TETON CENTENNIAL TRAIL PROJECT
IDAHO HIGHWAY 33

CONCEPT DESIGN REPORT

Prepared for:

Western Federal Lands Highway Division, the City of Victor, Idaho, and Teton County, Wyoming

WFLHD Task Order No. DTFH7015F19006

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I. EXECUTIVE SUMMARY

The city of Victor, Idaho, and Teton County, Wyoming, are working with Western Federal Lands Highway Division (WFLHD) to design and build 2.3 miles of the Teton Centennial Trail. The project includes a paved trail, bridge replacement, highway crossings, retaining walls, drainage, and other features.

Purpose of the Concept Design Report

The Concept Design Report evaluates trail and bridge alternatives and provides estimated costs and impacts to support project decision-making.

Summary of Costs

The estimated cost for the baseline project including engineering and construction is $3,076,300. Trail parking and highway crossings add costs to the baseline project.

Key Issues

The following table presents the primary project issues.

Table 1: Key Issues

Issue	Description
Right-of-way	Based on the recent survey, the trail just west of Moose Creek is located on private property. Property acquisition may be needed, and easements will be required.
Geotechnical	Bridge foundations, walls, and the pavement sections each have a large impact to cost. Exploration has not yet been performed.
Wetlands	Wetlands are located near the project but have not been delineated. Mitigation may be possible within the project area.
Budget	A disparity of $950,695 exists between funding and the estimated baseline project cost.
Utility Permits	Bonneville Power Administration (BPA) requires a Land Use Agreement for improvements on existing easements, and access changes that could affect schedule and have some cost implications.
ITD and WYDOT Coordination	Idaho Transportation Department (ITD) and Wyoming Department of Transportation (WYDOT) requirements for highway crossings, details, and other features could have an impact on cost and schedule.

II. INTRODUCTION

The proposed Teton Centennial Trail project is located along a transportation corridor that weaves through national forests and the Teton foothills, connecting the city of Victor, Idaho, and the city of Wilson, Wyoming. The proposed trail would wind along the Idaho Highway 33 (ID-33) and for a short distance would extend eastward along Wyoming Highway 22 (WY-22). The highway provides the sole access to the high-use trailheads and parking areas throughout the year. More than 2 million visitors travel through the Teton Pass and project area annually, and the proposed trail will provide visitors with safe, nonmotorized access to the area. The project is sponsored by the City of Victor, Idaho, and Teton County, Wyoming, and is supported by a broad partnership of governmental

organizations, nongovernmental organizations (NGOs), businesses, and the U.S. Forest Service (USFS). The following are some of the overall project objectives:

- Address deficient facilities and the resulting safety hazards along this high-use bicycle route corridor.
- Increase safety for all users, including meeting a need to improve mode choices by providing a pathway that is separated from the highway.
- Support travel and tourism goals; recent studies have documented the high economic benefits provided by the bicycle and pedestrian pathways and trails in the area.
- Provide the key missing link needed to connect major regional pathway systems; given the mountainous terrain, the sole feasible access is over Teton Pass.
- Support and advance the established environmental goals in the adopted plans of the City of Victor, Idaho, and Teton County, Wyoming.

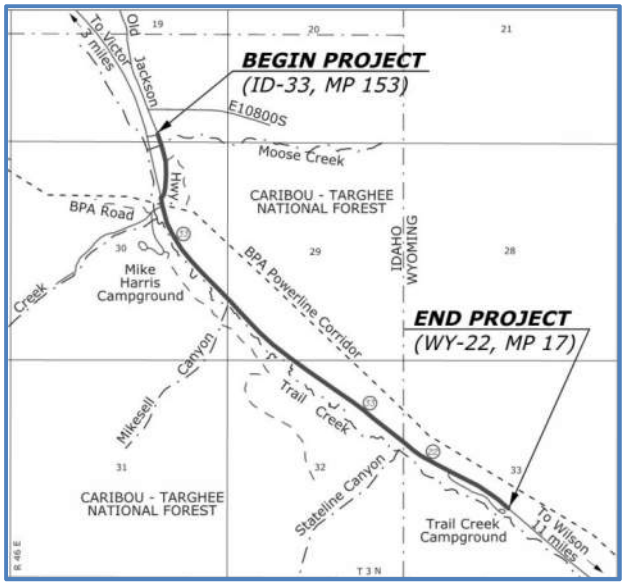
The project need is confirmed in local transportation and land use plans, in USFS plans, and in the environmental study completed for the proposed trail.

The proposed project is part of the National Environmental Policy Act (NEPA) decision issued in 2002. The Section 106 archaeological concurrence was also obtained in 2002. The proposed project plans to stay within the parameters of those decisions. The conceptual design of the project has demonstrated the feasibility of meeting standards and established estimated project costs, and provides a basis for alternative selection.

III. PROJECT SCOPE

The Teton Centennial Trail project will construct a bicycle/pedestrian pathway from Moose Creek to the Trail Creek Campground, as shown in the Figure 1.

FIGURE 1: PROJECT LOCATION MAP



Trail

The project will consist of 2.3 miles of trail with a pathway typical section that includes a 14-foot-wide compacted sub-base, a 12-foot-4-inch-wide crushed base course, and 2-inch-thick asphalt for a finished 10-foot-wide pathway surface. Retaining walls and slope stability along the trail are included.

Bridge

One bridge over Moose Creek will be replaced, and will carry vehicular and maintenance traffic to the parking area east of the creek and provide BPA maintenance access. The bridge will provide a 16-foot roadway width between rails and will have a 65-foot-long span.

Traffic, Signing, and Striping

The proposed highway crossings require changes to signing and striping as well as new rectangular rapid flash beacons.

Drainage

The project will need to replace several existing culverts and foot bridges, and add culverts to convey stormwater for the design flows. An erosion control design will also be necessary.

Geotechnical

Bridge foundations, pavement sections, wall type selection, and foundations are included in the project.

Utilities

Proposed improvements on a BPA easement will require coordination, and a fiber communication line located along the highway will need to be avoided.

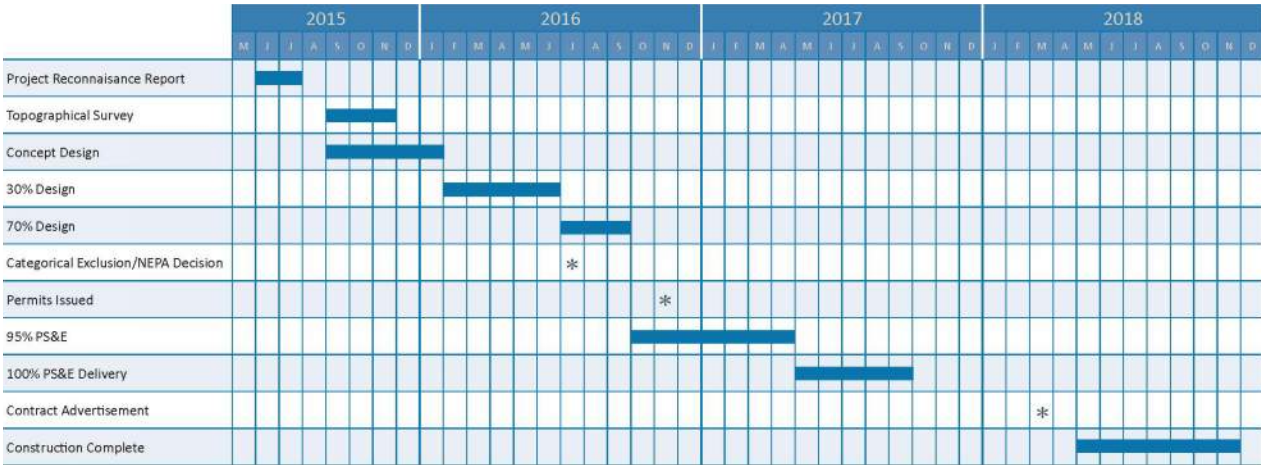
Environmental

The project impacts will include removing trees and affecting Moose Creek. A potential to impact wetlands also exists. Permitting will require coordination with environmental agencies.

IV. SCHEDULE

The Teton Centennial Trail project development and construction schedule is shown in Figure 2 below.

FIGURE 2: PROJECT SCHEDULE



V. ESTIMATED COSTS AND BUDGET

The conceptual trail alignment has been developed along with alternatives for highway crossings, connections, the Moose Creek Bridge, and the parking lot. Itemized conceptual costs are included in Appendix B, and are summarized below in Table 2, along with total costs for the Baseline Project and the Recommended Project. The estimated costs in Table 2 do not include design and construction engineering. Additional details of the alternatives are described in Section VI of this report.

TABLE 2: ESTIMATED COSTS

Mainline Trail	$1,271,000

Moose Creek Bridge	
26-inch Prestressed Concrete Voided Slabs	$239,300
30-inch Prestressed Concrete Bulb Tee Girders	$215,300
36-inch Prestressed Concrete Deck Bulb Tee Girders	$247,000

Parking Lot	
Large	$111,000
Medium	$56,000
Small	$42,000
No Build	$0

Mike Harris Cutslope	
Highway	$488,000
Hillside	$465,000

Border Connection	
Border Spur	$40,200
No Build	$0

Crossing at Mike Harris Campground	
At-Grade Crossing	$74,000
Undercrossing	$809,000
No Build	$0

Crossing at Trail Creek Campground	
At-Grade Crossing	$112,000
Perpendicular Undercrossing	$1,142,000
Diagonal Undercrossing	$1,321,000

Baseline Project	
Mainline Trail	$1,271,000
30-inch Prestressed Concrete Bulb Tee Girders	$215,300
No Parking Lot	$0
Hillside	$465,000
No Mike Harris Crossing	$0
No Border Spur	$0
Trail Creek At-Grade Crossing	$112,000
Total	**$2,063,300**

Recommended Project	
Mainline Trail	$1,271,000
30-inch Prestressed Concrete Bulb Tee Girders	$215,300
Medium Parking Lot	$56,000
Hillside	$465,000
Mike Harris At-Grade Crossing	$74,000
No Border Spur	$0
Trail Creek At-Grade Crossing	$112,000
Total	**$2,193,300**

The following summary table (Table 3) presents the project budget and compares it to the estimated baseline project costs. The table provides a breakdown of engineering and construction costs. Stakeholder funding is shown to illustrate the changes and evaluate whether additional funds will be necessary.

TABLE 3: BUDGET SUMMARY

	FLAP			Recon	**Concept Design****	Difference
	Victor	Teton	Total	Report*	**(Recommended)**	from FLAP
PE	$190,000	$35,000	$225,000	$238,377	**$663,000**	$438,000
CE	$130,000		$130,000	$158,900	**$220,000**	$90,000
CN	$1,385,000	$255,605	$1,640,605	$1,589,000	**$2,193,300**	$552,695
Total	$1,705,000	$290,605	$1,995,605	$1,986,277	**$3,076,300**	$1,080,695

*Does not include Wyoming Segment

**Estimated costs are subject to alternative selection and project development processes

EXPLANATION OF DIFFERENCES

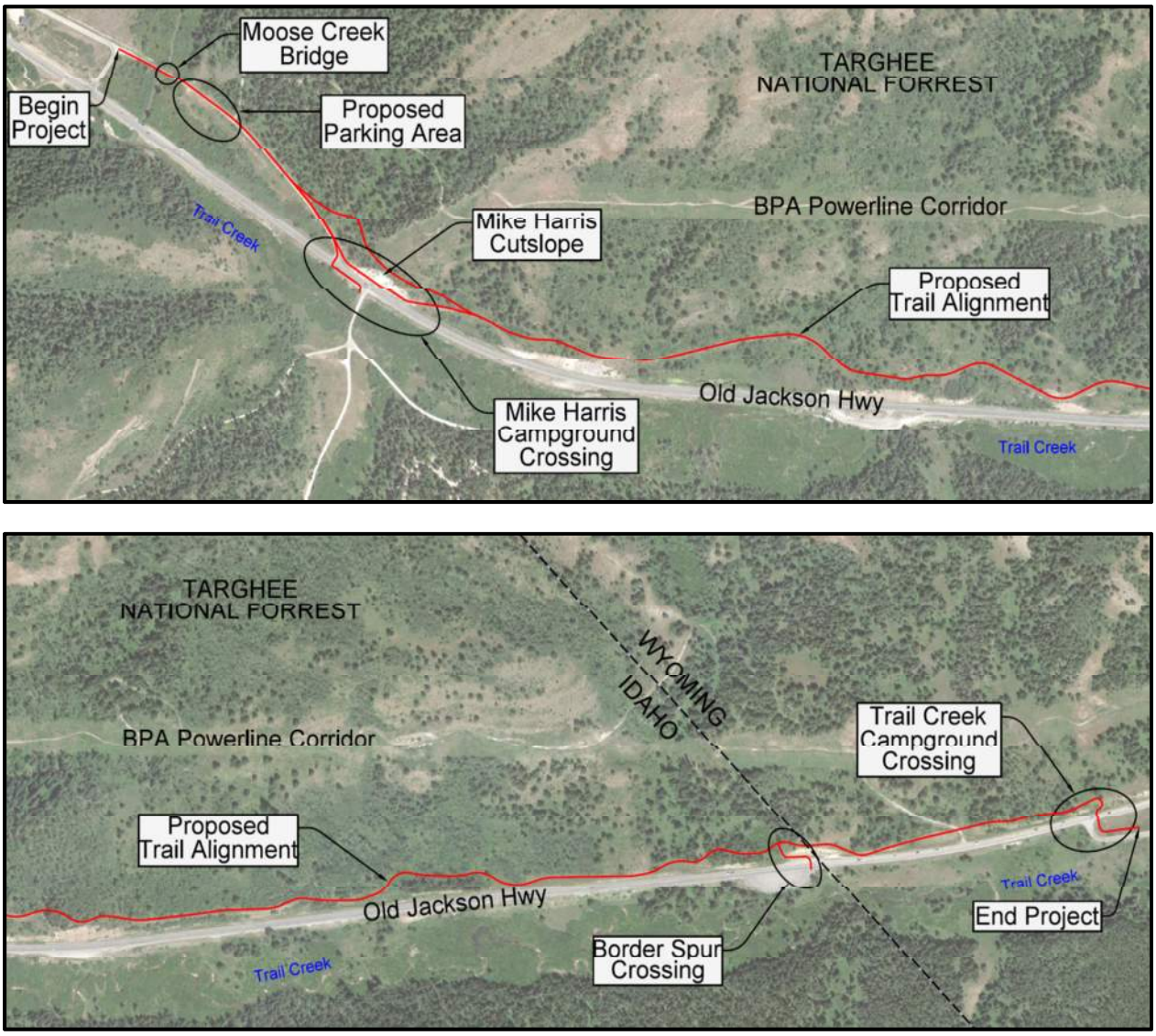
The estimated costs have increased compared to the costs estimated in the Reconnaissance Report. The addition of the Wyoming segment accounts for 33 percent of the increase. The remaining increase can be attributed to retaining walls and railings along with additional project development costs. Right-of-way costs are not included.

VI. KEY ISSUES AND CONSTRAINTS

The conceptual alignment establishes a feasible trail alignment that meets standards. Several key issues were identified as having a high potential impact to the project. Alternatives have been developed to evaluate different

solutions related to those issues and to understand the associated costs. The Figure 3 below identifies the key project issues, and the subsections below describe alternative solutions for the project issues.

FIGURE 3: KEY ISSUES MAP



A. BRIDGE REPLACEMENT

The bridge across Moose Creek will be replaced. The new bridge will be designed for vehicle use and BPA maintenance access. A detailed Type, Size, and Location (TS&L) Report has been developed that evaluates three different bridge types. Based on cost, maintenance, and constructability, and as indicated in bold in the bridge type ranking table below, the TS&L Report recommends a 30-inch prestressed concrete bulb tee girder bridge with a cast-in-place concrete bridge deck (see the TS&L Report in Appendix C for details). Removal of the existing 20-foot by 24-foot, single-span bridge will require containment methods to prevent concrete debris from entering the creek. The existing abutment walls will be removed to a minimum of 3 feet below grade.

TABLE 4: RANKED BRIDGE ALTERNATIVES

Alt.	Bridge Type	Initial Cost	Future Maintenance	Constructability
A	26-inch Prestressed Concrete Voided Slabs	2 ($239,300)	3	1
B	**30-inch Prestressed Concrete Bulb Tee Girders**	**1 ($215,300)**	**1**	**3**
C	36-inch Prestressed Concrete Deck Bulb Tee Girders	3 ($247,000)	2	2

B. PARKING LOT

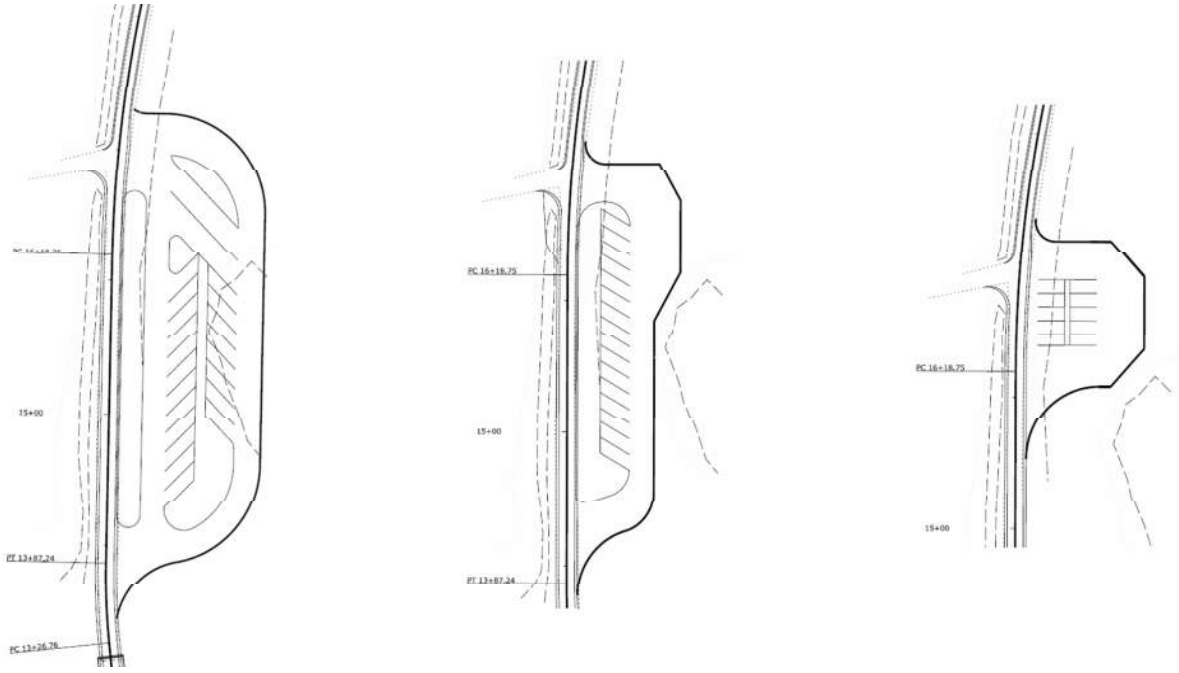
1. ALTERNATIVES CONSIDERED

A parking lot located along the south side of the Old Jackson Highway just east of the Moose Creek Bridge was considered. The parking lot would include the following features:

- Accommodation for 10 to 20 parking spaces.
- Space for a horse trailer to park and turn around.
- Aggregate base rock section (16-inch thickness) is recommended for equestrian recreation areas and provides a cost savings compared to using pavement.
- Entrance and exit treatments were designed to accommodate a horse trailer or other large vehicles.
- No facilities or structures were included in the conceptual parking lot design.

Three parking lot alternatives have been developed (see Figure 4). Each alternative varies in size, layout, cost, and impacts, as described below.

FIGURE 4: PARKING LOT ALTERNATIVES



ALTERNATIVE A ALTERNATIVE B ALTERNATIVE C

2. EVALUATION

The parking lot alternatives are included in the Concept Plans in Appendix A and summarized in Table 5 below. The table includes the proposed surface area of the parking lot alternatives in square feet (SF) as well as the area of potential wetland impact and estimated construction costs of each of the three alternatives. Users of the existing soft single-track trail currently park at the roadway intersection located at the beginning of the project. No parking forecasts were performed for the project; however, three cars were observed parked just west of the Moose Creek Bridge during a site visit on a weekday, and local agency stakeholders report growing parking usage.

TABLE 5: PARKING LOT ALTERNATIVES SUMMARY

Alternative (Size)	Surface Area	Parking Spots	Area of Potential Wetland Impact (based on survey elevations)	Estimated Construction Cost
A (Large)	25,138 SF	20 with 2 trailer parking spots	7,796 SF	$111,000
B (Medium)	13,744SF	16 with 1 trailer parking spot	437 SF	$56,000
C (Small)	9,656 SF	10 with 1 trailer parking spot	0 SF	$42,000
No Build	-	-	-	$0

3. RECOMMENDATION

Parking Lot Alternative B is recommended for its efficient layout, capacity, and scalability (if costs need to be reduced).

C. TRAIL ALIGNMENT

The conceptual trail alignment has been developed in accordance with the Environmental Assessment prepared for the project and the design criteria outlined in the Reconnaissance Report. The pathway will be constructed north of and elevated slightly above ID-33 from Moose Creek, traveling across the Idaho/Wyoming state line, continuing along WY-22, and ending at the Trail Creek Campground.

The conceptual trail design takes into account the following considerations:

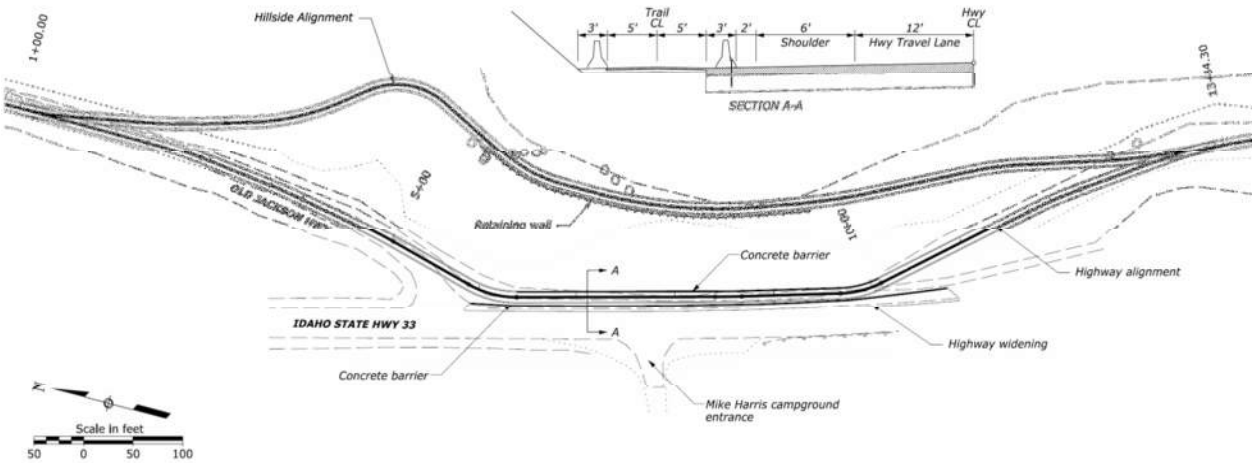
- Vehicle and BPA utility vehicle traffic on the proposed trail from west of the Moose Creek Bridge to the BPA access road turnout located at the proposed parking lot described above.
- The trail alignment follows the Old Jackson Highway roadbed and departs from this roadbed only when necessary in order to traverse terrain and in other areas where following the roadbed is not feasible.
- Minimize slope cuts/fills while meeting the maximum slope requirements of 15 percent.

1. ALTERNATIVES CONSIDERED

a. MIKE HARRIS CUTSLOPE

As the trail approaches the Mike Harris Campground entrance, the Old Jackson Highway roadbed terminates at an intersection with ID-33, and a steep rock cut slope impedes an easy route along the highway. Two alternatives for the trail have been developed in this area: the Highway Alternative and the Hillside Alternative (see Figure 5).

FIGURE 5: MIKE HARRIS CUTSLOPE ALTERNATIVES



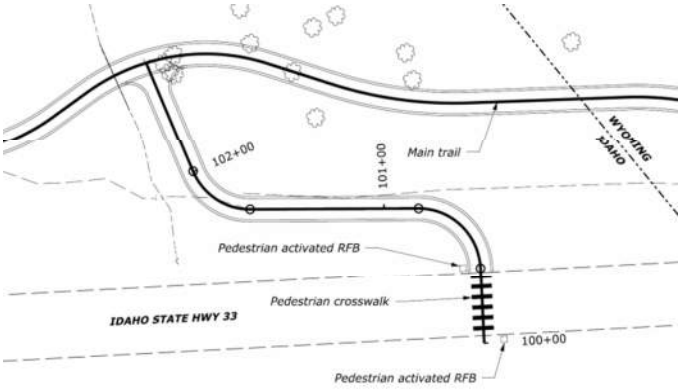
HIGHWAY ALTERNATIVE

The Highway Alternative trail alignment follows the Old Jackson Highway roadbed to the intersection with ID-33. The trail would follow along the face of the rock cut slope, then climb up to meet the Old Jackson Highway roadbed on the east side of the rock cut. This alternative is relatively flat and requires only a short 8 percent slope to connect back to the existing roadbed. The trail users would be in proximity to the highway facility. A typical section was developed to determine the minimum separation between the trail and the highway facilities. Based on IDT standards and rock fall factors, the typical section would require highway shoulder widening and a barrier. Placement of longitudinal barrier adjacent to the highway in proximity to a horizontal curve will require a sight distance analysis in order to determine the scope of any safety impacts to highway operations. A catchment area will be needed adjacent to the rock slope to collect any falling debris. Cutting the rock face, scaling the rock cut, and installing wire mesh will likely be needed.

HILLSIDE ALTERNATIVE

The Hillside Alternative begins 400 feet east of the BPA access road intersection with the Old Jackson Highway, where the trail diverges from the old roadbed and slowly climbs the adjacent hillside over the rock cut slope. The alignment requires a 15 percent slope for 300 feet in order to climb the hillside, but no switchbacks will be necessary. While the trail grades may be steeper than desirable, the trail alignment over the hillside provides a good user experience and overlook. Retaining walls and safety railing will likely be needed as the trail traverses the steep terrain across the hillside.

FIGURE 6: BORDER CONNECTION ALTERNATIVE



b. BORDER CONNECTION

An alternative for a spur trail that would connect the Teton Centennial Trail to the paved highway pullout area at the state border with an at-grade crossing was evaluated (see Figure 6). The trail connection is short, and the highway

geometry supports a safe crossing location. The crossing would require a rectangular rapid flash beacon along with striping and signing.

2. EVALUATION

a. Mike Harris Cutslope

Table 6 below summarizes the impacts, costs, and other factors of the Mike Harris cutslope alternatives.

Table 6: Mike Harris Cut Slope Alternatives Summary

Alternative	Advantages	Disadvantages	Estimated Construction Cost
Highway	• 8% maximum trail grade • Utilization of roadbed • Minimize disturbed area	• Impacts to highway traffic • Unknown rock cut behavior • Long-term maintenance	$488,000
Hillside	• Separation from the highway • No impacts to rock cut • No impacts to highway	• 15% slope for 300 feet • Estimated 360 feet of walls • Additional tree removal	$465,000

Highway Alternative

Additional considerations for this alternative include the potential liability associated with having users be below a rock cut and adjacent to the highway. ITD may require small changes in the typical section in order to provide additional safety, which could have a large impact on costs. The following additional work will be needed for this alternative during the design phase:

- Close coordination with IDT.
- Geotechnical testing and evaluation of the rock slope stability.
- Analysis for rock fall protection of the trail and roadway.
- Investigation of highway widening pavement.
- Construction staging and highway traffic control design.

Hillside Alternative

The additional work listed below will be needed for this alternative during the design phase:

- Geotechnical exploration to determine wall design parameters.

b. Border Connection

Table 7 below summarizes the impacts, costs, and other factors of the border connection alternatives.

Table 7: Border Connection Alternatives Summary

Alternative	Advantages	Disadvantages	Estimated Construction Cost
Spur	• Provides safety features for users to cross the highway	• Trail users must cross a high speed facility • Intermittent delay to highway traffic	$40,200
No Build	• Separation from the highway • Minimizes cost • Trail Creek Crossing will be located ½-mile away	• Not providing a crossing may be less safe if users cross the highway at the border	$0

3. RECOMMENDATION

a. MIKE HARRIS CUTSLOPE

The Hillside Alternative is recommended because of this alternative minimizes the impacts to the highway and the project risks associated with the rock cut. Additionally, the Hillside Alternative provides a more natural setting by separating trail users from vehicular traffic.

b. BORDER CONNECTION

The No Build Alternative is recommended at this location. The border area is for vehicle traffic and does not provide any facilities or connections for pathway users. Maintaining separation between facilities provides a safe condition.

