NDSWC

» Three Public Input Meetings

» One Public Hearing

» Website

US HIGHWAY
McKenzie County Road 16
to Jct US Highway 2



KLJ

NDDOT
North Dakota
Department of Transportation

Public Hearing
Thursday, December 19, 2013
Open House: 6:00-8:00 pm CDT
Formal Presentation:
5:30 pm CDT
Harrington Inn & Suites
1315 14th Street West
Williston, North Dakota

What is the proposed project?
The proposed project is located in northwestern North Dakota along the US Highway 85 corridor between McKenzie County Road 16 and the junction of US Highway 2 in the City of Williston. The proposed project has been developed to address the purpose and need described below. Specifically, the North Dakota Department of Transportation (NDDOT), in cooperation with the lead federal agency, the Federal Highway Administration (FHWA), and cooperating agencies, the US Army Corps of Engineers and US Coast Guard, is proposing to modify a 12-mile segment of US Highway 85 to create four lanes and replace the Lewis & Clark Bridge over the Missouri River to accommodate four lanes of traffic. An Environmental Assessment (EA) has been produced to analyze potential environmental, social and economic impacts of the proposed project.

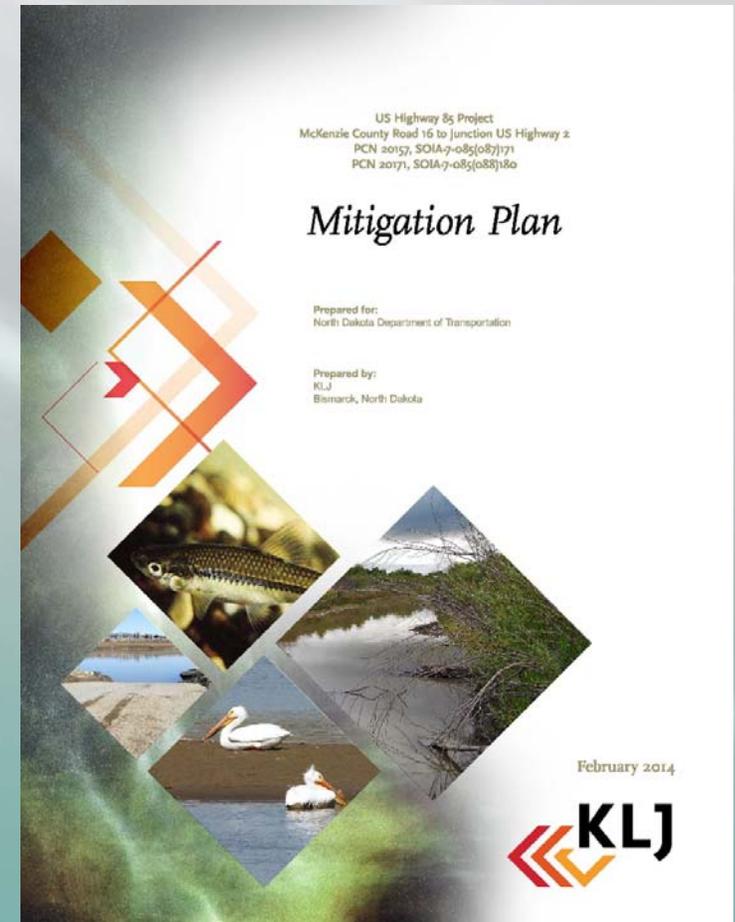
Why is the project needed?
The need for the proposed project is driven by increased heavy truck traffic along US Highway 85 between Walford City and the junction of US Highway 2 near Williston, North Dakota. Roadway improvements are needed to address capacity, transportation demand and system linkage, social demands and economic development, safety and roadway deficiencies.

