





Montana Department of Transportation
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Memorandum

To: Jim Davies, P.E.
Project Design Engineer
Road Design Section

From: Patrick McCann, P.E. 
Geotechnical Manager, Butte District

Dave Cunningham, P.E. 
District Geotechnical Engineer, Butte District

Date: 4-22-2013

Subject: STPP 49-1(25)9
Stone Creek - North
CN 7931000
Geotechnical Preliminary Report (Activity 460)

The Geotechnical Section completed their Preliminary Geotechnical Evaluation with a site visit on April 12, 2013. The following is a summary of information gathered during the site visit and from published geological information.

Location

The project is located in Beaverhead and Madison Counties on P-49, approximately 9 miles North of Dillon from RP 9.0 to RP 16.2. The length of the project is anticipated to be 7.2 miles. Stations run from South to North, in accordance to the reference posts on the project.

Intent

It is our understanding that the intent of this project is to reconstruct this section of P-49, North of Dillon, to provide geometric improvements to the existing roadway, shoulder widening, and structure replacements. This project will include the improvements of horizontal and vertical alignment along with replacing two bridges over Stone Creek and the Beaverhead River.

Roadway Features

It is our understanding that the horizontal alignment will closely follow the existing alignment from the beginning of the project, MP 9.0, to the south side of the Beaverhead River Bridge. The alignment through the Beaverhead River Bridge will be shifted towards the west. There are 5 horizontal curves that do not meet standards, but will be redesigned to meet current standards.

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Vertical alignments will be designed to improve sight distance and lessen the grade and rolling hills. There are currently nine vertical curves along the project that will be redesigned. The design speed for this project is 55 mph based on functional classification and terrain along with project being in rural area.

Areal Geology

The area is mapped as Alluvium, Valley Fill deposits, and Lodge Pole Limestone. Alluvium (Qal) consists of silt, sand, and gravel in channels and flood plains of major rivers and streams and in related alluvial fans. Valley Fill Deposits (Tbz) consists of light gray to yellowish-brown, moderately indurated and well indurated tuffaceous sandstone and siltstone containing subordinate interbeds of limestone and marl and lenses of pebbles and cobble conglomerate composed of locally derived rock fragments. Lodge Pole Limestone (IPMu) consists of medium to dark gray, fine to medium grained, thin to thickly bedded limestone, overlying medium to dark gray and brownish-gray, thinly bedded, laminated, argillaceous limestone, containing thin interbeds and bedding partings of dark gray shaly limestone and calcareous shale.

Field Observations

Two geologic features were noted during the site visit. A massive limestone outcrop (Beaverhead Rock) is present on the west side of road near MP 15.2 and a smaller geologic feature (a minor sandstone outcrop) was noted at MP 11.8, on the west side of roadway, just south of the Diamond O Ranch approach.

Based on visual examination, the surficial soils consist of silt, sand, and gravel associated with alluvium within the Beaverhead River drainage. There is underground telephone and overhead power present throughout the project corridor. There are multiple irrigation ditches, siphons, and possible irrigation pressure line crossings within the project limits. Riparian and/or wetland areas were noted at MP 12.7 (Private Ponds on the East Side of road associated with the Five Rivers Lodge) and on the North side of the Beaverhead River Bridge to approximately MP 15.3.

Also noted were irrigation ditches and siphons from the Beaverhead River Bridge to the end of project. Irrigation ditches are present on both sides of the roadway from approximate MP 15.3 to MP 15.5. From MP 15.5 to end of project, an irrigation ditch is located on the east side of roadway.

Geotechnical Considerations

The majority of the project traverses alluvial deposits of sand, gravel and silt. The centerline soil survey completed by MDT in 2012 indicated the majority of subgrade soils on the project classify as A-2-4. A-4 soils were also noted from MP 15.5 to the end of project. No unusual signs of pavement distress due to subgrade failure were noted at the time of the field review.

A foundation investigation will be required at bridge replacement locations and most new culvert installations/extensions. Cuts or fills over ten feet in height, or that have special issues such as groundwater intrusion or stability concerns, will also require subsurface investigation.

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Preliminary cut and fill slope configurations should be no steeper than 2H:1V. This may be adjusted based on conditions found during the subsurface investigation.

One area of special concern is located on the north side of the Beaverhead River Bridge. This is a riparian/wetland area, which may present difficulties for conducting subsurface investigations in this area. Additionally, this area will likely require alternate construction methods/sequences to complete. Recommendations for this location will be presented in the Geotechnical 464 and/or 466 reports after completion of the subsurface investigation (Activity 462).

SPA permits may be required prior to drilling. Utilities, depending on their location, should not pose any problems with respect to drilling activities. However, some overhead utilities may be too close to drill in some locations. Permission to access private property adjacent to the project will likely be required prior to drilling. If Right of Entry permits have been procured for this project, the Geotechnical Section requests that they receive copies.