D. CROSSING AT MIKE HARRIS CAMPGROUND

1. ALTERNATIVES CONSIDERED

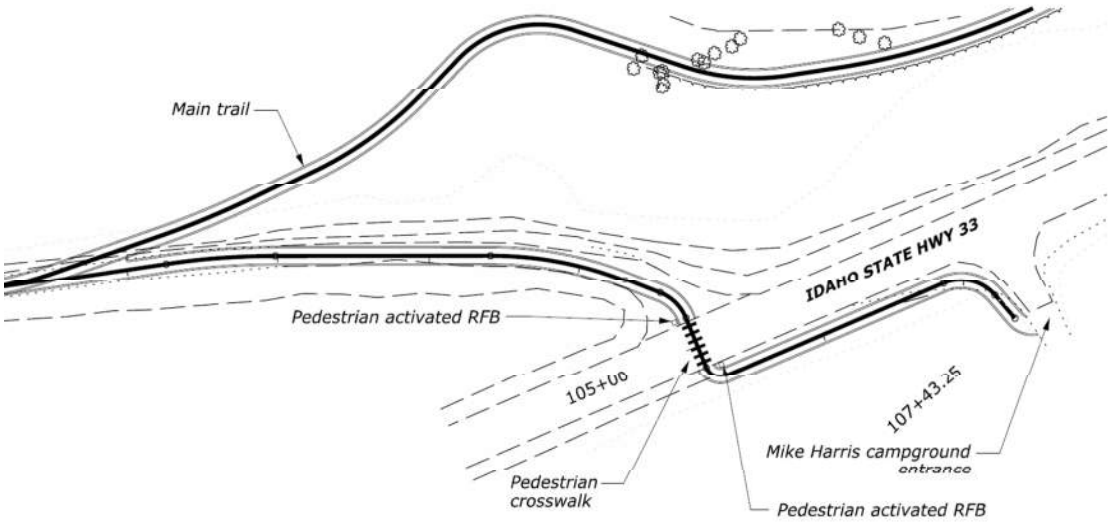
Conceptual alternatives to provide a connection across ID-33 from the Teton Centennial Trail to the Mike Harris Campground were developed and evaluated. The alternatives include an at-grade crossing and an undercrossing, as described and illustrated below.

a. AT-GRADE CROSSING ALTERNATIVE

The proposed at-grade crossing of ID-33 near the Mike Harris Campground (see Figure 7) will make an important connection to an area of use area within the National Forest. The crossing will include:

- Rectangular rapid flash beacon installation.
- Adequate highway sight distance.
- Striping and advanced signing similar to the crossing treatment used along ID-33 in Driggs, Idaho, as depicted in Figure 8.
- Trail connections to the main trail and Mike Harris Campground entrance.

FIGURE 7: MIKE HARRIS CAMPGROUND CONNECTION – AT-GRADE CROSSING

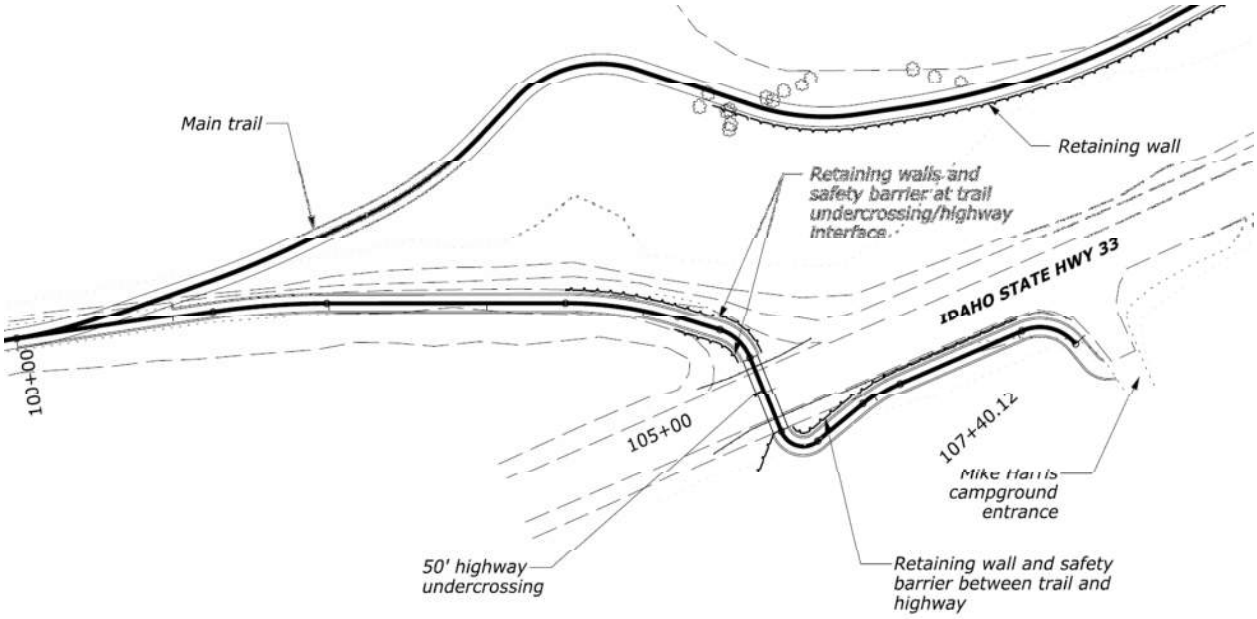


b. Undercrossing Alternative

FIGURE 8: RECTANGULAR RAPID FLASH BEACON ON ID-33 IN DRIGGS, IDAHO

The Undercrossing Alternative provides a grade- separated crossing of ID-33 at the Mike Harris Campground entrance (see Figure 9). This alternative would consist of a descending trail with walls that connect to a 10-foot by 10-foot reinforced concrete box culvert to cross the highway. A trail connection from the crossing to the Mike Harris Campground entrance is also included. Excavation to bring the trail down to the undercrossing elevation will result in steep grades with a tight turning radius on the south side of the highway. Trail Creek is located approximately 300 feet from the proposed crossing, which could affect construction. The undercrossing also would likely impact wetlands in the area. For additional details regarding the undercrossing structure, walls, and staging, see the TS&L Report in Appendix C.

FIGURE 9: MIKE HARRIS CAMPGROUND CONNECTION – UNDERCROSSING



2. EVALUATION

Table 8 below summarizes the impacts, costs, and other factors of the crossing at Mike Harris Campground alternatives.

TABLE 8: CROSSING AT MIKE HARRIS CAMPGROUND ALTERNATIVES SUMMARY

Alternative	Advantages	Disadvantages	Estimated Construction Cost
At-Grade	• Safe highway crossing	• Trail users must cross a high speed facility • Intermittent delay to highway traffic	$74,000
Underpass	• Separates trail users from vehicle traffic • Safest highway crossing option	• Considerable structure costs • Impacts to highway • Steep grades and tight turning • Box culvert drainage • Constructability adjacent to Trail Creek • Long-term maintenance • Relocation of fiber communication line	$809,000
No Build	• No highway impacts	• No safety features for trail users to cross highway	$0

3. RECOMMENDATION

The highway geometry and trail geometry support a safe at-grade crossing location, therefore the At-grade Alternative is recommended.

E. CROSSING AT TRAIL CREEK CAMPGROUND

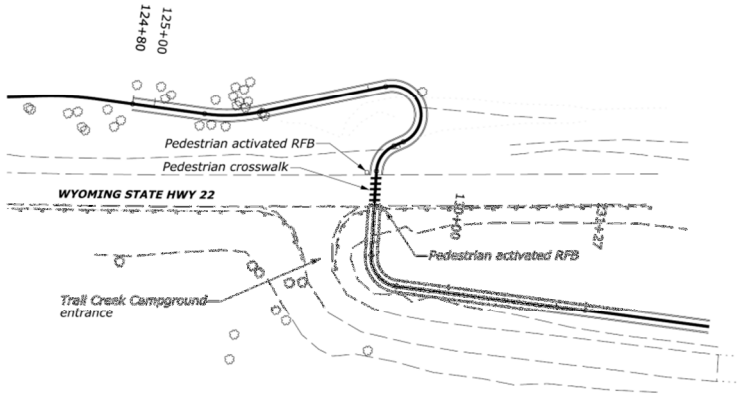
1. ALTERNATIVES CONSIDERED

Conceptual alternatives to provide a connection across WY-22 from the Teton Centennial Trail to the Trail Creek Campground were developed and evaluated. The location of the trail crossing poses several challenges, including steep topography and highway impacts. The alternatives include an at-grade crossing and two different undercrossings, as described below and as shown in the Concept Plans included in Appendix A.

a. AT-GRADE ALTERNATIVE

The proposed at-grade crossing of WY-22 near the Trail Creek Campground provides a safe and cost effective alternative. An evaluation of the existing roadway intersection with the proposed trail alignment was performed. The crossing location is appropriate for a rectangular rapid flash beacon installation and provides adequate sight distance for the proposed crossing. The installation would include striping and advanced signing. On either side of the crossing,

FIGURE 10: TRAIL CREEK CAMPGROUND CONNECTION – AT GRADE

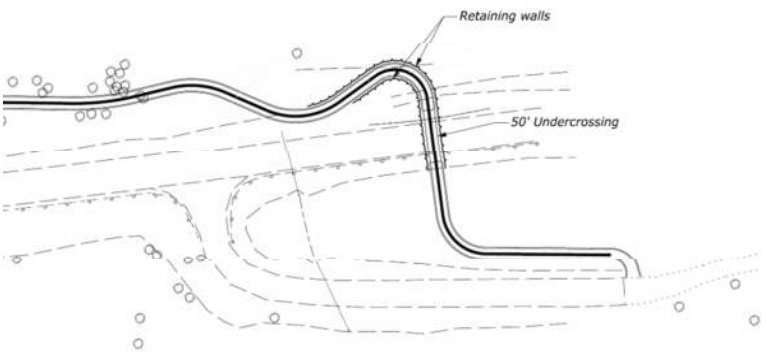


the trail alignment requires steeper grades than desirable in order to meet the highway elevation as the terrain on either side of the highway varies significantly in elevation.

b. Undercrossing Alternative A (Perpendicular)

The Undercrossing Alternative A provides a grade-separated crossing of WY-22 at the Trail Creek Campground entrance. North of the highway, the trail alignment is on a hillside and must descend at steep grades and with tight curvature in order to connect to a reinforced concrete box culvert that crosses perpendicular to the highway east of the Trail Creek Campground entrance, as shown in the Concept Plans in Appendix A. The box culvert would have 10-foot by 10-foot interior dimensions. The large differences in elevation between the highway, trail, and hillside require the construction of retaining walls in the vicinity of the undercrossing. A trail connection from the crossing to the Trail Creek Campground entrance along the north side of the campground entrance road is also included. Preservation or replacement of existing drainage features and patterns within the area south of the highway at this location must be accounted for as well. For additional details regarding the Undercrossing Alternative A structure, walls, and staging, see the TS&L Report in Appendix C.

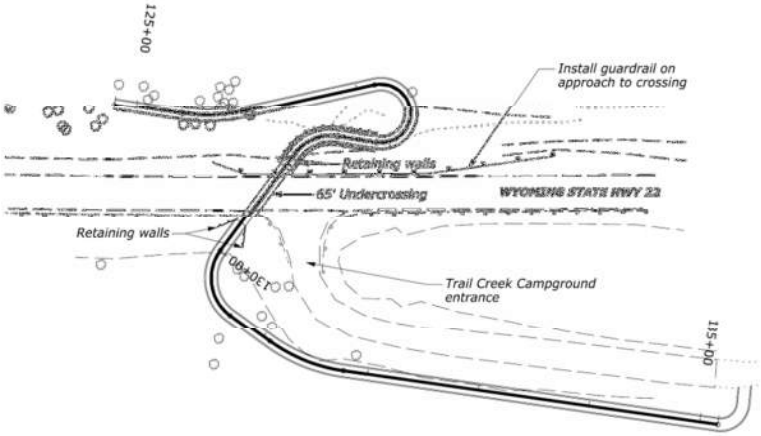
Figure 11: Trail Creek Campground Connection – Perpendicular Undercrossing



c. Undercrossing Alternative B (Diagonal)

The Undercrossing Alternative B provides a grade- separated crossing of WY-22 at the Trail Creek Campground entrance. Similar to Undercrossing Alternative A, north of the highway the trail alignment descends steeply from the hillside in order to connect to a reinforced concrete box culvert that crosses the highway at a skew west of the Trail Creek Campground entrance. The box culvert would have 10-foot by 10-foot interior dimensions. The large differences in elevation between the highway, trail, and hillside require the construction of retaining walls in the vicinity of the undercrossing. A trail connection from the crossing to the Trail Creek Campground entrance along the south side of the entrance roadway is included. For additional details regarding the Undercrossing Alternative B structure, walls, and staging, see the TS&L Report in Appendix C.

Figure 12: Trail Creek Campground Connection – Diagonal Undercrossing



2. EVALUATION

Evaluation of the three alternatives for a connection across WY-22 to the Trail Greek Campground is summarized in the Table 9 below.

TABLE 9: CROSSING AT TRAIL CREEK CAMPGROUND ALTERNATIVES SUMMARY

Alternative	Advantages	Disadvantages	Estimated Construction Cost
At-Grade Alternative	• Safe highway crossing	• Trail users must cross a high speed facility • Intermittent delay to highway traffic	$112,000
Underpass Alternative A	• Separates trail users from vehicle traffic	• Considerable structure costs • Impacts to highway traffic • Steep grades and tight turning • Box culvert drainage • Constructability adjacent to Trail Creek • Long-term maintenance • Relocation of fiber communication line	$1,142,000
Underpass Alternative B	• Separates trail users from vehicle traffic	• Considerable structure costs • Impacts to highway traffic • Steep grades and tight turning • Box culvert drainage • Constructability adjacent to Trail Creek • Long-term maintenance • Relocation of fiber communication line	$1,321,000

The selection of an underpass alternative should consider the following:

- Required maintenance responsibility and access.
- Drainage within the box culvert underneath the highway.
- Structural costs exclusive of the box culvert.

3. RECOMMENDATION

The At-grade Alternative provides adequate highway sight distance and is recommended.

F. GEOTECHNICAL CONSIDERATIONS

1. CONSTRUCTED SLOPES

The preliminary geotechnical recommendations provide the following approaches to proposed cut and fill slopes:

- Proposed cut slopes < 3 feet: 1.5H:1V (1H:1V if cut into sedimentary or volcanic rock deposits)
- Proposed cut slopes >3 feet: 2H:1V

- Proposed fill slopes: 2H:1V

2. WALLS

Several locations along the trail will likely require retaining walls based on the conceptual alignment and topographic survey. The conceptual trail alignment has set a feasible alignment, and locations along the alignment that will potentially need walls have been identified. A final alignment and evaluation of the cuts and fills required, as well as an evaluation of slope stability, will be needed in order to confirm the required walls. Two types of retaining structures are anticipated for this project, MSE walls used for large fill conditions and gravity walls for cut locations and small wall heights. Table 10 below provides a summary of the anticipated wall locations based on the conceptual alignment. Walls are assumed to be offset 8 feet from the centerline of the trail, and heights (in linear feet (LF)) and area dimensions are exposed face only.

TABLE 10: SUMMARY OF RETAINING WALLS

Alternative	Begin Sta.	End Sta.	Length (LF)	Type	Avg Height (LF)	Max Height (LF)	Area (SF)
Main Trail	71+79.27 Lt	72+98.59 Lt	119	Cut	5.0	6.5	598
	99+50.00 Lt	107+01.50 Lt	752	Cut	2.0	4.8	1,483
	120+12.61 Rt	121+13.56 Rt	101	Fill	3.7	4.4	372
Hillside	26+10.33 Rt	29+43.97 Rt	334	Fill	3.0	5.7	1,014
Highway	9+61.93 Rt	10+54.85 Rt	93	Fill	5.8	8.0	537
Mike Harris Undercrossing	103+50.00 Lt	104+75.00 Lt	125	Cut	7.5	18.0	2,800
	104+25.00 Rt	104+75.00 Rt	50	Cut			
	105+25.00 Lt	107+00.00 Lt	175	Cut			
	105+25.00 Rt	105+50.00 Rt	25	Cut			
Trail Creek Undercrossing A	127+60.00 Lt	129+00.00 Lt	140	Cut	20.8	22.0	5,000
	128+00.00 Rt	129+00.00 Rt	100	Cut			
Trail Creek Udercrossing B	128+10.00 Lt	128+95.00 Lt	85	Cut	29.4	22.0	5,000
	128+10.00 Rt	128+95.00 Rt	85	Cut			

Wall limits will be refined during the design process and opportunities to minimize wall heights, wall limits, or replacing with other slope stability measures may be possible. The construction of walls adjacent to the trail may in some cases require the installation of safety railing along such walls in order to prevent trail users from potentially leaving the pathway and falling. Such railing would need to be at least 42 inches high to provide safety for cyclists. In addition, at locations where the trail alignment follows the top of long, steep slopes, it may be desirable to place safety railing along the trail in order to prevent possible serious injury. The concept design assumes that approximately 30 percent of the trail will require a railing.

3. PAVEMENT

The preliminary geotechnical recommendations provide the following approaches for pavement:

- Centennial Trail: 2 inches asphalt on 4 inches aggregate base course
- Vehicle Segments: 5 inches asphalt on 6 inches aggregate base course
- Parking Area: 16 inches aggregate base course
- Subgrade Stabilization: 16 inches to 22 inches aggregate base course

G. ENVIRONMENTAL CONSIDERATIONS

Environmental coordination and research were performed during the conceptual design phase and documented in the Concept Environmental Memorandum (see Appendix E). Below are brief summaries of the environmental considerations.

1. WETLANDS AND WATERS SUMMARY

Wetlands

A project corridor evaluation of wetland and water resources was conducted, and it determined that wetlands occur within the project corridor and have the possibility of being impacted at locations near Moose Creek and the proposed parking lot location.

Waters

Moose Creek, Trail Creek, and an unnamed tributary to Trail Creek are located within the project corridor. Moose Creek and Trail Creek are the only perennial streams. The unnamed tributary and other small conveyances appear to be intermittent or ephemeral. The replacement of the bridge crossing at Moose Creek is expected to have impacts to waters.

2. HAZARDOUS MATERIALS

A hazardous materials assessment was performed and determined the following:

- Records evidence of off-site hazardous material facilities that could affect the project were not revealed.
- The existing Moose Creek bridge railing possibly could be chemically treated, and the paint might be lead based.
- Lead contamination of shoulder soils adjacent to the old highway might exist.

Some sampling and field evaluation are recommended. See Appendix D for additional information.

3. SECTION 106

As part of the prior project analysis and Environmental Assessment process, both the Wyoming and Idaho State Historic Preservation Offices (SHPOs) were consulted to ensure project compliance with Section 106 of the National Historic Preservation Act. Each agency found that the project would not result in effects to historic properties. During the conceptual design phase, the culverts were evaluated, and it was found that none of the culverts were deemed to possess distinctive characteristics or association with significant patterns of history.

4. SECTIONS 4(F) AND 6(F)

Coordination and research was performed to determine impacts to Section 4(f) and Section 6(f) properties. Based on a review of the National Park Service database for applicable grants, no resources subject to the requirements of Section 6(f) were identified in the project area. Additional coordination is required to determine the potential impacts on park properties and cultural resources, and whether these impacts constitute a “use.” Public notice and opportunity for public comment could also be necessary.

H. HYDRAULICS

1. BRIDGE HYDRAULICS

The proposed Teton Centennial Trail project will replace the existing bridge over Moose Creek. A hydraulic analysis was completed for the existing and proposed bridge conditions using HEC-RAS (version 4.1). Both the existing bridge and the proposed bridge are single-span bridges (without piers). The clear span of the existing bridge is 20 feet wide. The abutments for the proposed bridge will be moved away from the channel to provide one and one-half times the bank width of the active channel. The bank width of the active channel for Moose Creek was calculated to be 35 to 40 feet in the vicinity of the proposed trail bridge, and the clear span of the proposed bridge will be 60 feet wide (out-in-out width of 65 feet). For comparison, the ID-33 highway bridge just downstream of the proposed trail bridge has a clear span of 41.4 feet.

Approximately 300 feet downstream from the location of the trail bridge is the confluence of Moose Creek and Trail Creek. Just upstream of the confluence is the ID-33 Bridge over Moose Creek. The HEC-RAS models extended past the ID-33 Bridge to capture any backwater effects at the proposed trail bridge. There is a flow control weir on Trail Creek (used for irrigation, but may not be active) approximately 550 feet downstream of the confluence of Moose Creek and Trail Creek. The total distance between the flow control weir and the trail bridge is 900 feet, with an estimated 5 to 6 feet of hydraulic gradient. Based on the aerial images, it appears unlikely that the weir would have a hydraulic effect on the trail bridge.

The drainage basin at the confluence of Moose Creek and Trail Creek is 21.8 square miles. The basin is heavily forested and has fairly steep terrain. The main channel is clean and winding. The streambed is covered with boulders that are approximately 0.5-foot to 1-foot in diameter. The adjacent overbanks are covered with thick brush. A manning's roughness coefficient, "n" value, of 0.05 was used for the main channel and a value of 0.10 was used for the overbanks.

A United States Geological Service (USGS) gaging station is located on Moose Creek just upstream of its confluence with Trail Creek. The station number is "13050800" and the station name is "Moose Creek NR Victor ID." Using the StreamStat website, the gage data was used to predict the 2-, 10-, 25-, 50-, 100-, and 500-year flows. Table 11 below lists the recurrence interval (in years) and the corresponding peak flow (in cubic feet per second (cfs)).

TABLE 11: USGS MOOSE CREEK PEAK FLOW

Recurrence Interval (years)	USGS Peak Flow (cfs)
2	280
10	371
25	408
50	433
100	456
500	504

Information from the Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) for Teton County, Idaho and Incorporated Areas Panel 16081C0144C, dated August 4, 1998, was used for this investigation. The map shows that Moose Creek is just outside of a mapped FEMA Floodplain. Because the bridge is not in a mapped floodway, a "no-rise" certification is not required. However, even if the bridge were in a mapped floodway, it would meet the "no-rise" requirements. Compared to existing conditions, the backwater effect from the bridge is reduced by 0.06 feet under the proposed conditions. IDT requires a minimum of 2 feet of freeboard between the 50-year water surface elevation and the low chord. The low chord elevation for the preferred alternative is 6,480.67 feet, and the 50-year water surface elevation is 6,477.68 feet, which equates to 2.99 feet of freeboard (see Table 12).

A hydraulic site visit was not performed by a hydraulic engineer during this phase of the project. Channel degradation, channel aggradation, lateral bank migration, channel avulsion, and large woody debris recruitment/transport that may affect the bridge were evaluated using site photos and aerial images. The photos indicate that the channel is stable and that degradation, aggradation, and avulsion are not occurring near the bridge. The photos also indicated that large woody debris is not a problem at the bridge site. It is recommended that a hydraulic engineer conduct a site visit before final design occurs to further examine the site for channel degradation, channel aggradation, lateral bank migration, channel avulsion, and large woody debris recruitment/transport. It is also recommended that ITD staff be contacted to provide observation information of the creek behavior and characteristics.

TABLE 12: PROPOSED STRUCTURE DATA (ELEVATION: NAVD 88)

Bridge Width	19'-2"
Out-to-Out Length	66 ft
Opening Length	60 ft
Q_{50}	433 ft^3/sec
Low chord Elevation	6480.67 ft
Q_{50} HW	6477.68 ft
Q_{50} Freeboard	2.99 ft
Roadway CL Elevation	6484.00 ft
Streambed Elev. at Entrance	6474.31 ft
V_{50}	5.37 ft/sec
V_{500}	5.57 ft/sec
Contraction Scour Depth	0.0 ft

A preliminary scour analysis was performed using the methodology in the Federal Highway Administration (FHWA) publication *Evaluating Scour at Bridge Fifth Edition, April 2012* (also known as HEC-18) and the 500-year flow data, as required by IDT. The D_{50} of the streambed was estimated to be 9 inches. The 500-year contraction scour was calculated to be zero feet deep.

2. CULVERT HYDRAULICS

During the project survey, an inventory of the existing culverts was completed. The proposed trail alignment crosses over five culverts, and seven culverts are in the vicinity of the project but will not be affected by the proposed trail alignment. The culverts were assessed by examining their condition, functionality, capacity, and location. The hydrology for each culvert was calculated using USGS regression equations for Idaho Region 6 for the 25-year storm event. Table 13 below presents a summary of the culvert inventory. The table also notes the culvert assessment: Will each culvert likely need to be removed, replaced, or protected? For the full culvert inventory, see Appendix F.

TABLE 13: CULVERT INVENTORY SUMMARY

Existing Culvert	Station	Type	Size	Remove	Replace	Protect	Under Trail Alignment	Notes
1	33+10	CMP	18"	X	X		X	Does not meet capacity requirements
2	47+40	CMP	18"	X			X	Upstream invert is buried and not at trail low point
3	53+48	CMP	18"	X			X	Upstream invert is buried and not at trail low point
4	59+70	CMP	18"	X			X	Not at trail low point
5	66+42	CMP	18"	X	X		X	Upstream invert is buried

Existing Culvert	Station	Type	Size	Remove	Replace	Protect	Under Trail Alignment	Notes
6	71+36	CMP	18"			X		There is capacity and project will not impact
7	77+36	CMP	12"	X				Does not appear to have a purpose
8	85+72	CMP	24"			X		Under ID-33 and project will not impact. Unknown slope. Capacity assumed.
9	110+10	CMP	24"			X		Under ID-33 and project will not impact. Unknown condition and slope. Capacity assumed.
10	120+34	CMP	24"			X		Under ID-33 and project will not impact. Unknown condition and slope. Capacity assumed.
11	127+40	CMP	30"			X		Under ID-33 and project will not impact. Has capacity.
12	130+14	CMP	30"			X		Under road and project will not impact. Culvert has capacity.

In many areas along the trail alignment, the ditch will collect sheet flow from the adjacent hill. The ditches will be sized to accommodate the offsite sheet flow. Riprap armoring in the ditches will be required for the steep areas of the trail alignment.

I. UTILITIES

1. BPA

The proposed trail crosses under BPA transmission lines, and the trail connects to a BPA access road that is used for maintenance of the transmission lines. Project requirements were researched, and based on that research, the project will need to obtain a Land Use Agreement with BPA that includes the requirements listed below. Obtaining the agreement requires coordination during design and an estimated 12-week review and approval period.

- Maintain a minimum distance of at least 25 feet between facilities and the transmission line structures.
- Equipment, machinery, and vehicles traveling on BPA's easement shall not come closer than 25 feet to any BPA structure or guy anchor ground attachment point.
- No storage of flammable materials or refueling of vehicles or equipment is allowed on BPA easements.
- Vegetation shall not exceed 10 feet in height, obstruct access to structures, or be planted within 50 feet of any structure.
- Access roads and trails within BPA easements shall be designed and built to withstand HS-20 vehicle loading.
- Access to BPA transmission line system by BPA and/or its contractors shall not be obstructed at any time.