Agency Coordination

- » Involve agencies early
- » Understand that each agency has their own mission statement
- » Bring ideas to the table
- » Make meetings as efficient as possible
 - » Anticipate potential questions or problems
- » Summarize decisions and obtain concurrence

Commitments & Mitigation Plan

- » Wildlife crossing
- » *Highflow structure*
- » *Clean all equipment and machinery prior to entering USACE property*
- » *Balance cut/fill volumes on USACE property*
- » *Tern and Plover monitoring*
- » *Bird diverters on overhead lines*
- » *Mitigation for upwards of 40,000 trees*
- » *No in-water work from April 15th to June 1st*
- » *Pile driving restrictions*
- » *Daily water quality monitoring*
- » *Preconstruction surveys for migratory birds*
- » *No explosives*
- » *No debris allowed to enter the river during demolition*





Roadway & Bridge Design



Design Criteria and Constraints

- » Salvage existing infrastructure
 - » Recent projects to add turn lanes, passing lanes, etc.
- » 65 mph design speed
- » Maintain traffic during construction (2 lanes)
- » 4-lanes with traffic separated
- » Access control & ROW
 - » Speed of development
 - » Ownership changes
- » Pavement type

Development



Development



Development



Development



Roadway Design Existing Conditions

» Safety

- » Passing and turning
- » Severe crashes including fatalities

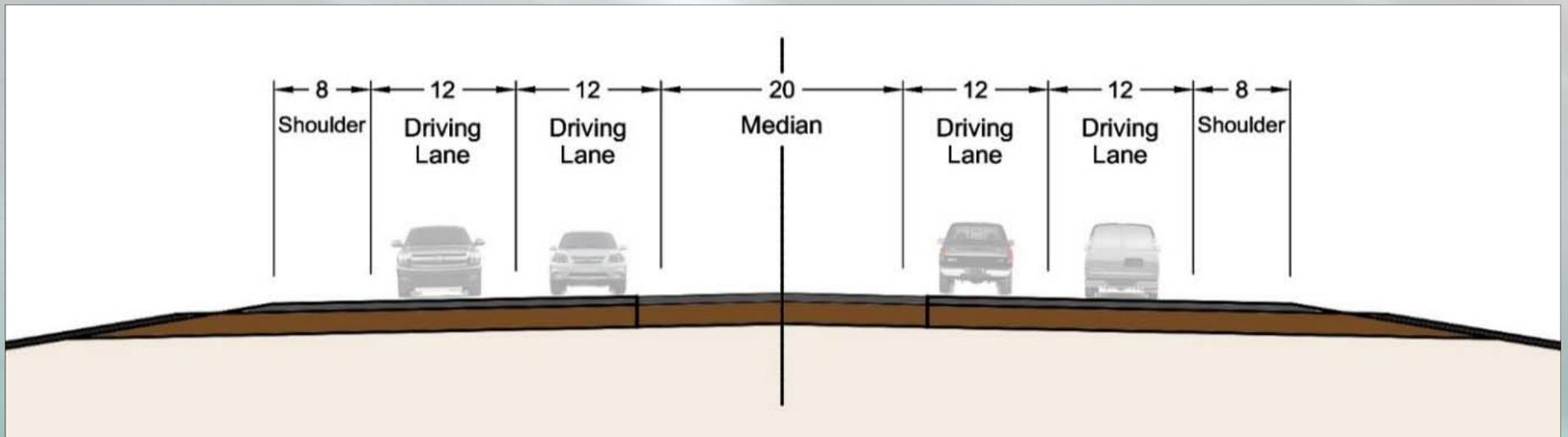
» Roadway deficiencies

- » Excessive rutting
- » Insufficient turn lanes
- » Access points in close proximity to Missouri River Bridge

