US 93 Polson Corridor Study

Existing Conditions of US 93

Prepared For:

Montana Department of Transportation

Confederated Salish & Kootenai Tribes

Lake County

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Chapter 2 Existing and Projected Conditions

This chapter documents the existing technical and environmental features along the existing US 93 corridor. The Technical Oversight Committee established the existing 6.5 mile study corridor along US 93. In addition to the existing US 93 corridor, the Committee determined the corridor study area which encompasses a full representation of the environment and physical surroundings of the study area. Even though several routes and alignments exist outside the existing US 93 corridor, there is a lack of detail and as-built drawings available for such alignments. The focus of this chapter consists of the existing technical features along the US 93 corridor.

2.1 Existing Roadway Users and Traffic Volumes

Montana Highway 35 (MT 35) intersects US 93 near RP 59.0 at South Shore Road and is primarily used by local traffic, commercial trucks, and recreational vehicles. Secondary Route 354 (S 354) intersects US 93 east of the Flathead River Bridge and is primarily used by local traffic, commuters, and commercial trucks. During the non-winter months, an increase in roadway users and traffic volumes is primarily due to recreation and tourism in the area.

The "weighted" Average Annual Daily Traffic (AADT) for US 93 through the study area for 2009 was 9,884, which has decreased since a peak of 12,610 in 2005. In 2009, the percentage of truck traffic through the corridor reached 10.9%. Table 2.1 shows the most recent 10-year traffic volumes for the corridor study area.

Table 2.1 Average Annual Daily Traffic

No.	Length (miles)	Location	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	0.332	US 93, RP 58.5 (.5 mile S of MT 35)	9,080	9,510	9,280	9,910	10,210	10,780	10,780	10,760	10,230	9,740	9,600
2	0.953	US 93, RP 59.5 (.5 mile N of MT 35)	11,430	9,860	12,610	12,410	13,590	14,690	14,690	14,660	13,440	12,590	11,760
3	0.400	US 93, East of 8th Street East in Polson	12,670	14,400	11,850	11,870	12,920	13,760	13,760	13,730	13,030	10,940	11,290
4	2.766	US 93, between 5th East and 2nd East in Polson	10,580	13,950	11,150	11,500	12,240	12,900	12,190	12,170	12,550	10,440	10,600
5	0.226	US 93 (2nd Avenue), between Main & 1st Street East in Polson	10,150	10,970	10,570	10,890	11,570	12,190	8,010	7,990	11,120	8,790	8,140
6	1.266	US 93, either end of Flathead River Bridge in Polson	6,380	7,730	6,890	7,980	7,830	8,010	12,900	12,870	8,910	6,810	6,850
		Weighted Average	*9,862*	*11,638*	*10,397*	*10,809*	*11,424*	*12,058*	*12,610*	*12,586*	*11,766*	*9,943*	*9,884*

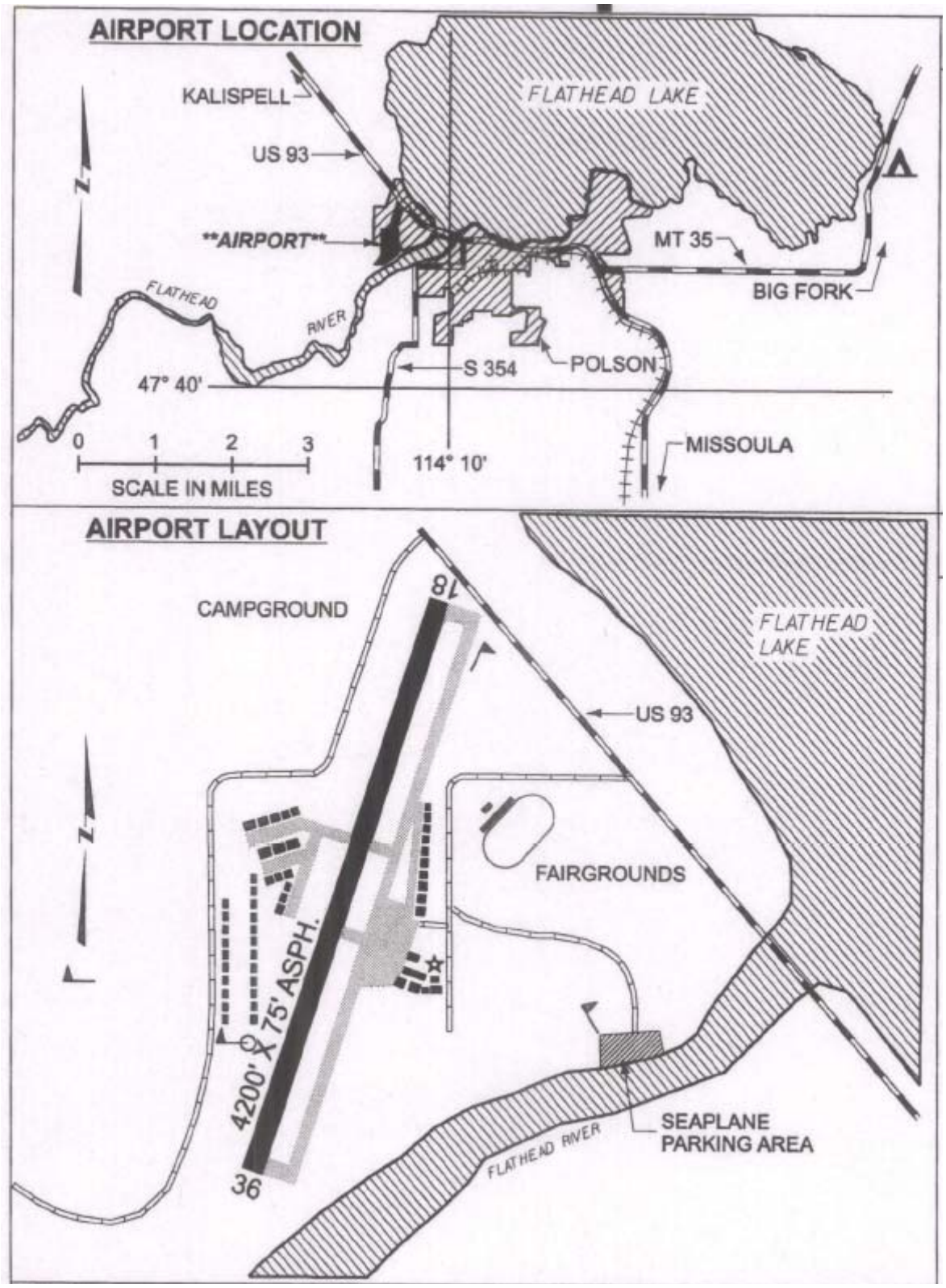
Source: MDT Traffic and Data Collection Analysis