2. FIBER OPTIC

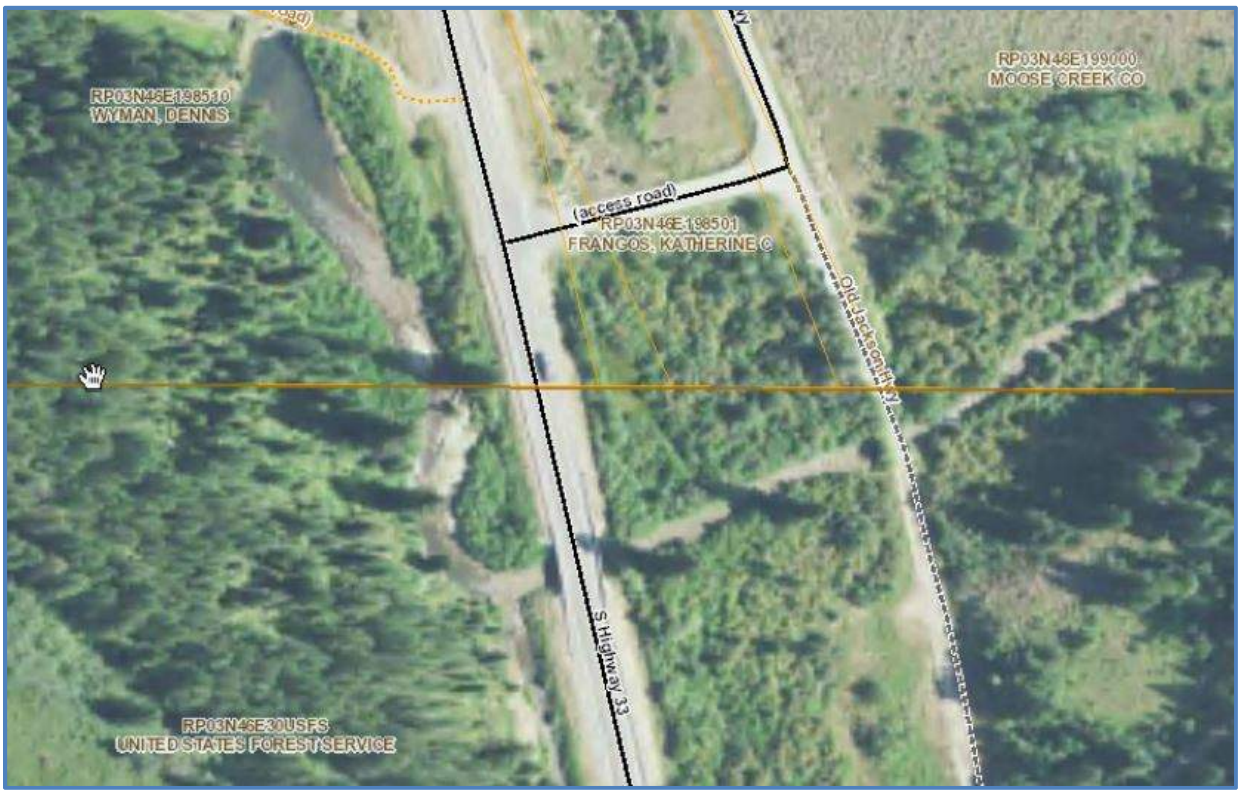
A communication line runs parallel to ID-33 near the ditch line along the north side of the highway. The size of the facility is unknown. Several locations along the project alignment may affect the communication line. Coordination to determine clearances and other contractor requirements will be necessary.

J. RIGHT-OF-WAY

1. ACQUISITION

A survey has identified that the existing Old Jackson roadway just west of Moose Creek is located on private property, and the proposed trail and bridge will impact the property (see Figure 13 below).

FIGURE 13: RIGHT-OF-WAY NEAR MOOSE CREEK



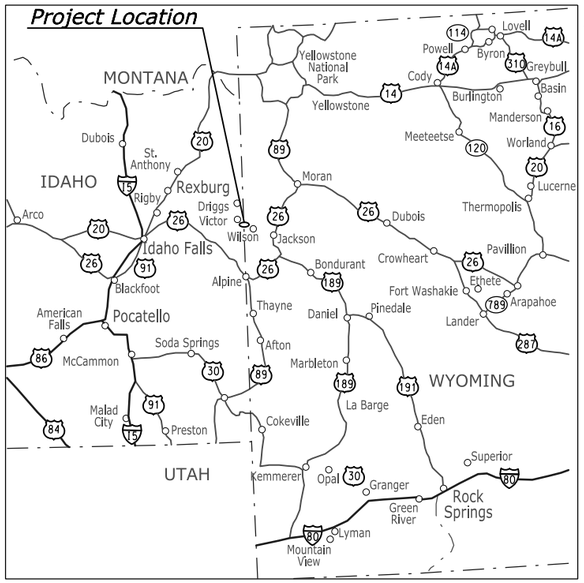
2. EASEMENTS

Temporary and permanent easements for the trail near Moose Creek and the bridge across Moose Creek will be needed. The USFS plans to grant an easement to ITD that will cover the trail and any area needed to maintain the trail. Granting appropriately sized easements minimizes the time-consuming permit authorizations between agencies that would otherwise have to occur in the future. The easement limits will need to be evaluated and defined.

APPENDIX A

Concept Plans

STATE	PROJECT	SHEET NUMBER
ID/WY	ID DOT T 33(1)	A.1



U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

PLANS FOR PROPOSED PROJECT

ID DOT T 33(1)

IDAHO TETON CENTENNIAL TRAIL CONCEPT PLAN

CARIBOU - TARGHEE NATIONAL FOREST
TETON COUNTY, IDAHO
TETON COUNTY, WYOMING

LENGTH 2.30 MILES

APPROVED:

_____ *DATE* _____

Director, Project Delivery,
Western Federal Lands Highway Division

TYPE OF CONSTRUCTION:

Grading, Drainage, Paving and Structures

DESIGN DESIGNATION:

ADT (2012)	–	*6,000*
ADT (2032)	–	*8,916*
V	–	*65*
e (max)	–	*N/A*

SPECIFICATION:

Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-14 US Customary Units

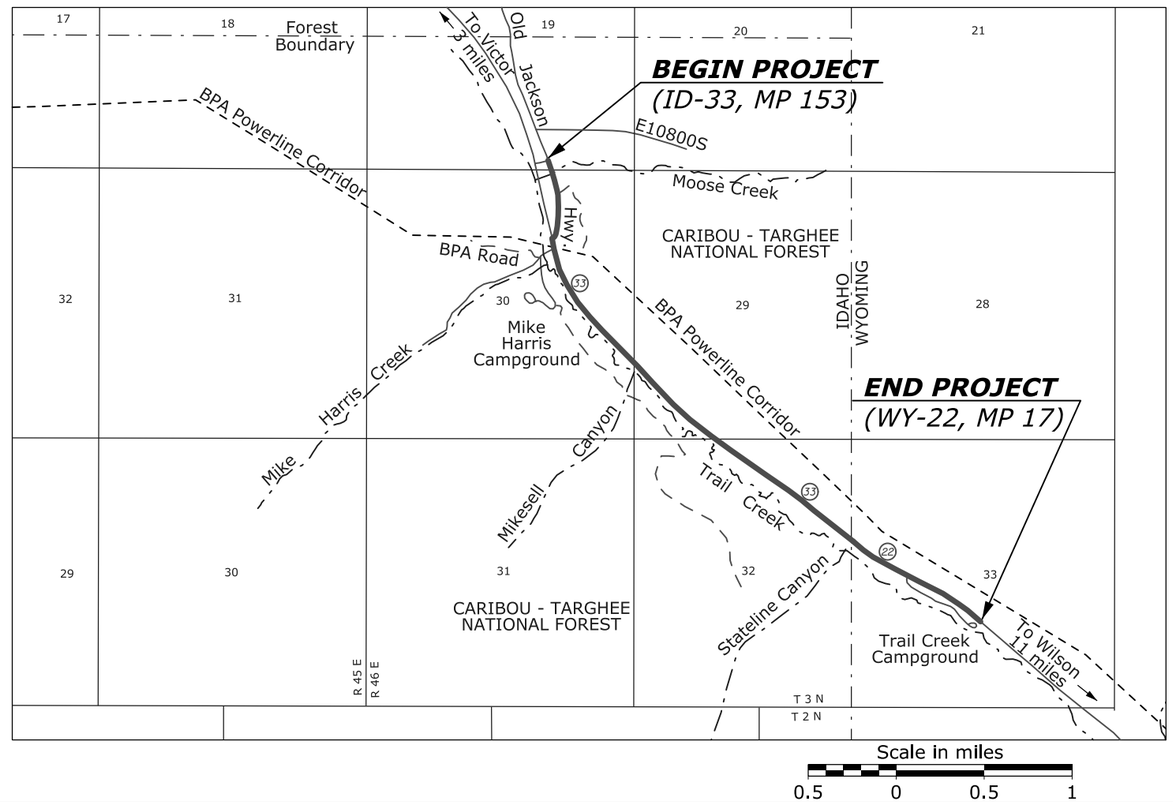
FEDERAL LANDS HIGHWAY
COMMITMENT TO EXCELLENCE

PLANS PREPARED FOR

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION
VANCOUVER, WASHINGTON

PLANS PREPARED BY

DAVID EVANS AND ASSOCIATES INC.



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A.2 PLAN SYMBOLS AND ABBREVIATIONS (STD. W101-1)
A.3 VICINITY MAP

B. SUMMARIES
B.1 SUMMARY OF QUANTITIES (TO BE PROVIDED LATER)

C. TYPICAL SECTIONS
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D. PLAN
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T.3 MOOSE CREEK CROSSING ALTERNATIVE C

PROJECT MANAGER
K. Gray

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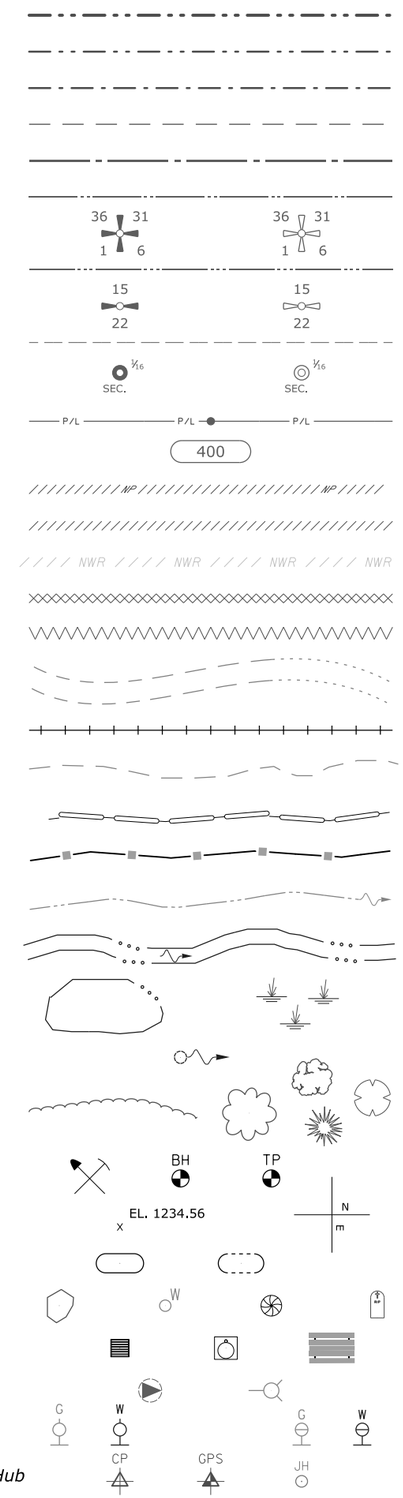
Δ	total central angle
Δc	curve central angle
Ø	diameter
θs	spiral central angle
abut.	abutment
ADT	average daily traffic
AH	ahead
appr.	approach
BK	back
BM	bench mark
BP	balance point
br.	bridge
brg.	bearing
cc or c. to c.	center to center
℄	centerline
clr.	clear
CMP	corrugated metal pipe
col.	column
conc.	concrete
conn.	connection
constr. jt.	construction joint
cont.	continuous
CS	point of curve to spiral
ctrs.	centers
CUFT	cubic foot (feet)
culv.	culvert
CUYD	cubic yard(s)
D	diameter
DHV	design hourly volume
dia.	diameter
diag.	diagonal
diaph.	diaphragm
dist.	distance
drwg(s).	drawing(s)
E	east
e	superelevation rate
El. 94.16 ft	elevation with number
elev.	elevation
emb.	embankment
EP	edge of pavement
EQ or eq.	equation
ER	edge of road
EW	edge of water
exc.	excavation
exp. jt.	expansion joint
fin.	finish
flg.	flange
ft2	square foot
ft3	cubic foot (feet)
ftg.	footing
ga.	gage (gauge)
galv.	galvanized
hdwl.	headwall
hex.	hexagon
HW	high water
ID	inside diameter
jt.	joint
L	length of curve
lam.	lamination
lat.	latitude
LNFT	linear foot (feet)
long.	longitudinal
LPSM	lump sum
Ls	length of spiral
lt. or LT	left
LW	low water
M.L.	main line
M.P.	mile post
matl.	material
max.	maximum
MGAL	thousand gallon
min.	minimum
mon.	monument
N	north
NC	normal crown
o. c.	on center
o. to o.	out to out
OD	outside diameter
OG	original ground
PC	point of curve
PCC	point of compound curve
PCS	point of curve to spiral
PI	point of intersection
pl.	plate
POC	point on curve
POS	point on spiral
POT	point on tangent
PS	point of tangent to spiral
PSC	point of spiral to curve
PST	point of spiral to tangent
PT	point of tangent
pvmt.	pavement
R	radius
R.	range
R/W	right-of-way
rdwy.	roadway
reinf.	reinforcement
reqd.	required
RFB	rapid flashing beacon
rt. or RT	right
rte.	route
S	south
SADT	seasonal average daily traffic
SC	point of spiral to curve
sec.	section
shldr.	shoulder
SLRY	slurry unit
spa.	spacing, spaces or spaced
SQFT	square foot
SQYD	square yard
SRS	point of spiral to reverse spiral
SS	point of spiral to spiral (no curve)
ST	point of spiral to tangent
STA, Sta.	station
std.	standard
stgr.	stringer
stiff.	stiffener
struc.	structural
STS	point of spiral to tangent spiral
sym.	symmetrical
T	tangent distance
T.	township
TBM	temporary bench mark
thd.	thread
TS	point of tangent to spiral
Ts	tangent distance (spiraled curve)
typ.	typical
V	design speed
vph	vehicles per hour
VPI	vertical point of intersection
W	west
yd2	square yard
yd3	cubic yard(s)

NOTE:

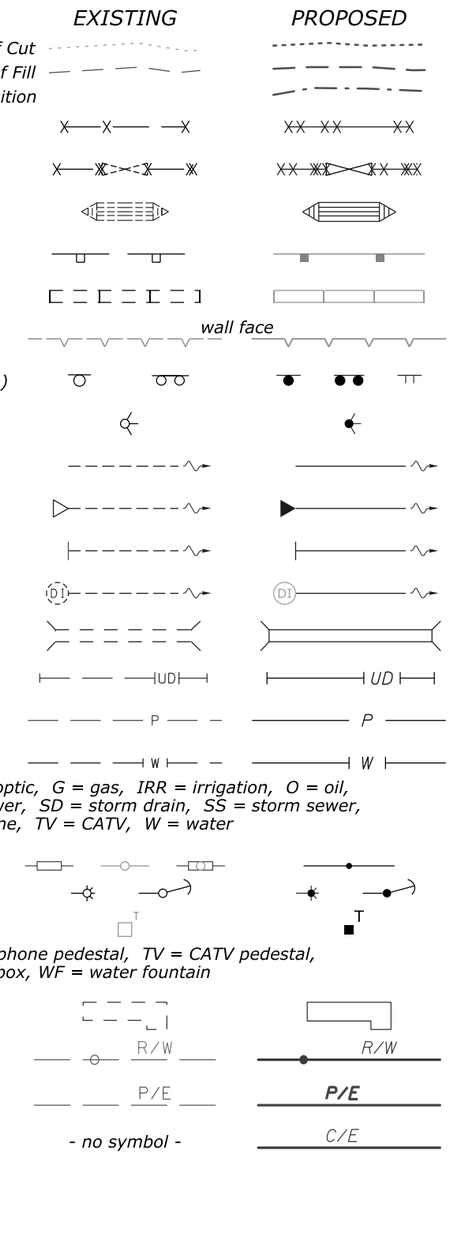
1. Other symbols used in the plans will be shown in a legend on the appropriate plan sheet.

National Boundary
State Boundary
County Boundary
City Boundary
Township or Range Line
Section Line
Section Corner (Found, Projected)
¼ Section Line
¼ Section Corner (Found, Projected)
1/16 Section Line
1/16 Section Corner (Found, Projected)
Property Line w/Found Property Corner
Parcel Number
National Park Boundary
National Forest Boundary
National Wildlife Refuge Boundary
BLM Lands Boundary
Indian Reservation Boundary
Existing Roadway (Road, Paved, Gravel)
Railroad
Trail
Wattle
Silt Fence
Intermittent Drainage or Small Creek
Large Creek or River
Lake, Pond or Reservoir; Marshland
Spring or Seep
Treeline; Individual Trees
Material Source; Bore Hole; Test Pit
Spot Elevation; Coordinate Grid Tick
Above Ground Tank; Underground Tank
Boulder; Well; Satellite Dish; Grave
Cooking Grate; Garbage Can; Picnic Table
Flagpole; Fire Hydrant
Gas & Water Meter; Gas & Water Valve
Control Point (Terrestrial and GPS); Jump Hub



STATE	PROJECT	SHEET NUMBER
ID/WY	ID DOT T 33 (1)	A.2

North Arrow



FM = force main, FO = fiber optic, G = gas, IRR = irrigation, O = oil, P = power, SA = sanitary sewer, SD = storm drain, SS = storm sewer, STEAM = steam, T = telephone, TV = CATV, W = water

Miscellaneous Utility Features
EM = electric meter, T = telephone pedestal, TV = CATV pedestal, UP = transformer or junction box, WF = water fountain

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

U.S. CUSTOMARY DETAIL

PLAN SYMBOLS AND ABBREVIATIONS

DETAIL APPROVED FOR USE 11/2001
REVISED: 9/2005 1/2007 10/2009

DETAIL W101-1

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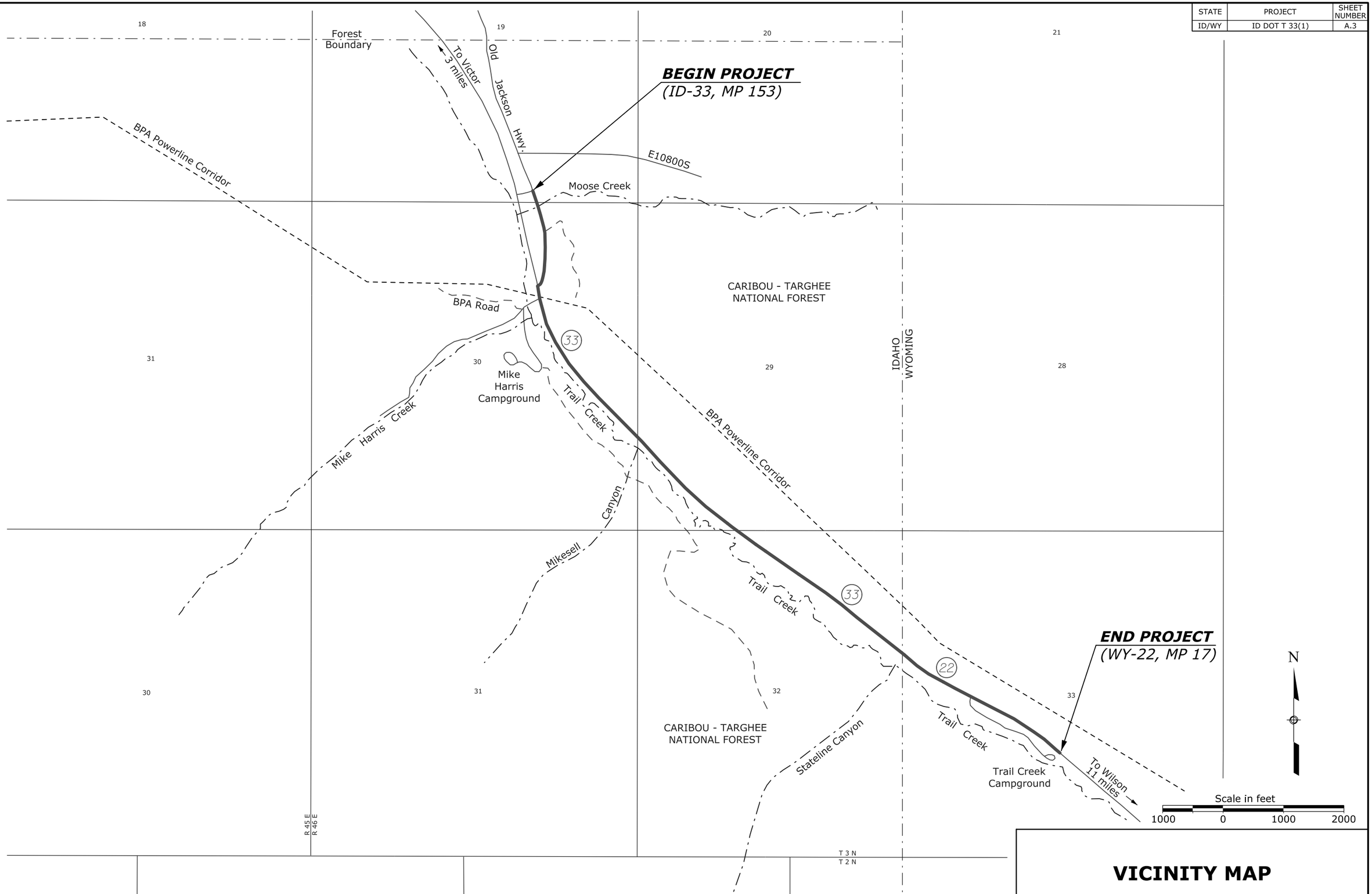

VICINITY MAP

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STATE	PROJECT	SHEET NUMBER
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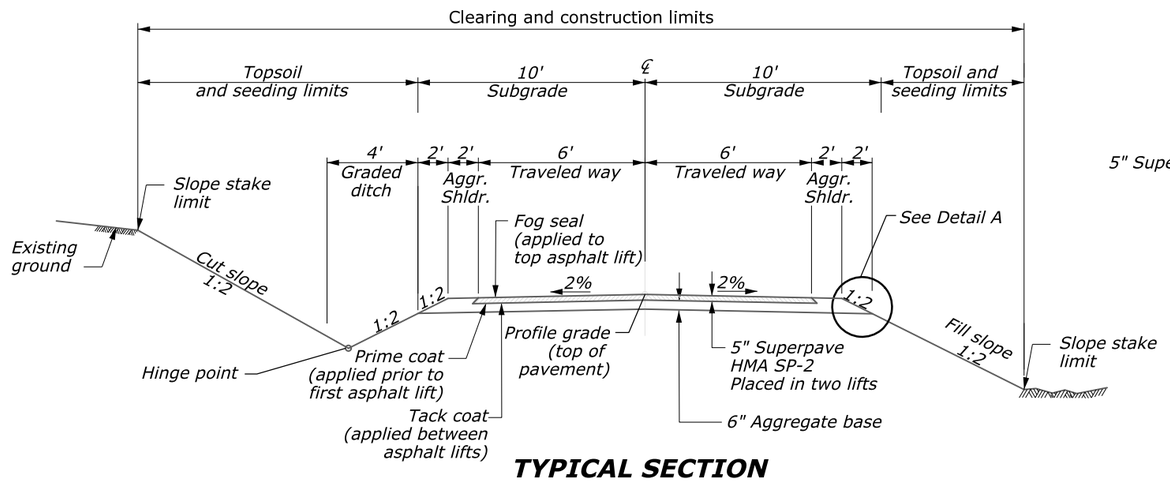
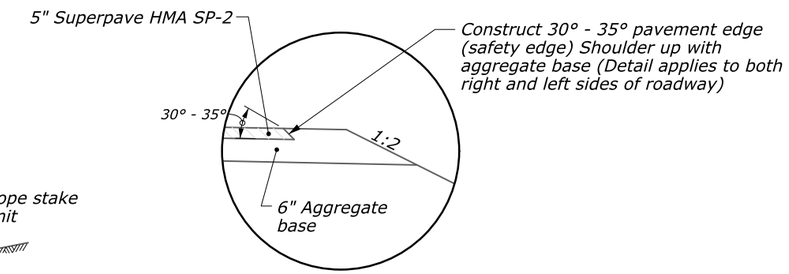


TYPICAL SECTION
MOOSE CREEK SEGMENT - VEHICLE

STA. 10+00 to STA. 12+31
STA. 12+96 to STA. 17+05



DETAIL A

NOTES:

1. Round all earth slopes and all rippable rock slopes.

TABULATION OF TYPICAL SECTION QUANTITIES

ITEM	DESCRIPTION	UNIT	TOTALS

TYPICAL SECTIONS

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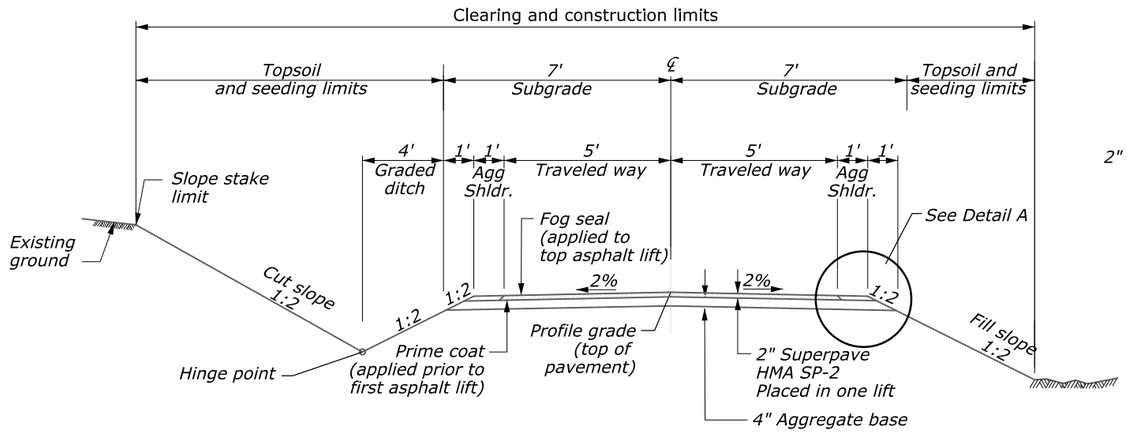
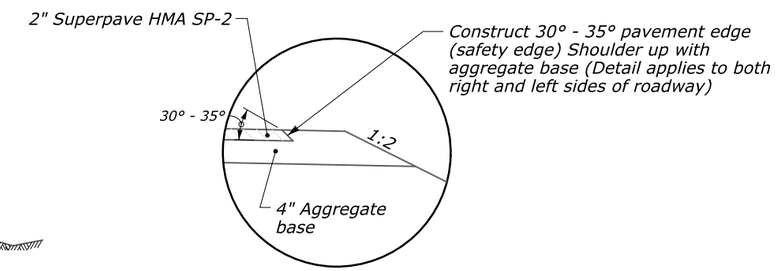


TYPICAL SECTION
GENERAL TRAIL

STA. 17+05 to STA. 129+03
STA. 129+53 to STA. 131+73



DETAIL A

NOTES:

1. Round all earth slopes and all rippable rock slopes.

TYPICAL SECTIONS

--/--- Checked by: --/--- Designed by:
17 December 2015 3:06 PM P:\FHAX00000220\0400CAD\SHEETS\RH\id-03301cb.dgn [US_Sur_ft2D]

ITEM 30201-1000 ROADWAY AGGREGATE	
APPROXIMATE LOCATION	QUANTITY (CUYD)
TOTAL	209

ITEM 20103-0000 CLEARING AND GRUBBING	
APPROXIMATE LOCATION	QUANTITY (sqyd)
TOTAL	

NOTE:

1. Stationing shown is approximate.

TABULATION OF PLAN QUANTITIES

--/---
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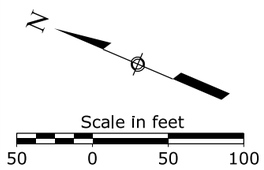
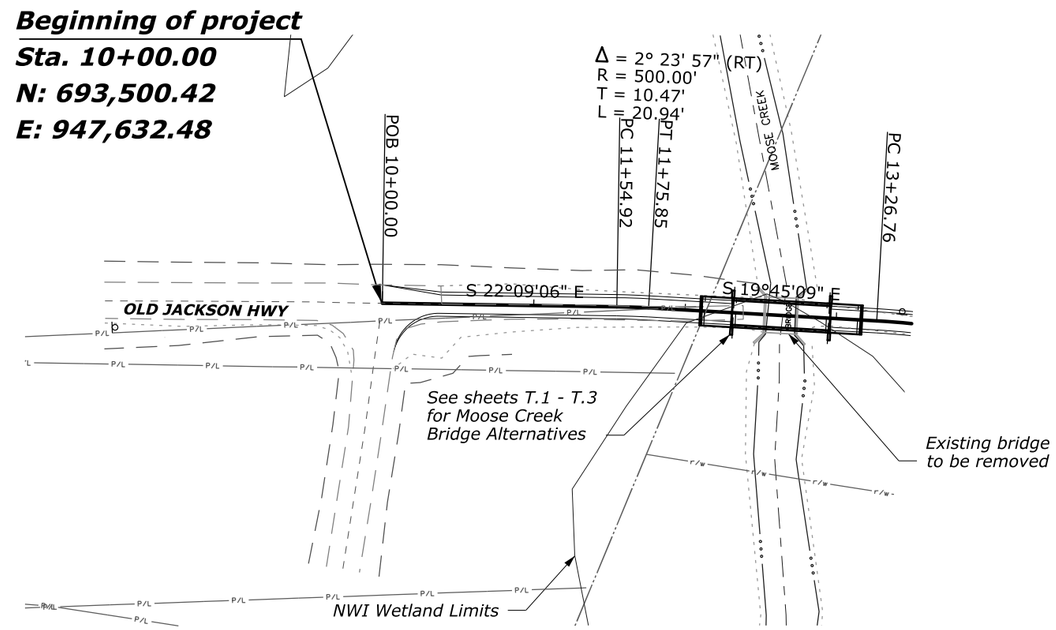
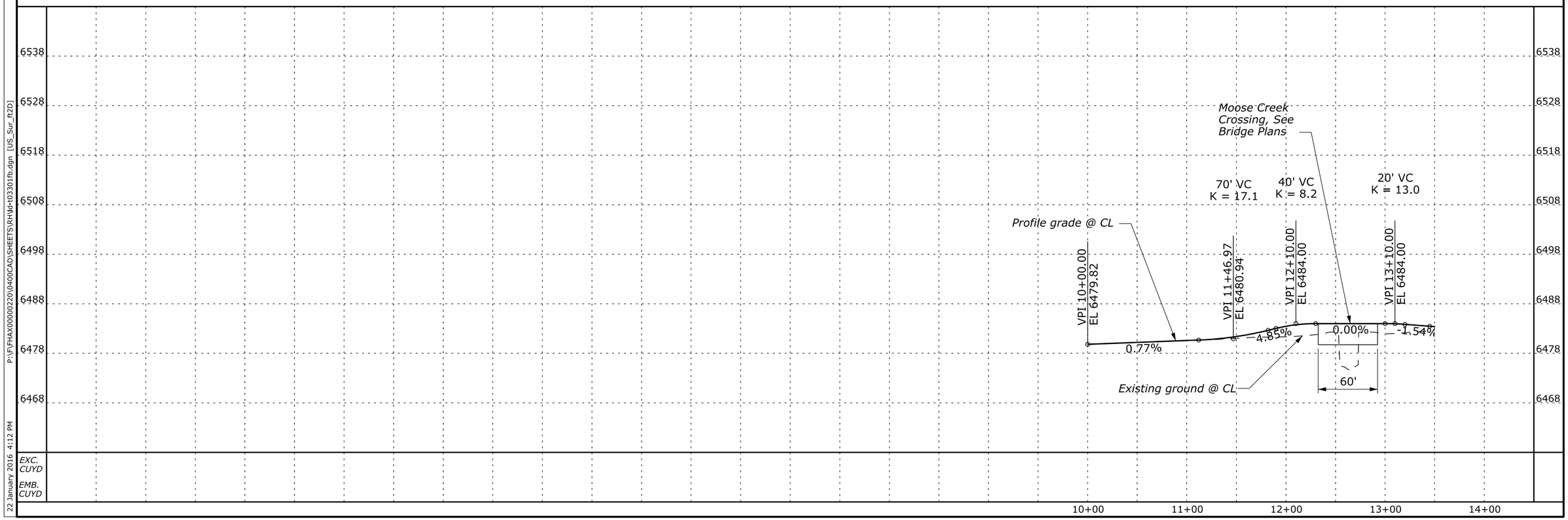
Designed by:
10 December 2015 2:33 PM
P:\FFHAX00000220\0400CAD\SHEETS\RH\id-t03301fa.dgn [US_Sur_ft2D]

STATE	PROJECT	SHEET NUMBER
ID/WY	ID DOT T 33(1)	D.2







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22 January 2016 4:12 PM

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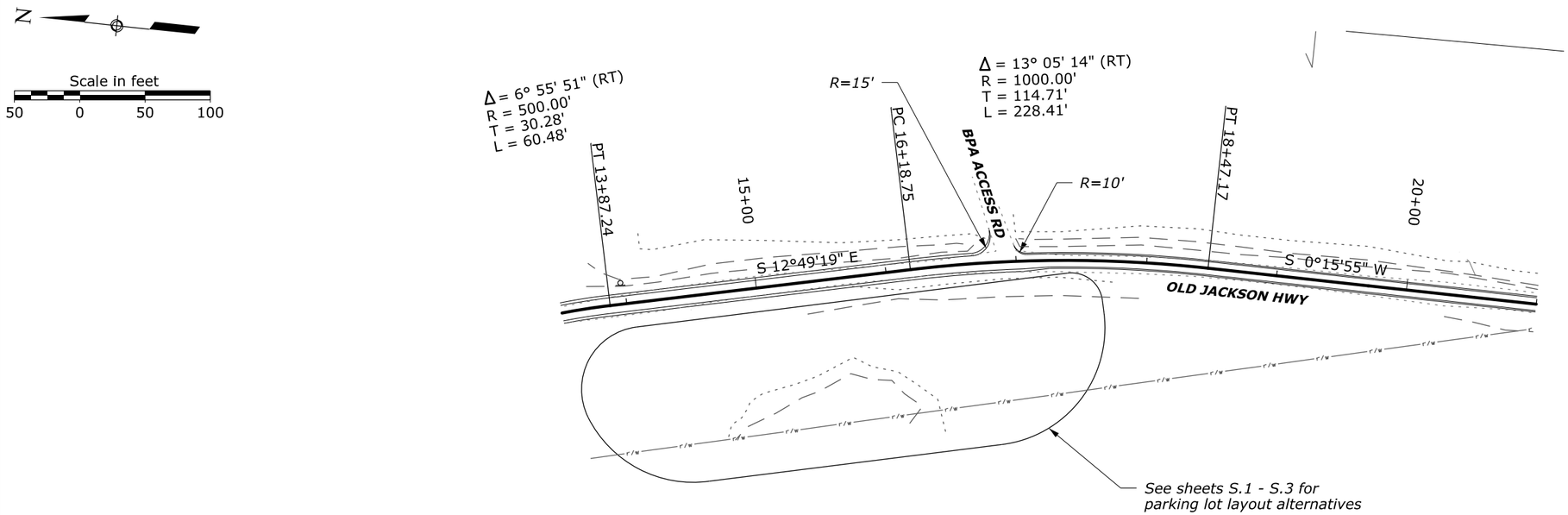
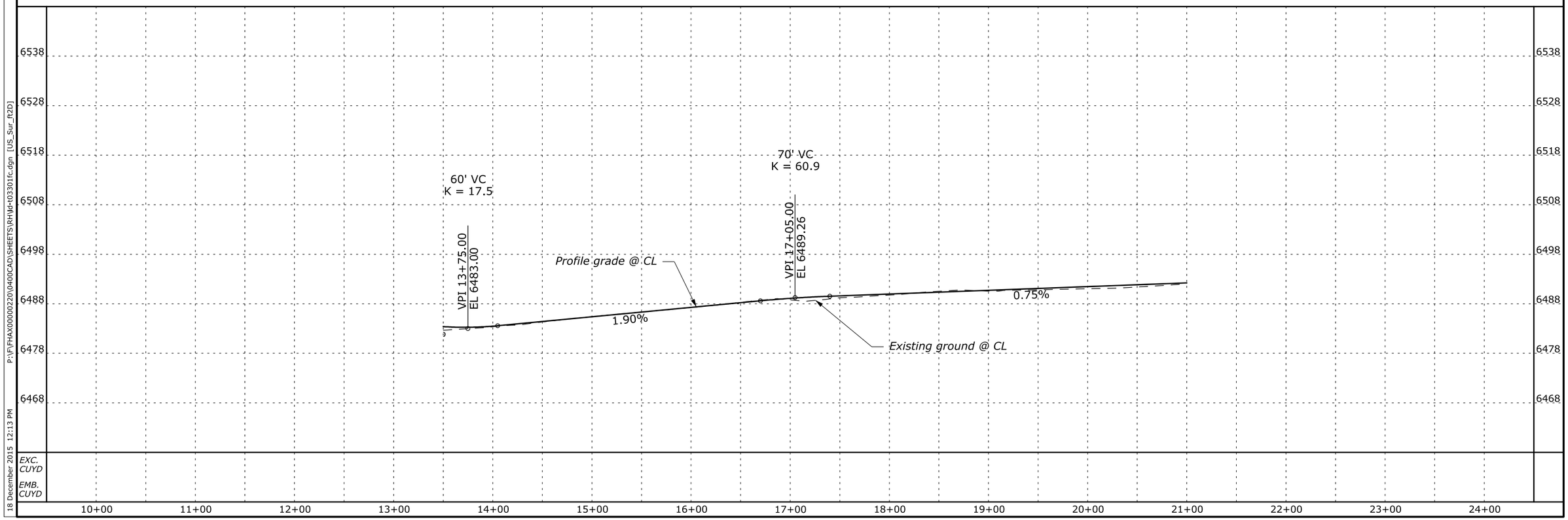
ID/WY	ID DOT T 33(1)	D.3





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18 December 2015 12:13 PM

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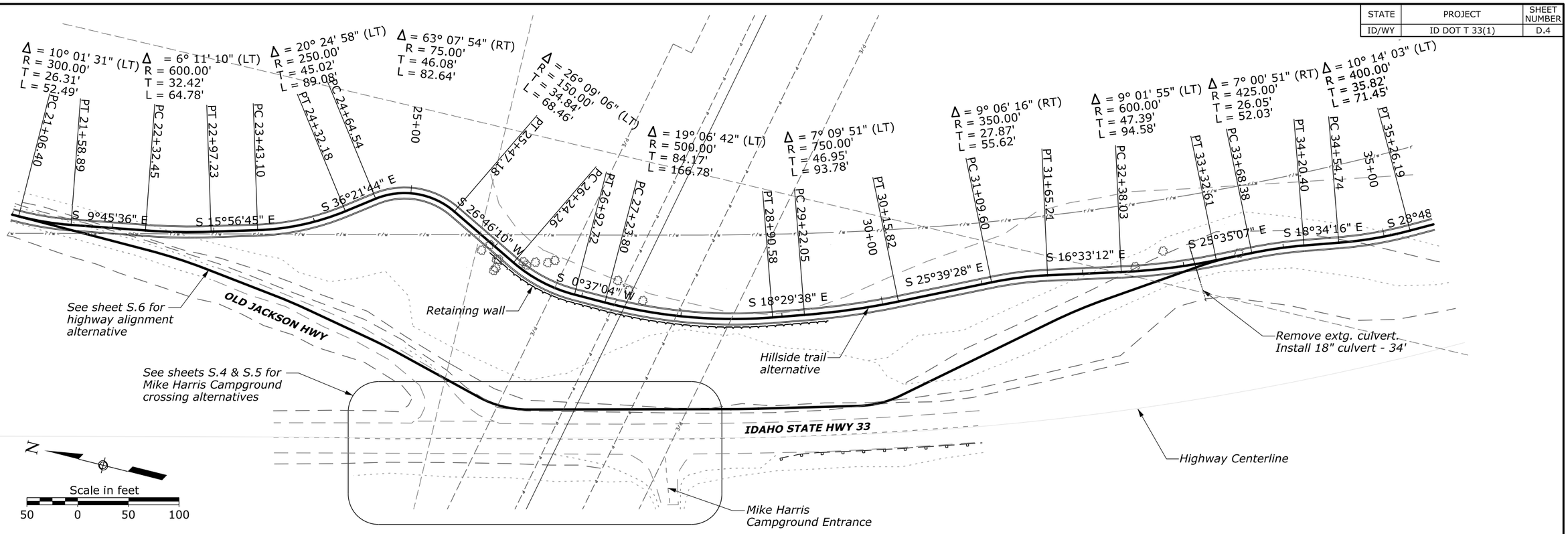
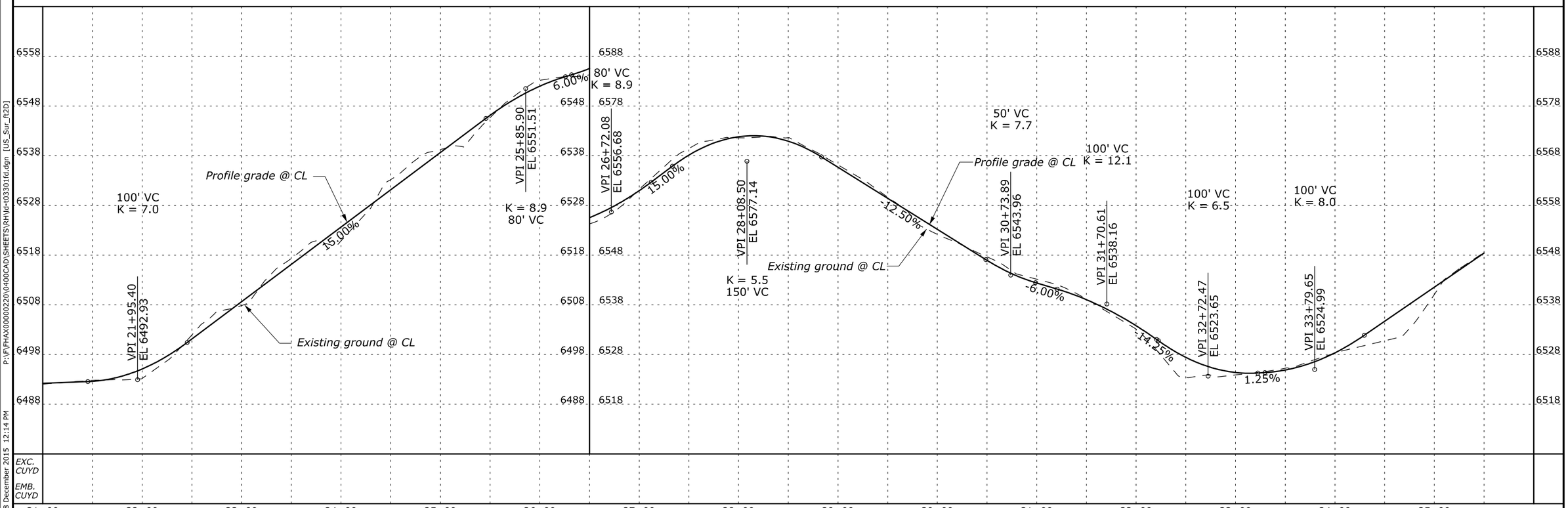
ID/WY	ID DOT T 33(1)	D.4





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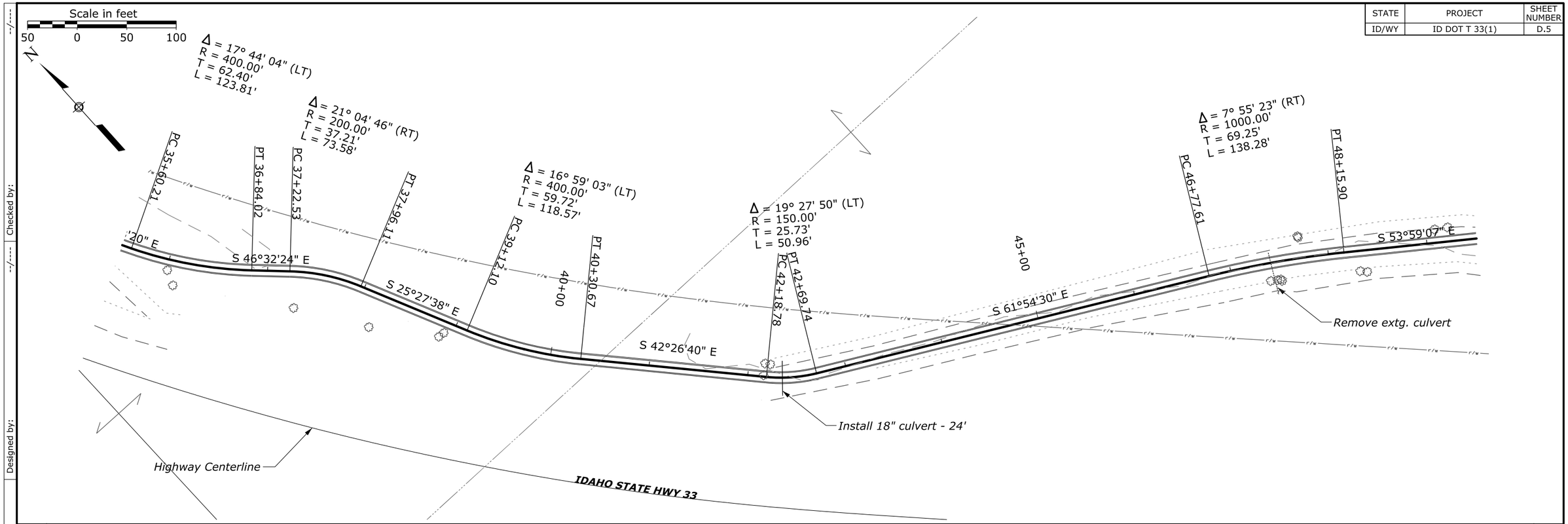
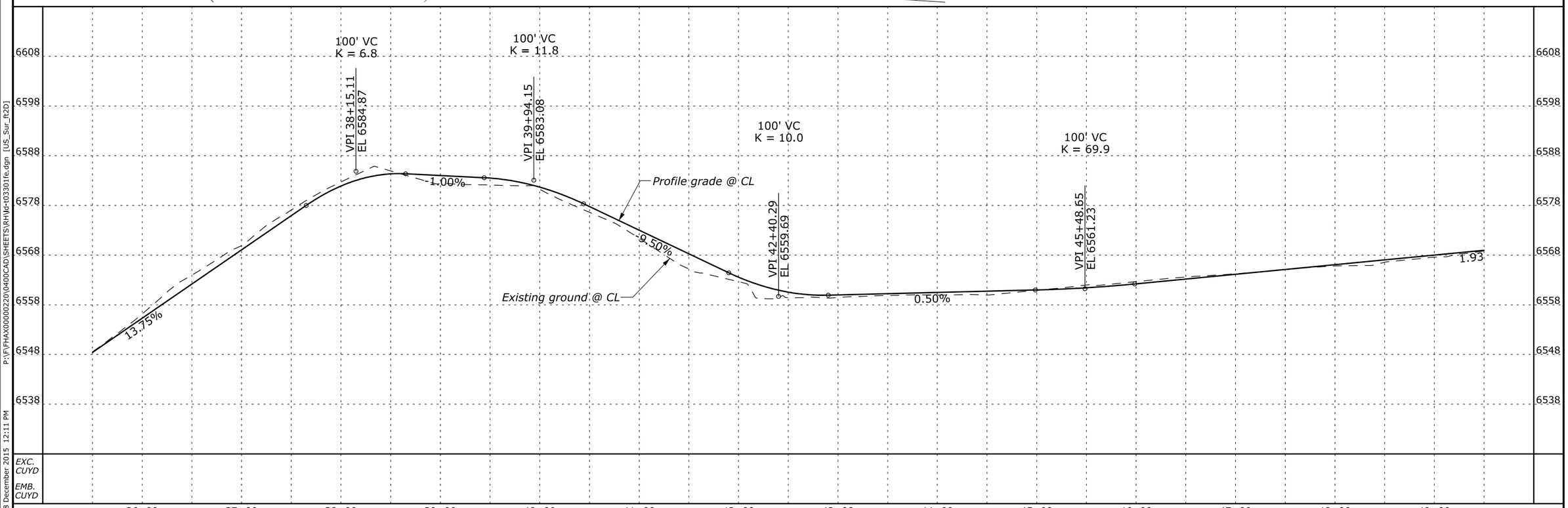
ID/WY	ID DOT T 33(1)	D.5





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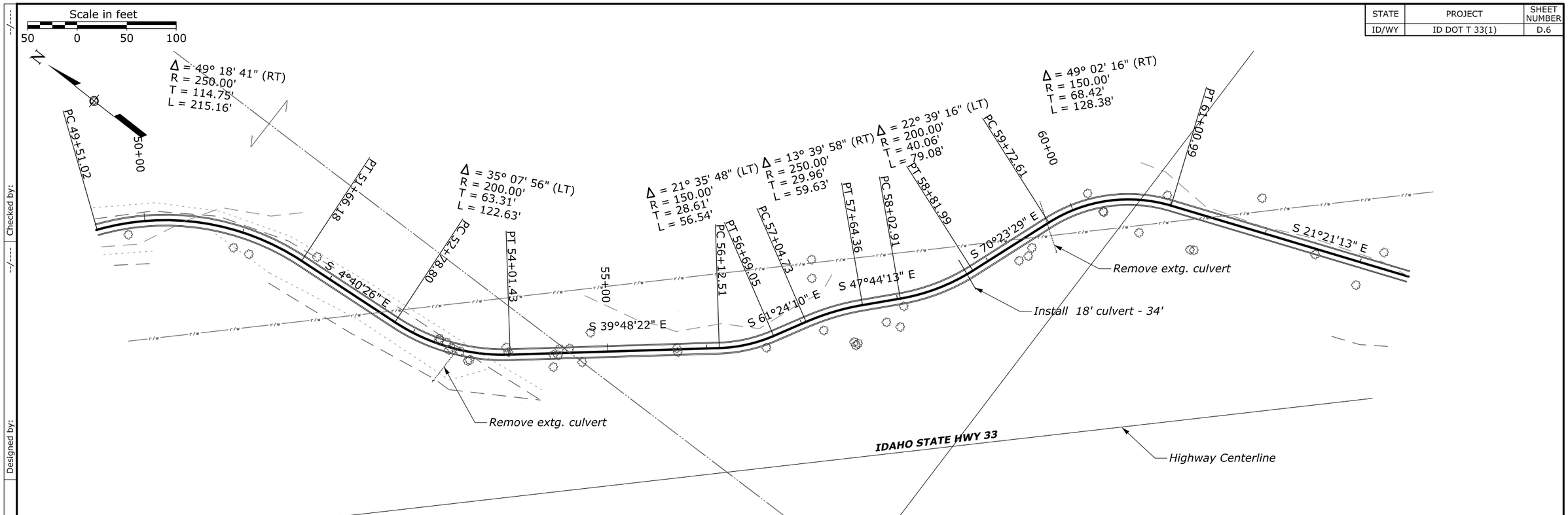
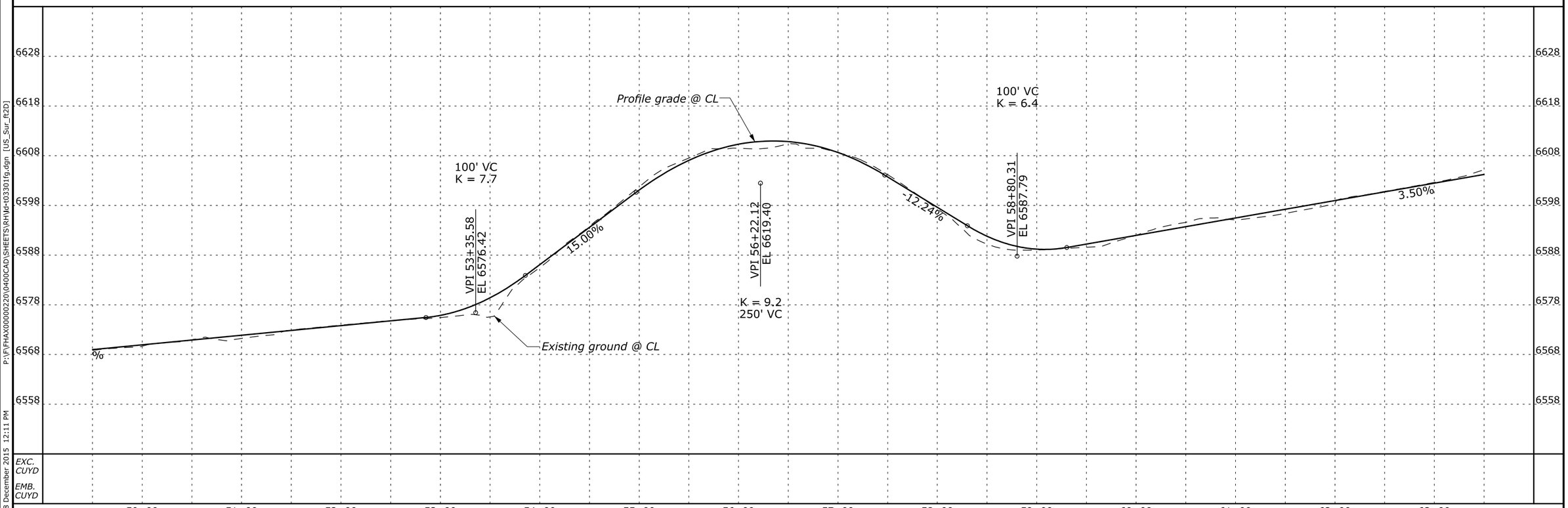
18 December 2015 12:11 PM

STATE	PROJECT	SHEET NUMBER
ID/WY	ID DOT T 33(1)	D.6





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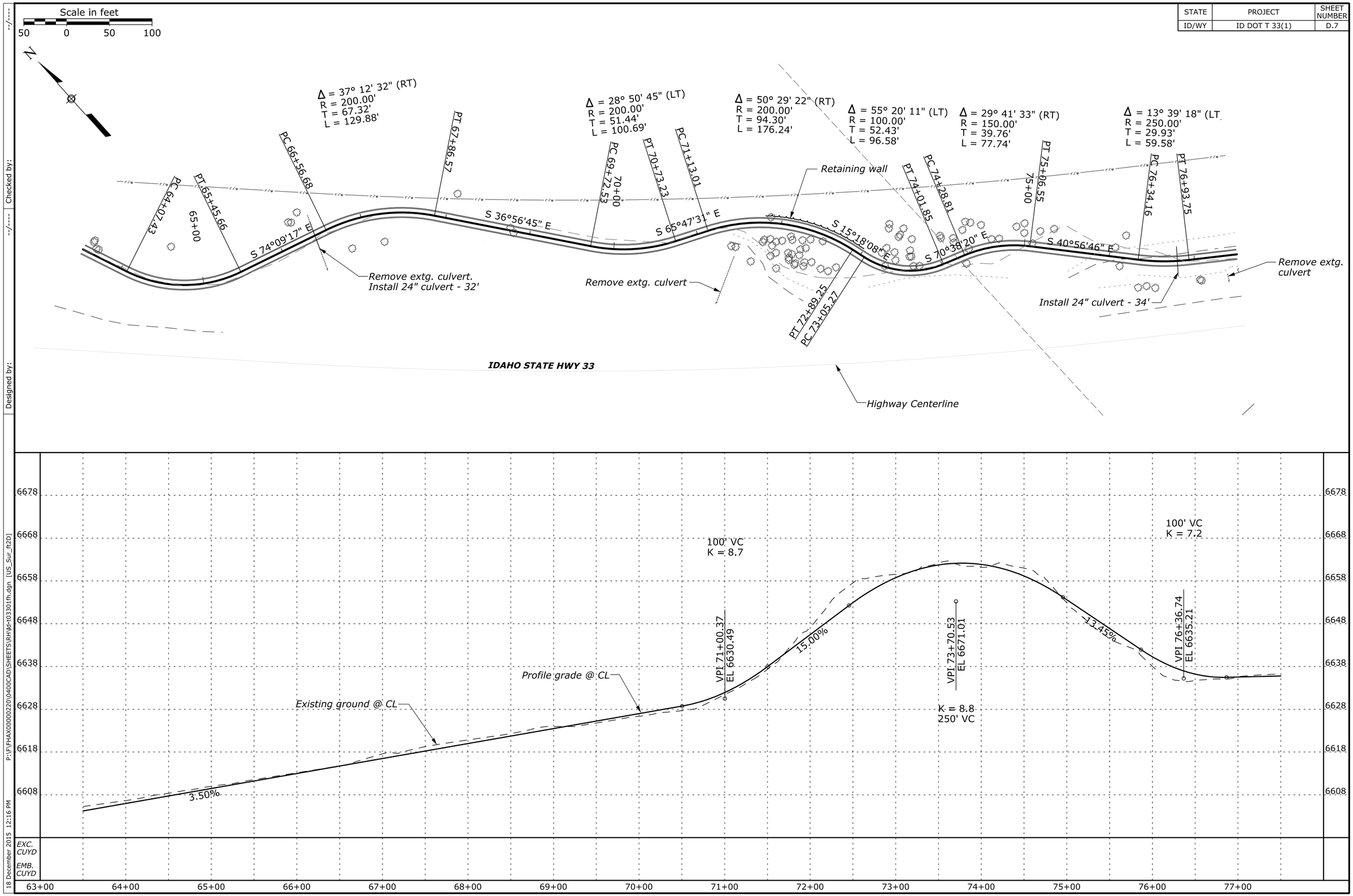
18 December 2015 12:11 PM