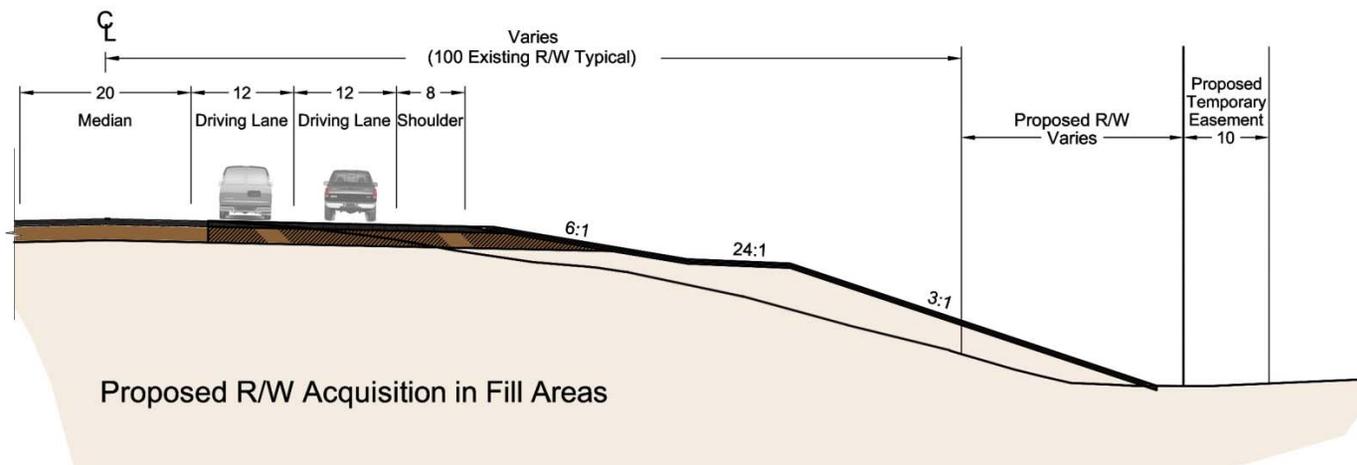
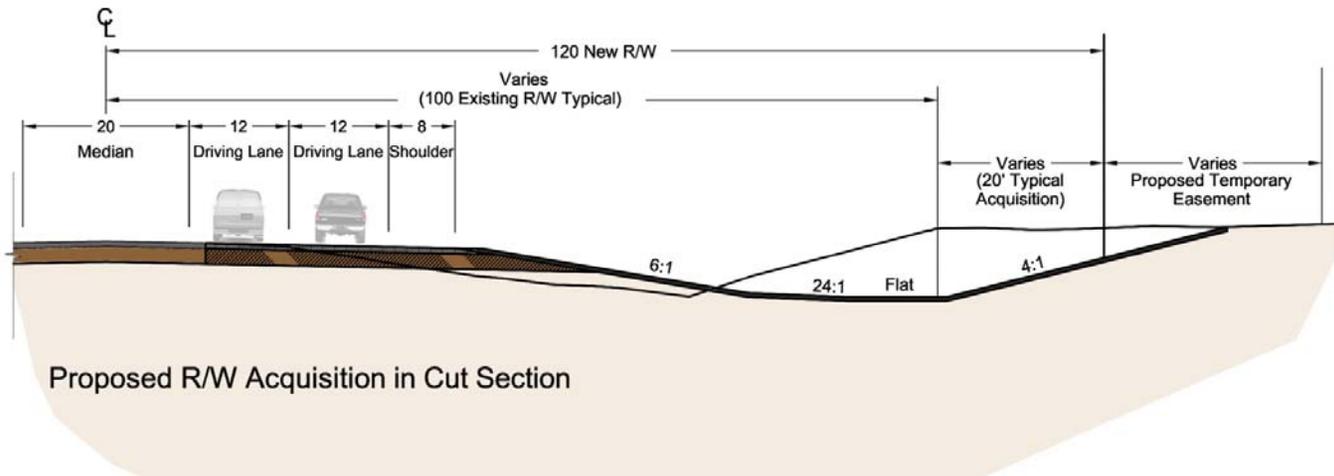
Typical Section