The following graphic shows the locations of the MDT Traffic Count stations shown in the table above.

MDT Statewide Traffic Count Site Location Map

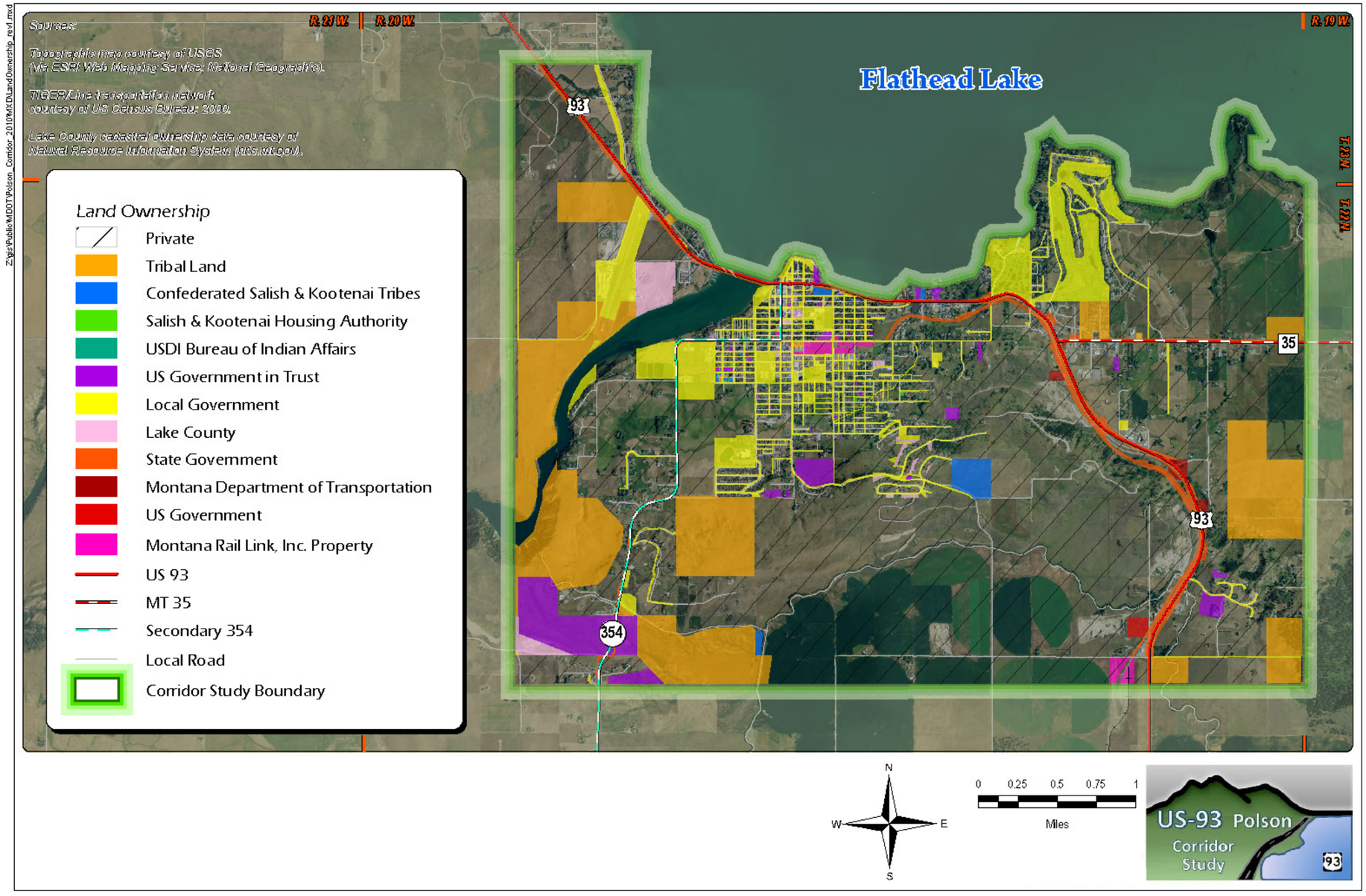
2.2 Right-of-Way and Jurisdictions

The existing US 93 corridor is located primarily along private property. The State of Montana maintains the right-of-way on each side of the highway. Three small sections of MDT land are within the study area boundary, and the level of impact is undetermined at this point. Montana Rail Link (MRL) infrastructure and right-of-way is located within the corridor study area. Montana Rail Link also has land ownership interspersed throughout the study area, primarily along 7th Avenue. If any improvement options are identified along 7th Avenue this will need to be addressed. The Flathead River flows along the west side of the study area and passes under US 93 at MP 61. CSKT has jurisdiction as authority of the Flathead River. The Polson Airport is located inside the study area boundary and west of the Flathead River and includes a seaplane landing area. The Federal Aviation Administration (FAA) has jurisdiction of the Polson Airport. The graphic below shows the location and layout of the Polson Airport. If improvement options are considered near the Polson Airport, appropriate coordination will be determined.


AIRPORT LOCATION
KALISPELL
US 93
FLATHEAD LAKE
AIRPORT
MT 35
BIG FORK
FLATHEAD
RIVER
S 354
POLSON
47° 40'
0 1 2 3
SCALE IN MILES
114° 10'
MISSOULA
AIRPORT LAYOUT
CAMPGROUND
18
FLATHEAD LAKE
US 93
FAIRGROUNDS
4200' X 75' ASPH.
36
SEAPLANE PARKING AREA
FLATHEAD RIVER

Resource agency coordination with the US Army Corps of Engineers (USACE), US Environmental Protection Agency (EPA), Montana Fish, Wildlife, and Parks (FWP), Montana Department of Environmental Quality (DEQ), Tribal Preservation Office, CSKT, Lake County, City of Polson, MDT, and FHWA was conducted on September 30, 2010. The proactive coordination with the resource agencies is essential to ensure agency guidelines and requirements are considered as improvement options develop. Regulatory areas that will be considered and further addressed include wildlife habitat, permitting, wetlands, and mapping considerations. Figure 2-1 shows the land ownership within the study area.

Figure 2-1 Land Ownership



2.3 Physical Characteristics