STATE	PROJECT	SHEET NUMBER
ID/WY	ID DOT T 33(1)	D.7



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Checked by: -/---
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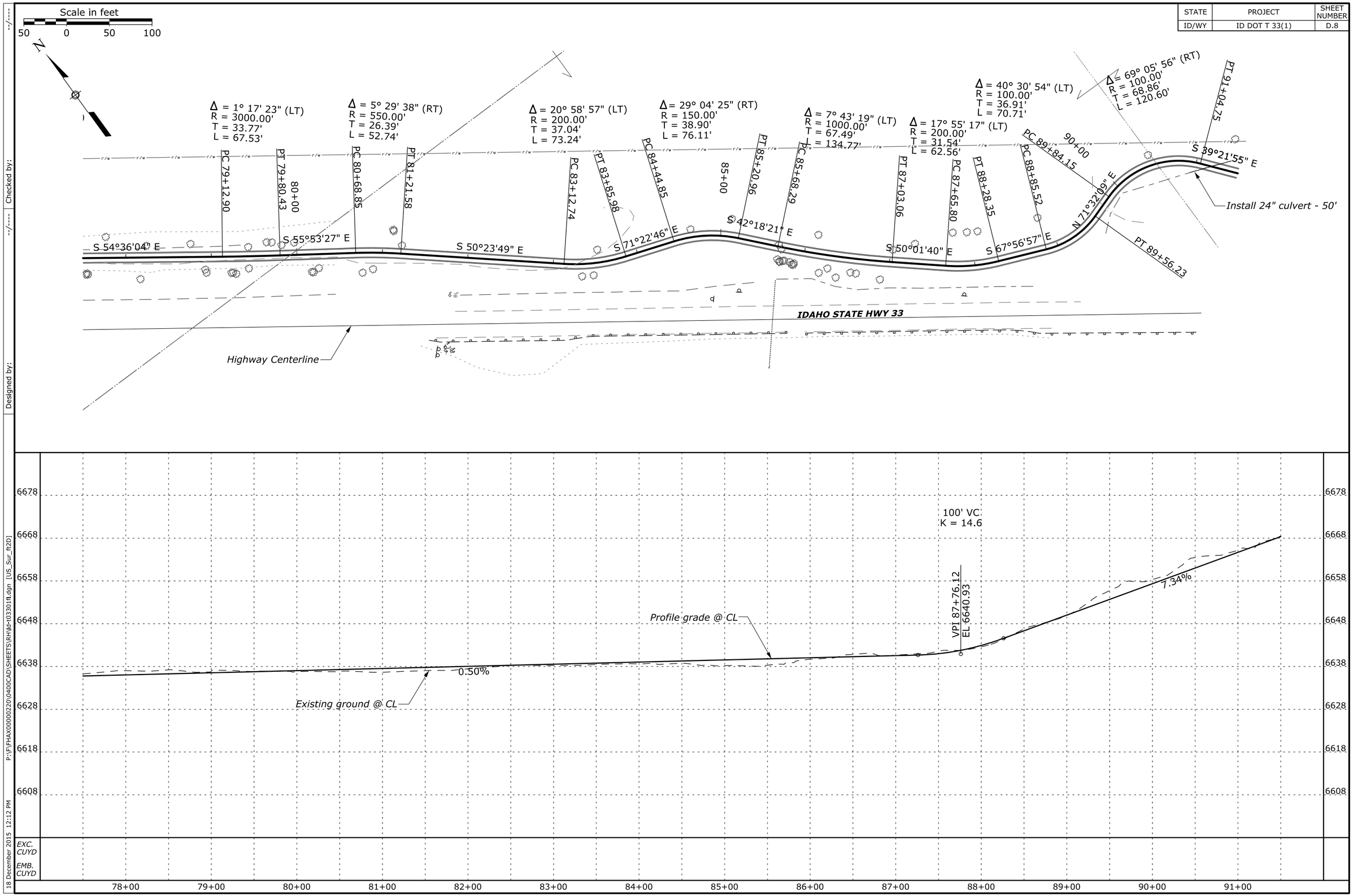
STATE	PROJECT	SHEET NUMBER
ID/WY	ID DOT T 33(1)	D.8



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18 December 2015 12:12 PM

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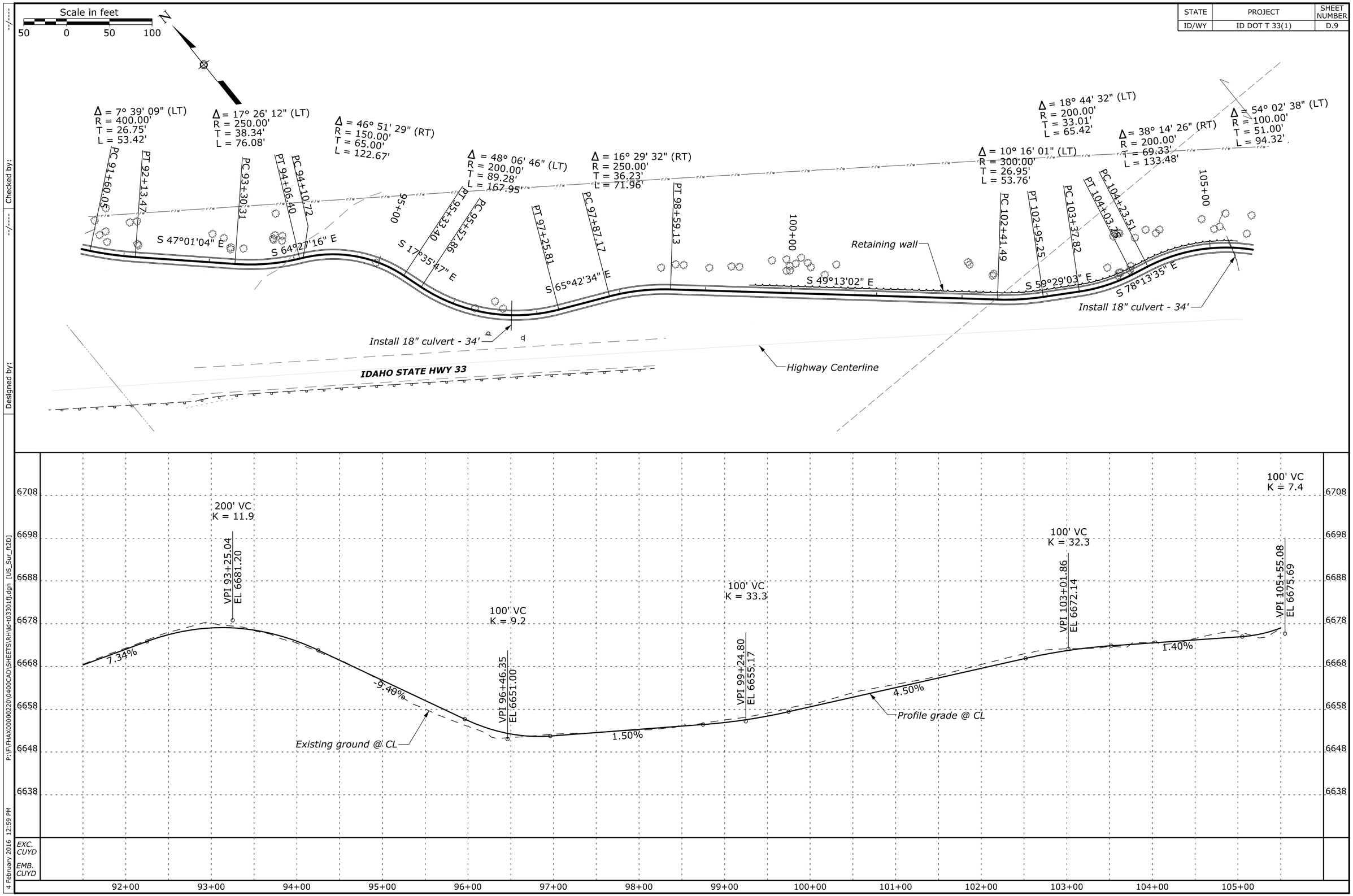
ID/WY	ID DOT T 33(1)	D.9



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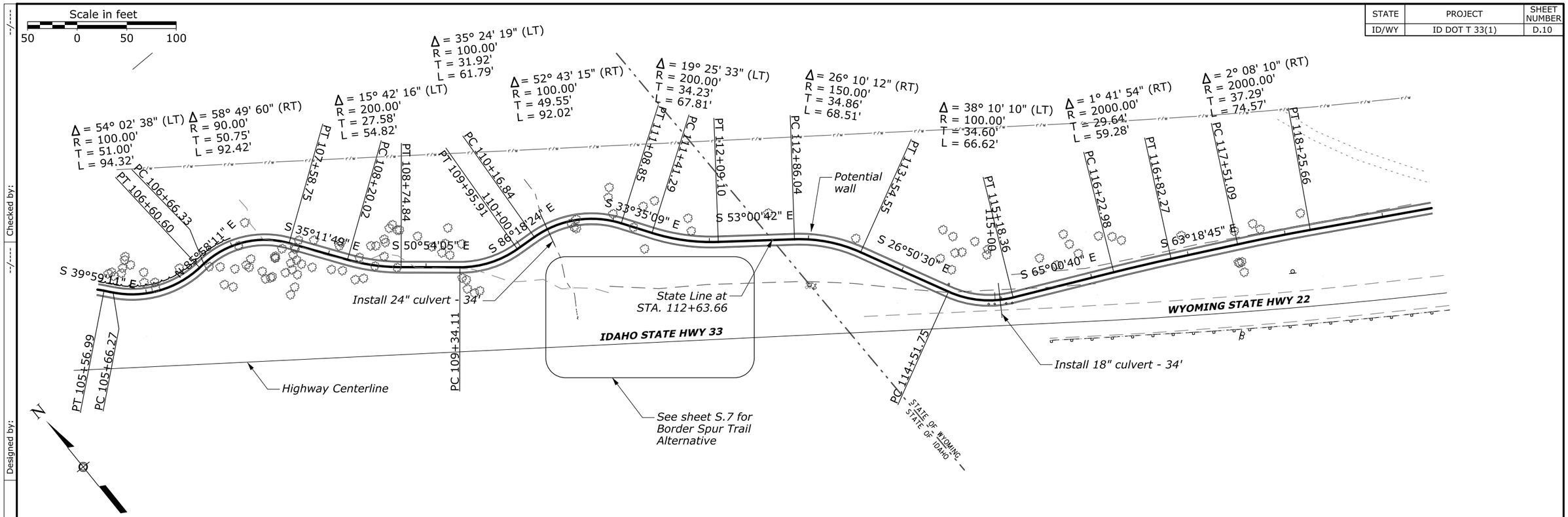
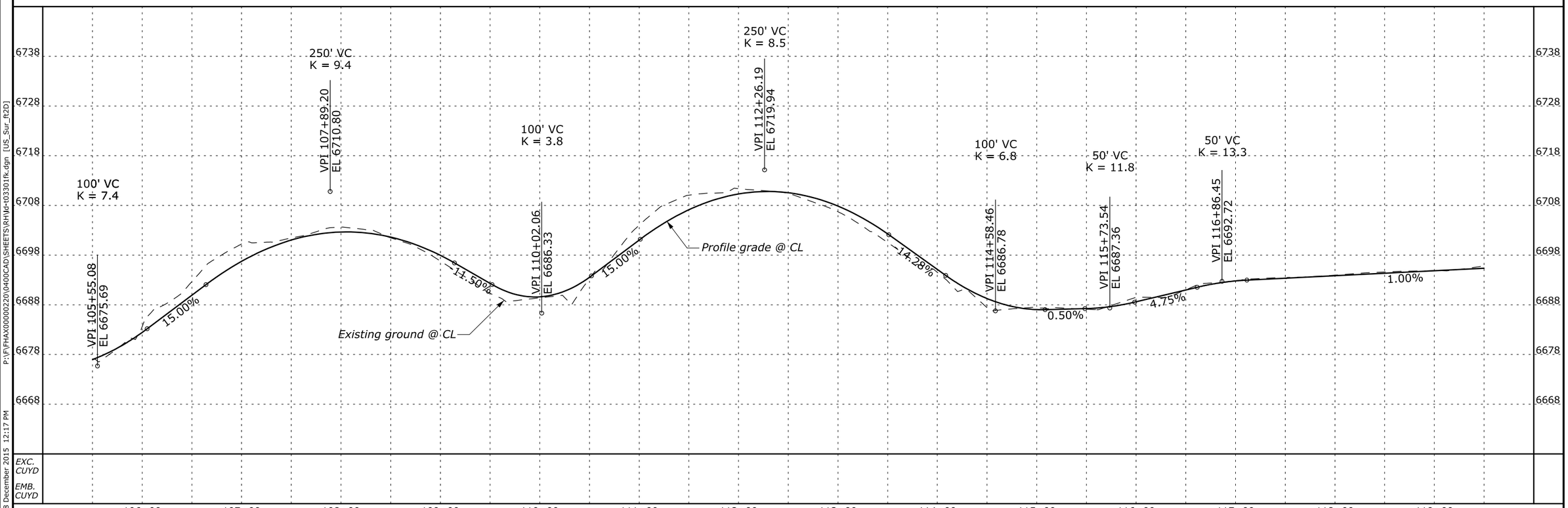
4 February 2016 12:59 PM

STATE	PROJECT	SHEET NUMBER
ID/WY	ID DOT T 33(1)	D.10





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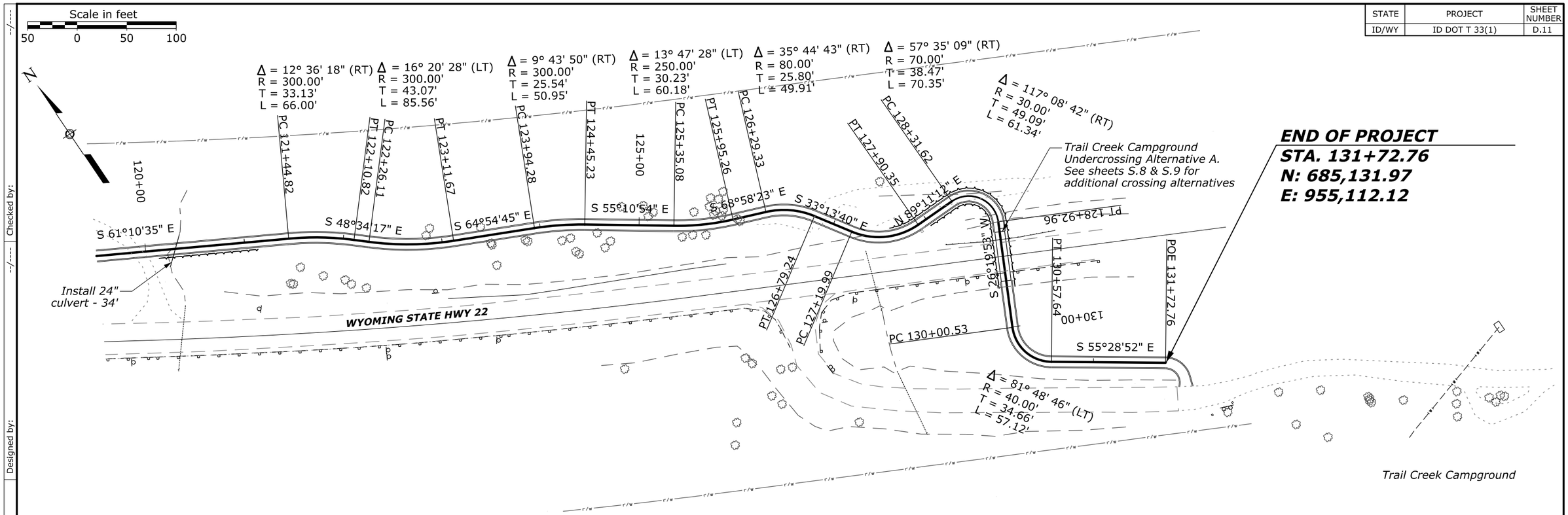
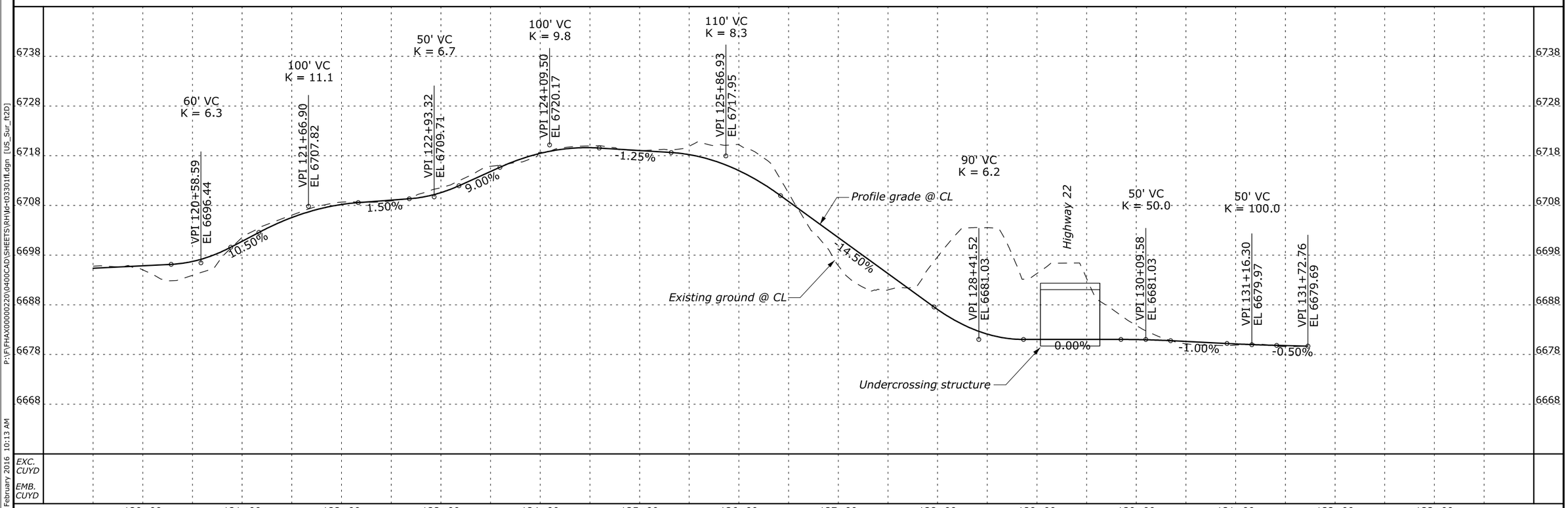
18 December 2015 12:17 PM

STATE	PROJECT	SHEET NUMBER
ID/WY	ID DOT T 33(1)	D.11





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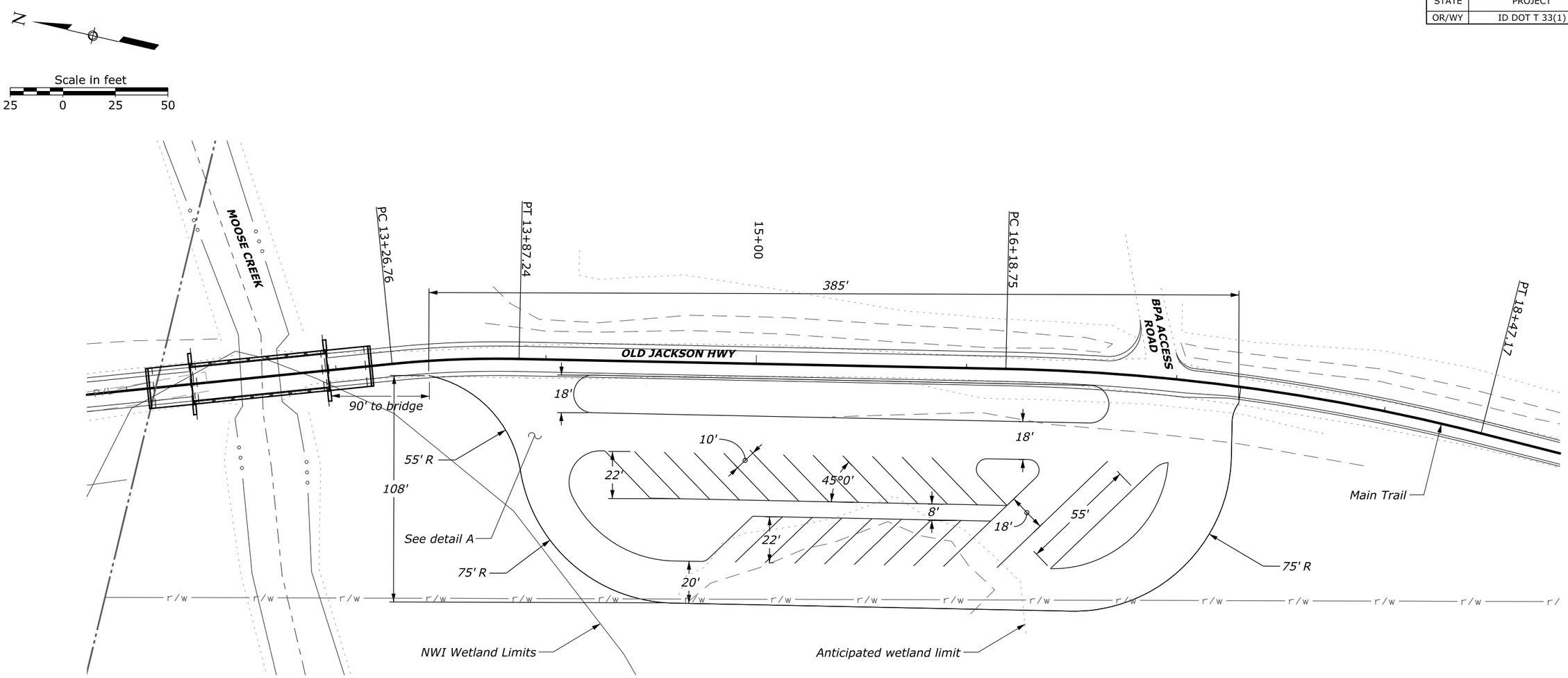
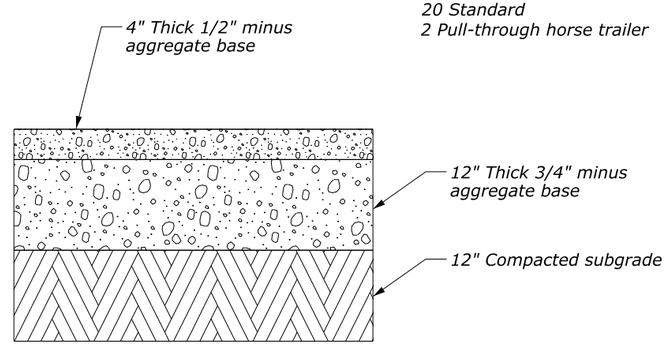
4 February 2016 10:13 AM

STATE	PROJECT	SHEET NUMBER
OR/WY	ID DOT T 33(1)	S.1



PARKING STALLS

20 Standard
2 Pull-through horse trailer



DETAIL A
PARKING LOT SURFACING

PARKING LOT ALTERNATIVE A

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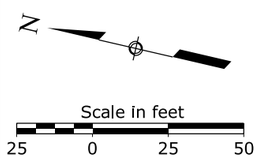
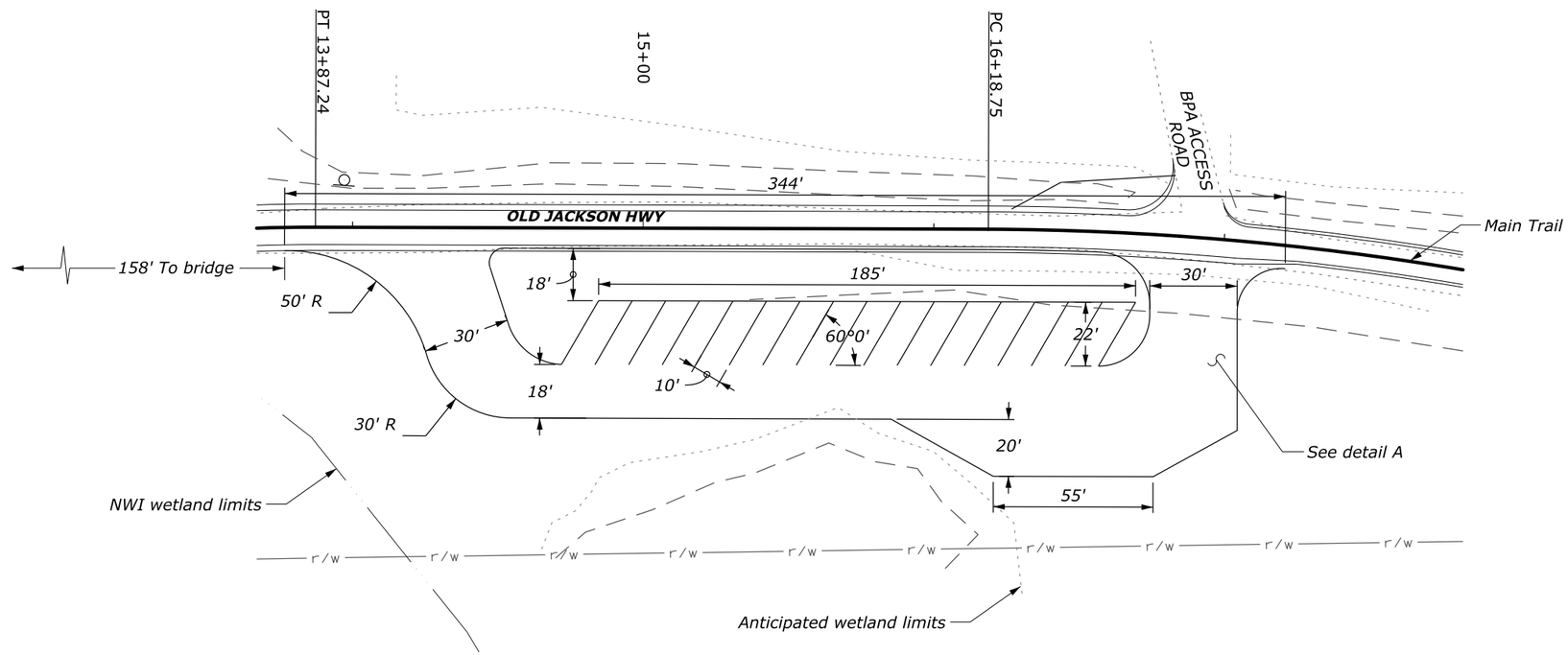
4 February 2016 10:59 AM P:\F\FHAX00000220\0400CAD\SHEETS\RH\id-t03301sa.dgn [US_Sur_ft2D]

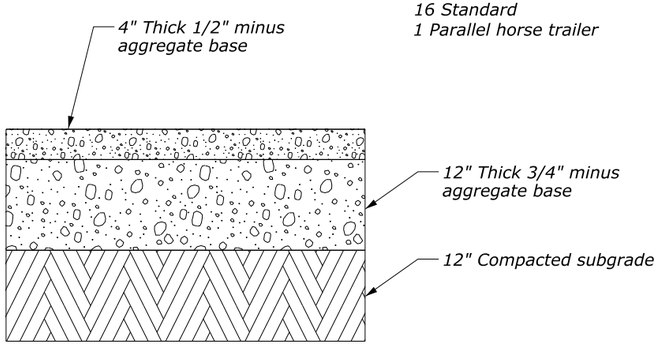
STATE	PROJECT	SHEET NUMBER
OR/WY	ID DOT T 33(1)	S.2





