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Musselshell River Floodplain Study – Phase 1

Final Field Reconnaissance and Hydraulic Structure Assessment

Montana DNRC

January 23, 2015

Pioneer Technical Services, Inc. 106 Pronghorn Trail, Bozeman Montana 59718

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Phase 1 Musselshell River Floodplain Study

Field Reconnaissance and Hydraulic Structure Assessment Report

Prepared for:

State of Montana, Department of Natural Resources and Conservation

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Final Field Reconnaissance and Hydraulic Structure Assessment

January 23, 2015

I hereby certify that all work products (maps, reports, etc.) prepared for this project were done so under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Montana.

George E. Austiguy, P.E.

Date: 01/23/15 Montana Registration No. 9528

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1. Introduction

The mainstem of the Musselshell River extends approximately 335 miles from its mouth at Fort Peck Reservoir to the confluence of the North and South Forks of the Musselshell near the town of Martinsdale, Montana. During the spring runoff in 2011, the river significantly flooded with peaks exceeding the 200-year event throughout the watershed. The flood resulted in devastating damages, including significant physical changes to the river channel as documented in the *Musselshell River Flood Rehabilitation River Assessment Triage Team (RATT) Summary Report* (Applied Geomorphology and RATT, 2012) (RATT Summary Report).

The existing floodplain mapping for the Musselshell River includes some detailed, limited detailed, and approximate level study reaches that date back to the late 1970s and early 1980s. In 2013, the City of Roundup and Musselshell County requested assistance from the Montana Department of Natural Resources and Conservation (DNRC) to update their floodplain mapping. The DNRC, in partnership with the Federal Emergency Management Agency (FEMA), the Musselshell River communities, and other stakeholders initiated work to produce new floodplain studies along select reaches of the river. This first phase of the Musselshell River floodplain study(ies) will provide the groundwork for scoping and completing floodplain mapping projects throughout the Musselshell River corridor. This phase of the project is comprised of the following activities:

1. Structure and bathymetric survey for a 10-mile reach near Roundup, Montana;
2. Field reconnaissance and hydraulic structure assessment; and
3. Hydrologic analysis.

This report documents the methodology and results of the field reconnaissance and hydraulic structure assessment activities completed in late August and early September of 2014.

2. Purpose of Investigation

The purpose of this investigation was to collect and organize relevant information for all of the hydraulic structures along the mainstem of the Musselshell River, and to assess each structure's potential to create a floodplain conveyance restriction during flood conditions. The information collected from this investigation will support future floodplain studies along the Musselshell River.

3. Methodology

A detailed review of the study area along the river was performed prior to fieldwork to locate all structures and identify ownership in the study area. Hydraulic structure types and locations were first identified from aerial imagery, and information that was collected from the RATT Summary Report. Each identified structure was assigned an identification code that included either a 'B' for bridge or 'D' for diversion, in addition to a number corresponding to the order of the structure along the stream alignment, beginning at the downstream extent of the study

reach and progressing upstream. A total of 92 structures, including 59 bridge structures and 33 diversion structures, were identified prior to conducting the fieldwork. Extensive coordination with local landowners, communities, county road departments, the Musselshell Watershed Coalition (MWC), the Montana Department of Transportation (MDT), DNRC, and Pioneer Technical Services, Inc. (Pioneer) took place prior to and throughout the fieldwork. A landowner notification process was coordinated by Pioneer, DNRC, and the MWC to request landowner permission to access properties prior to fieldwork. Landowners received two notification letters, one from the MWC and one from Pioneer, describing the purpose of the study and the upcoming fieldwork activities; the letter also provided project contact information to allow landowners to voice concerns and/or ask questions. As a follow-up to the letters, local MWC members made courtesy calls to the landowners approximately 5 to 7 days prior to commencement of the fieldwork. Landowner concerns and instructions were noted and the fieldwork was performed accordingly. Additionally, local county road departments and MDT were sent letters and contacted for the purpose of identifying future construction projects involving changes to road structures and also to obtain structure as-built information. The landowner notification letter, MWC notification letter, MDT letter, and county road department letters and phone log summaries are provided in Appendix A.

Field reconnaissance and structure inventory fieldwork started at the downstream end of the Musselshell River on August 25, 2014 and progressed upstream with completion on September 2, 2014. A total of six bridges were not inventoried due to lack of landowner access permission. In addition, fewer bridges and more diversion structures were discovered during fieldwork than were identified during the planning process, resulting in a total structure inventory count of 87 (53 bridges and 34 diversions) (Figure 1). Pioneer performed the field reconnaissance and structure inventory for all of the structures, with assistance from members of the MWC group and/or local landowners.

The following characteristics were recorded for all inventoried structures: location, type, condition, structure-specific dimensions, material type, and backwater potential. All structure attributes were recorded in an electronic data dictionary within a hand-held Trimble Global Positioning System (GPS). The data dictionary was designed to collect up to 4 span measurements per bridge, or a bridge with a maximum of 3 piers. Each span measurement field was provided an associated description field (e.g., Span 1 and Span 1 Description). Bridge B27 had 11 piers, which exceeded the data dictionary format, so additional span information was stored under the Span 1 Description field as a string (see Appendix B).

Upon completion of the fieldwork, the data dictionary information was transferred from the GPS to an Environmental Systems Research Institute (ESRI) geodatabase. The complete results from the structure inventory, including the data summary tables, structure figures, and photographs are provided in Appendix B.

3.1 Structure Measurements

At each structure, measurements were acquired using a 25-foot tape measure, 200-foot tape measure, measuring wheel, survey rod, and where appropriate, a range finder.

3.1.1 Bridges

The following measurements were typical for bridge structures:

- Span Length(s): Span length was measured between abutments and/or between piers.
- Deck Width: Deck width was measured perpendicular to traffic from the outermost face on the upstream side of the structure to the outermost face on the downstream side of the structure.
- Deck Thickness: Deck thickness was measured from the top of the deck to the low chord of the structure.
- Guard Rail Height: Guard rail height was measured from the top of the guard rail to the top of the deck surface.
- Pier Width: Pier width was measured perpendicular to stream flow at the widest point of the pier.

3.1.2 Diversion Structures

The following measurement was typical for diversion structures:

- Span Length(s): Span length is the distance from one end of the diversion structure to the other, measured perpendicular to stream flow.

Due to unsafe high flow conditions, some of the diversion structure span lengths were estimated in the field using a survey rod for reference or from aerial imagery in ArcGIS, and some of the spans were measured using a range finder.

3.1.3 Culverts

The following measurements were typical for culverts:

- Culvert Length: Culvert length was measured at the maximum horizontal distance from the culvert inlet to the culvert outlet.
- Culvert Height: Culvert height was measured at the maximum vertical height inside the culvert.
- Inlet/Outlet Relative to the Deck: Inlet/outlet relative to the deck was measured vertically from the road deck edge to the top of the culvert inlet/outlet.

3.2 Structure Photographs

In addition to measurements, field personnel took photographs of each structure and the surrounding conditions. Generally, four photographs were taken for bridges and two photographs were taken for diversion structures, including:

Bridges

1) View of the upstream channel taken from on top of the bridge;
2) View of the downstream channel taken from on top of the bridge;
3) View of the bridge looking upstream; and
4) View of the bridge looking downstream.

Diversion Structures

1) View of the structure looking across the channel; and
2) View of the structure looking across the channel with the measuring rod.

3.3 Flow Constriction Assessment

Site and structure conditions were assessed at each location. The study area received significant rainfall a few days prior to the fieldwork resulting in significant stream flows during the fieldwork; these field conditions were beneficial for qualitatively assessing each structure's potential to back up water during flood conditions. The structures were rated "Low," "Moderate" or "High" for backwater potential during the base flood. A "Low" rating represents a structure with little or no floodplain or channel encroachment and has little backwater potential. A "Moderate" rating indicates a structure with a moderate degree of floodplain encroachment such as a slightly elevated roadway embankment or slightly constrictive abutments that reduce flood flow conveyance. "High" rating was assigned to a structure that typically included an elevated road embankment spanning the majority of the floodplain, likely to cause a significant backwater condition. Most of the diversion structures that were inventoried were assigned a "Low" backwater potential as the structures generally did not appear to pose a constriction within the floodplain.

After the 2011 flood, three diversion structures, D9, D12, and D13, are no longer located in direct flow of the main channel of the Musselshell River. Diversion D9 near River Mile 81.7 of the Musselshell Alignment (referred to as the Naderman Diversion in the RATT Summary Report) lies in the pre-2011 river channel, and no longer functions as a diversion structure. Backwater potential for this structure was reported as "Low" because high flood waters could still potentially flow into the pre-2011 river channel and the diversion could create some backwater. The D9 diversion structure is shown in photograph 2014_0826BP of this report and Figures 58 and 59 in the RATT Summary Report. The D12 diversion structure lies in the pre-2011 river channel and has been completely covered by sediment; this diversion structure was reported as 'Other' for backwater potential as the top of the structure was level with the pre-2011 river channel bed, and would not create any backwater.

Due to high flows from the 2011 floodwaters, the river currently flows around one side of diversion structure D13 (referred to as the Egge Diversion in the RATT Summary Report) as shown on Figure 2014_0827AC of this report and Figure 57 in the RATT Summary Report. This structure was given a 'Low' backwater potential rating; during flood conditions, the slightly elevated structure could potentially cause backwater prior to overtopping the channel banks. The RATT Summary Report identified both the D9 and D13 diversion structures as non-

functional. Montana Fish Wildlife and Parks (FWP) is currently coordinating with the landowner to remove the Egge Diversion from the river. Locations for diversion structures D9, D12, and D13 are shown on **Figure 3** and **Figure 4**.

3.4 Musselshell River Reference Alignments

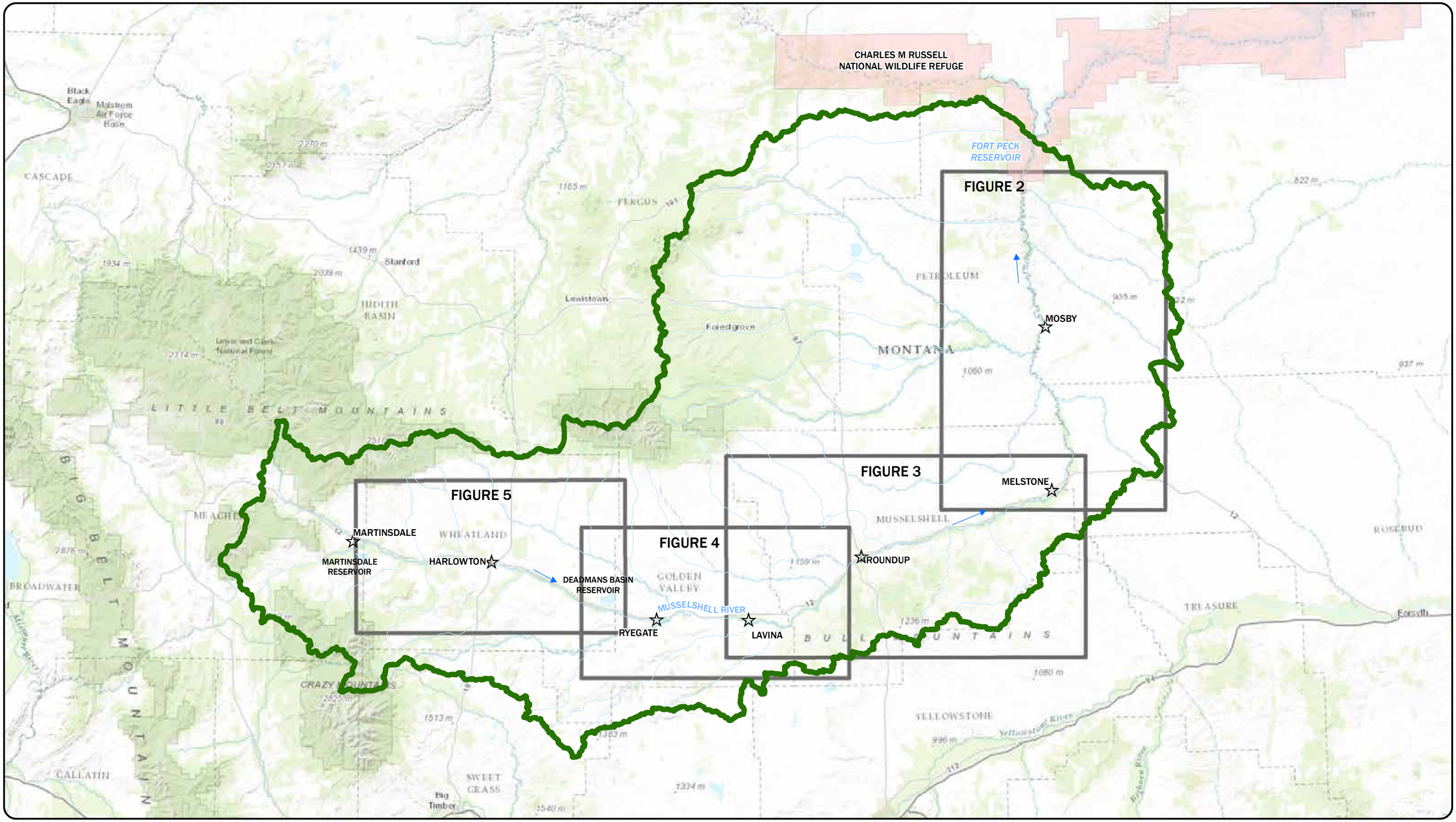
To facilitate future use of the structure inventory and field reconnaissance results in county-based flood mapping projects, the river alignment was organized into four alignments, based on county boundaries. Each alignment name is based on the county in which the Musselshell River resides or directly borders. The four county alignments include:

1. Petroleum/Garfield/Rosebud County Alignment,
2. Musselshell County Alignment,
3. Golden Valley County Alignment, and
4. Wheatland County Alignment.

The alignments were constructed by adjusting the RATT alignment origin to start at the Charles Russell Wildlife Refuge boundary at the downstream end of the study area. The alignment was then partitioned into four segments based on the county boundaries. Note that the RATT alignment was based on the 2011 channel alignment using 2011 NAIP aerial imagery which may depart from previous or future channel locations.

Starting at the Charles Russell Wildlife Refuge boundary, the Petroleum/Garfield/Rosebud alignment runs south (upstream) along the Musselshell River channel until it reaches River Mile 104 just east of Melstone, Montana. This location marks the origin of the Musselshell County Alignment which follows the river channel southwest through Musselshell County and ends where the Musselshell River intersects the Golden Valley County boundary at Musselshell County River Mile 93. The Golden Valley County Alignment begins at this location and follows the river channel west until it intersects the Wheatland County border at Golden Valley River Mile 51. The last alignment in the study reach is the Wheatland County Alignment which originates at the Wheatland County\Golden Valley County border. The Wheatland alignment terminates at the western border of Wheatland County at Wheatland County River Mile 78.

The alignments are displayed on **Figures 2**, **3**, **4**, and **5**.



LEGEND

- TOWN
- MUSSELSHELL WATERSHED
- CHARLES M RUSSELL NATIONAL WILDLIFE REFUGE
- SHEET INDEX
- WHEATLAND ALIGNMENT
- GOLDEN VALLEY ALIGNMENT
- MUSSELSHELL ALIGNMENT
- PETROLEUM/GARFIELD/ROSEBUD ALIGNMENT

N

DISPLAYED AS:
PROJECTION/ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/DNRC/ESRI WORLD TOPO

0 7.5 15 30
Miles

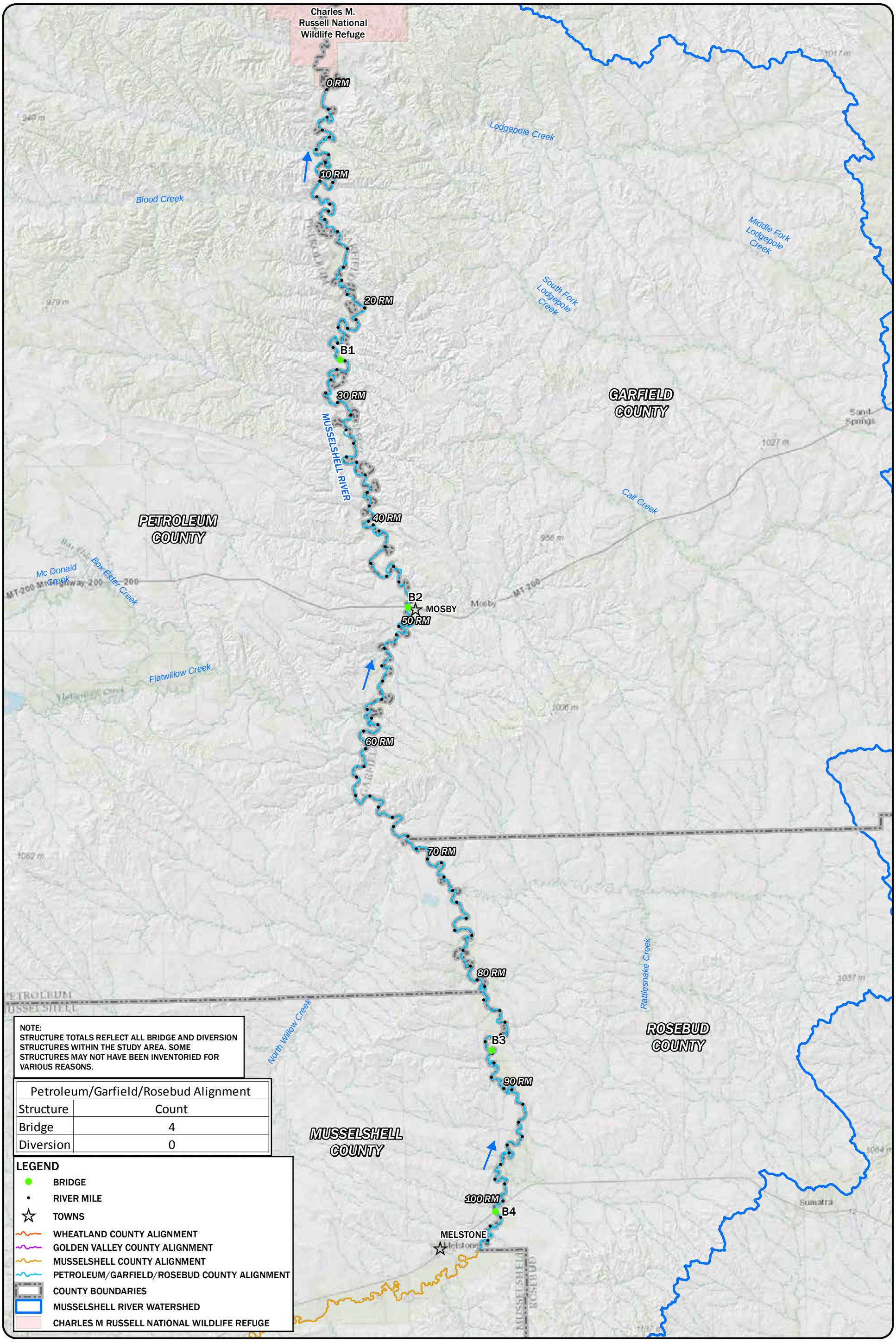
FIGURE 1

LOCATION OF HYDRAULIC STRUCTURES WITHIN THE MUSSELSHELL RIVER WATERSHED

PIONEER TECHNICAL SERVICES, INC.

DATE: 1/22/2015

Path: \\192.168.254.15\project$\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\MslshlFP-GI-StruInv-001-14.mxd



Petroleum/Garfield/Rosebud Alignment	
Structure	Count
Bridge	4
Diversion	0

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/ESRI WORLD TOPO

0 10,000 20,000 40,000
Feet

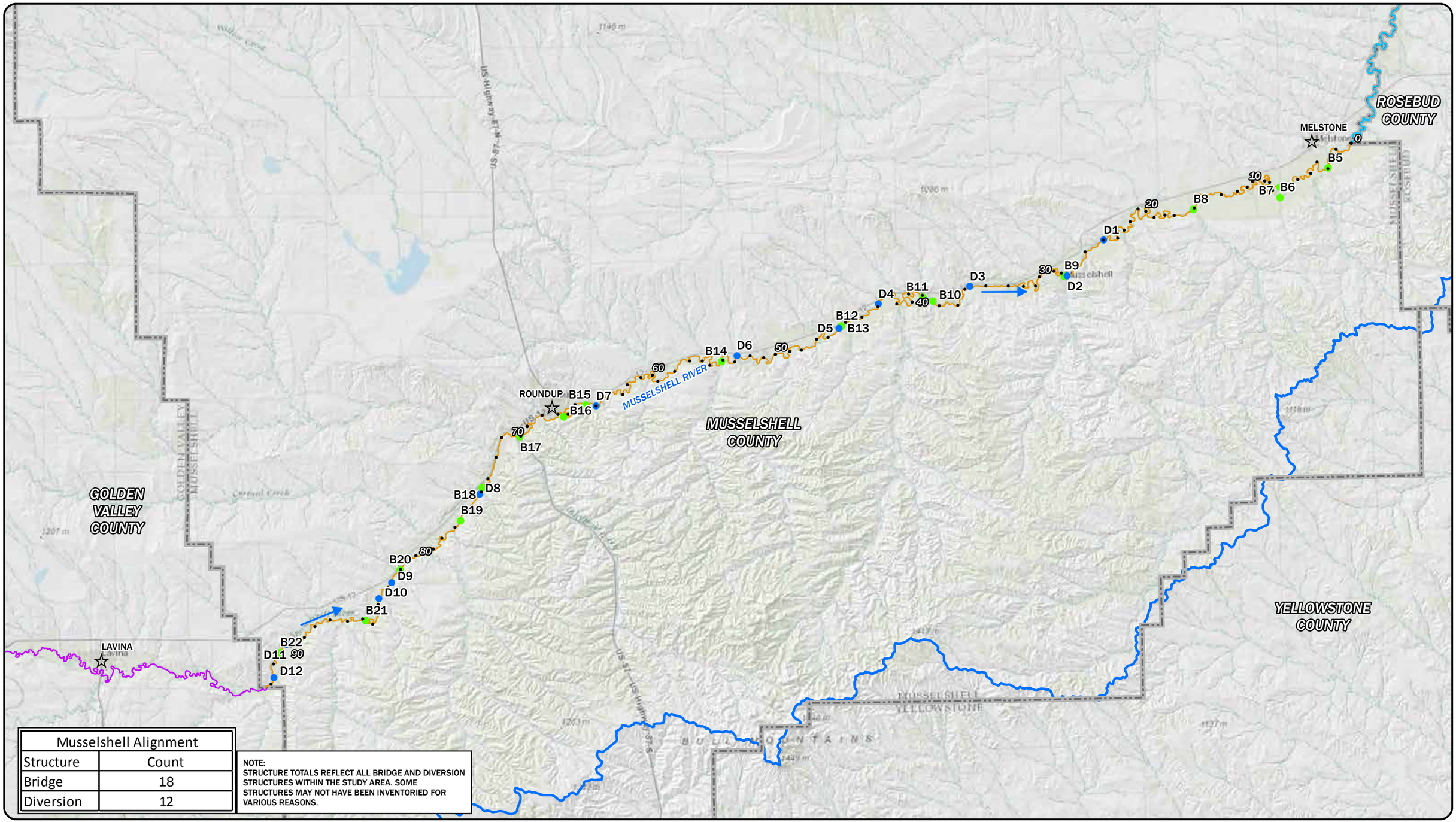
FIGURE 2

PIONEER TECHNICAL SERVICES, INC.

PETROLEUM/ GARFIELD/ ROSEBUD COUNTY ALIGNMENT

DATE: 1/22/2015

Path: \\192.168.254.15\project$\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\MslshlFP-GI-StruInv-002-14.mxd



Musselshell Alignment	
Structure	Count
Bridge	18
Diversion	12

NOTE:
STRUCTURE TOTALS REFLECT ALL BRIDGE AND DIVERSION STRUCTURES WITHIN THE STUDY AREA. SOME STRUCTURES MAY NOT HAVE BEEN INVENTORIED FOR VARIOUS REASONS.

LEGEND

- BRIDGE
- DIVERSION
- RIVER MILE
- TOWNS
- WHEATLAND COUNTY ALIGNMENT
- GOLDEN VALLEY COUNTY ALIGNMENT
- MUSSELSHELL COUNTY ALIGNMENT
- PETROLEUM/GARFIELD/ROSEBUD COUNTY ALIGNMENT
- COUNTY BOUNDARIES
- MUSSELSHELL RIVER WATERSHED

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/ESRI WORLD TOPO

0 10,000 20,000 40,000
Feet

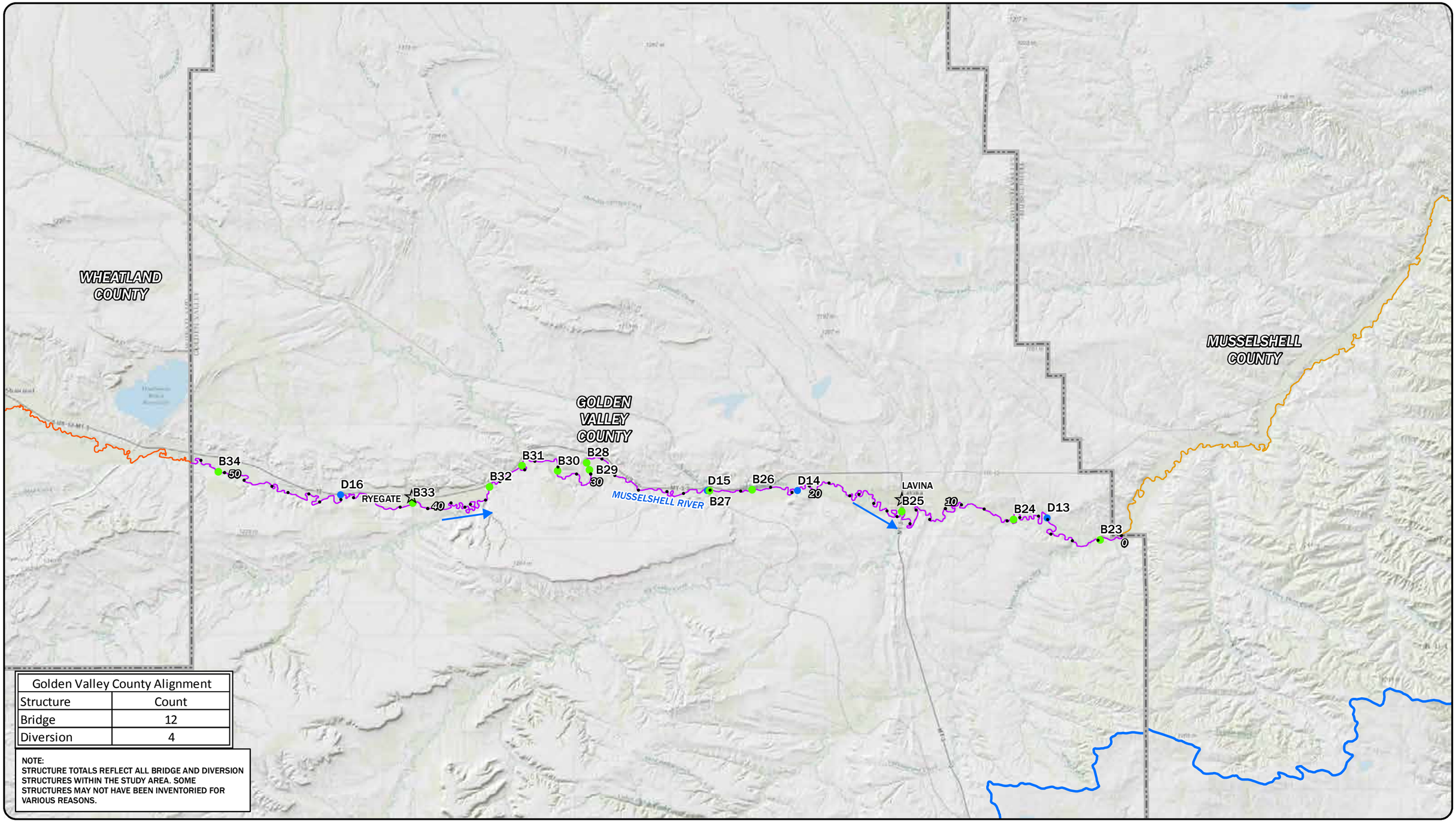
FIGURE 3

PIONEER TECHNICAL SERVICES, INC.

DATE: 1/22/2015

MUSSELSHELL COUNTY ALIGNMENT

Path: \\192.168.254.15\project$\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\MslshlFP-GI-StruInv-003-14.mxd



Golden Valley County Alignment	
Structure	Count
Bridge	12
Diversion	4

NOTE:
STRUCTURE TOTALS REFLECT ALL BRIDGE AND DIVERSION STRUCTURES WITHIN THE STUDY AREA. SOME STRUCTURES MAY NOT HAVE BEEN INVENTORIED FOR VARIOUS REASONS.

LEGEND

- BRIDGE
- DIVERSION
- RIVER MILE
- TOWNS
- WHEATLAND COUNTY ALIGNMENT
- GOLDEN VALLEY COUNTY ALIGNMENT
- MUSSELSHELL COUNTY ALIGNMENT
- PETROLEUM/GARFIELD/ROSEBUD COUNTY ALIGNMENT
- COUNTY BOUNDARIES
- MUSSELSHELL RIVER WATERSHED

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/ESRI WORLD TOPO

0 7,500 15,000 30,000
Feet

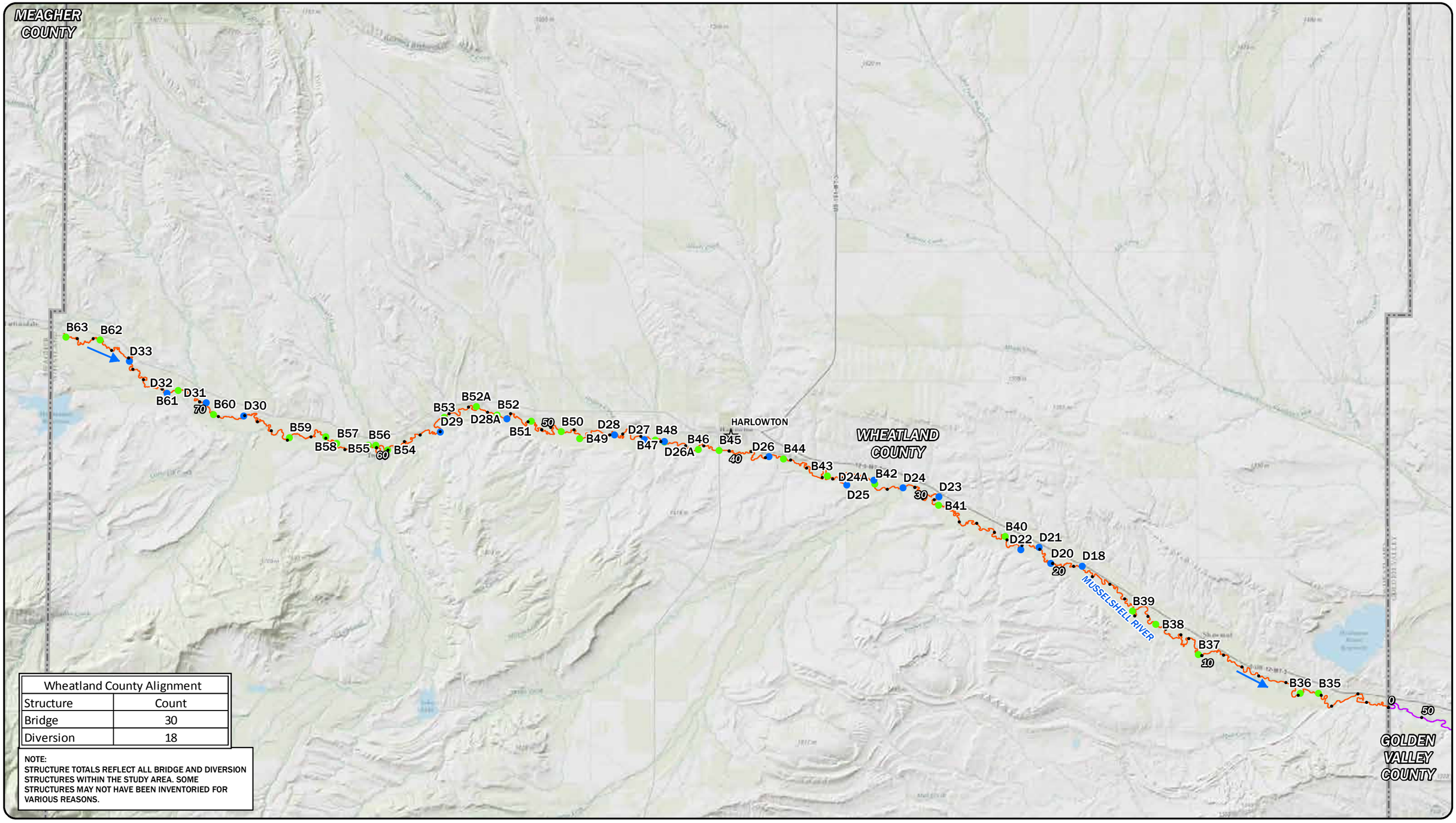
FIGURE 4

PIONEER TECHNICAL SERVICES, INC.

DATE: 1/22/2015

GOLDEN VALLEY COUNTY ALIGNMENT

Path: \\192.168.254.15\project$\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\MslshIFP-GI-StruInv-004-14.mxd



Wheatland County Alignment	
Structure	Count
Bridge	30
Diversion	18

NOTE:
STRUCTURE TOTALS REFLECT ALL BRIDGE AND DIVERSION STRUCTURES WITHIN THE STUDY AREA. SOME STRUCTURES MAY NOT HAVE BEEN INVENTORIED FOR VARIOUS REASONS.

LEGEND

- BRIDGE
- DIVERSION
- RIVER MILE
- TOWNS
- WHEATLAND COUNTY ALIGNMENT
- GOLDEN VALLEY COUNTY ALIGNMENT
- MUSSELSHELL COUNTY ALIGNMENT
- PETROLEUM/GARFIELD/ROSEBUD COUNTY ALIGNMENT
- COUNTY BOUNDARIES
- MUSSELSHELL RIVER WATERSHED

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/ESRI WORLD TOPO

0 7,500 15,000 30,000
Feet

FIGURE 5

PIONEER TECHNICAL SERVICES, INC.

DATE: 1/22/2015

WHEATLAND COUNTY ALIGNMENT

Path: \\192.168.254.15\project$\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\MslshlFP-GI-StruInv-005-14.mxd

4. Summary/Overview

The field reconnaissance and hydraulic structure inventory was conducted for the entire Musselshell River from the confluence of the North and South Forks of the Musselshell near Martinsdale to the Charley Russell Wildlife Refuge boundary near Fort Peck Reservoir. The purpose of this investigation was to collect and assess information for all of the hydraulic structures along the mainstem of the Musselshell River. Information collected from this investigation will support future floodplain studies.

Fieldwork commenced beginning on the downstream end of the river on August 25, 2014, and progressed upstream until completion on September 2, 2014. A total of 87 structures, 53 bridges and 34 diversion structures were inventoried. Structure-specific attributes were collected using an electronic data dictionary within a handheld GPS.

4.1 Backwater Potential

Backwater potential was an attribute collected for all bridges and diversion structures, and each structure was rated by field personnel from 'Low' to 'High' for their potential to create a backwater condition as described in Section 3. **Table 1** summarizes the backwater potential for the inventoried structures.

Table 1. Backwater Potential Summary

Backwater Potential Rating	Inventoried Bridges	Percent of Total (%)	Inventoried Diversion Structures	Percent of Total (%)
High	12	23%	0	0%
Moderate	24	45%	0	0%
Low	15	28%	32	94%
Other*	2	4%	2	6%
Total	53	100%	34	100%

Note: Table reflects all inventoried bridges and diversion structures within the study area. The table does not include structures that were not inventoried.

A total of 12 bridges were rated with a 'High' backwater potential. Typically the high backwater potential structures were abandoned railroad bridges or State\Federal highway bridges with high railroad\roadway grade elevations significantly constricting floodplain conveyance. Forty-five percent of the bridges were rated with a 'Moderate' backwater potential, indicating slightly

elevated road embankments, or abutments with a moderate degree of encroachment. Almost all (94%) of the diversion structures were rated with a 'Low' backwater potential. 'Other' backwater potential was used to describe structures without backwater potential. Bridges and diversion structures that were rated with 'Other' backwater potential include two bridges (B55 and B59) and two diversion structures (D12 and D20). The two bridges and diversion structure D20 had little remains left in place (Partial Structure) and structure D12 was completely covered with deposited sediment. According to the landowner, bridge B58 is no longer present and, therefore, was not inventoried.

4.2 County Reach Structure Inventory

To facilitate future, county-based flood studies, the Musselshell river alignment was organized into four separate alignments based on the county boundary, as described in Section 3. Table 2 shows the number and type of structures associated with each county alignment, as well as the associated backwater potential ratings.

Table 2. Structure Inventory Summary by County

Alignment/ Reach	Total Bridges[1]	Inventoried Bridges	Total Diversion Structures[1]	Inventoried Diversion Structures	Total Inventoried Structures	% of Total Inventoried[2]	Backwater Potential Rating			
							High	Moderate	Low	Other[3]
Petroleum/ Garfield/ Rosebud	4	4	0	0	4	5%	1	3	0	0
Musselshell	18[4]	14	12	12	26	30%	3	7	15	1
Golden Valley	12[5]	9	4	4	13	15%	4	3	6	0
Wheatland	30[6]	26	18	18	44	51%	4	11	26	3
Total	64	53	34	34	87	100%	12	24	47	4

[1] Total structures within study area along the mainstem Musselshell River.
[2] Percent of inventoried structures for each county reach.
[3] 'Other' Backwater Potential denotes no backwater potential.
[4] Four bridges are addressed under the Detailed Structure Survey Report and were not inventoried.
[5] Three bridges were not inventoried due to denied landowner access.
[6] Four bridges were not inventoried; three due to denied landowner access and one no longer exists.

The Petroleum/Garfield/Rosebud County reach has the fewest (5%) hydraulic structures of the 4 county reaches. Three of the four bridges, were rated with 'Moderate' backwater potential. Highway 200 bridge (B2) was rated with 'High' backwater potential. The structures were generally high profile bridges in fair to good structural condition.

The Musselshell County reach begins 104 river miles upstream of the Charles Russell Wildlife Refuge where the Petroleum/Garfield/Rosebud County Alignment terminates. This reach contains 18 bridges and 12 diversion structures. Four of the 18 bridges in Musselshell County were part of the Musselshell River Floodplain Study Phase 1 Detailed Structure and Bathymetric

Survey Report; therefore, they were not inventoried and were not assigned with a backwater potential. The four survey bridges (B15-B18) are shown in **Figure 3.**

Musselshell County includes the second highest number of structures of the four county reaches. Fifty percent (50%) of the bridges were rated with 'Moderate' backwater potential, with 4 having 'Low' backwater potential, and 3 with 'High' backwater potential. The majority of bridges in this reach were found to be in fair to good structural condition, with two bridges in poor condition.

The Golden Valley County reach originates where the Musselshell County reach terminates and includes a total of 12 bridges and 4 diversion structures. Landowner access to three of the bridges (B28, B29 and B30) was denied; therefore, they were not inventoried, but are included in the total number of bridges in Golden Valley County and are included in **Table 2**.

Within the Golden Valley County reach, the majority of the bridges were rated as 'High' or 'Moderate' backwater potential due to elevated road or railroad grades spanning the floodplain. Five of the bridges were abandoned railroad bridges deemed to be in fair structural condition. All of the diversion structures located along the Golden Valley County Alignment were in good structural condition and assigned 'Low' backwater potential. Diversion structure D13 was damaged from the 2011 flood waters, and the river channel currently flows around one side of the structure. This structure was deemed 'non-functional' in the RATT Summary Report. All of the Golden Valley Alignment structures are shown on **Figure 4**.

The Wheatland County reach originates where the Golden Valley County alignment terminates and contains the greatest number (51%) of inventoried hydraulic structures of the four county reaches. A total of 30 bridges and 18 diversion structures are located within the Wheatland County reach. Three of the bridges (B40, B51 and B63) were denied access and therefore were not inventoried. Bridge B58 has been washed out according to the landowner (firsthand conversation with the inventory staff) and no longer exists; therefore, this bridge was not inventoried. These non-inventoried bridges are included in the total number of bridges for Wheatland County shown in **Table 2.**

Most of the Wheatland County bridges were assigned 'Moderate' to 'High' backwater potential ratings and were in fair to good structural condition. Three private bridges (B55, B58, and B59) were assigned 'Other' backwater potential denoting no backwater potential. Bridges B55 and B59 had little remains left in place, and field personnel were told directly by the landowner that bridge B58 was non-existent. As shown on **Figure 5**, the missing bridge locations are within a 4-river mile stretch of one another, and are approximately 20 river miles upstream from the town of Harlowton, Montana.

Within Wheatland County, diversion structures were rated with 'Low' backwater potential and were in good structural condition. Three diversion structures (D20, D28A, and D32) were found to be in poor structural condition, as the large rocks comprising the structures had been washed

downstream. These structures are spaced approximately 20 to 30 river miles apart along the 79-mile reach as shown on **Figure 5**.

The river segment between structures D9 and B25 (the river reach near the shared border of Musselshell County and Golden Valley County, upstream of the town of Roundup) was found to have a high density of structures damaged from flood flows and consists of structures that could potentially cause significant backwater. This area includes damaged diversion structures (D9, D12, and D13) and consecutive bridges (B22 through B25). These structures were assigned a 'High' backwater potential rating.

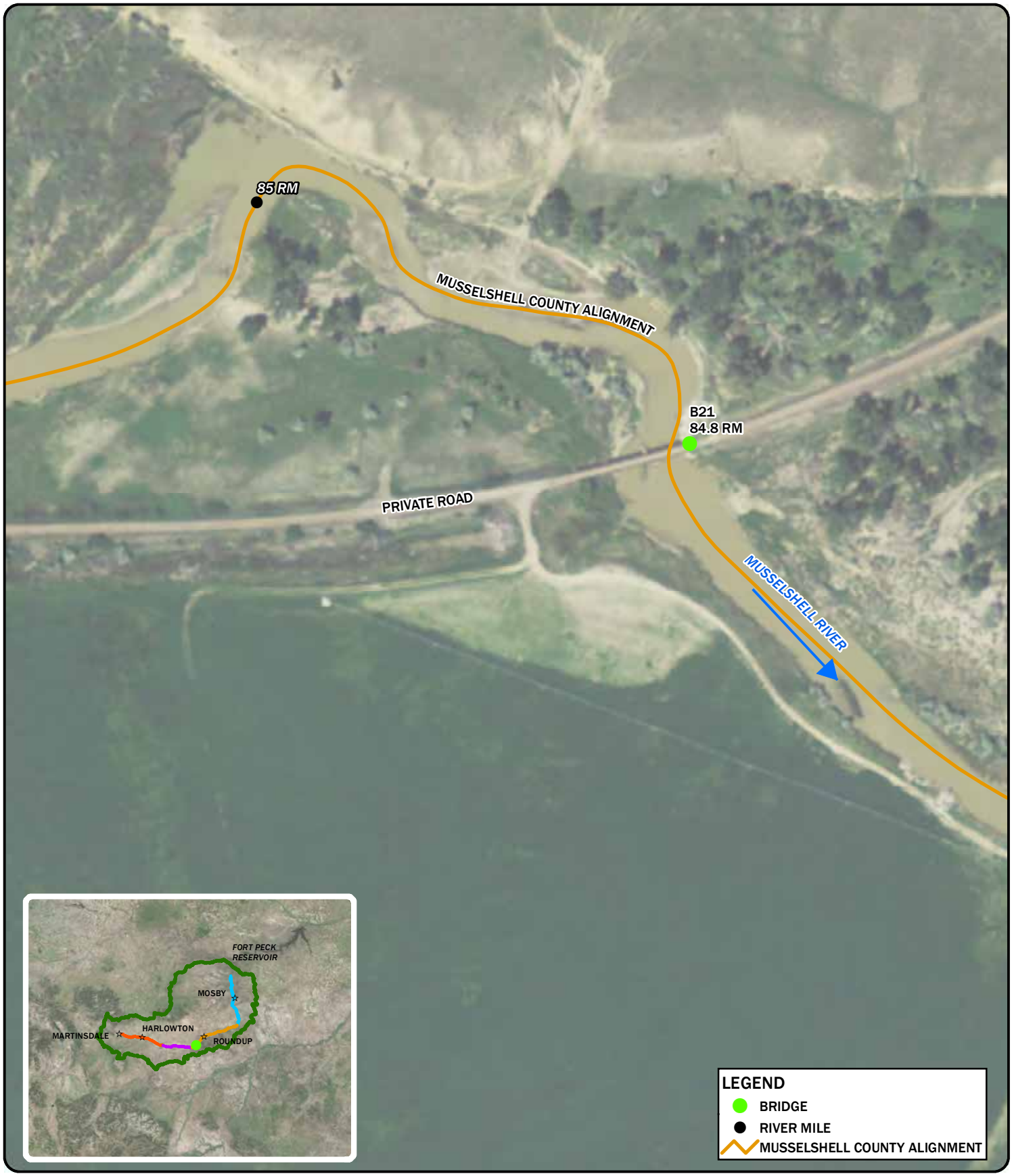
4.3 Supporting Information

All landowner, county, and MDT notification letters and call log summaries are provided in **Appendix A**. The structure inventory data are presented in **Appendix B**, and raw field data recorded in logbooks are provided in **Appendix C**. As discussed previously, there were various reasons for identified structures that could not be inventoried or have missing information in **Appendix B**. Structure as-built information and additional remedial structure plans obtained from local county road departments and from the MDT is provided in **Appendix D**. Low elevation aerial photographs of diversion structures are provided in **Appendix E**.

4.4 Project GIS Database

In addition to this report, a project ESRI GIS database has been constructed as a digital work product. Following completion of fieldwork, the structure attributes were transferred from the field GPS and stored in an ESRI geodatabase. The geodatabase provides a spatial view of the structures, and includes all structure attributes and photographs collected during inventory as well as additional supporting information. After importing the data into ArcGIS or other GIS software, the IDENTIFY tool may be used to display attributes for each structure.

Within the GIS database, photographs and aerial views of the structures are provided in an attached PDF file. An example PDF for bridge structure B21 is shown in **Figure 6** and **Figure 7**.



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE 6

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B21

DATE: 1/22/2015

Path: \\192.168.254.15\project$\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\MslshlFP-GI-StruInv-006-14.mxd

	Photo Number: 2014_0826BR
	Date: 8/26/2014
	Description: Looking downstream at B21 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0826BS
	Date: 8/26/2014
	Description: Looking downstream from B21 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

5. References

Applied Geomorphology and RATT, 2012. Musselshell River Flood Rehabilitation River Assessment Triage Team (RATT) Summary Report.

Appendix A. Notification Letters and Logs

Engineering and Environmental Services

August 2014

Dear Landowner along the Musselshell River,

We are writing to inform you that the Montana Department of Natural Resources and Conservation (DNRC) has hired our firm to complete a bridge and diversion structure inventory, and survey work along the Musselshell River. The work will ultimately help to update and increase the accuracy of the floodplain mapping along selected reaches of the Musselshell River. The scope of our field work is to survey channel cross sections approximately every 1,000 feet for a 10-mile reach of the Musselshell River near Roundup, and to collect basic information on bridges and diversion structures (hydraulic structure inventory). The hydraulic structure inventory will cover the entire 335 mile extent of the Musselshell River main stem, from its mouth at Fort Peck Reservoir to the confluence of the North and South Forks of the Musselshell near the Town of Martinsdale (area noted in the image below).

We are sending you this courtesy notice because you have been identified as a landowner along the river channel in the study area. We will have survey personnel conducting the work between August 25, 2014 and October 3, 2014. We plan to survey or collect information approximately 50 feet beyond the water's edge at each cross-section, bridge, or diversion structure. A representative from MWC or DNRC will call you 5 to 7 days prior to our field staff accessing your property. If you do not wish for our survey personnel to enter your property, please notify us using the contact information below. If you do not have a telephone land line and would like to be contacted on your cell phone or via email, please provide that contact information to the project contacts listed below.

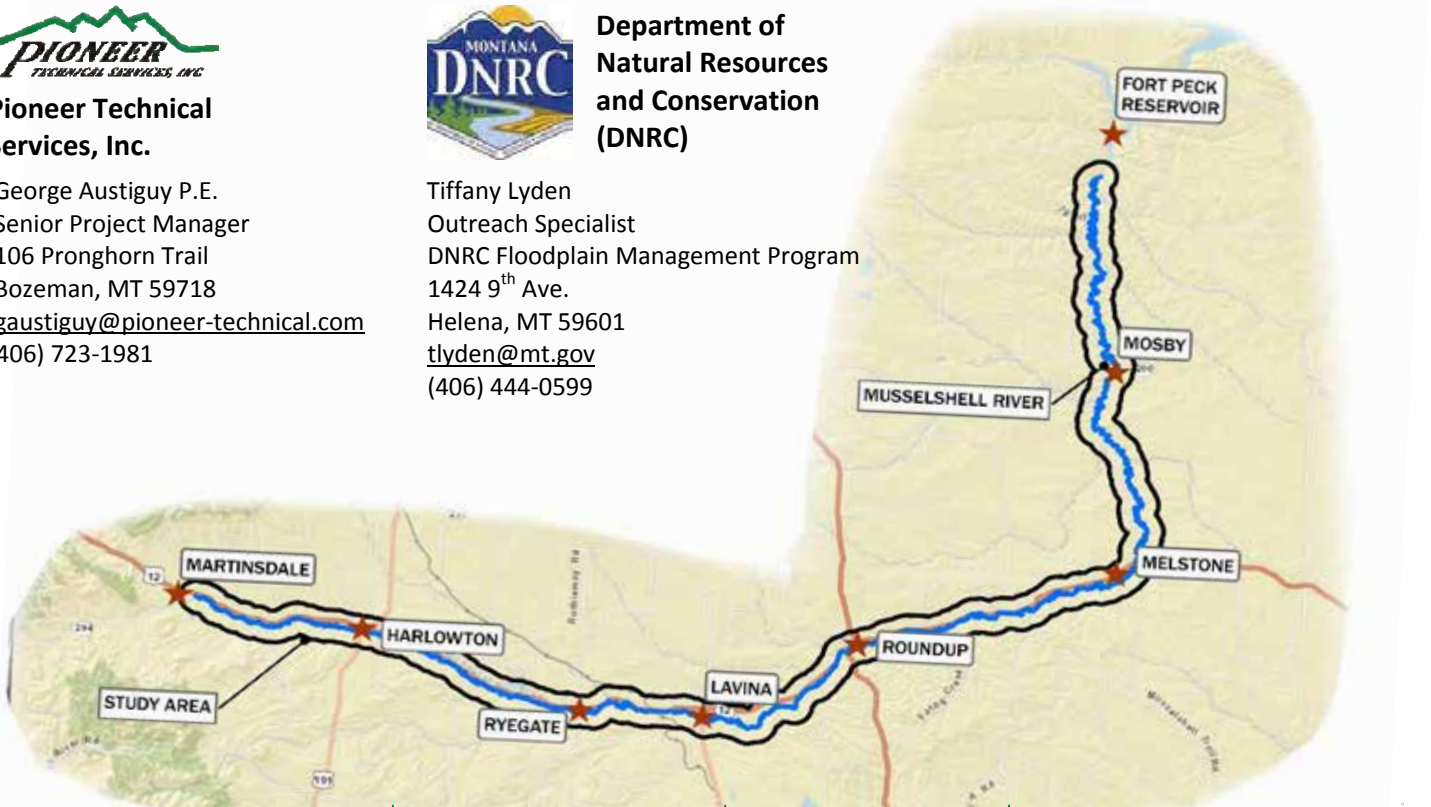
If you have any questions or comments, please direct all correspondence to the following:

Pioneer Technical Services, Inc.

George Austiguy P.E.
Senior Project Manager
106 Pronghorn Trail
Bozeman, MT 59718
gaustiguy@pioneer-technical.com
(406) 723-1981

Department of Natural Resources and Conservation (DNRC)

Tiffany Lyden
Outreach Specialist
DNRC Floodplain Management Program
1424 9th Ave.
Helena, MT 59601
tlyden@mt.gov
(406) 444-0599



Musselshell Watershed Coalition
Coordinator: Laura Nowlin
P.O. Box 118
Winnett, MT 59087
lmcdistrict.wordpress.com/musselshell-watershed-coalition

August 5, 2014

To landowners and water users living and working along the Musselshell River,

The Montana Department of Natural Resources and Conservation (DNRC) and Pioneer Technical (see enclosed letter) approached the Musselshell Water Coalition (MWC) to assist in communicating with landowners as they begin inventorying and inspecting bridge and diversion structures along the entire 335 mile reach of the Musselshell main-stem. The information is being gathered for future floodplain mapping studies along select reaches of the Musselshell River. The floodplain mapping project is a result of two opportunities; 1) grant dollars DNRC's Floodplain Unit has secured to identify flood risk, and 2) interest expressed by counties and towns in the basin to update hydrologic data and floodplain mapping for the river, that when completed would result in a more accurate assessment of flood risk and provide beneficial information for flood insurance ratings – reducing the financial burden to property owners.

MWC, as some of you may know, is an ongoing local forum for water user associations, conservation districts, and state and federal natural resource agencies, to develop and implement voluntary strategies to improve water storage and delivery infrastructure, water management, and floodplain health along the Musselshell River main-stem. The data and mapping that will be generated from this project will also assist MWC with its own long-term strategic planning that is currently being supported by a $75,000 resource planning grant received from Montana's DNRC in 2014.

As explained in the Pioneer Technical letter, if you do not want people to cross your property, just let either the MWC or Pioneer Technical know, and your wishes will be respected. A representative from MWC or DNRC will call you 5-7 days prior to Pioneer Technical accessing your property. If you have any other questions or concerns, please contact one of us (Bill Milton, 323-1771; Laura Nowlin, 429-4832).

Thank you ahead of time for your consideration of their request.

Respectfully,

Bill Milton, Facilitator
Laura Nowlin, Coordinator

Nicole Hockaday

From: Murray Strong [mstrong@pioneer-technical.com]
Sent: Tuesday, November 11, 2014 11:04 AM
To: nhockaday@pioneer-technical.com
Subject: FW: Musselshell River Bridges
Attachments: Musselshell Bridges.xlsx

From: Murray Strong [mailto:mstrong@pioneer-technical.com]
Sent: Tuesday, October 28, 2014 3:37 PM
To: 'kbarnes@mt.gov'
Cc: gaustiguy@pioneer-technical.com; Joel Gerhart (jgerhart@pioneer-technical.com); nhockaday@pioneer-technical.com
Subject: Musselshell River Bridges

Ken –
Attached is a line list of bridges obtained from the MDT query site. The bridges are divided into On-System and Off-System. The list you received earlier would be those On-System with an additional one added south of Roundup on Highway 87.

Pioneer would appreciate plan and profiles of the structures ("as-builts") or the nearest you have to help us complete our inventory and survey work on the Musselshell River for DNRC.

Please let me know when the plans can be picked up.

Please confirm that you have received this email as well.

Thank you.

Murray Strong
Pioneer Technical Service, Inc.
201 W. Broadway Ave. Suite C
Helena, MT 59601
406-459-6684 (cell)
406-457-8252

Admin Area	HIS Route	MPOST	Bridge ID	On/Off System	Location	Feature Intersect	Year Built	Year Recon	Year Insp	NHS Rte	S.R.	ADT	Owner	County	Latitude (Decimal)	Longitude (Decimal)	Draw No
Dist 5	L54001	0.2	L54001000+02001	Off System	N EDGE TWO DOT	MUSSELSHELL RIVER 017	1965		2014	N	92.2	100	County Highway Agency	WHEATLAND	46.43014167	-110.0721306	6436
Dist 5	L54009	0.5	L54012000+05001	Off System	2M SE HARLOWTON	MUSSELSHELL RIVER 016	1977		2012	N	99	100	County Highway Agency	WHEATLAND	46.42523056	-109.7999333	888888
Dist 5	L54003	0.5	L54016000+05001	Off System	6M W TWO DOT	MUSSELSHELL RIVER 018	2011		2013	N	98.9	100	County Highway Agency	WHEATLAND	46.45451944	-110.1973333	20133
Dist 5	L54010	0.6	L54021000+06001	Off System	4M E HARLOWTON	MUSSELSHELL RIVER 008	1988		2014	N	99.9	100	County Highway Agency	WHEATLAND	46.41383611	-109.7398139	14025
Dist 5	L19201	0.5	L19201024+00001	Off System	BARBER	MUSSELSHELL RIVER 023	1983		2014	N	99.8	100	County Highway Agency	GOLDEN VALLEY	46.30842778	-109.3853056	13230
Dist 5	L19203	0.03	L19203026+02001	Off System	1M NE CUSHMAN	MUSSELSHELL RIVER 015	2012		2014	N	100	100	County Highway Agency	GOLDEN VALLEY	46.29921111	-109.0359056	21231
Dist 5	L19217	0.6	L19217000+03001	Off System	2M E RYEGATE	MUSSELSHELL RIVER 003	1911	1994	2013	N	65	100	County Highway Agency	GOLDEN VALLEY	46.30143333	-109.2077	15622
Dist 5	L33101	24.61	L33001027+08001	Off System	6M W MUSSELSHELL	MUSSELSHELL RIVER 015	1916		2012	N	57.8	100	County Highway Agency	MUSSELSHELL	46.50860833	-108.2159583	RECORDS
Dist 5	L33102	0.1	L33006015+07001	Off System	SE ROUNDUP	MUSSELSHELL RIVER 008	1970		2014	N	34.1	100	County Highway Agency	MUSSELSHELL	46.43936389	-108.5315694	none
Dist 5	L33103	1.4	L33007001+04001	Off System	1M SE MELSTONE	MUSSELSHELL RIVER 017	1992		2011	N	99.6	100	County Highway Agency	MUSSELSHELL	46.58195278	-107.8581806	15086
Dist 5	L33104	0.4	L33017000+04001	Off System	7M NE ROUNDUP	MUSSELSHELL RIVER 012	1915		2012	N	26.5	100	County Highway Agency	MUSSELSHELL	46.4714	-108.3925306	8
Dist 5	L33027	0.83	L33027000+08281	Off System	3M SW MELSTONE	MUSSELSHELL RIVER 024	2013		2013	N	98.7	100	County Highway Agency	MUSSELSHELL	46.57083333	-107.9009167	RECORDS
Dist 5	L33117	1.2	L33027001+02001	Off System	3M SW MELSTONE	MUSSELSHELL RIVER 018	1916		2012	N	13.8	100	County Highway Agency	MUSSELSHELL	46.56488611	-107.9009333	RECORDS
Dist 5	L33124	0.7	L33028000+07001	Off System	6M SW MELSTONE	MUSSELSHELL RIVER 019	1916		2013	N	35.6	100	County Highway Agency	MUSSELSHELL	46.55887778	-107.9774139	RECORDS
Dist 5	L33111	1.8	L33030003+06001	Off System	15M SW ROUNDUP	MUSSELSHELL RIVER 004	1988		2012	N	99.1	100	County Highway Agency	MUSSELSHELL	46.2987	-108.7814917	14019
Dist 5	L33129	0.9	L33045000+04001	Off System	1M E ROUNDUP	MUSSLESHELL RIVER 011	1995		2014	N	100	100	County Highway Agency	MUSSELSHELL	46.44641944	-108.5124556	15682
Dist 5	L33548	0	L33548000+00001	Off System	ROUNDUP	MUSSELSHELL RIVER 025	2013		2013	N	85	100	County Highway Agency	MUSSELSHELL	46.43929167	-108.5366639	RECORDS
Dist 4	L44118	3.1	L44118003+01001	Off System	15M NW SUMATRA	MUSSELSHELL RIVER 001	1930	1960	2014	N	41.1	100	County Highway Agency	ROSEBUD	46.71998333	-107.8221944	none
Dist 5	P00045	43.43	P00045043+04301	On System	1M S HARLOWTON	MUSSELSHELL RIVER	1969		2012	N	88.4	710	State Highway Agency	WHEATLAND	46.42910278	-109.8423056	9172
Dist 5	P00053	45.55	P00053045+05521	On System	LAVINA	MUSSELSHELL RIVER	1959		2014	Y	71.5	1730	State Highway Agency	GOLDEN VALLEY	46.28887222	-108.9379278	4383
Dist 5	S00300	0.2	S00300000+02001	On System	RYEGATE	MUSSELSHELL RIVER	1962		2014	N	82	340	State Highway Agency	GOLDEN VALLEY	46.2939	-109.2578417	5846
Dist 5	P00016	47.55	P00016047+05501	On System	ROUNDUP	MUSSELSHELL RIVER	1996		2014	Y	80	3030	State Highway Agency	MUSSELSHELL	46.42795556	-108.5701556	15727
Dist 5	S00310	40.19	S00310040+01921	On System	MUSSELSHELL	MUSSELSHELL RIVER	1960		2013	N	75.9	120	State Highway Agency	MUSSELSHELL	46.52011667	-108.0920028	4533
Dist 5	S00381	0.4	S00381000+04001	On System	7M SW ROUNDUP	MUSSELSHELL RIVER	1949		2014	N	58.8	340	State Highway Agency	MUSSELSHELL	46.37735	-108.6231444	2774
Dist 5	P00057	158.4	P00057158+03721	On System	MOSBY	MUSSELSHELL RIVER	1973		2013	Y	91.5	380	State Highway Agency	GARFIELD	46.99424722	-107.8892083	10815

Telephone Conversation Tracker for Musselshell River County Calls								
Date	**Start time**	**End time**	**Department**	**Name**	**Phone Number**	**Subject**	**Notes**	**Information**
10/27/2014	3:26 PM	3:36 PM	Rosebud County Road Department	Wayne	(406) 346-2261	County Bridge Info - As-Builts/Upgrades	Only one county bridge (on Bridge Road)- half owned by Rosebud County and half owned by Musselshell County. No as-builts/no plans to upgrade. Rosebud County redecked with bridge plank, and Musselshell County redecked with old stuff they used to redeck bridges with. Did not send the letter, no need to.	Wayne will send a bridge report to Pioneer Office. Received.
10/28/2014	1:36 PM	1:40 PM	Musselshell County Road Department	Woman (no name)	(406) 323-2814	County Bridge Info - As-Builts/Upgrades	Talked to a woman at the department. Won't be really quick to receive as-built information. Have plans to do a temporary deck on one of the bridges. Followed-up with letter for more detail on structures we are interested in. Received packet of information from them on 11/12/14.	Sent a letter to them. Received compiled information from them on 11/12/14.
11/6/2014	9:00 AM	9:00 AM	Golden Valley County Road Department	-	(406) 568-2218	County Bridge Info - As-Builts/Upgrades	Tried the department office multiple times with no answer, left a message on 11/6/14 at 9:00 AM. Received one page response on 11/10/14, there are no future remedial plans other than regular maintenance.	Sent a letter to them. Follow-up phone message left.
11/6/2014	8:36 AM	8:40 AM	Wheatland County Road Department	Steve	(406) 632-5661	County Bridge Info - As-Builts/Upgrades	They do not have any as-builts and do not have any future plans to change/upgrade any of the bridges. Steve took the letter to the commissioners, and they said this didn't really concern them. Will not be getting any information.	Sent a letter to them, follow up call details listed in the 'Notes' column.

Engineering and
Environmental Services

October 2014

Golden Valley County Road Department
P.O. Box 10
Ryegate, MT 59074

Attention Golden Valley County Road Department,

The Montana Department of Natural Resources and Conservation (DNRC) has hired our firm to complete a bridge and diversion structure inventory, and survey work along the Musselshell River. The work will ultimately help refine the current Musselshell River floodplain mapping. A major part of our scope is to collect basic information on bridges and diversion structures (hydraulic structure inventory). The hydraulic structure inventory covers the entire 335 mile extent of the Musselshell River main stem, from its mouth at Fort Peck Lake to the confluence of the North and South Forks of the Musselshell near the Town of Martinsdale (area noted in the image below).

Attached is a list and figure identifying the Golden Valley County river bridges under your jurisdiction within the project area. We are requesting additional information on these bridges, specifically:

- A copy of the As-Built Drawings, if available; and
- Any future plans to replace or upgrade the existing bridge structure

Information regarding federal and state Musselshell River bridges located in Golden Valley County is being obtained from the Montana Department of Transportation (MDT).

We appreciate your participation in this effort.

Please direct all information, including any questions or comments, to the following:

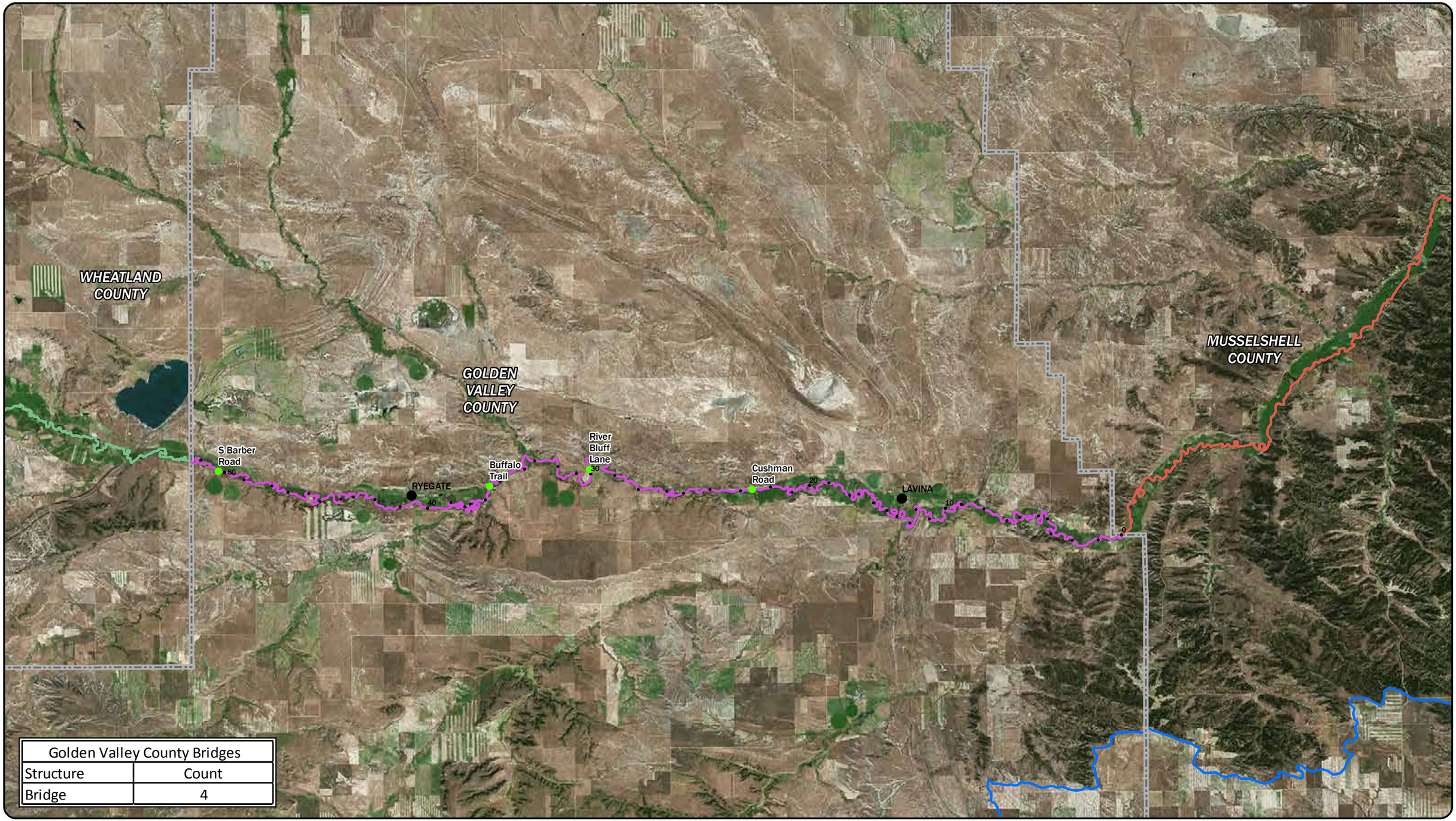
Pioneer Technical Services, Inc.

Nicole Hockaday
Staff Engineer
307 East Park, Suite 421
Anaconda, MT 59711
nhockaday@pioneer-technical.com
(406) 723-1932

Golden Valley County

City-County Bridges

Structure Type	County	Road Name	Road System
Bridge	Golden Valley	Cushman Road	City-County
Bridge	Golden Valley	River Bluff Lane	City-County
Bridge	Golden Valley	Buffalo Trail	City-County
Bridge	Golden Valley	S Barber Road	City-County



Golden Valley County Bridges	
Structure	Count
Bridge	4

LEGEND

- BRIDGE
- TOWNS
- RIVER MILE
- WHEATLAND ALIGNMENT
- GOLDEN VALLEY ALIGNMENT
- MUSSELSHELL ALIGNMENT
- PETROLEUM/GARFIELD/ROSEBUD ALIGNMENT
- COUNTY BOUNDARIES
- MUSSELSHELL RIVER DRAINAGE BASIN

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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
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PIONEER TECHNICAL SERVICES, INC.

GOLDEN VALLEY COUNTY CITY-COUNTY BRIDGES

DATE: 10/24/2014

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PIONEER TECHNICAL SERVICES, INC.

Engineering and Environmental Services

October 2014

Musselshell County Road Department
506 Main Street
Roundup, MT 59072

Attention Musselshell County Road Department,

The Montana Department of Natural Resources and Conservation (DNRC) has hired our firm to complete a bridge and diversion structure inventory, and survey work along the Musselshell River. The work will ultimately help refine the current Musselshell River floodplain mapping. A major part of our scope is to collect basic information on bridges and diversion structures (hydraulic structure inventory). The hydraulic structure inventory covers the entire 335 mile extent of the Musselshell River main stem, from its mouth at Fort Peck Lake to the confluence of the North and South Forks of the Musselshell near the Town of Martinsdale (area noted in the image below).

Attached is a list and figure identifying the Musselshell County river bridges under your jurisdiction within the project area. We are requesting additional information on these bridges, specifically:

- A copy of the As-Built Drawings, if available; and
- Any future plans to replace or upgrade the existing bridge structure

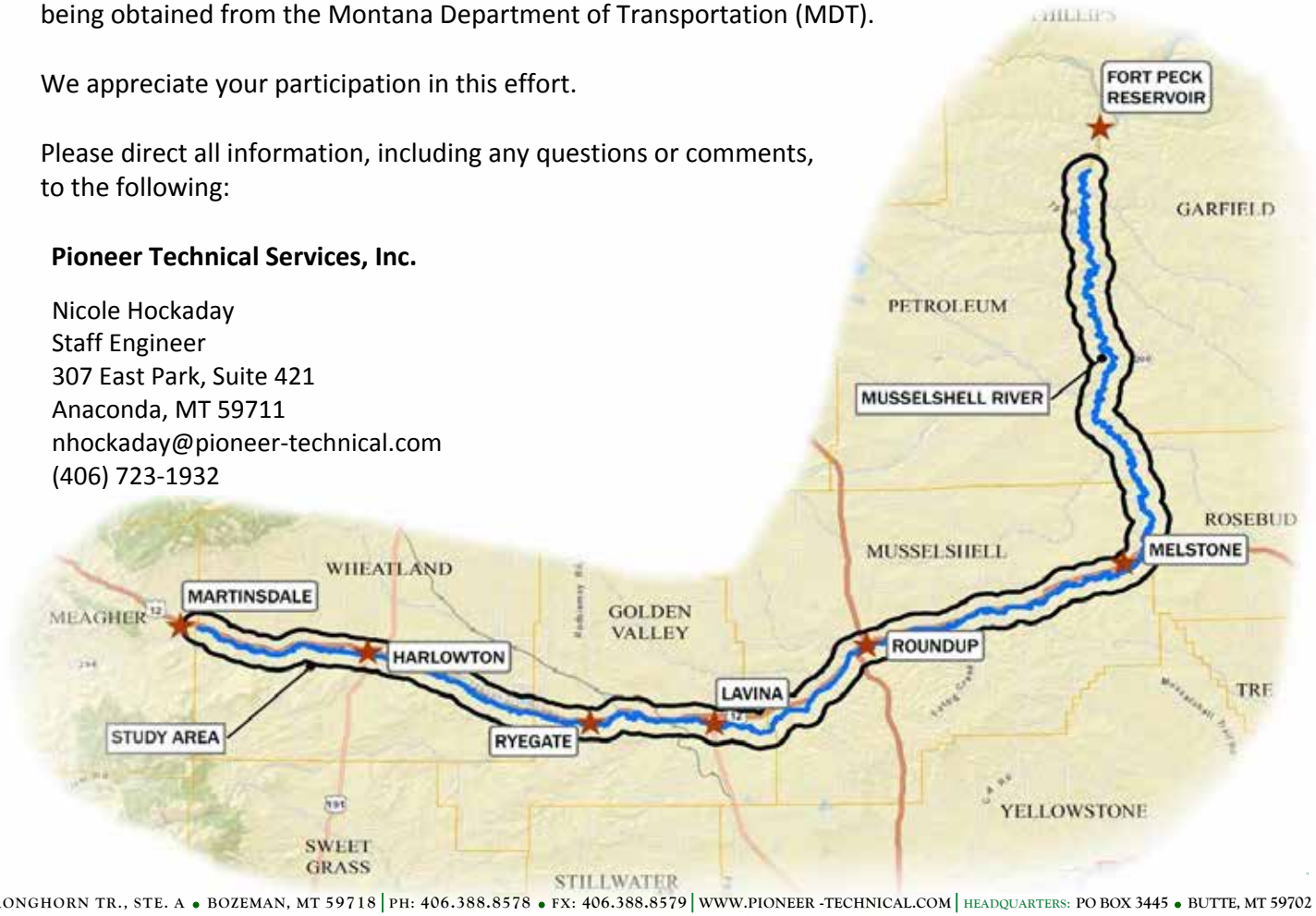
Information regarding federal and state Musselshell River bridges located in Musselshell County is being obtained from the Montana Department of Transportation (MDT).

We appreciate your participation in this effort.

Please direct all information, including any questions or comments, to the following:

Pioneer Technical Services, Inc.