US 93 is a major north/south highway providing a vital regional link between Idaho and Canada, and is functionally classified as a Rural Principal Arterial on the NHS Non-Interstate System. This corridor also provides an important link between Missoula, Kalispell, and surrounding communities. At the south end of the corridor (RP 58.5), US 93 functions as a four-lane divided highway which transitions to a four-lane undivided highway with interspersed turning lanes. Just north of the junction of US 93 and MT 35, the four-lane segment of US 93 transitions to a two-lane roadway with interspersed turning lanes. The posted speed limit along the US 93 corridor varies from 25 mph to 70 mph. The graphic below shows the posted speed limits through the US 93 corridor.

Posted speed limits

The US 93 facility enters the corridor study area at the southeastern section at RP 56.5 and traverses northward on primarily level terrain comprised of farm and agricultural lands. Continuing northward, US 93 curves slightly eastward crossing the Pablo Feeder Canal and around a bluff before continuing to the northwest to the southern bank of the Flathead Lake, where it continues westward through the City of Polson. Once across the Flathead River, the facility curves to the northwest exiting the corridor study area boundary at RP 63.0.

Work was recently completed on US 93 from Minesinger Trail to MT 35. The following reconstruction activities were completed:

- Construction of a 4-lane roadway
- Construction of an overlook of Flathead Lake form the top of Polson Hill
- One wildlife crossing structure
- Two bike and pedestrian paths
    - US 93/MT 35 junction east to Turtle Lake Road
    - Top of Polson Hill to ½ mile north of Caffrey Road
- Installations of sidewalks along Haack Road and Anchor Way Frontage Road
- Installation of traffic signal at the junction of US 93 and MT 35
- Two southbound, left-turn lanes and one northbound, right-turn lane
- Turn bays at Walmart intersection, Frontage Road, and Ford/Caffrey Road intersection

2.4 Design Standards

Table 2.2 lists the design standards for rural and urban principal arterials according to MDT design criteria. The design speed for this corridor ranges from 45 mph to 70 mph. Although the segment of US 93 through the city of Polson is not classified as an urban principal arterial, MDT design standards will apply if improvement options are further developed from the study.