PARKING STALLS

16 Standard
1 Parallel horse trailer



DETAIL A
PARKING LOT SURFACING

PARKING LOT ALTERNATIVE B

18 December 2015 12:29 PM P:\F\FHAX00000220\0400CAD\SHEETS\RH\ID-033013sb.dgn [US_Sur_ft2D]
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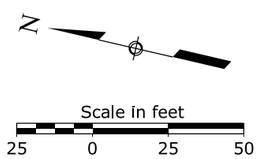
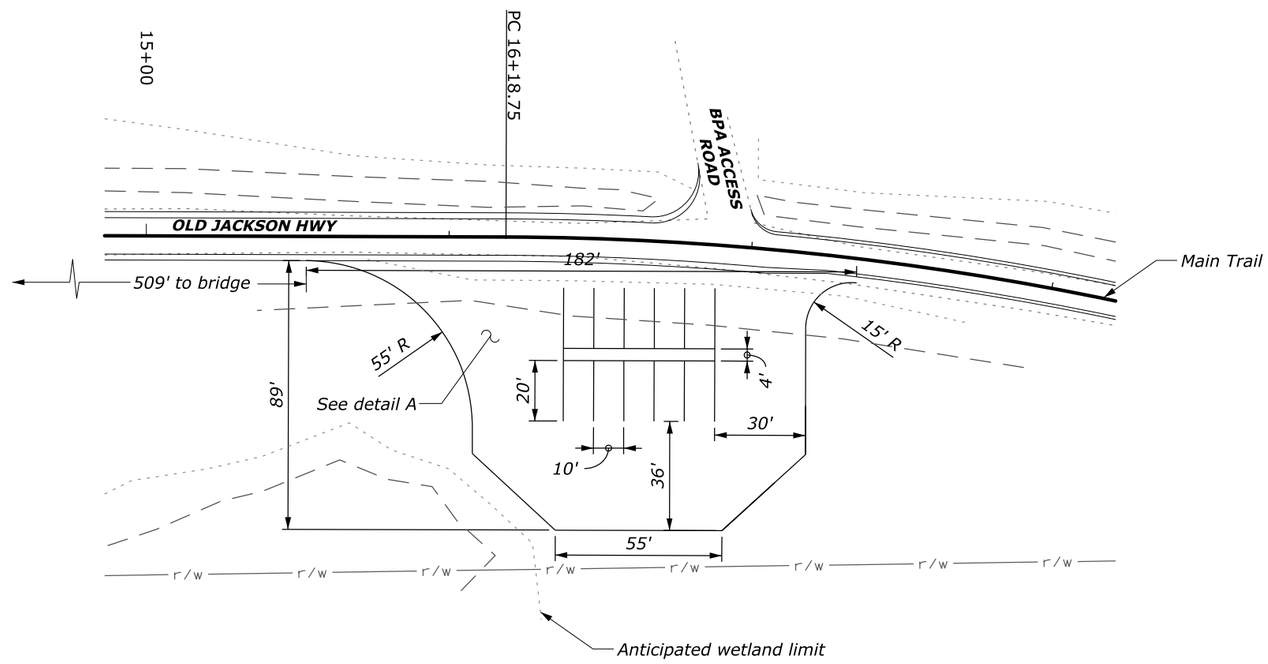
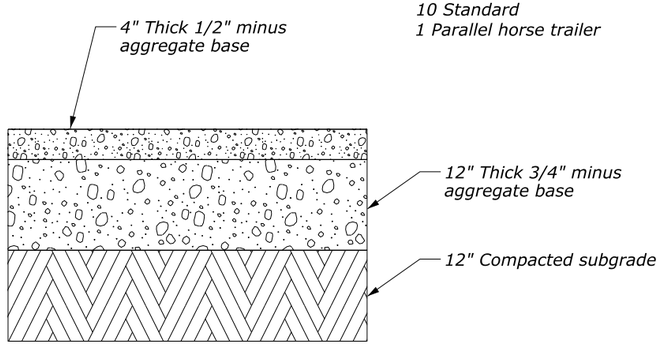
STATE	PROJECT	SHEET NUMBER
OR/WY	ID DOT T 33(1)	S.3





PARKING STALLS

10 Standard
1 Parallel horse trailer



DETAIL A
PARKING LOT SURFACING

PARKING LOT ALTERNATIVE C

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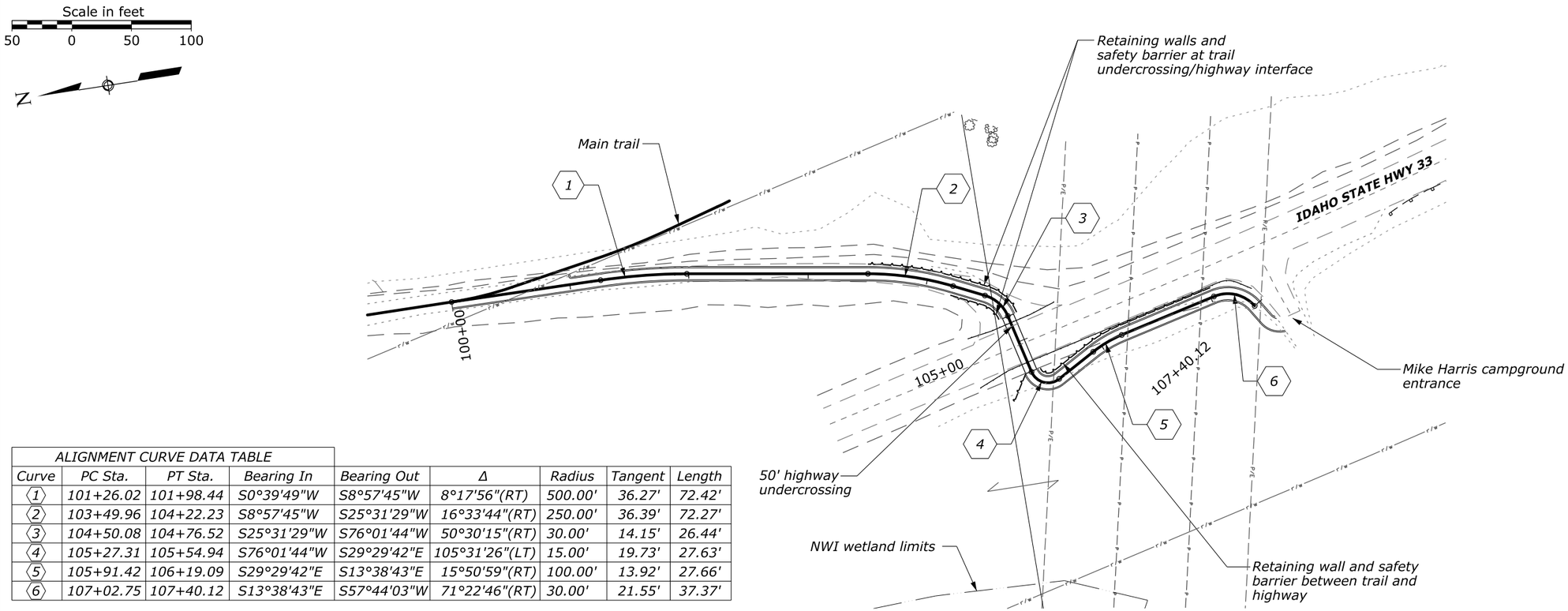
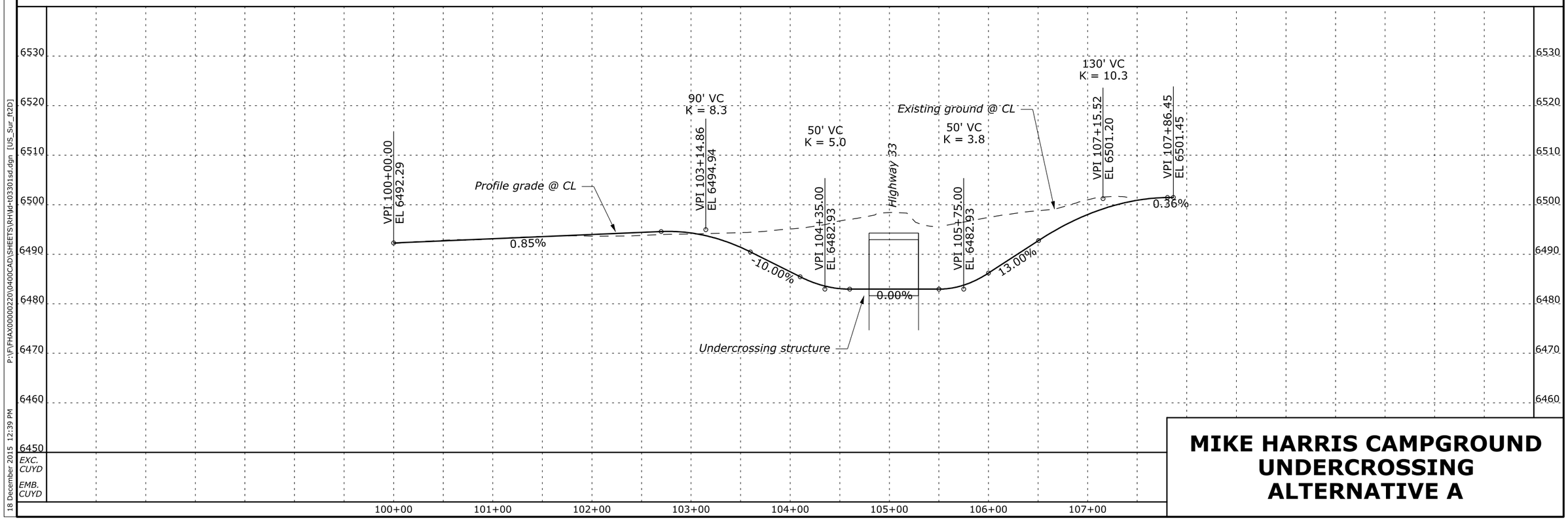
18 December 2015 1:46 PM
P:\FFHAX00000220\0400CAD\SHEETS\RH\id-t03301sc.dgn [US_Sur_ft2D]

STATE	PROJECT	SHEET NUMBER
ID/WY	ID DOT T 33(1)	S.4



ALIGNMENT CURVE DATA TABLE

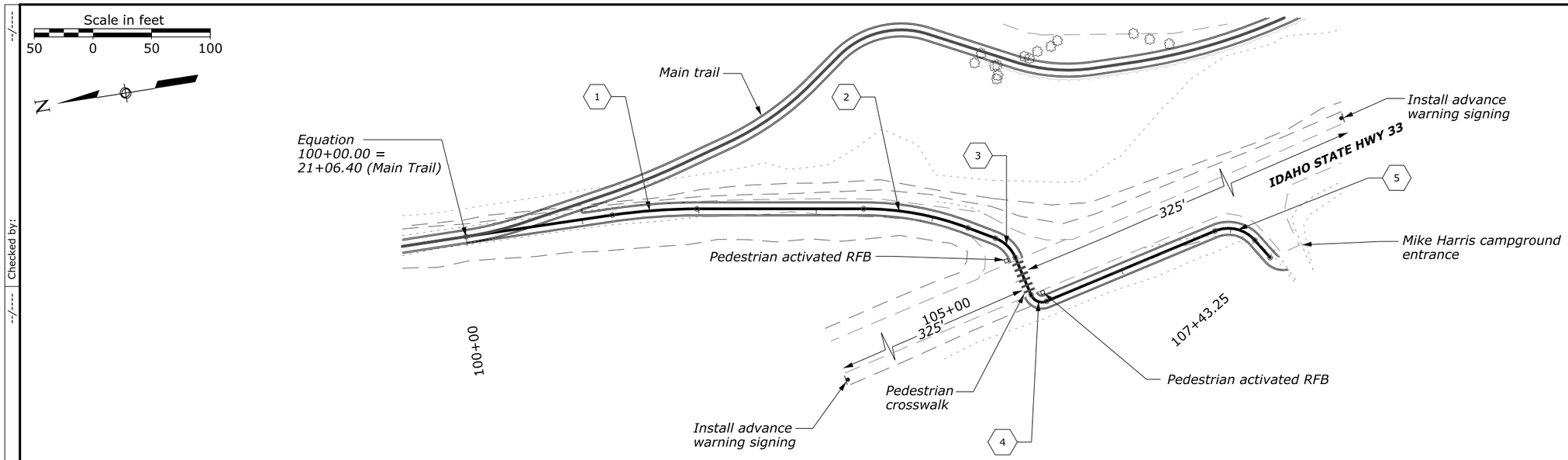
Curve	PC Sta.	PT Sta.	Bearing In	Bearing Out	Δ	Radius	Tangent	Length
1	101+26.02	101+98.44	S0°39'49"W	S8°57'45"W	8°17'56"(RT)	500.00'	36.27'	72.42'
2	103+49.96	104+22.23	S8°57'45"W	S25°31'29"W	16°33'44"(RT)	250.00'	36.39'	72.27'
3	104+50.08	104+76.52	S25°31'29"W	S76°01'44"W	50°30'15"(RT)	30.00'	14.15'	26.44'
4	105+27.31	105+54.94	S76°01'44"W	S29°29'42"E	105°31'26"(LT)	15.00'	19.73'	27.63'
5	105+91.42	106+19.09	S29°29'42"E	S13°38'43"E	15°50'59"(RT)	100.00'	13.92'	27.66'
6	107+02.75	107+40.12	S13°38'43"E	S57°44'03"W	71°22'46"(RT)	30.00'	21.55'	37.37'



MIKE HARRIS CAMPGROUND UNDERCROSSING ALTERNATIVE A

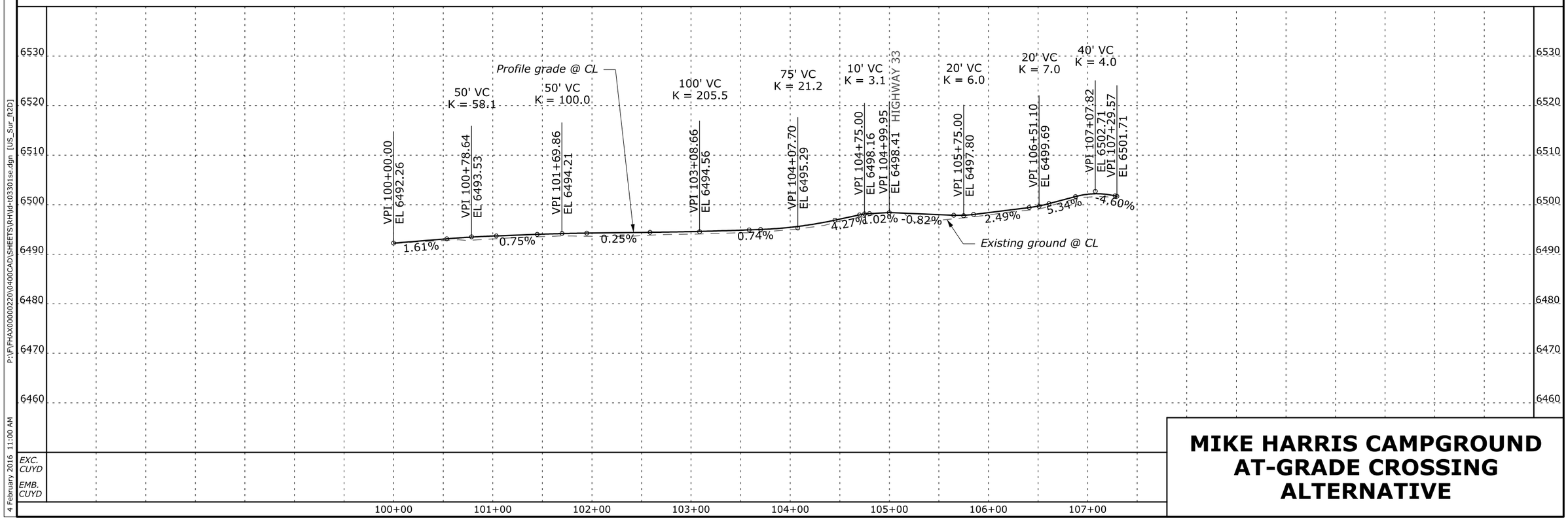
Designed by: --/---
Checked by: --/---
P:\FEHAX00000220\0400CAD\SHEETS\RH\id-03301sd.dgn [US_Sur_ft2D]
18 December 2015 12:39 PM

STATE	PROJECT	SHEET NUMBER
ID/WY	ID DOT T 33(1)	S.5



ALIGNMENT CURVE DATA TABLE								
Curve	PC Sta.	PT Sta.	Bearing In	Bearing Out	Δ	Radius	Tangent	Length
1	101+26.02	101+98.44	S0°39'49"W	S8°57'45"W	8°17'56"(RT)	500.00'	36.27'	72.42'
2	103+40.43	104+31.25	S8°57'45"W	S29°46'38"W	20°48'53"(RT)	250.00'	45.92'	90.82'
3	104+56.21	104+80.47	S29°46'38"W	S76°05'57"W	46°19'18"(RT)	30.00'	12.83'	24.25'
4	105+15.11	105+30.77	S76°05'57"W	S13°37'37"E	89°43'34"(LT)	10.00'	9.95'	15.66'
5	106+86.18	107+23.41	S13°37'37"E	S57°28'20"W	71°05'57"(RT)	30.00'	21.44'	37.23'

NOTE:
Highway alignment supports SSD>645' (Design speed=65 MPH) to crossing location from both directions



MIKE HARRIS CAMPGROUND AT-GRADE CROSSING ALTERNATIVE

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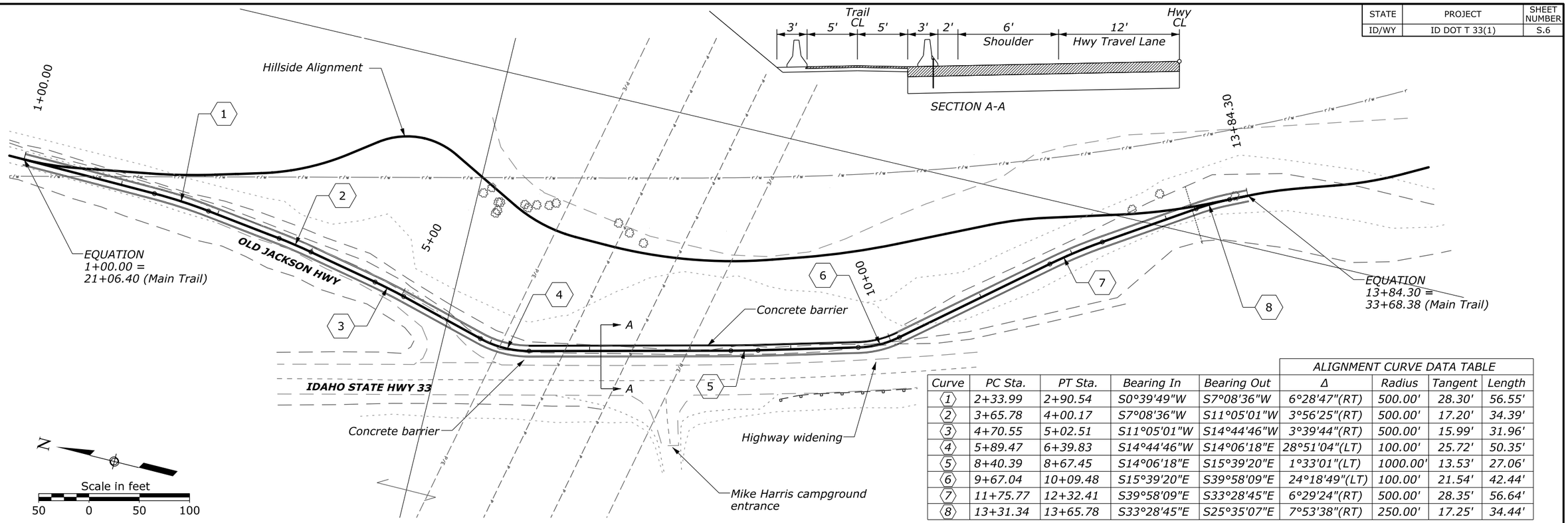
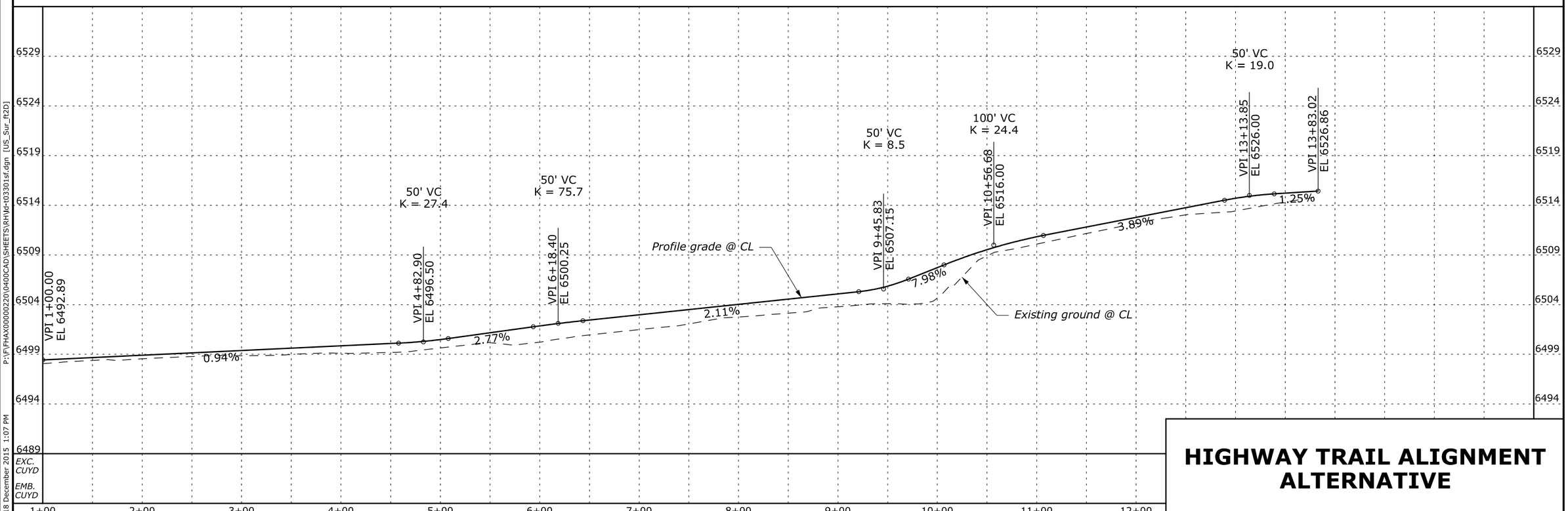
4 February 2016 11:00 AM

STATE	PROJECT	SHEET NUMBER
ID/WY	ID DOT T 33(1)	S.6



ALIGNMENT CURVE DATA TABLE

Curve	PC Sta.	PT Sta.	Bearing In	Bearing Out	Δ	Radius	Tangent	Length
1	2+33.99	2+90.54	S0°39'49"W	S7°08'36"W	6°28'47"(RT)	500.00'	28.30'	56.55'
2	3+65.78	4+00.17	S7°08'36"W	S11°05'01"W	3°56'25"(RT)	500.00'	17.20'	34.39'
3	4+70.55	5+02.51	S11°05'01"W	S14°44'46"W	3°39'44"(RT)	500.00'	15.99'	31.96'
4	5+89.47	6+39.83	S14°44'46"W	S14°06'18"E	28°51'04"(LT)	100.00'	25.72'	50.35'
5	8+40.39	8+67.45	S14°06'18"E	S15°39'20"E	1°33'01"(LT)	1000.00'	13.53'	27.06'
6	9+67.04	10+09.48	S15°39'20"E	S39°58'09"E	24°18'49"(LT)	100.00'	21.54'	42.44'
7	11+75.77	12+32.41	S39°58'09"E	S33°28'45"E	6°29'24"(RT)	500.00'	28.35'	56.64'
8	13+31.34	13+65.78	S33°28'45"E	S25°35'07"E	7°53'38"(RT)	250.00'	17.25'	34.44'



HIGHWAY TRAIL ALIGNMENT ALTERNATIVE

--/---- Designed by: --/---- Checked by: --/----

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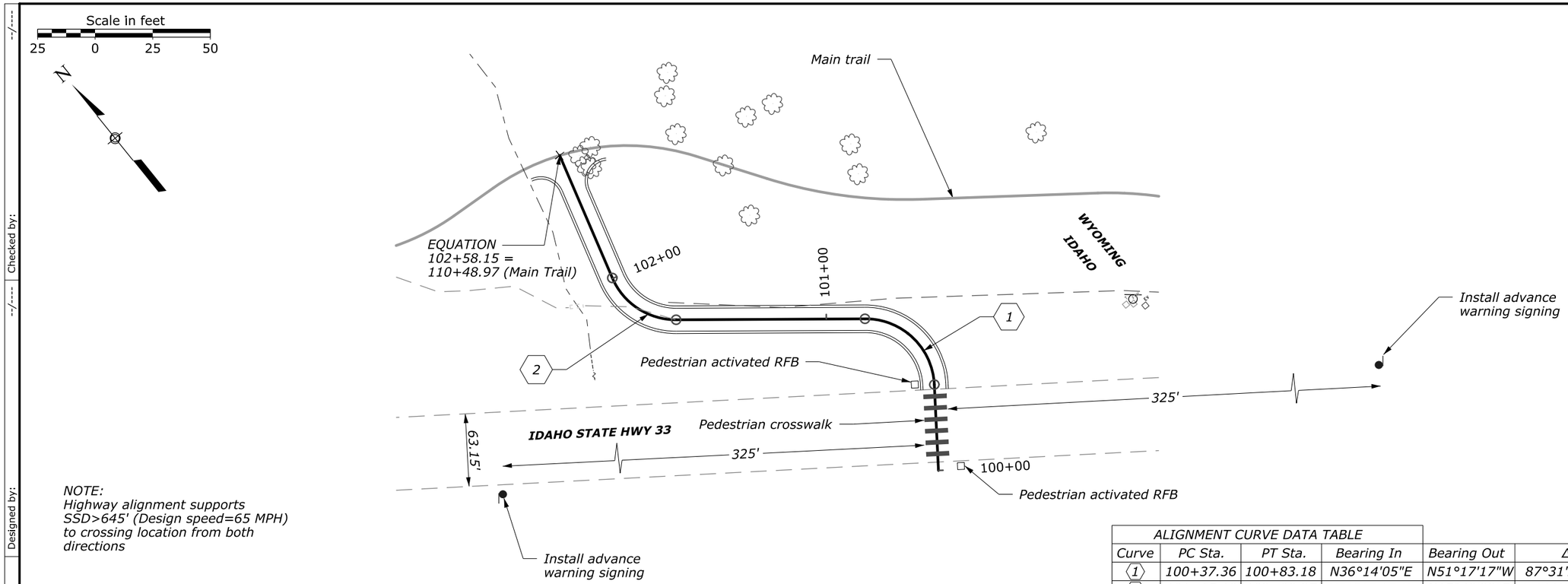
18 December 2015 1:07 PM

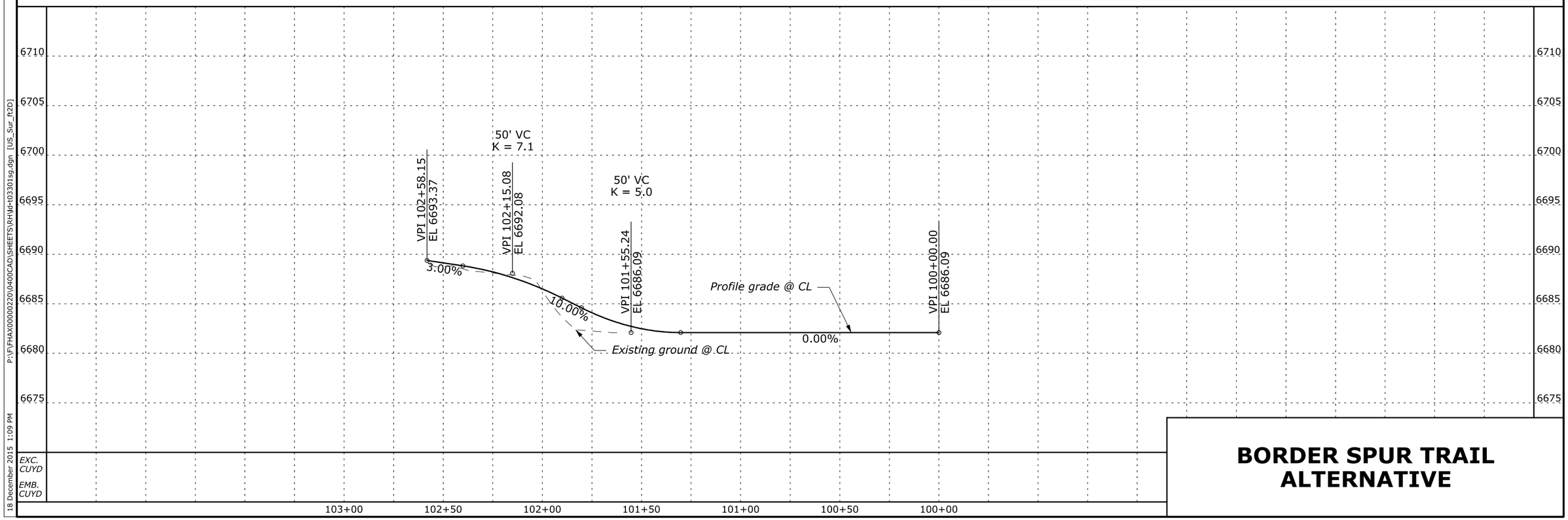
STATE	PROJECT	SHEET NUMBER
ID/WY	ID DOT T 33(1)	S.7