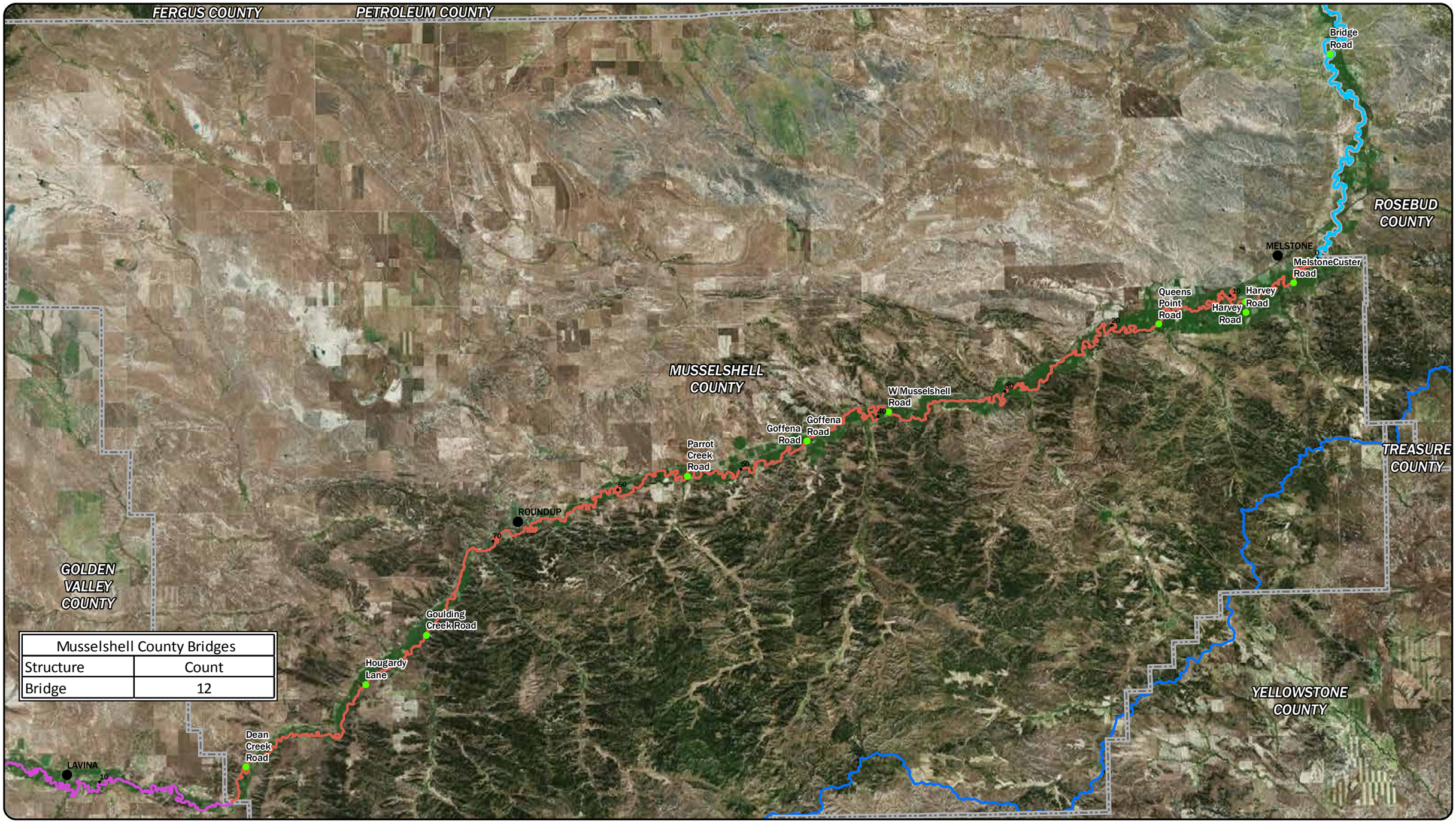
Nicole Hockaday
Staff Engineer
307 East Park, Suite 421
Anaconda, MT 59711
nhockaday@pioneer-technical.com
(406) 723-1932



Musselshell County

City-County Bridges

Structure Type	County	Road Name	Road System
Bridge	Musselshell	Bridge Road	City-County
Bridge	Musselshell	MelstoneCuster Road	City-County
Bridge	Musselshell	Harvey Road	City-County
Bridge	Musselshell	Harvey Road	City-County
Bridge	Musselshell	Queens Point Road	City-County
Bridge	Musselshell	W Musselshell Road	City-County
Bridge	Musselshell	Goffena Road	City-County
Bridge	Musselshell	Goffena Road	City-County
Bridge	Musselshell	Parrot Creek Road	City-County
Bridge	Musselshell	Goulding Creek Road	City-County
Bridge	Musselshell	Hougardy Lane	City-County
Bridge	Musselshell	Dean Creek Road	City-County



Musselshell County Bridges	
Structure	Count
Bridge	12

LEGEND

- BRIDGE
- TOWNS
- RIVER MILE
- WHEATLAND ALIGNMENT
- GOLDEN VALLEY ALIGNMENT
- MUSSELSHELL ALIGNMENT
- PETROLEUM/GARFIELD/ROSEBUD ALIGNMENT
- COUNTY BOUNDARIES
- MUSSELSHELL RIVER DRAINAGE BASIN

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DISPLAYED AS:
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DATUM: NAD 83
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SOURCE: PIONEER/RATT/NRIS
ESRI WORLD IMAGERY-LAST UPDATE 10/14

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PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL COUNTY
CITY-COUNTY BRIDGES

DATE: 10/24/2014

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PIONEER TECHNICAL SERVICES, INC.

Engineering and Environmental Services

October 2014

Wheatland County Road Department
P.O. Box 1903
Harlowton, MT 59036

Attention Wheatland County Road Department,

The Montana Department of Natural Resources and Conservation (DNRC) has hired our firm to complete a bridge and diversion structure inventory, and survey work along the Musselshell River. The work will ultimately help refine the current Musselshell River floodplain mapping. A major part of our scope is to collect basic information on bridges and diversion structures (hydraulic structure inventory). The hydraulic structure inventory covers the entire 335 mile extent of the Musselshell River main stem, from its mouth at Fort Peck Lake to the confluence of the North and South Forks of the Musselshell near the Town of Martinsdale (area noted in the image below).

Attached is a list and figure identifying the Wheatland County river bridges under your jurisdiction within the project area. We are requesting additional information on these bridges, specifically:

- A copy of the As-Built Drawings, if available; and
- Any future plans to replace or upgrade the existing bridge structure

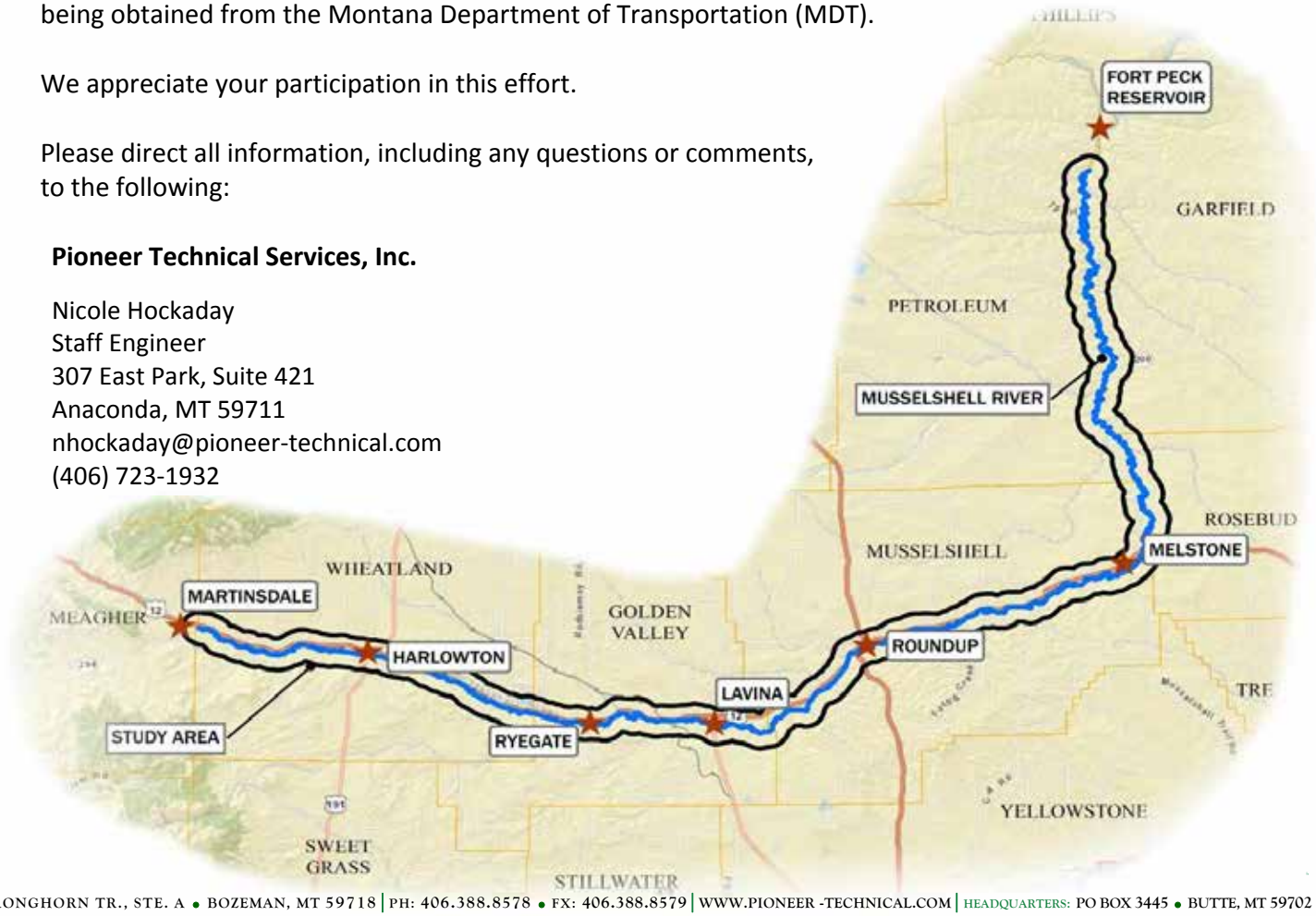
Information regarding federal and state Musselshell River bridges located in Wheatland County is being obtained from the Montana Department of Transportation (MDT).

We appreciate your participation in this effort.

Please direct all information, including any questions or comments, to the following:

Pioneer Technical Services, Inc.

Nicole Hockaday
Staff Engineer
307 East Park, Suite 421
Anaconda, MT 59711
nhockaday@pioneer-technical.com
(406) 723-1932



Wheatland County

City-County Bridges

Structure Type	County	Road Name	Road System
Bridge	Wheatland	Shawmut Road	City-County
Bridge	Wheatland	WinneCook Lane	City-County
Bridge	Wheatland	Tierney Loop Road	City-County
Bridge	Wheatland	Red Bridge Road	City-County
Bridge	Wheatland	Klock Road	City-County
Bridge	Wheatland	Muir Lane	City-County
Bridge	Wheatland	Muskrat Road	City-County
Bridge	Wheatland	Otter Trail	City-County
Bridge	Wheatland	Leppink Road	City-County
Bridge	Wheatland	Two Dot Highway	City-County
Bridge	Wheatland	Whitetail Drive	City-County
Bridge	Wheatland	Selkirk Road	City-County
Bridge	Wheatland	BB Drive	City-County
Bridge	Wheatland	Martinsdale Colony Lane	City-County

Wheatland County Bridges	
Structure	Count
Bridge	14

LEGEND

- BRIDGE
- TOWNS
- RIVER MILE
- WHEATLAND ALIGNMENT
- GOLDEN VALLEY ALIGNMENT
- MUSSELSHELL ALIGNMENT
- PETROLEUM/GARFIELD/ROSEBUD ALIGNMENT
- COUNTY BOUNDARIES
- MUSSELSHELL RIVER DRAINAGE BASIN

N

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Feet

PIONEER TECHNICAL SERVICES, INC.

WHEATLAND COUNTY CITY-COUNTY BRIDGES

DATE: 10/24/2014

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Appendix B. Hydraulic Structure Inventory

Bridge Structure Data

Structure Number	Date of Inspection	Latitude_WGS84	Longitude_WGS84	River Mile by Alignment (mi)	Alignment	County	Road Name	Road System[6]	Structure Type	Structure Comments	Structure Condition	Structure Condition Description
B1	8/25/2014	47.1476	-107.9456	25.8	Petroleum/Garfield/Rosebud	Garfield	Hailee Coulee Road		Bridge		Fair	
B2	8/25/2014	46.9943	-107.8888	48.3	Petroleum/Garfield/Rosebud	Petroleum	Highway 200	Primary	Bridge		Good	
B3	8/25/2014	46.7200	-107.8222	86.6	Petroleum/Garfield/Rosebud	Rosebud	Bridge Road	City-County	Bridge		Fair	
B4	8/25/2014	46.6204	-107.8218	100.7	Petroleum/Garfield/Rosebud	Musselshell	US Highway 12 E	Primary	Bridge		Good	
B5	8/25/2014	46.5821	-107.8584	3.0	Musselshell	Musselshell	MelstoneCuster Road	City-County	Bridge		Good	
B6	8/25/2014	46.5648	-107.9009	7.6	Musselshell	Musselshell	Harvey Road	City-County	Bridge		Fair	
B7[1]	8/25/2014	46.5712	-107.9009	7.5	Musselshell	Musselshell	Harvey Road	City-County	Bridge		Good	
B8	8/25/2014	46.5588	-107.9773	16.1	Musselshell	Musselshell	Queens Point Road	City-County	Bridge		Fair	
B9	8/25/2014	46.5200	-108.0915	27.9	Musselshell	Musselshell	S Musselshell Road	Secondary	Bridge		Good	
B10	8/26/2014	46.5062	-108.2068	37.3	Musselshell	Musselshell	Abandoned railroad grade	RR-Private	Railroad Bridge		Fair	
B11	8/26/2014	46.5086	-108.2156	37.9	Musselshell	Musselshell	W Musselshell Road	City-County	Bridge		Fair	
B12	8/26/2014	46.4918	-108.2876	45.2	Musselshell	Musselshell	Goffena Road	City-County	Bridge		Poor	Holes in deck, cracked concrete piers, appears to be on abandonded railroad grade
B13	8/26/2014	46.4916	-108.2878	45.7	Musselshell	Musselshell	Goffena Road	City-County	Bridge	Abandoned bridge	Fair	
B14	8/26/2014	46.4715	-108.3927	54.1	Musselshell	Musselshell	Parrot Creek Road	City-County	Bridge		Fair	Cracked concrete pier
B15[2]		46.4465	-108.5125	65.5	Musselshell	Musselshell	Number 4 Road	City-County	Bridge			
B16[2]		46.4393	-108.5316	67.6	Musselshell	Musselshell	2nd Ave E	City-County	Bridge			
B17[2]		46.4277	-108.5702	71.0	Musselshell	Musselshell	US Highway 87 S	NHS Non-Interstate	Bridge			
B18[2]		46.3971	-108.6039	74.8	Musselshell	Musselshell	Private		Bridge			
B19	8/26/2014	46.3773	-108.6229	76.6	Musselshell	Musselshell	Goulding Creek Road	City-County	Bridge		Good	
B20	8/26/2014	46.3479	-108.6763	81.0	Musselshell	Musselshell	Hougardy Lane	City-County	Bridge		Poor	Closed bridge, dilapidated
B21	8/26/2014	46.3173	-108.7067	84.8	Musselshell	Musselshell	Private	RR-Private	Railroad Bridge	Old railroad bridge converted to vehicle bridge	Fair	
B22	8/26/2014	46.2987	-108.7817	90.7	Musselshell	Musselshell	Dean Creek Road	City-County	Bridge		Good	
B23	8/27/2014	46.2756	-108.8082	0.9	Golden Valley	Golden Valley	Abandoned railroad grade	RR-Private	Railroad Bridge	Abandoned	Fair	
B24	8/27/2014	46.2851	-108.8646	6.5	Golden Valley	Golden Valley	Abandoned railroad grade	RR-Private	Railroad Bridge	Abandoned	Fair	
B25	8/27/2014	46.2891	-108.9380	13.7	Golden Valley	Golden Valley	State Highway 3	NHS Non-Interstate	Bridge		Good	
B26	8/27/2014	46.2994	-109.0359	22.6	Golden Valley	Golden Valley	Cushman Road	City-County	Bridge		Good	
B27	8/27/2014	46.2991	-109.0637	24.0	Golden Valley	Golden Valley	Railroad grade	RR-Private	Railroad Bridge	Nonactive	Good	
B28[3]		46.3120	-109.1439	29.6	Golden Valley	Golden Valley	Private		Bridge	Access denied, not inventoried		
B29[3]		46.3089	-109.1422	29.8	Golden Valley	Golden Valley	River Bluff Lane	City-County	Bridge	Access denied, not inventoried		
B30[3]		46.3084	-109.1631	31.9	Golden Valley	Golden Valley	Abandoned railroad grade	RR-Private	Railroad Bridge	Access denied, not inventoried		
B31	8/27/2014	46.3108	-109.1863	33.7	Golden Valley	Golden Valley	Abandoned railroad grade	RR-Private	Railroad Bridge	Abandoned	Fair	
B32	8/27/2014	46.3014	-109.2076	35.4	Golden Valley	Golden Valley	Buffalo Trail	City-County	Bridge		Good	
B33	8/27/2014	46.2941	-109.2580	40.6	Golden Valley	Golden Valley	Montana Highway 300	Secondary	Bridge		Good	
B34	8/27/2014	46.3085	-109.3852	50.2	Golden Valley	Golden Valley	S Barber Road	City-County	Bridge		Good	
B35	8/28/2014	46.3190	-109.4488	4.2	Wheatland	Wheatland	Private		Bridge		Poor	Structure tilted
B36	8/28/2014	46.3191	-109.4607	4.9	Wheatland	Wheatland	OK Bar Road		Bridge		Good	
B37	8/28/2014	46.3365	-109.5275	10.1	Wheatland	Wheatland	Shawmut Road	City-County	Bridge		Good	
B38	8/28/2014	46.3504	-109.5555	13.4	Wheatland	Wheatland	Private		Bridge		Good	
B39	8/28/2014	46.3564	-109.5708	15.2	Wheatland	Wheatland	Private		Bridge		Fair	
B40	8/28/2014	46.3901	-109.6542	23.1	Wheatland	Wheatland	WinneCook Lane	City-County	Bridge		Good	
B41	8/28/2014	46.4041	-109.6979	27.5	Wheatland	Wheatland	Private		Bridge		Good	
B42	9/2/2014	46.4138	-109.7397	31.6	Wheatland	Wheatland	Tierney Loop Road	City-County	Bridge		Good	
B43	9/2/2014	46.4173	-109.7709	34.4	Wheatland	Wheatland	Private		Bridge		Poor	
B44	9/2/2014	46.4251	-109.7998	37.3	Wheatland	Wheatland	Red Bridge Road	City-County	Bridge		Good	
B45	9/2/2014	46.4288	-109.8420	40.3	Wheatland	Wheatland	US Highway 191 N	Primary	Bridge		Good	
B46	9/2/2014	46.4292	-109.8559	41.4	Wheatland	Wheatland	Klock Road	City-County	Bridge		Fair	
B47	9/2/2014	46.4325	-109.8781	42.9	Wheatland	Wheatland	Abandoned railroad grade	RR-Private	Railroad Bridge		Good	
B48	9/2/2014	46.4334	-109.8840	43.3	Wheatland	Wheatland	Muir Lane	City-County	Bridge		Good	
B49[3]		46.4338	-109.9337	47.5	Wheatland	Wheatland	Private		Bridge	Access denied, not inventoried		
B50	9/2/2014	46.4369	-109.9457	48.5	Wheatland	Wheatland	Muskrat Road	City-County	Bridge		Good	
B51[3]		46.4417	-109.9655	50.9	Wheatland	Wheatland	Private		Bridge	Access denied, not inventoried		
B52	9/2/2014	46.4444	-109.9878	52.6	Wheatland	Wheatland	Otter Trail	City-County	Bridge		Fair	
B52A	9/2/2014	46.4481	-110.0015	53.4	Wheatland	Wheatland	Private		Bridge		Good	
B53	9/2/2014	46.4431	-110.0227	55.2	Wheatland	Wheatland	Private		Bridge		Good	
B54	9/2/2014	46.4282	-110.0595	59.0	Wheatland	Wheatland	Leppink Road	City-County	Bridge		Good	
B55	9/2/2014	46.4302	-110.0673	60.1	Wheatland	Wheatland	Private		Bridge	Partial Structure	Poor	
B56	9/2/2014	46.4303	-110.0722	60.5	Wheatland	Wheatland	Two Dot Highway	City-County	Bridge		Good	
B57	9/2/2014	46.4310	-110.0930	62.5	Wheatland	Wheatland	Private		Bridge		Fair	
B58[4]		46.4339	-110.1004	63.1	Wheatland	Wheatland	Private		Bridge	Bridge gone, not inventoried	Poor	
B59	9/2/2014	46.4334	-110.1241	64.9	Wheatland	Wheatland	Private		Bridge	Partial Structure	Poor	
B60	9/2/2014	46.4437	-110.1741	69.2	Wheatland	Wheatland	Whitetail Drive	City-County	Bridge		Fair	
B61	9/2/2014	46.4544	-110.1975	71.2	Wheatland	Wheatland	Selkirk Road	City-County	Bridge		Good	
B62	9/2/2014	46.4770	-110.2490	76.7	Wheatland	Wheatland	BB Drive	City-County	Bridge		Good	
B63[3]		46.4780	-110.2715	78.5	Wheatland	Wheatland	Martinsdale Colony Lane	City-County	Bridge	Access denied, not inventoried		

Note [1] : Bridge B7 had four culverts installed 271' north of the bridge under the road grade/bridge approach with the following characteristics:
CMP Culvert, CulvHt (ft): 5.0, Inlet2Deck (ft): 6.0, Out2Deck (ft): 5.5, Culvert Length (ft): 72.5, Culvert Entrance Type: Other, Culvert Entrance Type Description: Projecting and backfilled, no headwall
Note [2]: Bridges B15, B16, B17, and B18 were surveyed under Activity 1 of the Musselshell River Floodplain Study - Phase 1 and are included in the Field Survey Report.
Note [3]: Access was denied for the following bridges: B28, B29, B30, B49, B51, and B63.
Note [4]: Bridge B58 was gone and was not inventoried per landowner comments.
Note [5]: S5 : Span 5, S6: Span 6, S7: Span 7, S8: Span 8, S9: Span 9, S10: Span 10, S11: Span 11, S12: Span 12
Note [6]: Road system data collected from Roads from the Montana Transportation Framework information published on 03-10-2014 in the Montana State Library.

Photos were not collected for the following structures: B15, B16, B17, B18, B28, B29, B30, B49, B51, B55, B58, and B63.
Stub Abutment: Set near the top of the embankment near the superstructure typically supported on piers that have been backfilled, having a relatively short vertical height. Usually constructed of concrete material.

Bridge Structure Data

Structure Number	Span 1 (ft)	Span 1 Description	Span 2 (ft)	Span 2 Description	Span 3 (ft)	Span 3 Description	Span 4 (ft)	Span 4 Description	Deck Width (ft)	Deck Thickness (ft)	Guardrail Height (ft)	Structure Material Type	Structure Material Type Description
B1	80	south abutment to pier	81	pier to north abutment	0		0		18.3	1.25	2.20	Steel	Concrete deck and abutments
B2	92	east abutment to pier 1	96	pier 1 to pier 2	97	pier 2 to pier 3	112	pier 3 to west abutment	33.6	6.40	2.55	Concrete	
B3	122	south abutment to pier	19	pier to north abutment	0		0		15.7	1.70	3.28	Steel Truss	Steel truss/wood deck
B4	74	west abutment to pier 1	77	pier 1 to pier 2	74	pier 2 to east abutment	0		24.0	3.32	3.40	Steel	Concrete deck
B5	77	north abutment to pier	75	pier to south abutment	0		0		26.3	3.97	2.30	Concrete	
B6	141	entire span of bridge	0		0		0		16.3	2.15	3.45	Steel Truss	Steel truss/concrete deck and abutments
B7[1]	122	entire span of bridge	0		0		0		27.4	4.80	3.50	Concrete	Concrete bridge, CMP culverts
B8	26	south abutment to pier 1	140	pier 1 to pier 2	32	pier 2 to north abutment	0		16.0	2.15	3.05	Steel Truss	Steel Truss/asphalt deck
B9	62	south abutment to pier 1	71	pier 1 to pier 2	62	pier 2 to north abutment	0		26.0	3.00	2.65	Concrete	
B10	83	east abutment to pier 1	65	pier 1 to pier 2	69	pier 2 to west abutment	0		18.0	4.20	4.60	Steel/Wood	
B11	142	entire span of bridge	0		0		0		16.3	2.30	3.45	Steel Truss	Steel truss/asphalt deck
B12	53	west abutment to pier 1	49	pier 1 to pier 2	56	pier 2 to pier 3	58	pier 3 to east abutment	14.0	8.00	0.00	Steel/Wood	Concrete piers/abutments and compacted gravel deck
B13	155	entire span of bridge	0		0		0		16.0	2.60	3.30	Steel Truss	Steel truss/wood deck
B14	40	west abutment to pier	126	pier to east abutment	0		0		16.0	2.10	3.20	Steel Truss	Steel truss/wood deck
B15[2]													
B16[2]													
B17[2]													
B18[2]													
B19	48	south abutment to pier 1	58	pier 1 to pier 2	47	pier 2 to north abutment	0		20.0	2.70	2.40	Steel	Steel Ibeam/concrete deck
B20	120	estimated span poor condition	0		0		0		16.0	3.00	2.70	Steel/Wood	Steel and wood truss/wood deck
B21	58	east abutment to pier 1	62	pier 1 to pier 2	54	pier 2 to west abutment	0		10.0	4.15	2.70	Steel/Wood	Steel sides/wood deck
B22	41	west abutment to pier 1	52	pier 1 to pier 2	41	pier 2 to east abutment	0		26.2	2.60	2.30	Steel	Steel Ibeam/concrete deck
B23	60	east abutment to pier 1	61	pier 1 to pier 2	61	pier 2 to west abutment	0		10.0	4.30	2.65	Steel/Wood	Steel sides/wood deck
B24	85	west abutment to pier	81	pier to east abutment	0		0		10.0	4.20	4.50	Steel/Wood	Steel sides/wood deck
B25	42	north abutment to pier 1	61	pier 1 to pier 2	42	pier 2 to south abutment	0		30.0	3.90	4.00	Concrete	
B26	119	entire span of bridge	0		0		0		31.6	5.20	2.50	Concrete	
B27	29	S5: 73', S6: 76', S7: 91', S8: 76', S9: 71', S10: 70', S11: 61', S12: 28' [5]	59		64		84		15.0	8.30	3.50	Steel/Wood	Wood deck with railroad track
B28[3]													
B29[3]													
B30[3]													
B31	56	west abutment to pier 1	55	pier 1 to pier 2	57	pier 2 to east abutment	0		10.0	2.70	2.50	Steel/Wood	Steel sides/wood deck
B32	140	entire span of bridge	0		0		0		16.4	2.20	4.00	Steel Truss	Steel truss/wood and metal deck
B33	72	north abutment to pier	72	pier to south abutment	0		0		25.1	4.00	2.90	Concrete	
B34	119	entire span of bridge	0		0		0		26.0	5.00	2.25	Concrete	
B35	83	entire span of bridge	0		0		0		12.0	3.60	0.00	Wood	Wood deck/no guard rails
B36	91	entire span of bridge	0		0		0		15.0	2.65	1.30	Steel/Wood	Compacted gravel deck
B37	66	south abutment to pier	66	pier to north abutment	0		0		22.0	3.30	2.60	Steel/Wood	Concrete deck
B38	81	entire span of bridge	0		0		0		16.0	3.20	0.00	Steel Truss	Arched steel truss/wood and concrete deck/concrete cylinder abutments
B39	42	southwest abutment to pier	42	pier to northeast abutment	0		0		16.2	2.00	0.00	Steel/Wood	Wood deck/no guard rails
B40	105	entire span of bridge	0		0		0		19.5	1.85	4.20	Steel Truss	Arched truss/wood deck
B41	54	south abutment to pier	54	pier to north abutment	0		0		16.0	1.50	0.00	Steel/Wood	Wood deck/no guard rail
B42	43	south abutment to pier 1	58	pier 1 to pier 2	48	pier 2 to north abutment	0		28.0	3.00	2.25	Steel	Steel Ibeam/concrete deck
B43	63	entire span of bridge	0		0		0		14.0	1.65	2.50	Wood	
B44	110	entire span of bridge	0		0		0		28.4	5.20	2.30	Concrete	
B45	87	south abutment to pier	86	pier to north abutment	0		0		45.8	5.00	2.25	Concrete	
B46	27	south abutment to pier 1	26	pier 1 to pier 2	24	pier 2 to pier 3	29	pier 3 to north abutment	13.0	2.30	0.00	Steel/Wood	Wood deck
B47	67	east abutment to pier	67	pier to west abutment	0		0		10.0	4.00	3.15	Steel/Wood	Steel sides/wood deck
B48	30	north abutment to pier 1	28	pier 1 to pier 2	33	pier 2 to south abutment	0		16.0	1.75	0.00	Wood	
B49[3]													
B50	72	entire span of bridge	0		0		0		16.0	3.60	0.00	Steel/Wood	Wood deck
B51[3]													
B52	41	north abutment to pier	42	pier to south abutment	0		0		17.4	2.30	0.00	Steel/Wood	Concrete deck
B52A	71	entire span of bridge	0		0		0		18.4	3.35	3.00	Steel Truss	Concrete Deck
B53	87	entire span of bridge	0		0		0		15.3	3.00	3.05	Steel Truss	Concrete deck
B54	89	entire span of bridge	0		0		0		8.8	2.50	0.00	Steel/Wood	
B55	0		0		0		0		0.0	0.00	0.00	Wood	
B56	56	north abutment to pier	56	pier to south abutment	0		0		31.4	4.00	3.00	Concrete	
B57	51	entire span of bridge	0		0		0		16.0	1.40	0.00	Steel/Wood	Wood deck and abutments
B58[4]	0		0		0		0		0.0	0.00	0.00	Unknown	
B59	0		0		0		0		0.0	0.00	0.00	Steel/Wood	
B60	43	entire span of bridge	0		0		0		16.3	2.70	3.30	Steel Truss	Asphalt deck
B61	61	north abutment to pier	60	pier to south abutment	0		0		26.4	3.00	3.60	Concrete	
B62	51	entire span of bridge	0		0		0		20.2	2.00	0.00	Steel/Wood	Wood deck
B63[3]													

Bridge Structure Data

Structure Number	Abutment Type	Abutment Fill Configuration	Number of Piers	Number of Piers Description	Pier Type	Pier Type Description	Pier Width (ft)	Backwater Potential	Backwater Potential Description
B1	Stub	Sloped	1		Group of Cylinders	2 cylinders	3	Moderate	
B2	Stub	Sloped	3		Sharp Nose	Concrete	5	High	
B3	Vert Steel/Vert Wood	Sloped	1		Group of Cylinders	9 cylinders with Ibeam on top	1	Moderate	South approach and road high elevation.
B4	Stub	Sloped	2		Sharp Nose	Concrete	3	Moderate	Remaining old bridge piers/abutments and railroad grade upstream higher elevation than B4.
B5	Stub	Sloped	1		Group of Cylinders	3 cylinders	2.5	Moderate	Slightly raised banks.
B6	Stub	Benched	0				0	Low	
B7[1]	Stub	Sloped	0				0	Low	Culverts installed approximately 271' north of bridge under road grade.
B8	Stub	Sloped	2		Sharp Nose		4	Low	
B9	Stub	Sloped	2		Sharp Nose	Concrete	3	Low	Flat road grade.
B10	Stub	None	2		Group of Cylinders	2 concrete cylinders	7.7	High	High railroad grade elevation.
B11	Vertical Concrete	Sloped	0				0	Moderate	Abandoned railroad grade directly downstream and parallel to bridge.
B12	Stub	Sloped	3		Sharp Nose	Concrete	0	High	High railroad grade on either side of structure.
B13	Vertical Concrete	None	0				0	Moderate	
B14	Vertical Concrete	None	1		Sharp Nose	Broken concrete nose	4.4	Moderate	
B15[2]									
B16[2]									
B17[2]									
B18[2]									
B19	Stub	Sloped	2		Sharp Nose	Concrete	2.2	Moderate	
B20	Vertical Concrete	None	0				0	Moderate	
B21	Vertical Concrete	None	2		Sharp Nose	Concrete	6	Moderate	Railroad grade elevation.
B22	Stub	Sloped	2		Group of Cylinders	4 cylinders, concrete slab on top	1	High	High road grade elevation/bridge approach.
B23	Stub	Sloped	2		Sharp Nose	Minor cracking	6	High	High railroad grade elevation
B24	Stub	Sloped	1		Square Nose	Minor cracking	6.6	High	High railroad grade on either side of structure.
B25	Stub	Sloped	2		Sharp Nose	Concrete	3	High	High highway grade elevation.
B26	Stub	Sloped	0				0	Moderate	
B27	Stub	Sloped	Other	11	Sharp Nose	Concrete	5	Low	
B28[3]									
B29[3]									
B30[3]									
B31	Stub	Sloped	2		Sharp Nose	Concrete	6	High	High railroad grade elevation.
B32	Stub	Sloped	0				0	Moderate	
B33	Stub	Sloped	1		Sharp Nose	Concrete	3	Moderate	
B34	Stub	Sloped	0				0	Low	High hill along one side of river.
B35	Mech Stabil Earth	Sloped	0				0	Moderate	
B36	Stub	Sloped	0				0	Moderate	
B37	Stub	Sloped	1		Sharp Nose	Concrete	2	Moderate	
B38	Vertical Concrete	Sloped	0				0	Low	
B39	Mech Stabil Earth	Sloped	1		Group of Cylinders	4 wood cylinders	1.5	Low	
B40	Vertical Steel	Sloped	0				0	Low	
B41	Vertical Steel	Sloped	1		Group of Cylinders	3 steel cylinders	4	Moderate	
B42	Stub	Sloped	2		Group of Cylinders	4 cylinders per pier, concrete slab on top	2.5	Moderate	
B43	Stub	Sloped	0				0	Low	
B44	Stub	Sloped	0				0	Moderate	
B45	Stub	Sloped	1		Sharp Nose	Concrete	3	High	High highway grade elevation.
B46	Mech Stabil Earth	Sloped	3		Group of Cylinders	3 metal cylinders per pier	1	Low	
B47	Stub	Sloped	1		Sharp Nose	Concrete	6	High	High railroad grade elevation.
B48	Mech Stabil Earth	Sloped	2		Group of Cylinders	4 metal cylinders per pier	1	Low	
B49[3]									
B50	Mech Stabil Earth	Sloped	0				0	Moderate	
B51[3]									
B52	Stub	Sloped	1		Sharp Nose	Concrete	3	Low	
B52A	Vertical Concrete	None	0				0	Moderate	
B53	Mech Stabil Earth	None	0				0	Moderate	
B54	Mech Stabil Earth	Sloped	0				0	Low	
B55	None	None	1		Group of Cylinders	Wood	Unknown	Other	No backwater potential, structure gone
B56	Stub	Sloped	1		Sharp Nose	Concrete	3	High	High highway grade elevation.
B57	Mech Stabil Earth	None	0				0	Low	
B58[4]	None	None	0				0	Other	No backwater potential, structure gone
B59	None	None	1		Group of Cylinders	6 wood cylinder posts remaining	0	Other	No backwater potential, structure gone
B60	Mech Stabil Earth	Sloped	0				0	Moderate	
B61	Stub	Sloped	1		Group of Cylinders	2 cylinders with concrete slab on top	4	High	High road grade elevation.
B62	Mech Stabil Earth	None	0				0	Moderate	
B63[3]									

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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

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Feet

FIGURE B1

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B1

DATE: 11/3/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B1-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AE
	Date: 8/25/2014
	Description: Looking downstream from B1 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AF
	Date: 8/25/2014
	Description: Looking upstream from B1 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AG
	Date: 8/25/2014
	Description: Looking downstream at B1 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AH
	Date: 8/25/2014
	Description: Looking upstream at B1 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B2

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B2

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B2-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AA
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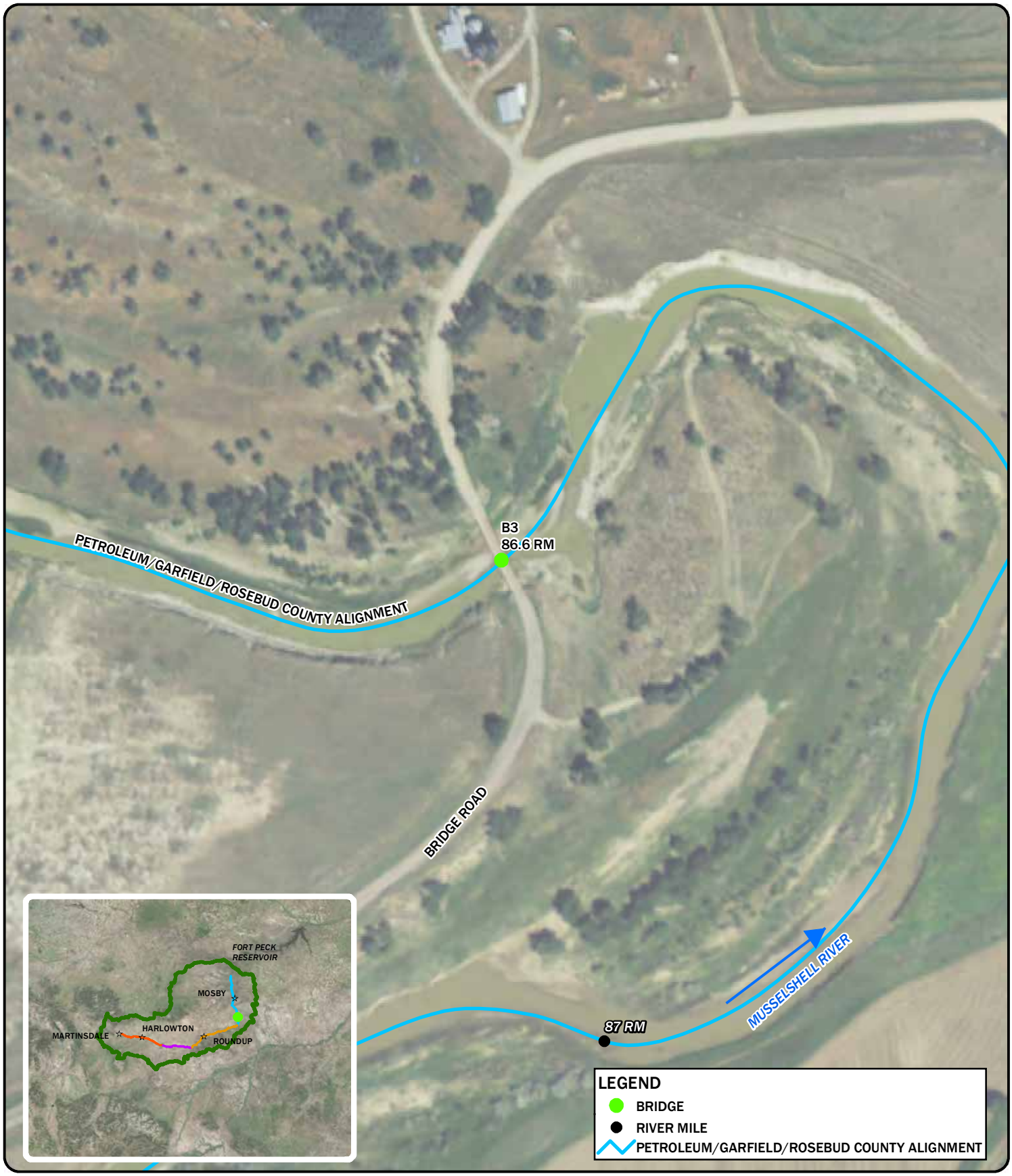
	Description: Looking downstream from B2 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AB
	Date: 8/25/2014
	Description: Looking upstream from B2 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AC
	Date: 8/25/2014
	Description: Looking upstream at B2 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AD
	Date: 8/25/2014
	Description: Looking downstream at B2 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B3

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B3

DATE: 11/2/2014

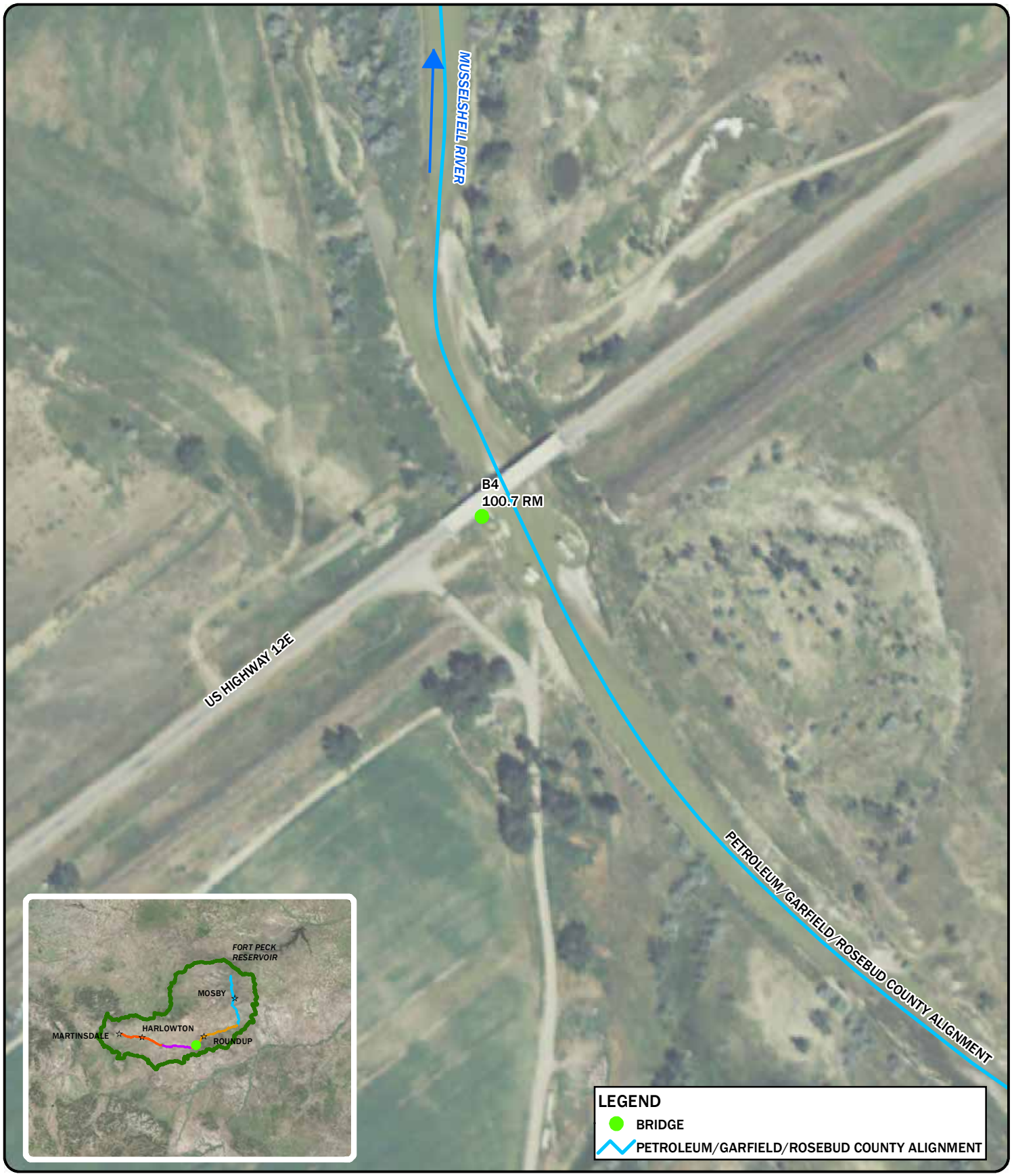
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B3-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AI
	Date: 8/25/2014
	Description: Looking downstream at B3 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AJ
	Date: 8/25/2014
	Description: Looking downstream from B3 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AK
	Date: 8/25/2014
	Description: Looking upstream from B3 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AL
	Date: 8/25/2014
	Description: Looking upstream at B3 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B4

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B4

DATE: 11/3/2014

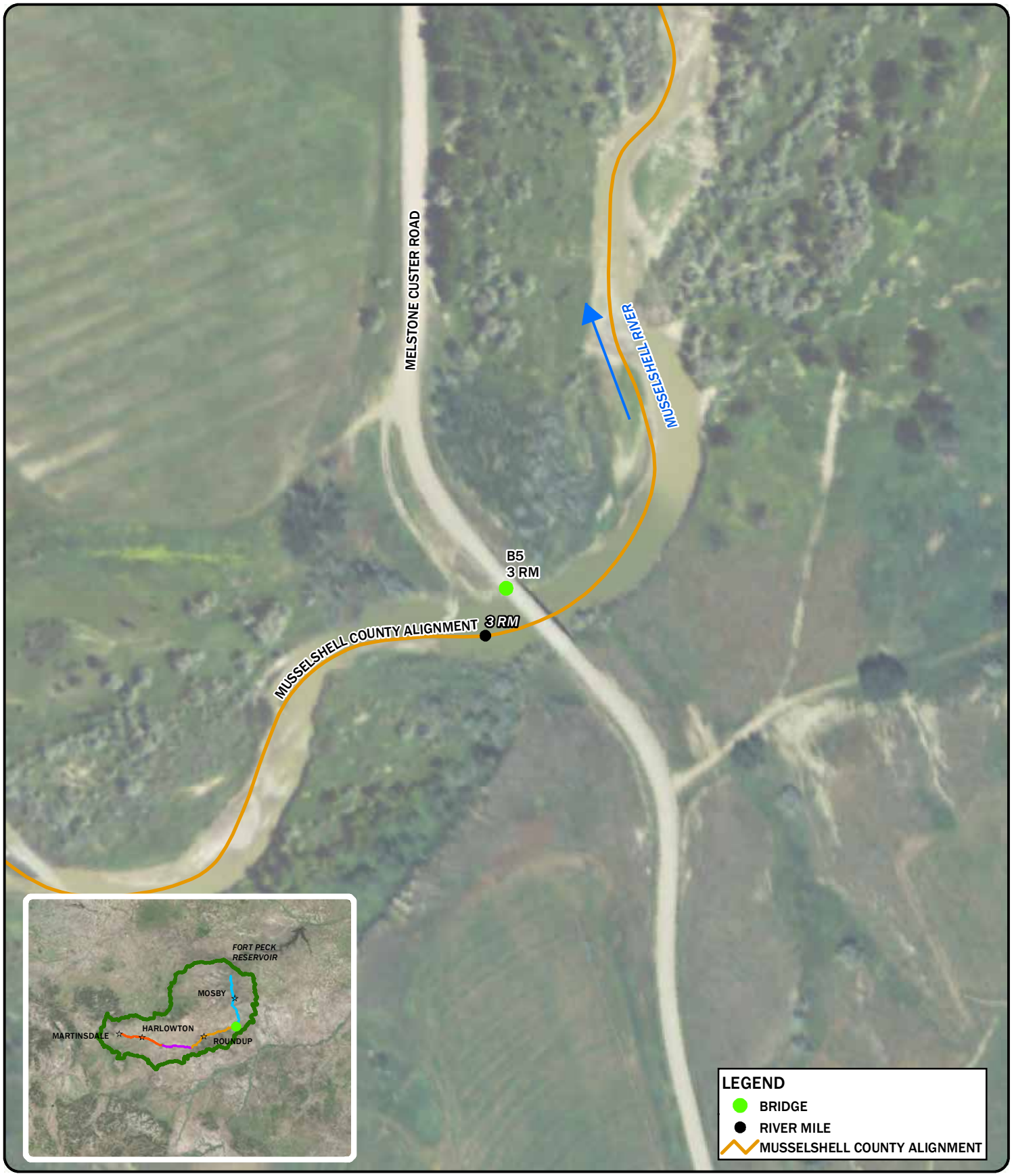
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B4-figure.mxd

	Photo Number: 2014_0825AM
	Date: 8/25/2014
	Description: Looking downstream at B4 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0825AN
	Date: 8/25/2014
	Description: Looking downstream from B4 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AO
	Date: 8/25/2014
	Description: Looking upstream from B4 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AP
	Date: 8/25/2014
	Description: Looking upstream at B4 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B5

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B5

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B5-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AQ
	Date: 8/25/2014
	Description: Looking downstream at B5 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AR
	Date: 8/25/2014
	Description: Looking downstream from B5 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AS
	Date: 8/25/2014
	Description: Looking upstream from B5 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AT
	Date: 8/25/2014
	Description: Looking upstream at B5 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 200 400 800
Feet

FIGURE B6

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B6

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B6-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AU
	Date: 8/25/2014
	Description: Looking upstream from B6 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AV
	Date: 8/25/2014
	Description: Looking downstream from B6 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AW
	Date: 8/25/2014
	Description: Looking upstream at B6 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AX
	Date: 8/25/2014
	Description: Looking downstream at B6 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B7

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B7

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B7-figure.mxd

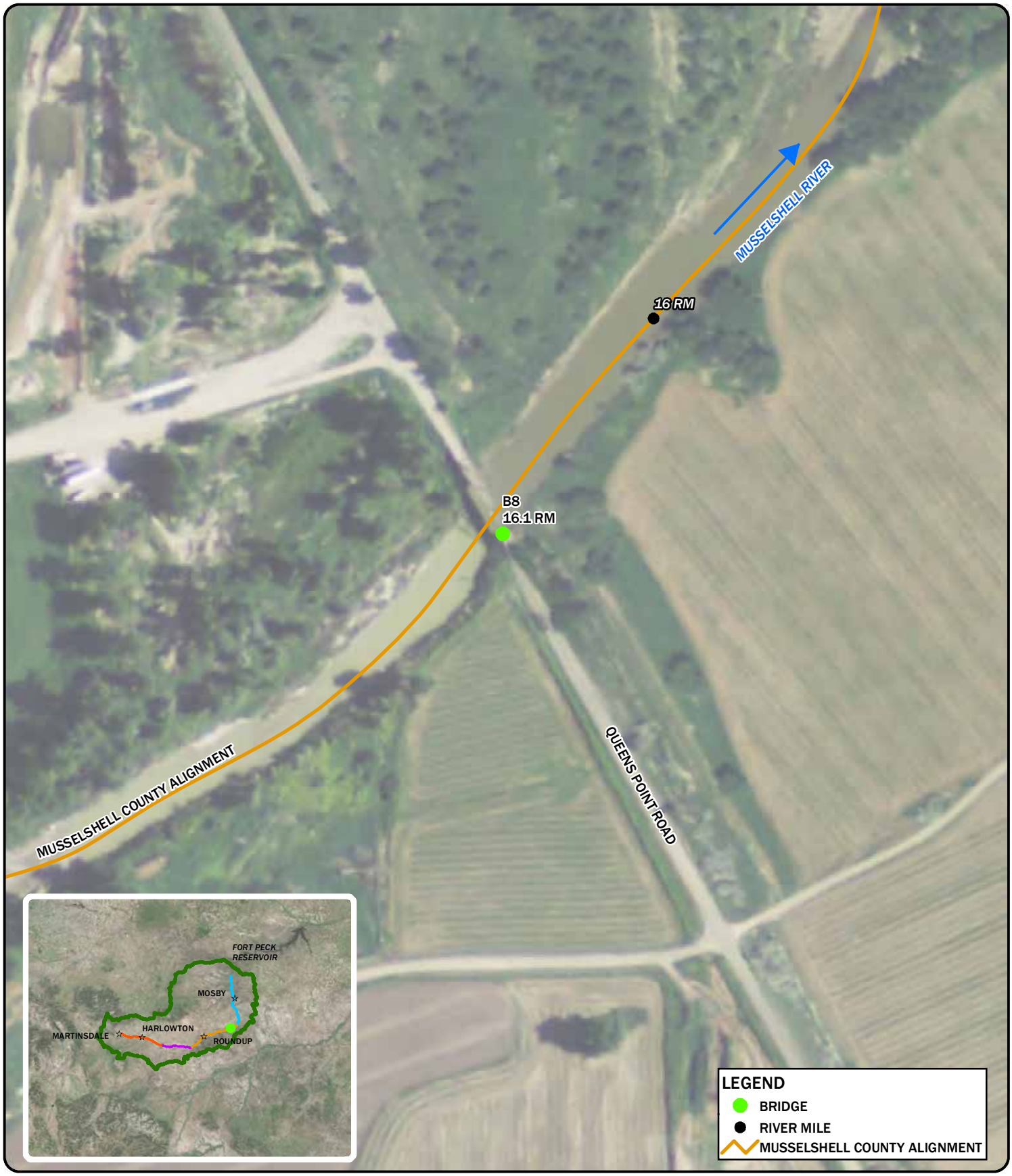
PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AY
	Date: 8/25/2014
	Description: Looking upstream at B7 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825AZ
	Date: 8/25/2014
	Description: Looking upstream from B7 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825BA
	Date: 8/25/2014
	Description: Looking downstream from B7 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825BB
	Date: 8/25/2014
	Description: Looking downstream at B7 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825BC
	Date: 8/25/2014
	Description: Looking at culvert outlets near B7 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B8

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B8

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B8-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825BD
	Date: 8/25/2014
	Description: Looking upstream from B8 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825BE
	Date: 8/25/2014
	Description: Looking downstream from B8 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825BF
	Date: 8/25/2014
	Description: Looking downstream at B8 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825BG
	Date: 8/25/2014
	Description: Looking upstream at B8 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B9

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B9

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B9-figure.mxd

	Photo Number: 2014_0825BJ
	Date: 8/25/2014
	Description: Looking upstream at B9 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0825BK
	Date: 8/25/2014
	Description: Looking upstream from B9 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825BL
	Date: 8/25/2014
	Description: Looking downstream from B9 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825BM
	Date: 8/25/2014
	Description: Looking downstream at B9 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B10

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B10

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B10-figure.mxd

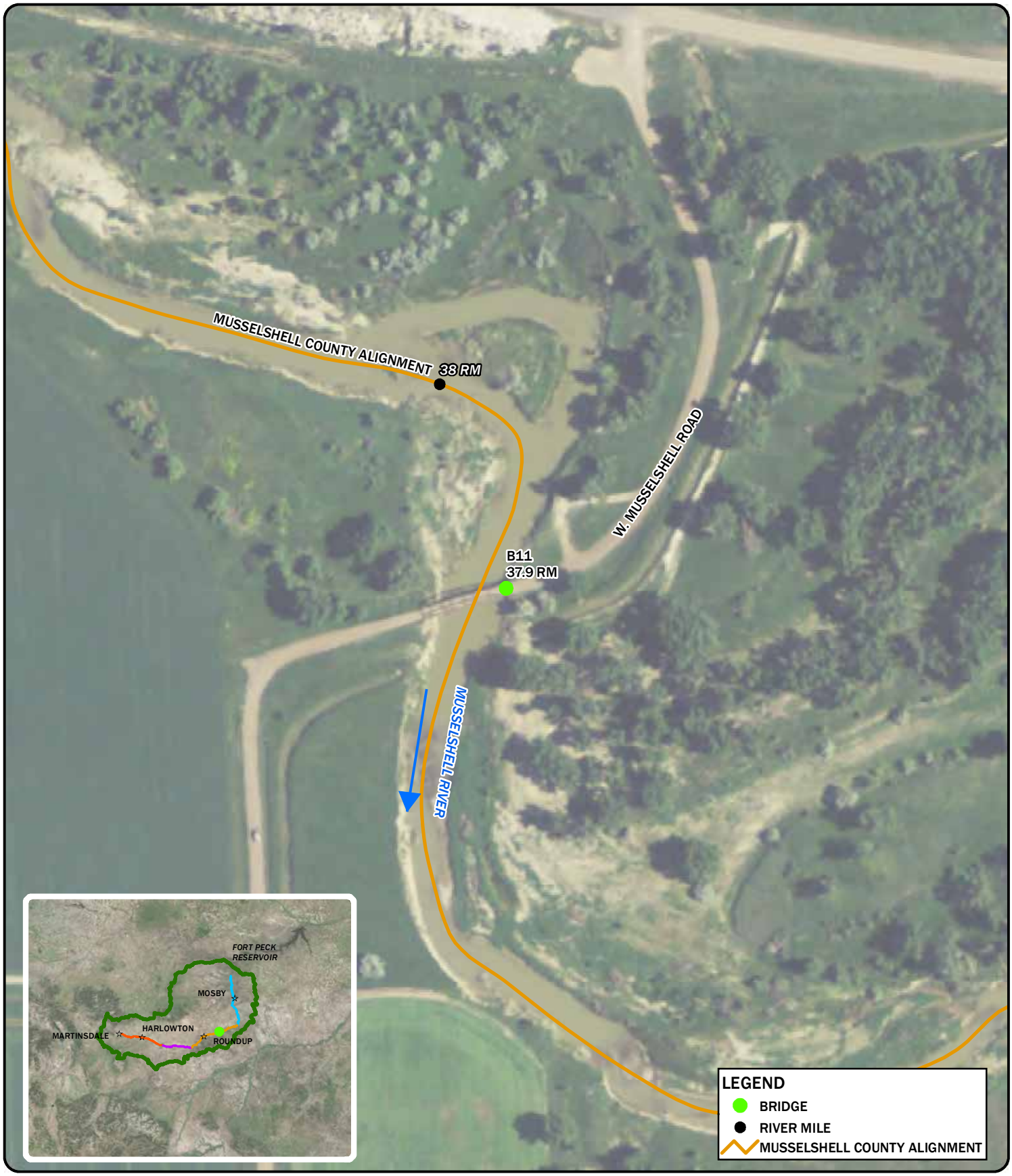
	Photo Number: 2014_0826AD
	Date: 8/26/2014
	Description: Looking downstream at B10 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0826AE
	Date: 8/26/2014
	Description: Looking downstream from B10 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AF
	Date: 8/26/2014
	Description: Looking across B10 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AG
	Date: 8/26/2014
	Description: Looking upstream from B10 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AH
	Date: 8/26/2014
	Description: Looking upstream at B10 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B11

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B11

DATE: 11/2/2014

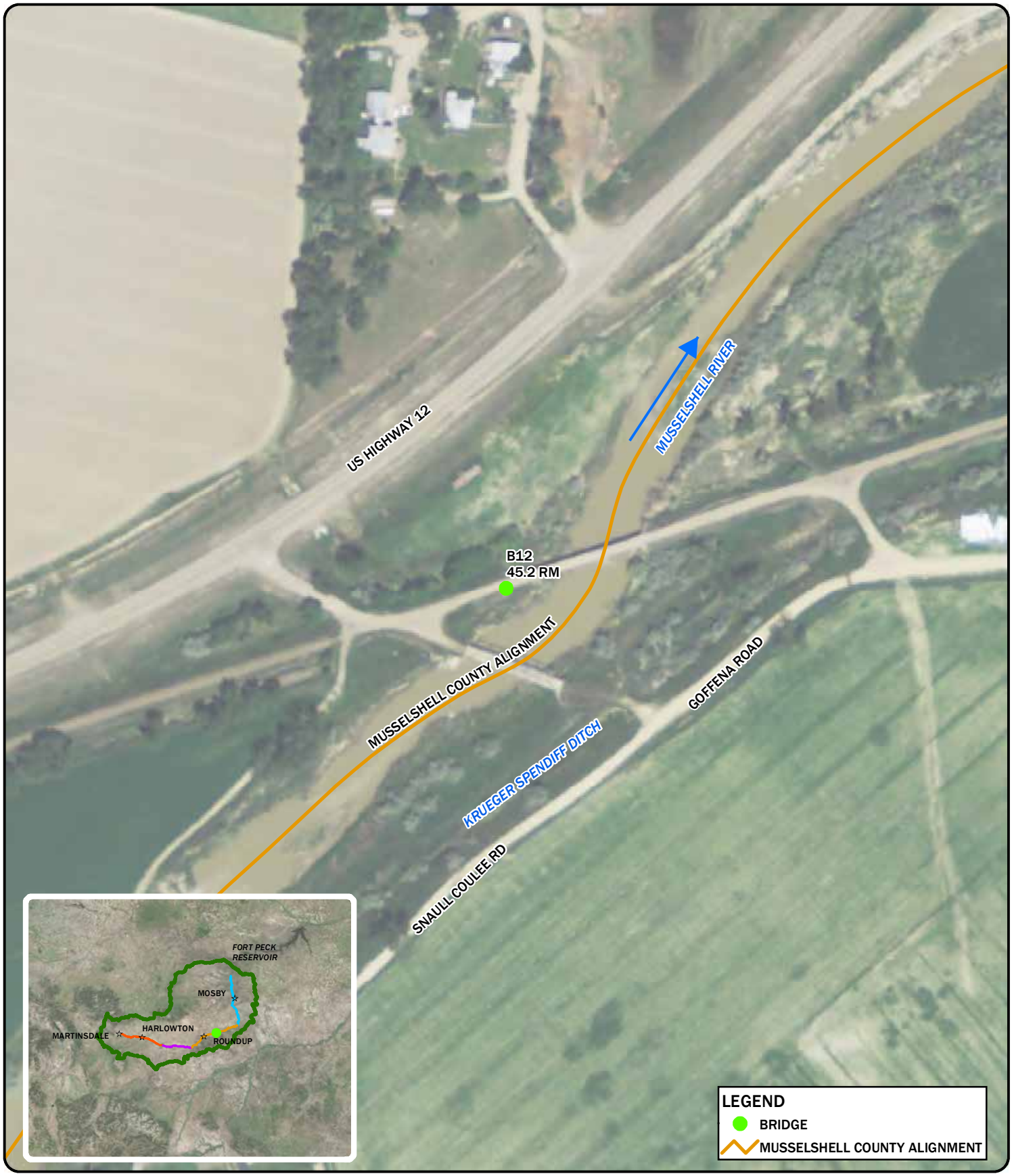
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B11-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AI
	Date: 8/26/2014
	Description: Looking downstream at B11 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AJ
	Date: 8/26/2014
	Description: Looking downstream from B11 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AK
	Date: 8/26/2014
	Description: Looking upstream from B11 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AL
	Date: 8/26/2014
	Description: Looking upstream at B11 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B12

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B12

DATE: 11/2/2014

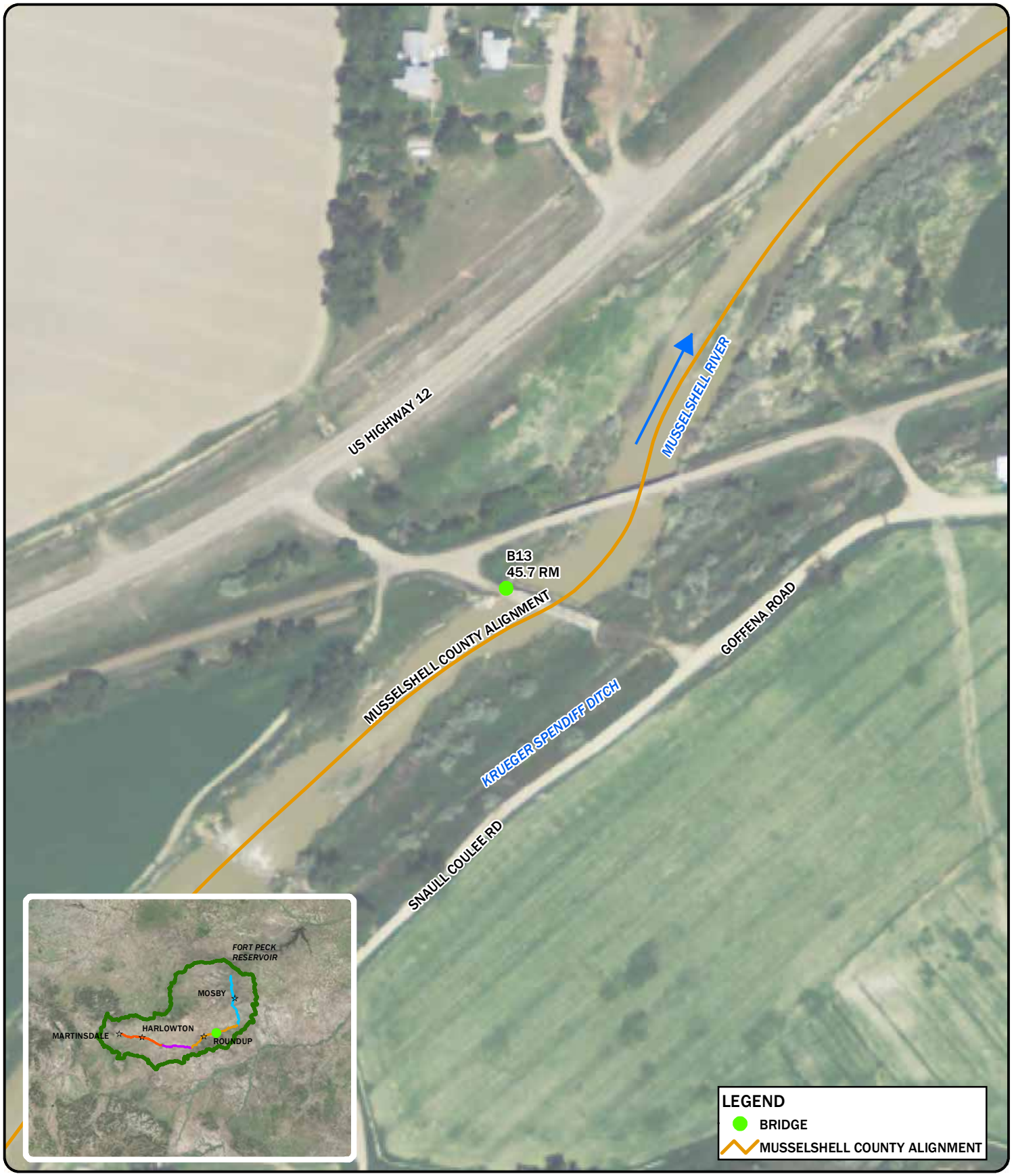
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B12-figure.mxd

	Photo Number: 2014_0826AM
	Date: 8/26/2014
	Description: Looking downstream from B12 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0826AN
	Date: 8/26/2014
	Description: Looking upstream from B12 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AO
	Date: 8/26/2014
	Description: Looking upstream at B12 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AP
	Date: 8/26/2014
	Description: Looking downstream at B12 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B13

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B13

DATE: 11/2/2014

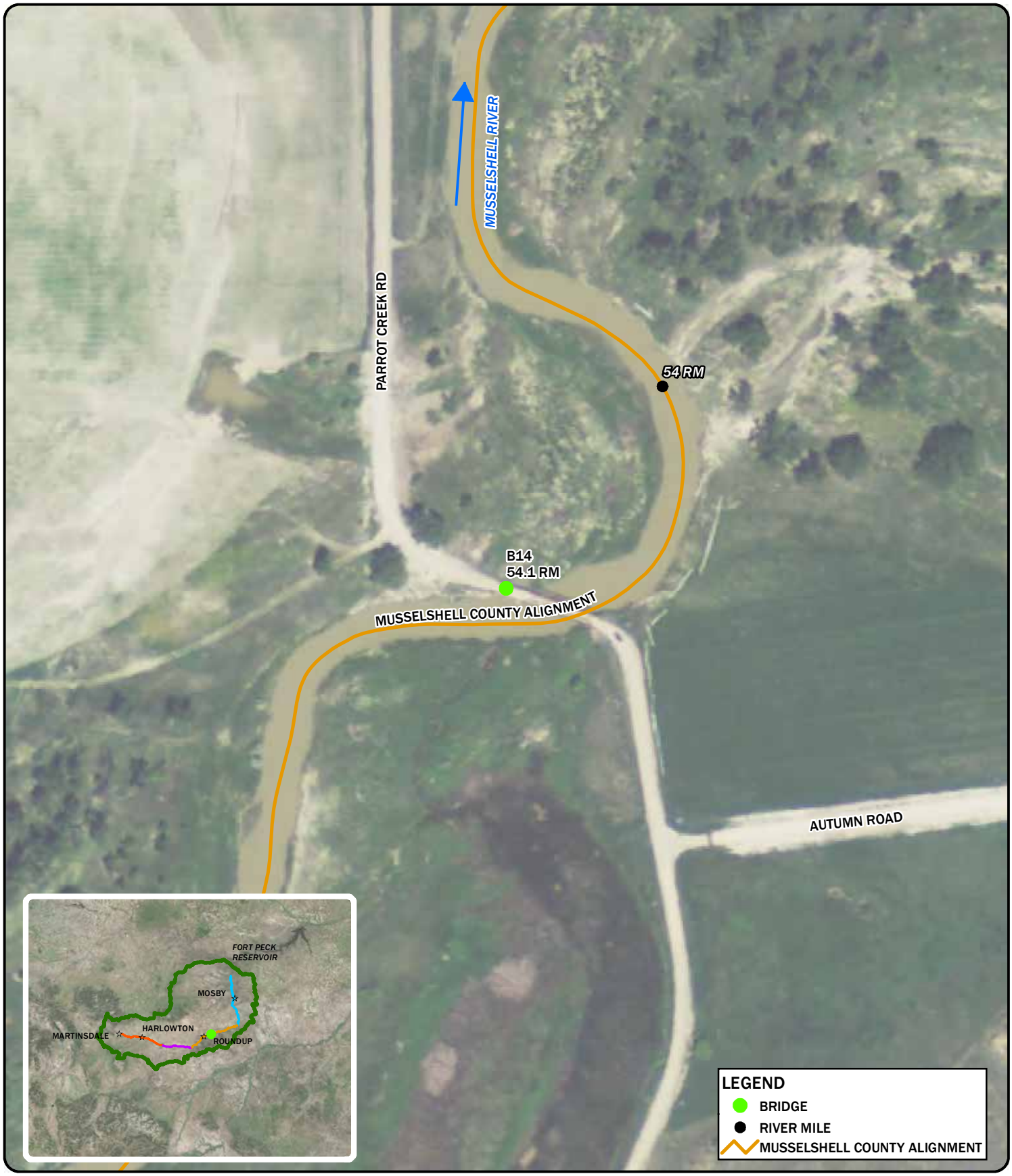
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B13-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AQ
	Date: 8/26/2014
	Description: Looking downstream from B13 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AR
	Date: 8/26/2014
	Description: Looking upstream from B13 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AS
	Date: 8/26/2014
	Description: Looking downstream at B13 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AT
	Date: 8/26/2014
	Description: Looking upstream at B13 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B14

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B14

DATE: 11/2/2014

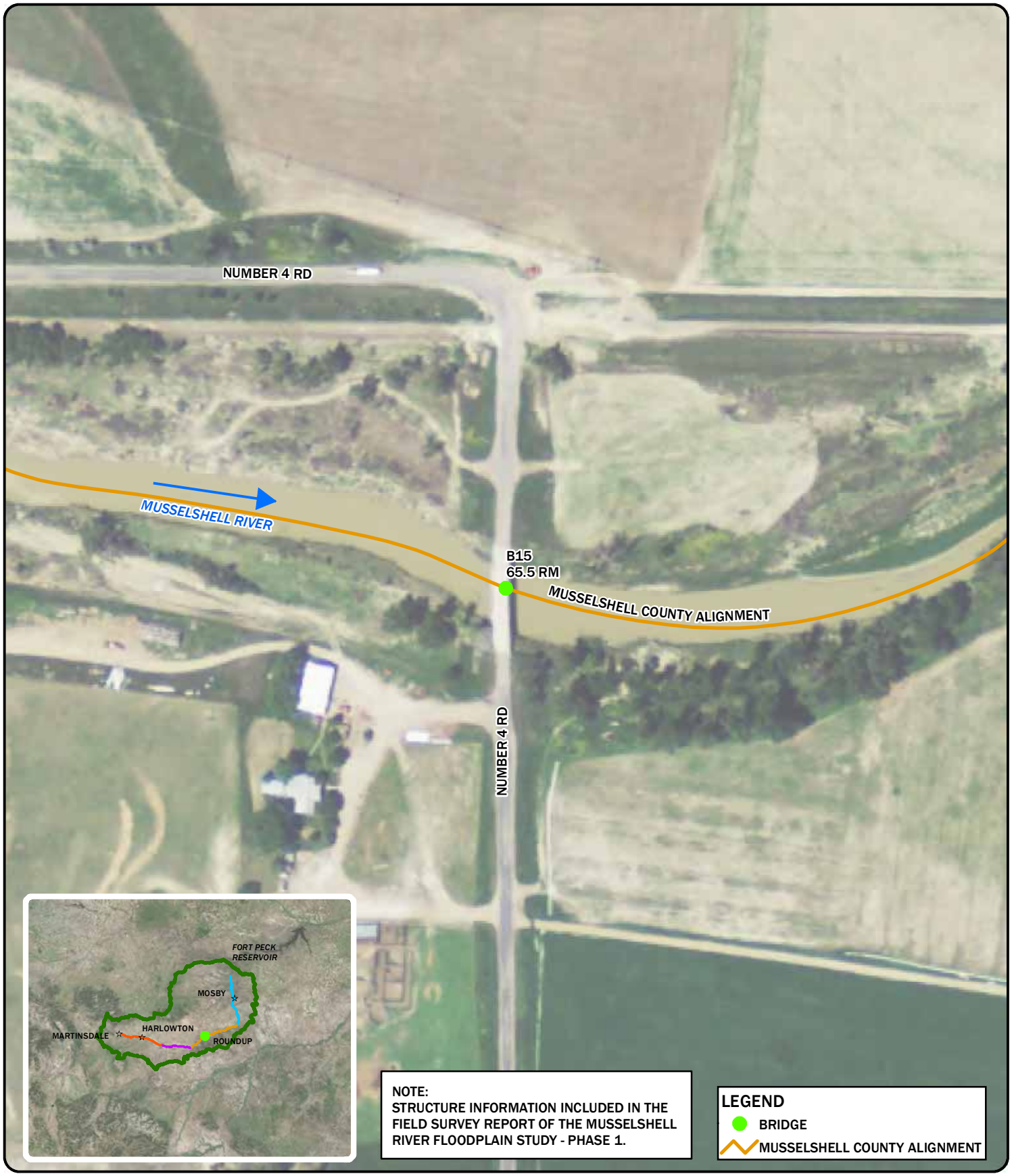
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B14-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AY
	Date: 8/26/2014
	Description: Looking downstream from B14 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AZ
	Date: 8/26/2014
	Description: Looking upstream from B14 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0826BA
	Date: 8/26/2014
	Description: Looking upstream at B14 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0826BB
	Date: 8/26/2014
	Description: Looking downstream at B14 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B15

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B15

DATE: 11/3/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B15-figure.mxd

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B16

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B16

DATE: 11/3/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B16-figure.mxd

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B17

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B17

DATE: 11/3/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B17-figure.mxd

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B18

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B18

DATE: 11/3/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B18-figure.mxd

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B19

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B19

DATE: 11/2/2014

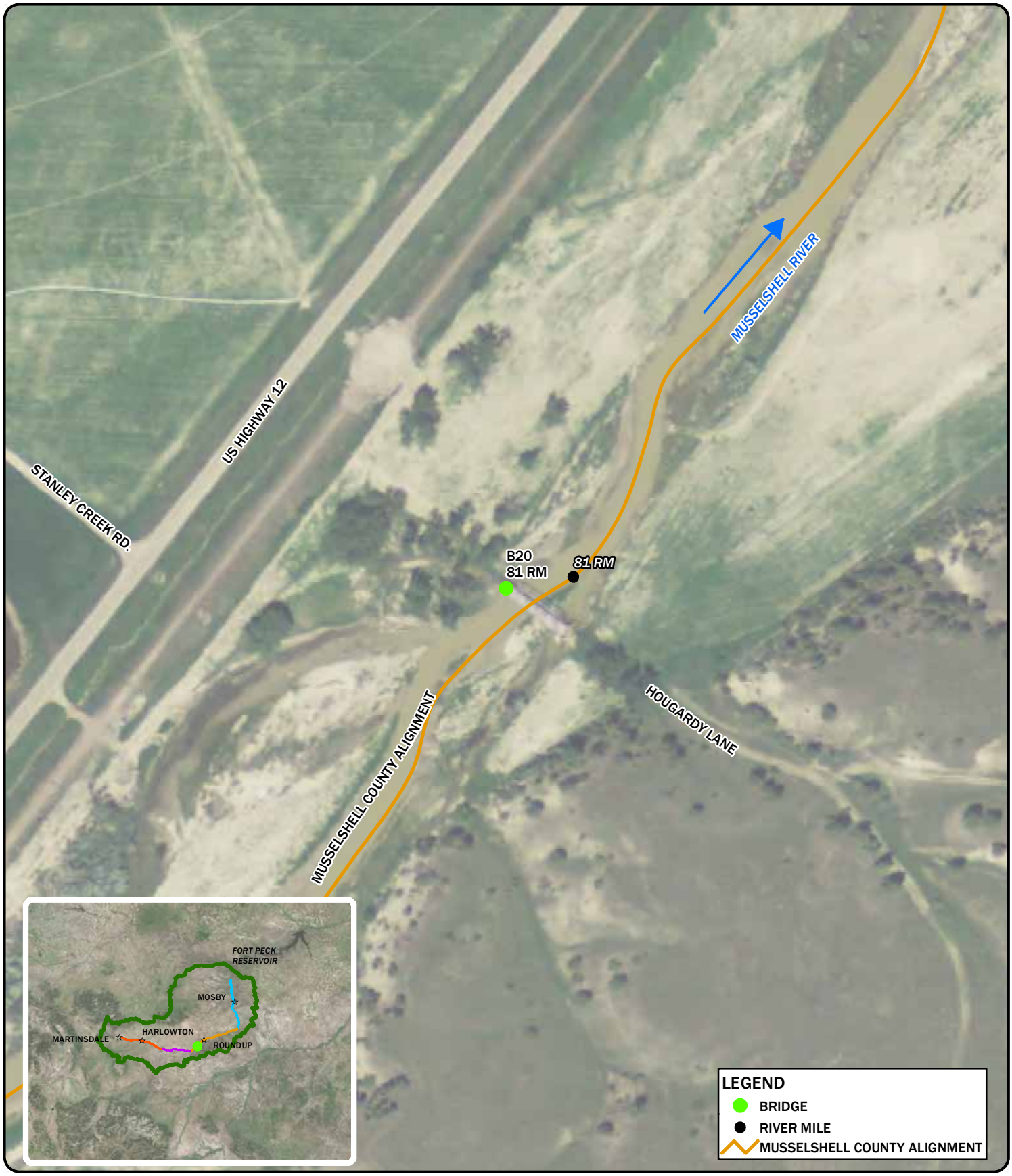
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B19-figure.mxd