- » Four lanes needed - what type of median?
 - » Divided ruled out early on
 - » ROW impacts
 - » Could not widen and salvage existing infrastructure
 - » Barrier separated
 - » Too many access points
 - » Cost and maintenance
 - » Flush median preferred
 - » 16-foot median with 10-foot shoulders
 - » 20 foot median with 8-foot shoulders

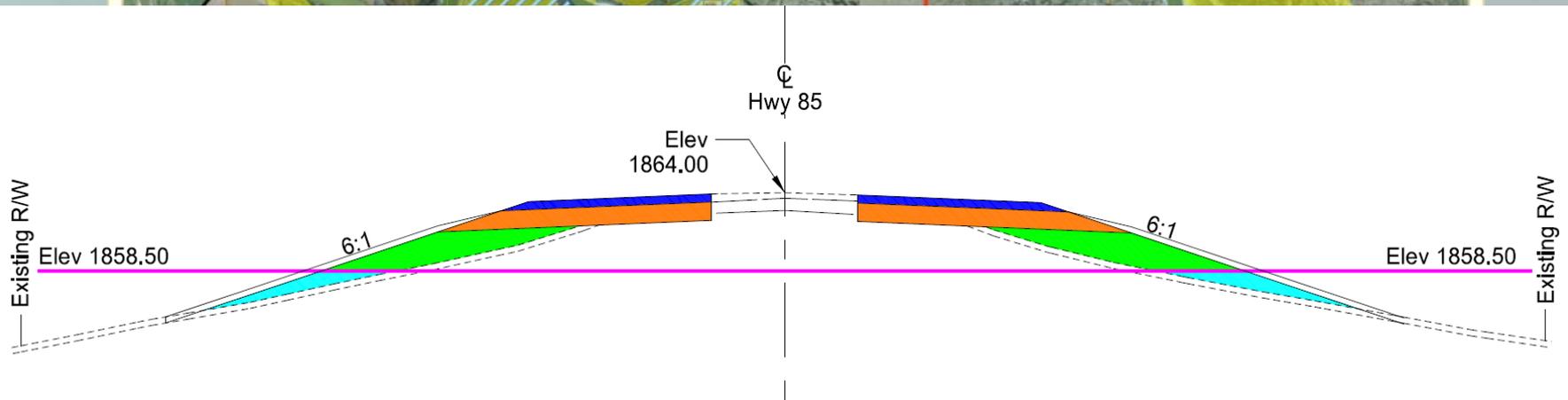
Typical Section



Typical Section



Cut/Fill Balance



Cut/Fill Balance

- » Balance cut/fill volumes within USACE owned lands to ensure no net loss of reservoir storage capacity

USACE ZONE	ELEVATION RANGE (NAVD 29)	CUT VOLUME	FILL VOLUME (IN-PLACE VOLUME)	NET FILL VOLUME PLACED
Zone 1	1837.5–1850.0	1,270 CY	2,750 CY	1,480 CY*
Zone 2	1850.0–1854.0	29,830 CY	13,670 CY	-16,160 CY
Zone 3	1854.0–1858.6	37,750 CY	52,160 CY	14,410 CY
Total Net Volume (Fill):				-1,750 CY

*Not included in total net volume. This excess fill would be balanced offsite in conjunction with a separate

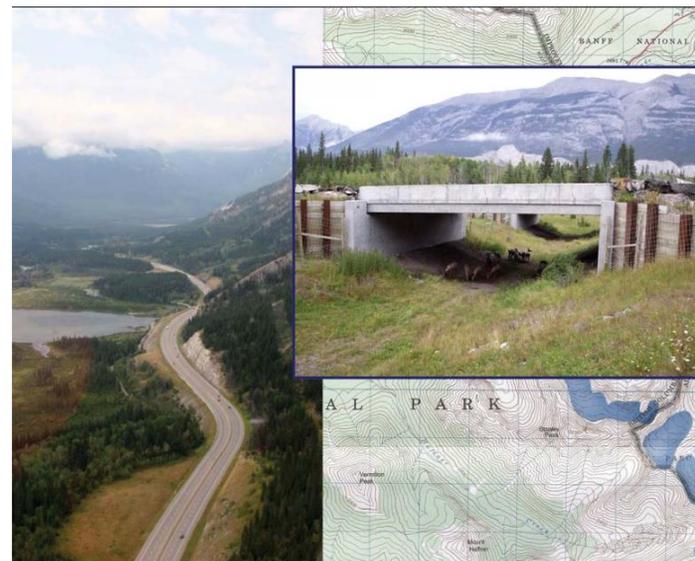
- » Value-engineering Study- 6:1 inslopes to 4:1