Table 2.2 Design Standards for US 93

Design Element			Design Criteria			
Design Controls	Functional Classificiation		Rural Principal Arterial		Urban Principal Arterial	
					2-Lane, Curbed	2-Lane, Uncurbed
	Design Forecast year		2030		2030	
	*Design Speed	Level	70 mph		40 - 45 mph	40 - 50 mph
		Rolling	60 mph			
	Level of Service		B		Desirable: B Minimum: C	
Roadway Elements	*Travel Lane Width		12'		12'	
	*Shoulder Width	Outside	Varies		Varies	
		Inside			N/A	
	Cross Slope	*Travel Lane	2%		2% Typical	2%
		Shoulder	2%		2% Typical	2%
	Median Width		Varies		N/A	
	TWLTL Width		N/A		16'	
Earth Cut Sections	Ditch	Inslope	6:1 (Width: 10')		N/A	Desirable: 6:1 Minimum: 4:1
		Width	10' Minimum		N/A	10' Minimum
		Slope	20:1 towards back slope		N/A	20:1 towards back slope
	Back Slope; Cut Depth at Slope Stake	0' - 5'	5:1		5:1	
		5' - 10'	4:1		Level/Rolling: 4:1	Mountainous: 3:1
		10' - 15'	3:1		Level/Rolling: 3:1	Mountainous: 2:1
		15' - 20'	2:1		Level/Rolling: 2:1	Mountainous: 1.5:1
		> 20'	1.5:1		1.5:1	
Earth Fill Slope	Fill Height at Slope Stake	0' - 10'	6:1		6:1	6:1
		10' - 20'	4:1		4:1	4:1
		20' - 30'	3:1		3:1	3:1
		> 30'	2:1		2:1	2:1
Alignment Elements	DESIGN SPEED		60 mph	70 mph	40 mph	45 mph
	*Stopping Sight Distance		570'	730'	305'	360'
	Passing Sight Distance		2135'	2480'	N/A	N/A
	*Minimum Radius		1200'	1810'	533'	711'
	*Superelevation Rate		e_{max} = 8.0%		e_{max} = 4.0%	
	*Vertical Curvature (K-value)	Crest	151	247	44	61
		Sag	136	181	64	79
	*Maximum Grade	Level	3%		6%	6%
		Rolling	4%		7%	7%
	Minimum Vertical Clearance		17.0'		17.0'	

Source: Montana Department of Transportation Road Design Manual Chapter 12, Figure 12-3 "Geometric Design Criteria for Rural and Urban Principal Arterials"

*Controlling design criteria (see Section 8.8 of the MDT Road Design Manual)

2.5 Roadway Geometrics

The MDT Road Design Manual specifies general design principles and controls which determine the overall operational characteristics of the roadway and enhance the aesthetic appearance of the highway. The physical and geometric design elements of the US 93 facility were evaluated to identify areas that do not meet current MDT design standards as shown in Table 2.2. The analysis was necessary to identify areas with substandard geometric design that may contribute to safety concerns.

Available information including as-built construction drawings and the 2009 Montana Road Log were utilized to conduct this analysis. Table 2.3 summarizes the findings of the roadway geometrics of US 93 through the study area and is further discussed in the sections below.

Table 2.3 Summary of US 93 Roadway Geometrics

Design Characteristic	Summary
Horizontal Alignment	Meets current design standards for design speeds of 45 mph and 60 mph
Vertical Alignment	Grades of 5.5% to 5.9% exceed 4% maximum
	Sag k-values of 128.81 and 130.15 are less 136 minimum
Roadside Clear Zone	Improvement options should be designed to current design standards
Surface Width	Surface widths of 28' and 38' are less than 40' recommended width*

** A formal capacity analysis may indicate a four-lane or wider facility is needed to provide LOS B in the design year, indicating a potential surface width of 68' or more.*

2.5.1 Horizontal Alignment

The horizontal alignment of US 93 has a major influence on traffic operation and safety and is comprised of elements that include curvature, superelevation, and sight distance. These parameters are directly related to the design speed. The horizontal alignment along US 93 meets current MDT design standards for design speeds ranging from 45 mph to 70 mph. The graphic below shows the range of design speeds through the existing US 93 corridor.

Design speeds

2.5.2 Vertical Alignment

The vertical alignment is a measure of elevation change of a roadway. The length and steepness of grades directly affects the operational characteristics of the roadway. The MDT Road Design Manual lists recommendations for maximum grades on rural and urban principal arterials according to the type of terrain in the area. Table 2.4 shows the maximum grade recommendations according to terrain.

Table 2.4 Maximum Grade

Terrain	Maximum
Level - Rural	3%
Rolling - Rural	4%
Level - Urban	6%
Rolling - Urban	7%

The grade and terrain throughout the corridor study area varies from level to rolling and from rural to urban. The vertical alignment of US 93 does not meet current design standards at five locations. These include:

1. From RP 57.2 to 57.8, the northbound grade goes from 5.9% to 5.7%, respectively. The nearly 6% grade exceeds the maximum allowable grade of 4% for a 60 mph rural design speed in rolling terrain. **A design exception was approved for this grade in April 2004.**
2. From RP 57.2 to 57.7, the southbound grade is 5.5% which exceeds the maximum grade of 4% recommended for a 60 mph rural design speed in rolling terrain. **A design exception was approved for this grade in April 2004.**
3. At RP 57.7, the vertical sag curve k-value of 130.15 does not meet the minimum k-value of 136. **A design exception was approved for this grade in April 2004.**
4. At RP 62.5, the grade of 4.8% exceeds the maximum grade of 4% recommended for a 60 mph rural design speed in rolling terrain.
5. At RP 62.5, the vertical sag curve k-value of 128.81 does not meet the minimum k-value of 136.

2.5.3 Roadside Safety (Clear Zone)

The roadside clear zone, starting at the edge of the traveled way, is the total roadside border area available for safe use by errant vehicles. The area may consist of a shoulder, a recoverable slope, a non-recoverable slope, and/or a recovery area. The desired width varies depending on traffic volumes, speeds, and roadside geometry. Clear zones are evaluated individually and based on the roadside cross section. In an urban section, the clear zone is not reduced due to the presence of curb and gutter. The urban section through Polson has substantial development such as landscaping features, signs,

mailboxes, signals, utilities, and luminaries, and it may be impractical to protect or remove the obstacles within the clear zone. Current MDT standards establish clear zone guidelines in rural and urban sections.