	Photo Number: 2014_0826BG
	Date: 8/26/2014
	Description: Looking upstream at B19 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0826BH
	Date: 8/26/2014
	Description: Looking upstream from B19 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BI
	Date: 8/26/2014
	Description: Looking downstream from B19 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BJ
	Date: 8/26/2014
	Description: Looking downstream at B19 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B20

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B20

DATE: 11/3/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B20-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BK
	Date: 8/26/2014
	Description: Looking south across B20 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BL
	Date: 8/26/2014
	Description: Looking downstream from B20 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BM
	Date: 8/26/2014
	Description: Looking upstream from B20 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BN
	Date: 8/26/2014
	Description: Looking upstream at B20 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BO
	Date: 8/26/2014
	Description: Looking downstream at B20 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B21

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B21

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B21-figure.mxd

	Photo Number: 2014_0826BR
	Date: 8/26/2014
	Description: Looking downstream at B21 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0826BS
	Date: 8/26/2014
	Description: Looking downstream from B21 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BT
	Date: 8/26/2014
	Description: Looking upstream from B21 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BU
	Date: 8/26/2014
	Description: Looking upstream at B21 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B22

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B22

DATE: 11/2/2014

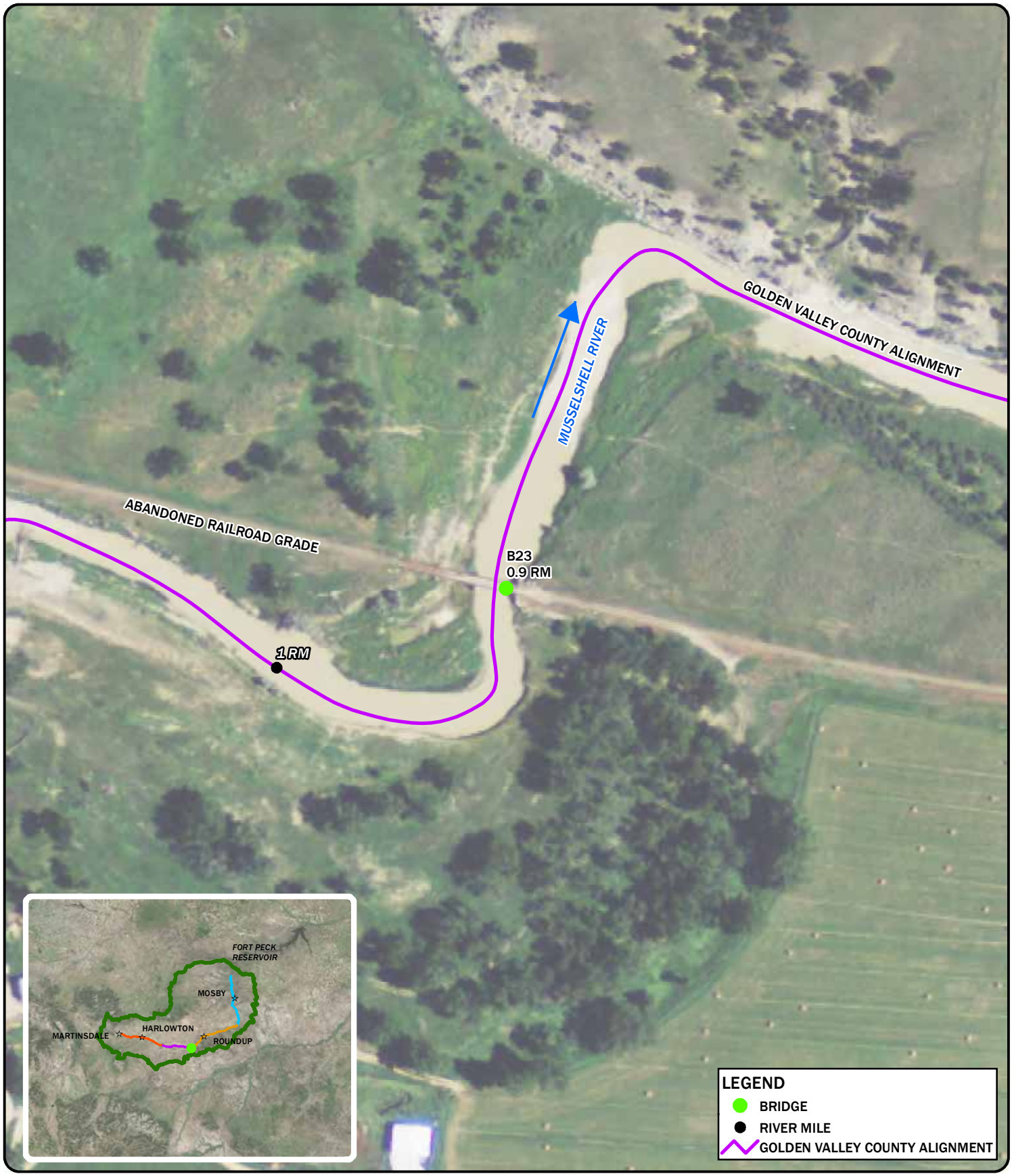
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B22-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BX
	Date: 8/26/2014
	Description: Looking downstream from B22 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BY
	Date: 8/26/2014
	Description: Looking upstream from B22 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0826BZ
	Date: 8/26/2014
	Description: Looking downstream at B22 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0826CA
	Date: 8/26/2014
	Description: Looking upstream at B22 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B23

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B23

DATE: 11/2/2014

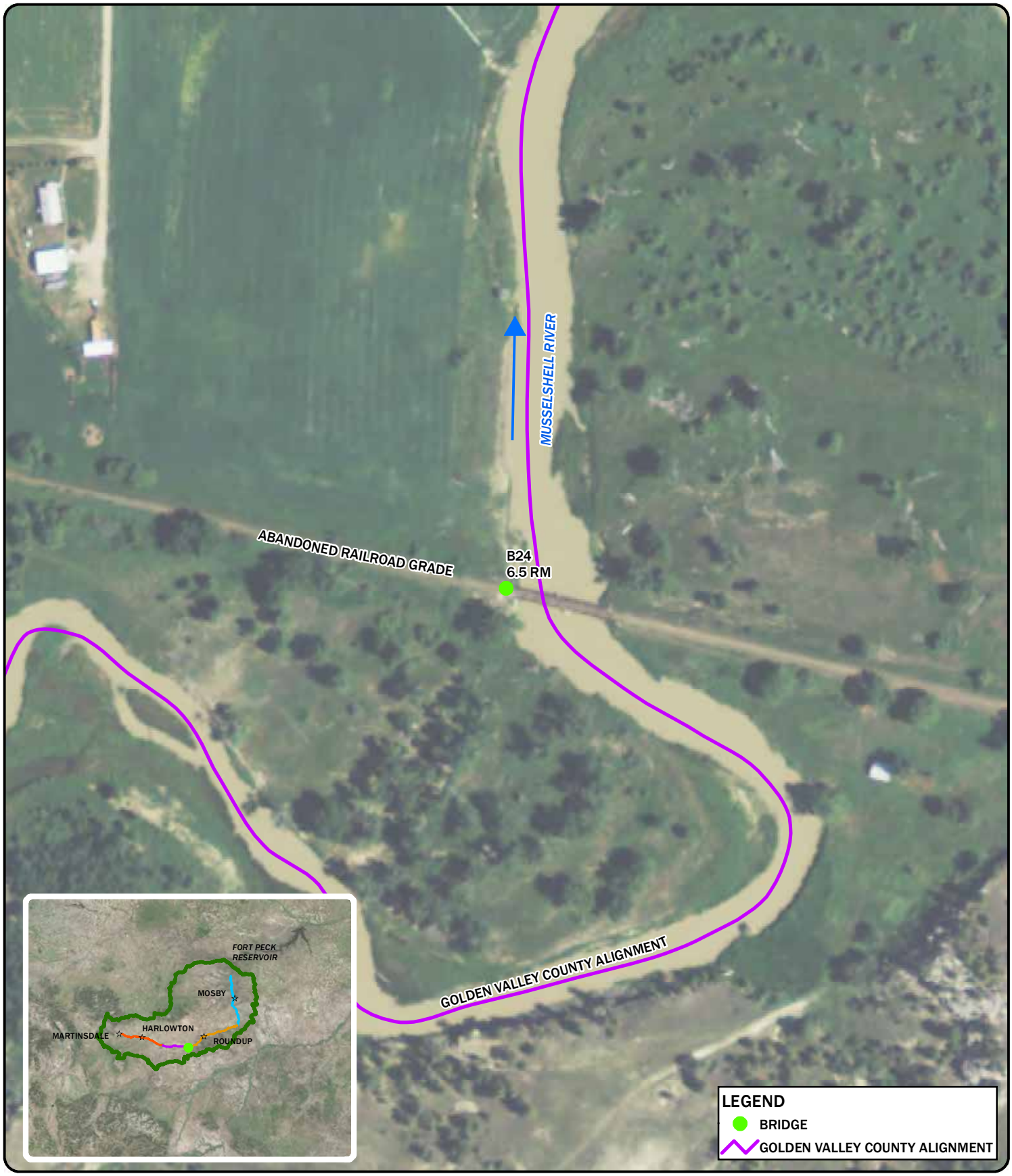
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B23-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AM
	Date: 8/27/2014
	Description: Looking downstream from B23 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AN
	Date: 8/27/2014
	Description: Looking upstream from B23 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AO
	Date: 8/27/2014
	Description: Looking upstream at B23 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AP
	Date: 8/27/2014
	Description: Looking downstream at B23 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



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UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

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Feet

FIGURE B24

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B24

DATE: 11/2/2014

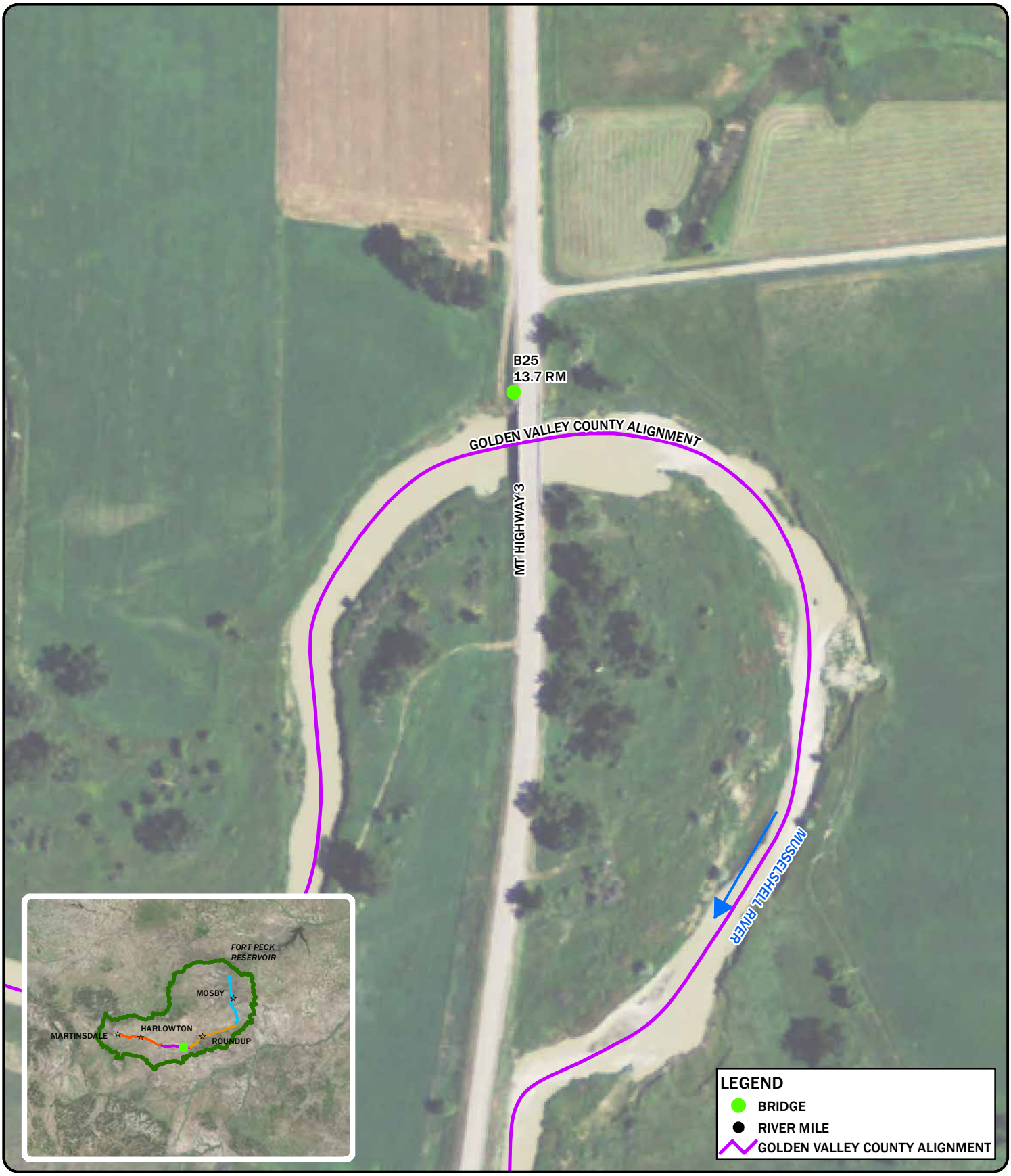
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B24-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AE
	Date: 8/27/2014
	Description: Looking upstream at B24 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AF
	Date: 8/27/2014
	Description: Looking upstream from B24 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AG
	Date: 8/27/2014
	Description: Looking downstream from B24 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AH
	Date: 8/27/2014
	Description: Looking downstream at B24 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B25

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B25

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B25-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AI
	Date: 8/27/2014
	Description: Looking downstream at B25 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AJ
	Date: 8/27/2014
	Description: Looking upstream from B25 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AK
	Date: 8/27/2014
	Description: Looking downstream from B25 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AL
	Date: 8/27/2014
	Description: Looking upstream at B25 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B26

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B26

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B26-figure.mxd

	Photo Number: 2014_0827AS
	Date: 8/27/2014
	Description: Looking upstream at B26 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0827AT
	Date: 8/27/2014
	Description: Looking downstream at B26 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AU
	Date: 8/27/2014
	Description: Looking downstream from B26 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AV
	Date: 8/27/2014
	Description: Looking upstream from B26 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B27

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B27

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B27-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AW
	Date: 8/27/2014
	Description: Looking south east at the length of B27 bridge
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AX
	Date: 8/27/2014
	Description: Looking downstream at B27 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AY
	Date: 8/27/2014
	Description: Looking downstream at B27 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AZ
	Date: 8/27/2014
	Description: Looking downstream at B27 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0827BA
	Date: 8/27/2014
	Description: Looking downstream at B27 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0827BB
	Date: 8/27/2014
	Description: Looking upstream at B27 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BC
	Date: 8/27/2014
	Description: Looking upstream at B27 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BD
	Date: 8/27/2014
	Description: Looking upstream at B27 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BE
	Date: 8/27/2014
	Description: Looking upstream from B27 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BF
	Date: 8/27/2014
	Description: Looking downstream from B27 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
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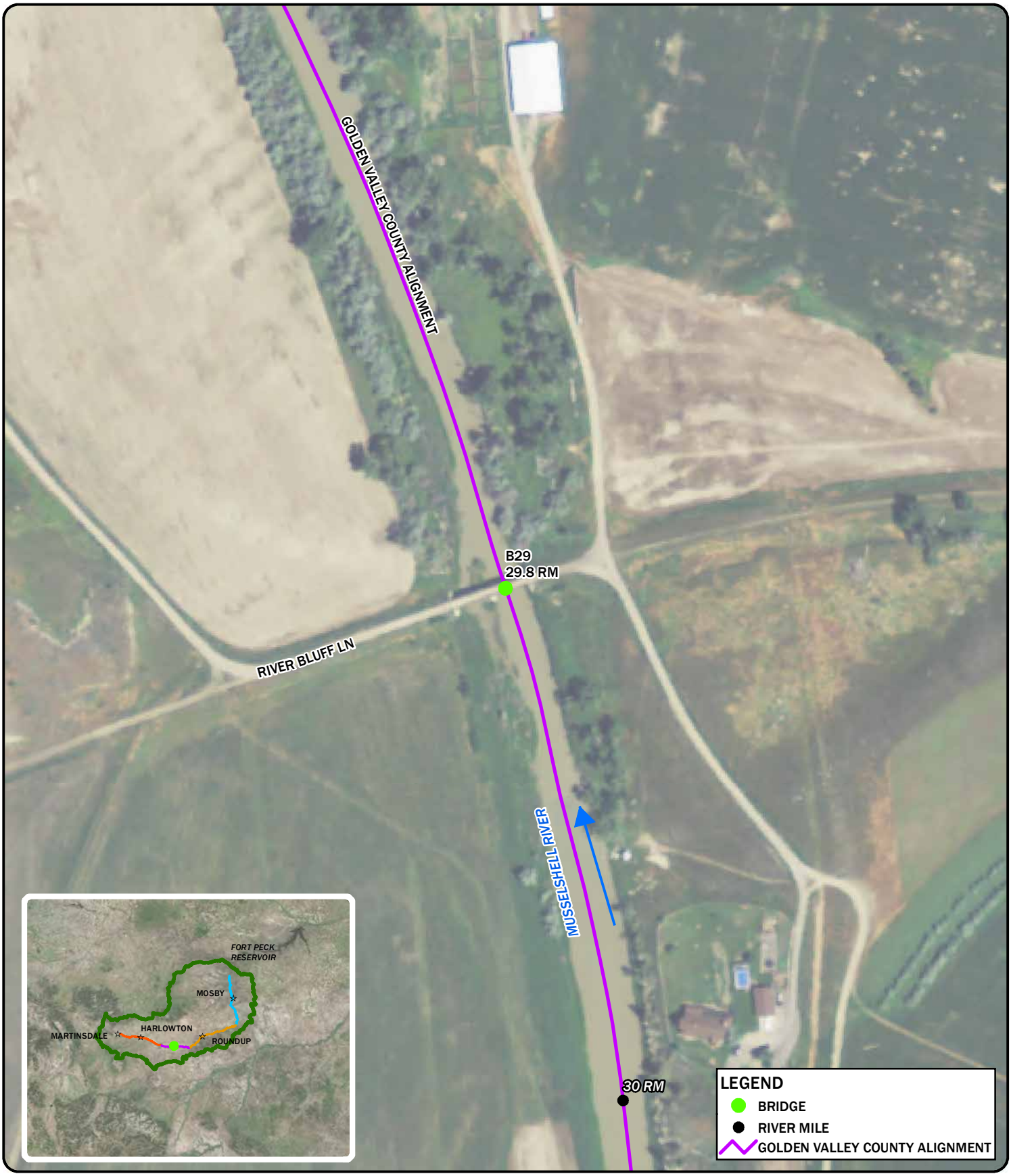
FIGURE B28

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B28

DATE: 11/5/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B28-figure.mxd



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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

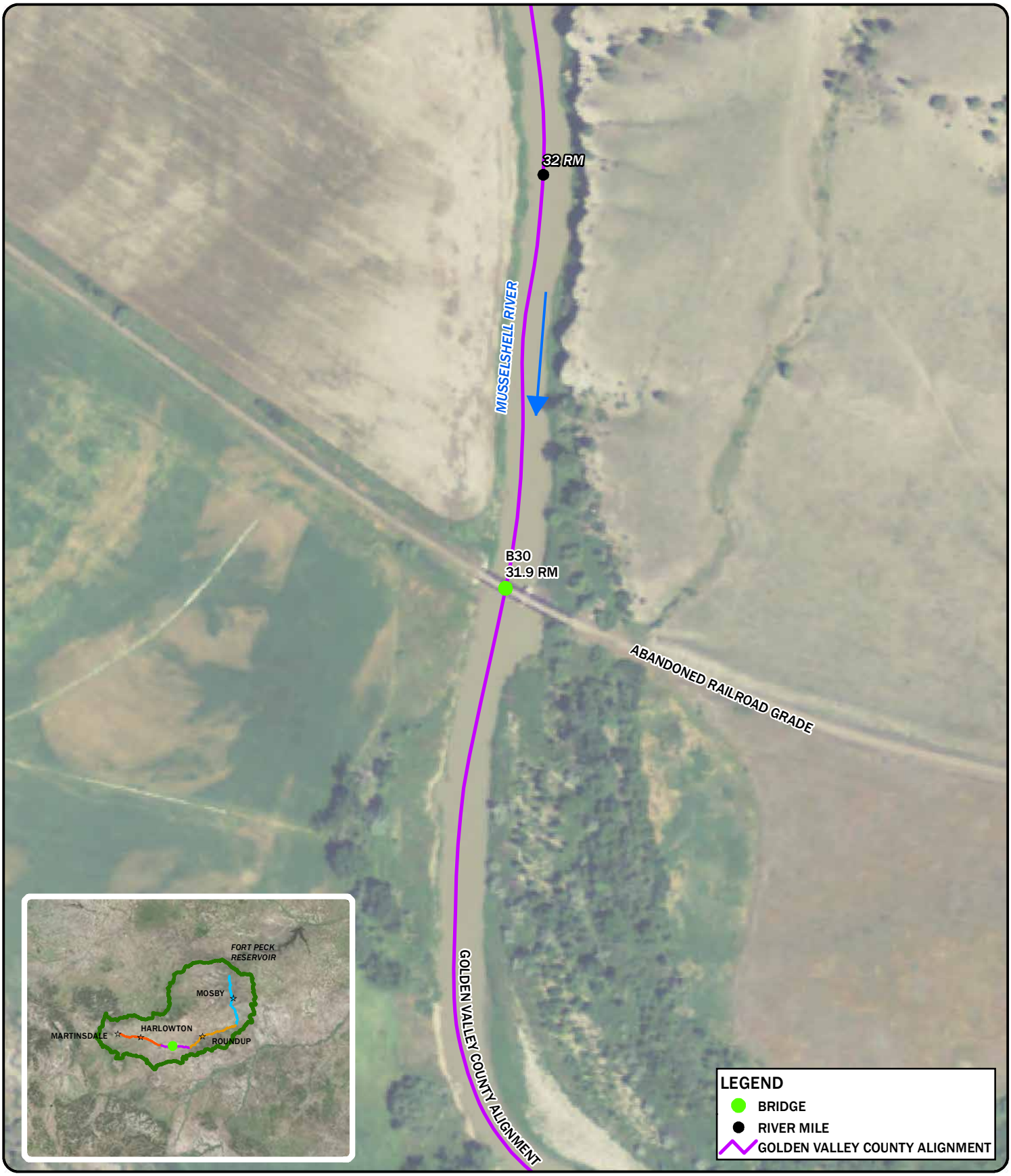
FIGURE B29

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B29

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B29-figure.mxd



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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

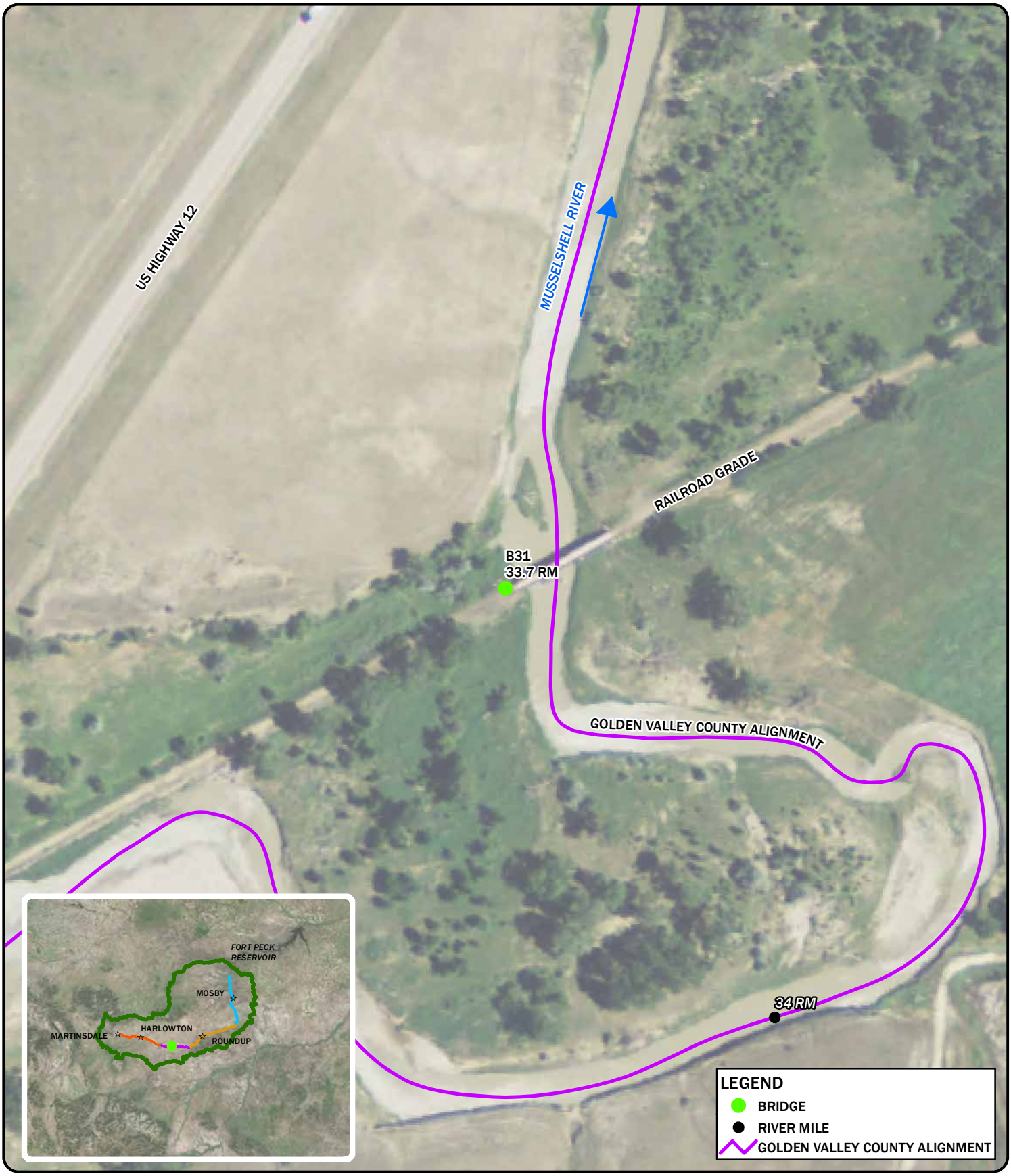
FIGURE B30

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B30

DATE: 11/3/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B30-figure.mxd



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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B31

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B31

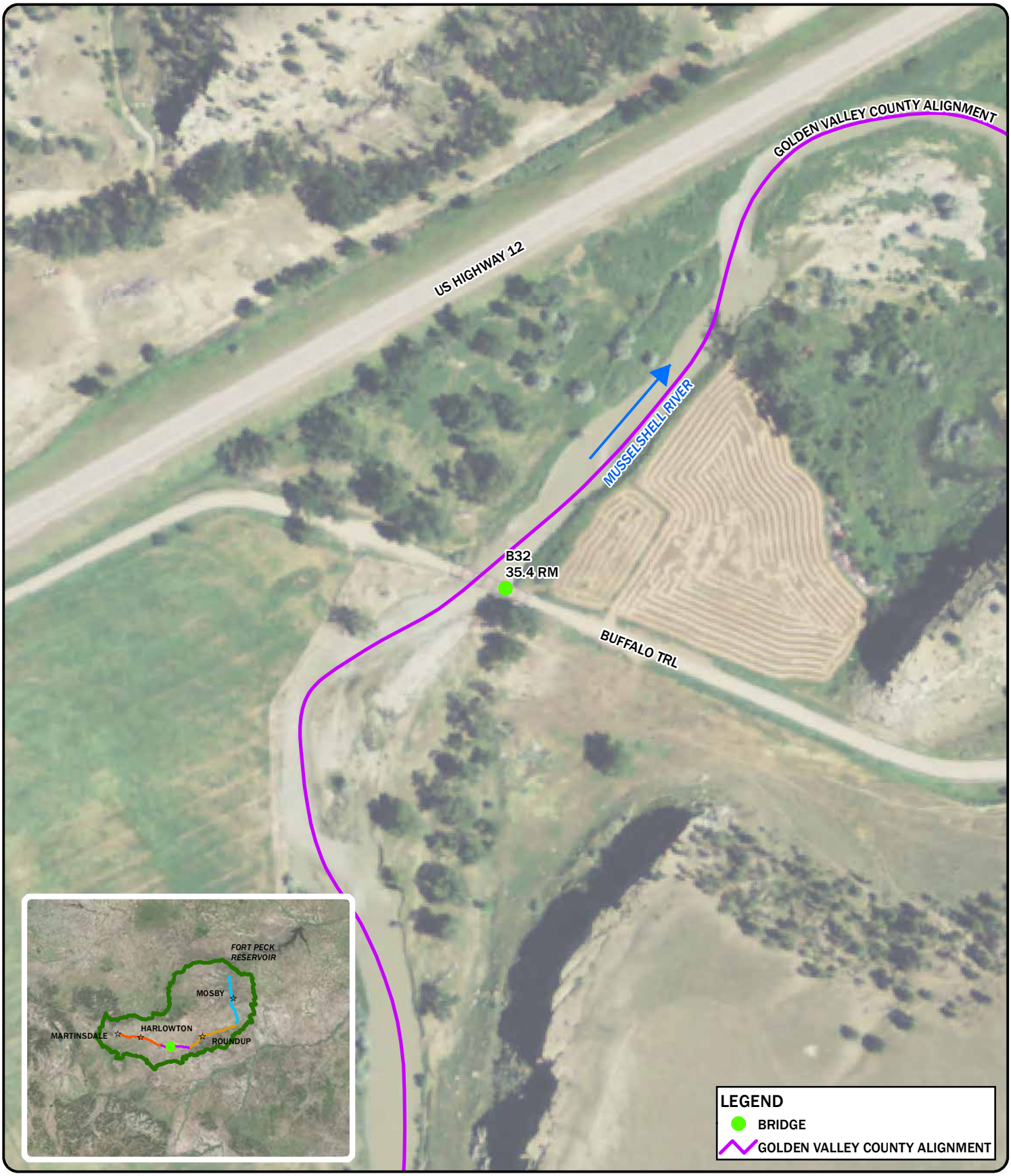
DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B31-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BI
	Date: 8/27/2014
	Description: Looking upstream at B31 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BJ
	Date: 8/27/2014
	Description: Looking upstream from B31 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BK
	Date: 8/27/2014
	Description: Looking downstream from B31 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



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SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B32

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B32

DATE: 11/2/2014

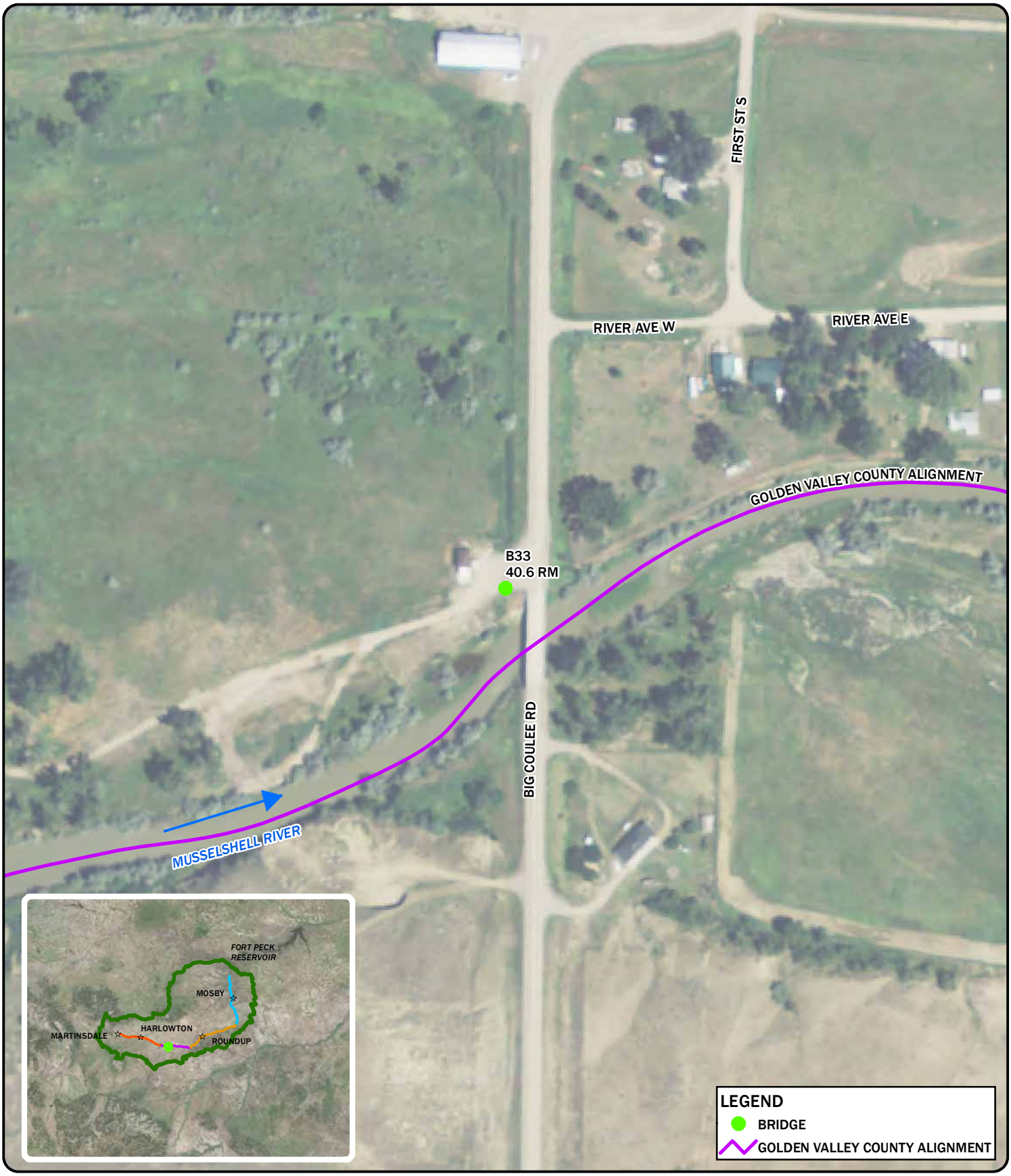
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B32-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BL
	Date: 8/27/2014
	Description: Looking downstream from B32 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BM
	Date: 8/27/2014
	Description: Looking upstream from B32 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BN
	Date: 8/27/2014
	Description: Looking upstream at B32 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BO
	Date: 8/27/2014
	Description: Looking downstream at B32 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



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UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

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Feet

FIGURE B33

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B33

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B33-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BP
	Date: 8/27/2014
	Description: Looking downstream at B33 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BQ
	Date: 8/27/2014
	Description: Looking upstream from B33 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BR
	Date: 8/27/2014
	Description: Looking downstream from B33 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BS
	Date: 8/27/2014
	Description: Looking upstream at B33 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B34

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B34

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B34-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BV
	Date: 8/27/2014
	Description: Looking upstream at B34 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BW
	Date: 8/27/2014
	Description: Looking upstream from B34 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BX
	Date: 8/27/2014
	Description: Looking downstream from B34 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BY
	Date: 8/27/2014
	Description: Looking downstream at B34 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B35

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B35

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B35-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AA
	Date: 8/28/2014
	Description: Looking downstream at B35 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AB
	Date: 8/28/2014
	Description: Looking upstream from B35 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AC
	Date: 8/28/2014
	Description: Looking downstream from B35 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AD
	Date: 8/28/2014
	Description: Looking upstream at B35 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B36

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B36

DATE: 11/2/2014

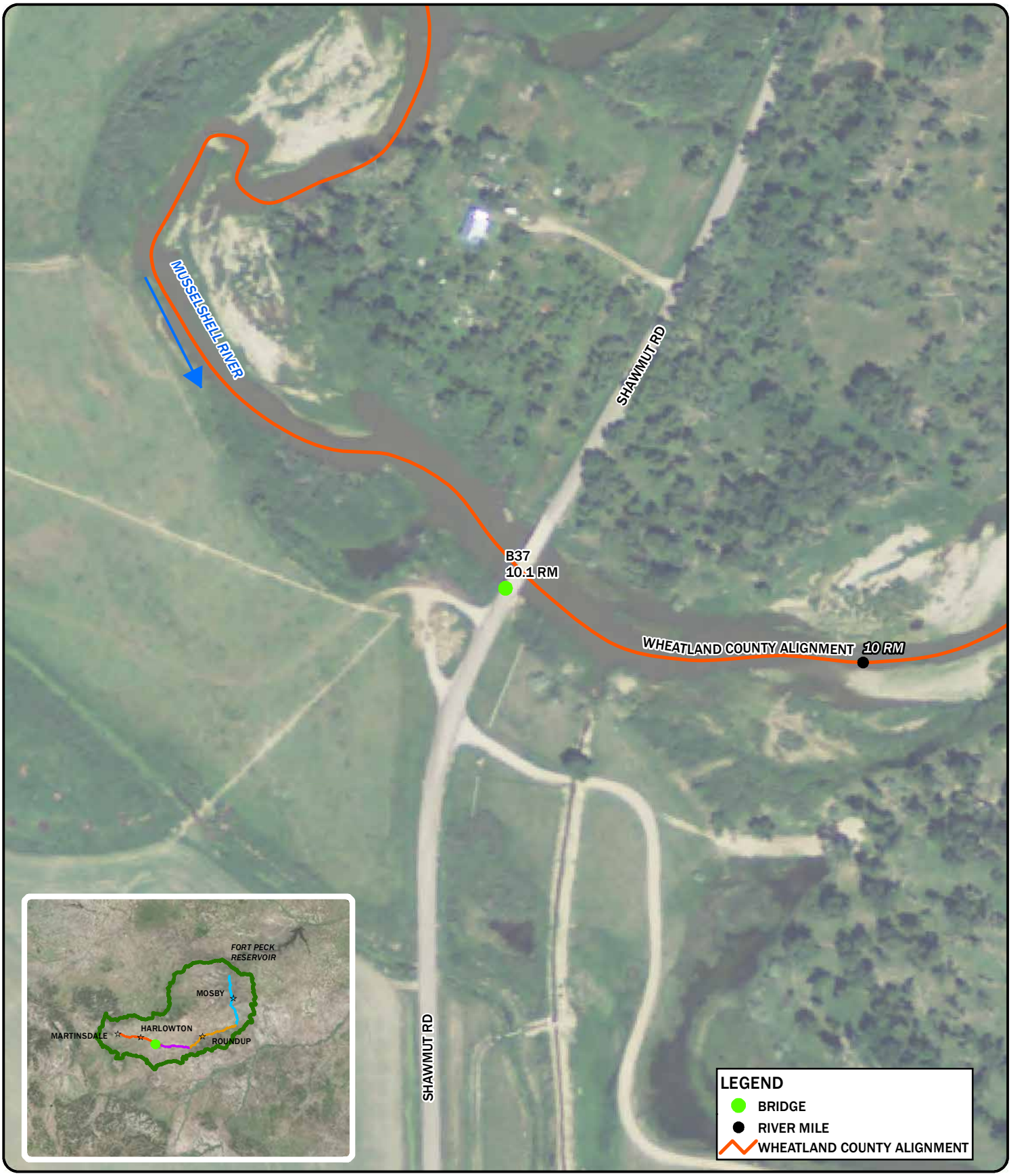
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B36-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AE
	Date: 8/28/2014
	Description: Looking downstream at B36 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AF
	Date: 8/28/2014
	Description: Looking downstream from B36 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AG
	Date: 8/28/2014
	Description: Looking upstream from B36 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AH
	Date: 8/28/2014
	Description: Looking upstream at B36 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
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SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B37

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B37

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B37-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AI
	Date: 8/28/2014
	Description: Looking downstream at B37 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AJ
	Date: 8/28/2014
	Description: Looking downstream from B37 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AK
	Date: 8/28/2014
	Description: Looking upstream from B37 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AL
	Date: 8/28/2014
	Description: Looking upstream at B37 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B38

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B38

DATE: 11/2/2014

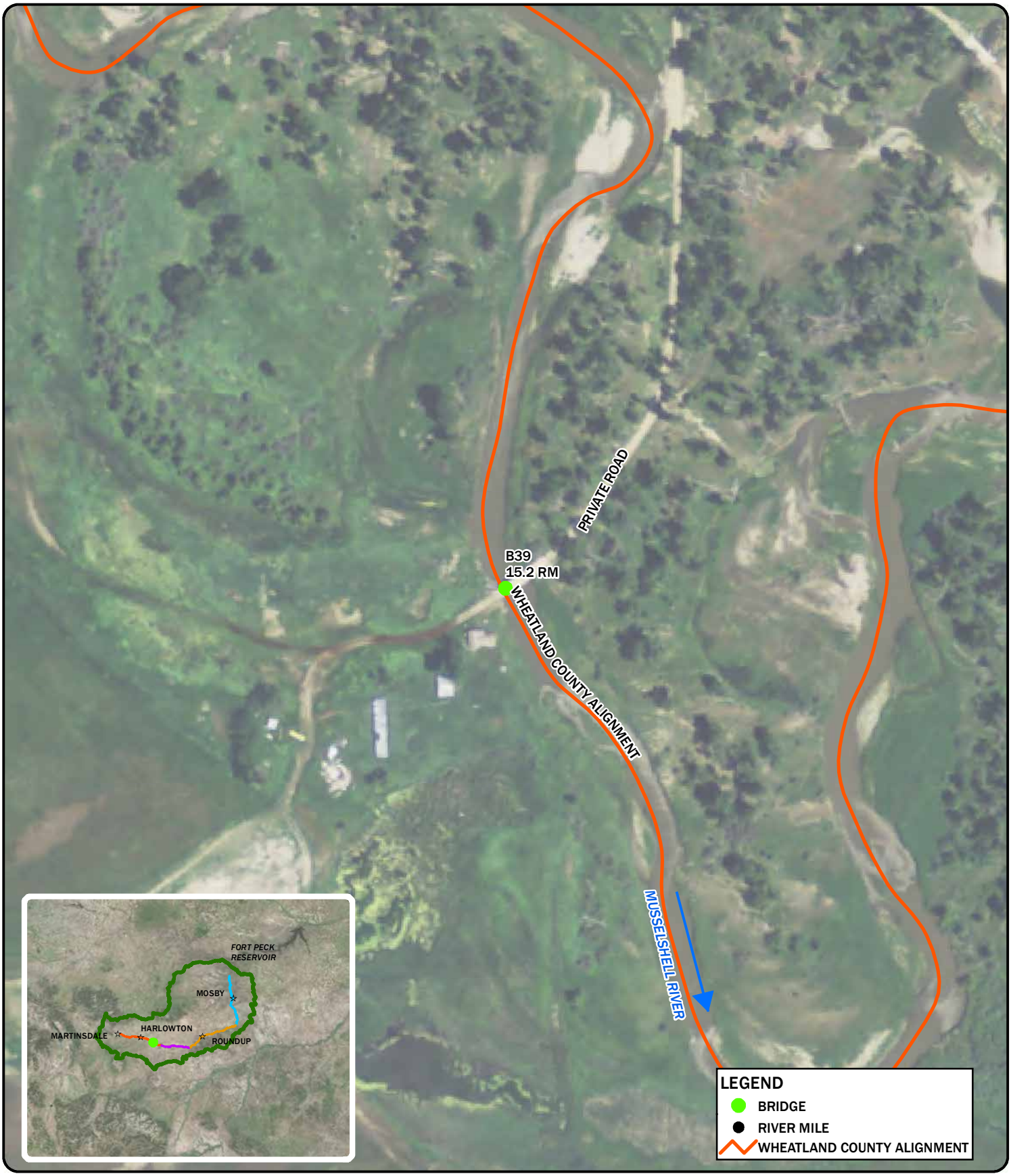
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B38-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AN
	Date: 8/28/2014
	Description: Looking upstream at B38 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AO
	Date: 8/28/2014
	Description: Looking downstream from B38 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AP
	Date: 8/28/2014
	Description: Looking upstream from B38 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AQ
	Date: 8/28/2014
	Description: Looking downstream at B38 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B39

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B39

DATE: 11/2/2014

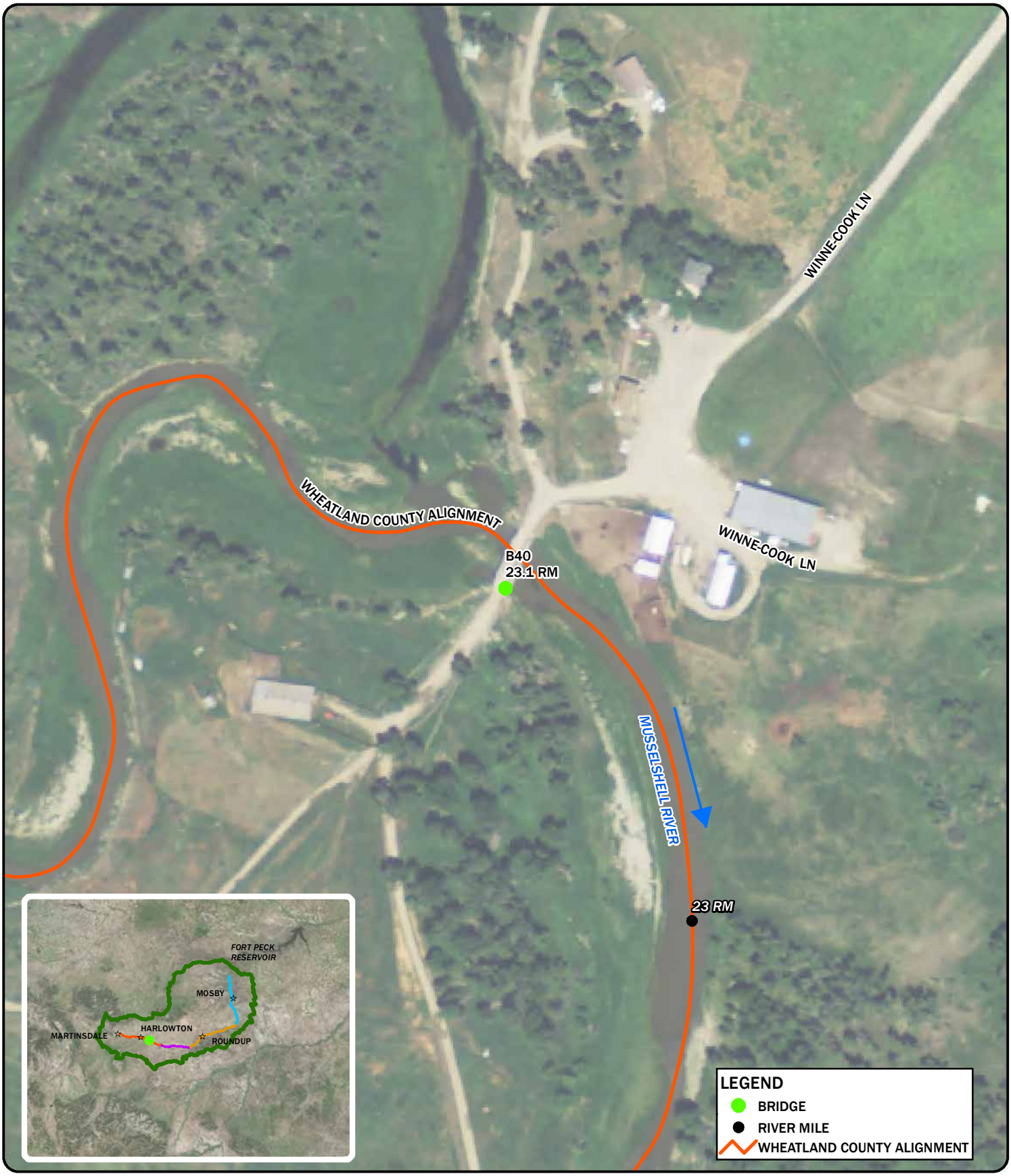
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B39-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AR
	Date: 8/28/2014
	Description: Looking upstream at B39 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AS
	Date: 8/28/2014
	Description: Looking downstream from B39 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AT
	Date: 8/28/2014
	Description: Looking upstream from B39 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AU
	Date: 8/28/2014
	Description: Looking downstream at B39 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B40

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B40

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B40-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AZ
	Date: 8/28/2014
	Description: Looking upstream from B40 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828BA
	Date: 8/28/2014
	Description: Looking downstream from B40 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828BB
	Date: 8/28/2014
	Description: Looking upstream at B40 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828BC
	Date: 8/28/2014
	Description: Looking downstream at B40 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B41

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B41

DATE: 11/2/2014

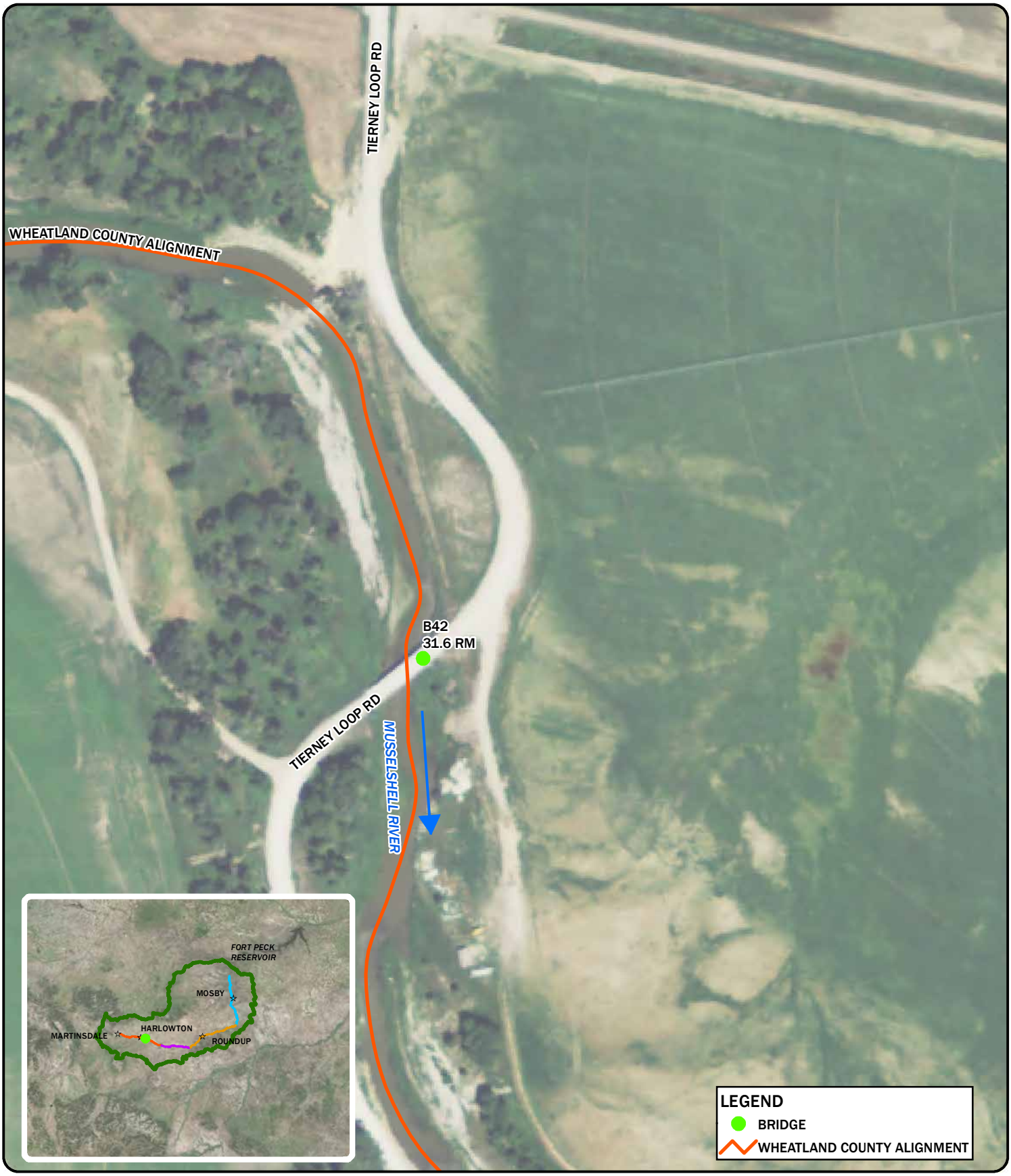
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B41-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828BJ
	Date: 8/28/2014
	Description: Looking downstream at B41 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828BK
	Date: 8/28/2014
	Description: Looking downstream from B41 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828BL
	Date: 8/28/2014
	Description: Looking upstream from B41 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828BM
	Date: 8/28/2014
	Description: Looking upstream at B41 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B42

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B42

DATE: 11/3/2014

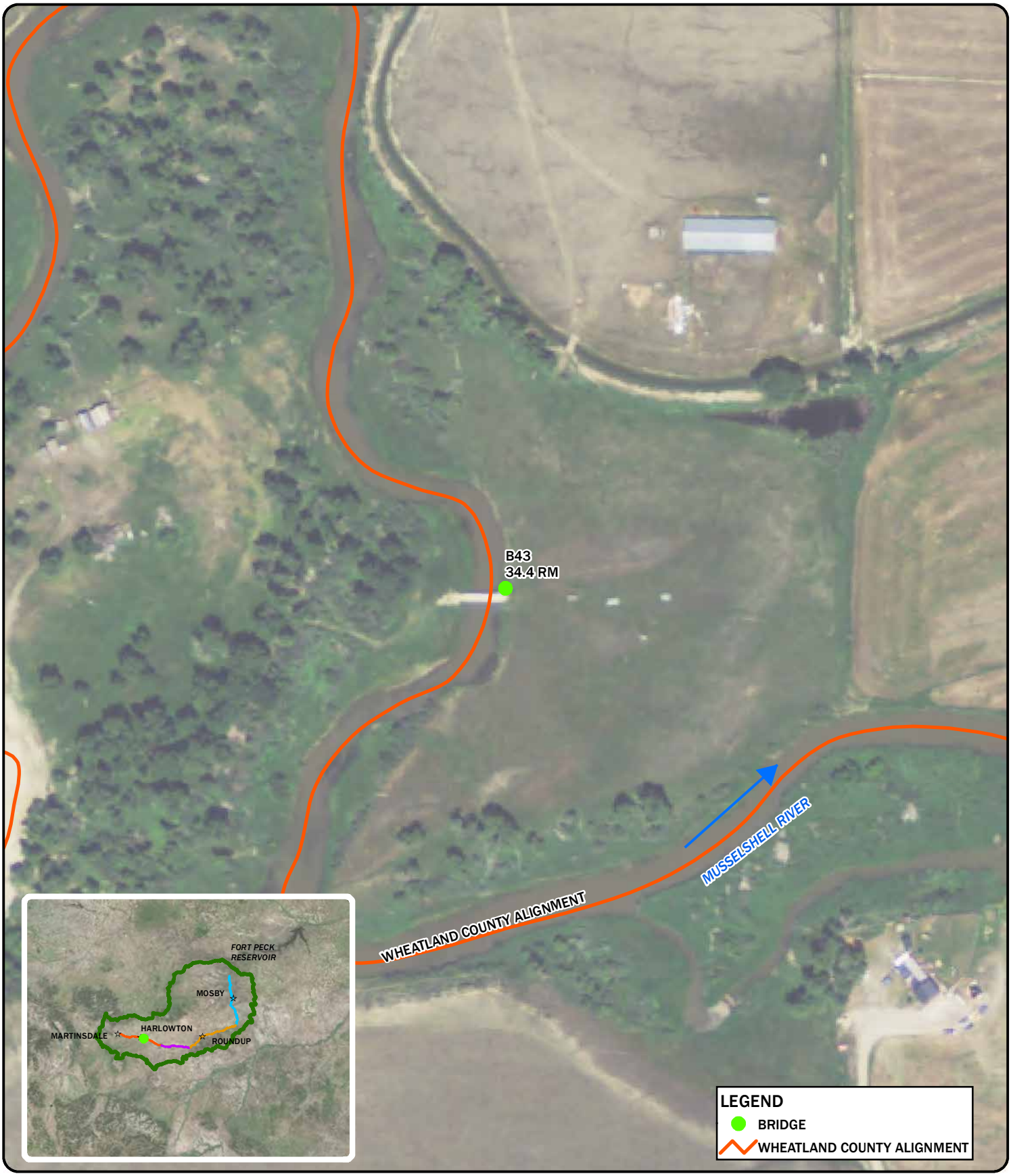
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B42-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AA
	Date: 9/2/2014
	Description: Looking downstream at B42 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AB
	Date: 9/2/2014
	Description: Looking downstream from B42 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AC
	Date: 9/2/2014
	Description: Looking upstream from B42 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AD
	Date: 9/2/2014
	Description: Looking upstream at B42 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B43

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B43

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B43-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AK
	Date: 9/2/2014
	Description: Looking downstream at B43 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AL
	Date: 9/2/2014
	Description: Looking downstream from B43 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AM
	Date: 9/2/2014
	Description: Looking upstream from B43 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AN
	Date: 9/2/2014
	Description: Looking upstream at B43 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B44

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B44

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B44-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AO
	Date: 9/2/2014
	Description: Looking downstream at B44 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AP
	Date: 9/2/2014
	Description: Looking downstream from B44 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AQ
	Date: 9/2/2014
	Description: Looking upstream from B44 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AR
	Date: 9/2/2014
	Description: Looking upstream at B44 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B45

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B45

DATE: 11/2/2014

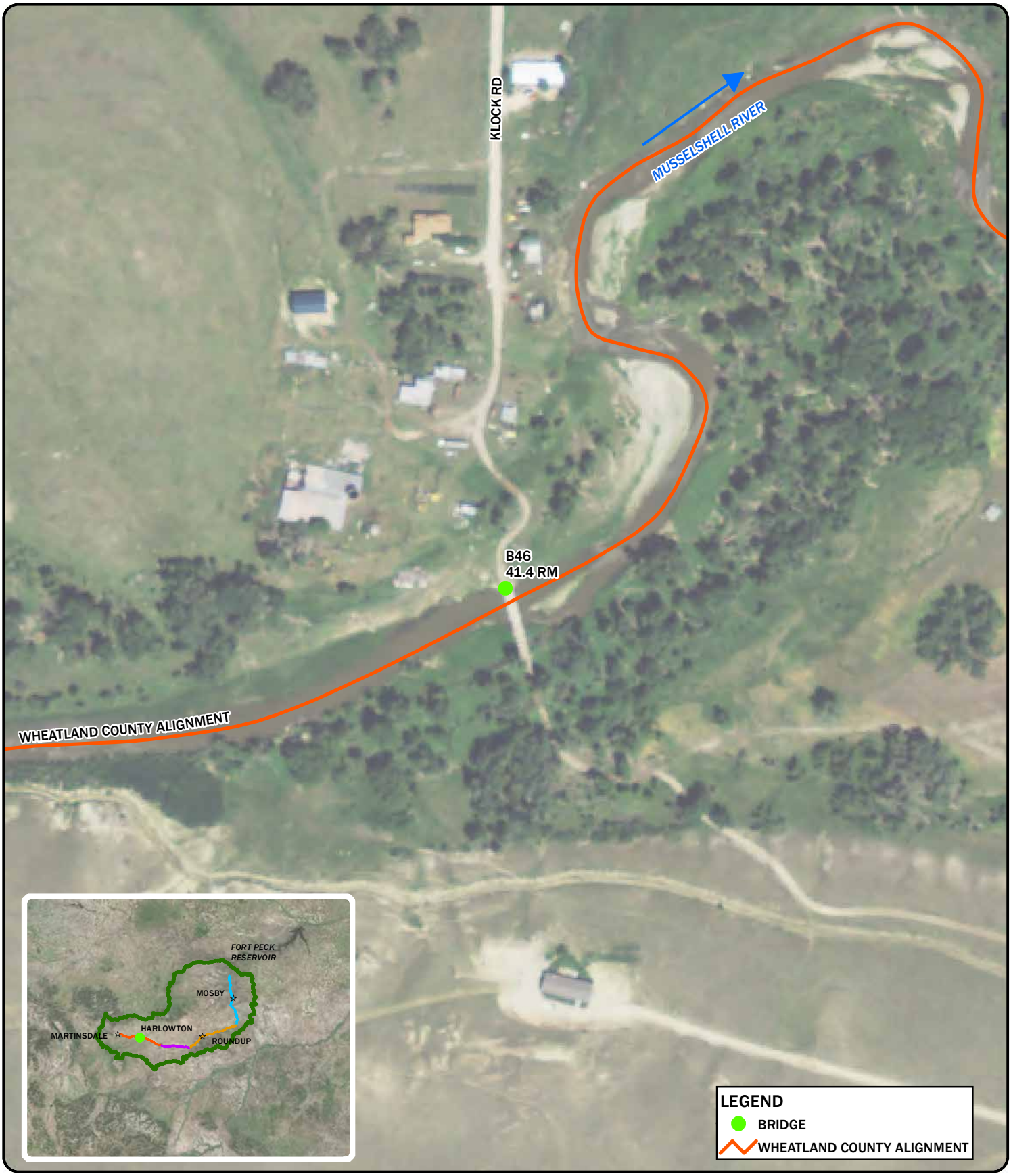
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B45-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AU
	Date: 9/2/2014
	Description: Looking upstream at B45 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AV
	Date: 9/2/2014
	Description: Looking upstream from B45 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0902AW
	Date: 9/2/2014
	Description: Looking downstream from B45 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0902AX
	Date: 9/2/2014
	Description: Looking downstream at B45 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B46

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B46

DATE: 11/2/2014

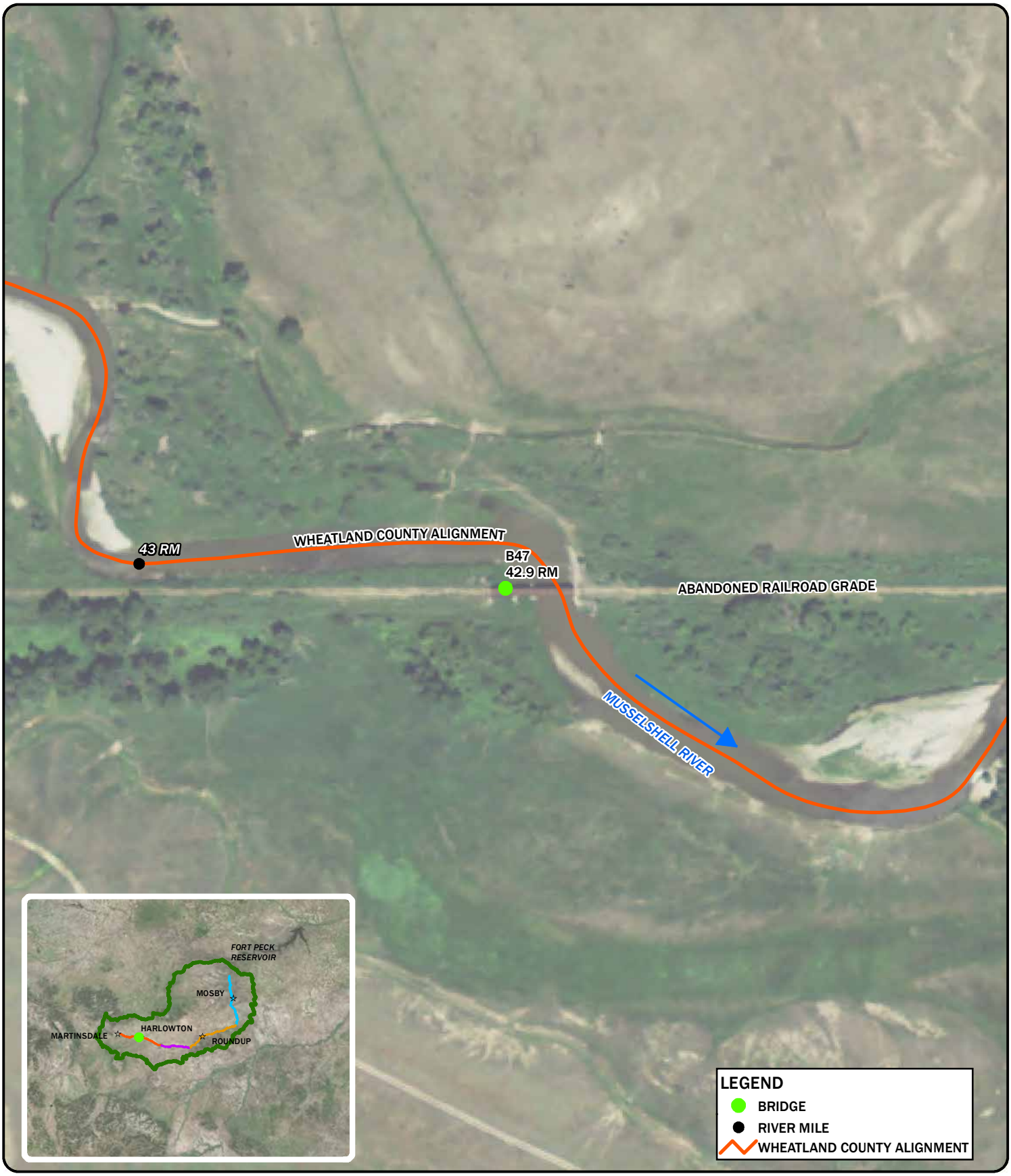
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B46-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AY
	Date: 9/2/2014
	Description: Looking downstream at B46 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AZ
	Date: 9/2/2014
	Description: Looking downstream from B46 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BA
	Date: 9/2/2014
	Description: Looking upstream from B46 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BB
	Date: 9/2/2014
	Description: Looking upstream at B46 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B47

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B47

DATE: 11/5/2014

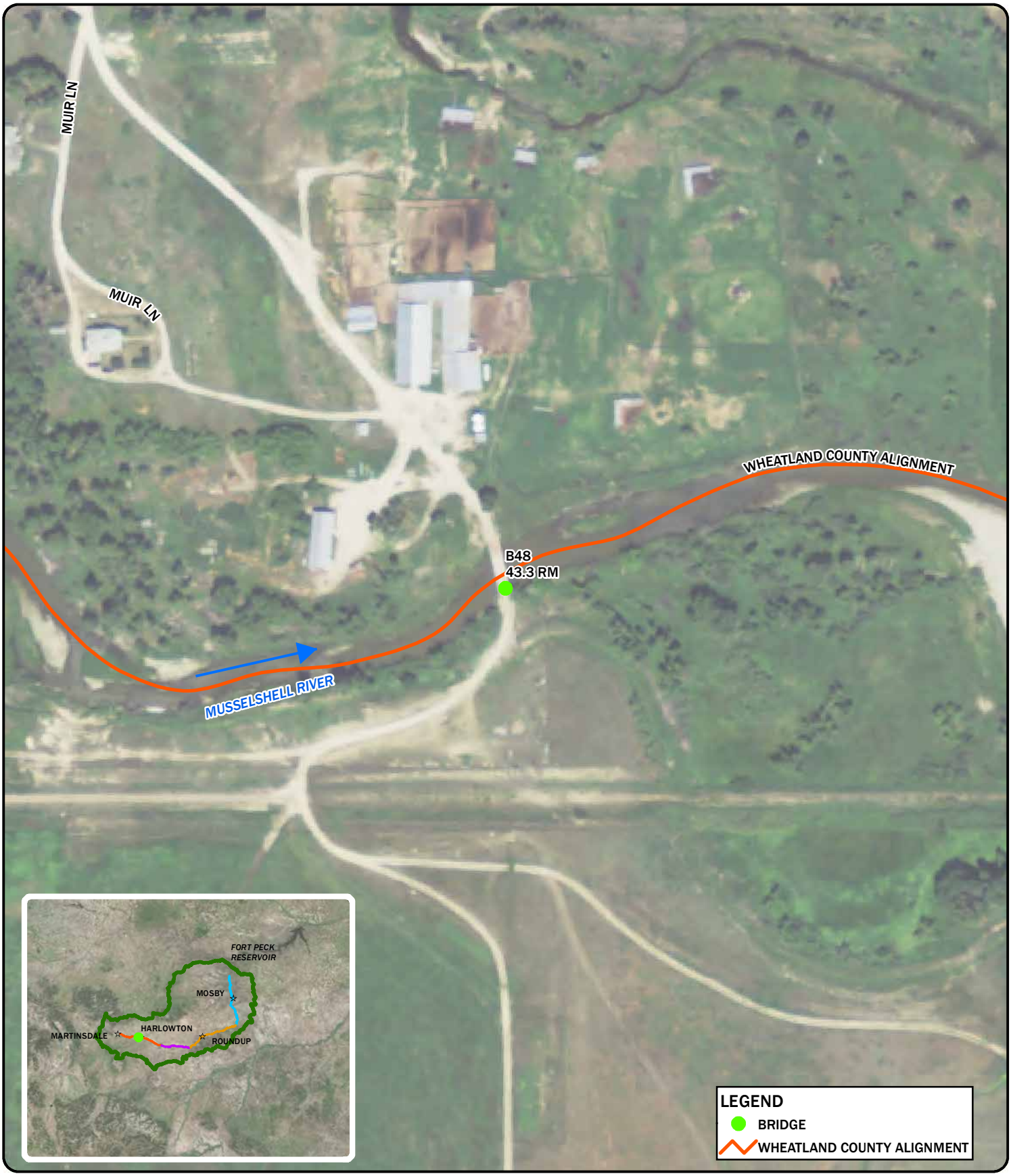
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B47-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BF
	Date: 9/2/2014
	Description: Looking downstream from B47 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BG
	Date: 9/2/2014
	Description: Looking upstream from B47 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BH
	Date: 9/2/2014
	Description: Looking downstream at B47 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BI
	Date: 9/2/2014
	Description: Looking upstream at B47 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B48

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B48

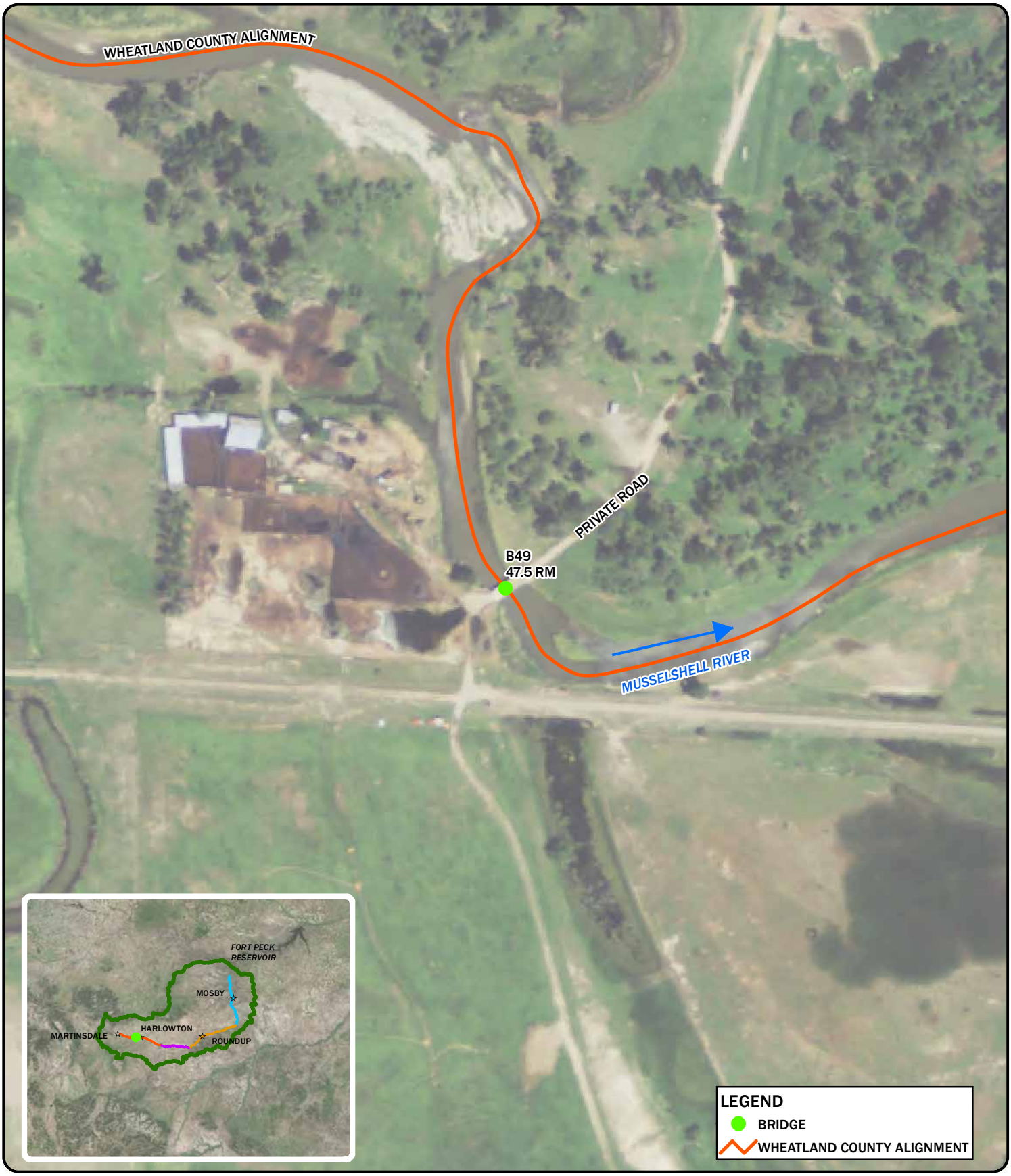
DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B48-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BC
	Date: 9/2/2014
	Description: Looking downstream from B48 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BD
	Date: 9/2/2014
	Description: Looking downstream at B48 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BE
	Date: 9/2/2014
	Description: Looking upstream at B48 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B49

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B49

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B49-figure.mxd

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B50

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B50

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B50-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BO
	Date: 9/2/2014
	Description: Looking upstream from B50 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BP
	Date: 9/2/2014
	Description: Looking downstream from B50 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BQ
	Date: 9/2/2014
	Description: Looking downstream at B50 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BR
	Date: 9/2/2014
	Description: Looking upstream at B50 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B51

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B51

DATE: 11/5/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B51-figure.mxd

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B52

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B52

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B52-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BS
	Date: 9/2/2014
	Description: Looking downstream from B52 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BT
	Date: 9/2/2014
	Description: Looking upstream from B52 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BU
	Date: 9/2/2014
	Description: Looking downstream at B52 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BV
	Date: 9/2/2014
	Description: Looking upstream at B52 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B52A