Wildlife Crossing

WILDLIFE CROSSING STRUCTURE HANDBOOK Design and Evaluation in North America

Publication No. FHWA-CFL/TD-11-003

March 2011

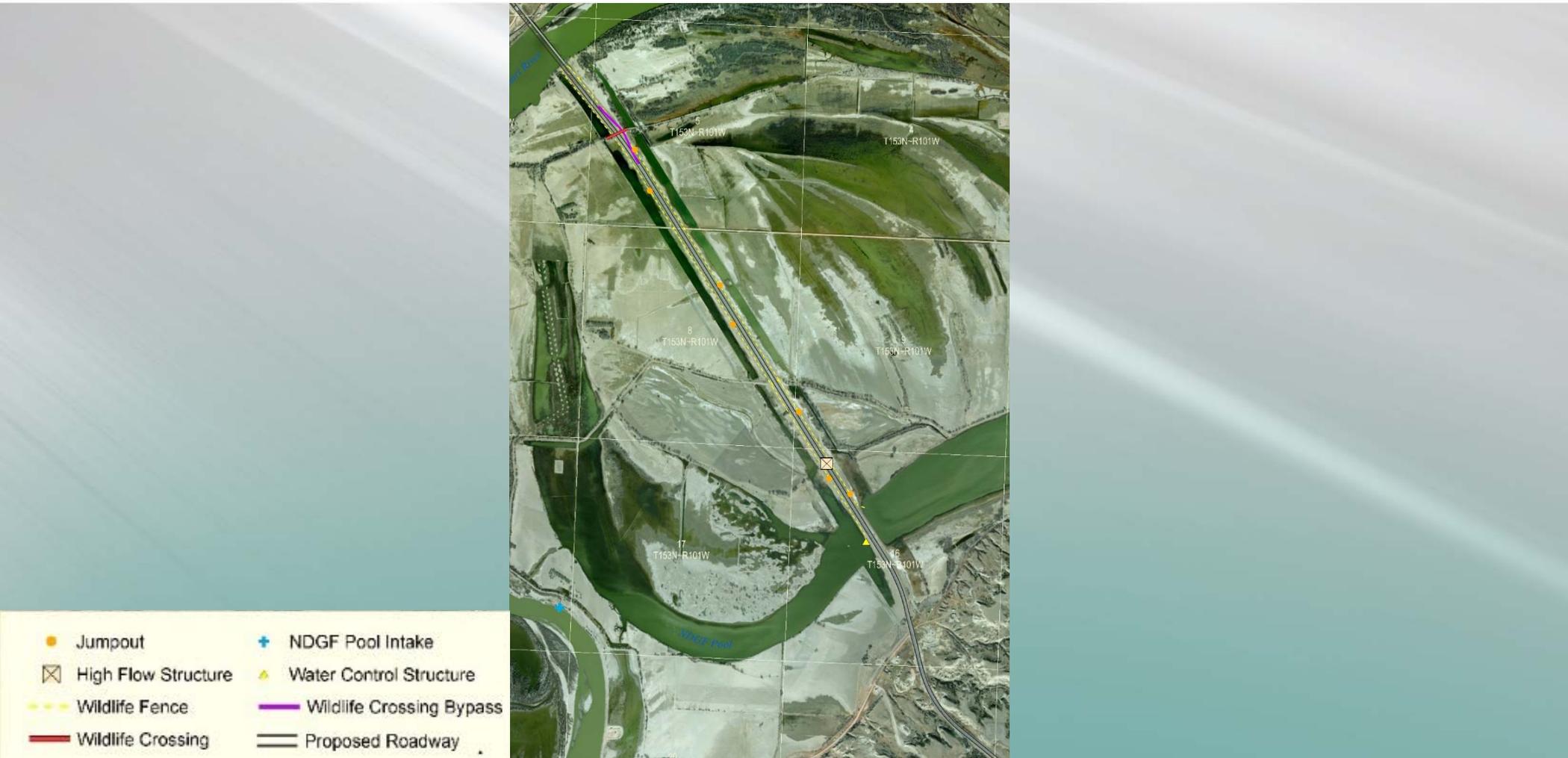


U.S. Department
of Transportation
**Federal Highway
Administration**

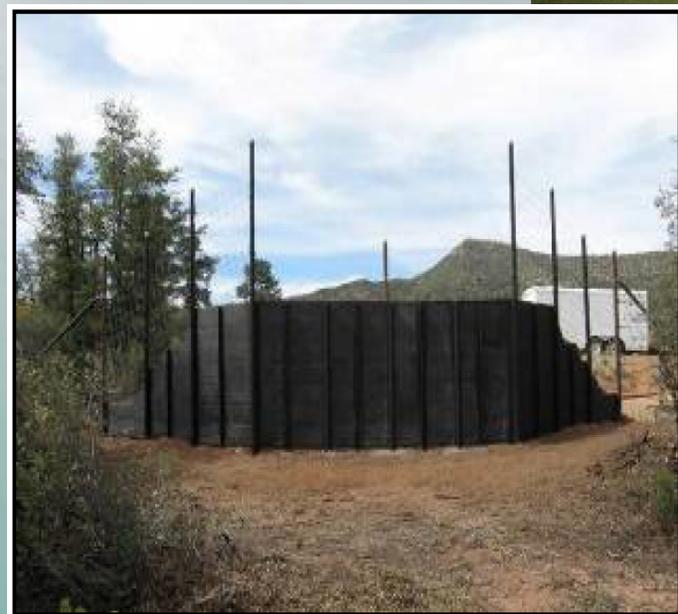


Central Federal Lands Highway Division
12300 West Dakota Avenue
Lakewood, CO 80228

Wildlife Crossing



Details



Missouri River Bridge Site



Existing Bridge



Existing Bridge



Bridge Analysis and Decisions

- » Built in 1973, SR 91.3
- » Initial Inspection
 - » Generally Good Condition
 - » Expansion Joints Failed
 - » Spalling And Deterioration At Abutment Pedestals
 - » Deck Deterioration
 - » Suspected Weld Cracks

Bridge Analysis and Decisions

- » Follow-up Inspection
 - » Overnight Inspection Using Under-Bridge Unit
 - » Longitudinal Stiffeners In Good Condition
 - » Suspected Crack Locations
 - » Verified By Magnetic Particle Testing (Braun Intertec)
 - » Paint Sample Tested
 - » Lead Paint Confirmed

Bridge Analysis and Decisions

» Fatigue Analysis

- » 3-D Finite Element Computer Model
- » Calculated Stresses In Fatigue Prone Details
 - » Historic Traffic Data And Future Traffic Projections
- » Some fatigue life remaining

» Options

- » Rehab and build new 2-lane adjacent
- » Remove and Replace with new 4-lane
- » Cost analysis showed full replacement preferred

Bridge Options

- » Initially pursued alternate designs
 - » Concrete segmental box girder
 - » Steel I-girder
- » Concrete alternate removed due to increased costs related to project decisions

Proposed Bridge Design Criteria

- » Clearance
 - » Navigation
 - » RR
 - » Hydraulics
- » Utilities
- » Water intake
- » Ice loading