As improvement options develop, roadside clear zones should be designed, to the extent practicable, to meet current MDT urban and rural design standards.

2.6 Surface Width

The 2009 Montana Road Log prepared by MDT contains the most current highway statistics. According to MDT NHS Route Segment Plan Map, the recommended surface width of US 93 is 40 feet or greater. However, the Route Segment Plan no longer defines a standard roadway width. The MDT Road Width Committee would determine the appropriate width during future project development. Table 2.5 below shows the existing roadway surface width and surface thickness through the corridor study area. Due to the presence of turning lanes, which are not included in the Road Log, the total surface width may be greater than the sum of lane widths and shoulder widths.

Table 2.5 Existing Roadway Surface Width

Location Reference Post (RP)	Width (feet)			Thickness (inches)		Travel Lanes
	Surface	Lane	Shoulder	Surface	Base	
RP 56.500 - 57.362	71	12	8	8.9	12.0	4
RP 57.362 - 57.865	71	12	8	10.7	12.0	4
RP 57.865 - 57.917	71	12	8	8.9	12.0	4
RP 57.917 - 58.361	71	12	8	5.9	6.9	4
RP 58.361 - 58.504	71	12	8	8.9	12.0	4
RP 58.504 - 58.912	71	12	8	10.7	12.0	4
RP 58.912 - 59.174	55	12	3	9.1	16.7	4
RP 59.174 - 59.511	39	12	7	4.8	24.0	2
RP 59.511 - 60.114	40	12	8	4.8	24.0	2
RP 60.114 - 60.724	39	12	7	4.8	24.0	2
RP 60.724 - 60.839	59	12	8	5.8	24.0	2
RP 60.839 - 61.113	38	12	7	5.8	24.0	2
RP 61.113 - 63.000	28	12	2	6.0	26.0	2

Source: 2009 Montana Road Log (page 42)

The Route Segment Plan does not extend into urban areas, due to certain constraints. Therefore, the section from RP 60.839 to 63.000 does not meet the current recommended surface width of 40 feet or greater. Along with the range of surface widths, the US 93 corridor has varying traffic flows, which can be seen in the posted speed limit graphic on page 6.

2.7 Geotechnical

A detailed geotechnical investigation report will not be developed for this corridor study. The US 93 Minesinger Trail – MT 35 project covers RP 55.5 to approximately 58.7. As-built drawings show the study area has no substantial geotechnical issues.

The Polson-East Geotechnical report noted subgrade materials generally consisting of glacial moraine sand and gravel with intermittent zones of low-plasticity fine-grained material. Frost susceptibility is a major concern during intermittent periods of moisture infiltration and freezing temperatures; particularly in cut areas with concentrated runoff.

Neither the drilling logs for the US 93 Minesinger Trail-MT 35 project nor the drilling logs for the Polson-East project indicate that bedrock was encountered. The study area is located in a moderate seismic risk area. Seismicity will need to be considered for any bridge foundation design. Polson is located within the Intermountain Seismic Belt, which appears to be predominately classified as a zone 3 on the Uniform Building Code seismic risk scale of 0 (low risk) to 4(high risk). Seismic zones reflect the variation in seismic risk across the country and are used to permit different requirements for methods of analysis, minimum support lengths, column design details, and foundation and abutment design procedures.

2.8 Drainage

The corridor study area is located within the Lower Flathead sub basin. Flathead Lake is the major body of water, with the Flathead River providing as a tributary to the Clark Fork River. The drainage has several unnamed streams contribute to the Lower Flathead and Flathead Lake. Storm water drainage is in place for the city of Polson. Several irrigation ditches and canals exist within the corridor, and consideration will be given to drainage as a improvement options develop.

2.9 Hydraulic Structures

Table 2.6 shows the hydraulic structures throughout the corridor. A full hydraulic analysis would be recommended if an improvement option is implemented within the study area. Based on a lack of historical flooding occurrences, it is presumed irrigation ditches, culverts, and bridges are hydraulically adequately sized.

Table 2.6 Hydraulic Structures

Approximate Location Reference Post (RP)	Size	Length	Remarks	As-Built Project
RP 56.68	24"	190'	Drain	US 93 - Minesinger Trail to MT 35 (2005)
RP 56.88	18"	110'	Approach LT	
RP 56.88	18"	118'	Approach RT	
RP 57.1	22' x 5' Box	140'	Pablo Feeder Canal	
RP 57.28	18"	50'	Approach RT	
RP 57.76 - 57.82	36"	360'	Irrigation Right	
RP 56.48	18"	103'	Storm Drain	
RP 56.56	18"	87'	Storm Drain	
RP 56.72	18"	105'	Storm Drain	
RP 56.78	18"	103'	Storm Drain	
RP 56.90	18"	79'	Storm Drain	
RP 57.51	18"	87'	Storm Drain	
RP 57.51 - 57.60	18"	487'	Storm Drain	
RP 57.60	18"	89'	Storm Drain	
RP 57.60 - 57.70	24"	490'	Storm Drain	
RP 57.68 - 57.70	18"	121'	Storm Drain	
RP 57.70 - 57.74	24"	235'	Storm Drain	
RP 57.74	12"	7'	Storm Drain	
RP 57.74 - 57.74	24"	113'	Storm Drain	
RP 57.74 - 57.74	24"	39'	Storm Drain	
RP 57.79	12"	7'	Storm Drain	
RP 57.79 - 57.83	18"	228'	Storm Drain	
RP 57.81	18"	295'	Storm Drain	
RP 57.83	12"	7'	Storm Drain	
RP 57.83	18"	115'	Storm Drain	
RP 57.83 - 57.89	18"	292'	Storm Drain	
RP 57.89	12"	7'	Storm Drain	
RP 57.89 - 57.94	18"	292'	Storm Drain	
RP 57.94	12"	7'	Storm Drain	
RP 57.94 - 58.03	18"	446'	Storm Drain	