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B52A

DATE: 11/2/2014

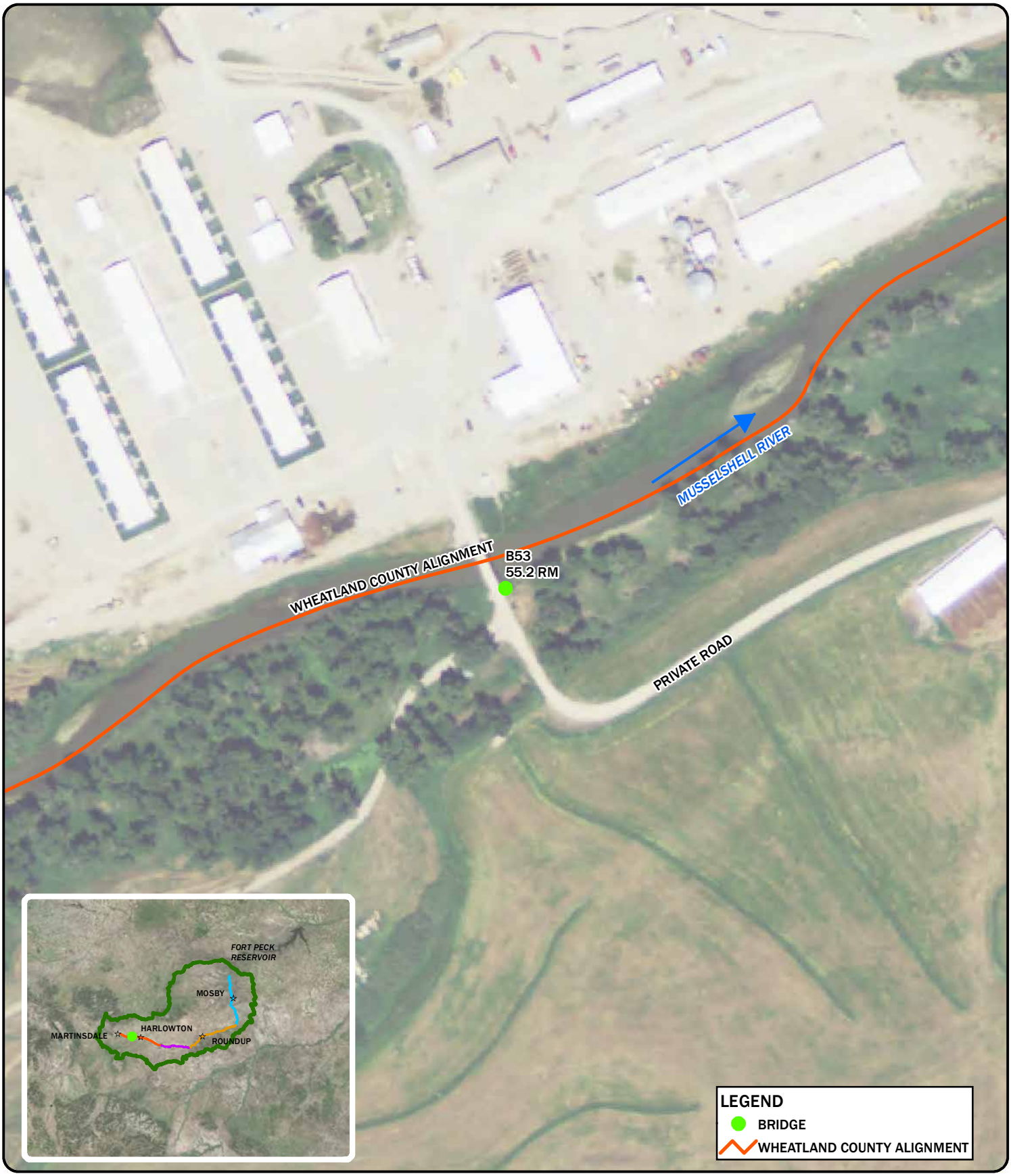
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B52A-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BY
	Date: 9/2/2014
	Description: Looking downstream from B52A bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BZ
	Date: 9/2/2014
	Description: Looking upstream from B52A bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0902CA
	Date: 9/2/2014
	Description: Looking upstream at B52A bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0902CB
	Date: 9/2/2014
	Description: Looking downstream at B52A bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B53

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B53

DATE: 11/2/2014

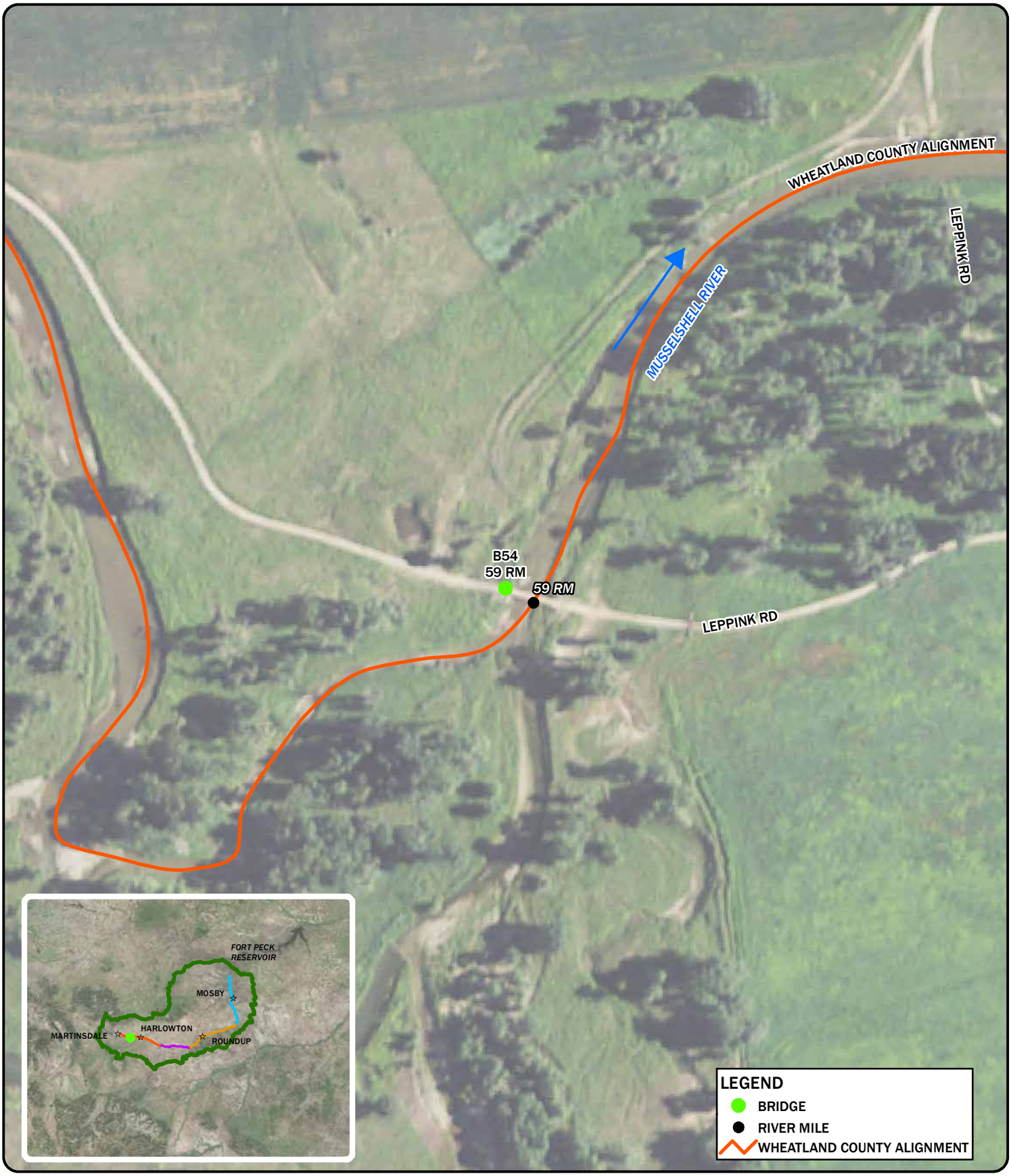
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B53-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CC
	Date: 9/2/2014
	Description: Looking upstream at B53 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CD
	Date: 9/2/2014
	Description: Looking upstream from B53 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CE
	Date: 9/2/2014
	Description: Looking downstream from B53 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CF
	Date: 9/2/2014
	Description: Looking downstream at B53 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B54

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B54

DATE: 11/2/2014

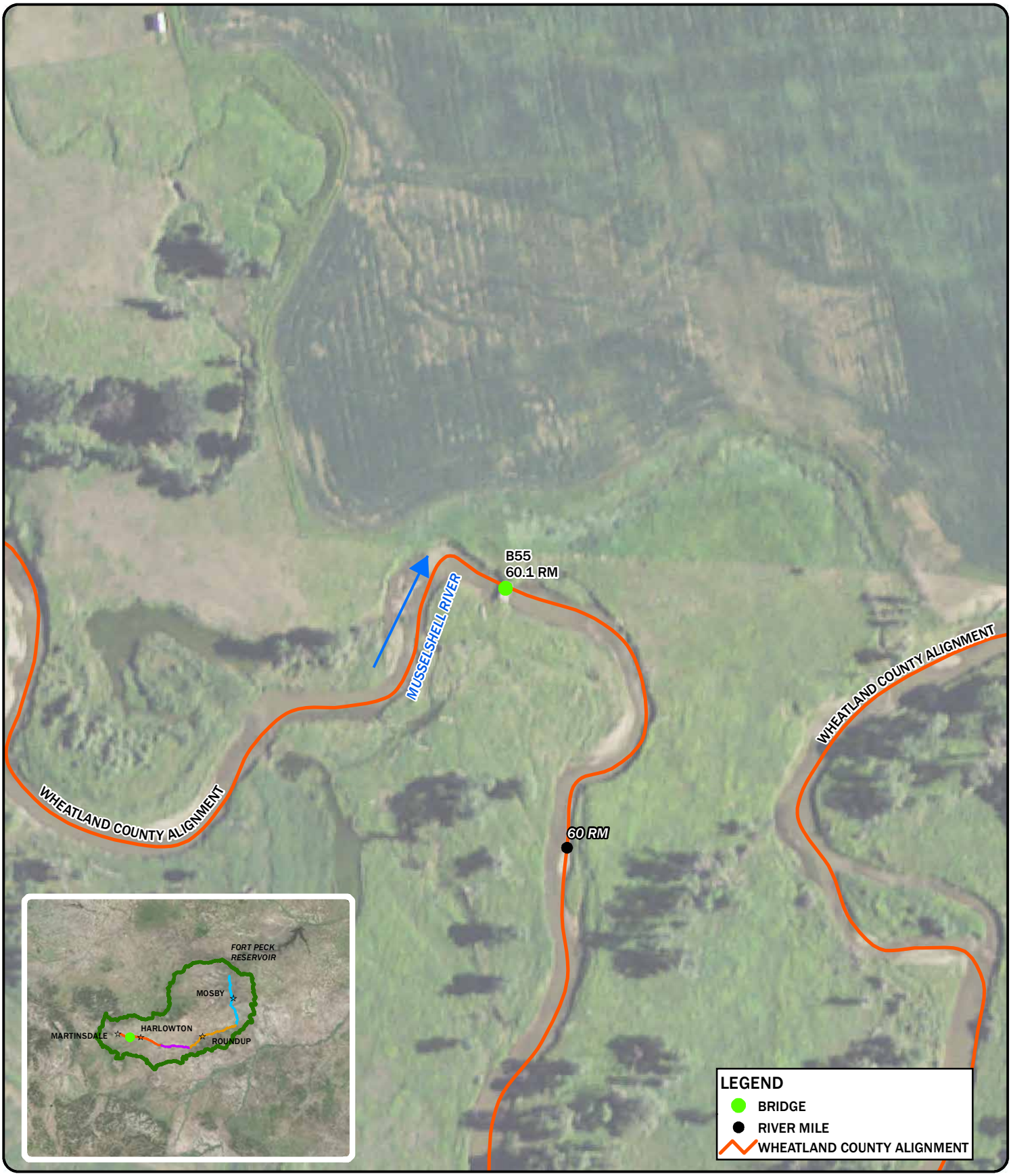
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B54-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902DL
	Date: 9/2/2014
	Description: Looking downstream at B54 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902DM
	Date: 9/2/2014
	Description: Looking downstream from B54 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902DN
	Date: 9/2/2014
	Description: Looking upstream from B54 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902DO
	Date: 9/2/2014
	Description: Looking upstream at B54 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B55

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B55

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B55-figure.mxd

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B56

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B56

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B56-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CI
	Date: 9/2/2014
	Description: Looking downstream at B56 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CJ
	Date: 9/2/2014
	Description: Looking downstream from B56 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CK
	Date: 9/2/2014
	Description: Looking upstream from B56 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CL
	Date: 9/2/2014
	Description: Looking upstream at B56 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B57

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B57

DATE: 11/2/2014

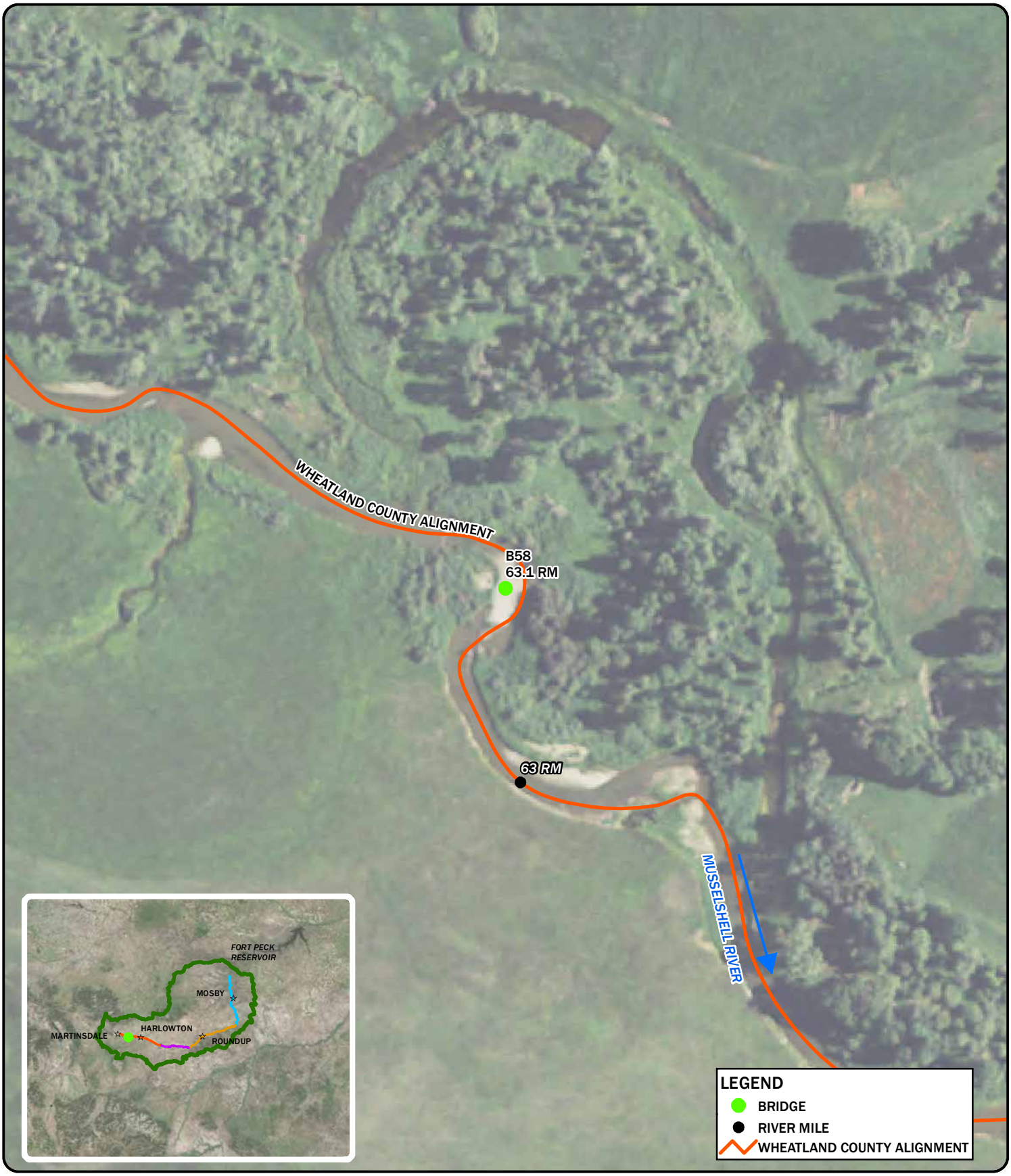
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B57-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902DH
	Date: 9/2/2014
	Description: Looking upstream at B57 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902DI
	Date: 9/2/2014
	Description: Looking upstream from B57 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902DJ
	Date: 9/2/2014
	Description: Looking downstream from B57 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902DK
	Date: 9/2/2014
	Description: Looking downstream at B57 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

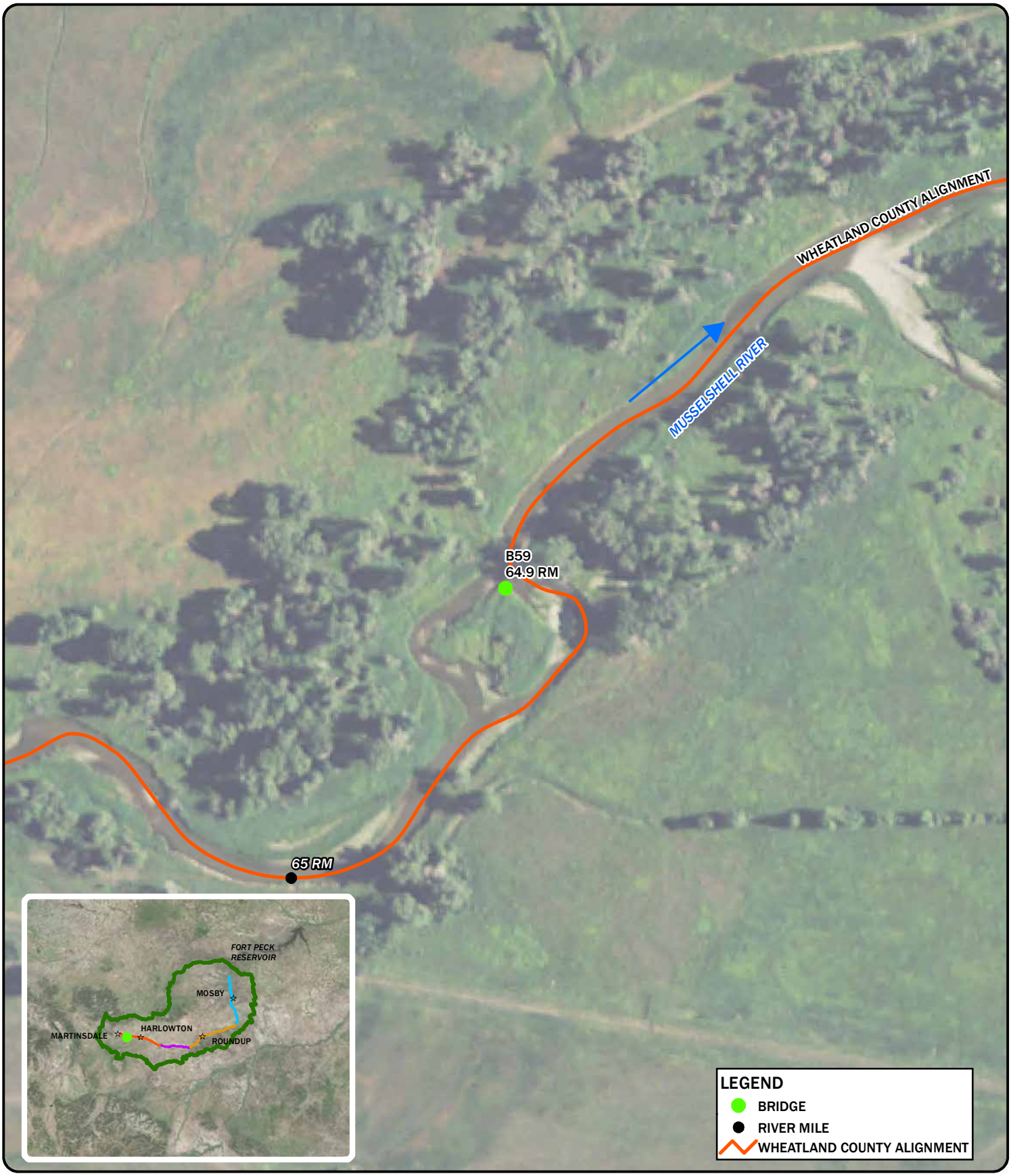
FIGURE B58

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B58

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B58-figure.mxd



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B59

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B59

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B59-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902DG
	Date: 9/2/2014
	Description: Looking downstream at former B59 bridge structure location
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B60

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B60

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B60-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CY
	Date: 9/2/2014
	Description: Looking downstream at B60 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CZ
	Date: 9/2/2014
	Description: Looking downstream from B60 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902DA
	Date: 9/2/2014
	Description: Looking upstream from B60 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902DB
	Date: 9/2/2014
	Description: Looking upstream at B60 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B61

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B61

DATE: 11/2/2014

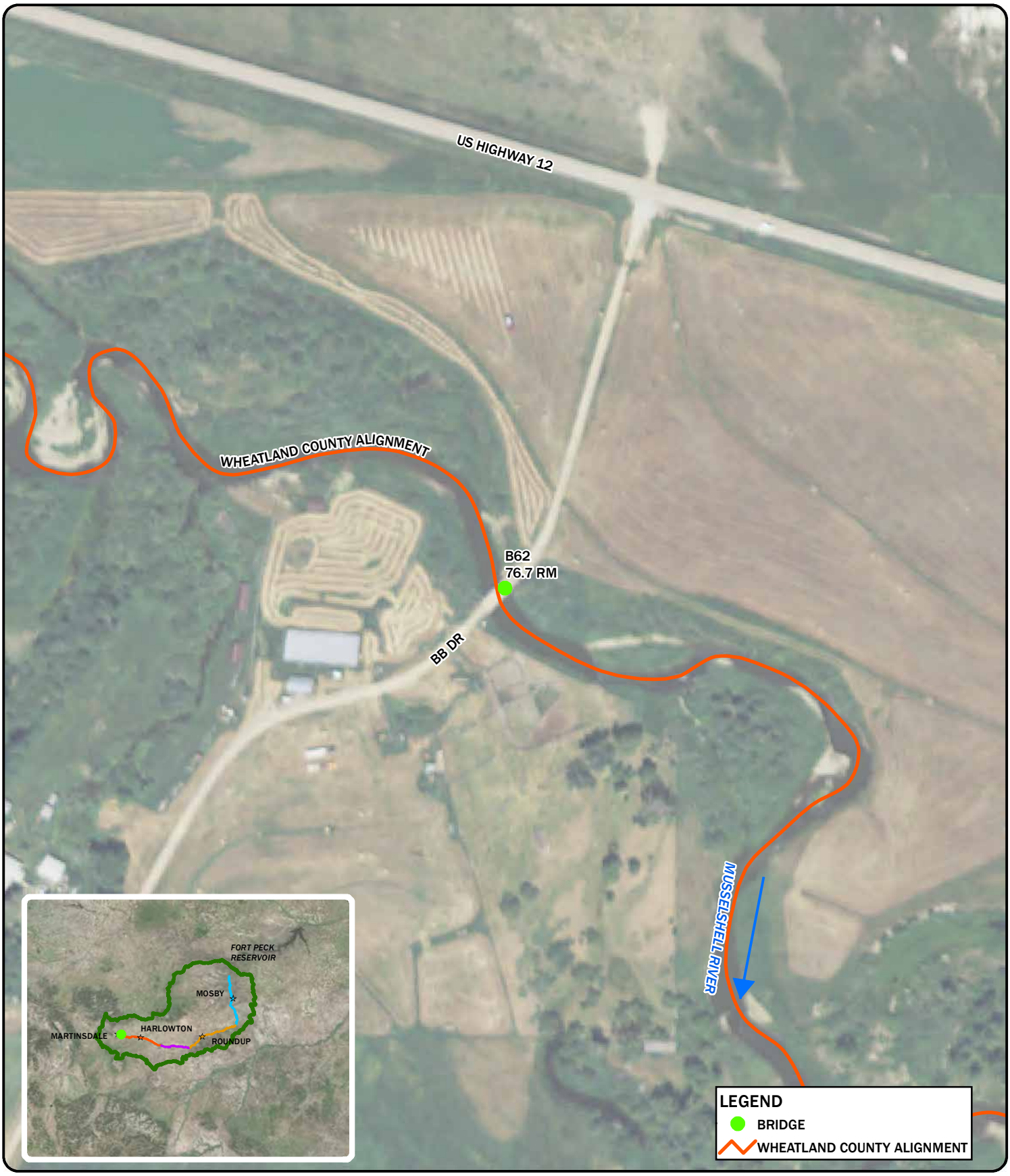
Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B61-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CS
	Date: 9/2/2014
	Description: Looking downstream at B61 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CT
	Date: 9/2/2014
	Description: Looking downstream from B61 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CU
	Date: 9/2/2014
	Description: Looking upstream from B61 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CV
	Date: 9/2/2014
	Description: Looking upstream at B61 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



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UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

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FIGURE B62

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B62

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B62-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CM
	Date: 9/2/2014
	Description: Looking downstream at B62 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CN
	Date: 9/2/2014
	Description: Looking downstream from B62 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CO
	Date: 9/2/2014
	Description: Looking upstream from B62 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CP
	Date: 9/2/2014
	Description: Looking upstream at B62 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE B63

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
B63

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\B63-figure.mxd

Diversion Structure Data

Structure Number	Date of Inspection	Latitude_WGS84	Longitude_WGS84	River Mile by Alignment (mi)	Alignment	County	Structure Type	Structure Comments	Structure Condition	Structure Condition Description	Span 1 (ft)	Span 1 Description
D1	8/25/2014	46.5414	-108.0564	25.0	Musselshell	Musselshell	Diversion		Fair	Flows too high to see much of structure	131	
D2	8/25/2014	46.5201	-108.0888	27.7	Musselshell	Musselshell	Diversion		Good		182	
D3	8/26/2014	46.5146	-108.1744	34.7	Musselshell	Musselshell	Diversion		Good		140	
D4	8/27/2014	46.5051	-108.2547	42.9	Musselshell	Musselshell	Diversion		Good		165	
D5	8/26/2014	46.4906	-108.2896	45.4	Musselshell	Musselshell	Diversion		Good		115	
D6	8/26/2014	46.4751	-108.3794	52.6	Musselshell	Musselshell	Diversion		Good		129	
D7[1]	8/26/2014	46.4456	-108.5032	65.0	Musselshell	Musselshell	Diversion		Good		65	
D8	8/26/2014	46.3930	-108.6061	75.1	Musselshell	Musselshell	Diversion		Good		150	
D9	8/26/2014	46.3404	-108.6836	81.7	Musselshell	Musselshell	Diversion		Fair		84	
D10	8/26/2014	46.3305	-108.6950	82.7	Musselshell	Musselshell	Diversion		Good		89	
D11	8/26/2014	46.3035	-108.7762	90.2	Musselshell	Musselshell	Diversion		Good		91	
D12	8/26/2014	46.2837	-108.7872	92.7	Musselshell	Musselshell	Diversion		Poor	Covered by river deposited gravel.	0	
D13	8/27/2014	46.2857	-108.8428	4.0	Golden Valley	Golden Valley	Diversion		Good	River flows around structure on one side.	95	
D14	8/27/2014	46.2989	-109.0060	20.6	Golden Valley	Golden Valley	Diversion		Good		120	
D15	8/27/2014	46.2992	-109.0650	24.1	Golden Valley	Golden Valley	Diversion		Good		153	
D16	8/27/2014	46.2980	-109.3052	43.8	Golden Valley	Golden Valley	Diversion		Good		76	
D17	8/28/2014	46.3436	-109.5439	12.4	Wheatland	Wheatland	Headgate				0	
D18	8/28/2014	46.3767	-109.6037	18.7	Wheatland	Wheatland	Diversion		Good		96	
D19[2]	8/28/2014	46.3778	-109.6243	20.1	Wheatland	Wheatland	Headgate				0	
D20	8/28/2014	46.3779	-109.6243	20.1	Wheatland	Wheatland	Diversion	Structure gone	Poor	Some large rock remains	0	
D21	8/28/2014	46.3852	-109.6320	21.1	Wheatland	Wheatland	Diversion		Fair		65	
D22	8/28/2014	46.3842	-109.6438	22.1	Wheatland	Wheatland	Diversion		Good		81	
D23	8/28/2014	46.4081	-109.6978	28.2	Wheatland	Wheatland	Diversion		Good		106	
D24	9/2/2014	46.4121	-109.7213	30.4	Wheatland	Wheatland	Diversion		Good		105	
D24A	9/2/2014	46.4155	-109.7403	31.7	Wheatland	Wheatland	Diversion		Good		54	
D25	9/2/2014	46.4134	-109.7583	33.3	Wheatland	Wheatland	Diversion		Good		93	
D26	9/2/2014	46.4260	-109.8093	37.9	Wheatland	Wheatland	Diversion		Good		95	
D26A	9/2/2014	46.4327	-109.8781	42.9	Wheatland	Wheatland	Diversion	Old concrete diversion structure	Poor		126	
D27	9/2/2014	46.4335	-109.8910	43.7	Wheatland	Wheatland	Diversion		Good		77	
D28	9/2/2014	46.4357	-109.9108	45.7	Wheatland	Wheatland	Diversion		Good		98	
D28A	9/2/2014	46.4426	-109.9815	52.3	Wheatland	Wheatland	Diversion		Poor	Rock lowered/moved downstream	30	
D29	9/2/2014	46.4365	-110.0252	56.0	Wheatland	Wheatland	Diversion		Fair		71	
D30	9/2/2014	46.4431	-110.1541	68.0	Wheatland	Wheatland	Diversion		Good		108	
D31	9/2/2014	46.4488	-110.1789	69.8	Wheatland	Wheatland	Diversion		Good		72	
D32	9/2/2014	46.4530	-110.2048	71.7	Wheatland	Wheatland	Diversion		Poor	Rocks washed downstream	83	
D33	9/2/2014	46.4674	-110.2295	74.7	Wheatland	Wheatland	Diversion		Good		58	

Note[1]: Structure D7 survey information included in the Field Survey Report under the Musselshell River Floodplain Study - Phase 1.
Note[2]: Photos were not collected for structure D19.

Fish Gates: Fish passages located on diversion structure

Diversion Structure Data

Structure Number	Structure Material Type	Structure Material Type Description	Backwater Potential	Backwater Potential Description
D1	Rock	Rock/concrete	Low	
D2	Concrete	Concrete with possible wood flashboards	Low	
D3	Concrete		Low	
D4	Concrete	3 fish gates	Low	
D5	Rock	Rock/concrete	Low	
D6	Concrete	Concrete with possible wood flashboards	Low	
D7[1]	Concrete		Low	
D8	Concrete		Low	
D9	Concrete	Structure runs along the south side of the river in old river channel	Low	Structure runs along the south side of the river in old river channel.
D10	Concrete	Concrete jersey barriers and rock	Low	
D11	Concrete	Possibly wood flashboard in middle	Low	
D12	Concrete	Covered with river deposited gravel/no longer in flowing river channel	Other	Covered by river deposited gravel, structure no longer in river channel/no backwater potential.
D13	Concrete		Low	
D14	Concrete	Concrete with wood flashboards	Low	
D15	Concrete	Concrete with flashboards, potentially pin and plank structure	Low	
D16	Rock	Possibly concrete also	Low	
D17	Concrete			
D18	Concrete	Concrete with wood flashboards	Low	
D19[2]	Concrete			
D20	Rock		Other	Structure gone/no backwater potential
D21	Concrete	Some eroded areas on concrete	Low	
D22	Rock		Low	
D23	Rock		Low	
D24	Rock		Low	
D24A	Rock		Low	
D25	Rock		Low	
D26	Rock		Low	
D26A	Concrete		Low	
D27	Rock		Low	
D28	Rock		Low	
D28A	Rock		Low	
D29	Wood	Wood flashboard structure	Low	
D30	Concrete		Low	
D31	Rock		Low	
D32	Rock		Low	
D33	Wood	Wood covered with tarps, some small rock	Low	

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UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

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FIGURE D1

PIONEER TECHNICAL SERVICES, INC.

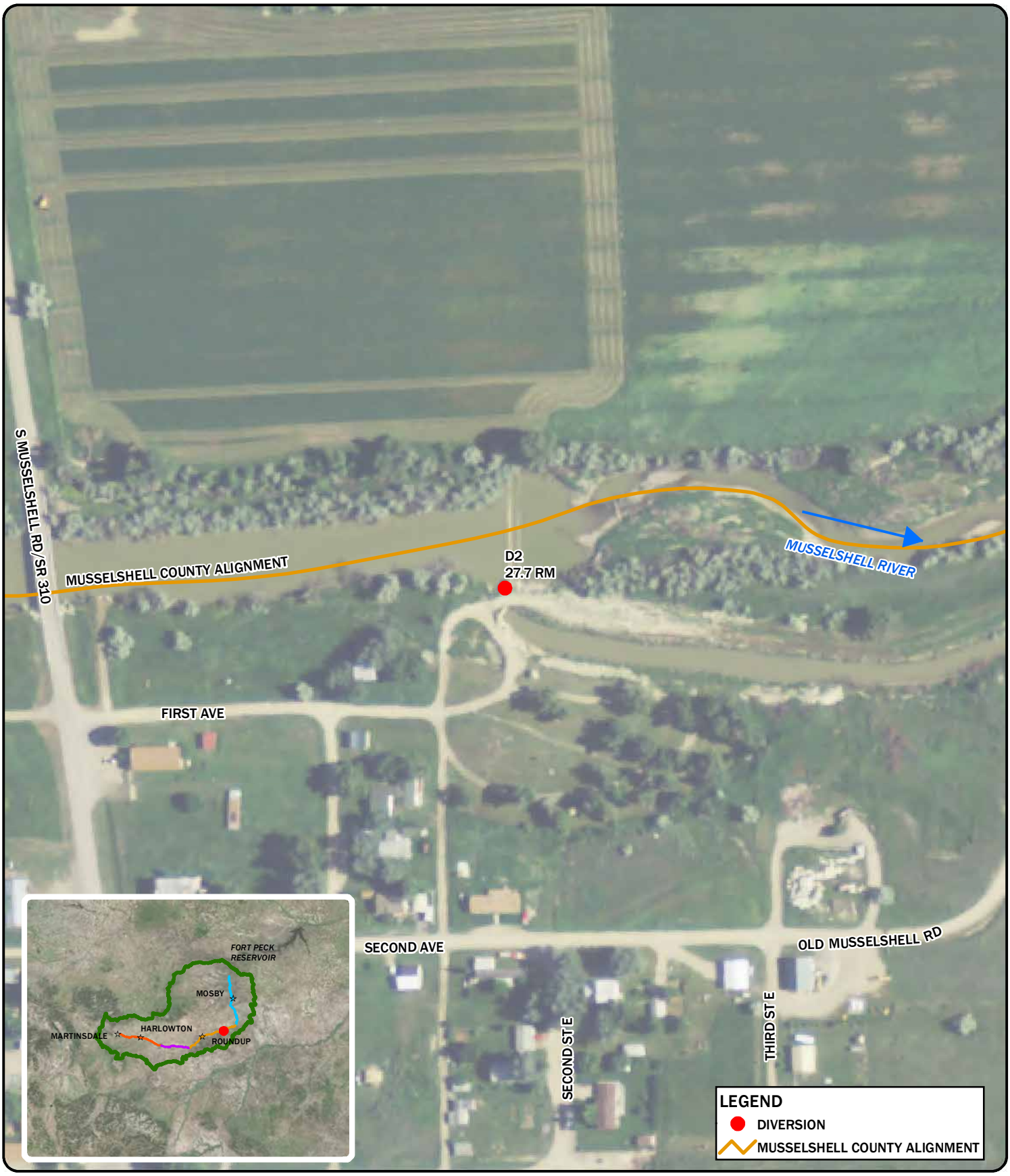
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D1

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D1-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825BH
	Date: 8/25/2014
	Description: Looking south across river where D1 diversion dam is located
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0825BI
	Date: 8/25/2014
	Description: Looking south across river where D1 diversion dam is located with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

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Feet

FIGURE D2

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
D2

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D2-figure.mxd

	Photo Number: 2014_0825BN
	Date: 8/25/2014
	Description: Looking north at D2 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: 2014_0825BO
	Date: 8/25/2014
	Description: Looking north at D2 diversion dam structure location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D3

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
D3

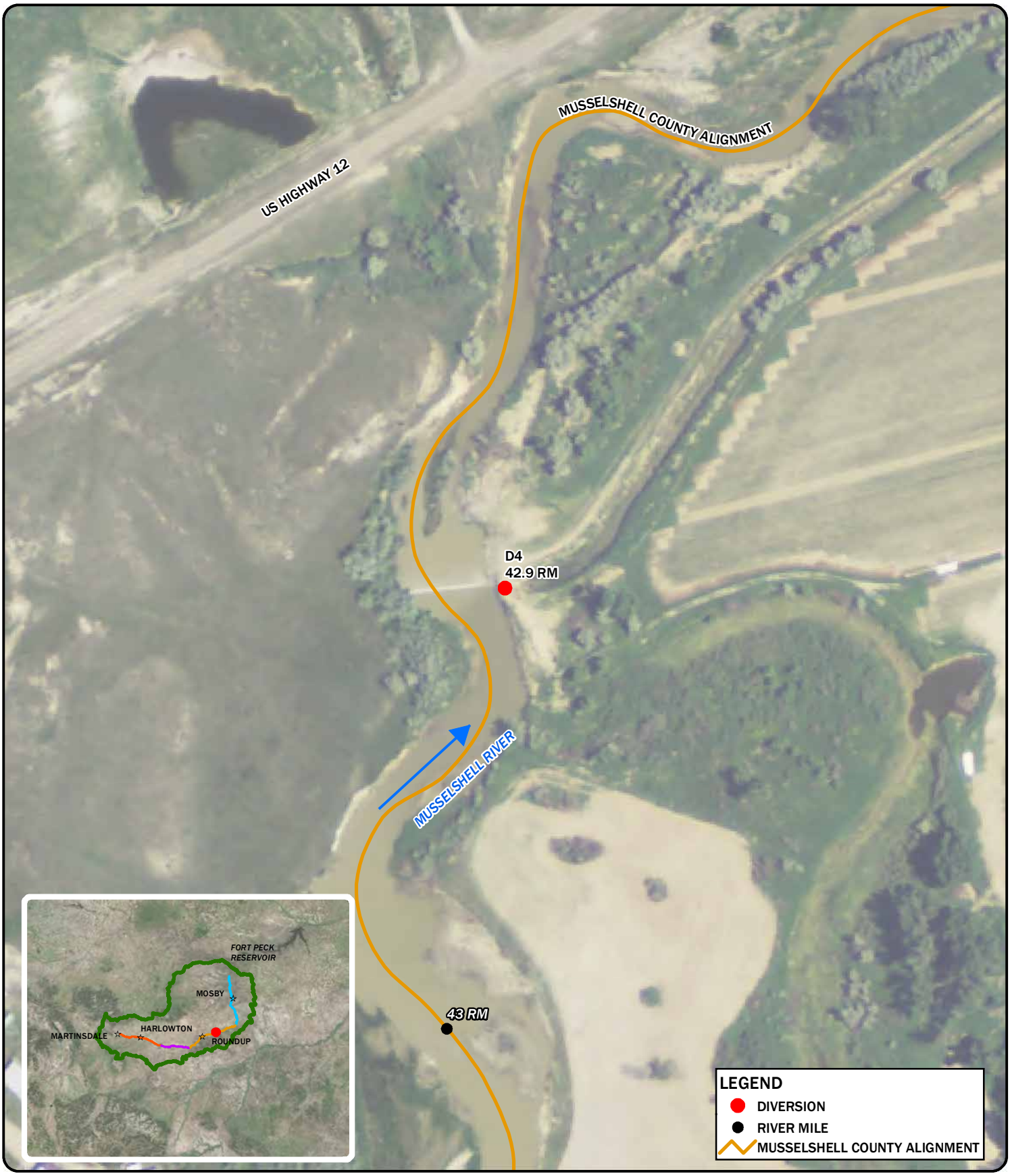
DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D3-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AA
	Date: 8/26/2014
	Description: Looking south at D3 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AB
	Date: 8/26/2014
	Description: Looking south at D3 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AC
	Date: 8/26/2014
	Description: Looking south at D3 diversion dam structure location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



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DATUM: NAD 83
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SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D4

PIONEER TECHNICAL SERVICES, INC.

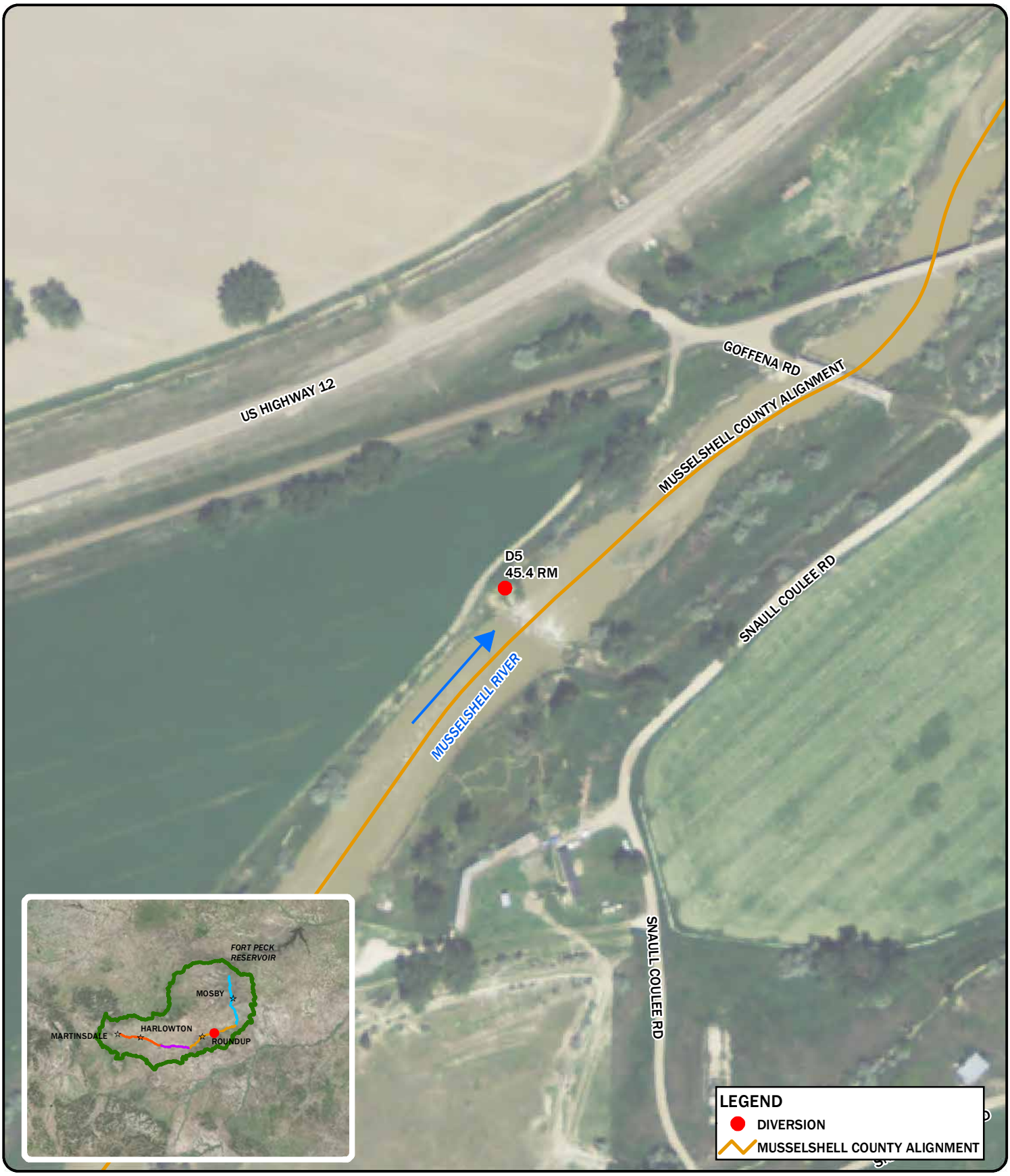
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D4

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D4-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AA
	Date: 8/27/2014
	Description: Looking west at D4 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AB
	Date: 8/27/2014
	Description: Looking west at D4 diversion dam structure location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



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DATUM: NAD 83
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SOURCE: PIONEER/RATT/NRIS/NAIP 2013

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FIGURE D5

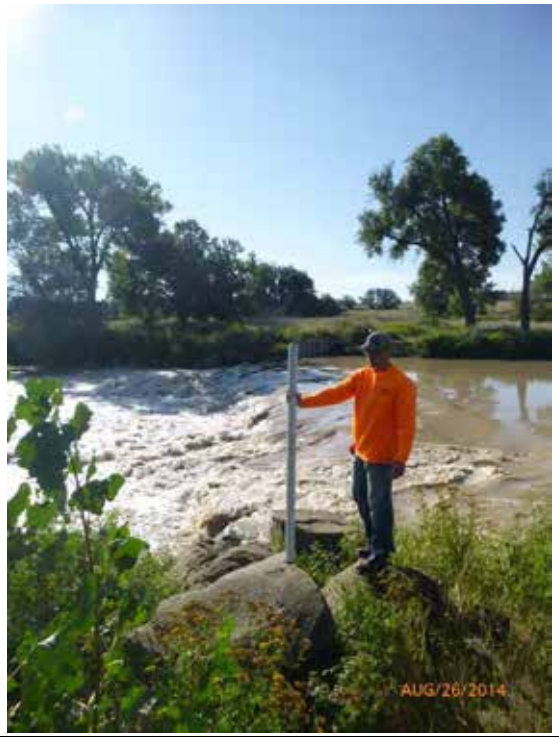
PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
D5

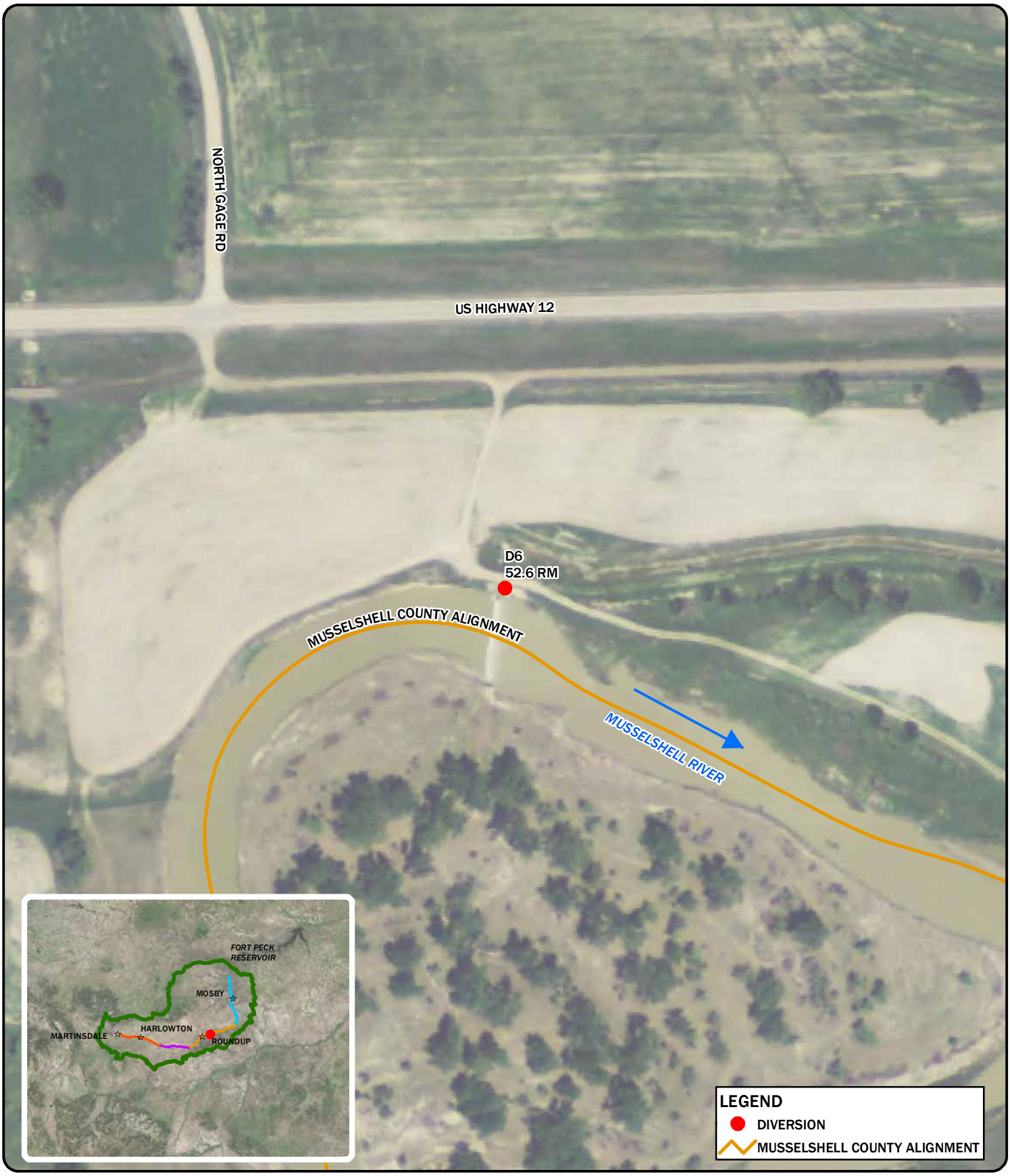
DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D5-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AU
	Date: 8/26/2014
	Description: Looking south at D5 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1



PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AV
	Date: 8/26/2014
	Description: Looking south at D5 diversion dam structure location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



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UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D6

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
D6

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D6-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AW
	Date: 8/26/2014
	Description: Looking south at D6 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826AX
	Date: 8/26/2014
	Description: Looking south at D6 diversion dam structure location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

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Feet

FIGURE D7

PIONEER TECHNICAL SERVICES, INC.

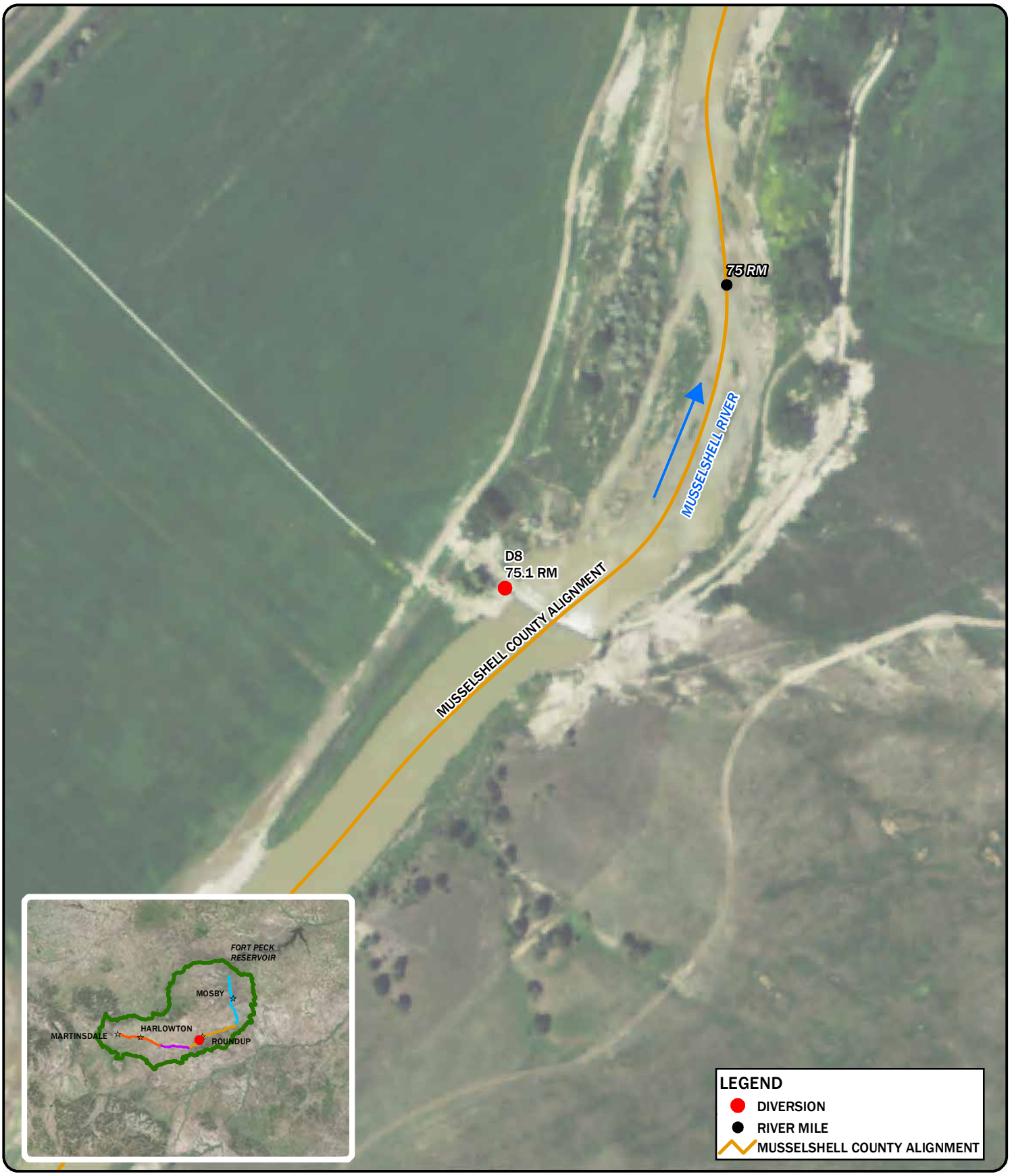
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D7

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D7-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BC
	Date: 8/26/2014
	Description: Looking north at D7 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BD
	Date: 8/26/2014
	Description: Looking north at D7 diversion dam structure location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



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SOURCE: PIONEER/RATT/NRIS/NAIP 2013

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FIGURE D8

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
D8

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D8-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BE
	Date: 8/26/2014
	Description: Looking south at D8 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BF
	Date: 8/26/2014
	Description: Looking south at D8 diversion dam structure location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1

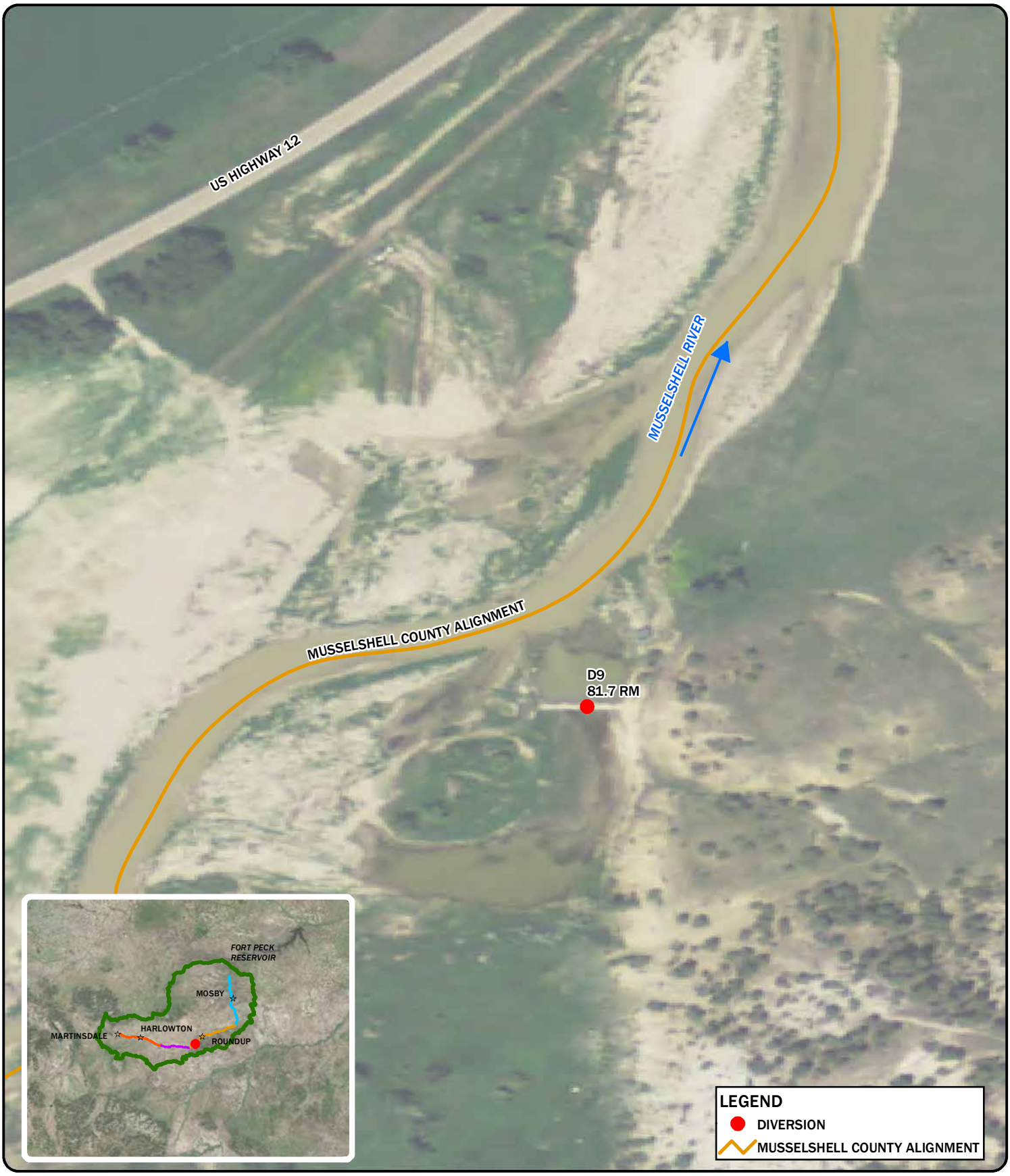

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FIGURE D9

PIONEER TECHNICAL SERVICES, INC.

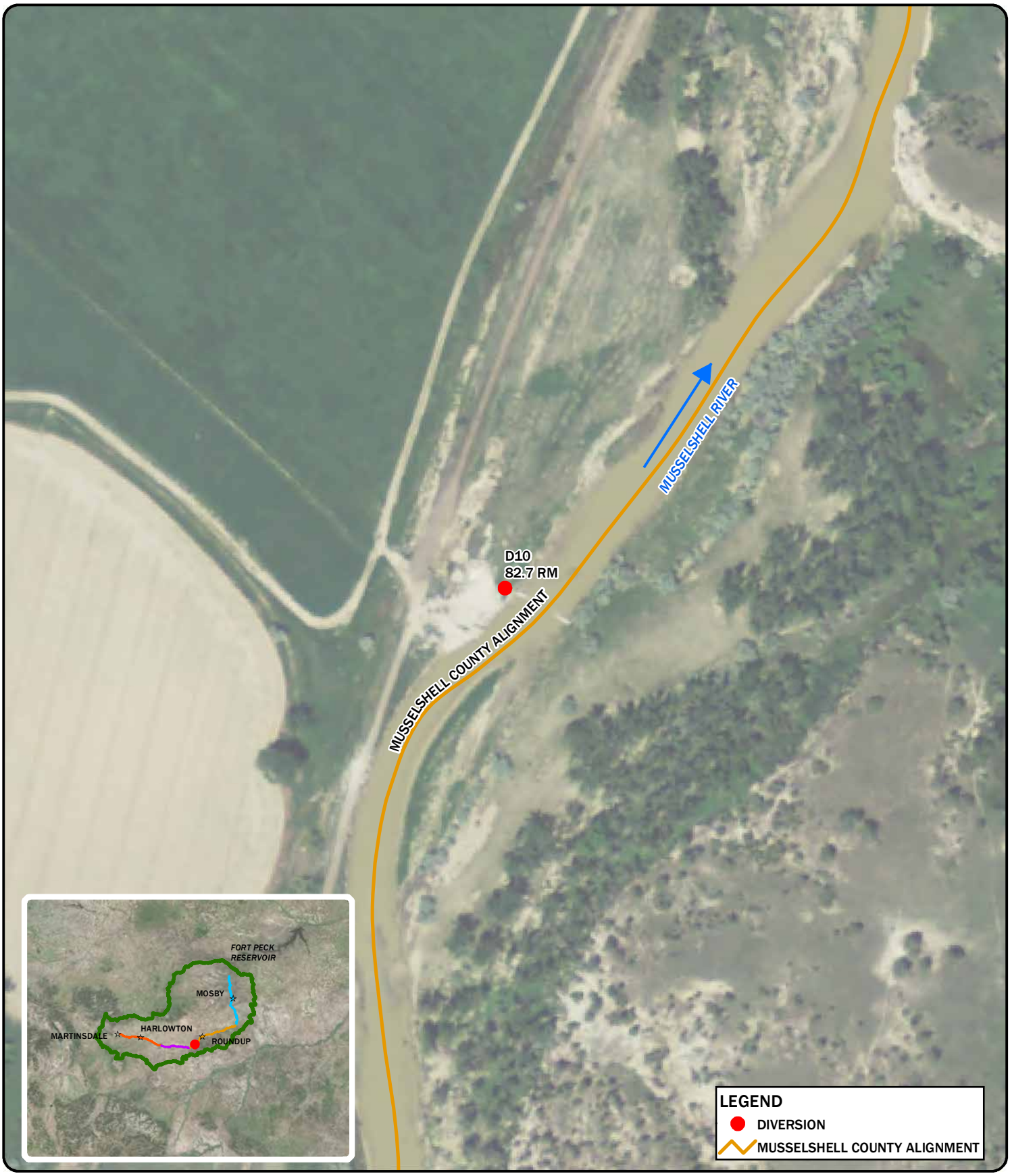
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D9

DATE: 11/5/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D9-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BP
	Date: 8/26/2014
	Description: Looking south at D9 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BQ
	Date: 8/26/2014
	Description: Looking south at D9 diversion dam structure location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



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SOURCE: PIONEER/RATT/NRIS/NAIP 2013

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Feet

FIGURE D10

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
D10

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D10-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BV
	Date: 8/26/2014
	Description: Looking south at D10 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826BW
	Date: 8/26/2014
	Description: Looking south at D10 diversion dam structure location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

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FIGURE D11

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
D11

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D11-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826CB
	Date: 8/26/2014
	Description: Looking west at D11 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826CC
	Date: 8/26/2014
	Description: Looking west at D11 diversion dam structure location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D12

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
D12

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D12-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826CD
	Date: 8/26/2014
	Description: Looking across stream at what use to be D12 diversion structure
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826CE
	Date: 8/26/2014
	Description: Looking at D12 diversion structure covered in gravel
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0826CF
	Date: 8/26/2014
	Description: Looking across stream at what use to be D12 diversion structure with reference rod
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
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FIGURE D13

PIONEER TECHNICAL SERVICES, INC.

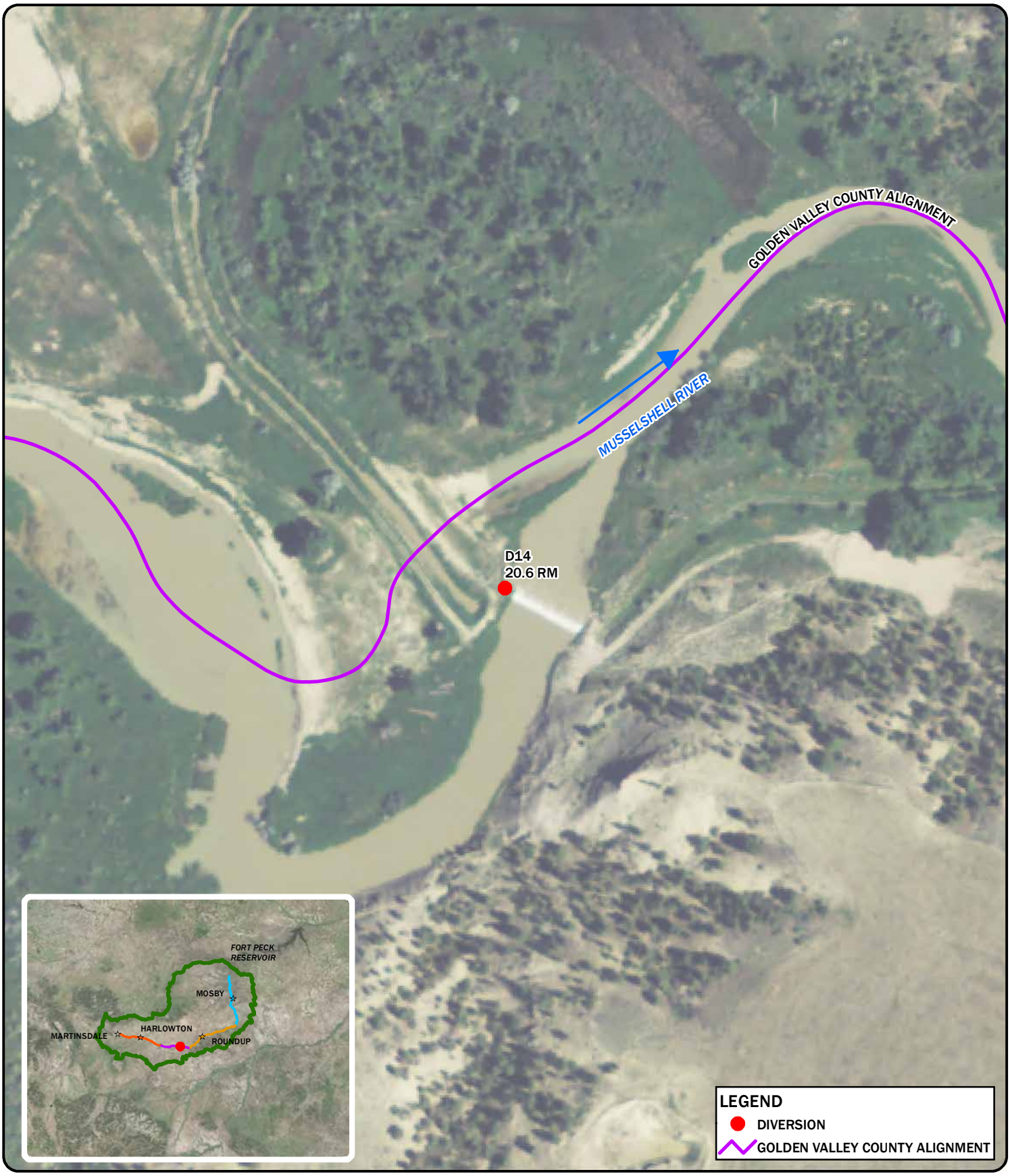
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D13

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D13-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AC
	Date: 8/27/2014
	Description: Looking west at D13 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AD
	Date: 8/27/2014
	Description: Looking west at D13 diversion dam structure location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



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UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D14

PIONEER TECHNICAL SERVICES, INC.

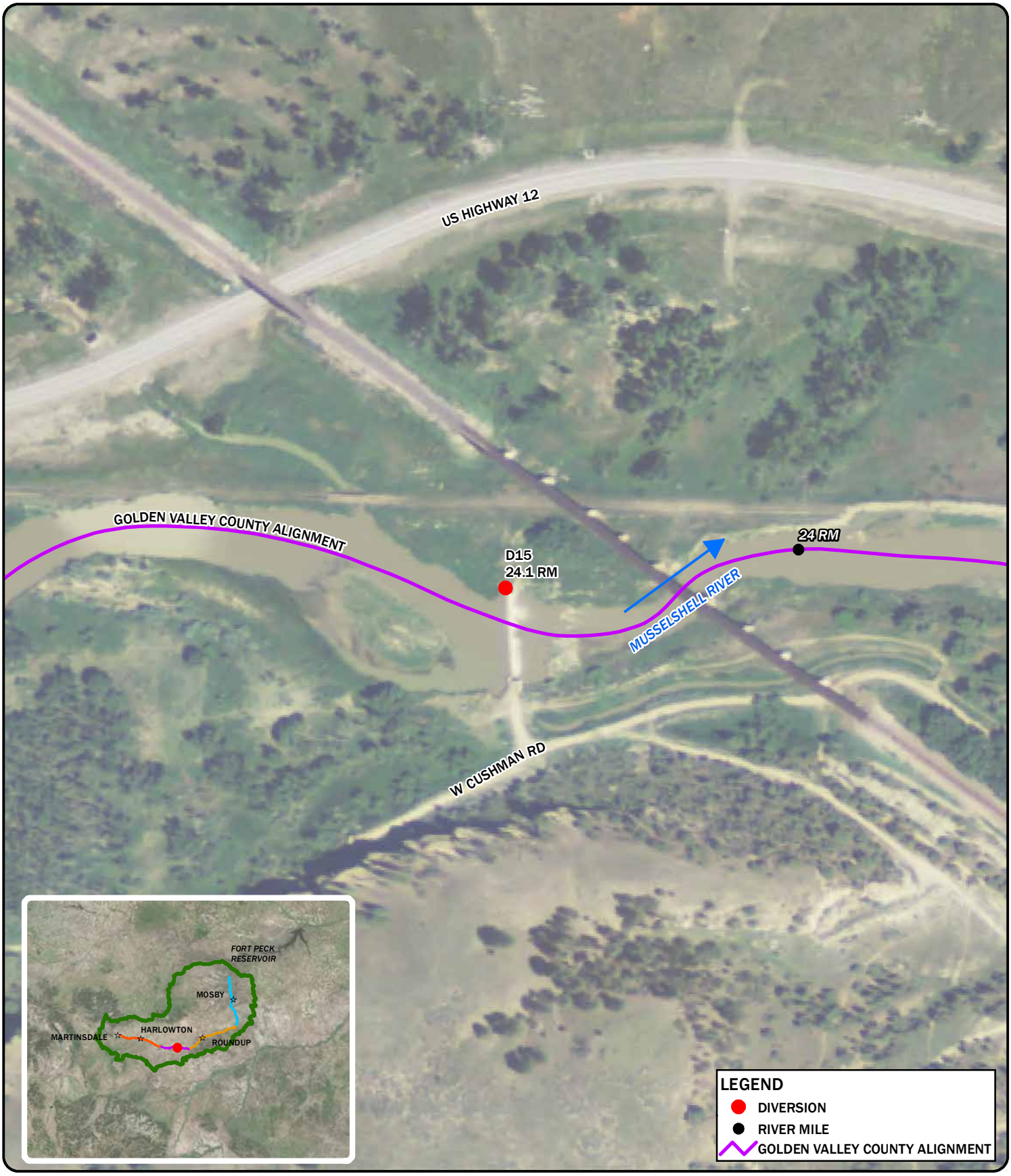
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D14

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D14-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AQ
	Date: 8/27/2014
	Description: Looking south at D14 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827AR
	Date: 8/27/2014
	Description: Looking south at D14 diversion dam structure location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D15

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
D15

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D15-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BG
	Date: 8/27/2014
	Description: Looking south at D15 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BH
	Date: 8/27/2014
	Description: Looking south at D15 diversion dam structure location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D16

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
D16

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D16-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BT
	Date: 8/27/2014
	Description: Looking south at D16 diversion dam location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0827BU
	Date: 8/27/2014
	Description: Looking south at D16 diversion dam location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AM
	Date: 8/28/2014
	Description: Looking at D17 head gate structure
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D18

PIONEER TECHNICAL SERVICES, INC.

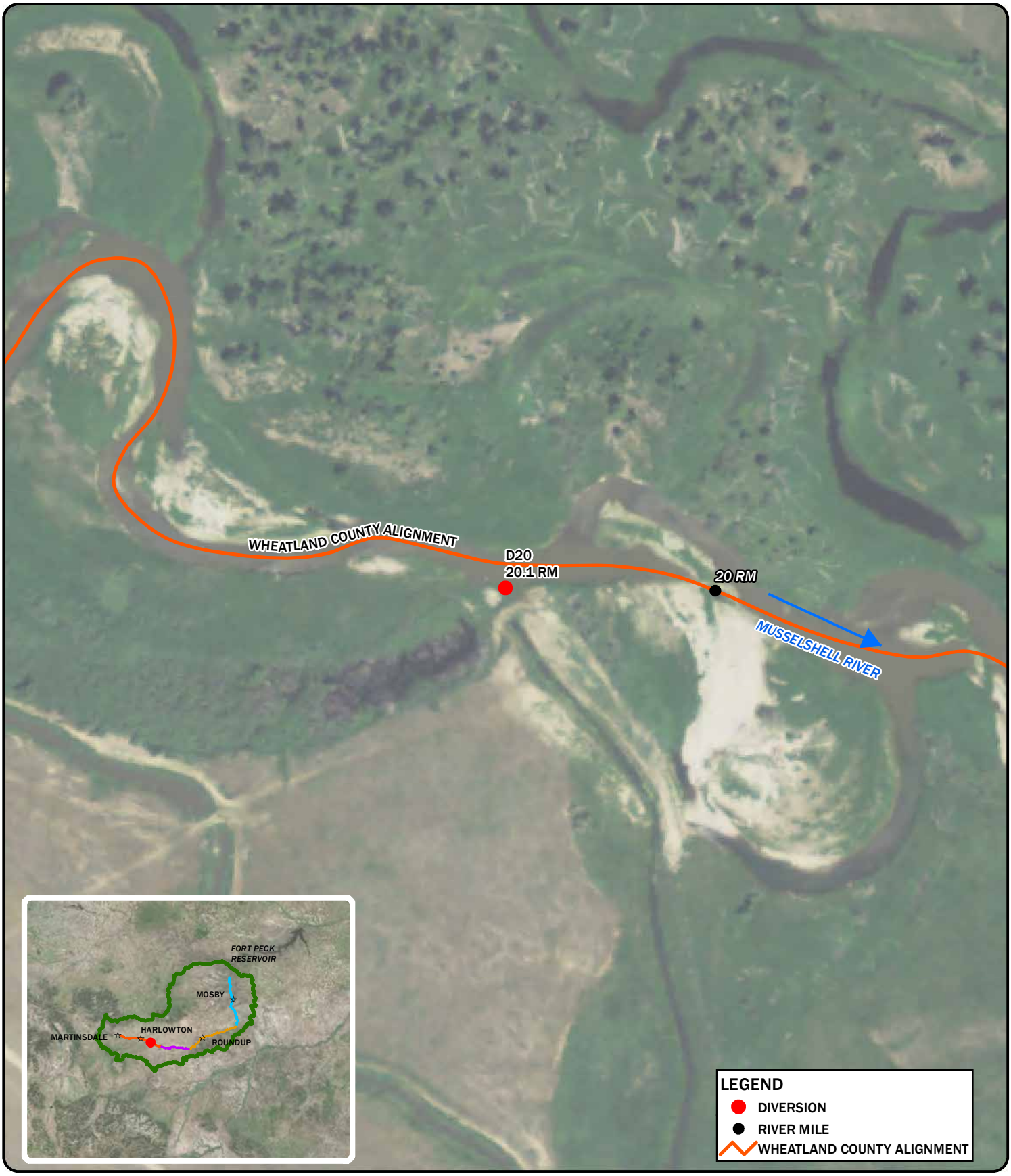
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D18

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D18-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AV
	Date: 8/28/2014
	Description: Looking south at D18 diversion dam location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AW
	Date: 8/28/2014
	Description: Looking south at D18 diversion dam location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D20

PIONEER TECHNICAL SERVICES, INC.