NOTE:
Highway alignment supports
SSD>645' (Design speed=65 MPH)
to crossing location from both
directions

ALIGNMENT CURVE DATA TABLE

Curve	PC Sta.	PT Sta.	Bearing In	Bearing Out	Δ	Radius	Tangent	Length
1	100+37.36	100+83.18	N36°14'05"E	N51°17'17"W	87°31'21"(LT)	30.00'	28.73'	45.83'
2	101+65.18	102+00.27	N51°17'17"W	N15°43'22"E	67°00'38"(RT)	30.00'	19.86'	35.09'



BORDER SPUR TRAIL ALTERNATIVE

Designed by: --/---- Checked by: --/----

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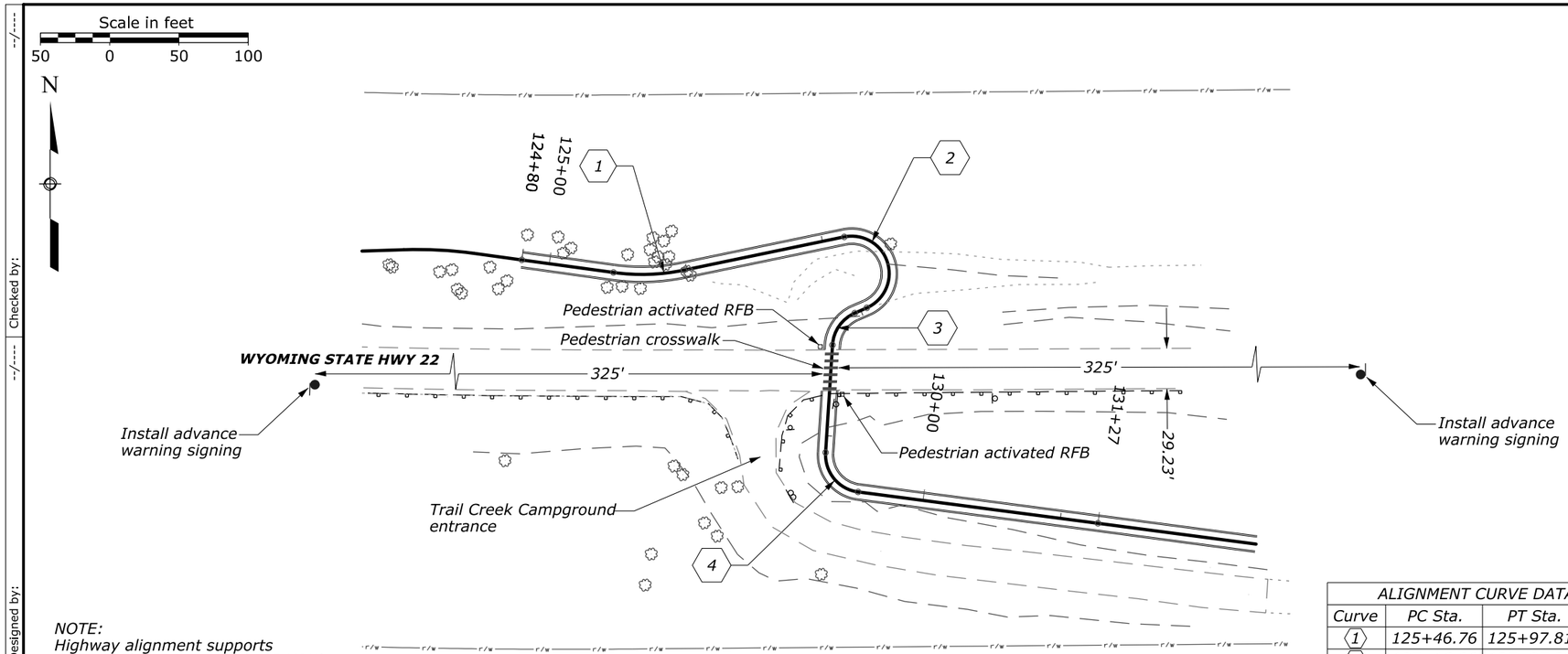
18 December 2015 1:09 PM

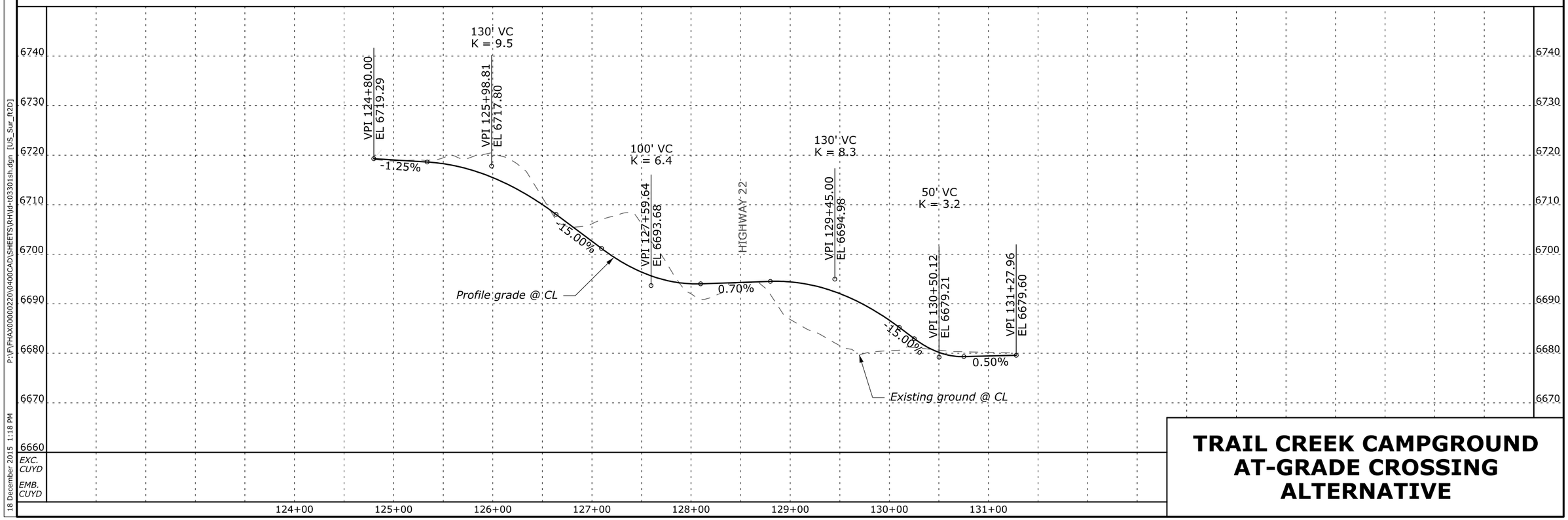
STATE	PROJECT	SHEET NUMBER
ID	ID DOT T 33(1	S.8



NOTE:
Highway alignment supports SSD>645' (Design speed=65 MPH) to crossing location from both directions

ALIGNMENT CURVE DATA TABLE

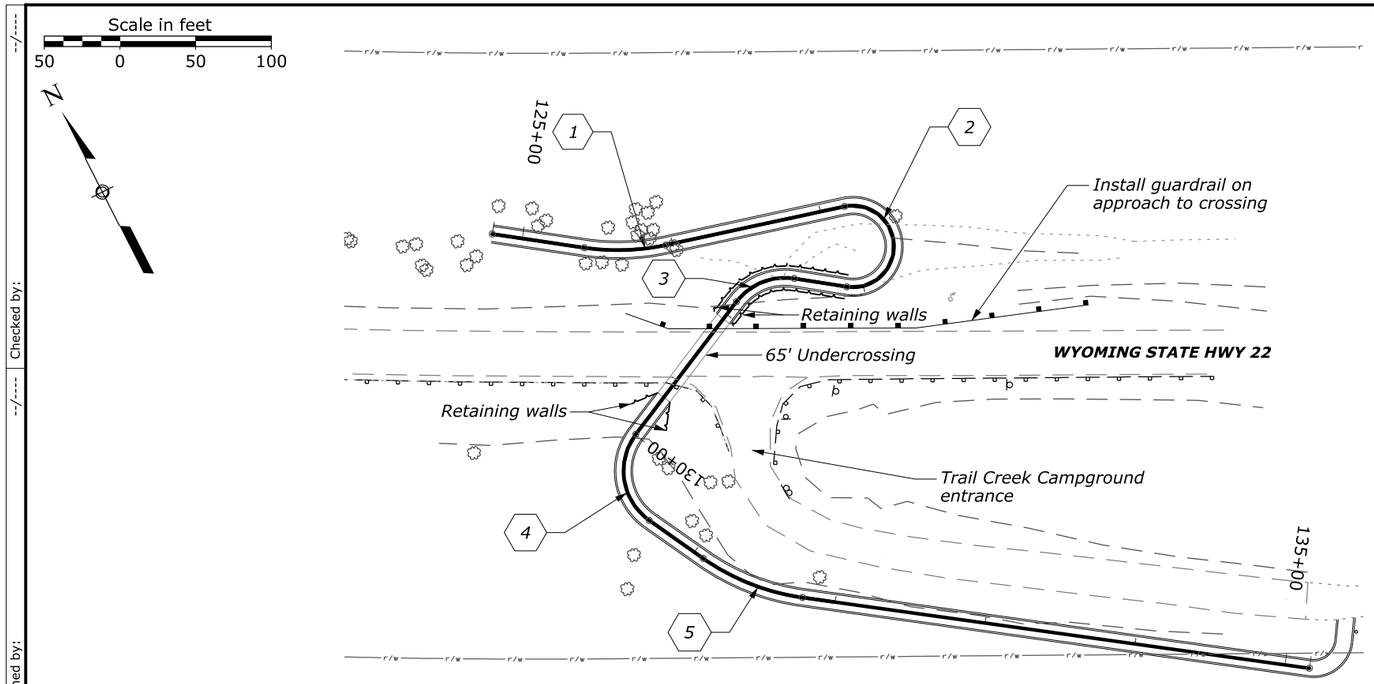
Curve	PC Sta.	PT Sta.	Bearing In	Bearing Out	Δ	Radius	Tangent	Length
1	125+46.76	125+97.81	S55°10'54"E	S74°41'05"E	19°30'10"(LT)	150.00'	25.78'	51.06'
2	127+16.06	127+95.28	S74°41'05"E	N86°35'12"W	168°05'52"(RT)	27.00'	259.02'	79.21'
3	128+04.74	128+34.33	N86°35'12"W	S30°38'12"W	62°46'36"(LT)	27.00'	16.47'	29.58'
4	129+12.09	129+52.71	S30°38'12"W	S55°34'03"E	86°12'15"(LT)	27.00'	25.27'	40.62'



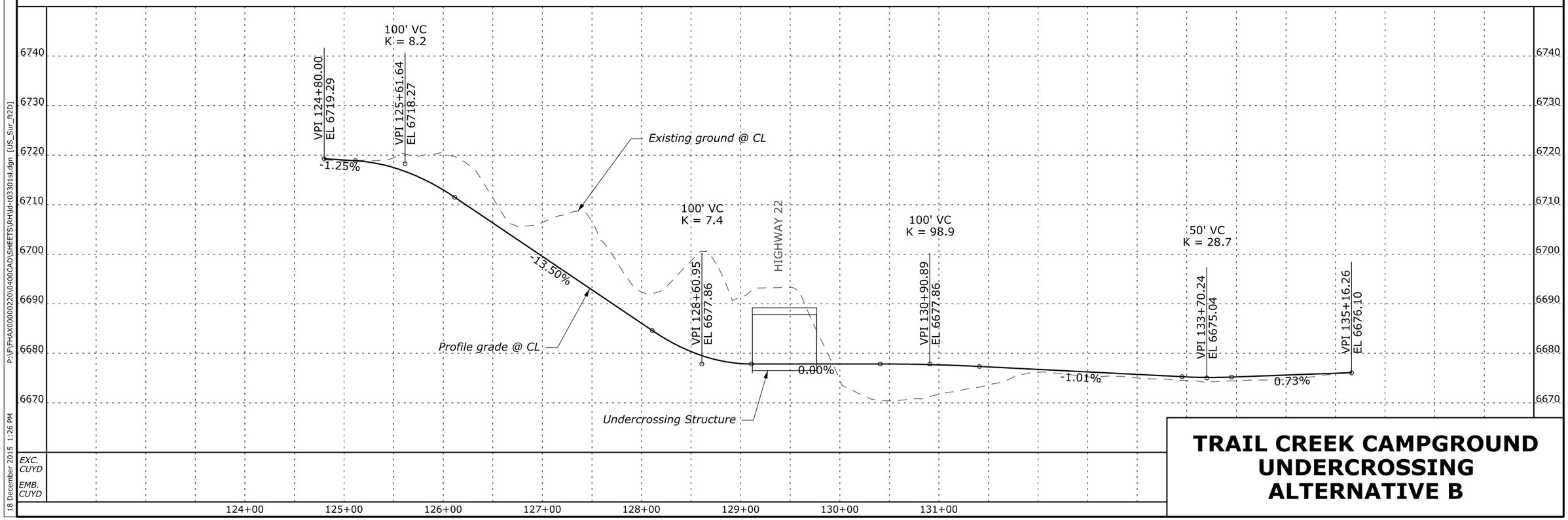
TRAIL CREEK CAMPGROUND AT-GRADE CROSSING ALTERNATIVE

Designed by: --/---
Checked by: --/---
P:\FEHAX00000220\0400CAD\SHEETS\RH\id-033301sh.dgn [US_Sur_ft2D]
18 December 2015 1:18 PM

STATE	PROJECT	SHEET NUMBER
ID/WY	ID DOT T 33(1)	S.9



ALIGNMENT CURVE DATA TABLE								
Curve	PC Sta.	PT Sta.	Bearing In	Bearing Out	Δ	Radius	Tangent	Length
1	125+41.41	125+95.49	S54°31'47"E	S75°11'12"E	20°39'25"(LT)	150.00'	27.34'	54.08'
2	127+16.24	128+11.06	S75°11'12"E	N53°58'58"W	201°12'14"(RT)	27.00'	———	94.82'
3	128+46.17	128+89.31	N53°58'58"W	S64°13'40"W	61°47'22"(LT)	40.00'	23.93'	43.14'
4	129+99.21	130+63.52	S64°13'40"W	S27°52'59"E	92°06'38"(LT)	40.00'	41.50'	64.31'
5	131+07.08	131+78.24	S27°52'59"E	S55°03'52"E	27°10'54"(LT)	150.00'	36.26'	71.06'



TRAIL CREEK CAMPGROUND UNDERCROSSING ALTERNATIVE B

Designed by: --/---
Checked by: --/---
P:\FEHAX00000220\0400CAD\SHEETS\RH\Id-033301sl.dgn [US_Sur_ft2D]
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APPENDIX B

Concept Cost Estimate

Project Description:	Idaho Teton Centennial Trail	Client: FHA	
Corridor Section:	Main Line		
Location:	Teton County, Idaho	Entered by: CRCO	
Description:	STA. 10+00.00 to 21+00.00, 33+50.00 to 124+80.00	Checked by: JFM	
Date:	2/4/2016		

ITEM NO.	SPECIFICATION SECTION	ITEM	UNIT	UNIT COST	QUANTITY	COST
200 -TEMPORARY FEATURES AND APPURTENANCES						
1		MOBILIZATION (10%)	LS	10%	ALL	$ 117,000.00
2		TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC (2%)	LS	2%	ALL	$ 23,400.00
3		EROSION CONTROL (1%)	LS	1%	ALL	$ 11,700.00
4		POLLUTION CONTROL PLAN	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 153,100.00**
300 - ROADWORK						
5		CONSTRUCTION SURVEY WORK (1.5%)	LS	1.5%	ALL	$ 17,600.00
6		CLEARING AND GRUBBING	LS	$ 10,000.00	ALL	$ 10,000.00
7		GENERAL EXCAVATION	CUYD	$ 10.00	21,000	$ 210,000.00
7		EMBANKMENT IN PLACE	CUYD	$ 10.50	2,600	$ 27,300.00
8		SUBGRADE STABILIZATION	CUYD	$ 30.00	250	$ 7,500.00
				Subtotal		**$ 272,400.00**
400 - DRAINAGE AND SEWERS						
9		DRAINAGE APPERTUNANCES	LS	$ 10,000.00	ALL	$ 10,000.00
				Subtotal		**$ 10,000.00**
500 - BRIDGES						
10		WALLS	LS	$ 250,000.00	ALL	$ 250,000.00
11		42 INCH WOOD RAIL	LS	$ 93,000.00	ALL	$ 93,000.00
				Subtotal		**$ 343,000.00**
600 - BASES						
12		AGGREGATE BASE	CY	$ 30.00	1,800	$ 54,000.00
				Subtotal		**$ 54,000.00**
700 - WEARING SURFACES						
13		LEVEL 3, ACP MIXTURE, 1/2 INCH DENSE	TON	$ 75.00	1,700	$ 127,500.00
				Subtotal		**$ 127,500.00**
800 - PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES						
14		STRIPING	LS	$ 2,000.00	ALL	$ 2,000.00
				Subtotal		**$ 2,000.00**
900 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS						
15		SIGNING	LS	$ 5,000.00	ALL	$ 5,000.00
				Subtotal		**$ 5,000.00**
1000 - RIGHT OF WAY DEVELOPMENT AND CONTROL						
16		SEEDING	AC	$ 2,000.00	5.0	$ 10,000.00
				Subtotal		**$ 10,000.00**
SUBTOTAL FOR CONSTRUCTION						**$ 977,000.00**
		CONTINGENCIES		30%		$ 294,000.00
		ENGINEERING DESIGN				$ -
		CONSTRUCTION ENGINEERING				$ -
		RIGHT OF WAY (ALL COSTS INCLUDING ADMINISTRATION, ACQUISITION & DEMO)	LS	-	ALL	$ -
PROJECT TOTAL (ROUNDED)						**$ 1,271,000.00**

Project Description:	Idaho Teton Centennial Trail	Client: FHA	
Corridor Section:	Parking Lot A Alternative		
Location:	Teton County, Idaho	Entered by: CRCO	
Description:	STA. 13+43.77 to STA. 17+30.71	Checked by: JFM	
Date:	2/2/2016		

ITEM NO.	SPECIFICATION SECTION	ITEM	UNIT	UNIT COST	QUANTITY	COST
200 -TEMPORARY FEATURES AND APPURTENANCES						
1		MOBILIZATION (10%)	LS	10%	ALL	$ 8,500.00
2		TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC (2%)	LS	2%	ALL	$ 1,700.00
3		EROSION CONTROL (1%)	LS	1%	ALL	$ 850.00
4		POLLUTION CONTROL PLAN	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 12,050.00**
300 - ROADWORK						
5		CONSTRUCTION SURVEY WORK (1.5%)	LS	1.5%	ALL	$ 1,300.00
6		CLEARING AND GRUBBING	LS	$ 1,800.00	ALL	$ 1,800.00
7		GENERAL EXCAVATION	CUYD	$ 10.00	180	$ 1,800.00
7		EMBANKMENT IN PLACE	CUYD	$ 10.50	2,200	$ 23,100.00
8		SUBGRADE STABILIZATION	CUYD	$ 30.00	0	$ -
				Subtotal		**$ 28,000.00**
400 - DRAINAGE AND SEWERS						
9		DRAINAGE APPERTUNANCES	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 1,000.00**
500 - BRIDGES						
10		BRIDGE	LS	$ -	ALL	$ -
11		WALLS	LS	$ -	ALL	$ -
				Subtotal		**$ -**
600 - BASES						
12		AGGREGATE BASE	CY	$ 30.00	1,300	$ 39,000.00
				Subtotal		**$ 39,000.00**
700 - WEARING SURFACES						
13		LEVEL 3, ACP MIXTURE, 1/2 INCH DENSE	TON	$ 75.00	0	$ -
				Subtotal		**$ -**
800 - PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES						
14		THERMAL PLASTIC, EXTRUDED OR SPRAYED, SURFACE, NON-PROFILED	FT	$ 1.00	1,900	$ 1,900.00
				Subtotal		**$ 1,900.00**
900 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS						
15		SIGNING	LS	$ 2,000.00	ALL	$ 2,000.00
				Subtotal		**$ 2,000.00**
1000 - RIGHT OF WAY DEVELOPMENT AND CONTROL						
16		SEEDING	AC	$ 2,000.00	0.3	$ 600.00
				Subtotal		**$ 600.00**
SUBTOTAL FOR CONSTRUCTION						**$ 84,600.00**
		CONTINGENCIES		30%		$ 26,000.00
		ENGINEERING DESIGN				$ -
		CONSTRUCTION ENGINEERING				$ -
		RIGHT OF WAY (ALL COSTS INCLUDING ADMINISTRATION, ACQUISITION & DEMO)	LS	-	ALL	$ -
PROJECT TOTAL (ROUNDED)						**$ 111,000.00**

Project Description:	Idaho Teton Centennial Trail	Client: FHA	
Corridor Section:	Parking Lot B Alternative		
Location:	Teton County, Idaho	Entered by: CRCO	
Description:	STA. 14+16.11 to STA. 17+04.75	Checked by: JFM	
Date:	2/2/2016		

ITEM NO.	SPECIFICATION SECTION	ITEM	UNIT	UNIT COST	QUANTITY	COST
200 -TEMPORARY FEATURES AND APPURTENANCES						
1		MOBILIZATION (10%)	LS	10%	ALL	$ 4,300.00
2		TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC (2%)	LS	2%	ALL	$ 860.00
3		EROSION CONTROL (1%)	LS	1%	ALL	$ 430.00
4		POLLUTION CONTROL PLAN	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 6,590.00**
300 - ROADWORK						
5		CONSTRUCTION SURVEY WORK (1.5%)	LS	1.5%	ALL	$ 700.00
6		CLEARING AND GRUBBING	LS	$ 1,000.00	ALL	$ 1,000.00
7		GENERAL EXCAVATION	CUYD	$ 10.00	170	$ 1,700.00
7		EMBANKMENT IN PLACE	CUYD	$ 10.50	800	$ 8,400.00
8		SUBGRADE STABILIZATION	CUYD	$ 30.00	0	$ -
				Subtotal		**$ 11,800.00**
400 - DRAINAGE AND SEWERS						
9		DRAINAGE APPERTUNANCES	LS	$ 750.00	ALL	$ 750.00
				Subtotal		**$ 750.00**
500 - BRIDGES						
10		BRIDGE	LS	$ -	ALL	$ -
11		WALLS	LS	$ -	ALL	$ -
				Subtotal		**$ -**
600 - BASES						
12		AGGREGATE BASE	CY	$ 30.00	700	$ 21,000.00
				Subtotal		**$ 21,000.00**
700 - WEARING SURFACES						
13		LEVEL 3, ACP MIXTURE, 1/2 INCH DENSE	TON	$ 75.00	0	$ -
				Subtotal		**$ -**
800 - PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES						
14		THERMAL PLASTIC, EXTRUDED OR SPRAYED, SURFACE, NON-PROFILED	FT	$ 1.00	930	$ 930.00
				Subtotal		**$ 930.00**
900 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS						
15		SIGNING	LS	$ 1,500.00	ALL	$ 1,500.00
				Subtotal		**$ 1,500.00**
1000 - RIGHT OF WAY DEVELOPMENT AND CONTROL						
16		SEEDING	AC	$ 2,000.00	0.2	$ 400.00
				Subtotal		**$ 400.00**
SUBTOTAL FOR CONSTRUCTION						**$ 43,000.00**
		CONTINGENCIES		30%		$ 13,000.00
		ENGINEERING DESIGN				$ -
		CONSTRUCTION ENGINEERING				$ -
		RIGHT OF WAY (ALL COSTS INCLUDING ADMINISTRATION, ACQUISITION & DEMO)	LS	-	ALL	$ -
PROJECT TOTAL (ROUNDED)						**$ 56,000.00**

Project Description:	Idaho Teton Centennial Trail	Client: FHA	
Corridor Section:	Parking Lot C Alternative		
Location:	Teton County, Idaho	Entered by: CRCO	
Description:	STA. 15+52.84 to STA. 17+35.79	Checked by: JFM	
Date:	2/2/2016		

ITEM NO.	SPECIFICATION SECTION	ITEM	UNIT	UNIT COST	QUANTITY	COST
200 -TEMPORARY FEATURES AND APPURTENANCES						
1		MOBILIZATION (10%)	LS	10%	ALL	$ 3,150.00
2		TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC (2%)	LS	2%	ALL	$ 630.00
3		EROSION CONTROL (1%)	LS	1%	ALL	$ 315.00
4		POLLUTION CONTROL PLAN	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 5,095.00**
300 - ROADWORK						
5		CONSTRUCTION SURVEY WORK (1.5%)	LS	1.5%	ALL	$ 500.00
6		CLEARING AND GRUBBING	LS	$ 600.00	ALL	$ 600.00
7		GENERAL EXCAVATION	CUYD	$ 10.00	60	$ 600.00
7		EMBANKMENT IN PLACE	CUYD	$ 10.50	720	$ 7,560.00
8		SUBGRADE STABILIZATION	CUYD	$ 30.00	0	$ -
				Subtotal		**$ 9,260.00**
400 - DRAINAGE AND SEWERS						
9		DRAINAGE APPERTUNANCES	LS	$ 500.00	ALL	$ 500.00
				Subtotal		**$ 500.00**
500 - BRIDGES						
10		BRIDGE	LS	$ -	ALL	$ -
11		WALLS	LS	$ -	ALL	$ -
				Subtotal		**$ -**
600 - BASES						
12		AGGREGATE BASE	CY	$ 30.00	500	$ 15,000.00
				Subtotal		**$ 15,000.00**
700 - WEARING SURFACES						
13		LEVEL 3, ACP MIXTURE, 1/2 INCH DENSE	TON	$ 75.00	0	$ -
				Subtotal		**$ -**
800 - PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES						
14		THERMAL PLASTIC, EXTRUDED OR SPRAYED, SURFACE, NON-PROFILED	FT	$ 1.00	350	$ 350.00
				Subtotal		**$ 350.00**
900 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS						
15		SIGNING	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 1,000.00**
1000 - RIGHT OF WAY DEVELOPMENT AND CONTROL						
16		SEEDING	AC	$ 2,000.00	0.05	$ 100.00
				Subtotal		**$ 100.00**
SUBTOTAL FOR CONSTRUCTION						**$ 31,400.00**
		CONTINGENCIES		30%		$ 10,000.00
		ENGINEERING DESIGN				$ -
		CONSTRUCTION ENGINEERING				$ -
		RIGHT OF WAY (ALL COSTS INCLUDING ADMINISTRATION, ACQUISITION & DEMO)	LS	-	ALL	$ -
PROJECT TOTAL (ROUNDED)						**$ 42,000.00**

Project Description:	Idaho Teton Centennial Trail	Client: FHA	
Corridor Section:	Highway Alternative		
Location:	Teton County, Idaho	Entered by: CRCO	
Description:	STA. 1+00.00 to STA. 13+84.30	Checked by: JFM	
Date:	2/2/2016		