Table 2.6 Hydraulic Structures

Approximate Location Reference Post (RP)	Size	Length	Remarks	As-Built Project
RP 58.08 - 58.08	18"	118'	Storm Drain	Polson-East (2004)
RP 58.08 - 58.11	24"	157'	Storm Drain	
RP 58.11	30"	149'	Storm Drain	
RP 58.11 - 58.14	24"	138'	Storm Drain	
RP 58.14	24"	113'	Storm Drain	
RP 58.22 - 58.27	18"	351'	Storm Drain	
RP 58.27 - 58.33	18"	330'	Storm Drain	
RP 58.33 - 58.37	18"	208'	Storm Drain	
RP 58.37	18"	46'	Storm Drain	
RP 58.37 - 58.45	18"	428'	Storm Drain	
RP 58.39	18"	103'	Storm Drain	
RP 58.45 - 58.46	18"	49'	Storm Drain	
RP 58.57	18"	80'	Storm Drain	
RP 58.69	18"	64'	Storm Drain	
RP 58.71 - 58.72	24"	34'	Storm Drain	
RP 58.71 - 58.74	24"	166'	Storm Drain	
RP 58.72 - 58.74	24"	133'	Storm Drain	
RP 58.74	24"	69'	Storm Drain	
RP 58.74	30"	41'	Storm Drain	
RP 58.74 - 58.82	24"	379'	Storm Drain	
RP 58.82	12"	67'	Storm Drain	
RP 58.82	18"	28'	Storm Drain	
RP 58.82 - 58.87	24"	302'	Storm Drain	
RP 58.87	12"	67'	Storm Drain	
RP 58.87	24"	94'	Storm Drain	
RP 58.87 - 58.94	24"	351'	Storm Drain	
RP 58.94	12"	107'	Storm Drain	
RP 58.94	18"	31'	Storm Drain	
RP 58.94 - 58.98	24"	185'	Storm Drain	
RP 58.97 - 58.98	24"	97'	Storm Drain	
RP 58.98	24"	33'	Storm Drain	
RP 58.98 - 59.02	30"	223'	Storm Drain	
RP 59.02	30"	92'	Storm Drain	
RP 59.02 - 59.04	24"	107'	Storm Drain	
RP 59.10	18"	105'	Storm Drain	
RP 59.10 - 59.14	18"	172'	Storm Drain	
RP 59.18	18"	72'	Storm Drain	
RP 59.18 - 59.22	18"	220'	Storm Drain	
RP 59.22	12"	71'	Storm Drain	

Table 2.6 Hydraulic Structures

Approximate Location Reference Post (RP)	Size	Length	Remarks	As-Built Project
RP 59.11	24"	76'	Drain	Pablo-Kalispell (1958 & 1966)
RP 59.26	18"	108'	Irrigation	
RP 59.28	15"	28'	Irrigation Approach RT	
RP 59.33	15"	60'	Approach RT	
RP 59.38	24"	80'	Drain	
RP 59.40	3-36"	110', 676', 430'	Irrigation	
RP 59.57	15"	30'	Irrigation	
RP 59.66	24"	76'	Drain	
RP 59.67	18"	130'	Drain	
RP 59.73 - 60.06	15"	1,750'	Drain	
RP 59.84	18"	40'	Approach LT	
RP 59.90	18"	40'	Approach LT	
RP 59.97	30"	94'	Drain	
RP 59.99	18"	40'	Approach LT	
RP 60.05	18"	50'	Approach LT	
RP 60.09	15"	40'	Irrigation Approach LT	
RP 60.10	18"	56'	Irrigation	
RP 60.11	24"	96'	Irrigation	
RP 60.20 - 60.23	15"	178'	Drain	
RP 60.23	18"	40'	Approach LT	
RP 60.23 - 60.24	15"	42'	Drain	
RP 60.24	24"	86'	Drain	
RP 60.26	24"	86'	Drain	
RP 60.47	24"	88'	Drain	
RP 60.50	24"	86'	Drain	
RP 60.52	24"	72'	Drain	
RP 60.61	12"	100'	Drain	
RP 60.62	24"	70'	Drain	
RP 61.07	15"	18'	Drain thru Embankment RT	
RP 61.50	18"	50'	Approach LT	
RP 61.53	24"	56'	Approach RT	