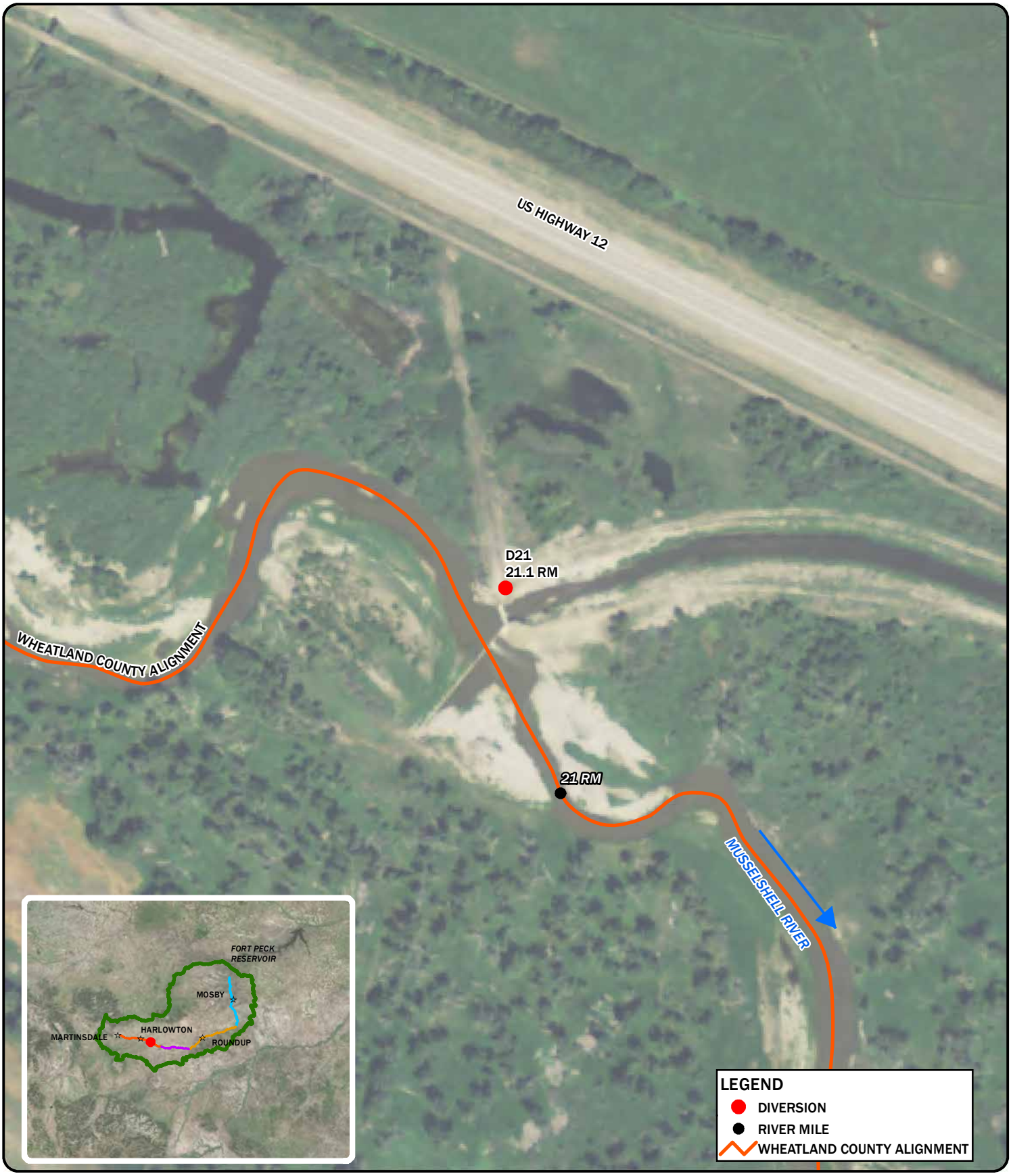
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D20

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D20-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828BF
	Date: 8/28/2014
	Description: Looking upstream at possible D20 diversion dam location, remains of large rocks
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828BG
	Date: 8/28/2014
	Description: Looking north at former diversion dam location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D21

PIONEER TECHNICAL SERVICES, INC.

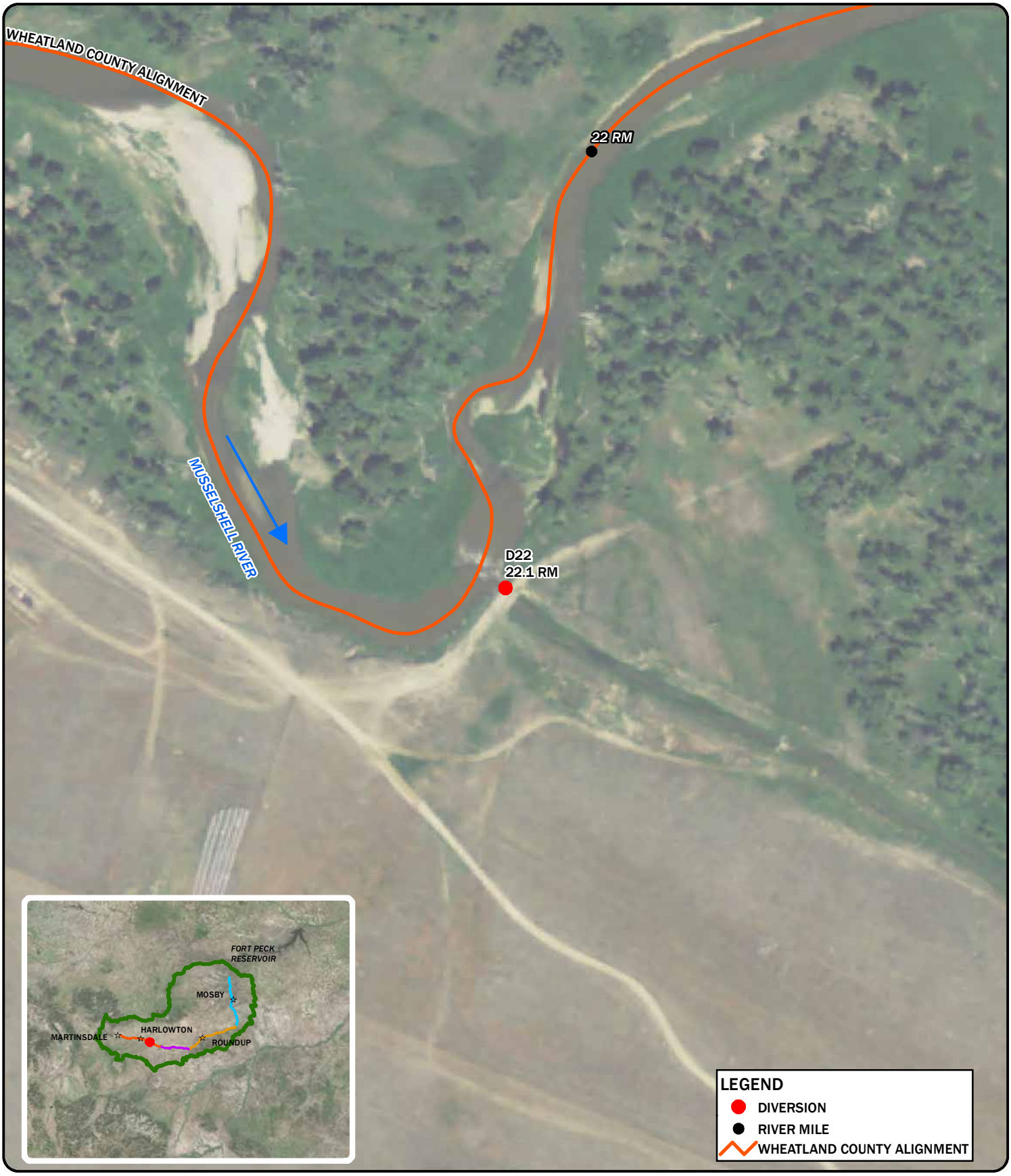
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D21

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D21-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AX
	Date: 8/28/2014
	Description: Looking at D21 diversion dam location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828AY
	Date: 8/28/2014
	Description: Looking at D21 diversion dam location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
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DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D22

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
D22

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D22-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828BD
	Date: 8/28/2014
	Description: Looking west at D22 diversion dam location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828BE
	Date: 8/28/2014
	Description: Looking west at D22 diversion dam location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D23

PIONEER TECHNICAL SERVICES, INC.

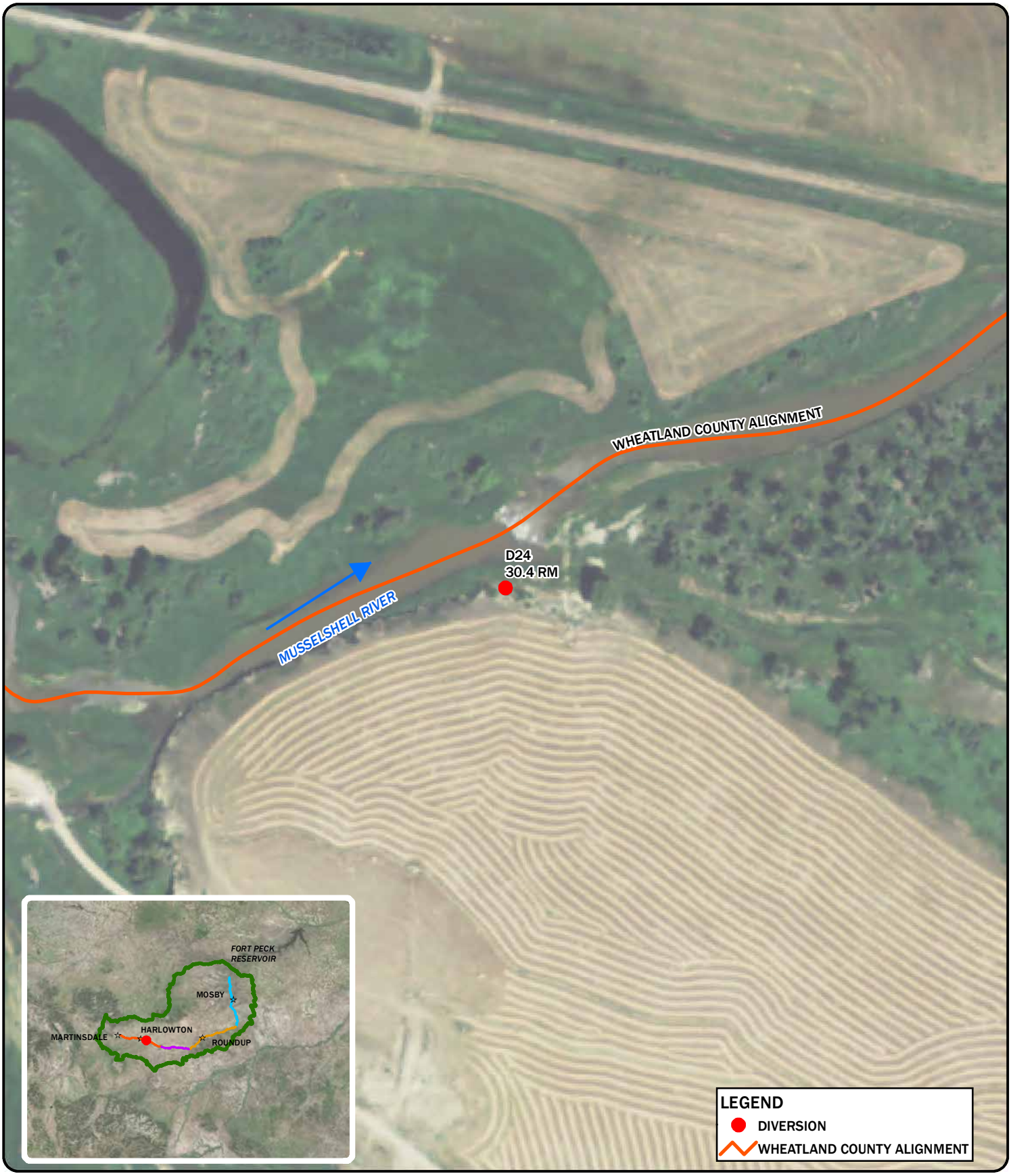
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D23

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D23-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828BH
	Date: 8/28/2014
	Description: Looking west at D23 diversion dam location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0828BI
	Date: 8/28/2014
	Description: Looking west at D23 diversion dam location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D24

PIONEER TECHNICAL SERVICES, INC.

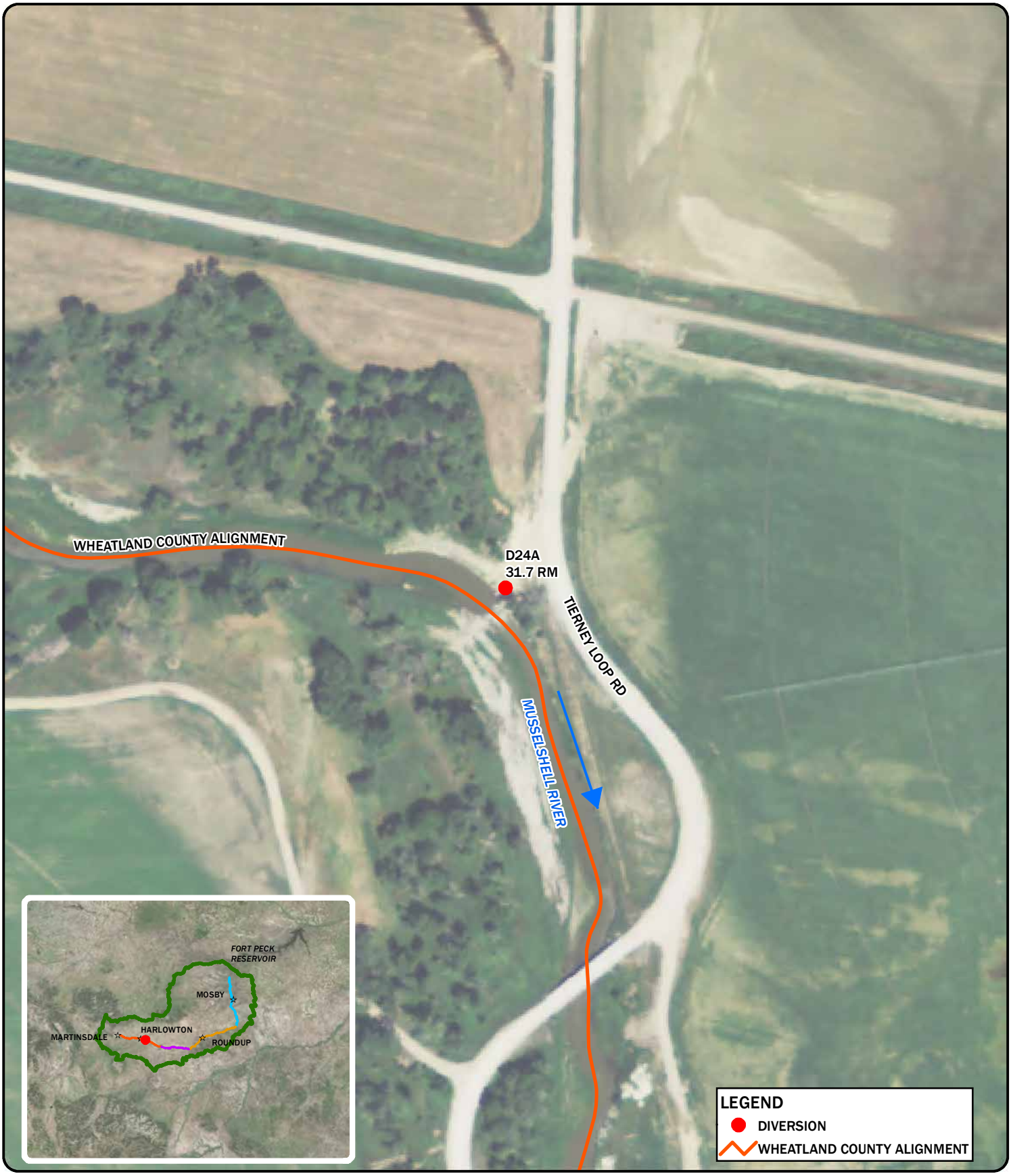
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D24

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D24-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AG
	Date: 9/2/2014
	Description: Looking north at D24 diversion dam location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AH
	Date: 9/2/2014
	Description: Looking north at D24 diversion dam location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D24A

PIONEER TECHNICAL SERVICES, INC.

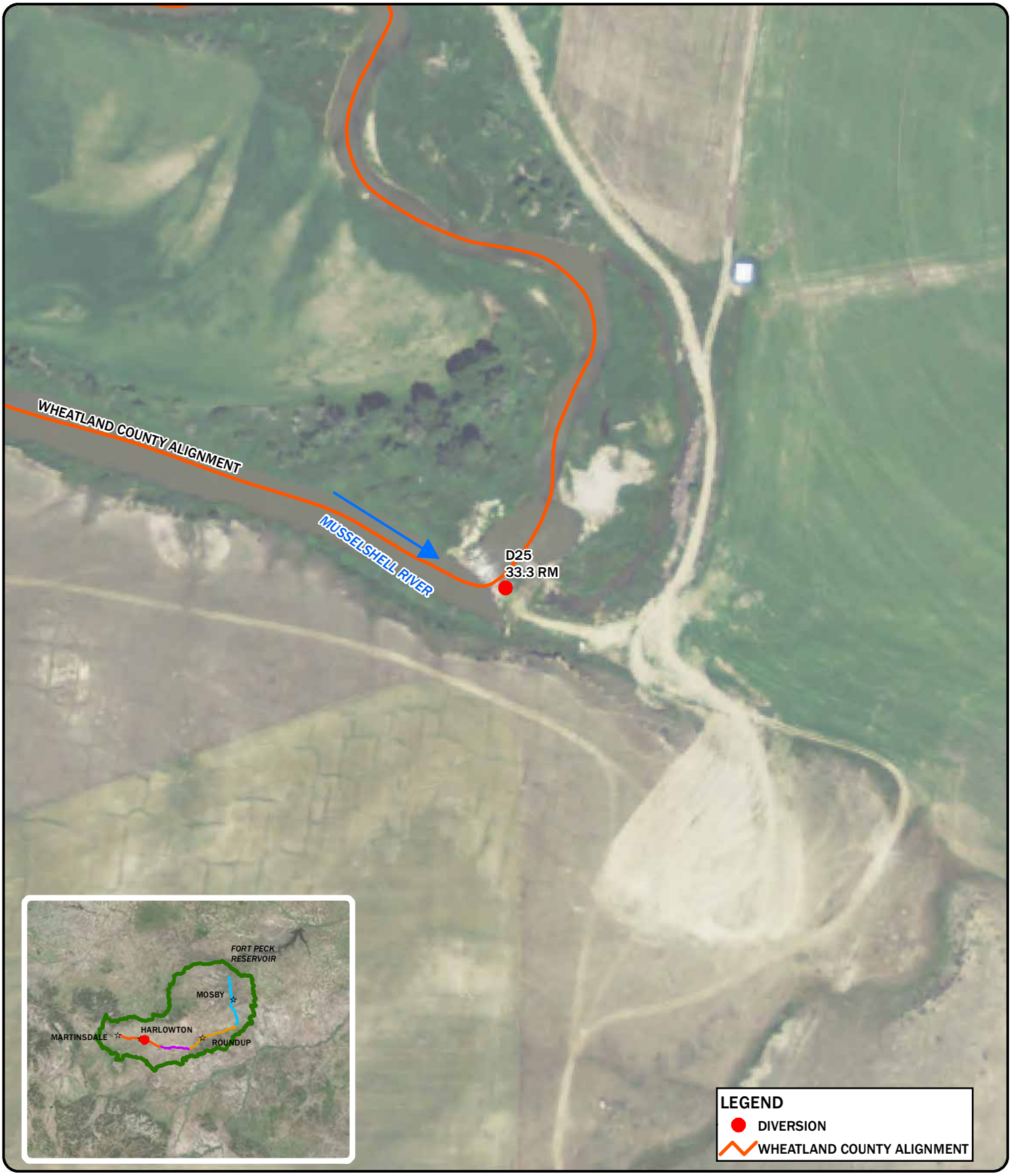
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D24A

DATE: 11/4/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D24A-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AE
	Date: 9/2/2014
	Description: Looking south at D24A diversion dam location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AF
	Date: 9/2/2014
	Description: Looking south at D24A diversion dam location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D25

PIONEER TECHNICAL SERVICES, INC.

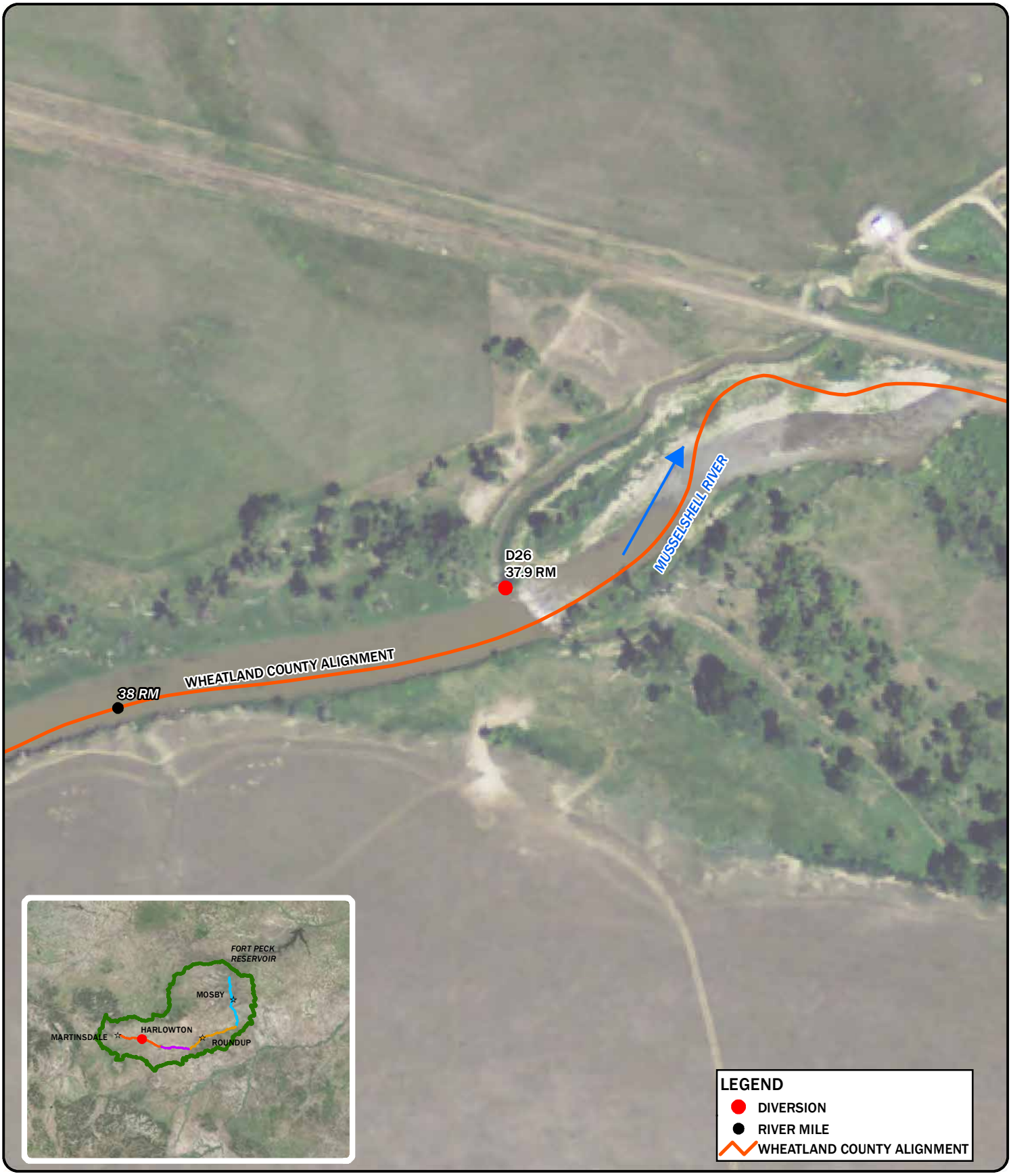
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D25

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D25-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AI
	Date: 9/2/2014
	Description: Looking north at D25 diversion dam location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AJ
	Date: 9/2/2014
	Description: Looking north at D25 diversion dam location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D26

PIONEER TECHNICAL SERVICES, INC.

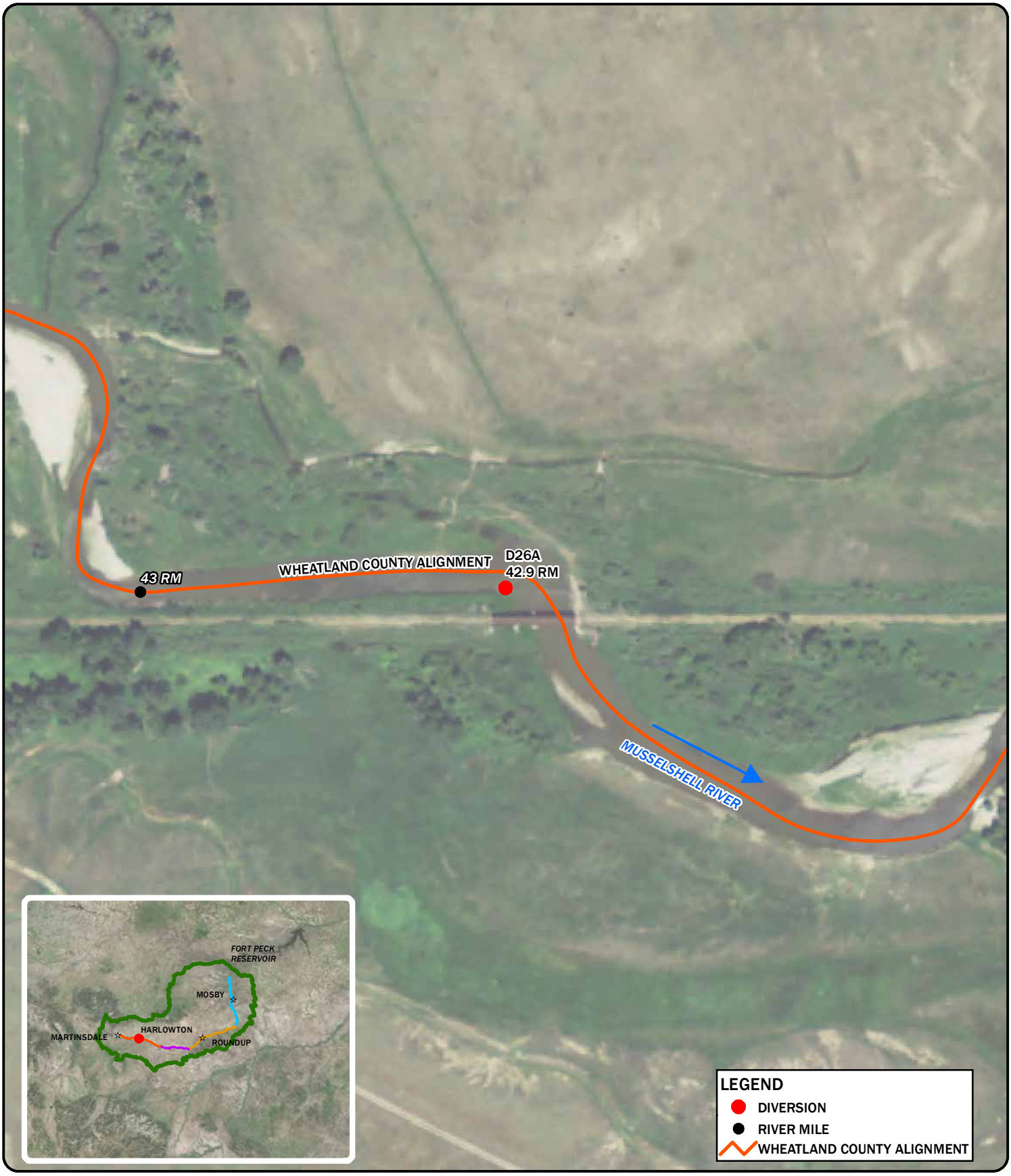
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D26

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D26-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AS
	Date: 9/2/2014
	Description: Looking south at D26 diversion dam location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902AT
	Date: 9/2/2014
	Description: Looking south at D26 diversion dam location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D26A

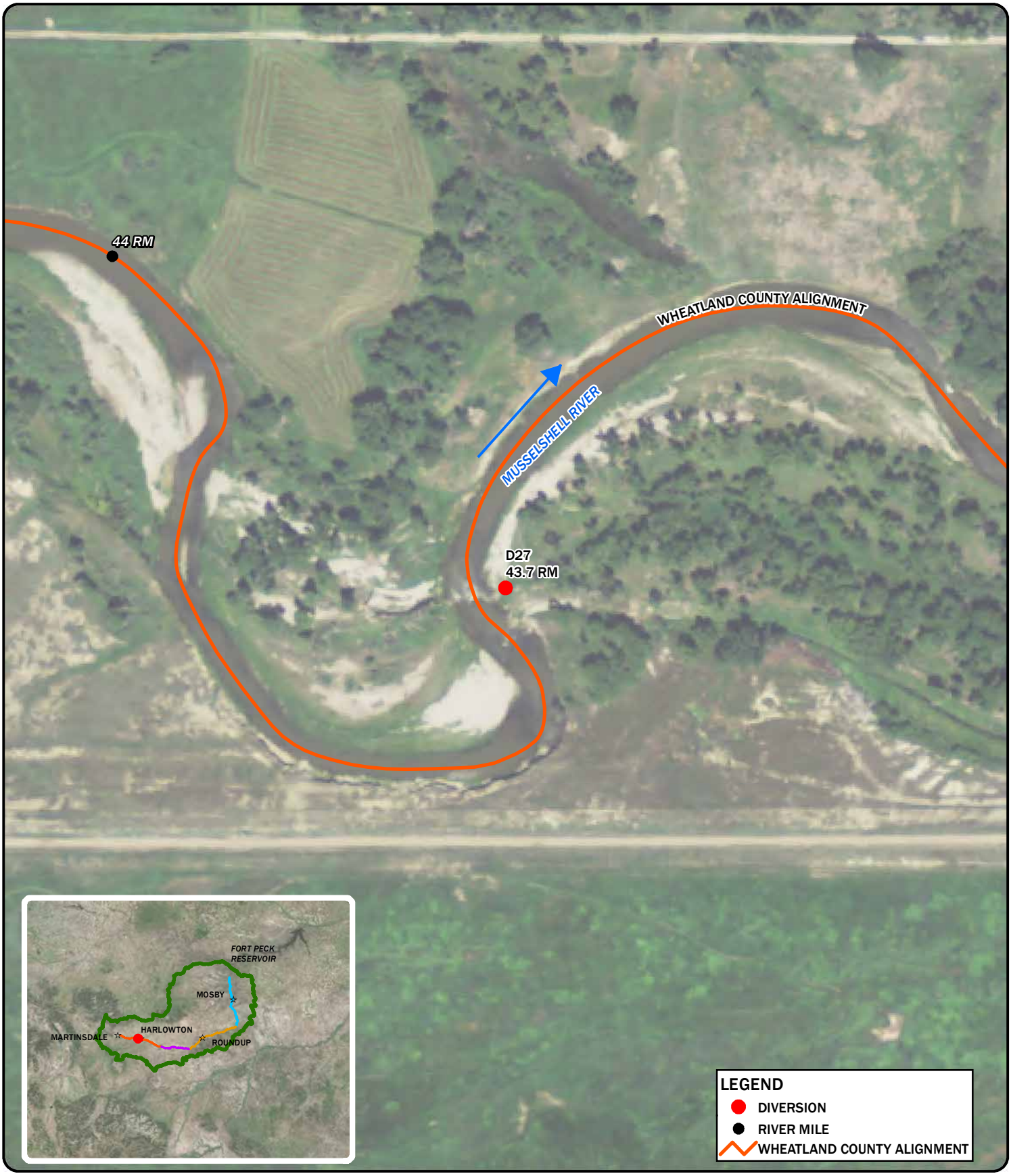
PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
D26A

DATE: 11/4/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D26A-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BJ
	Date: 9/2/2014
	Description: Diversion structure D26A located directly upstream of B47 bridge structure
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D27

PIONEER TECHNICAL SERVICES, INC.

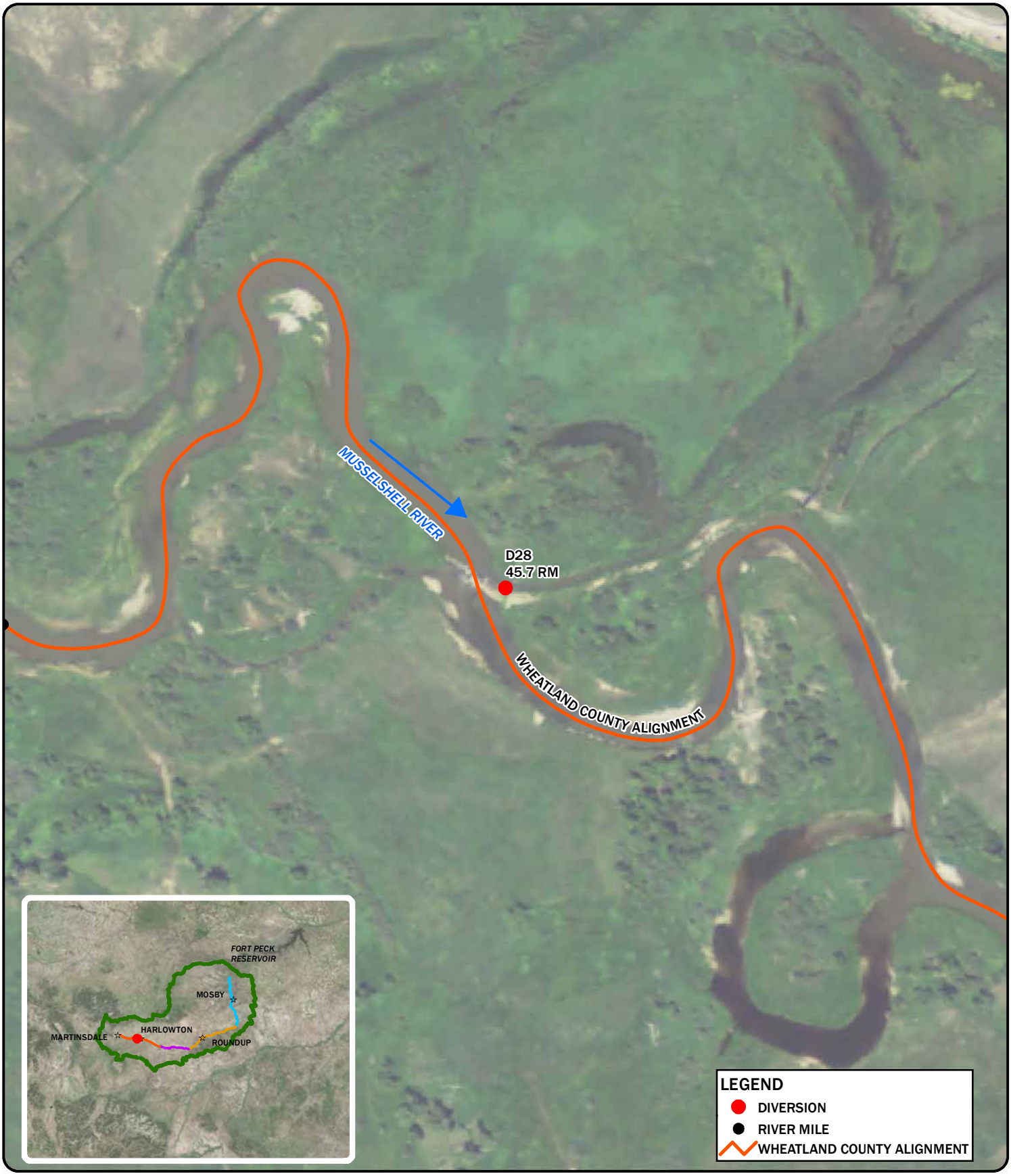
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D27

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D27-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BK
	Date: 9/2/2014
	Description: Looking west at D27 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BL
	Date: 9/2/2014
	Description: Looking west at D27 diversion dam structure location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D28

PIONEER TECHNICAL SERVICES, INC.

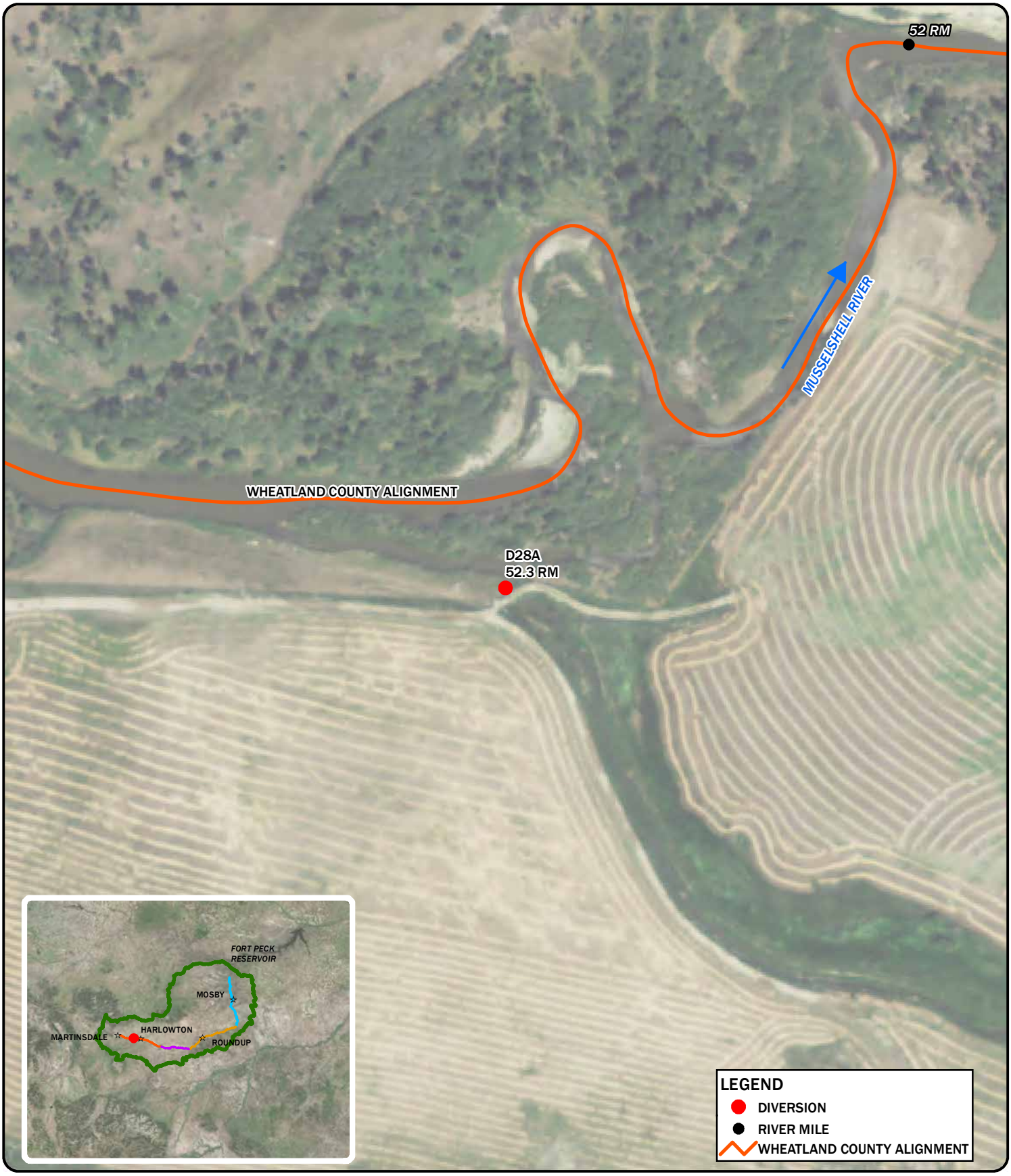
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D28

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D28-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BM
	Date: 9/2/2014
	Description: Looking west at D28 diversion dam structure location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BN
	Date: 9/2/2014
	Description: Looking west at D28 diversion dam structure location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D28A

PIONEER TECHNICAL SERVICES, INC.

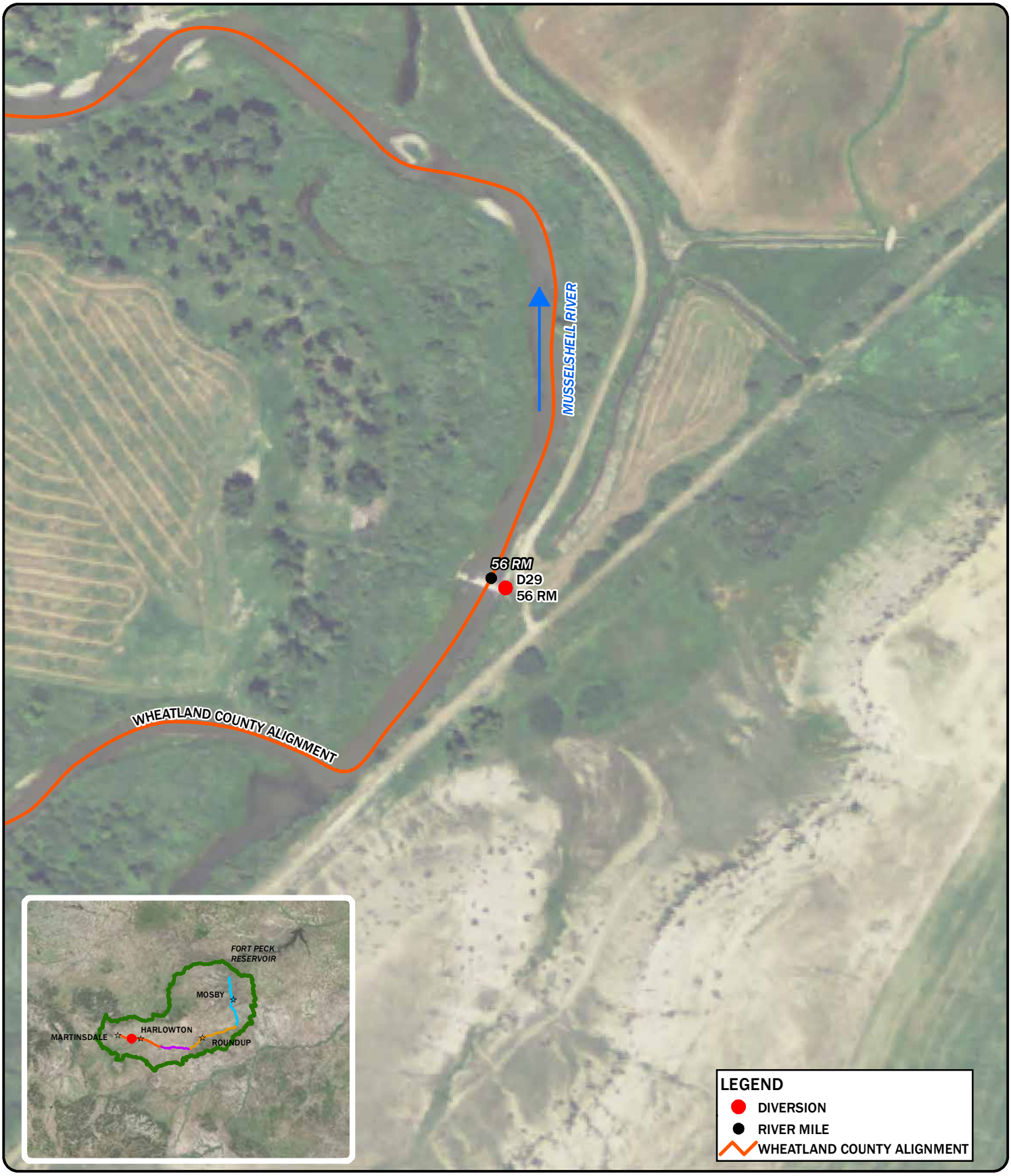
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D28A

DATE: 11/4/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D28A-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BW
	Date: 9/2/2014
	Description: Looking downstream at D28A diversion dam location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902BX
	Date: 9/2/2014
	Description: Looking across D28A diversion dam structure at upstream end
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D29

PIONEER TECHNICAL SERVICES, INC.

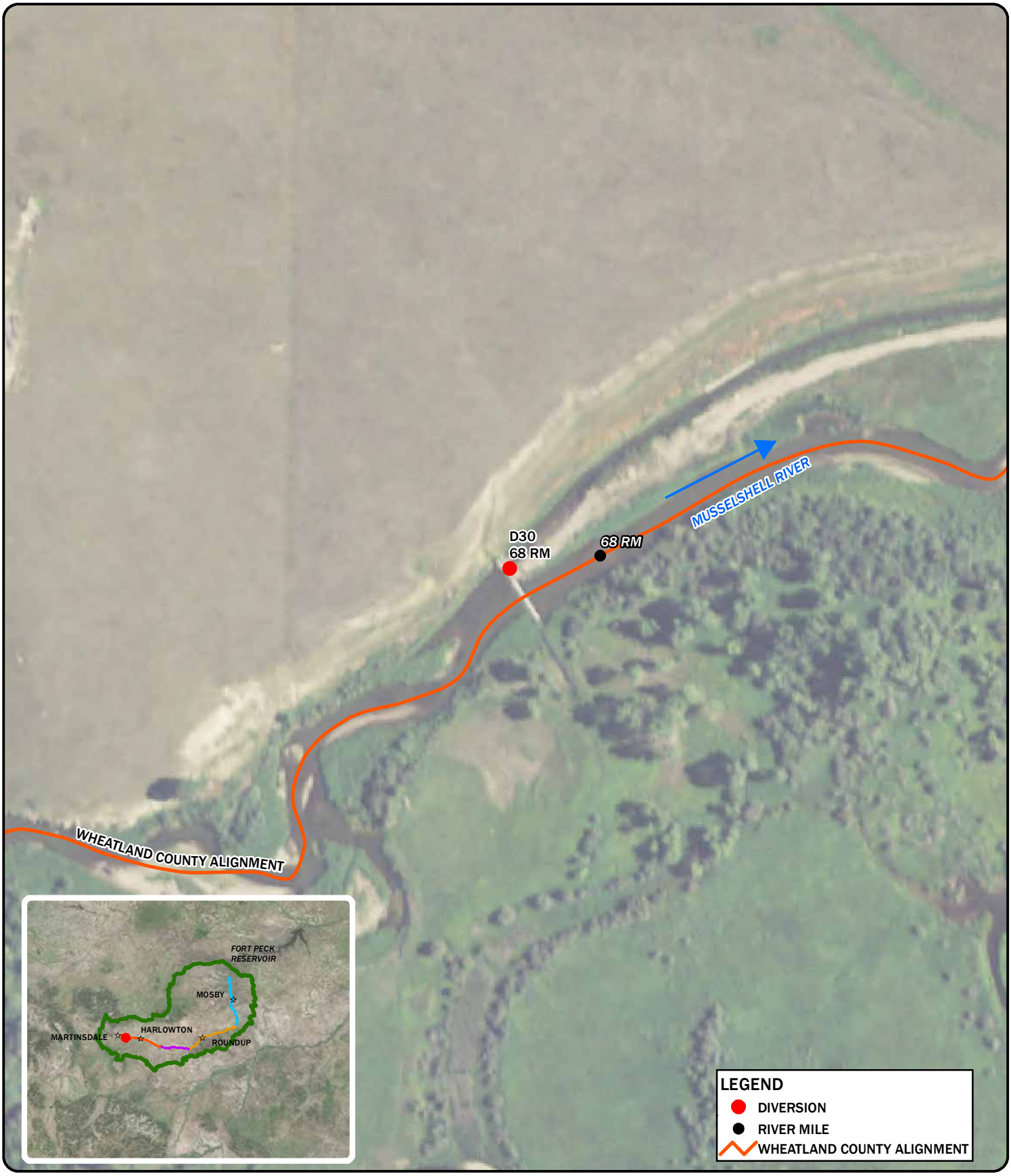
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D29

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D29-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CG
	Date: 9/2/2014
	Description: Looking north at D29 diversion dam location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CH
	Date: 9/2/2014
	Description: Looking north at D29 diversion dam location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D30

PIONEER TECHNICAL SERVICES, INC.

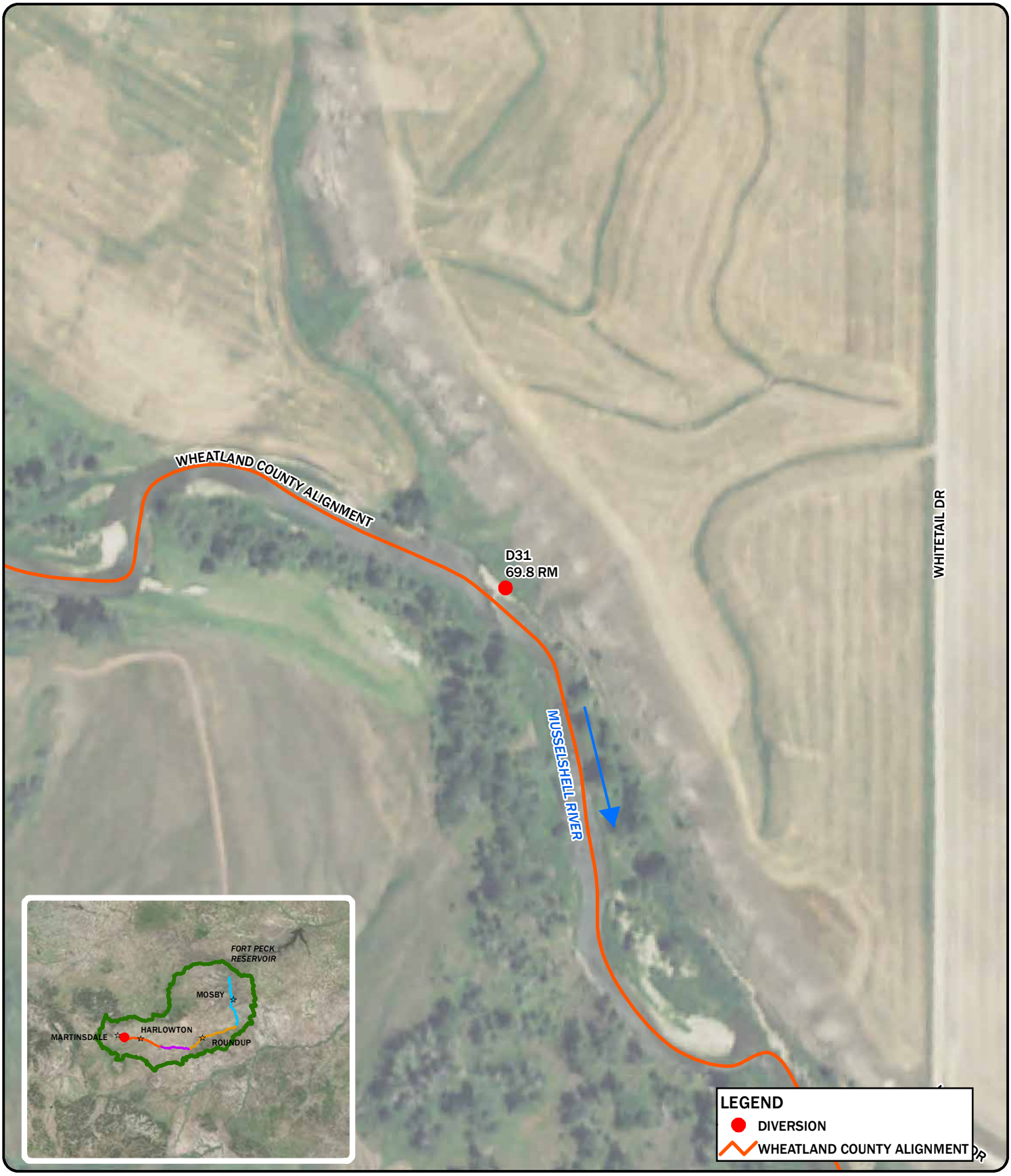
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D30

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D30-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902DE
	Date: 9/2/2014
	Description: Looking south at D30 diversion dam location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902DF
	Date: 9/2/2014
	Description: Looking south at D30 diversion dam location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D31

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
D31

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D31-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902DC
	Date: 9/2/2014
	Description: Looking south at D31 diversion dam location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902DD
	Date: 9/2/2014
	Description: Looking south at D31 diversion dam location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1

DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D32

PIONEER TECHNICAL SERVICES, INC.

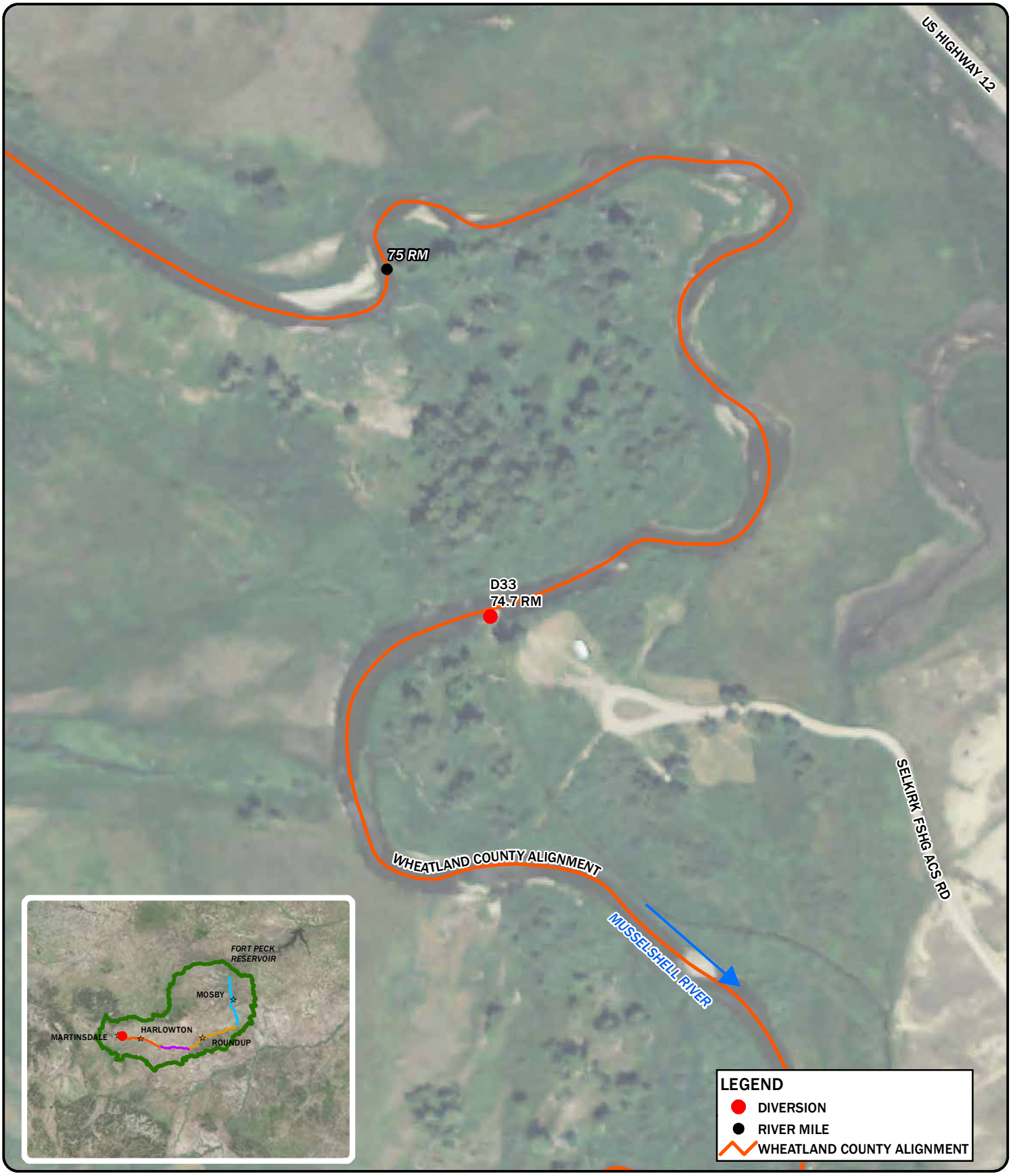
MUSSELSHELL RIVER
STRUCTURE INVENTORY
D32

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D32-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CW
	Date: 9/2/2014
	Description: Looking north at D32 diversion dam location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CX
	Date: 9/2/2014
	Description: Looking north at D32 diversion dam location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1



DISPLAYED AS:
PROJ./ZONE: MSP
DATUM: NAD 83
UNITS: INTERNATIONAL FEET
SOURCE: PIONEER/RATT/NRIS/NAIP 2013

0 100 200 400
Feet

FIGURE D33

PIONEER TECHNICAL SERVICES, INC.

MUSSELSHELL RIVER
STRUCTURE INVENTORY
D33

DATE: 11/2/2014

Path: P:\DNRC\Musselshell\GIS\Project\StructureInventory_Draft\D33-figure.mxd

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CQ
	Date: 9/2/2014
	Description: Looking north at D33 diversion dam location
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: 2014_0902CR
	Date: 9/2/2014
	Description: Looking north at D33 diversion dam location with reference rod
	Project: Musselshell River Floodplain Study - Phase 1

Appendix C. Field Logbooks

Musselshell River
Structure Inventory

Rite in the Rain
ALL-WEATHER
FIELD
№ 353

August 25th
To
August 28th
2014

Book #1

Appendix (F-2)

Pioneer Technical Services
(Missouri River Irrigation Inventory)
1101 S Montana St
Butte, MT 59701

Missouri River Irrigation
Inventory

3/25/[illegible] N. Hozzadaj

Mississippi River Inventory

Plan: Bank Survey [illegible] of [illegible] and of Mississippi River Pillsbury

HBO at B: [illegible] Rectangular

8:23 [illegible] at B2 Structure

Span 1 : 91'7"
Span 2 : 96'11"
Span 3 : 96'8"
Span 4 : 112'

* All spans + deck widths measured connected Ex: 91'7" = 91'7"

Deck Width : 33'7" 1.75

Deck Thick : 6.4'

Grd Right : 2.55'

No Curbs :

Inlet 2 Deck : N/A

Outlet 2 Deck : N/A

Pier Width : 5'

Description : 4 span concrete bridge

Photo 1 : From bridge looking downstream

Photo 2 : From bridge looking upstream

Photo 3 : Looking upstream

Photo 4 : Looking downstream

* [illegible] in the floodplain

[illegible]

②

[illegible]

Span 1 : 80' 4"
Span 2 : [illegible] 8"
Deck width : 15' 5"
Deck Thick : [illegible]
Grid Right : 2.2'
[illegible]
Pier width : 3
[illegible]

} (1) 4, 80.0, 15.5 in (GPS)

[illegible]
[illegible] upstream
[illegible] downstream
[illegible] upstream

★ [illegible] (GPS) [illegible] 2/22 & 3/29

[illegible] 1.5'

③

Arrive at 35 [illegible] @ 12:37

Span 1 : 122'
Span 2 : 15' 5"
Deck width : 15' 8"
Deck Thick : 1.7'
Grid Right : 5.28'
No [illegible]
Pier width : 1.0'

} (1) 122.0, 15.5 + 15.8 in (GPS)

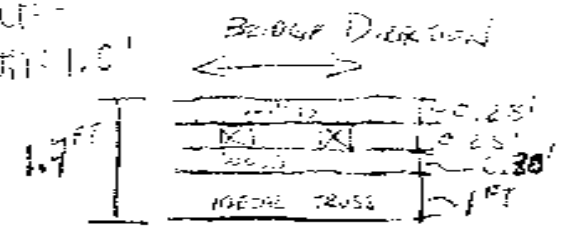


Photo 1 : Looking downstream
Photo 2 : From bridge downstream
Photo 3 : From bridge upstream
Photo 4 : Looking upstream

- [illegible] cracks about [illegible] road and deck planks

Left @ ~~[illegible]~~ TWD 13:05

Arrive at B4 structure @ ~~1:15~~ TBD 13:15

Span 1: 74' 1"
Span 2: 77' 3"
Span 3: 74' 4"
Deck width: 24'
Deck thick: 3.32'
Girder ht: 3.4'
Ballast: —
Pier width: 3'
Piers: 2

(74.1, 77.3, 74.4 + 24.0 in GPS)

.62' girder
2.7' max thick
3.32'

Photo 1: looking downstream
Photo 2: F/bridge downstream
Photo 3: F/bridge upstream
Photo 4: looking upstream

* Upstream col bridge/RR girder inspection shows buckling underneath

Leave @ ~~1:35~~ TBD 13:32

Arrive @ B5 structure @ ~~1:45~~ TBD 13:45

Span 1: 76' 7"
Span 2: 75' 3"
Deck width: 26' 4"
Deck thick: 3.97'
Girder ht: 2.3'
Ballast: —
Pier width: 2.5'
Piers: 1

(76.7, 75.3 + 26.4 in GPS)

.62' girder
+ 3.35' trans
3.97'

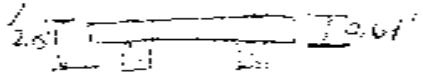
Photo 1: looking downstream
Photo 2: F/bridge downstream
Photo 3: F/bridge upstream
Photo 4: looking upstream

Separate @ ~~2:00~~ TBD 14:00

(2)

Arrive @ B6 Structure @ ~~2:15~~ TBD 14:15

Span: 140' 0" (Curb Length) } (140.0 + 6.4) in GPS



Deck Width: ~~2.15~~ TBD → 10' 4"
Deck Thick: 2.15'
Curb Ht: 5.40'
Culverts: -
Pier Width: N/P
Piers: N/P 0

Photo 1: F/ Bridge (NE) (UP) stream
Photo 2: F/ Bridge (SW) upstream
Photo 3: Looking upstream
Photo 4: Looking downstream

Left site @ ~~2:30~~ TBD 14:30

(3)

Arrive @ B7 Structure @ ~~2:30~~ TBD 14:30

Span: ~~27.5~~ (NG) 121' 9" } (27.5 + 121.9) in GPS (Curve Length)

Deck Width: 27' 5"
Deck Thick: 4.8' — Curb 4.3
Curb Ht: 3.5' + .5 = 4.8'
Culverts: 4 (See below)
Pier Width: N/A
Piers: N/A 0

10 + 24 + 50.5 + 12 = 12.5'

Culvert Length:
** Non-grade 12" 105 meters culverts installed (corrugated metal)
~ 27' 8" roadway of bridge 5' diameter
4 culverts Out 2 Dia: 5.5' Inlet 2 Dia: 6'

Photo 1: Looking upstream
Photo 2: F/ Bridge upstream
Photo 3: F/ Bridge downstream
Photo 4: Looking downstream
Photo 5: Outlet of culverts
Left site @ ~~3:00~~ 15:00
(4) ~~Photo 6: Inlet of culverts~~

Arrive at B8 Stream at ~~3:05~~ TMD 15:05

Span 1: 25' 5"
Span 2: 137' 5"
Span 3: 31' 5"
Deck width: 14'
Deck thick: 5.15'
Girder ht: 3.05'
Abutment: Rock
Pier width: 4.0'
Piers: 2

(25.5, 139.5, 31.5 +
10.0 m (GPS)

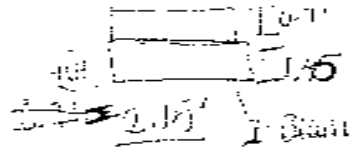


Photo 1: F/ bridge looking upstream
Photo 2: F/ bridge looking downstream
Photo 3: Looking downstream
Photo 4: Looking upstream

Left B8 @ ~~3:25~~ TMD 15:20

Attempted to access Dr. Wantman's property but was turned back by landowner adjacent to the Brillinger Ranch - he was very moody / truck blocking road - will call Lynn ~~[illegible]~~ ~~[illegible]~~ previously @

Arrive at ~~B4~~ D1 at ~~4:20~~ 16:20 Diversion

Span 1: Photo 1

*Note: Flows are higher than normal. Can't see structure. Lynn showed us diversion dam location.

Deck width: N
Deck thick: N/A
Girder ht: N/A
Abutment: N/A
Pier width: N/A
Piers: N/A

Photo 1: Looking S. across river where diversion dam is
Photo 2: Looking at diversion dam w/ rod in picture for reference

[illegible] @ 84 on [illegible] [illegible]

Sample [illegible] 8
Sample [illegible] 2"
[illegible] 8
Net width: 3 [illegible] 2'
Dist [illegible] 3'
Sig Point [illegible]
[illegible]
Pan width: 5.0
Page 2

Photo 1: Looking upstream
Photo 2: Looking upstream
Photo 3: Looking downstream
Photo 4: Looking downstream

Date [illegible]

~~Attached to D2~~

[illegible] Archived at D2

Diversion Structure w/ [illegible] ~~Points~~ Provided

For dimension see photo #2 w/ measuring rod & its [illegible] from land.

Photo #1 looking north at diversion structure

Photo #2 looking north at diversion structure w/ measuring rod

Date [illegible]

(1E)

[illegible]

[illegible]

[illegible] 20

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] 8:10 7:45

[illegible] (Gal [illegible])

[illegible]

[illegible]

[illegible]

[illegible] 4.2

[illegible] 4.0

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] B12 Stream [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] B12 Stream [illegible]

Spud: [illegible]
Drill [illegible]
Drill [illegible]
No [illegible]
Spud 12:45 [illegible]
Spud 5:55 [illegible]
Spud 4:57 [illegible]
Pile [illegible]
Rig [illegible]

Phase 1: [illegible]
Phase 2: [illegible]
Phase 3: [illegible]
Phase 4: [illegible]

[illegible]
[illegible]
[illegible]

[illegible]

[illegible] DIS 12 9:26

DIVERSION ROCK & CONCRETE

SEE PHOTO 2 SEE [illegible] SHEETS

PHOTO 1: LOOKING S. @ DIVERSION DAM

PHOTO 2: LOOKING S. @ DIVERSION DAM w/ ROD

* NOTE: HARD TO TELL IF THERE WAS CONCRETE PUT HERE BACK IS CONCRETE

OFFSITE @ 9:32

[illegible] DIS 12 9:26

(20)

[illegible] D7 STRUCTURE @ 10:40

[illegible]

[illegible]

[illegible] CONCRETE [illegible]
[illegible]

PHOTO 1: LOOKING N. AT DIVERSION DAM
PHOTO 2: LOOKING N. AT DIVERSION DAM
W/ ROD
OFFSITE @ 11:28

(21)

DIVERSION D8 STRUCTURE @ 11:30

DIVERSION CANAL

ESTIMATED 125 FT

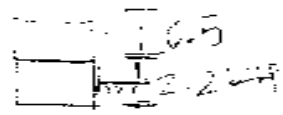
PHOTO 1: LOOKING S. @ DIVERSION DAM
PHOTO 2: LOOKING S. @ DIVERSION DAM
W/ ROD.

OFFSITE @ 11:54

[illegible] at 13:00

Span: [illegible]
Span: [illegible]
[illegible]
[illegible]
Length: 2.4'
[illegible]
[illegible] 2.2'
[illegible]

Span: 47.3'



(481, 548,
47.3 + 20.0
MGPS)

Photo 1: Looking upstream
Photo 2: F/ bridge looking upstream
Photo 3: F/ bridge looking downstream
Photo 4: Looking downstream

Clear [illegible] at 13:25

(23)

Arrive at 5RC station at 13:35

Span: Estimated 13' flat
* Bridge cross - poor condition
did not walk across
Span width: 4.0'
Deck width: 3.0'
Max depth: 2.7'
Cutwaters: None
Pier width: N/A
Piers: 0

Photo 1: Looking south across bridge
Photo 2: F/ bridge downstream
Photo 3: F/ bridge upstream
Photo 4: Looking upstream
Photo 5: Looking downstream

Clear at 13:55

(24)

Arrived at DIVERSION at 13:26

DIVERSION - CONCRETE

*NOTE: DIVERSION STRUCTURE RUNS PARALLEL TO RIVER ON SOUTH SIDE

ESTIMATED - 90'

PHOTO 1: LOOKING SOUTH AT DIVERSION

PHOTO 2: LOOKING SOUTH AT DIVERSION w/ ROD

OFF SITE @ 1326

(25) 13:35

Arrived at 691 Structure at ~~1:35~~ TMC

Span 1: 58'0"
Span 2: 61'6"
Span 3: 54'3"
Deck Width: 10'
Deck thick: 4.15'
Grade Ht: 2.7'
Curbs: None
Piers: 2
Pier Width: 6.0'

(58.0, 61.6, 54.3 & 10.0 in GPS)

*May be old railroad grade converted to vehicle bridge

PHOTO 1: Looking downstream.
PHOTO 2: F/ bridge downstream.
PHOTO 3: F/ bridge upstream.
PHOTO 4: Looking upstream

OFF SITE @ ~~1:50~~ TMC 13:50

(26)

Arrived at ~~B22~~ (B 3.0) at ~~2:05~~ (TMD) 14:08

Downstream - Concrete Jersey
Precasters ~ 2000

* Notes: Can't see much of
structure, just ends

Estimated ~ 100'

Photo 1: Looking S @ Downstream
Photo 2: Downstream pressure
tank.

Off Site @ ~~2:20~~ (TMD) 1420

(27)

Arrived at B22 at ~~2:40~~ (TMD) 1440

Span 1: 41'8"
Span 2: 51'5"
Span 3: 41'3"
Skewed: 26' 2"
Skew Angle: 2.6
Grade Ht: 23'
Guard: None
Piers: 2
Pier width: 1.0'

(41.0, 51.5, 41.3 + 26.2 in GPS)

Photo 1: F/Bridge looking downstream
Photo 2: F/Bridge looking upstream
Photo 3: Looking downstream
Photo 4: Looking upstream

Off Site @ ~~3:00~~ (TMD) 1500

Arrive at D12 at 5:35

DEBRIS - concrete → looks like it is probably flood g/w steel in the model but unable to tell if it is at water level (fishing is)

Photo 1: looking west @ Diversion Dam
Photo 2: looking west @ Diversion Dam and road

Estimated Length = 70'

Arrive @ 5:40

Arrive at D12 at 5:40 pm

- Travel to site location

→ Irrigation issues

- Photos 1, 2, 3 [illegible] concrete, leaning away, bank, deposited gravel

→ [illegible]

- Diversion Dam - concrete (round) with gravel deposited behind (on [illegible] side of river, no [illegible] in river)

- Photo 1: across river at what used to be concrete diversion structure.

- Photo 2: structure with rod [illegible] covered with gravel

Photo 3: D12 structure covered in gravel

Site (a 5:40 pm

30

MOVED TO BAY @ 5:45

8/27/14 WEDNESDAY

MUSSELSHELL

T. DELKER
N. HOLLADAY

3

ARRIVE @ D4 @ 7:00

DIVERSION – [illegible] → [illegible]

ESTIMATED WIDTH – FROM LYNN'S SHEET. SEE PHOTO 2.

* [illegible] DIVERSION IS [illegible] STRUCTURE

PHOTO 1: LOOKING WEST @ DIVERSION FROM
PHOTO 2: LOOKING WEST @ DIVERSION DAM w/ ROD.

LEFT SITE @ 7:18

Arrive at D13 structure at 8:20
Talking to landowner (not creek) → OK.
Dimson – [illegible]
[illegible]
[illegible]

Overall span fairly @ 95%

*Note: Cows [illegible] around west side of dam.

Photo 1: Looking [illegible] [illegible] dam
Photo 2: Looking [illegible] [illegible] dam w/ [illegible]

Depart at 8:30

Arrive at 524 structure at 8:50
RR bridge (abandoned)
Span 1: 84' 5"
Span 2: 80' 6"
Deck width: 10.0'
Deck thick: 4.2'
Girder ht: 4.5'
(84.5, 80.6, 10.0 in GPS)

* Talked to landowner off of Hamilton Rd. → OK to access his property

Pier: 1
Pier width: 6.6'

Photo 1: Looking upstream
Photo 2: F/ bridge downstream
Photo 3: F/ bridge downstream
Photo 4: Looking downstream

Depart @ 9:15

(34)

Arrive at B25 structure at 9:30

Span 1: 41' 8"
Span 2: 41' 11"
Span 3: 41' 5"
Deck width: 23' 32'
Deck thick: 3.9'
Clearance: 4.0'
Piers: 2 small round
Abutments: — none
Pier width: 3.0'

(41.8, 41.11, 41.5, + 30.0 in GPS)

PHOTO 1: Looking downstream
PHOTO 2: F/bridge looking upstream
PHOTO 3: F/bridge looking downstream
PHOTO 4: Looking upstream

Depart at 9:50

(35)

Arrive at B23 structure at 10:20
RR bridge (abandoned)

Span 1: 60' 2"
Span 2: 60' 7"
Span 3: 61' 1"
Deck width: 10'
Deck thick: 4.3'
Clearance: 2.05'
Abutments: none
Piers: 2
Pier width: 6.0'

(60.2, 60.7, 61.1, + 10.0 in GPS)

PHOTO 1: F/ bridge downstream
PHOTO 2: F/ bridge upstream
PHOTO 3: Looking upstream
PHOTO 4: Looking downstream

* Trees to Kathleen ([illegible]) depicted going on property.

Depart at 10:45

Arrive at DAM [illegible] at 1125

[illegible] Cameras & Photographers

Obtain Spot [illegible] See Page 2

[illegible]

Photo [illegible] S. @ Division Dam

Photo [illegible] S. @ Division Dam w/DD

Depart at 1145

Arrive at BSL at 1150

Spill: 113'

Dec width: 31½'

Dec thick: 5.2'

Chord Ht: 8.5'

McCarys

Piers: 3

Piers width: N/A

(187 + 31.7 unEPS)

1.40

11.25'

5.75

.05

F.S.