Anticipated Foundation Types

At this time, we anticipate that the Stone Creek structure foundations will be driven piling systems utilizing pipe piles or H-piling. The Bridge over the Beaverhead River may be driven piling or drilled shafts, depending on subsurface conditions, structure configuration, and foundation loadings.

An aerial map, geological map, and photos of the project are attached to this report.

Questions regarding this project may be directed to Dave Cunningham, MDT Geotechnical Section, at 444-7617 or via e-mail at dcunningham@mt.gov or Patrick McCann, MDT Geotechnical section, at 444-6277 or via e-mail at pmccann@mt.gov.

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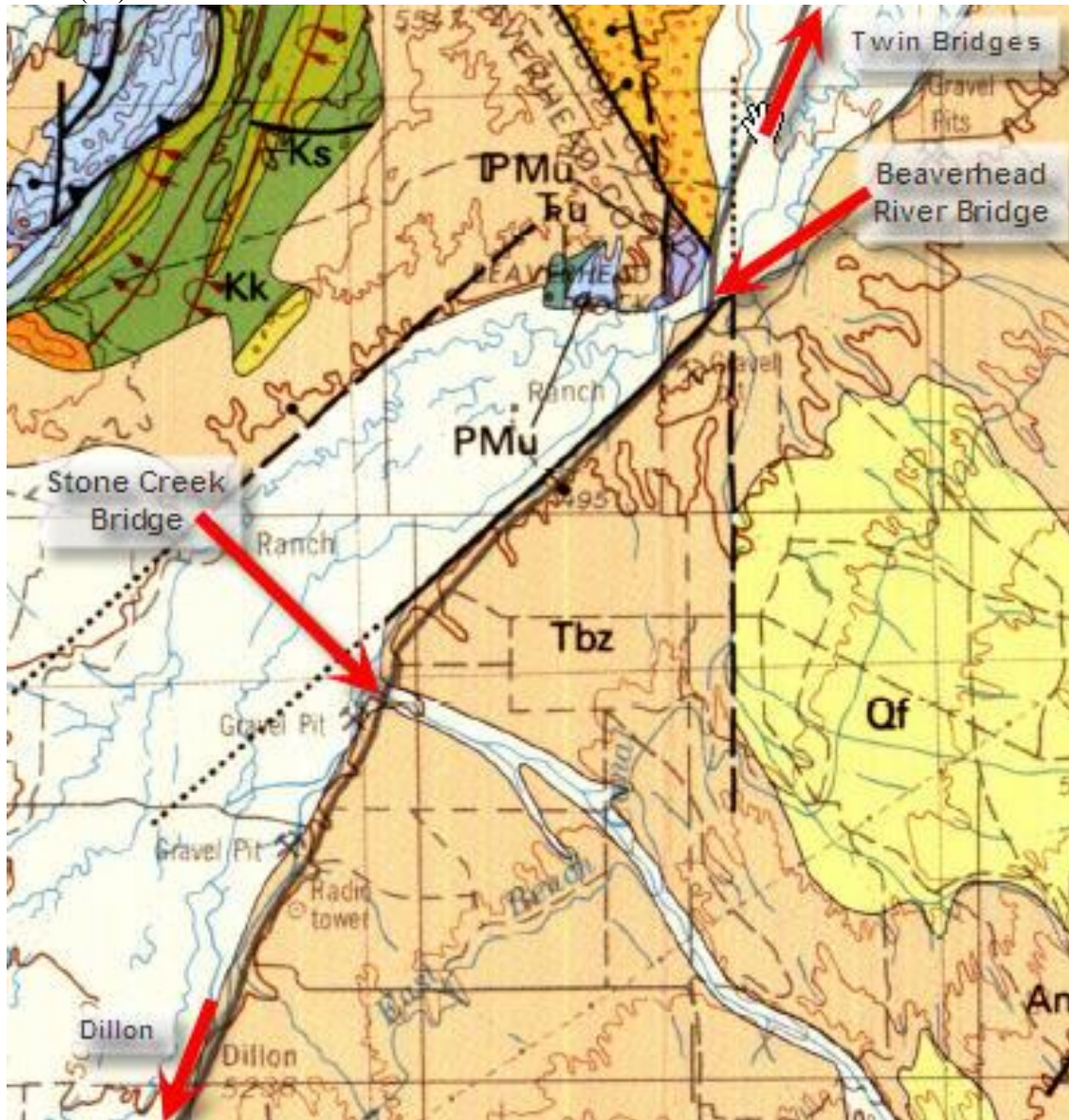
Attachments: Project Location Map
 Project Geologic Map
 Project Location Photos

Project Location Map



Project Geologic Map

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Project Photos

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MP 10.8, east side road – irrigation pump station



MP 11.8, west side road – sandstone outcropping

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MP 12.7, looking North – Wetland/Private Ponds



North End of Beaverhead River Bridge, looking south – Wetland area

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North of Beaverhead River Bridge, west side of road – Wetland and Limestone outcrop

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