Table 2.6 Hydraulic Structures				
Approximate Location Reference Post (RP)	Size	Length	Remarks	As-Built Project
RP 61.39	18"	40'	Approach LT	Polson-North (1955)
RP 61.39	15"	26'	Approach RT	
RP 61.43	15"	110'	Approach RT	
RP 61.50	24"	76'	Drain	
RP 61.60	24"	126'	Drain	
RP 61.81	15"	32'	Farm Entrance RT	
RP 61.82	15"	40'	Farm Entrance RT	
RP 61.83	24"	58'	Drain	
RP 61.89	15"	34'	Approach RT	
RP 62.13	15"	38'	Approach RT	
RP 62.15		74'	Stockpass	
RP 62.35	15"	40'	Farm Entrance LT	
RP 62.36	12"	84'	Irrigation	
RP 62.58	15"	64'	Farm Entrance LT & RT	
RP 62.74	15"	30'	Farm Entrance RT	
RP 62.78	36"	68'	Drain	
RP 62.88	15"	36'	Approach LT	

2.10 Bridge Crossings

Four bridge crossings are located along the corridor. They include the Flathead River Bridge, the Pablo Feeder Canal Bridge, and two Wildlife Underpass Bridges. The Pablo Feeder Canal Bridge and two Wildlife Underpass Bridges were assessed in 2009, and the Flathead River Bridge was assessed in 2010. The assessments determined the Sufficiency Rating (SR) for each structure.

The Sufficiency Rating formula is a method of evaluating highway bridge data to obtain a numeric value indicating the sufficiency of the bridge to remain in service. The result of this method is the percentage in which 100 is an entirely sufficient bridge and 0 is an entirely deficient bridge. In order to receive funding through the Highway Bridge Replacement and Rehabilitation Program (HBRRP), structures must be *Structurally Deficient* or *Functionally Obsolete* and have an SR of 80% or below. Structures with an SR of 0 to 49.9% are eligible for replacement, and structures 50 to 80 are eligible for rehabilitation unless otherwise approved by the FHWA. The following criteria determine whether or not a structure is structurally deficient or functionally obsolete:

1. Structurally Deficient. A condition of **4 or less** for any of the following:

   Deck Rating

   Superstructure Rating

   Substructure Rating

   Or, an appraisal of 2 or less for the following:

Structure Rating

Waterway Adequacy

2. Functionally Obsolete. An appraisal of **3 or less** for the following:

Deck Geometry

Under Clearance

Approach Roadway Alignment

Or, an appraisal of 3 for the following:

Structure Rating

Waterway Adequacy

All four structures are not structurally deficient and not functionally obsolete at the present time. Table 2.7 shows the sufficiency ratings of the four bridge crossings.

Table 2.7 Bridge Sufficiency Rating (SR)

Structurally Deficiency SR Criteria		Flathead River	Pablo Feeder Canal	Wildlife Underpass	Wildlife Underpass
Deck Rating	≤4	7	-	-	-
Superstructure Rating	≤4	7	-	-	-
Substructure Rating	≤4	7	-	-	-
Structure Rating	≤2	7	8	7	7
Waterway Adequacy	≤2	8	9	-	-
Functionally Obsolete SR Criteria					
Structure Rating	≠3	7	8	7	7
Deck Geometry	≤3	4	9	5	5
Under Clearance	≤3	-	-	-	-
Waterway Adequacy	≠3	8	9	-	-
Approach Roadway Alignment	≤3	8	8	8	8
Design Loading		5 MS 18 (HS 20)	5 MS 18 (HS 20)	5 MS 18 (HS 20)	5 MS 18 (HS 20)
Sufficiency Rating		66.9	84.9	83.2	83.2
Structure Status		Not Deficient	Not Deficient	Not Deficient	Not Deficient

2.10.1 Flathead River Bridge

The Flathead River Bridge is a two lane structure located at RP 61.2. Constructed in 1966 on a horizontal tangent, the bridge is 1,562 feet long and 30 feet wide with a concrete cast-in-place deck and 25 spans.

Based on the above ratings, the Flathead River Bridge is categorized as ***not structurally deficient*** and ***not functionally obsolete***. In 2009, the Flathead River Bridge underwent a bridge deck rehabilitation project.

2.10.2 Pablo Feeder Canal Bridge

The Pablo Feeder Canal Bridge is a concrete box culvert located at RP 57.1. Constructed in 2006 on a horizontal tangent, the culvert spans the four-lane divided roadway of US 93 in addition to the two-lane frontage roads on both the east and west sides of US 93 for a total of 8 lanes of traffic. This culvert is 140 feet long and is 22 feet wide situated at a 33-degree skew. To address the moderate potential of strong ground motion in Seismic 3 areas, the appropriate National Earthquake Hazards Reduction Program seismic design parameters were included for a soil profile Type II.

Based on the above ratings, the Pablo Feeder Canal Bridge is categorized as ***not structurally deficient*** and ***not functionally obsolete***.

2.10.3 Wildlife Underpass Bridge

The Wildlife Underpass Bridge (Structure No. P00005057+07611) is a two lane structure located at RP 57.8. Constructed in 2006 on a horizontal curve, the steel culvert bridge is 25 feet long and 36 feet wide. The Wildlife Underpass Bridge is ***not structurally deficient*** and ***not functionally obsolete***.

2.11 Crash Analysis

Safety issues are a concern along US 93 through the study area. In 2010, the MDT Traffic and Safety Bureau conducted a crash analysis along US 93 from RP 55.0 to RP 65.0 through the Polson area. Due to the recent reconstruction of the segment south of Polson, the latest three-year crash data was provided from July 1, 2007 to June 30, 2010. The segments of US south of MT 35 and north of Irvine Flats Road exhibit more rural than the urban section through town; therefore the study area was divided into three segments. The analysis compared the study area with the average crash rates on Non-Interstate National Highway System (NINHS) routes statewide. The results are shown in Table 2.8.