Photo [illegible] upstream

Photo [illegible] downstream

Photo [illegible] F/Bridge downstream

Photo [illegible] F/Bridge upstream

Depart at 1205

[illegible] OF DIV. STRUCTURE AT 10:30

DIVERSION ROUTE DAM
[illegible] MAIN DIVERT
SHOWS 50 FEET - LOOK @
PHOTO #2

PHOTO 1: LOOKING S. @ DIVERSION DAM
PHOTO 2: LOOKING S. @ DIVERSION DAM
W/ ROD

DEPARTED @ 10:35

[illegible] OF DIV. STRUCTURE AT 10:30

*BASE RAILROAD TIES 11 PLACES/BENT
SPAN 1: 28'6"
SPAN 2: [illegible] 7.5" BEAMS
SPAN 3: 24'0" [illegible]
SPAN 4: 24' [illegible]
SPAN 5: [illegible] SAN [illegible]
SPAN 6: 15'11"
SPAN 7: 9'0"
SPAN 8: [illegible]

DECKING
PROJECT
(BOTTOM)
[illegible]
DECKING

ARRIVED @ [illegible]
DEPARTED @ 12:50

GAGE HEIGHT: [illegible] FEET
DIV. WIDTH: 15' PIER WIDTH: 5'
DIV. TUBE: 8.2

PHOTO 1: WEST @ DIVERSION DAM LOOKING SE
PHOTO 2: [illegible] DOWNSTREAM
PHOTO 3: LOOKING UPSTREAM
PHOTO 4: BRIDGE LOOKING WESTERLY
PHOTO 5: BRIDGE LOOKING DOWNSTREAM

DEPARTED @ 12:30

(4)

Arrive at B31 at ~~1:00~~ TIME 13:00

Span 1: 56' 0"
Span 2: 55' 10"
Span 3: 56' 9"
Deck width: 10'
Deck thick: 3.7'
Curb ht: 2.0'
Cutwaters: None
Piers: 2
Pier width: 6.0'
Scour: None
Not applicable / Bridge

} (56.0, 55.1, 56.9 + 10.0 on GPS)

Photo 1: looking upstream
Photo 2: F/ bridge looking upstream
Photo 3: F/ bridge looking downstream

* Neighbor (Wilson) on Cleveland Springs Bridge (see Photo 4)

Departed at ~~1:15~~ TIME 13:15

13:20 (5)

Arrive at B32 structure at ~~1:20~~ TIME

Span 1: 140' 0"

} 140.0, 16.5 on GPS)

Deck width: 16' 6"
Deck thick: 2.2'
Curb Ht: 4.0'
Cutwaters: None
Piers: None
Pier width: N/A

* Talked to arborists before entering property (Jess Tarpila)

Photo 1: F/ bridge downstream
Photo 2: F/ bridge upstream
Photo 3: Looking upstream
Photo 4: Looking downstream

Left site @ ~~1:35~~ TIME 13:35

(92) 13.38

Arrive at B33 structure at ~~1:38~~ TMD

Span 1: 72' 3"
Span 2: 71' 5"
} (72.3, 71.5+ 25.1 AGPS)

Dam Width: 35' 10'
Dam Thick: 4.0'
Max Ht: 2.9'
No culverts
Piers: 1
Pier Width: 3.0'

Photo 1: Looking ~~upstream~~ down
Photo 3: F/Photo looking upstream
Photo 4: F/ Bridge looking down
Photo ~~3~~ 2: Looking upstream

Depart at ~~1:50~~ TMD 13:50

(93) 13.53

Arrive at Dike structure at ~~1:53~~ TMD

Diversion - Rock - Possibly some concrete

Estimated span ~ 60'

* Note. Hard to see structure, can see concrete head gate & a few rocks poking out of water

Photo 1: Looking S. @ Diversion Dam
Photo 2: Looking S. @ Diversion Dam w/ Red

Depart at 14:00

(AH)

Arrive at 634 Inspection at ~~4:35~~ 4:35 (THD)

Span: 19' 0"

Deck width: 20' 0"
Skew angle: 5.0°
Roadway: 9.35'
Piers: 0
No cracks: –
Pier width: N/A

PHOTO 1: Looking upstream
PHOTO 2: Looking downstream
PHOTO 3: Looking downstream
PHOTO 4: Looking downstream

Leave @ 4:45

8/20/14 | Thursday | Leon Hammond w/ DS

Arrive at 835 Inspection at 6:30 (AS)

Span: 32' 0" (main span)

Deck width: ~~3~~ 12'
Deck thick: 3' 3"
Curb Ht: None
No cracks: –
Piers: 0
Pier width: N/A

PHOTO 1: Looking downstream
PHOTO 2: Looking upstream
PHOTO 3: Looking downstream
PHOTO 4: Looking upstream

Leave at 6:30

Arrive at 337 Stevens at 6:40

Span 1: 91'0" (Other span) } (91.0 + 15.0 on GPS)

Deckwidth: 10'0"
Deck thickness: 5.0"
Girder Ht: 1.3'
Girders: [illegible]
Piers: 0
Pierwidth: N/A

Condition: [illegible] structure
[illegible]

Pier 1: [illegible]
Pier 2: [illegible]
Pier 3: [illegible]
Pier 4: [illegible]

Exits at 6:45

Arrive at 337 Stevens at 7:00 (47)

Span 1: 66'4" } (66.4, 66.4, 22.0 on GPS)
Span 2: 66'4"

Deckwidth: 22.0'
Deck thickness: 3.3'
Girder Ht: 2.0
Girders: [illegible]
Piers: 1 [illegible]
Pierwidth: 2.0'
[illegible]

Pier 1: [illegible]
Pier 2: [illegible]
Pier 3: [illegible]
Pier 4: [illegible]

Exits at 7:15

Arrived at D17 smolt at 7:18

- Only Nooksack smolt (1 hatchery) out of total sample of 41 fish

* Took point at Nooksack smolt

- looked up & down river for Nooksack smolt

Point: Point of Nooksack smolt
Pictures:

Departed at 7:45

Arrived B38 smolt at 8:00
* Stopped & talked to landowner
Depth: 8.4' (4/adjacent)
Visibility: 8'0" (8'0" / 16.0 in GPS)

Det mean: 16'0"
Det max: 3.2'
Gill hit: None
Debris: None
Pairs: 0

Observations: [illegible] species [illegible]

Pics 1: [illegible] - upstream
Pics 2: [illegible] downstream
Pics 3: [illegible] upstream
Pics 4: [illegible] downstream

Departed 8:45

Arrive at B[illegible] at 8:15

[illegible] — [illegible] + [illegible] + [illegible]
[illegible]
[illegible]
[illegible] 2 [illegible]
[illegible]
[illegible]
[illegible] Lucia [illegible]
[illegible]

[illegible]
[illegible]

Photo 1 [illegible]
Photo 2 [illegible] (→ [illegible])
Photo 3 [illegible]
Photo 4 [illegible]

[illegible]

Arrive at DIS structure at 8:30

Division - 3/4 [illegible]
1/4 [illegible] structure
→ [illegible]
[illegible] → [illegible]

Estimated spill - 120'

Photo 1 Looking S @ Diversion Dam
Photo 2 Looking S @ Diversion Dam w/ rod

Complete 8:45

(52)

Arrive at D21 structure at 8:50

Structure - concrete structure

Estimated ~ 150'

*Start survey - 8:54 / D21 dw sc
get reconstructed river gear (H/Lion)

Photo 1: at underside structure
Photo 2: Downstream structure w/
pool

Depart at 9:00

(53)

Arrive at B40 at 9:0

Span 1: 105' 0" (clear width)
Roadway: 19' 6"
Deck thickness 1.85'
Girder ht: 4.2'
Guards: None
Piers : None
Pier width: -

(105.0, 19.6 ft GPS)

/ aluminum wire

Abutment: stone / concrete

Photo 1: F/ Bridge upstream
Photo 2: F/ bridge downstream
Photo 3: looking upstream
Photo 4: looking downstream

Depart at 9:15

(34)

Arrive @ D22 structure at 9:15

Diversion: Rock

Estimated ~ 60'

Photo 1: Looking west @ Diversion Dam
Photo 2: Looking west @ Diversion Dam w/ Rod

9:25

(35)

Arrive @ ~~D17~~ D20 @ 9:40
THD

Diversion - Appears to be gone, some remains of large rock

Estimate River Length - 50' ft
See photo 2 for spud

Photo 1: Looking upstream @ possible location, remains of large rock
Photo 2: Looking N at old diversion location w/ rod.

D19 is head gate for D20

Offsite @ 10:15

(56)

Arrive at D23 structure at 10:~~50~~ 20 am

Diversion: Rock

Estimated Length ~130'

Photo 1: Looking u/s @ Diversion Dam
Photo 2: Looking u/s @ Diversion Dam w/ROW

Depart @ 10:30

(57)

Arrive at B41 structure at 10:36

Span 1: 54'2"
Span 2: 54'4"
} (54.2, 54.2 ~ 16.6 meters)
Deck width: 16'0"
Deck thick: 1.5'
Guardrail: None
Curbs: None
Piers: 1 cylinder (3)
Pier width: 4.0'
Abutments: vertical mud / sloped

Photo 1: Looking downstream
Photo 2: F/ bridge downstream
Photo 3: F/ bridge upstream
Photo 4: Looking upstream

Depart at 10:50

(5)

END OF BOOK # 1

[illegible]

9:30.4

Musselshell River
Structure Inventory

Rite in the Rain
ALL-WEATHER
FIELD
Nº 353

September 2nd

2014

Book #2

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] * [illegible]

[illegible]

[illegible] at 8:10

[illegible] - Rock structure

Diameter 165' (large finder)

[illegible] Locating N & division

[illegible] Locating N & division w/ measuring tape

[illegible] structure - GPS [illegible] direction

Open at 8:10

(2)

[illegible] 7:00

* GPS
[illegible]
[illegible]
[illegible]

[illegible] 427" (427)
[illegible] 576" (576)
[illegible] 479" 479
[illegible] 28.0 (GPS)
[illegible] 3'
[illegible] 2.25'
[illegible] 1.00
[illegible] 2 [illegible]
[illegible] 25'
[illegible] [illegible]
[illegible]

[illegible] Hauler [illegible]
[illegible] [illegible] [illegible]
[illegible] [illegible] upstream
[illegible] [illegible]

[illegible] 7:30

(3)

* New Division not identified on maps
→ name D24A [illegible] at 7:30
Division - D24A
[illegible] structure
Estimated Spot (Rough Area) / [illegible]
18 yards = 54'

→ [illegible] upstream (~15)

Photo 1: Looking S. @ division structure
Photo 2: Looking @ division structure w/ missing [illegible]

[illegible] at 7:40

(4)

Arrive at B25 [illegible] @ 8:10

Location: [illegible]

Estimated span: 3 spans = 93'
(very hidden)

Photo 1: looking N @ division

Photo 2: looking W @ division
w/ [illegible] Rd

Depart @ 8:20

(5)

Arrive at B43 [illegible] @ 8:30

Span 1: 62'6"

Deck width: 14'
Deck thick: 1.05
Girder Ht: 2.5'
Curbs: [illegible]
Piers: 0
Pier width: NA
Abutments: [illegible]
Backwater: [illegible] very old bridge

Photo 1: looking downstream
Photo 2: F/ bridge downstream
Photo 3: F/ bridge upstream
Photo 4: looking upstream

Depart @ 8:40

(1)

Arrive at B44 structure at 8:50

Span: 110' 4" (or GPS 110.4 - 28.5)

Deck width: 28' 5"
Deck thick: 5.2'
Clearance: 2.3'
Curbs: 0
Rails: C
Piers/bents: N/A
Material: Rock/concrete/steel
Condition: Failing

Photo 1: Looking downstream
Photo 2: W/ bridge downstream
Photo 3: W/ bridge upstream
Photo 4: Looking upstream

Depart at 9:10

(2)

Arrive at Dam structure at 9:02

Diversion - Rice diversion dam

Estimated span - 31.6 yds = 94.8'
(range finder)

Photo 1: Looking S. @ diversion dam

Photo 2: Looking S. @ diversion dam
w/ measuring rod

Check @ 9:12

(8)

Arrive at B45 structure at 9:20

Span 1: 37' 2" (37.2
Span 2: 86' 2" 86.2
(.450 on GPS)

Deck width: 45' 9"
Deck thick: 5.0'
Culverts: None
Girder: 2.35'
Piers: 1 concrete/concrete
Pier width: 3.0'
No scouring

Photo 1: Looking upstream
Photo 2: F/bridge upstream
Photo 3: F/bridge downstream
Photo 4: Looking downstream

Depart @ 9:32

Arrive at B46 structure at 9:40 (9)

Spans

Span 1 20' 7"
Span 2 25' 0"
Span 3 24' 1"
Span 4 28' 7"

Deck width: 13'0"
Deck thick: F/cap 2.3'
No culverts: None
Girder: None
Piers: 3 3 columns (round)/pier
Pier width: 1'

Photo 1: Looking downstream
Photo 2: F/bridge downstream
Photo 3: F/bridge upstream
Photo 4: Looking upstream

Offsite @ 9:50

(10) B47 (14)

Junction ~~B46~~ Structure at 10:05
to RR Bridge

Span 1: 66' 9"
Span 2: 66' 9"
} 66.9, 66.9 + 10.0 (in GPS)

Deck width: 10.0'
Deck thick: 4.0'
Girder Ht: 3.15'
Outlet: None
Pier: 1 (concrete structure)
Pier width: 6.0'

* Division structure (old) directly upstream of RR Bridge

Photo 1: F/bridge downstream
Photo 2: F/bridge upstream
Photo 3: looking downstream
Photo 4: looking upstream

change @ 10:25 point D2UA

Photo 5: two point → old division dam
- concrete Estimated span = 41.9 yds
(from map)

B48 (15)

Junction ~~B47~~ Structure at 10:00

Span 1: 30' 3"
Span 2: 27' 9"
Span 3: 32' 6"
} 30.3, 27.9, 32.6 + 10.0 (in GPS)

Deck width: 10.0'
Deck thick: 1.75'
Girder Ht: None
Outlet: None
Pier: 2 (4 metal cylinders)
Pier width: 1.0'

Photo 1: F/bridge upstream
Photo 2: F/bridge downstream
Photo 3: looking downstream
~~Photo 4: looking upstream~~

Offsite @ 10:05

(12)

Structure D27 Structure # 10:36

Division: Rock dam

Estimated span: 25.7 yds = 77.1'
(Rock Under)

PHOTO: Looking west @ Rock Diversion Dam

PHOTO2 - Looking west @ Rock Diversion Dam w/ ROD

Structure # 8-43-

(13)

Structure D28 Structure # 10:50

Division: Rock Diversion Dam

Estimated span 32.7 yds = 98.1' (26)
(Rock Under)

PHOTO1: Looking west @ Rock Diversion Dam

PHOTO2 Looking west @ Rock Diversion Dam w/ ROD

Structure @ 10:55

(4)

Arrive at B50 structure at 11:10

Span 1: 71' 8" (71.8 + 10.0 in GPS)

Deck width: 10'
Deck thick: 3.0'
Girder ht: None
Outrig: None
Pier: 0
Pier width: N/A

Photo 1: F/bridge upstream
Photo 2: F/bridge downstream
Photo 3: Abutm downstream
Photo 4: Looking upstream

Depart at 11:15

(5)

Arrive at B52 structure at 11:20

Span 1: 41' 0" (41.0 in GPS)
Span 2: 41' 0" (41.0 in GPS)

Deck width: 17' 0"
Deck thick: 2.5'
Girder ht: [illegible]
Outrig: None
Pier: 4 (Staggered)
Pier width: 5.0'

Photo 1: F/bridge downstream
Photo 2: F/bridge upstream
Photo 3: Abutm downstream
Photo 4: Looking upstream

Depart at 11:30

[illegible] 352A

Arrive at A structure at 11:30

[illegible]

Lincoln Road Dam

- Gates to be lowered & moved downstream?

Estimated drop: 10.1 yards
= 30.3 ft

Photo 1: looking downstream at dam & diversion dam

Photo 2: looking across start of dam structure, (upstream end).

Depart @ 11:39

352A

Arrive at A structure at 11:45

* Missing bridge - bridge from County Rd 9 (Pass Creek Rd)

Span: 71'3" } (71.3 + 18.5 = 89.8)

Deck width: 18.5'
Deck thick: 3.35'
Height: 30'
No piers: -
No abutments: -

Photo 1 F/ bridge downstream
Photo 2 F/ bridge upstream
Photo 3 looking upstream
Photo 4 looking downstream

Depart at 11:55

(20) 13:50

ARRIVE AT B~~3~~ 5A STRUCTURE AT ~~4:10~~ THD

SPAN 1: 56'0"
SPAN 2: 56'0"

DIVERSION: 31.5"
DIV HOLE: 4.0'
CREST HT: 3.0'
NO DIVERS
PIER 1
PIER DIAM 3.0'

56.0
56.0
31.5 IN
GPS

ACCESS (21)

PICS: ~~F/DIRECT~~ DOWNSTREAM
2 F/DIRECT DOWNSTREAM
3 F/DIRECT UPSTREAM
4 ACCESS UPSTREAM

DEPART AT ~~4:10~~ THD 13:10

13:49 (20)

ARRIVE AT D33 STRUCTURE AT ~~1:49~~ THD

DIVERSION: WOOD - TARPS HOLDING STRUCTURE TOGETHER

* NOTE: SILVERK. FISHING ACCESS ROAD

ESTIMATED: 19.4 ft = 58.2'

PHOTO 1: LOOKING NORTH @ DIVERSION DAM

PHOTO 2: LOOKING NORTH @ DIVERSION DAM w/ ROD

DEPART @ ~~1:50~~ THD 13:56

(22) 14:09

Entry at DS2 Structure at ~~2:09~~ TMS

Division: Rock

* Note: Structure is [illegible] [illegible]

Estimated Span ~ 27.5 yr = 82.5

Photo 1: Looking N. @ Diversion Dam
Photo 2: Looking N. @ Diversion Dam w/ROL

[illegible] 14:19 TMS

13:58 (23)

Entry at Bridge at ~~1:55~~ TMS

Span 1: 60' 9" (N side), 60.9, 60.2
Span 2: 60' 2" } 20.5
Deck Width: 20' 5" } (GPS)
Deck Thick: 3.0'
Grade Ht: 3.0'
Curvature: Tight
Piers: 1 (2 columns/pier)
Pier Width: 4.0'

Photo 1: Looking Downstream
Photo 2: F/Bridge Looking Downstream
Photo 3: F/Bridge Looking Upstream
Photo 4: Looking Upstream

Offsite @ ~~2:07~~ TMS (24) 05 14:05

(21)

14:40

Arrive at D31 Structure at ~~2:40~~ THO

Diversion - Rock (Local material)

Estimated depth = 24-1 gals = 12.3 FT
(Half width)

Photo 1: Looking S. @ Diversion Dam

Photo 2: Looking S. @ Diversion Dam w/ ROD

Offsite @ ~~2:45~~ THO ~~12~~ THO 14:45

13:40

Arrive at B62 Structure at ~~1:40~~ THO (18)

Span: 50' 8" (50.8 - 30.2 = 20.6)
@ 20' 2"
Deck width: ~~50'~~
Deck thickness: 20"
Girder ht: NAV
Abutment: NAV
Pier: NAV
Pier width: X

Photo 1: Looking Downstream
Photo 2: F/Bridge looking Downstream
Photo 3: F/Bridge looking Upstream
Photo 4: Looking Upstream

Offsite @ ~~1:45~~ THO 13:45

(20)

14:25

Arrival at B30 structure at ~~2:25~~ THD

Span: 43' 5"

Deck width: 10' 3"

(43.3 + 10.3 in GPS)

Deck thick: 8.7'

Structure: 3.3'

Abutment: Neat

Pier: C

Pier width: N/A

Photo 1: Looking Downstream

Photo 2: F/Bridge Looking Downstream

Photo 3: F/Bridge Looking Upstream

Photo 4: Looking Upstream

Offsite @ ~~2:30~~ THD 14:30

14:56 (21)

Arrival at D30 structure at ~~2:56~~ THD

Division: Concrete

Estimated Span: 36 yd = 108 ft

Photo 1: Looking S @ Diversion Dam

Photo 2: Looking S @ Diversion Dam w/ROD

Offsite @ ~~3:00~~ THD 15:12

(22) 15:22

Arrive at B58 structure at ~~3:22~~ THD

Span: N/A

Deck width: N/A
Deck thick: N/A
Curb ht: N/A
Railing: N/A
Pier: N/A
Pier width: N/A

* Note: Bridge is gone - few wood piers standing

Photo 1: Looking downstream @ old bridge location
~~Photo 2:~~
~~Photo 3:~~
~~Photo 4:~~ THD

Offsite @ ~~3:23~~ THD 15:23

* Talked to landowner of B58 bridge gone.

16:00

Arrive at B57 structure at ~~4:00~~ THD (23)

Span: 51'0"

Deck width: 16'
Deck thick: 1.41'
Curb ht: None
Railing: None
Pier: 0
Pier width: N/A

abutment - mech. stabilized w/ wood

Photo 1 Looking upstream
Photo 2 F/ bridge upstream
Photo 3 F/ bridge downstream
Photo 4 Looking downstream

Offsite @ ~~4:05~~ THD 16:05

(30)

Arrive at B54 structure at ~~4:20~~ 16:20 TMD

Span 1: 89' 4"

Deck width: 8' 9"

(89.4 + 8.9 in GPS)

Deck thick: 25'
Grd & Ht: None
Culvert: 0
Pier: 0
Pier width: N/A

abutment - stabilized earth

Photo 1 looking downstream
Photo 2 F/ bridge downstream
Photo 3 F/ bridge upstream
Photo 4 Looking upstream

OFFSITE @ ~~4:25~~ TMD 16:25

(31)

Arrive at B55 structure at ~~4:26~~ 16:26

Span:

* - STRUCTURE IS GONE - SOME WOOD PIERS LEFT.

Deck width
Deck thick
Grd & Ht
Culvert
Pier
Pier width

N/A

Photo 1:
Photo 2:
Photo 3:
Photo 4:

NONE TAKEN

END OF BOOK #2

[illegible]

9/13/14

DELPHIA-MELSTONE CANALS

CONSTRUCTED 1950 & 1953 BY

MONTANA

MONTANA WATER RESOURCES BOARD

IN CO-OPERATION WITH

DELPHIA - MELSTONE WATER USERS' ASSOC

Lynns

D2

D4

DIVERSION DAMS PROJECT DATA

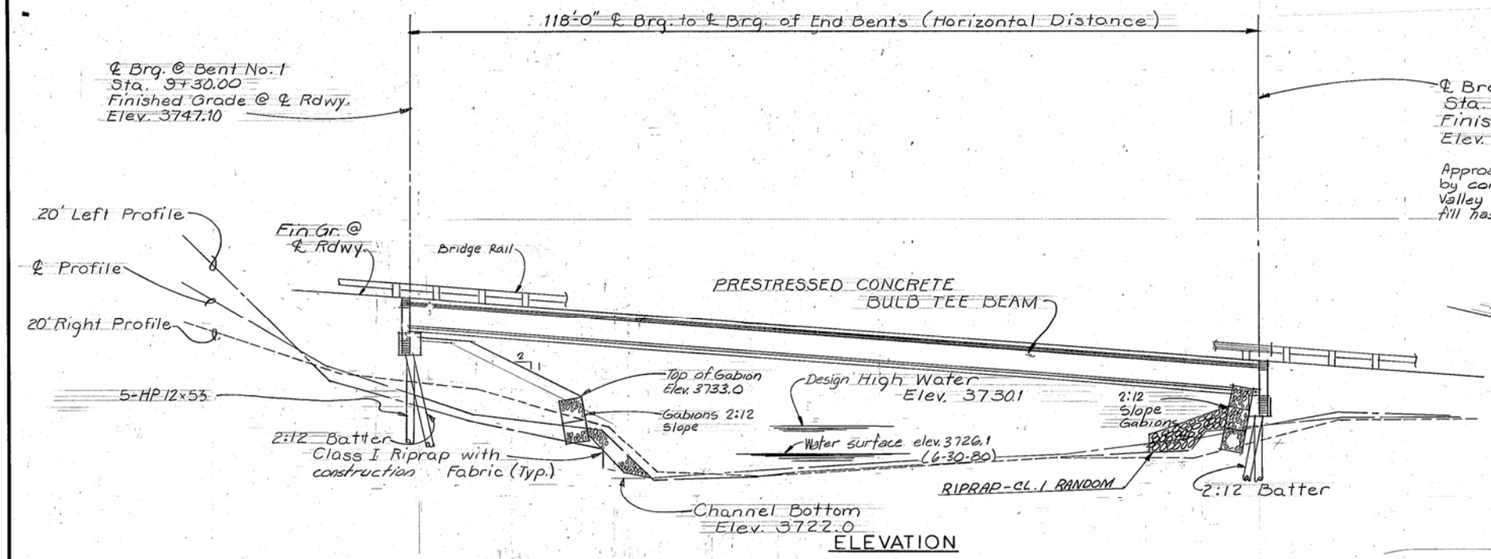
MUSSELSHELL —	LENGTH	182.0 FEET
	HEIGHT	4.0 FEET
DELPHIA —	LENGTH	164.5 FEET
	HEIGHT	4.0 FEET
CANALS —	LENGTH	66.6 MILES
LAND —	NEW IRRIGATION	14,500 ACRES
	SUPPLEMENTAL IRRIGATION	1,800 ACRES

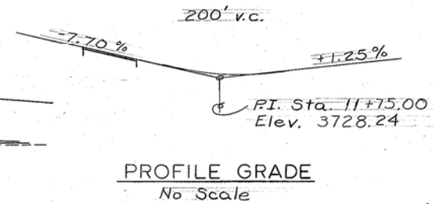
Appendix D. Bridge Structure Record Drawings

Map	Admin Area	HIS Route	MPOST	Bridge ID	On/Off System	Location	Feature Intersect	Year Built	Year Recon	Year Insp	NHS Rte	S.R.	ADT	Owner	County	Latitude (Decimal)	Longitude (Decimal)	Draw No	In Project?
Google	Dist 5	L54001	0.2	L54001000+02001	Off System	N EDGE TWO DOT	MUSSELSHELL RIVER 017	1965		2014	N	92.2	100	County Highway Agency	WHEATLAND	46.43014167	-110.0721306	6436	no
Google	Dist 5	L54009	0.5	L54012000+05001	Off System	2M SE HARLOWTON	MUSSELSHELL RIVER 016	1977		2012	N	99	100	County Highway Agency	WHEATLAND	46.42523056	-109.7999333	888888	no
Google	Dist 5	L54003	0.5	L54016000+05001	Off System	6M W TWO DOT	MUSSELSHELL RIVER 018	2011		2013	N	98.9	100	County Highway Agency	WHEATLAND	46.45451944	-110.1973333	20133	no
Google	Dist 5	L54010	0.6	L54021000+06001	Off System	4M E HARLOWTON	MUSSELSHELL RIVER 008	1988		2014	N	99.9	100	County Highway Agency	WHEATLAND	46.41383611	-109.7398139	14025	no
Google	Dist 5	L19201	0.5	L19201024+00001	Off System	BARBER	MUSSELSHELL RIVER 023	1983		2014	N	99.8	100	County Highway Agency	GOLDEN VALLEY	46.30842778	-109.3853056	13230	no
Google	Dist 5	L19203	0.03	L19203026+02001	Off System	1M NE CUSHMAN	MUSSELSHELL RIVER 015	2012		2014	N	100	100	County Highway Agency	GOLDEN VALLEY	46.29921111	-109.0359056	21231	no
Google	Dist 5	L19217	0.6	L19217000+03001	Off System	2M E RYEGATE	MUSSELSHELL RIVER 003	1911	1994	2013	N	65	100	County Highway Agency	GOLDEN VALLEY	46.30143333	-109.2077	15622	no
Google	Dist 5	L33101	24.61	L33001027+08001	Off System	6M W MUSSELSHELL	MUSSELSHELL RIVER 015	1916		2012	N	57.8	100	County Highway Agency	MUSSELSHELL	46.50860833	-108.2159583	RECORDS	no
Google	Dist 5	L33102	0.1	L33006015+07001	Off System	SE ROUNDUP	MUSSELSHELL RIVER 008	1970		2014	N	34.1	100	County Highway Agency	MUSSELSHELL	46.43936389	-108.5315694	none	no
Google	Dist 5	L33103	1.4	L33007001+04001	Off System	1M SE MELSTONE	MUSSELSHELL RIVER 017	1992		2011	N	99.6	100	County Highway Agency	MUSSELSHELL	46.58195278	-107.8581806	15086	no
Google	Dist 5	L33104	0.4	L33017000+04001	Off System	7M NE ROUNDUP	MUSSELSHELL RIVER 012	1915		2012	N	26.5	100	County Highway Agency	MUSSELSHELL	46.4714	-108.3925306	8	New 3 span bridge in 2016
Google	Dist 5	L33027	0.83	L33027000+08281	Off System	3M SW MELSTONE	MUSSELSHELL RIVER 024	2013		2013	N	98.7	100	County Highway Agency	MUSSELSHELL	46.57083333	-107.9009167	RECORDS	no
Google	Dist 5	L33117	1.2	L33027001+02001	Off System	3M SW MELSTONE	MUSSELSHELL RIVER 018	1916		2012	N	13.8	100	County Highway Agency	MUSSELSHELL	46.56488611	-107.9009333	RECORDS	no
Google	Dist 5	L33124	0.7	L33028000+07001	Off System	6M SW MELSTONE	MUSSELSHELL RIVER 019	1916		2013	N	35.6	100	County Highway Agency	MUSSELSHELL	46.55887778	-107.9774139	RECORDS	New 3 span bridge in 2017
Google	Dist 5	L33111	1.8	L33030003+06001	Off System	15M SW ROUNDUP	MUSSELSHELL RIVER 004	1988		2012	N	99.1	100	County Highway Agency	MUSSELSHELL	46.2987	-108.7814917	14019	no
Google	Dist 5	L33129	0.9	L33045000+04001	Off System	1M E ROUNDUP	MUSSLESHELL RIVER 011	1995		2014	N	100	100	County Highway Agency	MUSSELSHELL	46.44641944	-108.5124556	15682	no
Google	Dist 5	L33548	0	L33548000+00001	Off System	ROUNDUP	MUSSELSHELL RIVER 025	2013		2013	N	85	100	County Highway Agency	MUSSELSHELL	46.43929167	-108.5366639	RECORDS	no
Google	Dist 4	L44118	3.1	L44118003+01001	Off System	15M NW SUMATRA	MUSSELSHELL RIVER 001	1930	1960	2014	N	41.1	100	County Highway Agency	ROSEBUD	46.71998333	-107.8221944	none	no
Google	Dist 5	P00045	43.43	P00045043+04301	On System	1M S HARLOWTON	MUSSELSHELL RIVER	1969		2012	N	88.4	710	State Highway Agency	WHEATLAND	46.42910278	-109.8423056	9172	no
Google	Dist 5	P00053	45.55	P00053045+05521	On System	LAVINA	MUSSELSHELL RIVER	1959		2014	Y	71.5	1730	State Highway Agency	GOLDEN VALLEY	46.28887222	-108.9379278	4383	no
Google	Dist 5	S00300	0.2	S00300000+02001	On System	RYEGATE	MUSSELSHELL RIVER	1962		2014	N	82	340	State Highway Agency	GOLDEN VALLEY	46.2939	-109.2578417	5846	no
Google	Dist 5	P00016	47.55	P00016047+05501	On System	ROUNDUP	MUSSELSHELL RIVER	1996		2014	Y	80	3030	State Highway Agency	MUSSELSHELL	46.42795556	-108.5701556	15727	no
Google	Dist 5	S00310	40.19	S00310040+01921	On System	MUSSELSHELL	MUSSELSHELL RIVER	1960		2013	N	75.9	120	State Highway Agency	MUSSELSHELL	46.52011667	-108.0920028	4533	no
Google	Dist 5	S00381	0.4	S00381000+04001	On System	7M SW ROUNDUP	MUSSELSHELL RIVER	1949		2014	N	58.8	340	State Highway Agency	MUSSELSHELL	46.37735	-108.6231444	2774	no
Google	Dist 5	P00057	158.37	P00057158+03721	On System	MOSBY	MUSSELSHELL RIVER	1973		2013	Y	91.5	380	State Highway Agency	GARFIELD	46.99424722	-107.8892083	10815	no

Grey highlighted bridge information provided by MDT. Information for unhighlighted bridges could not be provided by MDT

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	MONT.	BR 9019(7)	1	7





PROFILE GRADE
No Scale

NOTES:

FINISHED GRADE: Finished Grade of bridge at ℄ Roadway is the same as profile grade shown on Road Plans.

LIVE LOAD: Standard HS20-44 loading

SPECIFICATIONS: Montana Department of Highways and the Montana Highway Commission Standard Specifications for Road and Bridge Construction, 1981 edition, and any amendments thereto, and Special Provisions shall govern unless otherwise noted. Design prepared in accordance with A.A.S.H.T.O. Specifications, 1977 edition, and any amendments thereto.

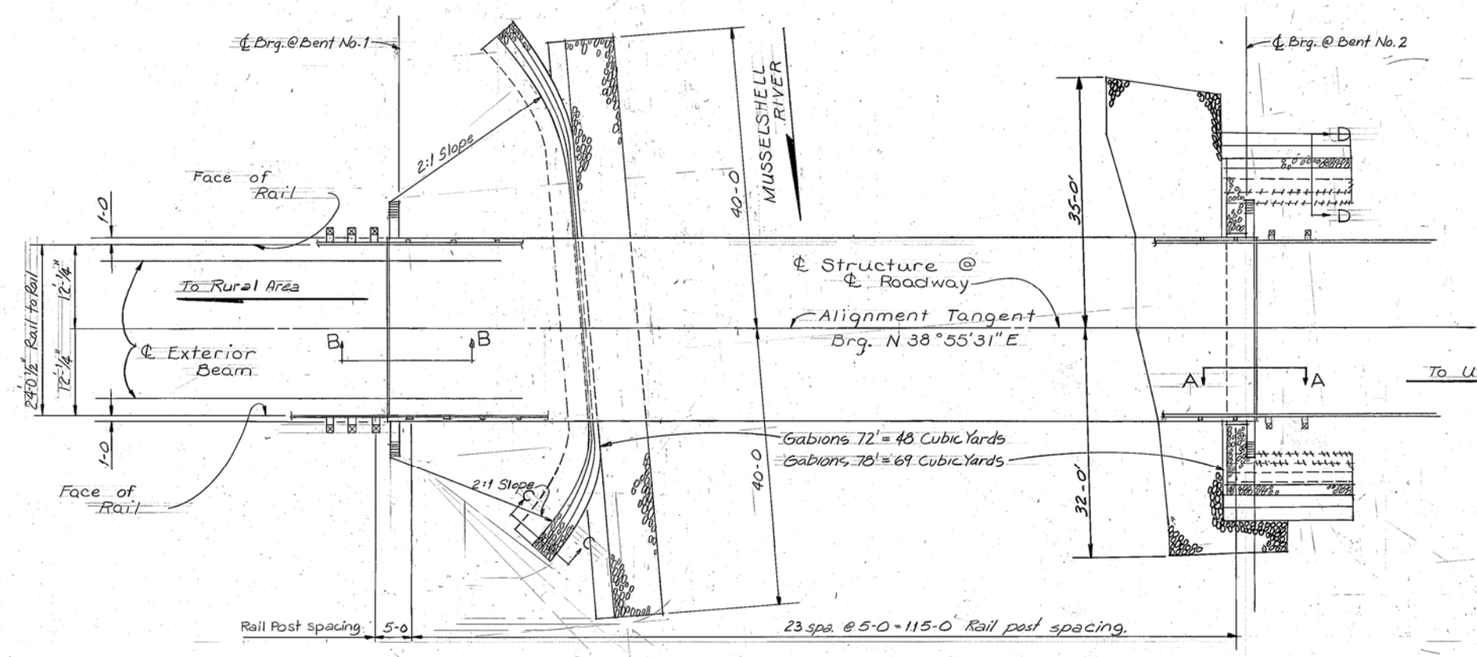
CAST-IN-PLACE CONCRETE: Unless otherwise approved, all concrete shall be Class "AD".

STRUCTURAL STEEL: All structural steel shall be measured and paid for on the lump sum basis, as set forth in the Standard Specifications. Estimated Wt. 1927 pounds.

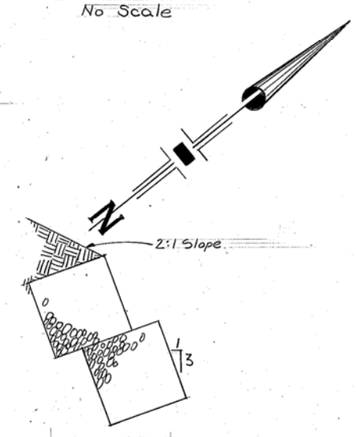
UTILITIES: For location of utilities, see appropriate Road Plans sheet.

REINFORCING STEEL: All reinforcing steel shall be of the deformed type and shall meet the requirement of ASTM Specifications A615, Grade 60 (AASHTO M-31).

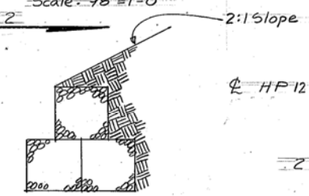
TRAFFIC CONTROL PLAN AND SEQUENCE OF OPERATIONS See "Special Provisions."



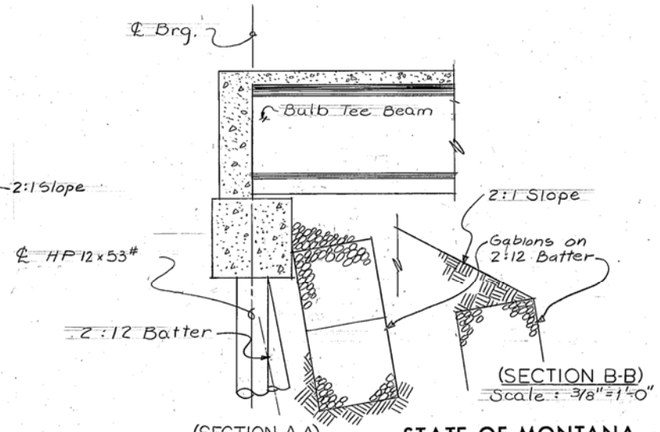
PLAN



SECTION C-C
Scale: 3/8" = 1'-0"



SECTION D-D
Scale: 1/4" = 1'-0"



(SECTION A-A)
Scale: 3/8" = 1'-0"

(SECTION B-B)
Scale: 3/8" = 1'-0"

Class of Concrete	*Minimum Required cylinder strength to achieve a 1.0 pay factor	Strength for Design purposes
"AD"	3400 psi.	3000 psi.

*See Supplemental Specifications Article 90.06 (c)

NOTE: The contractor shall not disturb the river banks except as specifically approved by the engineer.

STREAM DATA
ICE: Light
DRIFT: Medium
SCOUR: None
SUBSOIL: See Log of Borings, Dwg. No. 13231
DESIGN FREQUENCY: 10% (10 yrs.)
DESIGN FLOW: 3600 c.f.s.
DRAINAGE AREA: 1594 Sq. Miles
DESIGN VELOCITY: 6.6 f.p.s.
BASE FLOOD FLOW: 8800 c.f.s.
OVERTOPPING FLOOD FLOW: 3700 c.f.s.
OVERTOPPING FLOOD FREQUENCY: 9% (11 yrs.)
BASE FLOOD ELEVATION: 3732.9

DESIGNED	J.F	
DRAWN	D.R	
CHECKED	J.F	8-1-83
APPROVED	/	/ /
REVISED		
REVISED		

STATE OF MONTANA
DEPARTMENT OF HIGHWAYS

BRIDGE OVER MUSSELSHELL RIVER
AT STA. 9+89.00
FEDERAL AID PROJECT NO. BR9019 (7)
GOLDEN VALLEY COUNTY

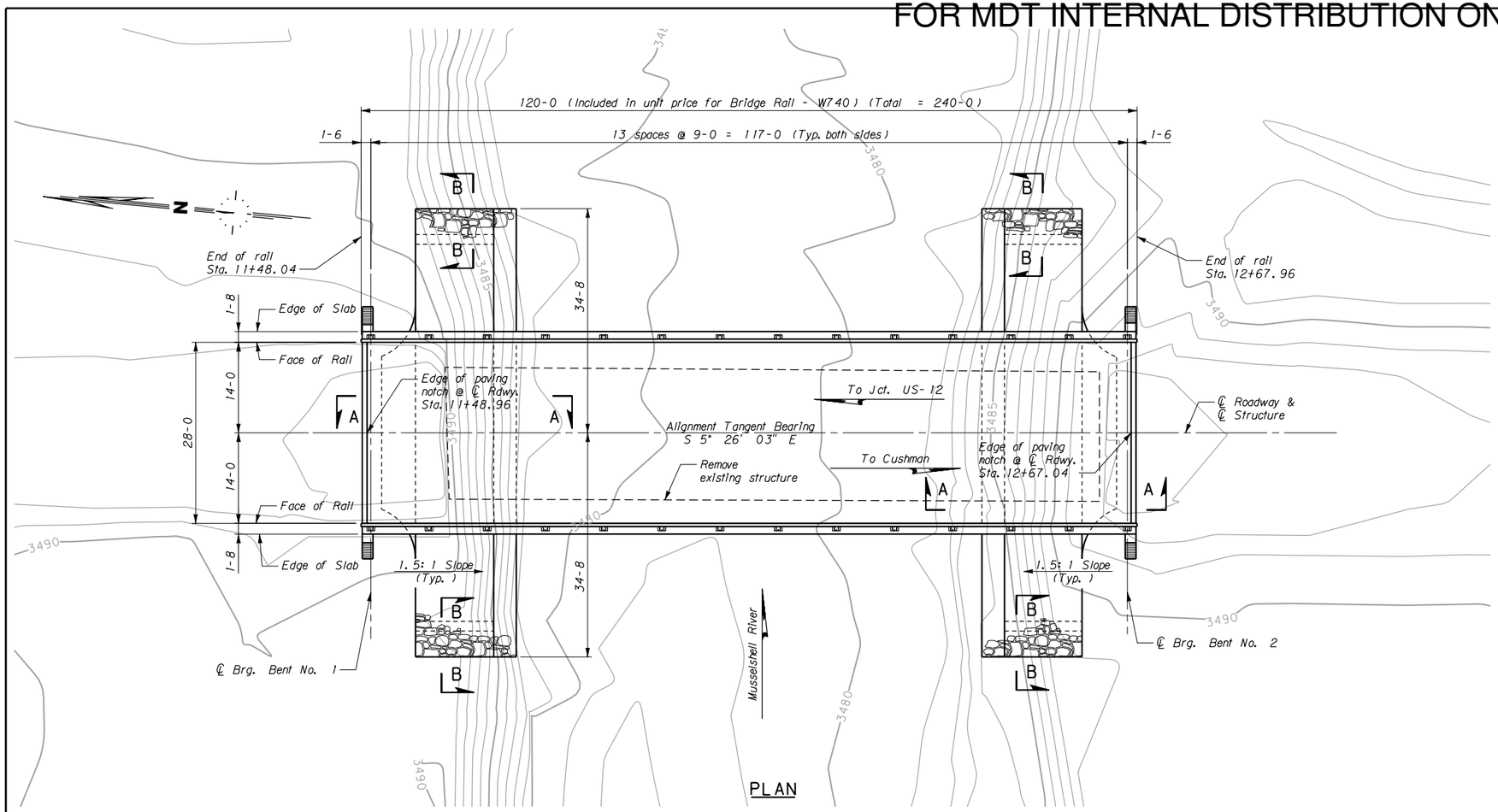
GENERAL LAYOUT
Scale: 1" = 10'-0" Except as noted

DRAWING NO. 13230

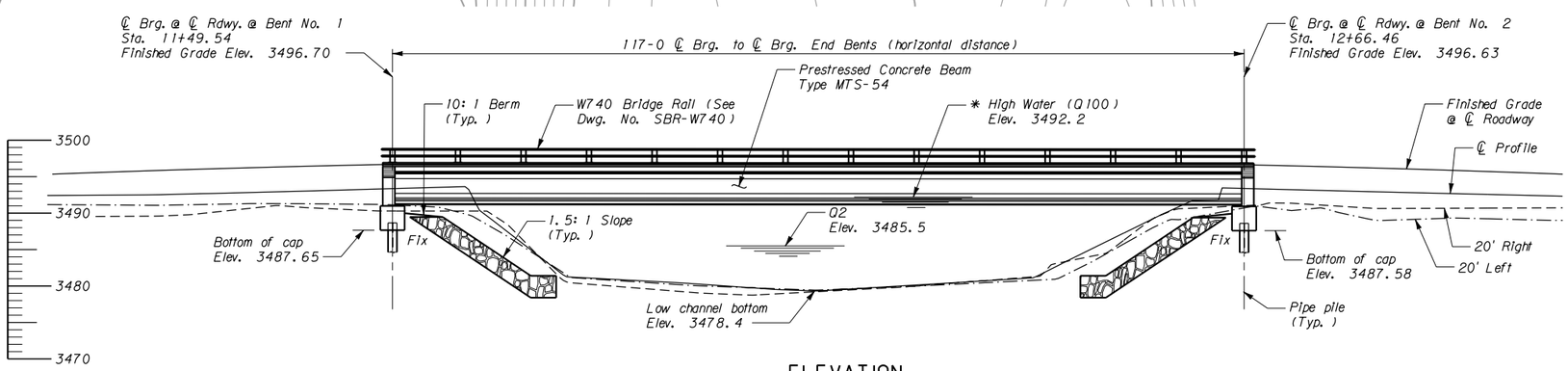
Plastic Lead

FOR MDT INTERNAL DISTRIBUTION ONLY

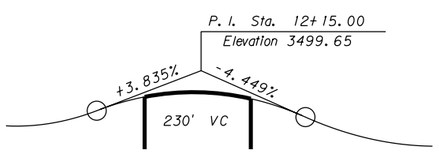
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	BR 9019(12)	B2



PLAN



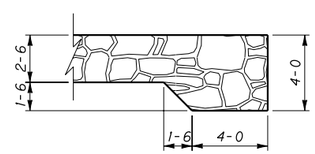
ELEVATION



PROFILE GRADE
No Scale

NOTE: Water Surface on date of survey Elev. 3480.5 (5-31-07)

NOTE: Top of Riprap elevation is 3489.39 except as shown in Section A-A.



SECTION B-B
Scale: 1/4" = 1'-0"

STREAM DATA

Drift:	Light
Contraction Scour (Q100):	0.0'
Ice:	None
Drainage Area:	2673 sq. mi.
2-year Stage (Q2):	3485.5
Base Flood Flow (Q100):	11,200 cfs
Base Flood Stage:	3492.2
* Base Flood Velocity:	8.44 fps
Low Beam Elevation:	3491.0

Also see Hydraulic Data Summary sheet.
Base Flood Stage elevation includes backwater
*

NOTES

FINISHED GRADE: Finished grade of bridge at centerline roadway is the same as the Profile Grade shown on Road Plans.

LIVE LOAD: Standard HL-93 loading.

SPECIFICATIONS: Montana Department of Transportation and the Montana Transportation Commission Standard Specifications for Road and Bridge Construction, 2006 edition, and any amendments thereto, and the Special Provisions govern unless otherwise noted. The design was prepared in accordance with AASHTO LRFD Bridge Design Specifications, Fourth edition - 2007 with 2008 interim revisions.

REINFORCING STEEL: Use new deformed type reinforcing steel meeting the requirements of AASHTO M 31 Grade 60. Include all costs associated with furnishing and placing new reinforcing steel in the unit price bid for either Reinforcing Steel or Reinforcing Steel - Epoxy Coated.

CAST IN PLACE CONCRETE: Unless otherwise approved or specified, use Class DD-Bridge for all substructure concrete and Class SD for all superstructure concrete.

CONCRETE STRENGTH: Use f'c = 4000 p.s.i. for Class DD-Bridge concrete. Use f'c = 4000 p.s.i. for Class SD concrete.

STRUCTURE EXCAVATION: Include structure excavation in the unit price bid for Class DD-Bridge concrete.

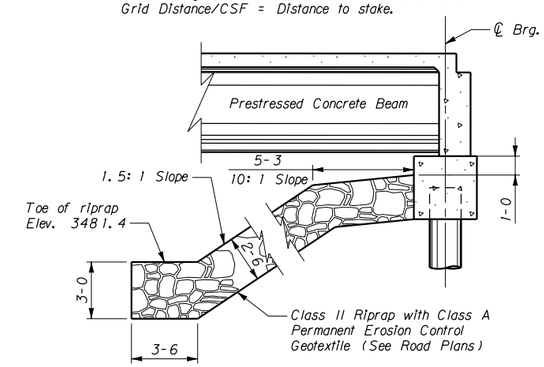
TRAFFIC CONTROL PLAN AND SEQUENCE OF OPERATIONS: See Special Provisions.

UTILITIES: Call 1-800-424-5555 for utility locates at least two working days prior to starting any construction activity that could disturb the utility.

EXISTING STRUCTURE: Remove the existing structure (see Road Plans sheets and Special Provisions).

STATE PLANE COORDINATES: Stations shown on the bridge plans are state plane grid stations based on state plane coordinates (NAD83-1992). Dimensions shown on the bridge plans are horizontal ground distances and not state plane grid distances. The combination scale factor (CSF) at this locations is 0.99930361.

Horizontal ground distance x CSF = Grid Distance
Grid Distance/CSF = Distance to stake.



SECTION A-A
Scale: 1/4" = 1'-0"

DESIGNED	5/21/09	J.A.N.
DRAWN	7/20/09	L.D.C.
CHECKED	6/30/11	J.S.O.
APPROVED	7/1/11	K.M.B.
REVISED		
REVISED		
REVISED		
REVISED		

MDT Montana Department of Transportation

BRIDGE OVER
MUSSELSHELL RIVER - CUSHMAN

AT STA. 12+08.00

FEDERAL AID PROJECT NO.
BR 9019(12)

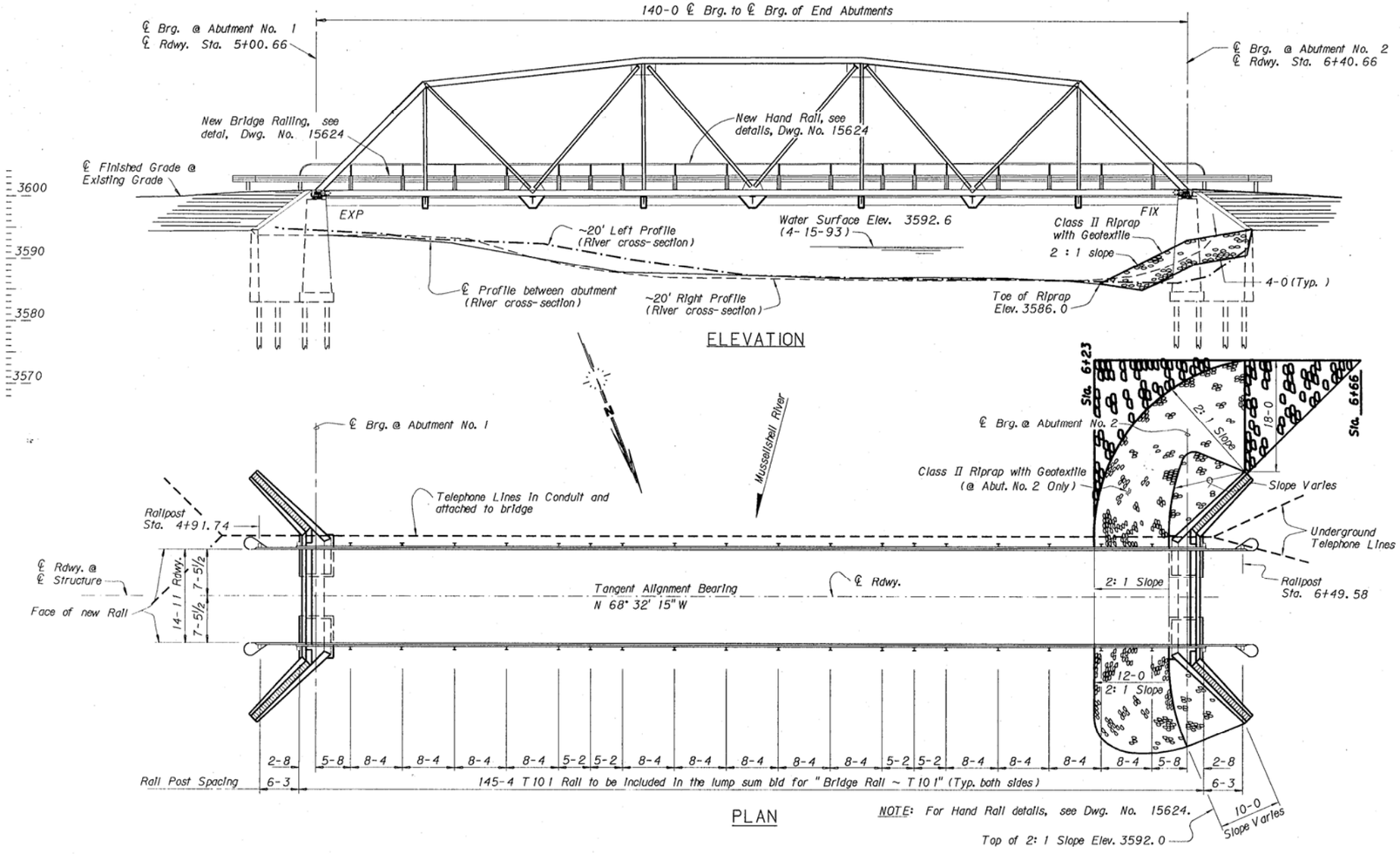
GOLDEN VALLEY COUNTY

GENERAL LAYOUT

Scale: 1" = 10'-0" (Except as noted)

c:\dgn\5166000brgen001.dgn UPN NUMBER 5166000
CPS - U2435 10/31/2014 10:53:04 AM DRAWING NO. 21231

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.
8	MONT.	BH 9019(10)	B1



PLAN

NOTE: For Hand Rail details, see Dwg. No. 15624.

NOTES

DIMENSIONS: The Contractor shall verify all plan dimensions and any dimensions necessary to do the bridge rehabilitation work. Vary construction as necessary with prior approval of the Engineer. Contractor shall verify all dimensions in the field before ordering any materials and before fabrication is begun.

FINISHED GRADE: The finished grade of the bridge at centerline Rdwy. shall remain the same as it is prior to construction.

SPECIFICATIONS: Montana Department of Transportation and the Montana Highway Commission Specifications for Road and Bridge Construction, 1987 Edition and any amendments thereto, and Special Provisions shall govern unless otherwise noted. Design prepared in accordance with A. A. S. H. T. O. Specifications, 1993 edition, and any amendments thereto.

TRAFFIC CONTROL PLAN AND SEQUENCE OF OPERATIONS: See "Special Provisions".

LIVE LOAD: A. A. S. H. T. O. Type 3-3 truck loading.

CAST IN PLACE CONCRETE: Unless otherwise approved, all cast-in-place concrete shall be Class "AD".

REINFORCING STEEL: All new reinforcing steel shall be of the deformed type and shall meet the requirements of A. S. T. M. Specifications A615, Grade 60 (A. A. S. H. T. O. M-31).

GUARD RAIL: All posts and plates shall conform to A. S. T. M. A36. Metal guardrail shall conform to A. A. S. H. T. O. M-180 and shall be lapped in the direction of traffic.

RAIL ERECTION: Rail posts shall be set perpendicular to lower chord of truss and rail shall be set parallel to lower chord of truss. To obtain proper rail height use vertical slots in rail posts for adjustment.

PAINTING: Painting shall be in accordance with the Standard Specification, Supplemental, and Dwg. No. SBR-T101, except that no red lead or lead silico-chromate primer paint shall be used.

RAIL PAYMENT: "Bridge Rail ~ T101" shall be paid for by the lineal foot which shall br full compensation for furnishing and installing all materials, including all equipment and labor necessary to complete the item. The number of lineal feet of "Bridge Rail ~ T101" for payment shall be as shown on the plans and computed as the horizontal distance between centerlines of end rail posts. Hand rail shall be paid for by the lineal foot which shall be full compensation for furnishing and installing all materials including all equipents and labor necessary to complete the item. The number of lineal feet of "Hand Rail" for payment shall be as shown on the plans and computed as the horizontal distance between the centerline of the end rail posts.

REMOVE DECK AND NAILERS: Existing decking, nailers and timber curb shall be removed by the Contractor. The decking shall be salvaged and become property of Golden Valley County (See Special Provisions for salvage). All costs associated with removing, salvaging, and disposing of the existing deck, nailers and timber curb shall be paid for under the lump sum bid item for "Remove Deck".

UTILITIES: Telephone lines are within the roadway Right-of-Way at both ends of the bridge throughout its length. The contractor shall use care in conducting his operation so as not to damage the phone lines or disrupt phone services. Any cost to the contractor for disruption of phone services shall be the responsibility of the contractor. The contractor shall notify the local phone company two weeks prior to starting work.

HARDWARE: All new hardware used in deck construction shall be galvanized and shall be included in the unit price bid for "Treated Timber".

TREATED TIMBER: All new decking, nailers and curb shall be treated timber and shall meet the requirements of the Standard Specifications, Supplemental Specifications, these plans, and Special Provisions. All new holes, cuts and chamfers in treated timber shall be thoroughly coated as per Supplemental Specification 558.04(c). The Contractor shall use all necessary care when using the solution so as to prevent this solution from reacting any stream or waterway.

STRUCTURAL STEEL: All structural steel shall be measured and paid for on the lump sum basis as set forth in the Standard Specifications. Estimated weight A36= 133lbs.

LIST OF DRAWINGS

SHEET NO.	DWG. NO.	TITLE
B1	15622	GENERAL LAYOUT - LIST OF DRAWINGS, AND ESTIMATED BRIDGE PLAN QUANTITIES
B2	15623	BRIDGE REHABILITATION DETAILS
B3	15624	BRIDGE REHABILITATION DETAILS
B4	15625	MUSSELSHELL RIVER near Ryegate (for reference only)
B5	SBR-T101 (2-6-90)	STANDARD BRIDGE RAIL - TYPE T101

Select Structural Timber for Decking: Select structural timber for decking shall be standard sawn inter-mountain Douglas Fir, Western Larch, or Pacific Coast Douglas Fir, conforming to A. A. S. H. T. O. M-168 and shall meet the requirements for numerical stress values shown on the table below. To avoid oversite, the grade of timber shall be clearly noted on the shop plans.

DESCRIPTION	Extreme Fiber in Bending "Fb" and Tension Parallel to the grain "Ft"		Horizontal Shear "FV"	Compression		Modulus of Elasticity
	Fb	Ft.		Perpendicular to grain "Fc⊥"	Parallel to grain "Fc"	
2" x 4" Laminated Decking	1600 p. s. i.	950 p. s. i.	85 p. s. i.	385 p. s. i.	1100 p. s. i.	1,600,000

ESTIMATED BRIDGE PLAN QUANTITIES

LOCATION	LENGTH	REMOVE DECK (LUMP SUM)	BRIDGE RAIL T101 (LIN. FT.)	HAND RAIL (LIN. FT.)	TREATED TIMBER (M. B. M.)	REVISE STRUCTURE (LUMP SUM)	ELASTOMERIC BEARING - T. F. E. (EACH)	STEEL RUNNING-PLATE (SQ. FT.)	STRUCTURAL STEEL (LUMP SUM)	BRIDGE SURVEY (LUMP SUM)
ABUTMENT NO. 1							2			
ABUTMENT NO. 2		1.0				1.0			1.0	1.0
SUPERSTRUCTURE	140		290.67	290.~~67~~7	14.~~00~~747			~~1100~~ 1121.6		
TOTAL	140	● 1.0	290.67	290.~~67~~7	14.~~00~~747	● 1.0	2	~~1120~~ 1121.6	● 1.0	● 1.0
		● $2,600.00				● $5,700.00			● $500.00	● $100.00

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER MUSSELSHELL RIVER

AT STA. 5+70.66

FEDERAL AID PROJECT NO. BH 9019(10)

GOLDEN VALLEY COUNTY

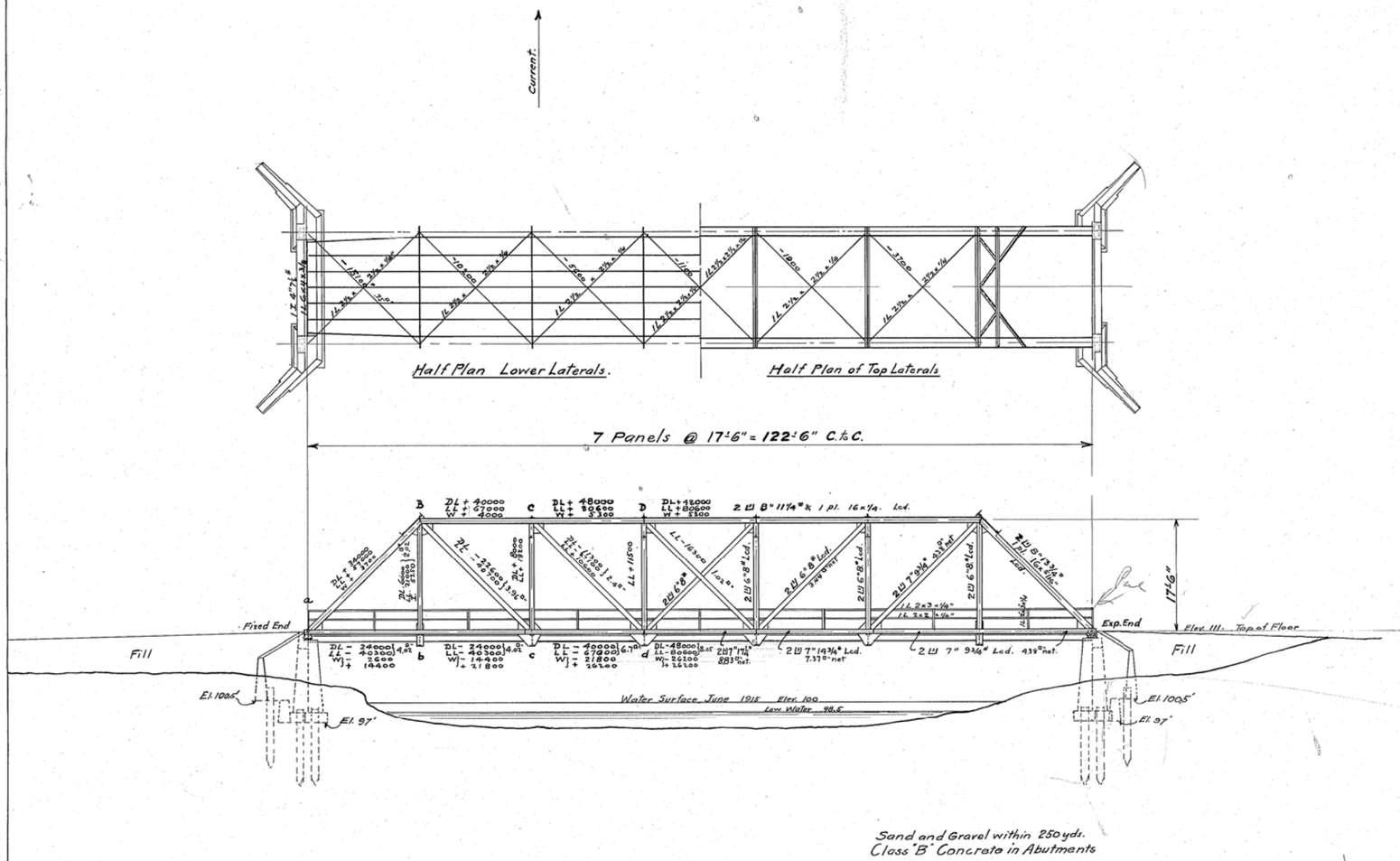
GENERAL LAYOUT, LIST OF DRAWINGS, AND ESTIMATED BRIDGE PLAN QUANTITIES

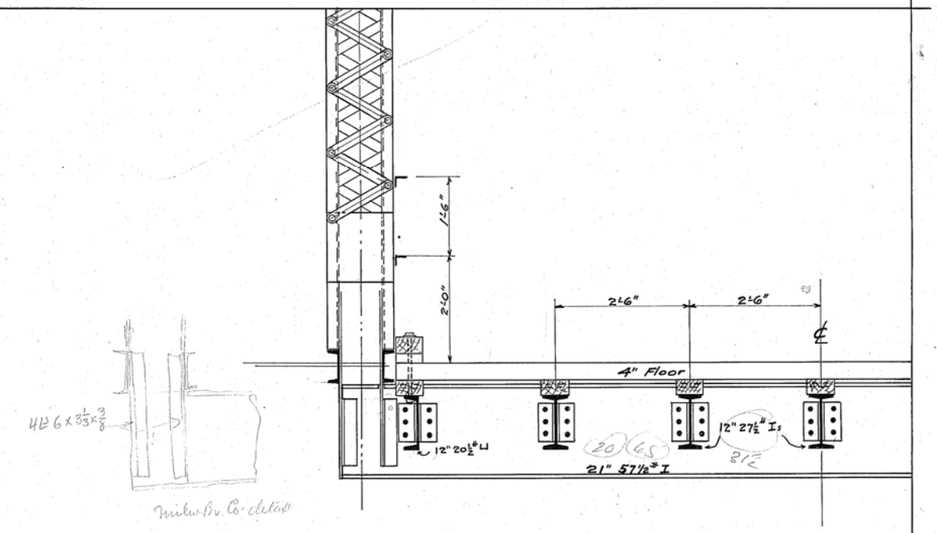
Scale: 1" = 10'-0"

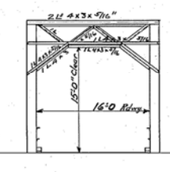
DESIGNED	10-27-92	D. W. C.
DRAWN	10-27-92	D. W. C.
CHECKED	10-4-93	R. W. M.
APPROVED		
REVISED		
REVISED		

DRAWING NO. 15622

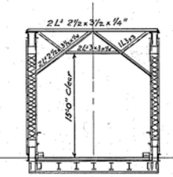
1496\br\gl. brg



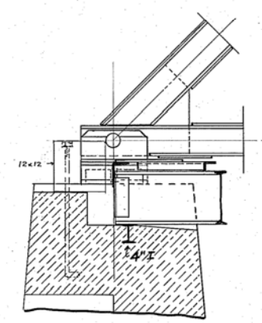




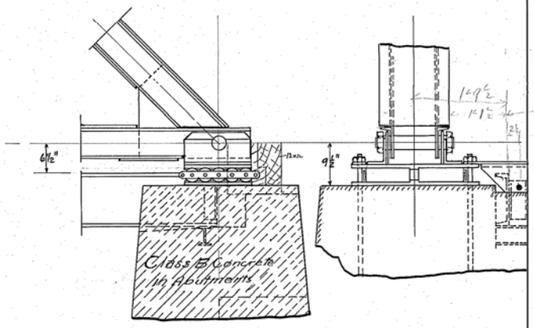
End Elevation.



Section C. & D.



Fixed End



Expansion End

Loads

D.L. 915# pr. lin. ft. of bridge.
L.L. on Trusses, 96# pr. sq. ft.
" " Floor System, 1-20 Ton Traction Engine, 2/3 on rear axle.
Impact " " 25 o/o of L.L.
Wind = 150# pr. lin. ft. at Top Chord, one half transferred below thru bracing.
300# " " " " Lower " , " " assumed moving.
Floor Beam Reaction = 3075.0#
Stringer assumed to carry 1/2 of Cone. Wheel Load, or 3.33 Tons.

Specifications

Except as noted, use Std. Specifications on pages #126 to 132 Carnegie Steel Co's 1913 Hand Book.
Paint - One Shop Coat Black Graphite Paint.
" Field " Brown " " .

122'-6" x 16' SPAN
over
Musselshell River
near
Gage, Musselshell Co., Montana.

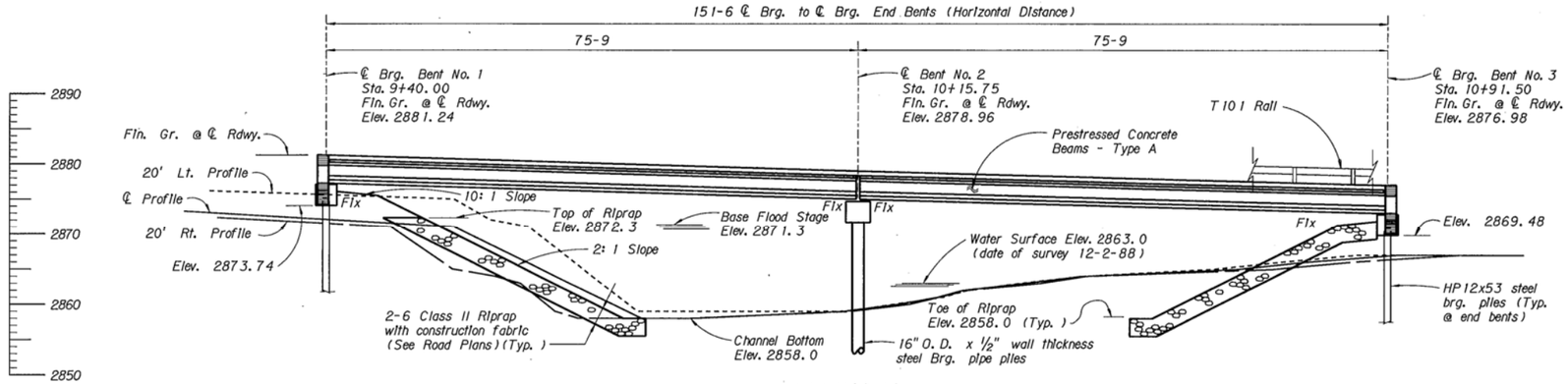
MONTANA STATE HIGHWAY COMMISSION.
HELENA, MONTANA. July 23-1915.
FILE No. 9. - DRAWING No. 8.

Approved [signature] Secretary

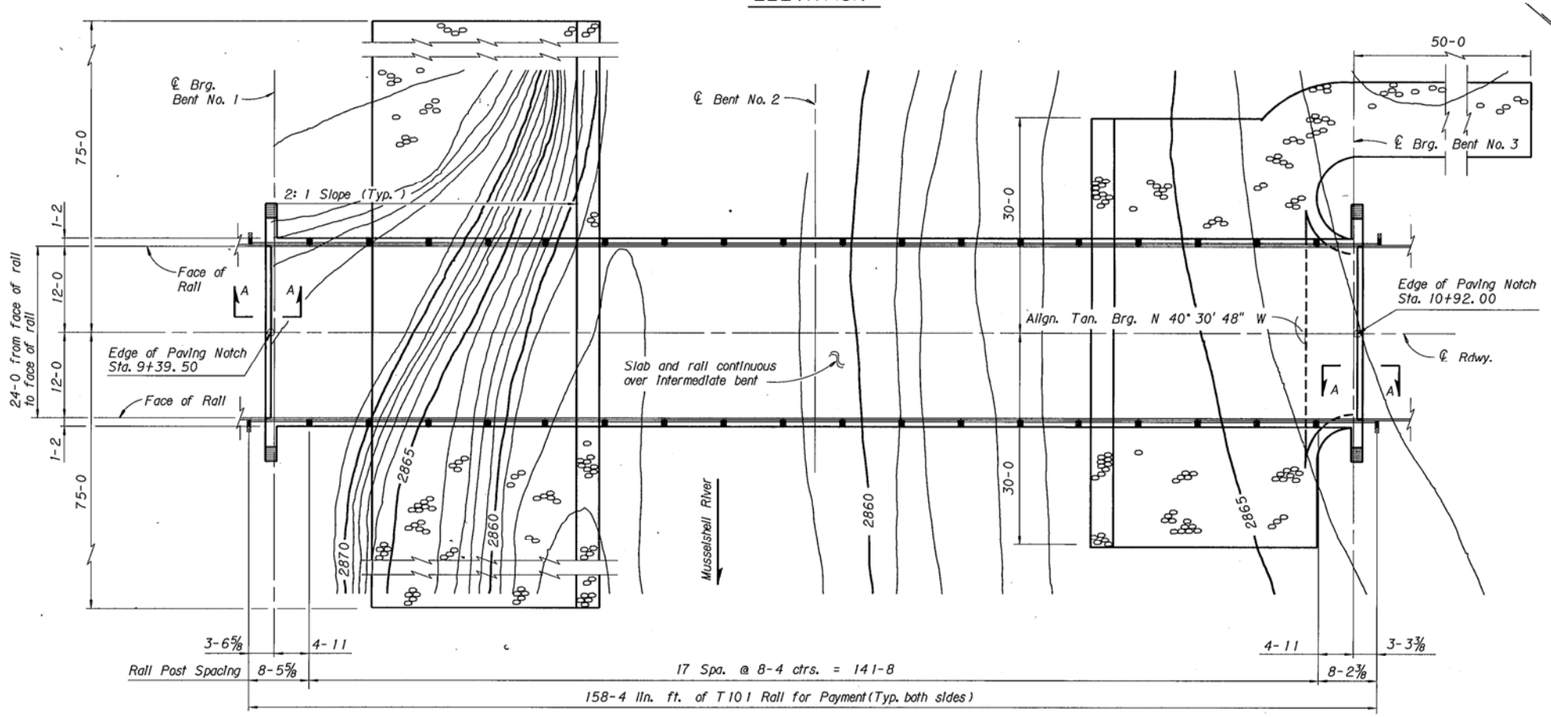
Scales - 1/16" & 3/4" = 1'-0".

Chas. A. Kyle, Bridge Eng'r.

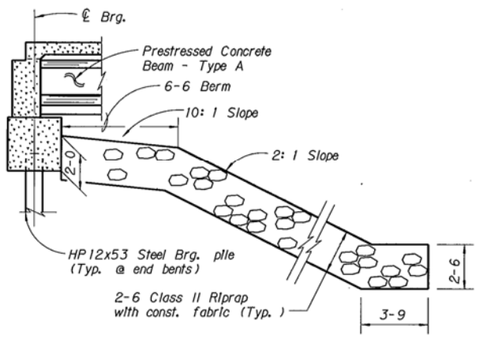
FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.
8	MONT.	BR 9033(5)	B2



ELEVATION



PLAN



SECTION A-A

(Bent No. 3 shown, Bent No. 1 similar)
Scale: 1/4" = 1'-0"

NOTES

FINISHED GRADE: Finished grade of bridge at centerline roadway is the same as Profile Grade

LIVE LOAD: Standard HS20-44 loading.

SPECIFICATIONS: Montana Department of Highways and the Montana Highway Commission Standard Specifications for Road and Bridge Construction, 1987 Edition, and any amendments thereto, and Special Provisions shall govern unless otherwise noted. Design prepared in accordance with A.A.S.H.T.O. Specifications, 1989 Edition, and any amendments thereto.

STRUCTURAL STEEL: All structural steel shall be measured and paid for on the lump sum basis as set forth in the Standard Specifications. Estimated weight: A36 = 437 lbs.

REINFORCING STEEL: All reinforcing steel shall be of the deformed type and shall meet the requirements of A.S.T.M. Specification A615, Grade 60 (A.A.S.H.T.O. M-31)

CAST IN PLACE CONCRETE: Unless otherwise approved, all substructure concrete shall be Class "AD" and all superstructure concrete shall be Class "BD Modified".

STRUCTURE EXCAVATION: Structure excavation for Bents No. 1 and No. 3 shall be calculated from berm elevation.

TRAFFIC CONTROL PLAN AND SEQUENCE OF OPERATIONS: See "Special Provisions".

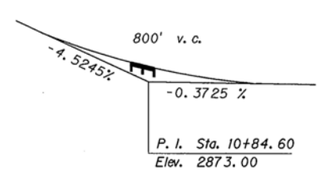
UTILITIES: For location of utilities, see the appropriate Road Plans sheet.

Class of Concrete	Minimum Req'd Cylinder Strength to achieve a 1.0 Pay Factor (p.s.i.)	Strength for Design Purposes (p.s.i.)
"AD"	3400	3000
"BD Modified"	3900	3500

STREAM DATA

Drift: Medium
Scour: Some
Ice: Moderate
Drainage Area: 4568 sq. mi.
Base Flood Flow (100 yr.): 11200 cfs
Base Flood Stage: 2871.30**
Base Flood Velocity: 9.3 fps

Also see Hydraulic Data Summary sheet.
**Base Flood Stage includes backwater



PROFILE GRADE
No Scale

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER MUSSELSHELL RIVER
AT STA. 10+15.75
FEDERAL AID PROJECT NO. BR9033(5)
MUSSELSHELL COUNTY
GENERAL LAYOUT

Scale: 1" = 10'-0" Except as noted

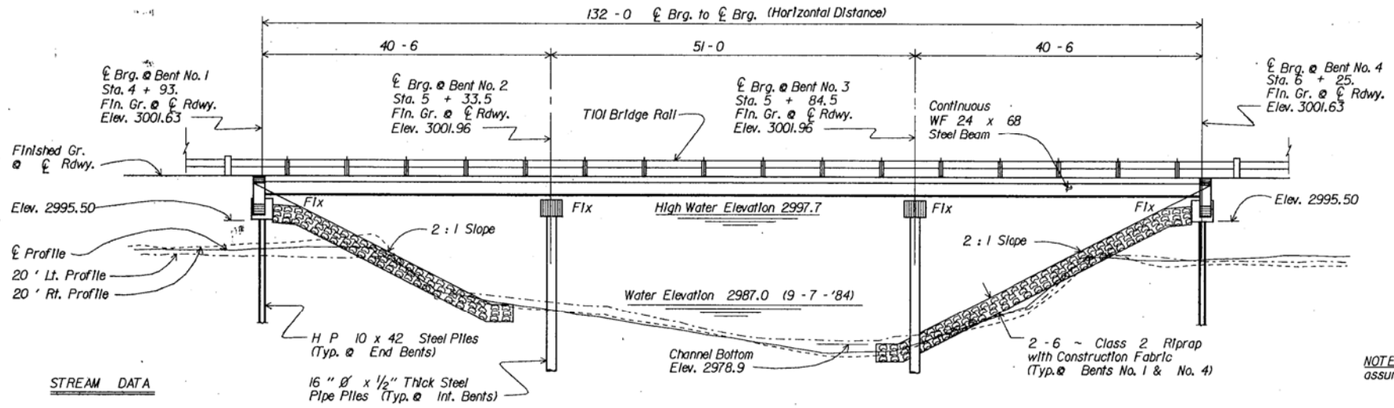
DESIGNED	2-13-91	K.F.M.
DRAWN	2-19-91	W.A.B.
APP. FOR DESIGN	6-6-91	K.M.B.
APPROVED	9-27-91	J.C.H.
REVISED		
REVISED		

DRAWING NO. 15086

[60,3]1284GL.DGN

MONTANA CADD 03-DEC-1991 07:25 BRBIL [60,3]1284gl.dgn 1

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.
8	MONT.	BR 9033 (4)	B 2



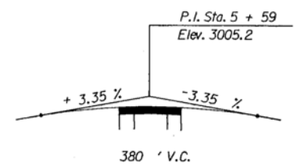
ELEVATION

STREAM DATA

ICE : Moderate
DRIFT : Medium
SCOUR : Moderate
DRAINAGE AREA : 3160.0 Sq. Miles
BASE FLOOD FLOW : 12,300 c.f.s.
BASE FLOOD STAGE : 2997.7 Ft.
BASE FLOOD VELOCITY : 6.8 Ft./ Sec.