Hydraulics

- » Published hydrology outdated
 - » Gage at bridge records stage only
 - » Did not take into account reservoir system influence
- » Developed project specific hydrology
- » US Army Corps Aggradation Study
 - » Water surface during flood events could rise by approximately 7 feet in 75 years
 - » Affected clearance at south end of the bridge

Potential Staging Areas and Temporary Bridges

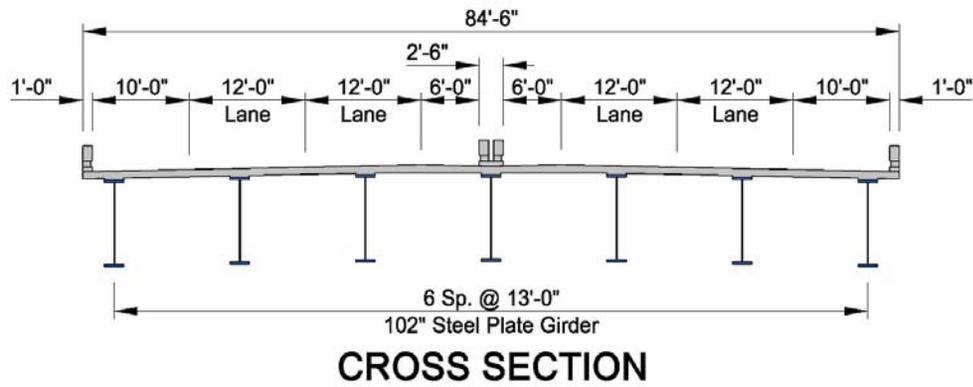
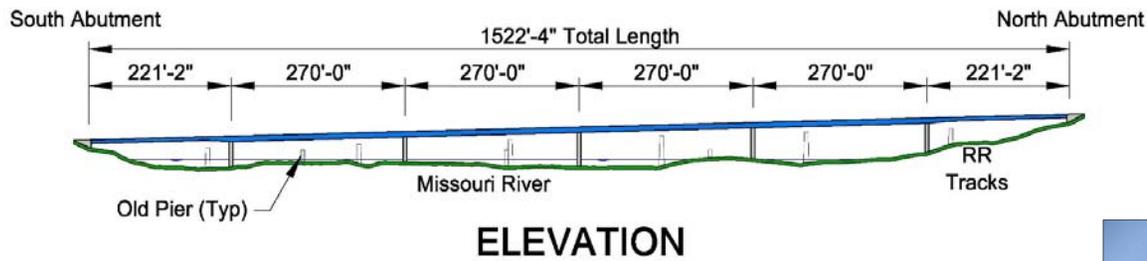


Example Temporary Bridge



Example Temporary Dock

Proposed Bridge





Summary & Lessons Learned



Fast Tracking - What Was the Outcome?

- » Bid first three segments in under one year
 - » Environmental clearances
 - » Corridor designs
 - » Eighteen miles R/W acquisition - both sides
 - » Utility coordination
- » Bid last two segments in under two years
 - » EA and permits
 - » Significant involvement from USFWS, USACE & BNSF
 - » Highway and major bridge design
 - » Eleven miles R/W acquisition - both sides

Fast Tracking - What Was the Outcome?

- » Total bid for all 5 segments - \$186 million
- » First three segments completed in 2014
- » Segment 4 completed in 2015
- » Segment 5 (Missouri River Bridge)
 - » Open to traffic end of 2016
- » Demolition of existing bridge in 2017

Lessons Learned

- » Multi-disciplined PM is effective
- » Facilitate DOT buy-in on critical decisions
 - » Documented decision process
 - » Provide necessary detail for timely decisions
- » Biological Opinion - 135 day “time clock”
- » Define resource agency liaison expectations
- » Assist ROW negotiations through survey
- » Internal & external coordination and communication is essential



Thank You!