Table 2.8 US 93 Crash Statistics (RP 55.0 - 65.0)
(from July 1, 2000 - June 30, 2010)

Statewide Average	Study Area			NINHS Rural Routes[1]	NINHS Urban Routes[2]
	South of MT 35	MT 35 to Irvine Flats Road	North of Irvine Flats Road		
All Vehicles Crash Rate	1.58	2.33	1.32	1.07	5.06
All Vehicles Severity Index	1.95	1.57	1.86	2.14	1.67
All Vehicles Severity Rate	3.08	3.66	2.46	2.29	8.48
Commercial Vehicles Crash Rate	2.63	4.44	1.05	0.90	
Commercial Vehicles Severity Index	1.88	1.22	1.00	2.34	
Commercial Vehicles Severity Rate	4.94	5.42	1.05	2.11	
Commercial Vehicle Crashes	8	18	4		
All Vehicle Crashes	73	256	79		

**Segment reconstructed, completed in 2006. Data from 3-Year Time Period July 1, 2007 - June 30, 2010*

Denotes segment of "urban" character of US 93.

1. NINHS Route averages outside the city limits from 2005 through 2009.
2. NINHS Route averages within city limits from 2004 through 2008.

Source: MDT Traffic and Safety Bureau, 2010.

The crash rate within the US 93 Polson Corridor is higher than the average comparable rural routes throughout the state of Montana. The "urban" section from MT 35 to Irvine Flats Road is higher than the NINHS rural routes, but less than the NINHS urban routes. Currently, the section from MT 35 to Irvine Flats Road is not functionally classified as an urban section. It is possible the 2010 Census may determine an urban classification for Polson. In the case of a rural to urban reclassification, the crash rate for the urban section would be less than the statewide average.

Table 2.9 shows the total number of crashes, with a breakdown of crashes by severity, for every quarter mile through the existing corridor study area boundary.

Table 2.9 Crash Data per Quarter-Mile

Reference Post Location	# Crashes	No Injury	Injury	Fatal Injury
56.50 - 56.74	31	13	16	2
56.75 - 56.99	12	10	2	
57.00 - 57.24	11	7	4	
57.25 - 57.49	7	6	1	
57.50 - 57.74	14	10	4	
57.75 - 57.99	9	6	3	
58.00 - 58.24	11	9	2	
58.25 - 58.49	5	5		
58.50 - 58.74	14	11	3	
58.75 - 58.99	20	12	8	
59.00 - 59.24	81	56	25	
59.25 - 59.49	16	11	5	

59.50 - 59.74	14	10	4	
59.75 - 59.99	11	9	2	
60.00 - 60.24	31	24	7	
60.25 - 60.49	32	26	6	
60.50 - 60.74	27	18	9	
60.75 - 60.99	95	77	18	
61.00 - 61.24	11	10	1	
61.25 - 61.49	3	1	2	
61.50 - 61.74	7	6	1	
61.75 - 61.99	8	5	3	
62.00 - 62.24	17	12	5	
62.25 - 62.49	10	7	3	
62.50 - 62.74	6	4	2	
62.75 - 62.99	2	1	1	
Corridor Total	505	366	137	2

2.12 Railroad

Montana Rail Link (MRL), which ends just within the southern boundary of the corridor study area, is a factor in developing improvement options. Guidelines have been established defining construction requirements and development standards near railroad facilities. MRL also has land ownership interspersed throughout the study area, primarily along 7th Avenue. If any improvement options are identified along 7th Avenue this will need to be addressed. As improvement options develop, consideration will be made to comply with specified railroad requirements.

2.13 Utilities

Several utilities exist throughout the corridor, primarily along US 93 corridor. Utilities include power (overhead and underground), telephone, water, sewer, gas, and fiber optics. As improvement options develop, it will be important to recognize the impact options may or may not have on the utilities within the corridor. Utility adjustments and/or relocations may delay projects if they are not identified in the project development process. Consideration will be given to utilities as improvement options develop.

2.14 Access Points

There are 115 access points along US 93 (58 north/east and 73 south/west) from RP 56.5 (Caffrey/Ford Road) to RP 63.0. Access control is implemented along existing US 93 from the study area boundary north to MT 35. All approaches and access points will be considered as the study develops. Table 2.10 contains a listing of approaches by approximate half-mile increments.

Table 2.10 Access Points along US 93

Reference Post (RP)	North/East of US 93		South/West of US 93		Total	
	No. Accesses	Density (access/mi)	No. Accesses	Density (access/mi)	No. Accesses	Density (access/mi)
56.5 to 57.0	2	4	2	4	4	8
57.0 to 57.5	1	2	0	0	1	2
57.5 to 58.0	0	0	1	2	1	2
58.0 to 58.5	1	2	1	2	2	4
58.5 to 59.0	1	2	1	2	2	4
59.0 to 59.5	8	16	4	8	12	24
59.5 to 60.0	16	32	11	22	27	54
60.0 to 60.5	8	16	20	40	28	56
60.5 to 61.0	13	26	23	46	36	72
61.0 to 61.5	2	4	3	6	5	10
61.5 to 62.0	3	6	4	8	7	14
62.0 to 62.5	2	4	1	2	3	6
62.5 to 63.0	1	2	2	4	3	6

Over the 3 mile section, the average density is 20 accesses per mile.