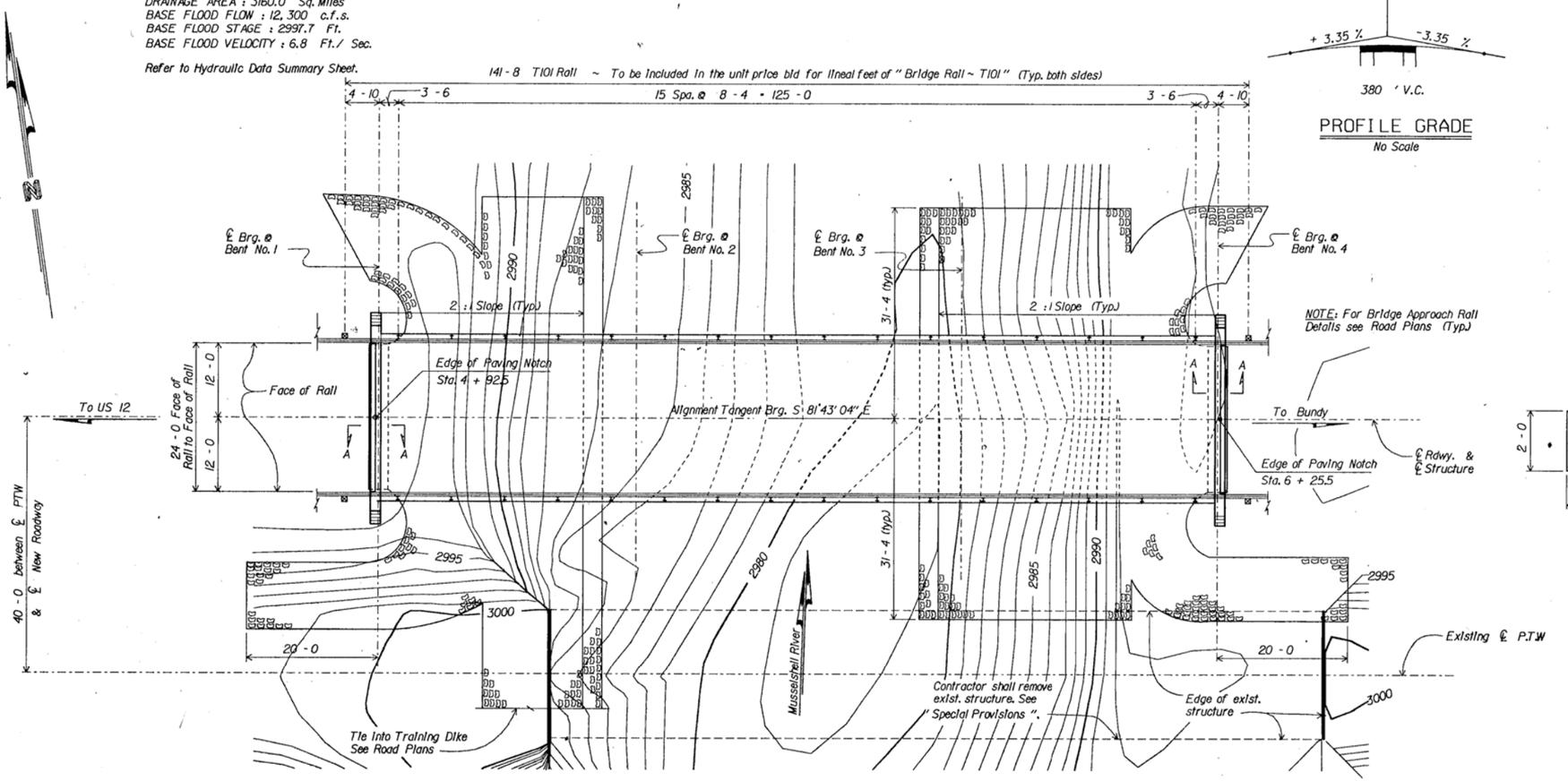
Refer to Hydraulic Data Summary Sheet.

NOTE : Elevations are based on an assumed datum (See Road Plans).



PROFILE GRADE

No Scale



PLAN

NOTES

LIVE LOAD: Standard HS20-44 loading.

STRUCTURAL STEEL: All Structural steel shall be measured and paid for on the lump sum basis as set forth in the Standard Specifications. Estimated Weight= A 588 = 42147 lbs.
A 36 = 479 lbs.

REINFORCING STEEL: All reinforcing steel shall be of the deformed type and shall meet the requirements of A.S.T.M. Specifications A615, Grade 60 (A.A.S.H.T.O. M-31).

CAST-IN-PLACE CONCRETE: Unless otherwise approved, all concrete in the slab shall be Class " BD Modified " and all other concrete shall be Class "AD ".

FINISHED GRADE: Finished Grade of Bridge @ ℄ Rdwy. is the same as the profile grade shown on the Road Plans.

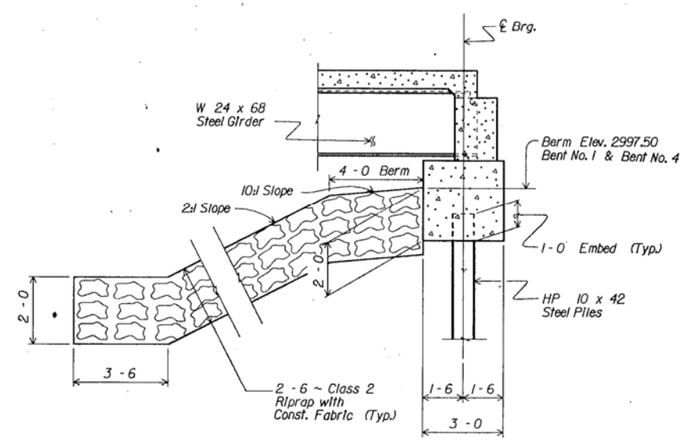
SPECIFICATIONS: Montana Dept. of Highways and the Montana Highway Commission Standard Specifications for Road and Bridge Construction, 1987 Edition and any amendments thereto and Special Provisions shall govern unless otherwise noted. Design prepared in accordance with A.A.S.H.T.O. Specifications, 1983 Edition, and any amendments thereto.

TRAFFIC CONTROL PLAN AND SEQUENCE OF OPERATION: See "Special Provisions."

STRUCTURE EXCAVATION: Structure Excavation shall be calculated from the berm elevation @ Bents No. 1 and No. 4.

HPS 10 x 42 STEEL PILES: HPS 10 x 42 Steel Piles may be substituted for HP 10 x 42 Steel Piles.

CLASS OF CONCRETE	MINIMUM REQ'D. CYLINDER STRENGTH TO ACHIEVE A 1.0 PAY FACTOR (p.s.i.)	STRENGTH FOR DESIGN PURPOSES (p.s.i.)
" AD "	3400	3000
" BD Mod "	3900	3500



SECTION A-A

Scale ~ 3/8" = 1 - 0

STATE OF MONTANA
DEPARTMENT OF HIGHWAYS

BRIDGE OVER MUSSELSHELL RIVER

AT STA. 5 + 59.0

FEDERAL AID PROJECT NO. BR 9033(4)

MUSSELSHELL COUNTY

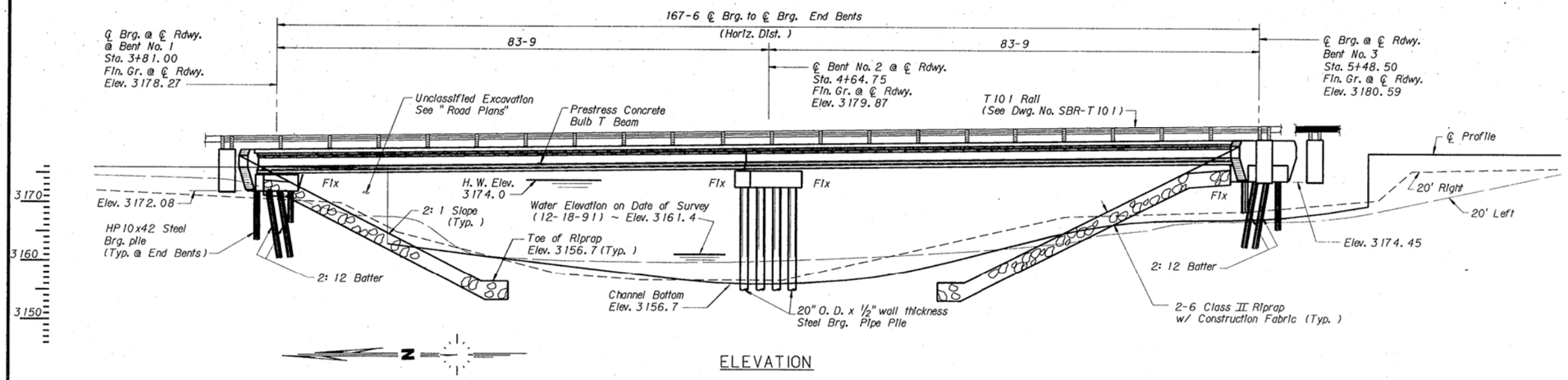
GENERAL LAYOUT

Scale ~ 1" = 10 - 0 (Except as noted)

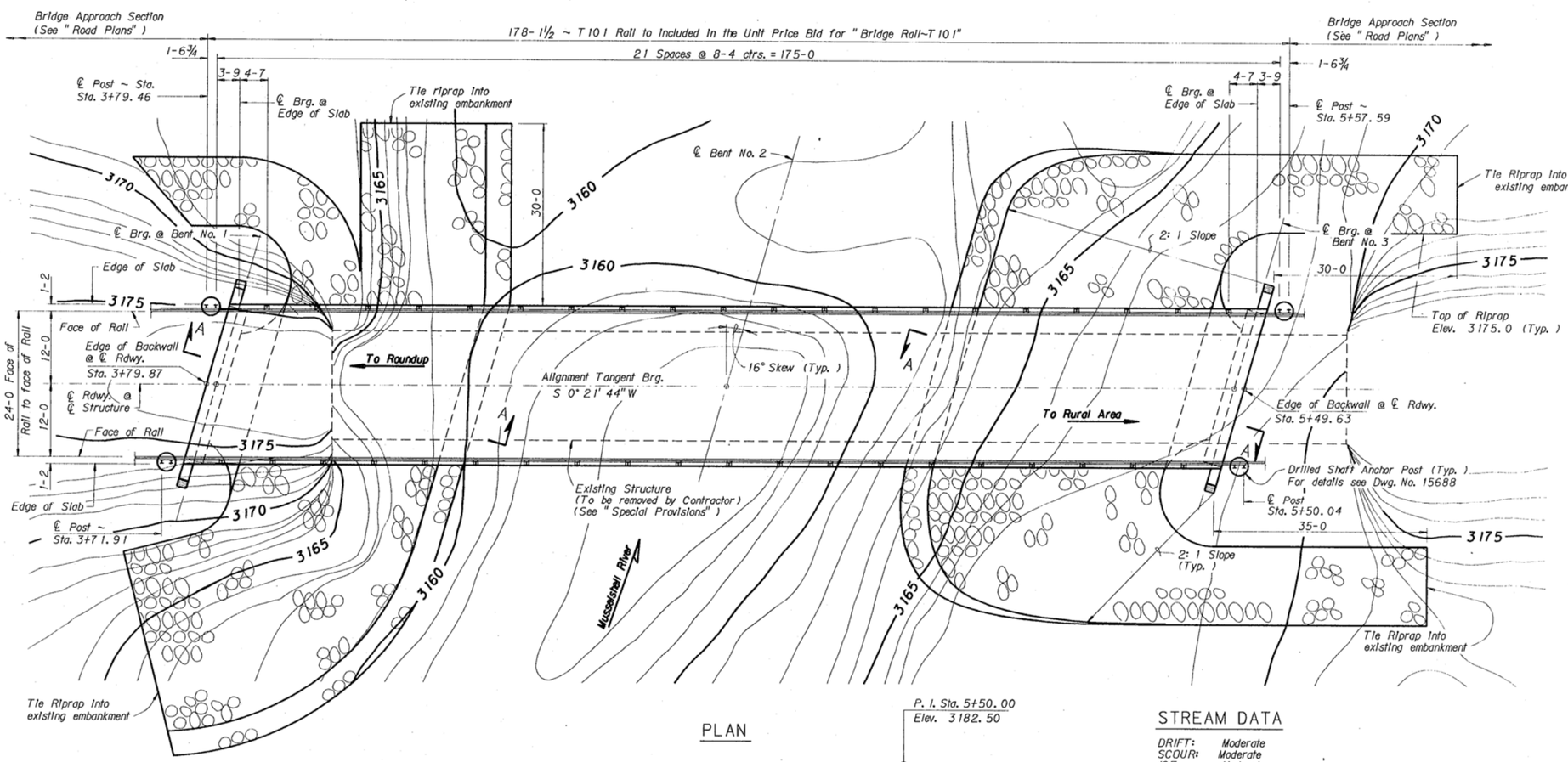
DESIGNED	8/25/86	A.G.C.
DRAWN	9/20/86	L.R.T.
CHECKED	3/18/87	C.O.F.
APPROVED		
REVISED		
REVISED		

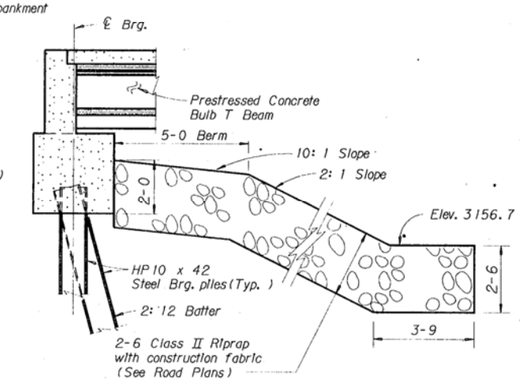
DRAWING NO. 14019

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.
8	MONT.	BR 9033(7)	B2



ELEVATION

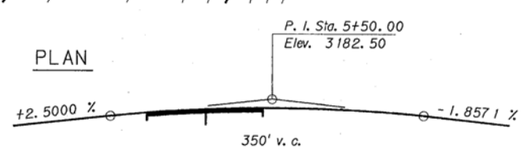




SECTION A-A

Scale: 3/8" = 1'-0"

PLAN



PROFILE GRADE

No Scale

STREAM DATA

DRIFT: Moderate
SCOUR: Moderate
ICE: Moderate
DRAINAGE AREA: 4036 sq. mi.
BASE FLOOD FLOW (100 YR.): 12318 cfs
* BASE FLOOD STAGE: 3174.0
BASE FLOOD VELOCITY: 8.4 fps
LOW BEAM ELEVATION: 3175.3'
Also see Hydraulic Data Summary Sheet

* Base flood stage includes backwater.

NOTES

SPECIFICATIONS: Montana Department of Transportation and the Montana Highway Commission Specifications for Road and Bridge Construction, 1987 Edition and any amendments thereto, and Special Provisions shall govern unless otherwise noted. Design prepared in accordance with A.A.S.H.T.O. Specifications, 1992 Edition and any amendments thereto.

LIVE LOAD: Standard HS20-44 loading.

STRUCTURAL STEEL: All Structural steel shall be measured and paid for on the lump sum basis as set forth in the Standard Specifications. Estimated Weight: A-36 = 2442 lbs.

REINFORCING STEEL: All reinforcing steel shall be of the deformed type and shall meet the requirements of A.S.T.M. Specifications A615, Grade 60 (A.A.S.H.T.O. M-31).

CAST-IN-PLACE CONCRETE: Unless otherwise approved, all cast-in-place concrete shall be Class "AD".

TRAFFIC CONTROL PLAN AND SEQUENCE OF OPERATION: See "Special Provisions."

FINISHED GRADE: The finished grade of the bridge at centerline Rdwy. is the same as the profile grade shown on the Road Plans.

STRUCTURE EXCAVATION: Structure excavation shall be measured from berm elevation.

UTILITIES: Refer to Road Plans for utility involvement.

HPS10 x 42 Steel Piles: HPS10 x 42 Steel Piles may be substituted for HP10 x 42 Steel Piles.

CLASS OF CONCRETE	MINIMUM REQ'D. CYLINDER STRENGTH TO ACHIEVE A 1.0 PAY FACTOR (p.s.i.)	STRENGTH FOR STRUCTURAL DESIGN PURPOSES (p.s.i.)
"AD"	3400	3000

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER MUSSELSHELL RIVER

AT STA. 4+64.75

FEDERAL AID PROJECT NO. BR9033(7)

MUSSELSHELL COUNTY

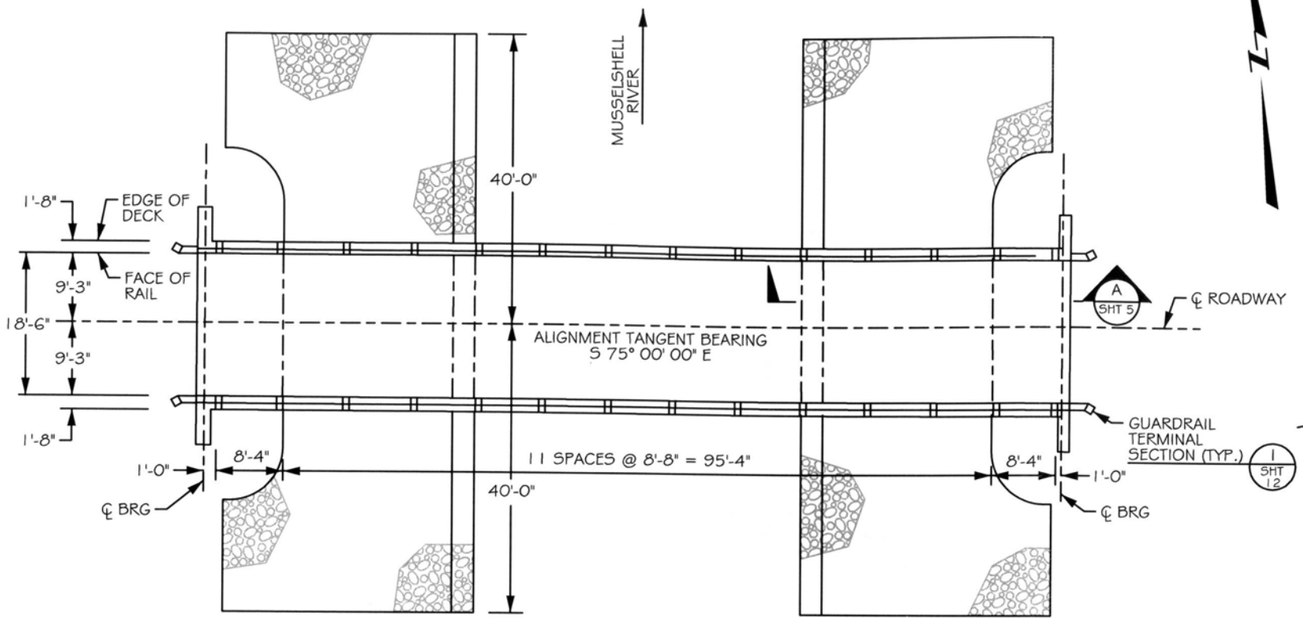
GENERAL LAYOUT

Scale: 1" = 10'-0" Except as noted

DESIGNED	3-19-93	K.F.M.
DRAWN	4-23-93	D.W.C.
CHECKED	1-7-94	R.W.M.
APPROVED		
REVISED		
REVISED		

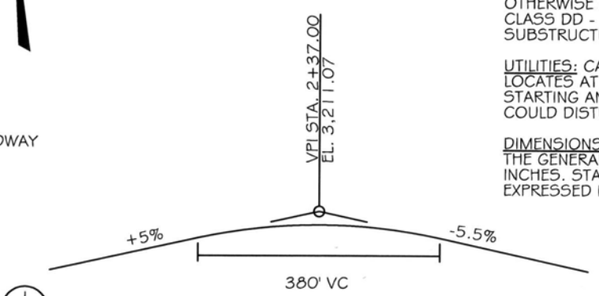
DRAWING NO. 15682

1482\br\gl.brg



PLAN

SCALE: 1" = 20'



PROFILE GRADE

NO SCALE

NOTES:

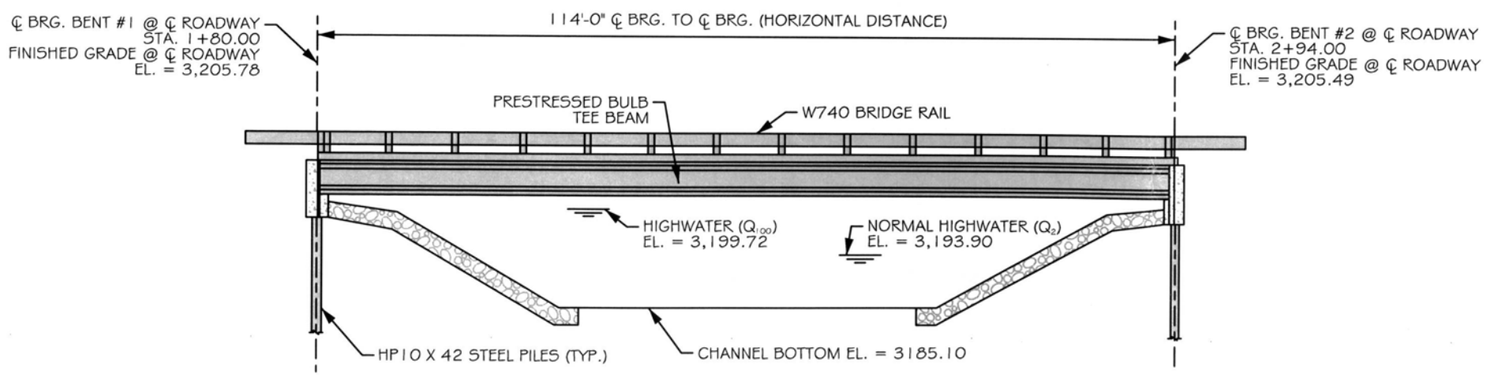
SPECIFICATIONS: MONTANA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2006 EDITION, AND ANY AMENDMENTS THERETO, AND THE SPECIAL PROVISIONS GOVERN UNLESS OTHERWISE NOTED.

LIVE LOAD: STANDARD HS 20-44 LOADING.

CAST IN PLACE CONCRETE: UNLESS OTHERWISE APPROVED OR SPECIFIED, USE CLASS DD - BRIDGE (3,000 PSI) FOR ALL SUBSTRUCTURE CONCRETE.

UTILITIES: CALL 1-800-424-5555 FOR UTILITY LOCATES AT LEAST TWO DAYS PRIOR TO STARTING ANY CONSTRUCTION ACTIVITY THAT COULD DISTURB THE UTILITY.

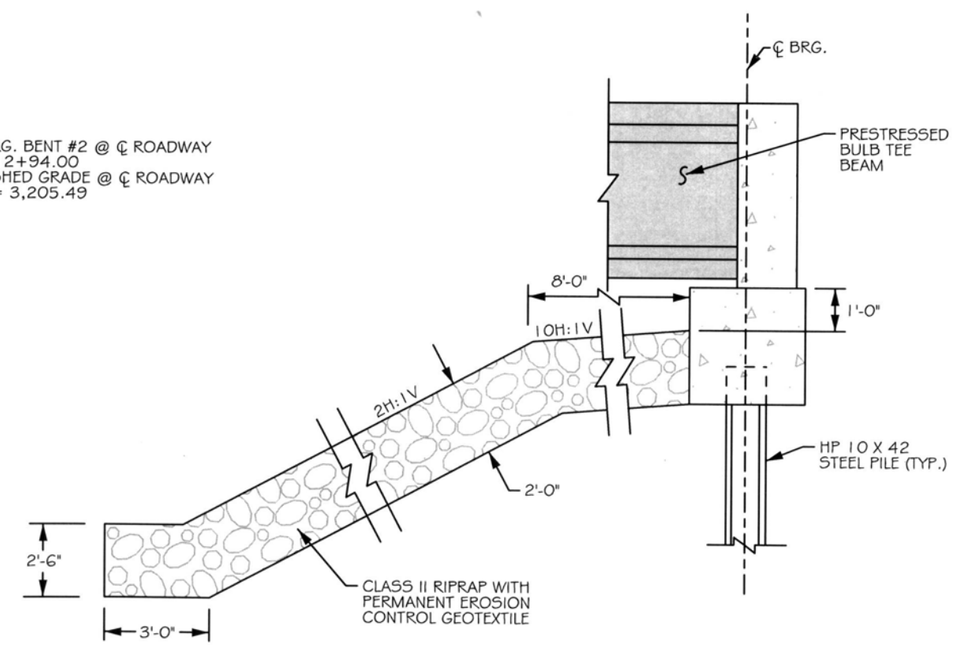
DIMENSIONS: ALL DIMENSIONS SHOWN ON THE GENERAL LAYOUT ARE IN FEET AND INCHES. STATIONS AND ELEVATIONS ARE EXPRESSED IN FEET.



ELEVATION

SCALE: 1" = 20'

STREAM DATA	
DRAINAGE AREA:	4,023 SQ. MILES
2 YEAR STAGE (Q_2):	3,193.90
BASE FLOOD FLOW (Q_{100}):	11,420 CFS
BASE FLOOD STAGE:	3,199.72
BASE FLOOD VELOCITY:	3.87 FPS
LOW BEAM EL.:	3,200.66



SECTION VIEW

SCALE: 1" = 4'

A
SHT 5

PO Box 118
Buffalo, MT 59418
Phone: 406-374-2451
Cell: 406-490-2579

Calvin O. Frank, PE
Consulting Engineer

MUSSELSHELL COUNTY
506 Main Street
Roundup, MT 59072

PEN TABLE PATH: K:\MUSSELSHELL COUNTY\11210\PDP\Mussel-mdl.Color.tbl
5/15/2012 FILE PATH: K:\MUSSELSHELL COUNTY\11210\DGN\FAIRGROUNDS BRIDGE PLAN SET\2011-210 FAIRGROUNDS BRIDGE.dgn

DSGN	DRAWN	DATE	CKD
COF	DDP	05/12	STH
REV	REV	DATE	CKD

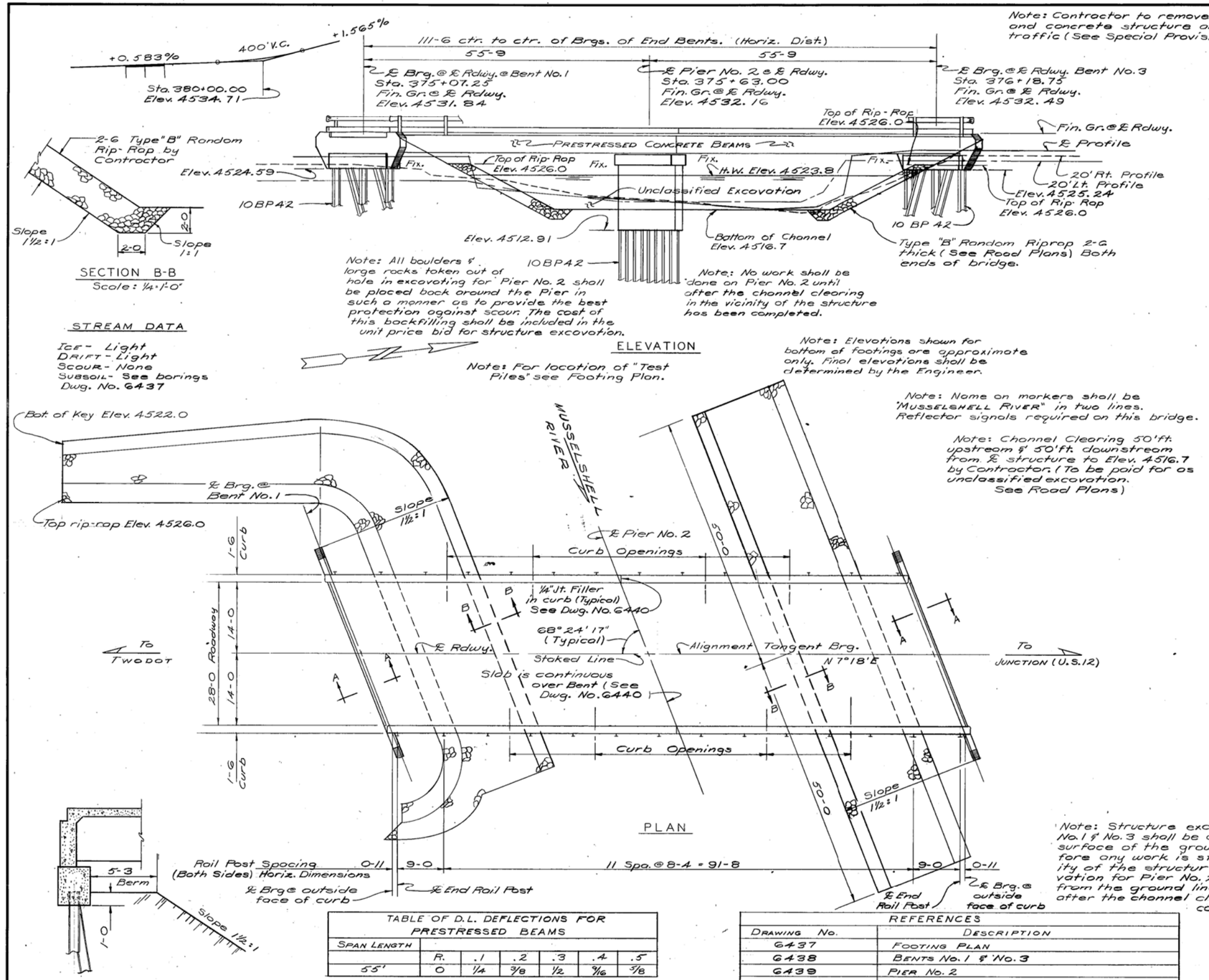
JOB # 2011-210

ROUNDUP FAIRGROUNDS BRIDGE
MUSSELSHELL RIVER

General Layout

SHEET
5

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	MONT.	S18(6)		1	7



Note: Contractor to remove existing steel and concrete structure and maintain traffic (See Special Provisions)

Note: Elevations shown for bottom of footings are approximate only. Final elevations shall be determined by the Engineer.

Note: Name on markers shall be "MUSSELSHELL RIVER" in two lines. Reflector signals required on this bridge.

Note: Channel Clearing 50'ft. upstream & 50'ft. downstream from ℄ structure to Elev. 4516.7 by Contractor. (To be paid for as unclassified excavation. See Road Plans)

Note: Structure excavation for Bents No. 1 & No. 3 shall be computed from the surface of the ground as it exists before any work is started in the vicinity of the structure. Structure excavation for Pier No. 2 shall be computed from the ground line that will exist after the channel clearing has been completed.

STREAM DATA

ICE - Light
DRIFT - Light
SCOUR - None
SUBSOIL - See borings
Dwg. No. 6437

NOTES

SPECIFICATIONS: Montana State Highway Commission Standard Specifications for Road and Bridge Construction, 1962 Edition, and any amendments thereto, and Special Provisions shall govern unless otherwise noted. Design prepared in accordance with A.A.S.H.O. Specifications, 1961 Edition and any amendments thereto.

LIVE LOAD: Standard H15-S12 loading.

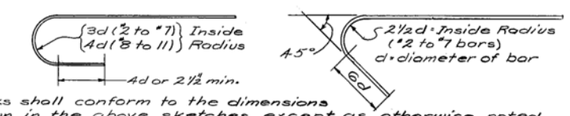
FINISHED GRADE: Finished plan grade of bridge is same as profile grade shown on road plans.

CAST IN PLACE CONCRETE: All cast in place concrete of superstructure and as noted on Bents No. 1 and No. 3 shall be Class "AD". All other concrete in Bents No. 1, No. 3 and Pier No. 2 shall be Class "A". An "Air Entraining Agent" shall be added to all cast in place concrete. Chamfer all exposed edges of concrete ¾" and fillet entrant angles ¾" unless otherwise noted. Quantities of Class "AD" concrete have been computed using pretensioned beams. Quantities of Class "AD" concrete and reinforcing steel will vary slightly using post-tensioned beams.

PRECAST PRESTRESSED CONCRETE BEAMS: All precast prestressed concrete beams shall have a minimum compressive strength of 5000 p.s.i. at the age of 28 days. (See Subsection 41.10 for Precast Pre-stressed Concrete Beams.) An "Air Entraining Agent" may be added to any precast prestressed concrete. Chamfer all exposed edges of concrete ¾ inches and do not fillet entrant angles unless otherwise noted.

SHAFTS: Shaft of Pier No. 2 shall be poured in not more than two (2) continuous runs; other construction joints shall be made only as noted on the plans or as determined by the Engineer.

REINFORCING STEEL: Bends in reinforcing steel shall be made to a radius of not less than four (4) diameters of the bar except for stirrups and tie bars, which shall be bent around a pin having a diameter of not less than two (2) bar diameters.



Hooks shall conform to the dimensions shown in the above sketches, except as otherwise noted.

STRUCTURAL STEEL: For requirements governing structural steels and their fabrication, see the Standard Specifications. To avoid oversight, these requirements shall be clearly noted on the shop drawings. Structural steel shall receive one (1) shop coat of red lead or zinc chromate primer and two (2) field coats consisting of first field or primer coat and one (1) coat of aluminum paint as specified in the Standard Specifications, on all surfaces not in contact with the concrete, except as noted in the Standard Specifications.

STRUCTURAL STEEL (Method of Measurement & Payment): Structural steel shall be paid for at the unit price bid for Reinforcing Steel and the weight paid for shall be the computed weight as obtained in accordance with the rules and assumptions specified in the Standard Specifications. The computed weight of each shipping unit shall be shown on the shop drawings. This weight may or may not be checked at the time the details are checked.

PIER NOSE ANGLE AND GUARD ANGLES: Pier Nose Angle and Guard Angles shall be paid for at the unit price bid for reinforcing steel.

FOUNDATION PILES: For bidding purposes only, pile lengths have been estimated as noted on the details of the bents and pier. All piling shall be driven as set forth in the Special Provisions.

TEST PILES: For Test Pile requirements see Special Provisions.

BACKFILL: The backfill at end bents may be complete up to the bottoms of the backwalls before superstructure is in place. The backfill against the backwalls shall not be placed until after the concrete roadway slab has been placed.

APPROVAL: Shop plans shall be approved by the Montana State Highway Department before fabrication is begun.

OTHER NOTES: For other notes see Dwgs No. 6437 and No. 6439.

TABLE OF D.L. DEFLECTIONS FOR PRESTRESSED BEAMS

SPAN LENGTH	R.	.1	.2	.3	.4	.5
55'	0	¼	⅜	½	9/16	⅝

REFERENCES

DRAWING No.	DESCRIPTION
6437	FOOTING PLAN
6438	BENTS No. 1 & No. 3
6439	PIER No. 2
6440	SLAB, CURB AND DIAPHRAGM DETAILS
PRES-BEAM STD. NO. 2 TYPE-A (Rev. 8-24-62)	STANDARD PRE-TENSIONED AND POST-TENSIONED PRES. CONC. BEAMS
S.B.B.R. (Rev. 10-8-62)	STEEL BEAM BRIDGE RAIL AND DETAILS

STATE OF MONTANA
STATE HIGHWAY COMMISSION

BRIDGE OVER MUSSELSHELL RIVER
AT STA. 375+63.00
FED. AID SECONDARY PROJ. NO. S 18 (6)
WHEATLAND COUNTY

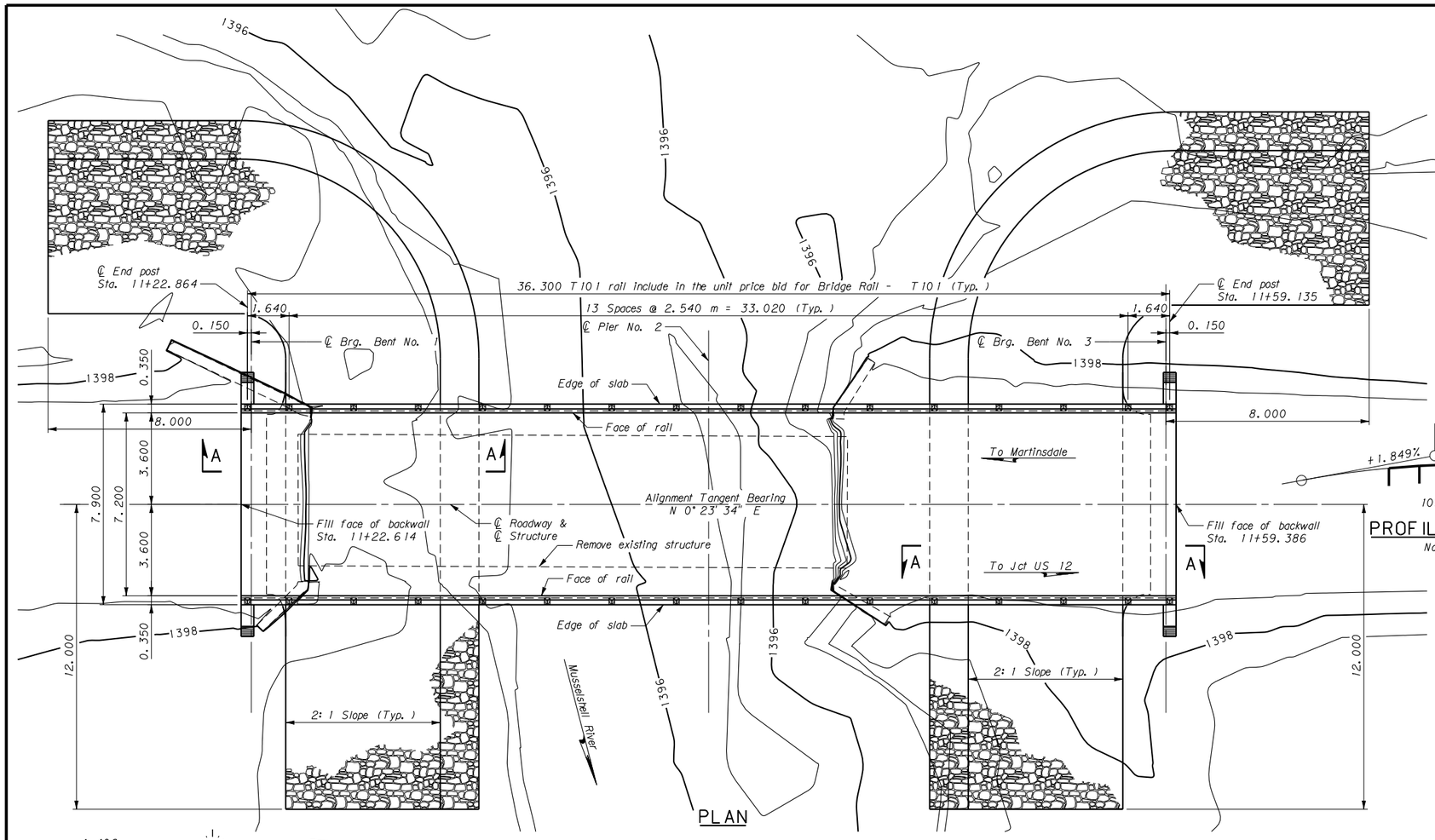
GENERAL LAYOUT
Scale: 1"=10'-0" Except as noted

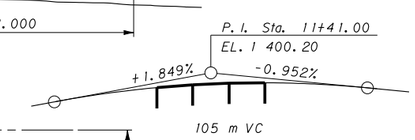
DESIGNED		
DRAWN	4-25-63	D.F.D.
TRACED		
CHECKED	5-8-63	K.G.R.
REVISED		
REVISED		

APPROVED BY _____ BRIDGE ENGINEER

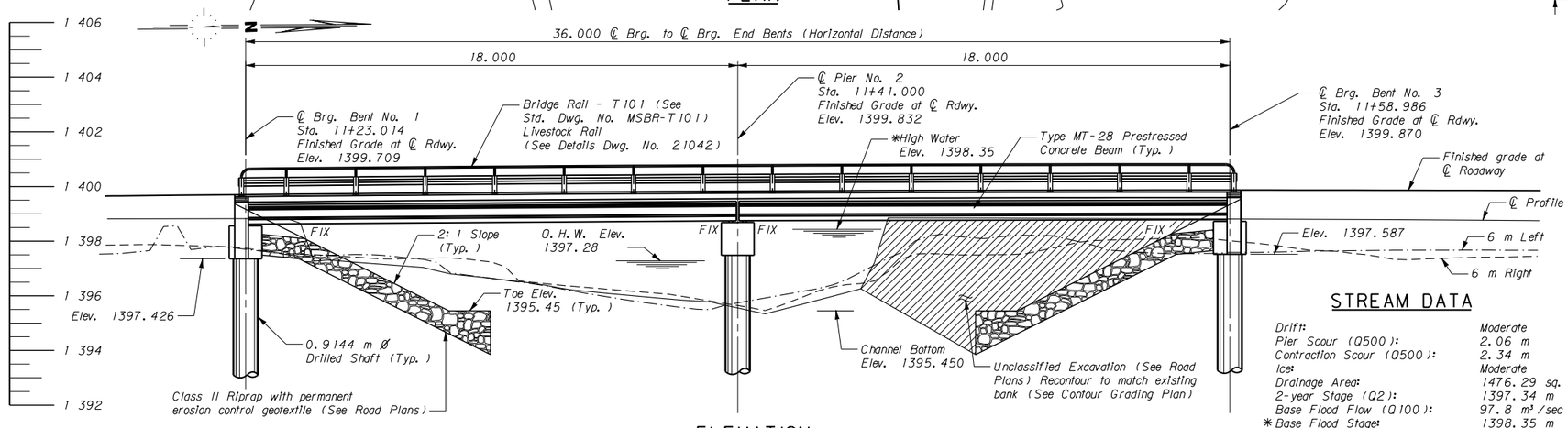
DRAWING NO. 6436

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	BR 9054(10)	B2

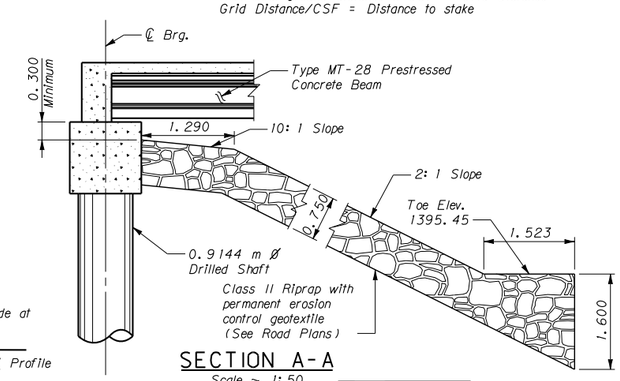




PROFILE GRADE
No Scale



ELEVATION



SECTION A-A
Scale ~ 1:50

NOTES

FINISHED GRADE: Finished grade of bridge at centerline roadway is the same as the Profile Grade shown on Road Plans.

LIVE LOAD: Standard HL-93 loading.

SPECIFICATIONS: Montana Department of Transportation and the Montana Transportation Commission Standard Specifications for Road and Bridge Construction, 2006 edition, and any amendments thereto, and the Special Provisions govern unless otherwise noted. The design was prepared in accordance with AASHTO LRFD Bridge Design Specifications, Fourth edition - 2007 with 2008 interim revisions.

REINFORCING STEEL: Use new deformed type reinforcing steel meeting the requirements of AASHTO M 31M Grade 420. Include all costs associated with furnishing and placing new reinforcing steel in the unit price bid for either Reinforcing Steel or Reinforcing Steel - Epoxy Coated.

CAST IN PLACE CONCRETE: Unless otherwise approved or specified, use Class DD-Bridge for all substructure concrete and Class SD for all superstructure concrete.

CONCRETE STRENGTH: Use f'c = 21 MPa for Class DD-Bridge concrete. Use f'c = 31 MPa for Class SD concrete.

STRUCTURE EXCAVATION: Include structure excavation in the unit price bid for Class DD-Bridge concrete.

TRAFFIC CONTROL PLAN AND SEQUENCE OF OPERATIONS: See Special Provisions.

UTILITIES: Call 1-800-424-5555 for utility locates at least two working days prior to starting any construction activity that could disturb the utility.

EXISTING STRUCTURE: Remove the existing structure (see Road Plans sheets and Special Provisions).

DIMENSIONS: All dimensions shown on the General Layout are in meters. All other drawings are dimensioned in millimeters except as noted. Stations and elevations are expressed in meters.

Stations shown on the bridge plans are state plane grid stations based on state plane coordinates (NAD83-1992). Dimensions shown on the bridge plans are horizontal ground distances and not state plane grid distances. The combination scale factor (CSF) at this location is 0.99922260.

Horizontal ground distance x CSF = Grid Distance
Grid Distance/CSF = Distance to stake

STREAM DATA

Drift:	Moderate
Pier Scour (Q500):	2.06 m
Contraction Scour (Q500):	2.34 m
Ice:	Moderate
Drainage Area:	1476.29 sq. km
2-year Stage (Q2):	1397.34 m
Base Flood Flow (Q100):	97.8 m³/sec
* Base Flood Stage:	1398.35 m
Base Flood Velocity:	2.04 m/sec
Low Beam Elevation:	1398.691 m

Also see Hydraulic Data Summary sheet.
* Base Flood Stage elevation includes backwater

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER MUSSELSHELL RIVER
AT STA. 11+41.000
FEDERAL AID PROJECT NO. BR 9054(10)
WHEATLAND COUNTY
GENERAL LAYOUT

Scale ~ 1:100 Except As Noted

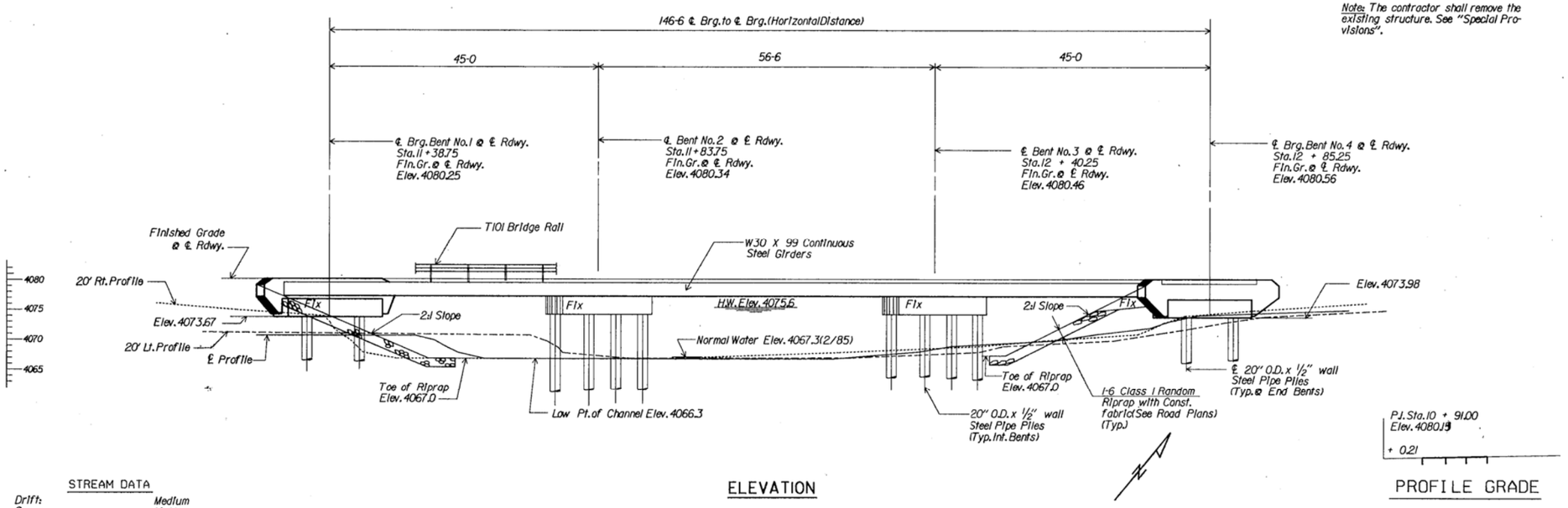
DESIGNED	4-19-05	C.G.J.
DRAWN	2-2-09	T.J.B.
CHECKED	12-1-10	J.S.O.
APPROVED	12-9-10	K.M.B.
REVISED		
REVISED		

FILENAME: 4885BRGEN002.DGN DRAWING NO. 20133

c:\dgn\4885brgen002.dgn
10/31/2014
11:10:25 AMCPS - U2435

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.
8	MONT.	BR 9054(3)	B2

Note: The contractor shall remove the existing structure. See "Special Provisions".



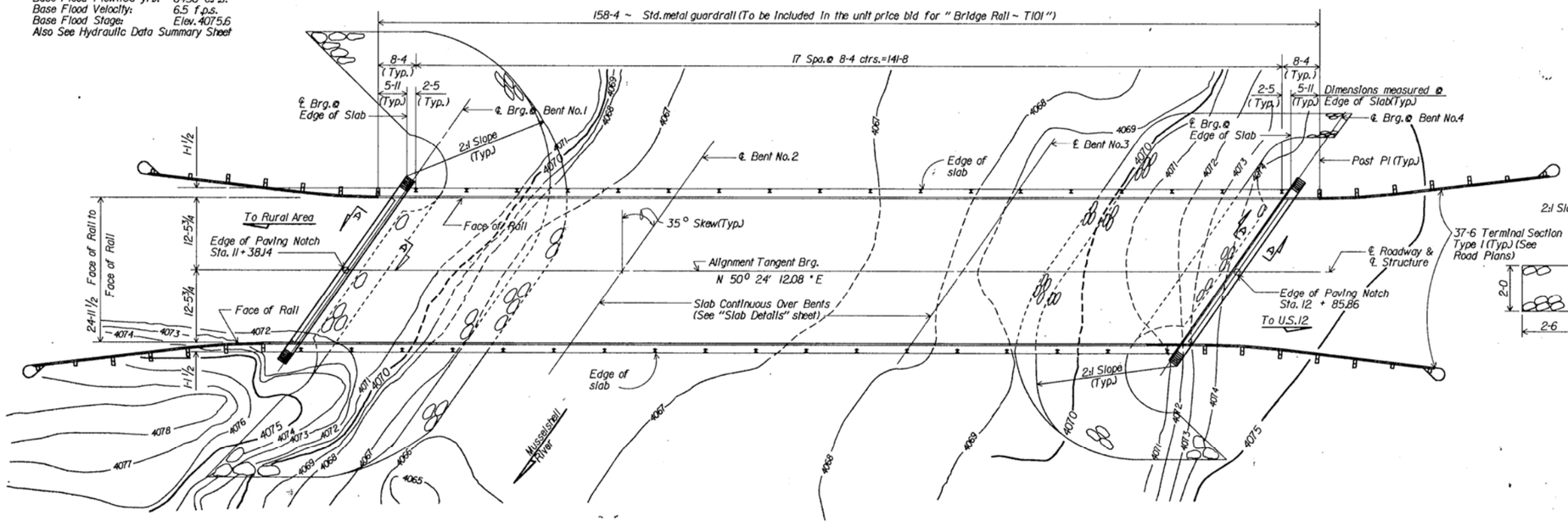
ELEVATION

PROFILE GRADE

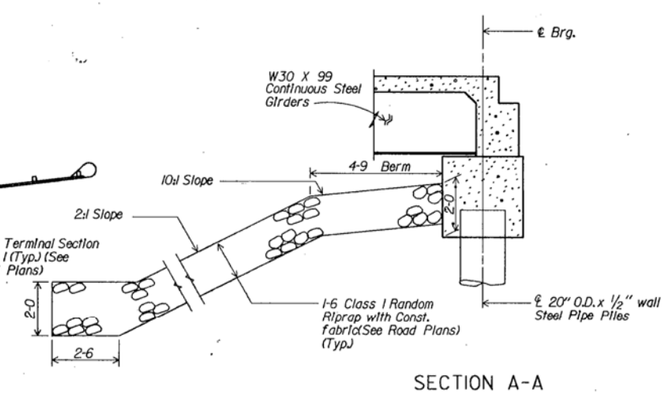
STREAM DATA

Drift:	Medium
Scour:	Light
Ice:	Moderate
Drainage Area:	1125 sq. mi.
Base Flood Flow (100 yr.):	6450 c.f.s.
Base Flood Velocity:	6.5 f.p.s.
Base Flood Stage:	Elev. 4075.6

Also See Hydraulic Data Summary Sheet



PLAN



SECTION A-A

SCALE: 3/8" = 1'- 0"

Class of Concrete	Minimum Req'd Cylinder Strength to achieve a 1.0 Pay Factor (p.s.i.)	Strength for Design Purposes (p.s.i.)
"AD"	3400	3000
"BD Modified"	3900	3500

DESIGNED	5-21-86	J.P.K.
DRAWN	7-14-86	K.M.R.
CHECKED	3-10-87	R.W.M.
APPROVED	4-28-87	N.H.R.
REVISED		
REVISED		

NOTES

FINISHED GRADE: Finished grade of bridge at centerline roadway is the same as the profile grade shown on Road Plans.

LIVE LOAD: Standard HS20-44 loading.

SPECIFICATIONS: Montana Department of Highways and the Montana Highway Commission Standard Specifications for Road and Bridge Construction, 1987 Edition, and any amendments thereto, and Special Provisions shall govern unless otherwise noted. Design prepared in accordance with A.A.S.H.T.O. Specifications, 1983 Edition, and any amendments thereto.

STRUCTURAL STEEL: All structural steel shall be measured and paid for on the lump sum basis as set forth in the Standard Specifications. Estimated weight: 685.39 lbs.

REINFORCING STEEL: All reinforcing steel shall be of the deformed type and shall meet the requirements of A.S.T.M. Specification A615, Grade 60 (A.A.S.H.T.O. M-31)

CAST IN PLACE CONCRETE: Unless otherwise approved, all substructure concrete shall be Class "AD" and all superstructure concrete shall be Class "BD Modified".

STRUCTURE EXCAVATION: Structure excavation for Bents No. 1 and No. 4 shall be calculated from berm elevation.

TRAFFIC CONTROL PLAN AND SEQUENCE OF OPERATIONS: See "Special Provisions".

UTILITIES: For location of utilities, see the appropriate Road Plans sheet.

STATE OF MONTANA
DEPARTMENT OF HIGHWAYS

BRIDGE OVER THE MUSSELSHELL RIVER

AT STA. 12 + 12.00

FEDERAL AID PROJECT NO. BR 9054(3)

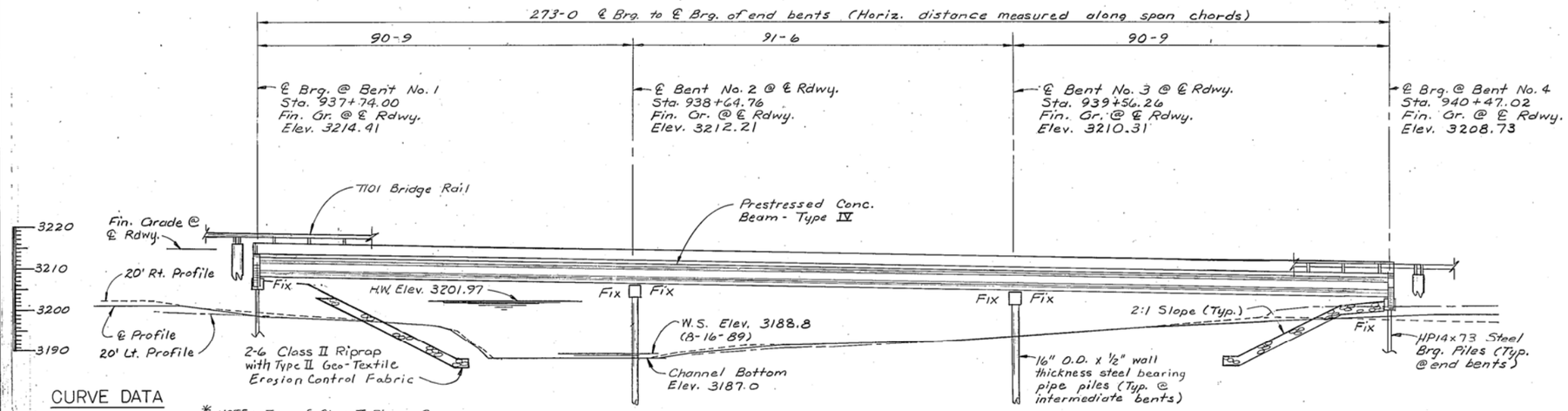
WHEATLAND COUNTY

GENERAL LAYOUT

SCALE: 1" = 10' - 0" (EXCEPT AS NOTED)

DRAWING NO. 14025

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	TOTAL SHEETS
8	MONT.	FTPP 16-2(7)46 F	82



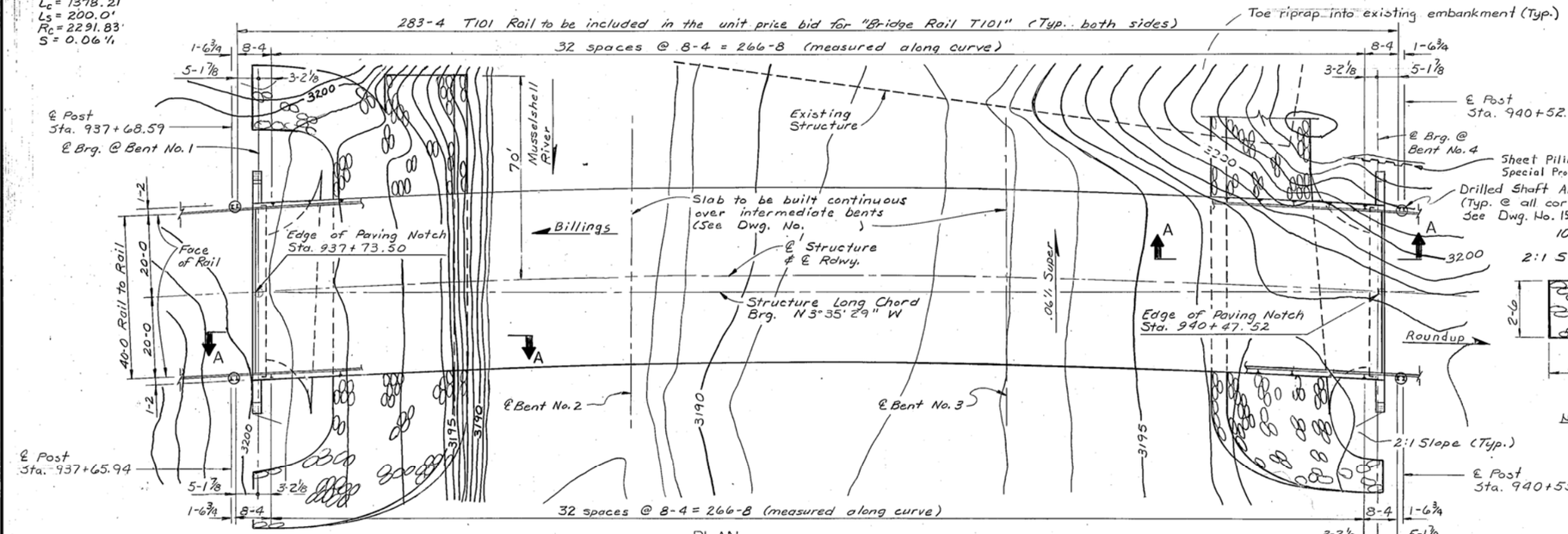
CURVE DATA

P.I. Sta. 934+23.97
$\Delta = 39°27'19"$ Rt.
$\Delta_c = 34°27'19"$ Rt.
$D_c = 2°30'$
$\theta_s = 2°30'$
$T_s = 922.10'$
$L_c = 1378.21$
$L_s = 200.0'$
$R_c = 2291.83'$
$S = 0.06'/'$

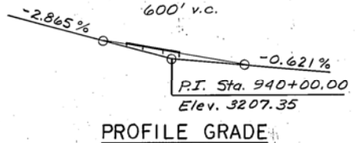
* NOTE: Top of Class II Riprap @ Bent No. 1 ~ Elev. 3203.00 ±.

NOTE: Slab and rail to be built on concentric curves parallel to curve at ℄ Rdwy.

ELEVATION



PLAN



PROFILE GRADE

No Scale

STREAM DATA

DRIFT: Light
SCOUR: None
ICE: Moderate
DRAINAGE AREA: 4023 sq. mi.
BASE FLOOD FLOW (100 yr.): 12,500 c.f.s.
BASE FLOOD STAGE: 3201.97'
BASE FLOOD VELOCITY: 5.9 f.p.s.
LOW BEAM ELEV: 3202.34
Also see Hydraulic Data Summary Sheet.

Class of Concrete	Minimum Req'd. Cylinder Strength to achieve a 1.0 pay factor (p.s.i.)	Strength for Design Purposes (p.s.i.)
"AD"	3400	3000
"BD Modified"	3900	3500

NOTES

FINISHED GRADE: Finished grade of bridge at ℄ rdwy. is .48 ft. higher than the profile grade shown on Road Plans.

LIVE LOAD: Standard HS20-44 loading.

SPECIFICATIONS: Montana Department of Transportation and the Montana Highway Commission Standard Specifications for Road and Bridge Construction, 1987 Edition, and any amendments thereto, and Special Provisions shall govern unless otherwise noted. Design prepared in accordance with A.A.S.H.T.O. Specifications, 1992 Edition, and any amendments thereto.

STRUCTURAL STEEL: All structural steel shall be measured and paid for on the lump sum basis as set forth in the Standard Specifications. Estimated weight = 704 pounds.

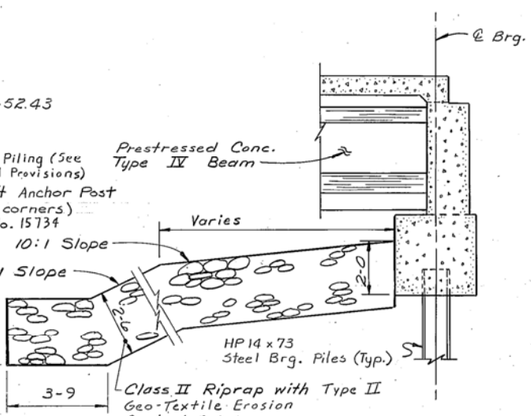
REINFORCING STEEL: All reinforcing steel shall be of the deformed type and shall meet the requirements of A.S.T.M. Specification A615, Grade 60 (A.A.S.H.T.O. M-31)

CAST-IN-PLACE CONCRETE: Unless otherwise approved, all substructure concrete shall be Class "AD" and all superstructure concrete shall be Class "BD Modified".

TRAFFIC CONTROL PLAN AND SEQUENCE OF OPERATIONS: See "Special Provisions".

STRUCTURE EXCAVATION: Structure excavation shall be calculated from berm elevations.

UTILITIES: For location of utilities, see the appropriate Road Plans sheet.



SECTION A-A

Scale: 3/8" = 1'-0"

NOTE: Typ. Section A-A @ Bent No. 1 except for note (*).

MONTANA DEPARTMENT OF TRANSPORTATION

BRIDGE OVER MUSSELSHELL RIVER
AT STA. 939+10.51
FEDERAL AID PROJECT NO. FTPP 16-2(7)46 F

MUSSELSHELL COUNTY

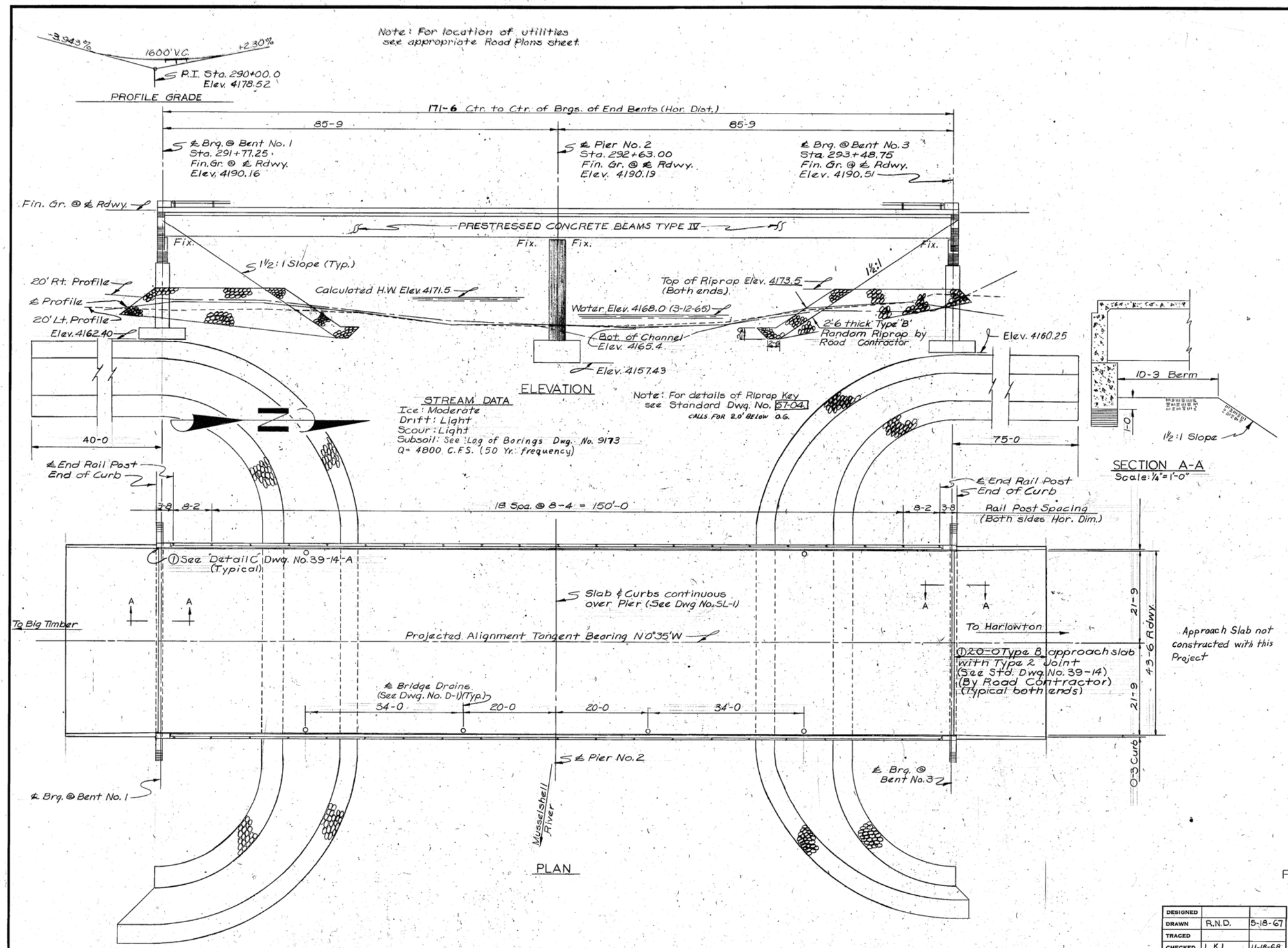
GENERAL LAYOUT

Scale: 1" = 15'-0" except as noted

DESIGNED	10-31-90	K.F.M.
DRAWN	11-15-90	W.A.B.
CHECKED	5-10-94	M.L.R.
APPROVED	3-8-95	J.P.K.
REVISED		
REVISED		

DRAWING NO. 15727

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	MONT.	F-45(12)	1	19



NOTES

LIVE LOAD: Standard HS20-44 Loading.

FOOTINGS: Footing of Pier No. 2 shall be keyed into undisturbed material a minimum of 2'-0". The area excavated for keying footings into undisturbed material shall be completely filled with concrete. The quantity of concrete deposited outside of neat lines, because of this requirement, depends upon the contractor's procedure; therefore it will vary and its cost shall be considered as part of the cost of the concrete inside of the neat lines. The quantity of concrete for piers and bents to be paid for shall be the amount only within the neat lines shown on the details. If changes in the details of the piers are ordered by the Engineer, the quantities will be revised according to the revised details.

SEQUENCE OF WORK: See Special Provisions.

BACKFILL: THE BACKFILL AT END BENTS MAY BE COMPLETE UP TO THE BOTTOMS OF THE BACKWALLS BEFORE SUPERSTRUCTURE IS IN PLACE. THE BACKFILL AGAINST THE BACKWALLS SHALL NOT BE PLACED UNTIL AFTER THE CONCRETE ROADWAY SLAB HAS BEEN PLACED.

FOOTINGS: ELEVATIONS SHOWN FOR BOTTOM OF FOOTINGS ARE APPROXIMATE ONLY. FINAL ELEVATIONS TO BE DETERMINED BY THE ENGINEER.

SPECIFICATIONS: MONTANA STATE HIGHWAY COMMISSION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 1966 EDITION, AND ANY AMENDMENTS THERETO, AND SPECIAL PROVISIONS SHALL GOVERN UNLESS OTHERWISE NOTED. DESIGN PREPARED IN ACCORDANCE WITH A.A.S.H.O. SPECIFICATIONS, 1965 EDITION, AND ANY AMENDMENTS THERETO.

CAST IN PLACE CONCRETE: UNLESS OTHERWISE NOTED, ALL CONCRETE IN SUPERSTRUCTURE SHALL BE CLASS "AD" AND ALL CONCRETE IN SUBSTRUCTURE SHALL BE CLASS "AD". AN "AIR ENTRAINING AGENT" SHALL BE ADDED TO ALL CONCRETE EXCEPT CLASS "AS". CHAMFER ALL EXPOSED EDGES OF CONCRETE WITH ENCLOSED ANGLE LESS THAN 120°, 3/4" AND FILLET ENTRANT ANGLES 3/4" UNLESS OTHERWISE NOTED.

STRUCTURAL STEEL: ALL STRUCTURAL STEEL SHALL BE MEASURED AND PAID FOR ON THE LUMP SUM BASIS AS SET FORTH IN THE STANDARD SPECIFICATIONS.
ESTIMATED WEIGHT = 923 POUNDS.

FOR REQUIREMENTS GOVERNING THE FABRICATION OF "STRUCTURAL STEEL" SEE THE STANDARD SPECIFICATIONS. TO AVOID OVERSIGHT THESE REQUIREMENTS SHALL BE CLEARLY NOTED ON THE SHOP DRAWINGS.

STRUCTURAL STEEL SHALL RECEIVE ONE (1) SHOP COAT OF RED LEAD OR BASIC LEAD SILICO CHROMATE PRIMER AND TWO (2) FIELD COATS CONSISTING OF FIRST FIELD OR PRIMER COAT AND ONE (1) COAT OF ALUMINUM PAINT AS SPECIFIED IN THE STANDARD SPECIFICATIONS.

APPROVAL: SHOP PLANS SHALL BE APPROVED BY THE MONTANA HIGHWAY DEPARTMENT BEFORE FABRICATION IS BEGUN.

SETTING OF MASONRY PLATES: CARE SHALL BE TAKEN IN PLACING REINFORCING STEEL SO AS TO CLEAR ANCHOR BOLTS.

MASONRY PLATES SHALL BE PLACED ON THREE LAYERS OF CANVAS THOROUGHLY SWABBED WITH RED LEAD AS CALLED FOR IN THE STANDARD SPECIFICATIONS. THE CONTRACTOR SHALL FINISH CONCRETE UNDER MASONRY PLATES TO THE EXACT ELEVATION SHOWN. BUSH HAMMERING WILL BE PERMITTED AND USED ONLY AS A MEANS OF LEVELING THE CONCRETE SURFACE TO ASSURE FULL AND LEVEL BEARING AND TO REMOVE LAITANCE, LOOSE AND FOREIGN MATERIAL. STEEL SHIMS SHALL BE USED TO BRING THE MASONRY PLATES UP TO GRADE IF NECESSARY. STEEL SHIMS SHALL BE THE SAME SIZE EXCEPT FOR THICKNESS, AS THE MASONRY PLATE. MINIMUM THICKNESS OF ANY SHIMS SHALL BE 1/8". THE COST OF BUSH HAMMERING AND SHIMS, IF ANY, SHALL BE INCLUDED IN THE UNIT PRICES BID FOR OTHER ITEMS.

DESIGNED		
DRAWN	R.N.D.	5-18-67
TRACED		
CHECKED	L.K.L.	11-18-68
① REVISED	L.K.L.	3-11-70
REVISED		

STATE OF MONTANA
STATE HIGHWAY COMMISSION

BRIDGE OVER MUSSELSHELL RIVER
AT STA. 292+63.00
FEDERAL AID PROJECT NO. F 45(12)
WHEATLAND COUNTY
GENERAL LAYOUT

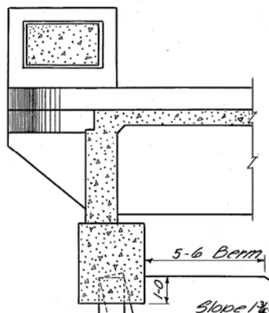
Scale: 1"=10-0 Except as noted

Approved By: _____
BRIDGE ENGINEER

DRAWING NO. 9172

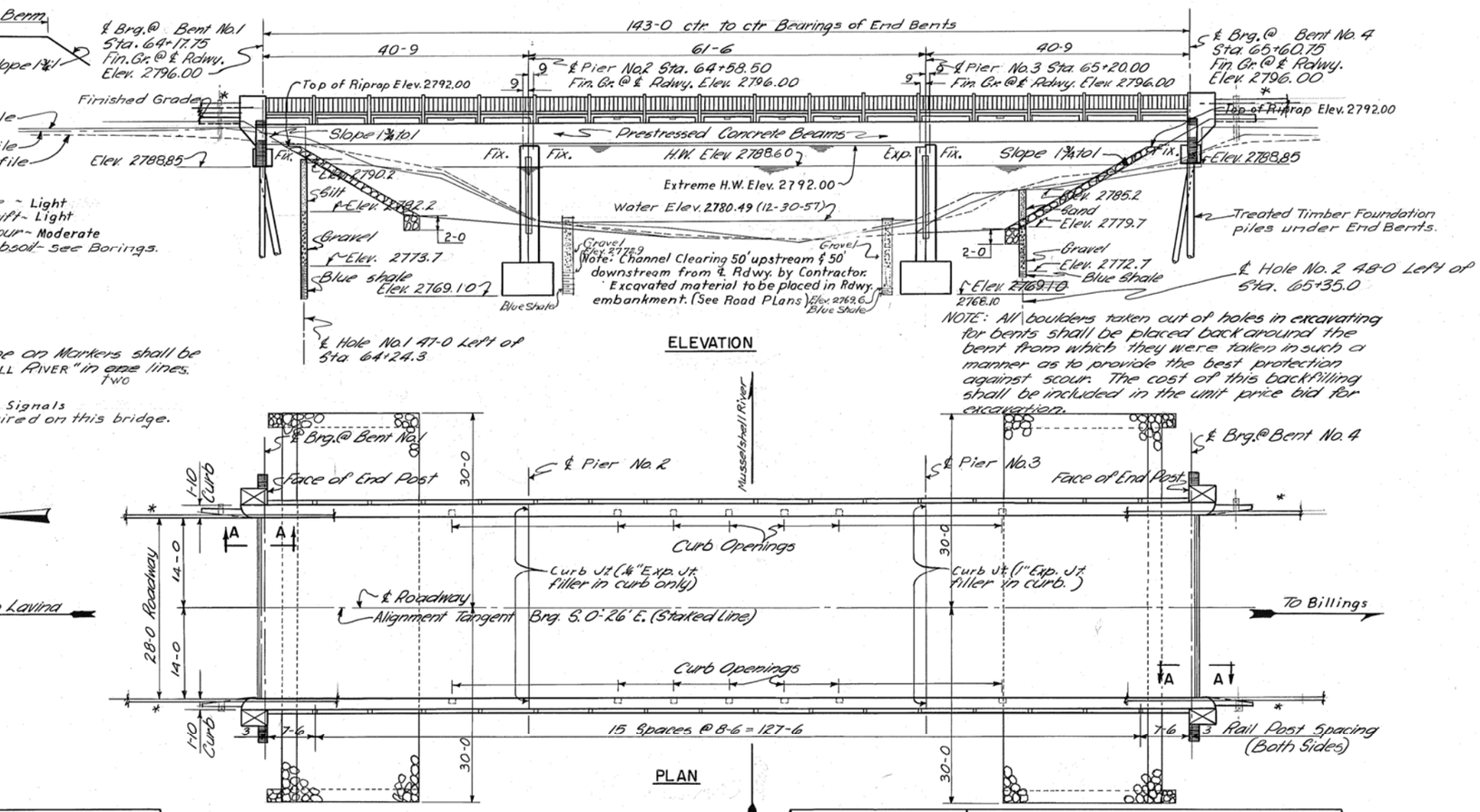
RDK

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	MONT.	DF 284(9)		1	17



SECTION A-A
Scale: ⅜"=1'-0"

Note: Elevations shown for bottom of footings are approximate only. Final elevations shall be determined by the Engineer.



ELEVATION

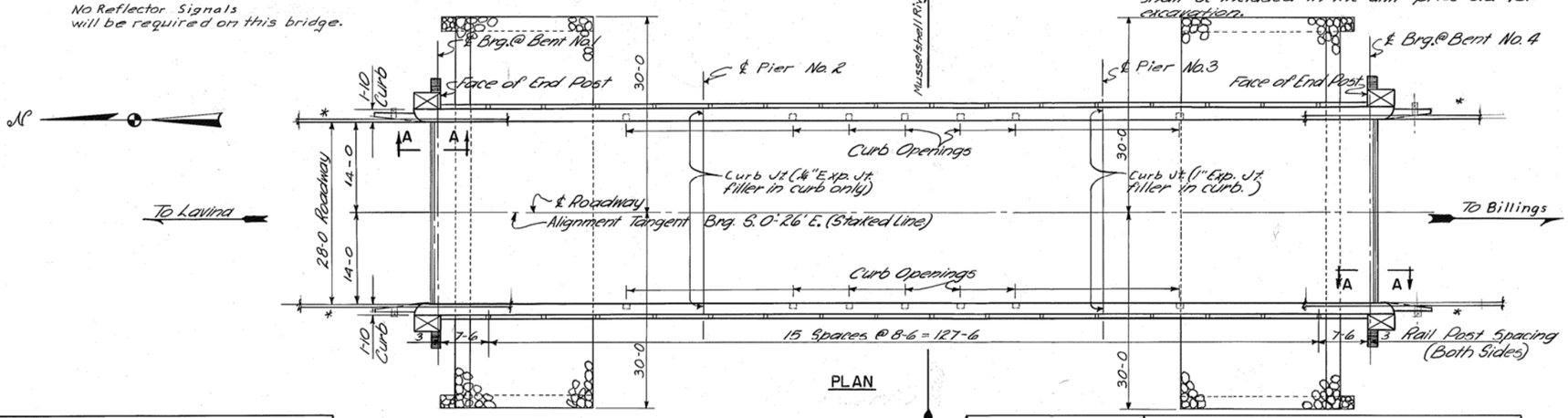
Note: Contractor to remove existing 140.7 ft. x 18 ft. steel and wood structure in place and maintain traffic. (See Special Provisions).

Note: Hand laid Riprap one foot thick by Contractor. Riprap to be placed at both ends of bridge. Riprap to be keyed back into slope two feet.

NOTE: All boulders taken out of holes in excavating for bents shall be placed back around the bent from which they were taken in such a manner as to provide the best protection against scour. The cost of this backfilling shall be included in the unit price bid for excavation.

NOTE: Name on Markers shall be "MUSSELSHELL RIVER" in one lines. Two

No Reflector Signals will be required on this bridge.



PLAN

NOTES

SOILS & FOUNDATION MATERIALS: Borings were taken by the Montana State Highway Department at the points shown, to obtain information on the subsoil at this bridge site so that a more reasonable conclusion could be reached as to the type and approximate elevation of bottom of foundation that should be used. The State Highway Department's interpretation of the materials encountered from the results of the borings is shown on this sheet.

The State Highway Department does not guarantee that the material which will be encountered in the course of excavation for the structure will be as listed in the log of borings shown hereon; neither does the State assume any responsibility for any variation or misinterpretation of the classes of materials.

No claim or adjustment in the unit price bid for excavation will be made if the materials found do not agree with those shown on this sheet in the log of borings.

Materials shown as sand and gravel may be of varying degrees of compactness or cementation.

CONCRETE: All concrete in Piers No. 2 & No. 3 shall be Class "A."

The Contractor will be permitted to deposit, for his convenience, all of the pier footings as a seal course in Piers No. 2 & No. 3 if he desires, in which case he shall use Class "S" concrete for the concrete deposited under water, and he shall place it in accordance with the requirements for "Depositing Concrete Under Water," as called for in the Standard Specifications. Concrete placed outside of neat lines shown on the plans, or neat lines as modified by the Engineer, as well as the change in mix for the seal, will be for the Contractor's convenience, and he shall include all cost connected therewith in the unit price bid for Class "A" concrete.

SHAFTS: Shafts of Piers No. 2 & No. 3 shall be poured in not more than two continuous runs, other construction joints shall be made only as noted on the plans or as determined by the engineer.

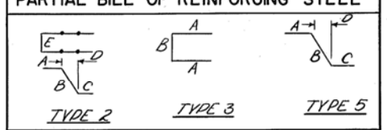
CONSTRUCTION JOINTS: Construction joints shall be made on a true horizontal line at the surfaces of the Piers and left rough in the interior with satisfactory shear keys. (See details of shear keys.

FOOTINGS: The footings of Piers No. 2 & No. 3 shall be keyed into undisturbed material for a minimum depth of 1-0. The area excavated for keying footings into the material shall be completely filled with concrete.

The quantity of concrete deposited outside of neat lines, because of this requirement, depends upon the contractor's procedure; therefore it will vary and its cost shall be considered a part of the cost of the concrete inside of neat lines. The quantity of concrete for piers to be paid for shall be the amount only within neat lines shown on the details. If changes in the details of the Piers are ordered by the Engineer, the quantities will be revised according to the revised details.

OTHER NOTES: For other notes see Dwg. No. 4387.

*PARTIAL BILL OF REINFORCING STEEL



All dimensions are out to out

Mark	Size	No.	Type	Length	A	B	C	D	E
C1	#4	272	5	3'-11"	1'-6	1'-2"	1'-3"	0'-1½	
C4	6	32	2	9-2	1-6	1-2	1-6	0-1½	0-10
C5	4	32	3	5-4	2-3	0-10			
C3	#4	64	str.	1-2					

* This Bill of Reinforcing Steel shall be used in conjunction with the Bill of Reinforcing Steel shown on Dwgs. No. SLAB-35 & 40-R28-5B & SLAB-60-R28-7B.

* Note: Bridge rail installed and made continuous with approach rail. Curb tapers to be installed. For details see Dwg. No. 13513

	REFERENCES
DWG. NO.	DESCRIPTION
4384	Bents No. 1 & No. 4
4385	Pier No. 2
4386	Pier No. 3
PRE.-35 & 40-R28-L19	Standard Pre-Tensioned Prestressed Concrete Beams
POST-35 & 40-R28-L19	Standard Post-Tensioned Prestressed Concrete Beams
SLAB-35 & 40-R28-5B	Standard Slab & Curb for Prestressed Concrete Beams
PRE.-60-R28-L19	Standard Pre-Tensioned Prestressed Concrete Beams
POST-60-R28-L19	Standard Post-Tensioned Prestressed Concrete Beams
SLAB-60-R28-7B	Standard Slab & Curb for Prestressed Concrete Beams
SBR-T3	Standard Steel Bridge Rail-Type No. 3

STATE OF MONTANA
STATE HIGHWAY COMMISSION

BRIDGE OVER MUSSELSHELL RIVER
AT STA. 64+89.25
FEDERAL AID PROJECT NO. DF 284(9)
GOLDEN VALLEY COUNTY

GENERAL LAYOUT

Scale: 1"=10'-0" Except As Noted

DESIGNED		
DRAWN	C.J.B.	3-5-58
TRACED	K.L.F.	3-10-58
CHECKED	HES.	4-25-58
* REVISED	S.M.W.	11-28-84
REVISED		

APPROVED BY _____ BRIDGE ENGINEER

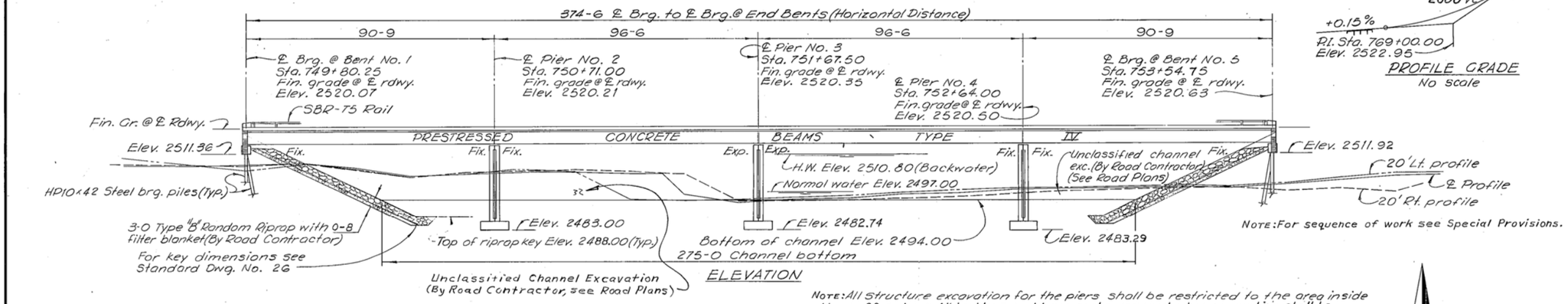
STATE PRECONST. NUMBER 1284-08

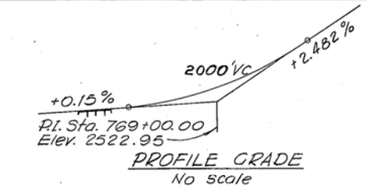
DRAWING NO. 4383

J.R.B.

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	MONT.	F-RF-256(36)	1	16

NOTE: For location of utilities see appropriate road plans sheets.

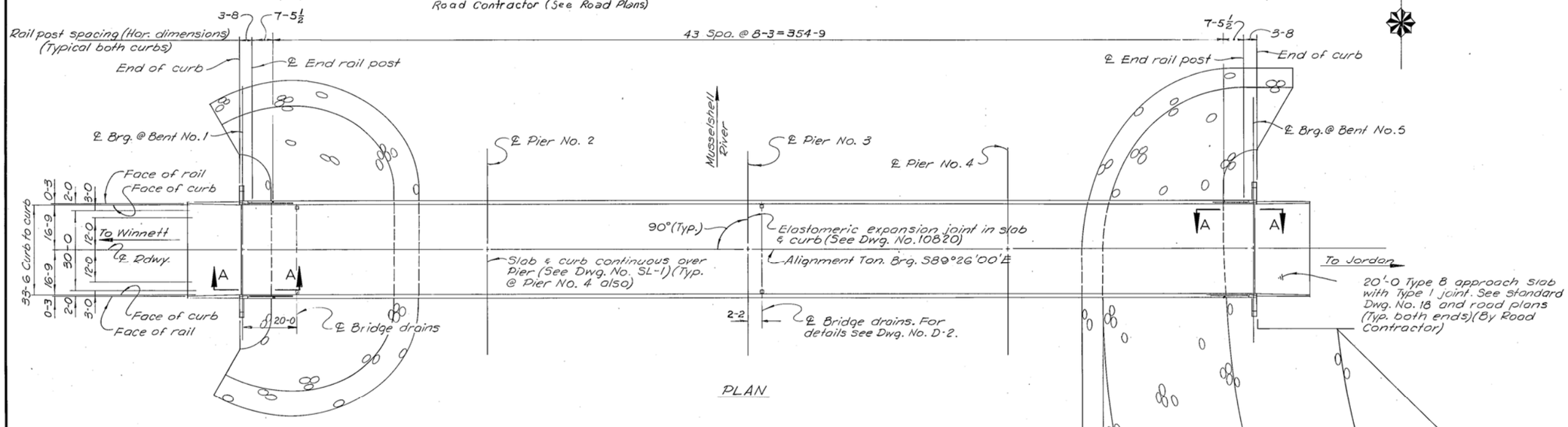




NOTE: For sequence of work see Special Provisions.

Note: Removal of existing structure and maintenance of traffic by Road Contractor (See Road Plans)

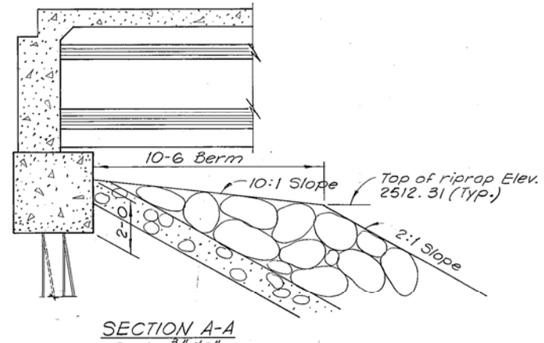
NOTE: All Structure excavation for the piers shall be restricted to the area inside the coffer dams. All boulders and large rocks removed when excavating shall be placed back around the piers from which they were removed in such a manner as to provide the best protection against scour. The cost of this backfill shall be included in the unit price bid for structure excavation.



PLAN

STREAM DATA

ICE: Some
DRIFT: Some
SCOUR: Moderate
SUBSOIL: See Log of Borings, Dwg. No. 10816
DESIGN FLOOD FREQUENCY: 50 yrs.
DESIGN FLOW: 22400 c.f.s.
DESIGN VELOCITY: 5.9 f.p.s.
DRAINAGE AREA: 7846 sq. mi.



SECTION A-A
Scale: 3/8" = 1'-0"

NOTE

FINISHED GRADE: FINISHED PLAN GRADE OF BRIDGE IS SAME AS PROFILE GRADE SHOWN ON ROAD PLANS.

LIVE LOAD: STANDARD HS20-44 LOADING.

SPECIFICATIONS: MONTANA STATE HIGHWAY COMMISSION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 1970 EDITION, AND ANY AMENDMENTS THERETO, AND SPECIAL PROVISIONS SHALL GOVERN UNLESS OTHERWISE NOTED. DESIGN PREPARED IN ACCORDANCE WITH A.A.S.H.O. SPECIFICATIONS, 1969 EDITION, AND ANY AMENDMENTS THERETO.

CAST IN PLACE CONCRETE: UNLESS OTHERWISE APPROVED, ALL CONCRETE SHALL BE CLASS "AD". AN "AIR ENTRAINING AGENT" SHALL BE ADDED TO ALL CONCRETE EXCEPT CLASS "AS". CHAMFER ALL EXPOSED EDGES OF CONCRETE WITH ENCLOSED ANGLE LESS THAN 120°, 3/4" AND FILLET ENTRANT ANGLES 3/4" UNLESS OTHERWISE NOTED. ALL FORMS FOR DECK SLAB SHALL BE REMOVED.

STRUCTURAL STEEL: ALL STRUCTURAL STEEL SHALL BE MEASURED AND PAID FOR ON THE LUMP SUM BASIS AS SET FORTH IN THE STANDARD SPECIFICATIONS.
ESTIMATED WEIGHT = 1792 POUNDS.

FOR REQUIREMENTS GOVERNING THE FABRICATION OF "STRUCTURAL STEEL" SEE THE STANDARD SPECIFICATIONS. TO AVOID OVERSIGHT THESE REQUIREMENTS SHALL BE CLEARLY NOTED ON THE SHOP DRAWINGS.

STRUCTURAL STEEL SHALL RECEIVE ONE (1) SHOP COAT OF RED LEAD OR BASIC LEAD SILICO CHROMATE PRIMER AND TWO (2) FIELD COATS CONSISTING OF FIRST FIELD OR PRIMER COAT AND ONE(1) COAT OF ALUMINUM PAINT AS SPECIFIED IN THE STANDARD SPECIFICATIONS.

APPROVAL: SHOP PLANS SHALL BE APPROVED BY THE STATE OF MONTANA, DEPARTMENT OF HIGHWAYS BEFORE FABRICATION IS BEGUN.

SETTING OF MASONRY PLATES: CARE SHALL BE TAKEN IN PLACING REINFORCING STEEL SO AS TO CLEAR ANCHOR BOLTS. MASONRY PLATES SHALL BE PLACED ON THREE LAYERS OF CANVAS THOROUGHLY SWABBED WITH RED LEAD AS CALLED FOR IN THE STANDARD SPECIFICATIONS. THE CONTRACTOR SHALL FINISH CONCRETE UNDER MASONRY PLATES TO THE EXACT ELEVATION SHOWN. BUSH HAMMERING WILL BE PERMITTED AND USED ONLY AS A MEANS OF LEVELING THE CONCRETE SURFACE TO ASSURE FULL AND LEVEL BEARING AND TO REMOVE LAITANCE, LOOSE AND FOREIGN MATERIAL. STEEL SHIMS SHALL BE USED TO BRING THE MASONRY PLATES UP TO GRADE IF NECESSARY. STEEL SHIMS SHALL BE THE SAME SIZE EXCEPT FOR THICKNESS, AS THE MASONRY PLATE. MINIMUM THICKNESS OF ANY SHIMS SHALL BE 1/8". THE COST OF BUSH HAMMERING AND SHIMS, IF ANY, SHALL BE INCLUDED IN THE UNIT PRICES BID FOR CLASS "AD" CONCRETE.

BACKFILL: THE BACKFILL AT END BENTS MAY BE COMPLETE UP TO THE BOTTOMS OF THE BACKWALLS BEFORE SUPERSTRUCTURE IS IN PLACE. THE BACKFILL AGAINST THE BACKWALLS SHALL NOT BE PLACED UNTIL AFTER THE CONCRETE ROADWAY SLAB HAS BEEN PLACED.

FOOTINGS: ELEVATIONS SHOWN FOR BOTTOM OF FOOTINGS ARE APPROXIMATE ONLY. FINAL ELEVATIONS TO BE DETERMINED BY THE ENGINEER.

PROTECTIVE COATING: DECK, CURBS AND CONCRETE END POSTS SHALL BE GIVEN A PROTECTIVE COATING OF BOILED LINSEED OIL. "SEE STANDARD SPECIFICATIONS".

FOUNDATION PILES: FOR BIDDING PURPOSES ONLY, PILE LENGTHS HAVE BEEN ESTIMATED AS SHOWN ON DRAWINGS.

COVERING: THE MINIMUM COVERING, MEASURED FROM THE SURFACE OF THE CONCRETE TO THE FACE OF ANY REINFORCEMENT BAR, SHALL BE NOT LESS THAN 2 INCHES EXCEPT AS FOLLOWS OR OTHERWISE NOTED:

BOTTOM OF SLAB	1 INCH
STIRRUPS AND TIES	1½ INCHES

IN ALL FOOTINGS AND PIER SHAFTS, THE MINIMUM COVERING SHALL BE 3 INCHES.

CONSTRUCTION JOINTS: CONSTRUCTION JOINTS SHALL BE MADE ON A TRUE HORIZONTAL LINE AT THE SURFACE OF THE BENTS AND PIERS AND LEFT ROUGH IN THE INTERIOR WITH SATISFACTORY SHEAR KEYS.
STRUCTURE EXCAVATION: STRUCTURE EXCAVATION FOR PIERS NO. 2, NO. SHALL BE COMPUTED FROM BELOW THE UNCLASSIFIED CHANNEL EXCAVATION.

STATE OF MONTANA
DEPARTMENT OF HIGHWAYS

BRIDGE OVER MUSSELSHELL RIVER
AT STA. 751+67.50
FEDERAL AID PROJECT NO. F-RF-256(36)
PETROLEUM & GARFIELD COUNTIES

GENERAL LAYOUT

Scale: 1" = 20'-0" Except as noted

DESIGNED		
DRAWN	G. Knudson	5-15-72
CHECKED	N. Roynlie	9-8-72
APPROVED	HES.	9-15-72
REVISED		
REVISED		

DRAWING NO. 10815

HES.

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	MONT.	S71(4)		1	7

Note: The series of three numbers inscribed on the log of borings indicate the number of blows per 6" penetration for each number of the series of a 2" sample tube which has been driven in accordance with the Standard Penetration Test made with a 2" split tube sampler using a 140" hammer having a 30" drop. The letter "R" indicates less then 6" penetration with a mimimum of 50 blows.

Note: Bridge to be built on a straight line grade between fin. gr. elevations show at end bents.

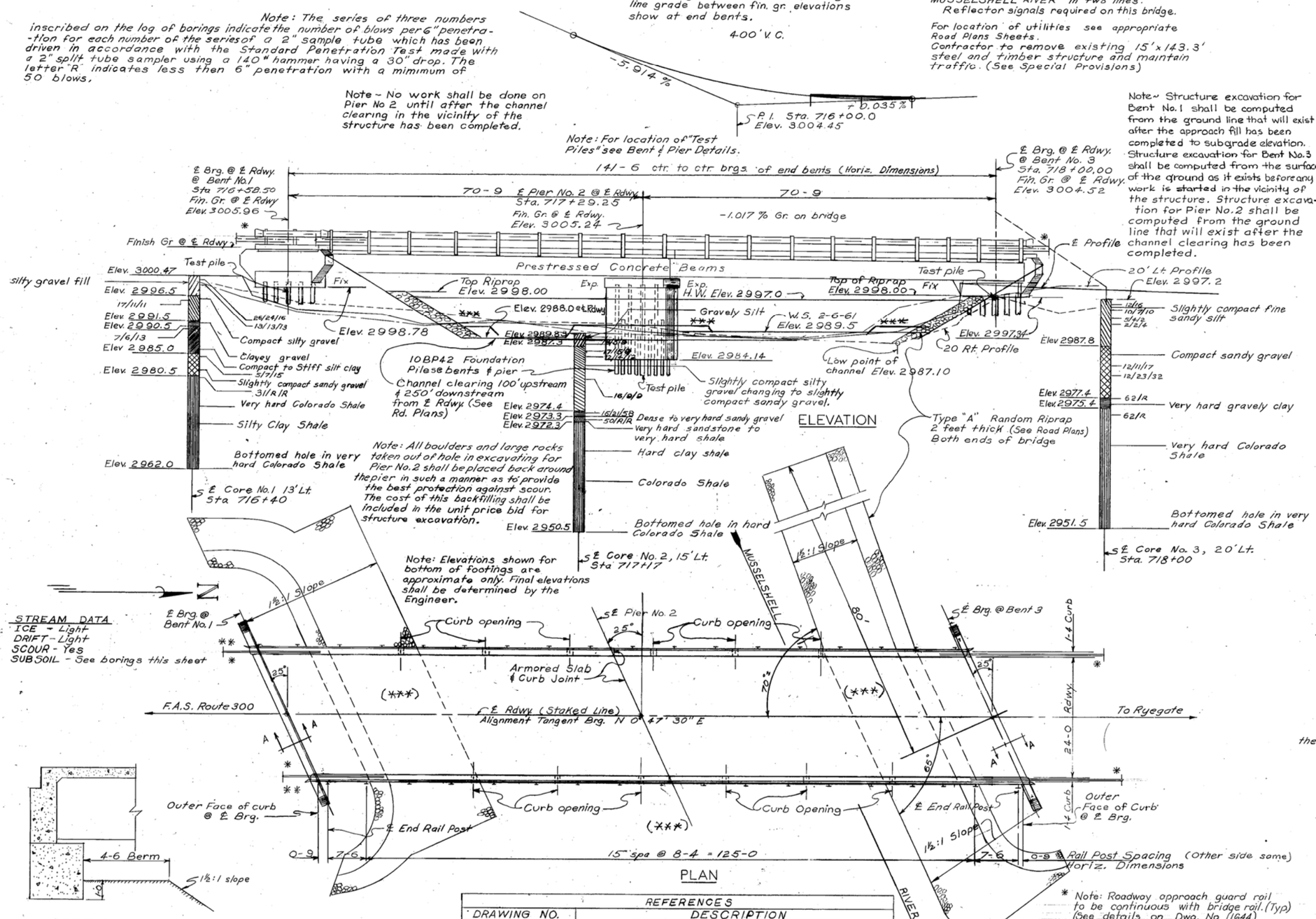
Note: Name on markers shall be "MUSSELSHELL RIVER" in two lines. Reflector signals required on this bridge.

For location of utilities see appropriate Road Plans Sheets.
Contractor to remove existing 15' x 143.3' steel and timber structure and maintain traffic. (See Special Provisions)

Note ~ No work shall be done on Pier No 2 until after the channel clearing in the vicinity of the structure has been completed.

Note: For location of "Test Piles" see Bent & Pier Details.

Note ~ Structure excavation for Bent No. 1 shall be computed from the ground line that will exist after the approach fill has been completed to subgrade elevation. Structure excavation for Bent No. 3 shall be computed from the surface of the ground as it exists before any work is started in the vicinity of the structure. Structure excavation for Pier No. 2 shall be computed from the ground line that will exist after the channel clearing has been completed.



REFERENCES	
DRAWING NO.	DESCRIPTION
5847	BENT NO. 1 & BENT NO. 3
5848	PIER NO. 2
5849	SLAB, CURB, & DIAPHRAGM DETAILS
PRES-BEAM STD. NO. 17 TYPE A	STD. PRE-TENSIONED & POST-TENSIONED PRES. CONC. BEAMS (Rev. 7-1-6)
PRES. S. & C. JOINTS	STD. SLAB & CURB JOINTS FOR PRES. CONC. BEAM SPANS. (Rev. 1-10-61)
SBBR	STEEL BEAM BRIDGE RAIL & DETAILS (Rev. 1-10-61)

NOTES

SPECIFICATIONS: Montana State Highway Commission Standard Specifications for Road and Bridge Construction, 1959 Edition, and any amendments thereto, and Special Provisions shall govern unless otherwise noted. Design prepared in accordance with A.A.S.H.O. Specifications, 1957 Edition, and any amendments thereto.

LIVE LOAD: Standard H15-S12 loading.

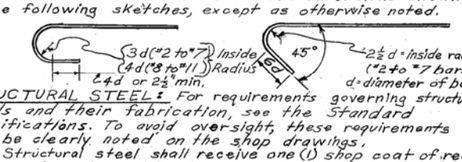
FINISHED GRADE: Finished plan grade of bridge is same as future finished grade shown on road plans.

CAST IN PLACE CONCRETE: All cast in place concrete of superstructure and as noted on Bents No. 1 and No. 3 shall be class "AD". All other concrete in Bents No. 1 & No. 3 & Pier No. 2 shall be Class "A". An "Air Entraining Agent" shall be added to all cast in place concrete. Chamfer all exposed edges of concrete 3/4" and fillet entrant angles 3/4" unless otherwise noted. Quantities of Class "AD" concrete have been computed using pretensioned beams. Quantities of class "AD" concrete and reinforcing steel will vary slightly using post-tensioned beams.

PRECAST PRESTRESSED CONCRETE: All precast prestressed concrete shall have a minimum compressive strength of 5000 p.s.i. at the age of 28 days. (See Special Provisions for Precast Prestressed Concrete Beams.) An "Air Entraining Agent" may be added to any precast prestressed concrete. Chamfer all exposed edges of concrete 3/4 inch and do not fillet entrant angles unless otherwise noted.

SHAFTS: Shaft of Pier No. 2 shall be poured in not more than 2 continuous runs; other construction joints shall be made only as noted on the plans or as determined by the Engineer.

REINFORCING STEEL: Bends in reinforcing steel shall be made to a radius of not less than four (4) diameters of the bar except for stirrups and tie bars, which shall be bent around a pin having a diameter of not less than two (2) bar diameters. Hooks shall conform to the dimensions shown in the following sketches, except as otherwise noted.



STRUCTURAL STEEL: For requirements governing structural steels and their fabrication, see the Standard Specifications. To avoid oversight, these requirements shall be clearly noted on the shop drawings.

Structural steel shall receive one (1) shop coat of red lead or zinc chromate primer and two (2) field coats consisting of first field or primer coat and one (1) coat of aluminum paint as specified in the Standard Specifications, on all surfaces not in contact with the concrete, except as noted in the Standard Specifications.

PIER NOSE ANGLES, GUARD ANGLES & ARMORED JOINTS: Pier nose angle, guard angles & armored joints shall be paid for at the unit price bid for reinforcing steel.

FOUNDATION PILES: For bidding purposes only, pile lengths have been estimated as noted on the details of the bents and pier. All piling shall be driven as set forth in the Special Provisions.

TEST PILES: For Test Pile Requirements see Special Provisions.

SOILS AND FOUNDATION MATERIALS: Borings were taken by the Montana State Highway Department at the points shown, to obtain information on the sub-soil at this bridge site so that a more reasonable conclusion could be reached as to the type and approximate elevation of bottom of foundation that should be used. The State Highway Department's interpretation of the materials encountered from the results of the borings is shown hereon.

The State Highway Department does not guarantee that the material which will be encountered in the course of excavation for the structure will be as listed in the log of borings; neither does the State assume any responsibility for any variation or misinterpretation of the classes of materials.

No claim or adjustment in the unit price bid for excavation will be made if the materials found do not agree with those shown in the log of borings. Materials shown as sand & gravel may be of varying degrees of compactness or cementation.

OTHER NOTES: See Dwg. No. 5847.

STATE OF MONTANA
STATE HIGHWAY COMMISSION

BRIDGE OVER MUSSELSHELL RIVER
AT STA. 717+29.25
FED. AID SECONDARY PROJ. NO. S-71(4)
GOLDEN VALLEY COUNTY
GENERAL LAYOUT

Scale: 1" = 10'-0" EXCEPT AS NOTED

** THIS CONTRACT: SFCS 300-1(7)0
Bridge rail revised with concrete barrier; see Dwg's No. 18310 thru 18312.

*** THIS CONTRACT: BH000(745). Riprap added to Bents 1 and 3 and Pier 2. See Dwg No. 19422.

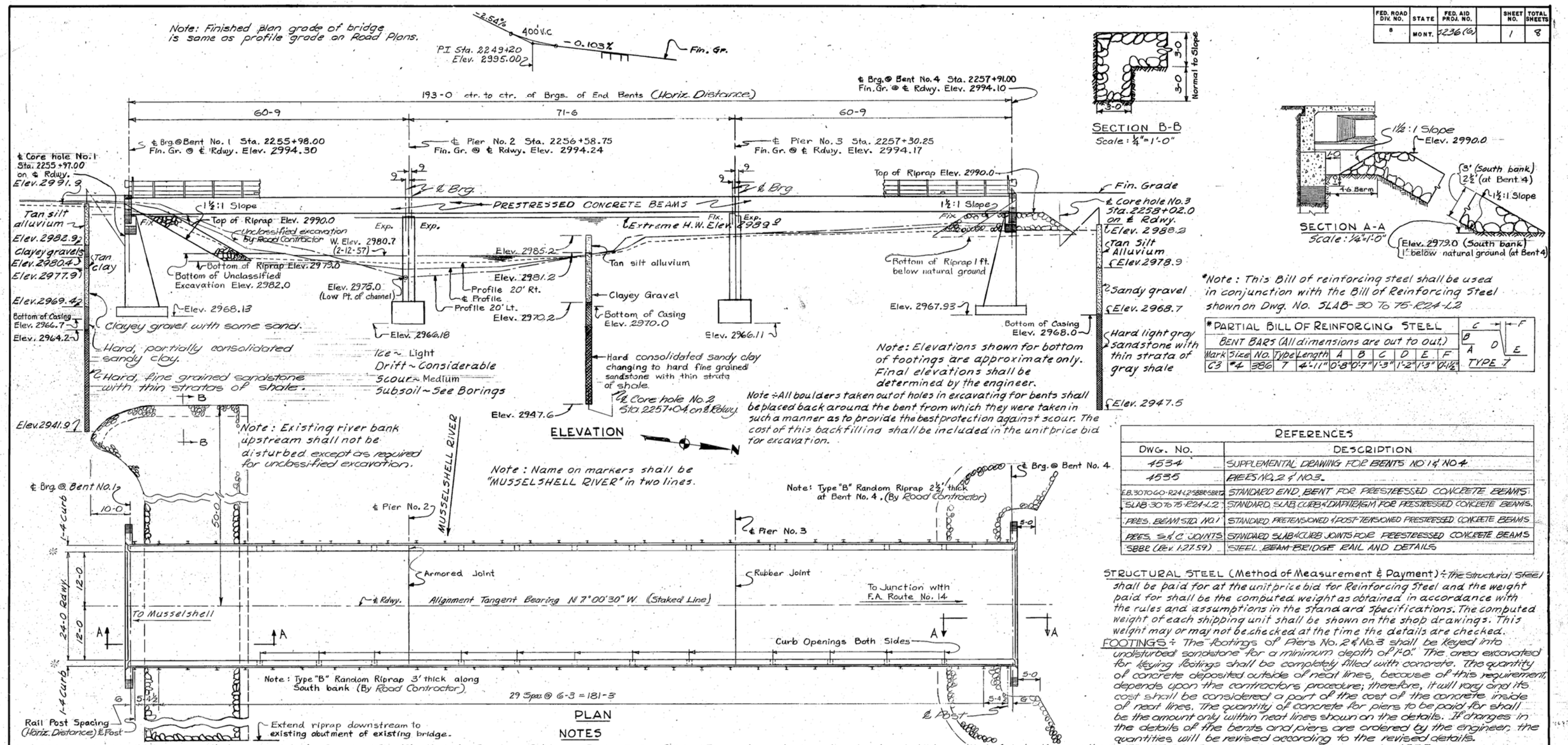
DESIGNED	W.B.D.	8-29-61	
DRAWN	C.C.S.	8-31-61	
TRACED			
CHECKED	E.D.K.	11-2-61	
* REVISED	N.H.R.	12-31-79	
** REVISED	D.W.C.	5-28-02	REVISED DWC 8-1-2005

APPROVED BY _____ BRIDGE ENGINEER

*** DRAWING NO. 5846

J.R.D.

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	MONT.	S236(6)		1	8



*Note: This Bill of reinforcing steel shall be used in conjunction with the Bill of Reinforcing Steel shown on Dwg. No. SLAB-30 To 75-R24-L2

*PARTIAL BILL OF REINFORCING STEEL

BENT BARS (All dimensions are out to out.)

Mark	Size	No.	Type	Length	A	B	C	D	E	F
C3	#4	386	7	4'-11"	0'-8"	0'-7"	1'-3"	1'-2"	1'-3"	0'-1½"

TYPE 7

REFERENCES	
DWG. NO.	DESCRIPTION
4534	SUPPLEMENTAL DRAWING FOR BENTS NO 1 & NO 4
4535	PRES NO. 2 & NO 3
E.B. 30 TO 60-R24 & 2 SBBR-SBR2	STANDARD END BENT FOR PRESTRESSED CONCRETE BEAMS
SLAB 30 TO 75-R24-L2	STANDARD SLAB, CURB & DIAPHRAGM FOR PRESTRESSED CONCRETE BEAMS
PRES. BEAM STD. NO. 1	STANDARD PRETENSIONED & POST-TENSIONED PRESTRESSED CONCRETE BEAMS
PRES. S & C JOINTS	STANDARD SLAB & CURB JOINTS FOR PRESTRESSED CONCRETE BEAMS
SBBR (Rev. 1-27-59)	STEEL BEAM BRIDGE RAIL AND DETAILS

STRUCTURAL STEEL (Method of Measurement & Payment) ÷ The Structural Steel shall be paid for at the unit price bid for Reinforcing Steel and the weight paid for shall be the computed weight as obtained in accordance with the rules and assumptions in the standard Specifications. The computed weight of each shipping unit shall be shown on the shop drawings. This weight may or may not be checked at the time the details are checked.

FOOTINGS ÷ The footings of Piers No. 2 & No. 3 shall be keyed into undisturbed sandstone for a minimum depth of 1'-0". The area excavated for keying footings shall be completely filled with concrete. The quantity of concrete deposited outside of neat lines, because of this requirement, depends upon the contractors procedure; therefore, it will vary and its cost shall be considered a part of the cost of the concrete inside of neat lines. The quantity of concrete for piers to be paid for shall be the amount only within neat lines shown on the details. If changes in the details of the bents and piers are ordered by the engineer, the quantities will be revised according to the revised details.

NOTES

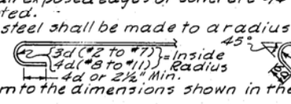
SPECIFICATIONS ÷ Montana State Highway Commission Standard Specifications for Road and Bridge Construction, 1959 Edition, and any amendments thereto and Special Provisions shall govern unless otherwise noted. Design prepared in accordance with A.A.S.H.O. Specifications, 1957 Edition.

LIVE LOAD ÷ Standard H15-S12 loading.

CAST IN PLACE CONCRETE ÷ All cast in place concrete in the superstructure and as noted for the End Bents shall be Class "AD." All other concrete in the Bents shall be Class "A." An "Air Entraining Agent" shall be added to all cast in place concrete. Chamfer all exposed edges of concrete ¾ inches and fillet entrant angles ¾ inches unless otherwise noted. Quantities of Class "AD" concrete have been computed using pretensioned beams. Quantities of Class "AD" concrete & reinforcing steel will vary slightly using post-tensioned beams.

PRECAST PRESTRESSED CONCRETE ÷ All precast prestressed concrete shall have a minimum compressive strength of 5000 p.s.i. at the age of 28 days. (See Special Provisions for Precast Prestressed Concrete Beams.) An "Air Entraining Agent" may be added to any precast prestressed concrete. Chamfer all exposed edges of concrete ¾ inches and do not fillet entrant angles unless otherwise noted.

REINFORCING STEEL ÷ Bends in reinforcing steel shall be made to a radius of not less than four diameters of the bar except for stirrups and tie bars which shall be bent around a pin having a diameter of not less than two bar diameters. Hooks shall conform to the dimensions shown in the above sketches, except as otherwise noted.



STRUCTURAL STEEL ÷ For requirements governing structural steels and their fabrication, see the OTHER NOTES ÷ For other notes see drawing No. 4535.
Standard Specifications. To avoid oversight, these requirements shall be clearly noted on the shop drawings. Structural steel shall receive one shop coat of red leador zinc chromate primer and two field coats consisting of first field or primer coat and one coat of aluminum paint as specified in the Standard Specifications, on all surfaces not in contact with concrete except as noted in the Standard Specifications.

ARMORED JOINT & AND GUARD ANGLES ÷ Slab guard angles, pier nose angles and armored joint material shall be paid for at the unit price bid for reinforcing steel.

SETTING OF SHOES ÷ Care shall be taken in placing reinforcing steel so as to clear anchor bolts. Contractor shall finish concrete under beam masonry plates slightly high and bush-hammer to exact elevation shown. Masonry plates shall be placed on three (3) layers of canvas thoroughly swabbed with red lead, as called for in the Standard Specifications.

APPROVAL ÷ Shop plans shall be approved by the Montana State Highway Department before fabrication is begun.

WELDS ÷ All welds shall be continuous fillet shop welds unless otherwise noted. Welds shall be paid for at the unit price bid for reinforcing steel and the weights shall be computed in accordance with the following: ¼" @ .160 #/ft; ⅜" @ .359 #/ft.

BACKFILL ÷ The backfill at end bents may be complete up to the bottoms of the backwalls before superstructure is in place. The backfill against the backwalls shall not be placed until after the concrete roadway slab has been placed.

* THIS CONTRACT: STPS 310-1(10) 34: Rail revised to concrete barrier. See details, Dwg. 19895-6.

STATE OF MONTANA
STATE HIGHWAY COMMISSION

BRIDGE OVER MUSSELSHELL RIVER
NEAR MUSSELSHELL
FED. AID SECONDARY PROJ. NO. S236(6)
MUSSELSHELL COUNTY

GENERAL LAYOUT

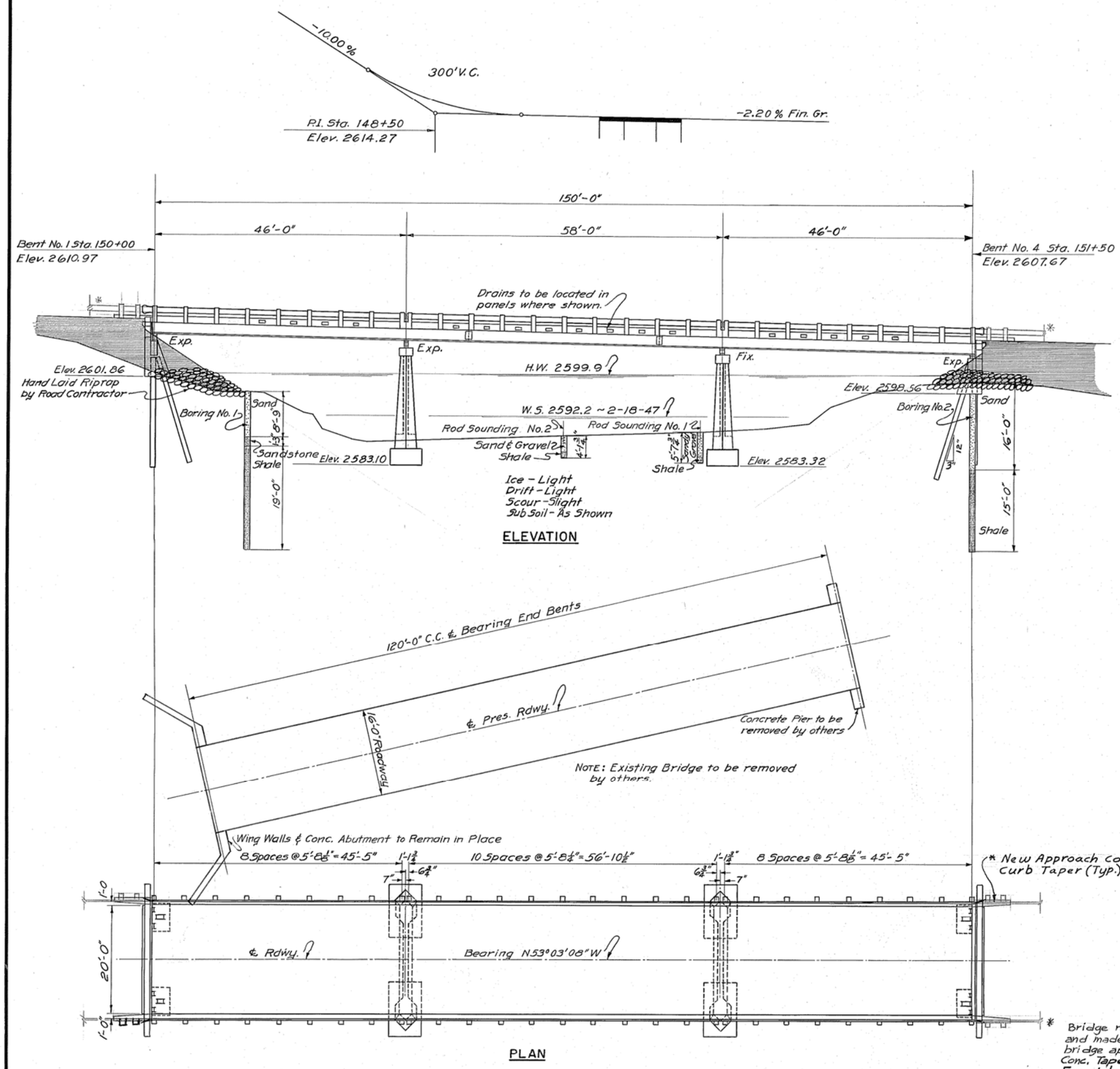
Scale ~ 1" = 10'-0" Except As Noted

DESIGNED		
DRAWN	R.E.C.	5-5-59
TRACED		
CHECKED	H.B.B.	5-14-59
REVISED	D.W.C.	8-11-05
REVISED		

APPROVED BY — BRIDGE ENGINEER

DRAWING NO. 4533

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	MONT.	S48(1)		1	6
		RS 381-1(3)0			



NOTES

SPECIFICATIONS:— Montana State Highway Commission Standard Specifications for Road and Bridge Construction adopted Jan. 1, 1946 and amendments thereto, and Special Provisions shall govern unless otherwise noted. Design prepared in accordance with the Montana 1945 Design Specifications for Highway Structures, Revised March 1, 1946.

LIVE LOAD:— Standard H-15 Loading.

CONCRETE:— All concrete of superstructure, including Rail Posts, shall be Class "A D". All concrete in Bents and Piers shall be Class "A"

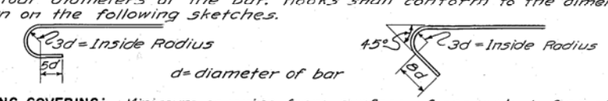
Chamfer all exposed edges of concrete 1½ inches and fillet entrant angles 1½ inches unless otherwise noted.

CONSTRUCTION JOINTS:— Construction Joints shall be made only at locations shown on the plans or as approved by the Engineer. Adequate keys shall be provided at all construction joints as noted on the plans or determined by the Engineer.

REINFORCING STEEL:— All reinforcing bars shall be of intermediate grade billet steel. They shall be of approved deformed section except as noted. Slab bars shall be supported on steel chairs placed sufficiently close together to maintain bars in proper position. All other bars shall be supported on either steel chairs or precast concrete blocks. The unit price bid for reinforcing steel shall include the cost of furnishing and placing chairs precast blocks and all other materials used to fasten reinforcing steel in place.

Splicing of main reinforcing bars shall not be permitted except as shown on the plans.

Bends in reinforcing bars shall be made to a radius of not less than four diameters of the bar. Hooks shall conform to the dimensions shown on the following sketches.



REINFORCING COVERING:— Minimum covering from surface of concrete to face of any reinforcing bars shall be 2 inches except in slabs, where the minimum covering shall be 1 inch. In footings of bents the minimum covering shall be 3 inches.

STRUCTURAL STEEL:— Requirements governing structural steel shall be noted on Shop Drawings and shall be in accordance with the Standard Specifications.

PAINT: One shop coat red lead and two field coats consisting of first field or primer coat and one coat of aluminum paint as specified in the Standard Specifications on all surfaces not in contact with concrete and as noted under "Painting of Steel Structures."

SETTING OF SHOES:— Care shall be taken in placing reinforcing steel so as to clear anchor bolts.

Contractor shall finish concrete under girder shoes slightly high and bush-hammer to exact elevation shown. Shoes shall be placed on three layers of canvas thoroughly swabbed with red lead, as called for in the Standard Specifications.

PREFORMED EXPANSION JOINT FILLER:— Preformed Expansion Joint Filler shall be Type "A" as specified by Montana State Highway Commission Standard Specifications for Road and Bridge Construction.

Cost of furnishing and placing shall be included in the unit price bid for Class "A D" concrete.

STEEL BRIDGE RAIL:— The price bid per lineal foot for Steel Bridge Rail shall be payment for rail units and fastenings complete in place. Concrete posts and reinforcing bars therein shall be paid for at contract unit prices bid for Class "A D" Concrete and Reinforcing Steel.

FINISHED GRADE:— Finished grade of Bridge is 0.5 ft. above profile grade shown on Road Plans.

FINISHING:— Attention is directed particularly to the requirements of paragraph 49.05(m)(2) of the Standard Specifications for the finishing of the concrete floor slab.

FOUNDATION MATERIALS:— Borings and rod soundings were made at this site by the Montana Highway Department to determine the character of the subsoil as a basis for the design of the foundations. The results of these borings and soundings are shown on this sheet.

The Highway Department does not guarantee that the material encountered in the excavation will be as shown nor does the State assume responsibility for any variations in hardness or character or any misinterpretation in classes of materials. No claim or adjustment in the unit price bid for excavation will be made if the materials found in the course of the excavation do not agree with those shown on the boring logs.

REFERENCES

DWG. NO.	DESCRIPTION
2774	General Layout
2775	Bents No. 1 & No. 4
2776	Piers No. 2 & No. 3
2777	Girders & Diaphragms
2778	Shoes & Floor Joints
2779	Section & Bridge Rail

* Bridge rail to be revised and made continuous with bridge approach guardrail. Conc. Tapers to be installed. For details See Dwg. No. 13506.

REVISION	S.D.K.	9-29-83
1	H.W.K.	5-18-48
REVISION	BY	DATE

DESIGNED		
DRAWN	C.A.M.	9-8-47
TRACED	J.W.A.	1-28-48
CHECKED	L.H.	3-19-48
REVIEWED		
REVIEWED		

STATE OF MONTANA
STATE HIGHWAY COMMISSION

BRIDGE OVER MUSSELSHELL RIVER

FED. AID SECONDARY PROJ. NO. S 48(1)

ROUNDUP WEST & SOUTH ROAD

MUSSELSHELL COUNTY

GENERAL LAYOUT

Scale - 1" = 10'-0"

APPROVED BY L. H. Thomas
BRIDGE PLANS ENGINEER

STATE NO. PRECONST. 8124 R/W CONST.

DRAWING NO. 2774

LARRY G. LEKSE
BRYAN W. ADOLPH
ROBERT T. GOFFENA
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506 Main Street
406-323-1104

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506 Main Street
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SUPT. OF SCHOOLS
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506 Main Street
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MUSSELSHELL COUNTY

ROUNDUP, MONTANA 59072

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CLERK OF DISTRICT COURT
506 Main Street
Fax 406-323-1716
406-323-1413

DONNA M. MARSH
JUSTICE OF THE PEACE
P.O. Box 660
406-323-1078

Pioneer Technical Services, Inc.
Attn: Nicole Hockaday
Staff Engineer
307 East Park, Suite 421
Anaconda, MT 59711

11-17-14

Hi Nicole,

First I have enclosed my data base of bridges for Musselshell County. I hope it will provide you with some of the info you need. The L #'s are the State of Montana's numbering system. For initial building plans they may be your best bet. Also enclosed is a copy of MDT'S STIP schedule. It shows the Parrot Cr. Rd. and Queen's Pt. Rd. to be replaced in 2017.

Dean Cr. Rd., Bundy Bridge, (L33030003+06001) last inspection enclosed.

Hougardy Lane (Elso Bridge) has been closed since I have worked for the county (15 yrs.) and condemned.

Goulding Cr. Rd., (S00381000+04001) enclosed inspection report.

Parrot Cr. Rd. bridge which is (L33017000+04001), Gage Bridge. This bridge has been severely damaged with the recent floods and run offs we have experienced since 2011. The pictures show much of the damage and structure.

Queens' Point Rd. (L33028000+07001), I am enclosing last inspection.

Cont.

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The first **Goffena Rd.** (west side) has been condemned since 2003. (L33035000+0.2001) we called it the Musselshell River Bridge.

The other **Goffena Rd.** is a privately owned and I have no info on that other than it is a railroad bridge.

W. Musselshell River Rd., (L33001027+08001) Delphia Bridge, enclosed inspection w/pics. This is a small bridge the river hasn't effected it like the others but it is old.

You have **2 Harvey** bridges, the riverbed was totally changed in the flood. I sent the inspections for both new and old bridges.
Brewer bridge is the old one (L33027001+02001)
New one is **Harvey bridge** (L33027000+08281)

Melstone Custer Rd. (L3307007/001+04001) a fairly new bridge was not much damaged either.

I put a post-it on your map, 2 of our bridges were omitted.

Fairgrounds bridge (L33548000+00001), new bridge

Then our **#4 Rd.,** (L33045000+04001) inspection report.

That's about all I have.

Sincerely,
Candy Kenner
Secretary
Musselshell County Road Dept.
506 Main St.
Roundup, MT 59072
406-323-2814
Fax 406-323-2476

Montana Department of Transportation

INITIAL ASSESSMENT FORM FOR STRUCTURE :

L44118003+01001

Location : 15M NW SUMATRA Structure Name: none

General Location Data

District Code, Number, Location 04 Dist 4 GLENDIVE

County Code, Location 087 ROSEBUD

Kind fo Hwy Code, Description 4 4 County Hwy

Str Owner Code, Description : 2 County Highway Agency

Intersecting Feature : MUSSELSHELL RIVER 001

Structure on the State Highway System : Latitude : 46^43'12"

Structure on the National Highway System : Longitude : 107^49'20"

Str Meet or Exceed NBIS Bridge Length : X

Division Code, Location :43 MILES CITY

City Code, Location :00000 RURAL AREA

Signed Route Number :44118

Maintained by Code, Description :2 County Highway Agency

Kilometer Post, Mile Post : 4.99 km 3.10

Construction Data

Construction Project Number

Construction Station Number 0+00.00

Construction Drawing Number : none

Construction Year : 1930

Reconstruction Year 1960

Traffic Data

Current ADT : 100 ADT Count Year : 2003 Percent Trucks : 3 %

Structure Loading, Rating and Posting Data

Loading Data :

Design Loading :		0 Unknown
Inventory Load, Design :	12.7 mton	2 AS Allowable Stress
Operating Load, Design :	19.0 mton	2 AS Allowable Stress
Posting		4 0.1-9.9%below

Rating Data :	Operating	Inventory	Posting
Truck 1 Type 3 :	23	20	20
Truck 2 Type 3-S3	36	23	23
Truck 3 Type 3 3 :	37	24	24

Structure, Roadway and Clearance Data

Structure Deck, Roadway and Span Data :

Structure Length 47.80 m

Deck Area 209.00 m sq

Deck Roadway Width : 4.60 m

Approach Roadway Width : 5.80 m

Median Code, Description : 0 No median

Structure Vertical and Horizontal Clearance Data :

Vertical Clearance Over the Structure : 99.99 m

Reference Feature for Vertical Clearance N Feature not hwy or RR

Vertical Clearance Under the Structure : 0.00 m

Reference Feature for Lateral Underclearance : N Feature not hwy or RR

Minimum Lateral Under Clearance Right : 0.00 m

Minimum Lateral Under Clearance Left : 0.00 m

Span Data

Main Span

Number Spans : 1

Material Type Code, Description 3 Steel

Span Design Code, Description : 10 Truss - Thru

Deck

Deck Structure Type 8 Wood or Timber

Deck Surfacing Type : 7 Wood or Timber

Deck Protection Type : 0 None

Deck Membrane Type : 0 None

Approach Span

Number of Spans : 1

Material Type Code, Description 3 Steel

Span Design Code, Description : 2 Stringer/Multi-beam or Girder

(52) Out-to Out Width 4.88 m

(50A) Curb Width : 0.00 m

(50B) Curb Width : 0.00 m

Skew Angle : °

Structure Vertical and Horizontal Clearance Data Inventory Route :

Over / Under Direction Name	Inventory Route	South, West or Bi directional Travel Direction	Vertical	Horizontal	North or East Travel Direction	Vertical	Horizontal
Route On Structure	L44118	Both	99.99 m	4.60 m	N/A		

Montana Department of Transportation

INITIAL ASSESSMENT FORM FOR STRUCTURE :

L44118003+01001

Continue

Inspection Data

Sufficiency Rating : 41.1

Structure Status : **Not Deficient**

Inspection Due Date : 26 August 2014

(91) Inspection Frequency (months) : 24

Next Fracture Critical Due Date : 28 Aug 2014

Fracture Critical Detail : **Steel trusses**

NBI Inspection Data

(90) Date of Last Inspection : 28 August 2012

Last Inspected By : Alex Eggen - 2058

(90) Inspection Date :

Inspected By :

(58) Deck Rating :	7	(68) Deck Geometry :	7	(36C) Approach Rail Rating :	N	(62) Culvert Rating :	N
(59) Superstructure Rating :	5	(67) Structure Rating :	4	(36A) Bridge Rail Rating :	0	(61) Channel Rating :	7
(60) Substructure Rating :	5	(69) Under Clearance :	N	(36B) Transition Rating :	N	(71) Waterway Adequacy :	5
(72) App Rdwy Align :	4	(41) Posting Status :	P	(36D) End Rail Rating :	0	(113) Scour Critical :	5

Unrepaired Spalls : 0 m sq

Deck Surfacing Depth : 0.00 in

Inspection Hours

Crew Hours for inspection :	4	Snooper Required :	N
Helper Hours :	-1	Snooper Hours for inspection :	-1
Special Crew Hours :	-1	Flagger Hours :	-1
Special Equipment Hours :	-1		

Inspection Work Candidates

Candidate ID	Date Requested	Status	Priority	Effected Structure Unit	Scope of Work	Action	Covered Condition Status

Element Inspection Data

* * * * * * * * * * Span : Main-0 - -1 * * * * * * * * * *

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 31 Timber Deck 36.8x4.88 field measure 179.58m2										
[redacted]	1	1	180	sq.m.	X	0	100	0	0	[redacted]
[redacted]					[redacted]	%	%	%	%	%

Previous Inspection Notes :

08/28/2012 - None

09/08/2010 - South 1/2 is 3" x 6" treated boards on edge. North 1/2 is 3" x 12" planks with 1" spacing and running planks with 1/2" gap.(Photo) TH

08/12/2008 - None

09/25/2006 - 3x6 Planking has moderate wear with some areas of rot.
4.88x36.6=178

09/25/2004 - None

09/24/2004 - Same as previously reported. Also 1/2 of the east end has some areas of rot with some loss of section.

02/25/2004 - None

02/20/2003 - Same as last insp.

03/07/2001 - Decking has moderate traffic wear.

02/01/1999 - Decking has light traffic wear.

02/21/1997 - None

Inspection Notes:

Element 113 - Paint Stl Stringer originally painted

[redacted]	1	2	256	m.	[redacted]	0	0	70	30	0
						%	%	%	%	%

Previous Inspection Notes :

08/28/2012 - Span 2 photos. AE

09/08/2010 - Changed element from unpainted to painted. Rust is prevalent with some pitting. 2nd stringer from right between 4th and 5th floorbeams is bent downstream. TH

Inspection Notes:

Element 121 - F/Stl Thru Truss/Bot originally painted Built up angles=17x6in h

[redacted]	1	2	73	m.	[redacted]	0	0	80	20	0
						%	%	%	%	%

Previous Inspection Notes :

08/28/2012 - None

09/08/2010 - Changed element from unpainted to painted. Left side near Bent 2 and right side near Abut 3 has out of plane bending(photos). L7 right vertical to lower cord connection panel has been cut and welded. All lattice is bent. Surface rust is prevalent with some pitting. TH

Inspection Notes:

********** Span : Main-0 - -1 (cont.) **********

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 126 - P/Stl Thru Truss/Top originally painted, Built up channel-16x10 1/4in h										
[redacted]	1	2	73	m.	[redacted]	0 %	0 %	80 %	20 %	0 %

Previous Inspection Notes

08/28/2012 - None

09/08/2010 - Changed element from unpainted to painted. Right side vertical at L7 has out of plane bending at lower connection point, connection point has been cut and welded(photo). Left side U3L3 and U1L1 have minor collision damage. L0U1 Left lattice is bent. Surface rust is prevalent with some pitting. TH

Inspection Notes:

Element 152 - Paint Stl Floor Beam originally painted 20in h x 6 1/4in w

[redacted]	1	2	44	m.	[redacted]	0 %	5 %	65 %	30 %	0 %

Previous Inspection Notes

08/28/2012 - Approx 5 percent of distressed paint still in place. AE

09/08/2010 - Changed element from unpainted to painted. Both left and right sides of all floor beams have been cut and welded at vertical to floor beam connection panels(photo). Surface rust is prevalent with some pitting. TH

Inspection Notes

Element 163 - Paint Gusset Plate

[redacted]	1	2	26	ea.	[redacted]	0 %	5 %	90 %	5 %	0 %

Previous Inspection Notes

08/28/2012 - L0 left that is attached to bearing has some twist in it at bent 2 AE

09/08/2010 - very little paint, surface rust prevalent. L7 right has been cut and welded and is also bent. TH

Inspection Notes:

Element 202 - Paint Stl Column

[redacted]	1	2	18	ea.	[redacted]	0 %	10 %	90 %	0 %	0 %

Previous Inspection Notes

08/28/2012 - Abut 3 piles photo. AE

09/08/2010 - 9" pipe is not painted but does have some protective bituminous coated wrap on it, most has peeled off. Changed from 0,100 to 0,10,90 percent. TH
08/12/2008 - Paint failed rust prevelant.

Inspection Notes:

* * * * * * * * * * Span . Main-0 - -1 (cont.) * * * * * * * * * *

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 216 Timber Abutment										
[redacted]	1	2	17	m.	[redacted]	0 %	55 %	30 %	15 %	[redacted] %

Previous Inspection Notes

08/28/2012 - Abut 3 photo. AE

09/08/2010 - Abut 3 right wingwall has 7" gap. left wingwall beam is broken and misaligned also has a gap(photo). TH

08/12/2008 - None

09/25/2006 - New corregated steel placed on fill side of abutment, can see part of it through rotton timber areas.

09/25/2004 - None

09/24/2004 - same as previously reported.

02/25/2004 - None

02/20/2003 - Same as last insp.

03/07/2001 - Same as last insp.

02/01/1999 - Abutmont 3 has rotating backwall with loss of section Wingwalls are falling down.

02/21/1997 - None

Inspection Notes

Element 231 - Paint Stl Grp originally painted

[redacted]	1	1	11	m.	[redacted]	0 %	50 %	50 %	0 %	0 %

Previous Inspection Notes

08/28/2012 - None

09/08/2010 - None

08/12/2008 - Paint failed rust prevolant

Inspection Notes

Element 313 - Fixed Bearing

[redacted]	1	1	2	ea.	[redacted]	50 %	50 %	0 %	[redacted] %	%

Previous Inspection Notes

08/28/2012 - all bearings have some bending.AE

09/08/2010 - None

08/12/2008 - None

09/25/2006 - None

09/25/2004 - None

09/24/2004 - The dirt has been removed but the rust is still the same.

02/25/2004 - None

02/20/2003 - Same comments.

03/07/2001 - Same comments.

02/01/1999 - Covered in dirt, rusting, and bent up.

02/21/1997 - None

Inspection Notes

* * * * * * * * * * Span : Main-0 - -1 (cont.) * * * * * * * * * *

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 334 - Metal Rail Coated originally painted 3x2angle and 2x2angle mounted to truss 3bd 3x2in angle posts										
[redacted]	1	1	73	m.	[redacted]	0 %	0 %	100 %	0 %	0 %

Previous Inspection Notes :

08/28/2012 - None

09/08/2010 - Changed from uncoated to coated. Paint has failed and surface rust is prevalent. Rail has collision damage North/approach and on the left/East side(photo). TH

Inspection Notes:

* * * * * * * * * * Span : Appr-1 - -1 * * * * * * * * * *

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 31 - Timber Deck 11 1/2x2 1/2in planks laid flat with 12in spacing overlaid with running planks with 1in gap										
[redacted]	1	1	29	sq.m.	X	100 %	0 %	0 %	0 %	[redacted] %

Previous Inspection Notes :

08/28/2012 - None

09/08/2010 - None

08/12/2008 - None

09/25/2006 - Decking has some newer planks.
6x4,88=29

09/25/2004 - None

09/24/2004 - Same as previusly reported.

02/25/2004 - None

02/20/2003 - Same comments as last insp.

03/07/2001 - Decking planks has cracking and splitting with moderate traffic wear.

02/01/1999 - Deck planks are cracking with light traffic wear.

02/21/1997 - None

Inspection Notes

********** Span : Appr-1 - -1 (cont.) **********

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 107 Paint Stl Opn Girder										
[redacted]	1	1	55	m.	[redacted]	0 %	80 %	20 %	0 %	0 %

Previous Inspection Notes :

08/28/2012 - Some pitting rust not measurable. AE

09/08/2010 - 9 - 5" x 12" painted steel I beams with peeling paint and some surface rust. TH

08/12/2008 - None

09/25/2006 - None

09/25/2004 - None

09/24/2004 - same as previously reported.

02/25/2004 - None

02/20/2003 - Same as last insp.

03/07/2001 - Same comments as last insp.

02/01/1999 - Paint peeling with rust occurring.

02/21/1997 - None

Inspection Notes:

Element 202 Paint Stl Column										
[redacted]	1	2	6	ea.	[redacted]	0 %	10 %	90 %	0 %	0 %

Previous Inspection Notes :

08/28/2012 - None

09/08/2010 - 9" pipe is not painted but does have some protective bituminous coated wrap on it, most has peeled off. Changed from 0,100 to 0,10,90 percent. TH

08/12/2008 - Paint failed rust prevelant.

Inspection Notes:

Element 216 - Timber Abutment										
[redacted]	1	2	17	m.	[redacted]	95 %	5 %	0 %	0 %	[redacted] %

Previous Inspection Notes :

08/28/2012 - Abut 1 left wing photo. AE

09/08/2010 - Abut 1/North, right/East wingwall has 3" gap between 6" x 17" beams, 6" gap on left side with plank added to fill side of wingwall and 2 signs added to fill side of Abut 1 left, to prevent fill material from sloughing through TH

08/12/2008 - None

09/25/2006 - None

09/25/2004 - None

09/24/2004 - Same as previously reported.

02/25/2004 - None

02/20/2003 - Same comments as last insp.

03/07/2001 - Same as last insp.

02/01/1999 - Light cracking in RT wingwall planks at abutment 1.

02/21/1997 - None

Inspection Notes:

********** Span : Appr-1 - -1 (cont.) **********

Element Description

Smart Flag	Scale Factor	Env	Quantity	Units	Insp Each	Pct Stat 1	Pct Stat 2	Pct Stat 3	Pct Stat 4	Pct Stat 5
Element 231 - Paint Stl Cap										
[redacted]	1	1	5	m.	[redacted]	0 %	50 %	50 %	0 %	0 %

Previous Inspection Notes :

08/28/2012 - None

09/08/2010 - Abut 1, 2 - 5" x 12" painted steel I beams welded side by side, some paint visible. Changed from 0,100 to 0,50,50 percent(photo). TH

08/12/2008 - Paint failed rust prevelant.

Inspection Notes:

Element 332 - Timb Bridge Railing

[redacted]	1	1	12	m.	[redacted]	30 %	70 %	0 %	[redacted] %	[redacted] %

Previous Inspection Notes :

08/28/2012 - None

09/08/2010 - 1 3/4" x 7 1/2" unpainted wood rail with 5" x 12" painted steel I beam curb. Guardrail posts are leaning out. Changed from 0,0,100 to 30,70,0 percent. TH

08/12/2008 - None

09/25/2006 - None

09/25/2004 - None

09/24/2004 - Same as previously reported.

02/25/2004 - None

02/20/2003 - Same comments

03/07/2001 - Same comments

02/01/1999 - Timber railing is bowing downward.

02/21/1997 - None

Inspection Notes.

General Inspection Notes

08/28/2012 - Underclearance= 13.9' to water and 15.5' to channel. High water flows over road a approx 300' north of structure. AE

09/08/2010 - A local resident told me that the bridge was cut apart at a different location so they could move it to current location and rewelded the bridge back together around 1960. TH (Can not snooper, posted at 20 ton and truck is 29 ton. TH 3-2-11)
08/12/2008 - Weight limit sign not ledgable, appear to bn two different tonage posting. 20,23,24(North. TH 9-20-10) and 10,23,24.(South TH 9-20-10)
09/25/2006 - None

09/25/2004 - None

09/24/2004 - Same as previously reported.

02/25/2004 - None

02/20/2003 - None

03/07/2001 - None

02/01/1999 - Miseing 1 load limit sign from the East end. Sign on the West end is shot up. Structure in middle of an S-curve. Roadway wider than structure.
02/21/1997 - Sufficiency Rating Calculation Accepted by opa$u5963 at 6/11/97 13:19:00
OPS$U5963 inspection comments -
Structure L44118003+01001 -
Date 2/21/97 -
Previous comments > Sufficiency Rating Calculation Accepted by opa$u5963 at 3/11/97 09:05:25
Sufficiency Rating Calculation Accepted by ops$u9004 at 2/19/97 14:56:04

02/01/1995 - Sufficiency Rating Calculation Accepted by opa$u5963 at 3/11/97 09:05:25
Sufficiency Rating Calculation Accepted by ops$u9004 at 2/19/97 14:56:04

02/01/1994 - Updated with tape 1994

08/01/1992 - Updated with tape 1993

01/01/1991 - Updated with tape 1992

10/01/1988 - Updated with tape 1991

Golden Valley County

City-County Bridges

Structure Type	County	Road Name	Road System	
Bridge	Golden Valley	Cushman Road	City-County	STATE
Bridge	Golden Valley	River Bluff Lane	City-County	PRIVATE
Bridge	Golden Valley	Buffalo Trail	City-County	STATE
Bridge	Golden Valley	S Barber Road	City-County	STATE

GOLDEN VALLEY COUNTY DOES NOT ANTICIPATE ANY IMPROVEMENTS ON THESE BRIDGES OTHER THAN BASIC MAINTENANCE.

Nicole Hockaday

From: Pedrazzi, Donna - NRCS-CD, Roundup, MT [Donna.Pedrazzi@mt.nacdnet.net]
Sent: Wednesday, November 05, 2014 8:18 AM
To: Laura Nowlin
Cc: nhockaday@pioneer-technical.com
Subject: RE: Musselshell River Structure Inventory

Follow Up Flag: Follow up
Flag Status: Flagged

Categories: To Do

The Naderman dam will not be repaired. It has been abandoned, as well as the Naderman ditch. All of the water users of the Naderman ditch are in the process of transferring their water right to pumping directly from the river. Sylvan Anderson's dam has not been abandoned or repaired. He can't come up with a plan that is acceptable to FWP, so he is just pumping right out of the river at this time. The Egge dam is going to be removed. FWP, Future Fisheries and Lower Musselshell CD (we have applied for a 223 grant) have submitted a plan to remove the dam and re-vegetate the banks.

Donna

From: Laura Nowlin [mailto:musselshellwc@gmail.com]
Sent: Tuesday, November 04, 2014 6:15 AM
To: Pedrazzi, Donna - NRCS-CD, Roundup, MT
Subject: Re: Musselshell River Structure Inventory

I let her know that FWP is working with the landowner to remove the Egge Diversion.

On Tue, Nov 4, 2014 at 6:11 AM, Laura Nowlin <musselshellwc@gmail.com> wrote:
Hi Donna,

I received this email from Nicole Hockaday, who is working on the floodplain project for DNRC. She is wondering if any work is being considered/proposed for the below structures. Do you know what is being planned for these?

Thanks,
Laura

---------- Forwarded message ----------
From: **Nicole Hockaday** <nhockaday@pioneer-technical.com>
Date: Mon, Nov 3, 2014 at 10:47 AM
Subject: Musselshell River Structure Inventory
To: Laura Nowlin <musselshellwc@gmail.com>

Hi Laura!

I am working towards completing the Structure Inventory Report from the Musselshell work we completed this past August/September, and had a couple of questions on some damaged diversion structures. Do you

know if there are any remedial activities proposed/future plans on the following diversion structures? If not, do you know who could I talk to about any future work/plans on these structures (if there are any)?

Diversion Structure ID (from Pioneer Report)	Diversion Structure ID (from RATT Report)	River Mile (from RATT Report)	County	Owner	Details of Damage
D9	Naderman Diversion	194.2	Musselshell	Vescovi Pulled Herefords	No longer in main river channel of Musselshell River (lies to the south in pre-2011 channel).
D12	-	205.1	Musselshell	Sylvan Anderson	Completely covered with deposited sediment, river flows around sediment deposited bank (where structure lies underneath).
D13	Egge Diversion	210	Golden Valley	Gerda Edwards	River flows around structure on one side (flanking).

Thank you for your help!

Nicole Hockaday

Staff Engineer

Office: (406) 723-1932

Cell: (406) 491-5973

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Laura Nowlin

Musselshell Watershed Coalition
406-429-4832
P.O. Box 118
Winnett, MT 59087
http://musselshellwc.wix.com/musselshellwc

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Laura Nowlin

Musselshell Watershed Coalition
406-429-4832
P.O. Box 118
Winnett, MT 59087
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Appendix E. Aerial Photographs

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9995
	Date: 8/12/2014
	Description: Aerial view of diversion structure D2.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9998
	Date: 8/12/2014
	Description: Aerial view of diversion structure D2.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9999
	Date: 8/12/2014
	Description: Aerial view of diversion structure D2.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_0003
	Date: 8/12/2014
	Description: Aerial view of diversion structure D2.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9992
	Date: 8/12/2014
	Description: Aerial view of diversion structure D3.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9984
	Date: 8/12/2014
	Description: Aerial view of diversion structure D4.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9986
	Date: 8/12/2014
	Description: Aerial view of diversion structure D4.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9976
	Date: 8/12/2014
	Description: Aerial view of diversion structure D5.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9980
	Date: 8/12/2014
	Description: Aerial view of diversion structure D5.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9961
	Date: 8/12/2014
	Description: Aerial view of diversion structure D6.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9964
	Date: 8/12/2014
	Description: Aerial view of diversion structure D6.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9955
	Date: 8/12/2014
	Description: Aerial view of diversion structure D7.
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: IMG_9956
	Date: 8/12/2014
	Description: Aerial view of diversion structure D7.
	Project: Musselshell River Floodplain Study - Phase 1

	Photo Number: IMG_9953
	Date: 8/12/2014
	Description: Aerial view of diversion structure D8.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9938
	Date: 8/12/2014
	Description: Aerial view of diversion structure D9.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9939
	Date: 8/12/2014
	Description: Aerial view of diversion structure D9.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9941
	Date: 8/12/2014
	Description: Aerial view of diversion structure D9.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9928
	Date: 8/12/2014
	Description: Aerial view of diversion structure D10.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9929
	Date: 8/12/2014
	Description: Aerial view of diversion structure D10.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9922
	Date: 8/12/2014
	Description: Aerial view of diversion structure D11.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9910
	Date: 8/12/2014
	Description: Aerial view of diversion structure D13.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9911
	Date: 8/12/2014
	Description: Aerial view of diversion structure D13.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9896
	Date: 8/12/2014
	Description: Aerial view of diversion structure D14.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9898
	Date: 8/12/2014
	Description: Aerial view of diversion structure D14.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9899
	Date: 8/12/2014
	Description: Aerial view of diversion structure D14.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9903
	Date: 8/12/2014
	Description: Aerial view of diversion structure D14.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9889
	Date: 8/12/2014
	Description: Aerial view of diversion structure D15.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9893
	Date: 8/12/2014
	Description: Aerial view of diversion structure D15.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9878
	Date: 8/12/2014
	Description: Aerial view of diversion structure D16.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9880
	Date: 8/12/2014
	Description: Aerial view of diversion structure D16.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9886
	Date: 8/12/2014
	Description: Aerial view of diversion structure D16.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_1681
	Date: 10/2/2014
	Description: Aerial view of diversion structure D18.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_1688
	Date: 10/2/2014
	Description: Aerial view of diversion structure D18.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9858
	Date: 8/12/2014
	Description: Aerial view of diversion structure D20.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9864
	Date: 8/12/2014
	Description: Aerial view of diversion structure D20.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9846
	Date: 8/12/2014
	Description: Aerial view of diversion structure D21.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9849
	Date: 8/12/2014
	Description: Aerial view of diversion structure D21.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9843
	Date: 8/12/2014
	Description: Aerial view of diversion structure D22.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9845
	Date: 8/12/2014
	Description: Aerial view of diversion structure D22.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9837
	Date: 8/12/2014
	Description: Aerial view of diversion structure D23.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9838
	Date: 8/12/2014
	Description: Aerial view of diversion structure D23.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9840
	Date: 8/12/2014
	Description: Aerial view of diversion structure D23.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9841
	Date: 8/12/2014
	Description: Aerial view of diversion structure D23.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9821
	Date: 8/12/2014
	Description: Aerial view of diversion structure D25.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9829
	Date: 8/12/2014
	Description: Aerial view of diversion structure D25.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9818
	Date: 8/12/2014
	Description: Aerial view of diversion structure D26.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9816
	Date: 8/12/2014
	Description: Aerial view of diversion structure D26.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9797
	Date: 8/12/2014
	Description: Aerial view of diversion structure D28.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9800
	Date: 8/12/2014
	Description: Aerial view of diversion structure D28.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9803
	Date: 8/12/2014
	Description: Aerial view of diversion structure D28.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9782
	Date: 8/12/2014
	Description: Aerial view of diversion structure D29.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9785
	Date: 8/12/2014
	Description: Aerial view of diversion structure D29.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9743
	Date: 8/12/2014
	Description: Aerial view of diversion structure D30.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9750
	Date: 8/12/2014
	Description: Aerial view of diversion structure D30.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9752
	Date: 8/12/2014
	Description: Aerial view of diversion structure D30.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_1663
	Date: 10/2/2014
	Description: Aerial view of diversion structure D31.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_1665
	Date: 10/2/2014
	Description: Aerial view of diversion structure D31.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9737
	Date: 8/12/2014
	Description: Aerial view of diversion structure D32.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9739
	Date: 8/12/2014
	Description: Aerial view of diversion structure D32.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9742
	Date: 8/12/2014
	Description: Aerial view of diversion structure D32.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9729
	Date: 8/12/2014
	Description: Aerial view of diversion structure D33.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9732
	Date: 8/12/2014
	Description: Aerial view of diversion structure D33.
	Project: Musselshell River Floodplain Study - Phase 1

PIONEER TECHNICAL SERVICES, INC.	Photo Number: IMG_9734
	Date: 8/12/2014
	Description: Aerial view of diversion structure D33.
	Project: Musselshell River Floodplain Study - Phase 1