ITEM NO.	SPECIFICATION SECTION	ITEM	UNIT	UNIT COST	QUANTITY	COST
200 -TEMPORARY FEATURES AND APPURTENANCES						
1		MOBILIZATION (10%)	LS	10%	ALL	$ 37,500.00
2		TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC (10%)	LS	10%	ALL	$ 37,500.00
3		EROSION CONTROL (1%)	LS	1%	ALL	$ 3,750.00
4		POLLUTION CONTROL PLAN	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 79,750.00**
300 - ROADWORK						
5		CONSTRUCTION SURVEY WORK (1.5%)	LS	1.5%	ALL	$ 5,700.00
6		CLEARING AND GRUBBING	LS	$ 700.00	ALL	$ 700.00
7		GENERAL EXCAVATION	CUYD	$ 10.00	700	$ 7,000.00
8		ROCK EXCAVATION	CUYD	$ 30.00	500	$ 15,000.00
7		EMBANKMENT IN PLACE	CUYD	$ 10.50	1,300	$ 13,650.00
8		SUBGRADE STABILIZATION	CUYD	$ 30.00	40	$ 1,200.00
				Subtotal		**$ 43,250.00**
400 - DRAINAGE AND SEWERS						
9		DRAINAGE APPERTUNANCES	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 1,000.00**
500 - BRIDGES						
10		BRIDGE	LS	$ -	ALL	$ -
11		WALLS	LS	$ 54,000.00	ALL	$ 54,000.00
11		SCALING	LS	$ 13,000.00	ALL	$ 13,000.00
12		WIRE MESH	LS	$ 70,000.00	ALL	$ 70,000.00
11		42 INCH WOOD RAIL	LS	$ 12,000.00	ALL	$ 12,000.00
				Subtotal		**$ 149,000.00**
600 - BASES						
12		AGGREGATE BASE	CY	$ 30.00	450	$ 13,500.00
				Subtotal		**$ 13,500.00**
700 - WEARING SURFACES						
13		LEVEL 3, ACP MIXTURE, 1/2 INCH DENSE	TON	$ 75.00	490	$ 36,750.00
				Subtotal		**$ 36,750.00**
800 - PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES						
14		CONCRETE BARRIER	FT	$ 50.00	1,000	$ 50,000.00
15		STRIPING	LS	$ 200.00	ALL	$ 200.00
				Subtotal		**$ 50,200.00**
900 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS						
16		SIGNING	LS	$ 500.00	ALL	$ 500.00
				Subtotal		**$ 500.00**
1000 - RIGHT OF WAY DEVELOPMENT AND CONTROL						
17		SEEDING	AC	$ 2,000.00	0.4	$ 800.00
				Subtotal		**$ 800.00**
SUBTOTAL FOR CONSTRUCTION						**$ 374,800.00**
		CONTINGENCIES		30%		$ 113,000.00
		ENGINEERING DESIGN				$ -
		CONSTRUCTION ENGINEERING				$ -
		RIGHT OF WAY (ALL COSTS INCLUDING ADMINISTRATION, ACQUISITION & DEMO)	LS	-	ALL	$ -
PROJECT TOTAL (ROUNDED)						**$ 488,000.00**

Project Description:	Idaho Teton Centennial Trail	Client: FHA	
Corridor Section:	Hillside Alternative		
Location:	Teton County, Idaho	Entered by: CRCO	
Description:	STA. 21+00.00 to STA. 33+50.00	Checked by: JFM	
Date:	2/2/2016		

ITEM NO.	SPECIFICATION SECTION	ITEM	UNIT	UNIT COST	QUANTITY	COST
200 -TEMPORARY FEATURES AND APPURTENANCES						
1		MOBILIZATION (10%)	LS	10%	ALL	$ 35,700.00
2		TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC (2%)	LS	2%	ALL	$ 7,140.00
3		EROSION CONTROL (1%)	LS	1%	ALL	$ 3,570.00
4		POLLUTION CONTROL PLAN	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 47,410.00**
300 - ROADWORK						
5		CONSTRUCTION SURVEY WORK (1.5%)	LS	1.5%	ALL	$ 5,400.00
6		CLEARING AND GRUBBING	LS	$ 3,900.00	ALL	$ 3,900.00
7		GENERAL EXCAVATION	CUYD	$ 10.00	4,500	$ 45,000.00
7		EMBANKMENT IN PLACE	CUYD	$ 10.50	11,000	$ 115,500.00
8		SUBGRADE STABILIZATION	CUYD	$ 30.00	40	$ 1,200.00
				Subtotal		**$ 171,000.00**
400 - DRAINAGE AND SEWERS						
9		DRAINAGE APPERTUNANCES	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 1,000.00**
500 - BRIDGES						
10		BRIDGE	LS	$ -	ALL	$ -
11		WALLS	LS	$ 102,000.00	ALL	$ 102,000.00
12		42 INCH WOOD RAIL	LS	$ 12,000.00	ALL	$ 12,000.00
				Subtotal		**$ 114,000.00**
600 - BASES						
13		AGGREGATE BASE	CY	$ 30.00	200	$ 6,000.00
				Subtotal		**$ 6,000.00**
700 - WEARING SURFACES						
14		LEVEL 3, ACP MIXTURE, 1/2 INCH DENSE	TON	$ 75.00	170	$ 12,750.00
				Subtotal		**$ 12,750.00**
800 - PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES						
15		STRIPING	LS	$ 200.00	ALL	$ 200.00
				Subtotal		**$ 200.00**
900 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS						
16		SIGNING	LS	$ 500.00	ALL	$ 500.00
				Subtotal		**$ 500.00**
1000 - RIGHT OF WAY DEVELOPMENT AND CONTROL						
17		SEEDING	AC	$ 2,000.00	2.0	$ 4,000.00
				Subtotal		**$ 4,000.00**
SUBTOTAL FOR CONSTRUCTION						**$ 356,900.00**
		CONTINGENCIES		30%		$ 108,000.00
		ENGINEERING DESIGN				$ -
		CONSTRUCTION ENGINEERING				$ -
		RIGHT OF WAY (ALL COSTS INCLUDING ADMINISTRATION, ACQUISITION & DEMO)	LS	-	ALL	$ -
PROJECT TOTAL (ROUNDED)						**$ 465,000.00**

Project Description:	Idaho Teton Centennial Trail	Client: FHA	
Corridor Section:	Mike Harris At-Grade Crossing Alternative		
Location:	Teton County, Idaho	Entered by: CRCO	
Description:	STA. 100+00.00 to STA. 107+29.57	Checked by: JFM	
Date:	2/2/2016		

ITEM NO.	SPECIFICATION SECTION	ITEM	UNIT	UNIT COST	QUANTITY	COST
200 -TEMPORARY FEATURES AND APPURTENANCES						
1		MOBILIZATION (10%)	LS	10%	ALL	$ 5,600.00
2		TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC (2%)	LS	2%	ALL	$ 1,120.00
3		EROSION CONTROL (1%)	LS	1%	ALL	$ 560.00
4		POLLUTION CONTROL PLAN	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 8,280.00**
300 - ROADWORK						
5		CONSTRUCTION SURVEY WORK (1.5%)	LS	1.5%	ALL	$ 900.00
6		CLEARING AND GRUBBING	LS	$ 320.00	ALL	$ 320.00
7		GENERAL EXCAVATION	CUYD	$ 10.00	700	$ 7,000.00
8		EMBANKMENT IN PLACE	CUYD	$ 10.50	60	$ 630.00
9		SUBGRADE STABILIZATION	CUYD	$ 30.00	20	$ 600.00
				Subtotal		**$ 9,450.00**
400 - DRAINAGE AND SEWERS						
10		DRAINAGE APPERTUNANCES	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 1,000.00**
500 - BRIDGES						
11		BRIDGE	LS	$ -	ALL	$ -
12		WALLS	LS	$ -	ALL	$ -
13		42 INCH WOOD RAIL	LS	$ 4,400.00	ALL	$ 4,400.00
				Subtotal		**$ 4,400.00**
600 - BASES						
14		AGGREGATE BASE	CY	$ 30.00	120	$ 3,600.00
				Subtotal		**$ 3,600.00**
700 - WEARING SURFACES						
15		LEVEL 3, ACP MIXTURE, 1/2 INCH DENSE	TON	$ 75.00	100	$ 7,500.00
				Subtotal		**$ 7,500.00**
800 - PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES						
16		STRIPING	LS	$ 500.00	ALL	$ 500.00
				Subtotal		**$ 500.00**
900 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS						
17		SIGNING	LS	$ 1,000.00	ALL	$ 1,000.00
18		RECTANGULAR RAPID FLASHING BEACON	LS	$ 20,000.00	ALL	$ 20,000.00
				Subtotal		**$ 21,000.00**
1000 - RIGHT OF WAY DEVELOPMENT AND CONTROL						
19		SEEDING	AC	$ 2,000.00	0.2	$ 400.00
				Subtotal		**$ 400.00**
SUBTOTAL FOR CONSTRUCTION						**$ 56,200.00**
		CONTINGENCIES		30%		$ 17,000.00
		ENGINEERING DESIGN				$ -
		CONSTRUCTION ENGINEERING				$ -
		RIGHT OF WAY (ALL COSTS INCLUDING ADMINISTRATION, ACQUISITION & DEMO)	LS	-	ALL	$ -
PROJECT TOTAL (ROUNDED)						**$ 74,000.00**

Project Description:	Idaho Teton Centennial Trail	Client: FHA	
Corridor Section:	Mike Harris Under Crossing Alternative		
Location:	Teton County, Idaho	Entered by: CRCO	
Description:	STA. 100+00.00 to STA. 107+86.45	Checked by: JFM	
Date:	2/2/2016		

ITEM NO.	SPECIFICATION SECTION	ITEM	UNIT	UNIT COST	QUANTITY	COST
200 -TEMPORARY FEATURES AND APPURTENANCES						
1		MOBILIZATION (10%)	LS	10%	ALL	$ 62,200.00
2		TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC (10%)	LS	10%	ALL	$ 62,200.00
3		EROSION CONTROL (1%)	LS	1%	ALL	$ 6,220.00
4		POLLUTION CONTROL PLAN	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 131,620.00**
300 - ROADWORK						
5		CONSTRUCTION SURVEY WORK (1.5%)	LS	1.5%	ALL	$ 9,400.00
6		CLEARING AND GRUBBING	LS	$ 380.00	ALL	$ 380.00
7		GENERAL EXCAVATION	CUYD	$ 10.00	3,300	$ 33,000.00
8		EMBANKMENT IN PLACE	CUYD	$ 10.50	20	$ 210.00
9		SUBGRADE STABILIZATION	CUYD	$ 30.00	20	$ 600.00
				Subtotal		**$ 43,590.00**
400 - DRAINAGE AND SEWERS						
10		DRAINAGE APPERTUNANCES	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 1,000.00**
500 - BRIDGES						
11		UNDERCROSSING	LS	$ 130,000.00	ALL	$ 130,000.00
12		WALLS	LS	$ 300,000.00	ALL	$ 300,000.00
13		42 INCH WOOD RAIL	LS	$ 3,400.00	ALL	$ 3,400.00
				Subtotal		**$ 433,400.00**
600 - BASES						
14		AGGREGATE BASE	CY	$ 30.00	120	$ 3,600.00
				Subtotal		**$ 3,600.00**
700 - WEARING SURFACES						
15		LEVEL 3, ACP MIXTURE, 1/2 INCH DENSE	TON	$ 75.00	100	$ 7,500.00
				Subtotal		**$ 7,500.00**
800 - PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES						
16		STRIPING	LS	$ 200.00	ALL	$ 200.00
				Subtotal		**$ 200.00**
900 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS						
17		SIGNING	LS	$ 500.00	ALL	$ 500.00
18		RECTANGULAR RAPID FLASHING BEACON	LS	$ -	ALL	$ -
				Subtotal		**$ 500.00**
1000 - RIGHT OF WAY DEVELOPMENT AND CONTROL						
19		SEEDING	AC	$ 2,000.00	0.2	$ 400.00
				Subtotal		**$ 400.00**
SUBTOTAL FOR CONSTRUCTION						**$ 621,900.00**
		CONTINGENCIES		30%		$ 187,000.00
		ENGINEERING DESIGN				$ -
		CONSTRUCTION ENGINEERING				$ -
		RIGHT OF WAY (ALL COSTS INCLUDING ADMINISTRATION, ACQUISITION & DEMO)	LS	-	ALL	$ -
PROJECT TOTAL (ROUNDED)						**$ 809,000.00**

Project Description:	Idaho Teton Centennial Trail	Client: FHA	
Corridor Section:	Border Spur Alternative		
Location:	Teton County, Idaho	Entered by: CRCO	
Description:	STA. 100+00.00 to STA. 102+58.15	Checked by: JFM	
Date:	2/2/2016		

ITEM NO.	SPECIFICATION SECTION	ITEM	UNIT	UNIT COST	QUANTITY	COST
200 -TEMPORARY FEATURES AND APPURTENANCES						
1		MOBILIZATION (10%)	LS	10%	ALL	$ 3,100.00
2		TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC (2%)	LS	2%	ALL	$ 620.00
3		EROSION CONTROL (1%)	LS	1%	ALL	$ 310.00
4		POLLUTION CONTROL PLAN	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 5,030.00**
300 - ROADWORK						
5		CONSTRUCTION SURVEY WORK (1.5%)	LS	1.5%	ALL	$ 500.00
6		CLEARING AND GRUBBING	LS	$ 100.00	ALL	$ 100.00
7		GENERAL EXCAVATION	CUYD	$ 10.00	140	$ 1,400.00
7		EMBANKMENT IN PLACE	CUYD	$ 10.50	35	$ 367.50
8		SUBGRADE STABILIZATION	CUYD	$ 30.00	3	$ 90.00
				Subtotal		**$ 2,457.50**
400 - DRAINAGE AND SEWERS						
9		DRAINAGE APPERTUNANCES	LS	$ 500.00	ALL	$ 500.00
				Subtotal		**$ 500.00**
500 - BRIDGES						
10		BRIDGE	LS	$ -	ALL	$ -
11		WALLS	LS	$ -	ALL	$ -
12		42 INCH WOOD RAIL	LS	$ 850.00	ALL	$ 850.00
				Subtotal		**$ 850.00**
600 - BASES						
13		AGGREGATE BASE	CY	$ 30.00	15	$ 450.00
				Subtotal		**$ 450.00**
700 - WEARING SURFACES						
14		LEVEL 3, ACP MIXTURE, 1/2 INCH DENSE	TON	$ 75.00	13	$ 975.00
				Subtotal		**$ 975.00**
800 - PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES						
15		STRIPING	LS	$ 500.00	ALL	$ 500.00
				Subtotal		**$ 500.00**
900 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS						
16		SIGNING	LS	$ 1,000.00	ALL	$ 1,000.00
17		RECTANGULAR RAPID FLASHING BEACON	LS	$ 20,000.00	ALL	$ 20,000.00
				Subtotal		**$ 20,000.00**
1000 - RIGHT OF WAY DEVELOPMENT AND CONTROL						
18		SEEDING	AC	$ 2,000.00	0.05	$ 100.00
				Subtotal		**$ 100.00**
SUBTOTAL FOR CONSTRUCTION						**$ 30,870.00**
		CONTINGENCIES		30%		$ 9,270.00
		ENGINEERING DESIGN				$ -
		CONSTRUCTION ENGINEERING				$ -
		RIGHT OF WAY (ALL COSTS INCLUDING ADMINISTRATION, ACQUISITION & DEMO)	LS	-	ALL	$ -
PROJECT TOTAL (ROUNDED)						**$ 40,200.00**

Project Description:	Idaho Teton Centennial Trail	Client: FHA	
Corridor Section:	Trail Creek At-Grade Crossing		
Location:	Teton County, Idaho	Entered by: CRCO	
Description:	STA. 124+80.00 to STA. 131+27.33	Checked by: JFM	
Date:	2/2/2016		

ITEM NO.	SPECIFICATION SECTION	ITEM	UNIT	UNIT COST	QUANTITY	COST
200 -TEMPORARY FEATURES AND APPURTENANCES						
1		MOBILIZATION (10%)	LS	10%	ALL	$ 8,500.00
2		TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC (2%)	LS	2%	ALL	$ 1,700.00
3		EROSION CONTROL (1%)	LS	1%	ALL	$ 850.00
4		POLLUTION CONTROL PLAN	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 12,050.00**
300 - ROADWORK						
5		CONSTRUCTION SURVEY WORK (1.5%)	LS	1.5%	ALL	$ 1,300.00
6		CLEARING AND GRUBBING	LS	$ 800.00	ALL	$ 800.00
7		GENERAL EXCAVATION	CUYD	$ 10.00	2,000	$ 20,000.00
8		EMBANKMENT IN PLACE	CUYD	$ 10.50	1,200	$ 12,600.00
9		SUBGRADE STABILIZATION	CUYD	$ 30.00	20	$ 600.00
				Subtotal		**$ 35,300.00**
400 - DRAINAGE AND SEWERS						
10		DRAINAGE APPERTUNANCES	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 1,000.00**
500 - BRIDGES						
11		BRIDGE	LS	$ -	ALL	$ -
12		WALLS	LS	$ -	ALL	$ -
13		42 INCH WOOD RAIL	LS	$ 5,900.00	ALL	$ 5,900.00
				Subtotal		**$ 5,900.00**
600 - BASES						
14		AGGREGATE BASE	CY	$ 30.00	100	$ 3,000.00
				Subtotal		**$ 3,000.00**
700 - WEARING SURFACES						
15		LEVEL 3, ACP MIXTURE, 1/2 INCH DENSE	TON	$ 75.00	80	$ 6,000.00
				Subtotal		**$ 6,000.00**
800 - PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES						
16		STRIPING	LS	$ 500.00	ALL	$ 500.00
				Subtotal		**$ 500.00**
900 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS						
17		RECTANGULAR RAPID FLASHING BEACON	LS	$ 20,000.00	ALL	$ 20,000.00
18		SIGNING	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 21,000.00**
1000 - RIGHT OF WAY DEVELOPMENT AND CONTROL						
19		SEEDING	AC	$ 2,000.00	0.4	$ 800.00
				Subtotal		**$ 800.00**
SUBTOTAL FOR CONSTRUCTION						**$ 85,600.00**
		CONTINGENCIES		30%		$ 26,000.00
		ENGINEERING DESIGN				$ -
		CONSTRUCTION ENGINEERING				$ -
		RIGHT OF WAY (ALL COSTS INCLUDING ADMINISTRATION, ACQUISITION & DEMO)	LS	-	ALL	$ -
PROJECT TOTAL (ROUNDED)						**$ 112,000.00**

Project Description:	Idaho Teton Centennial Trail	Client: FHA	
Corridor Section:	Trail Creek Crossing - Diagonal Undercrossing Alternative		
Location:	Teton County, Idaho	Entered by: CRCO	
Description:	STA. 124+80.00 to STA. 135+16.25	Checked by: JFM	
Date:	2/2/2016		

ITEM NO.	SPECIFICATION SECTION	ITEM	UNIT	UNIT COST	QUANTITY	COST
200 -TEMPORARY FEATURES AND APPURTENANCES						
1		MOBILIZATION (10%)	LS	10%	ALL	$ 101,500.00
2		TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC (10%)	LS	10%	ALL	$ 101,500.00
3		EROSION CONTROL (1%)	LS	1%	ALL	$ 10,150.00
4		POLLUTION CONTROL PLAN	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 214,150.00**
300 - ROADWORK						
5		CONSTRUCTION SURVEY WORK (1.5%)	LS	1.5%	ALL	$ 15,300.00
6		CLEARING AND GRUBBING	LS	$ 1,200.00	ALL	$ 1,200.00
7		GENERAL EXCAVATION	CUYD	$ 10.00	5,800	$ 58,000.00
7		EMBANKMENT IN PLACE	CUYD	$ 10.50	900	$ 9,450.00
8		SUBGRADE STABILIZATION	CUYD	$ 30.00	30	$ 900.00
				Subtotal		**$ 84,850.00**
400 - DRAINAGE AND SEWERS						
9		DRAINAGE APPERTUNANCES	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 1,000.00**
500 - BRIDGES						
10		BRIDGE	LS	$ 195,000.00	ALL	$ 195,000.00
11		WALLS	LS	$ 500,000.00	ALL	$ 500,000.00
12		42 INCH WOOD RAIL	LS	$ 6,500.00	ALL	$ 6,500.00
				Subtotal		**$ 701,500.00**
600 - BASES						
13		AGGREGATE BASE	CY	$ 30.00	130	$ 3,900.00
				Subtotal		**$ 3,900.00**
700 - WEARING SURFACES						
14		LEVEL 3, ACP MIXTURE, 1/2 INCH DENSE	TON	$ 75.00	110	$ 8,250.00
				Subtotal		**$ 8,250.00**
800 - PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES						
15		STRIPING	LS	$ 200.00	ALL	$ 200.00
				Subtotal		**$ 200.00**
900 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS						
16		SIGNING	LS	$ 500.00	ALL	$ 500.00
				Subtotal		**$ 500.00**
1000 - RIGHT OF WAY DEVELOPMENT AND CONTROL						
17		SEEDING	AC	$ 2,000.00	0.6	$ 1,200.00
				Subtotal		**$ 1,200.00**
SUBTOTAL FOR CONSTRUCTION						**$ 1,015,600.00**
		CONTINGENCIES		30%		$ 305,000.00
		ENGINEERING DESIGN				$ -
		CONSTRUCTION ENGINEERING				$ -
		RIGHT OF WAY (ALL COSTS INCLUDING ADMINISTRATION, ACQUISITION & DEMO)	LS	-	ALL	$ -
PROJECT TOTAL (ROUNDED)						**$ 1,321,000.00**

Project Description:	Idaho Teton Centennial Trail	Client: FHA	
Corridor Section:	Trail Creek Crossing - Perpendicular Undercrossing Alternative		
Location:	Teton County, Idaho	Entered by: CRCO	
Description:	STA. 124+80.00 to STA. 131+72.76	Checked by: JFM	
Date:	2/2/2016		

ITEM NO.	SPECIFICATION SECTION	ITEM	UNIT	UNIT COST	QUANTITY	COST
200 -TEMPORARY FEATURES AND APPURTENANCES						
1		MOBILIZATION (10%)	LS	10%	ALL	$ 88,000.00
2		TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC (10%)	LS	10%	ALL	$ 88,000.00
3		EROSION CONTROL (1%)	LS	1%	ALL	$ 8,800.00
4		POLLUTION CONTROL PLAN	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 185,800.00**
300 - ROADWORK						
5		CONSTRUCTION SURVEY WORK (1.5%)	LS	1.5%	ALL	$ 13,200.00
6		CLEARING AND GRUBBING	LS	$ 680.00	ALL	$ 680.00
7		GENERAL EXCAVATION	CUYD	$ 10.00	2,600	$ 26,000.00
7		EMBANKMENT IN PLACE	CUYD	$ 10.50	400	$ 4,200.00
8		SUBGRADE STABILIZATION	CUYD	$ 30.00	20	$ 600.00
				Subtotal		**$ 44,680.00**
400 - DRAINAGE AND SEWERS						
9		DRAINAGE APPERTUNANCES	LS	$ 1,000.00	ALL	$ 1,000.00
				Subtotal		**$ 1,000.00**
500 - BRIDGES						
10		BRIDGE	LS	$ 130,000.00	ALL	$ 130,000.00
11		WALLS	LS	$ 500,000.00	ALL	$ 500,000.00
12		42 INCH WOOD RAIL	LS	$ 6,300.00	ALL	$ 6,300.00
				Subtotal		**$ 636,300.00**
600 - BASES						
13		AGGREGATE BASE	CY	$ 30.00	90	$ 2,700.00
				Subtotal		**$ 2,700.00**
700 - WEARING SURFACES						
14		LEVEL 3, ACP MIXTURE, 1/2 INCH DENSE	TON	$ 75.00	80	$ 6,000.00
				Subtotal		**$ 6,000.00**
800 - PERMANENT TRAFFIC SAFETY AND GUIDANCE DEVICES						
15		STRIPING	LS	$ 200.00	ALL	$ 200.00
				Subtotal		**$ 200.00**
900 - PERMANENT TRAFFIC CONTROL AND ILLUMINATION SYSTEMS						
16		SIGNING	LS	$ 500.00	ALL	$ 500.00
				Subtotal		**$ 500.00**
1000 - RIGHT OF WAY DEVELOPMENT AND CONTROL						
17		SEEDING	AC	$ 2,000.00	0.4	$ 800.00
				Subtotal		**$ 800.00**
SUBTOTAL FOR CONSTRUCTION						**$ 878,000.00**
		CONTINGENCIES		30%		$ 264,000.00
		ENGINEERING DESIGN				$ -
		CONSTRUCTION ENGINEERING				$ -
		RIGHT OF WAY (ALL COSTS INCLUDING ADMINISTRATION, ACQUISITION & DEMO)	LS	-	ALL	$ -
PROJECT TOTAL (ROUNDED)						**$ 1,142,000.00**

APPENDIX C

Moose Creek Bridge Replacement Type, Size, and Location Report

Teton Centennial Trail Project

Moose Creek Bridge Replacement

Type, Size, and Location Report

Prepared for:

Western Federal Lands Highway Division and the city of Victor, Idaho

Contract: DTFH70-10-D-00019
Task Order: DTFH7015F19006
Project: ID DOT T 33(1)

Prepared by:

DAVID EVANS AND ASSOCIATES INC.

January 29th, 2016

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Appendix A: Draft TS&L Plans

Appendix B: Draft Preliminary Cost Estimates

PROJECT DESCRIPTION

The "Teton Centennial Trail Project" (Project) is located along Idaho Highway 33 (ID-33) and Wyoming Highway 22 (WYO 22), a transportation corridor linking the towns of Victor, ID and Jackson, WY over the Teton Pass. Located in the Caribou-Targhee National Forest, the proposed trail will provide visitors safe, non-motorized access through this scenic corridor.

For much of the Project length, the proposed trail follows the "Old Jackson Highway", parallel to ID-33. At the western edge of the Project, this alignment crosses Moose Creek via an approximately 20 foot long existing concrete frame/slab bridge. The Project objectives include the replacement of this deteriorated structure.

At this location, a paved roadway section is proposed, crossing Moose Creek to a proposed paved parking area for vehicles, recreation vehicles, horse trailers, and Bonneville Power Administration (BPA) maintenance vehicles just east of the bridge.

REPORT OBJECTIVES

The objectives of this Bridge Type, Size and Location Report (TS&L) are to present and summarize the proposed replacement alternatives considered for the Moose Creek Bridge, describe the relative advantages and disadvantages of each replacement alternative, present preliminary plans and cost estimates for each alternative, and recommend a preferred alternative for advancement to final design.

A secondary objective of this report is to provide a conceptual overview of the options and preliminary rough costs of the proposed trail underpass crossings of ID-33 at the Mike Harris Campground and WYO 22 at the Trail Creek Campground.

EXISTING CONDITIONS

The existing structure carrying Old Jackson Highway over Moose Creek is a single-span, 20 foot long x 24 foot wide concrete slab/frame bridge. The old roadbed has been abandoned and the structure exhibits extensive widespread concrete deterioration. Due to its unsafe condition and extensive rehabilitation needs, replacement has been deemed necessary.

EXISTING STRUCTURE REMOVAL

As stated above and in the Reconnaissance Report dated July 2015, the existing, deteriorated structure will be removed. Removal of the structure will require containment methods to prevent concrete debris from entering Moose Creek. The existing abutment walls will be removed to a minimum of 3 feet below grade.

DESIGN CRITERIA

The replacement bridge will be designed in accordance with the Idaho Transportation Department (ITD) Load and Resistance Factor Design (LRFD) Bridge Design Manual; the AASHTO LRFD Bridge Design Specifications, Seventh Edition, 2014; and the Federal Lands Highway Project Development and Design Manual (PDDM). In cases of conflict, the PDDM shall govern.

Considering that the new bridge is intended to provide access for BPA maintenance vehicles and potentially heavy equipment, and also considering that the bridge will be periodically load rated by Load and Resistance Factor Rating procedures for capacity to carry legal highway loads, it is prudent to design for the AASHTO HL-93 truck and concurrent lane loading.

Moose Creek is a habitat for Yellowstone Cutthroat Trout. To avoid impacting the stream habitat, it is recommended that the bridge completely span the bank-to-bank stream width; a preliminary hydraulics and hydrologic analysis has determined this clear span to be 60 feet between inner faces of abutments. Moreover, the roadway profile has been set in order to provide a minimum of 2 feet of vertical clearance above the 50-year design flood elevation of Moose Creek, which has been determined as 6477.75'.

The bridge will provide access to a parking area at the trailhead that will accommodate 10 to 20 vehicles. In addition, the bridge will provide access for BPA maintenance vehicles. The anticipated daily traffic on the bridge is low enough that a single lane is appropriate for this crossing. The bridge will also be short enough and on a relatively straight alignment, so that oncoming traffic has adequate sight distance to stop and allow traffic to clear the bridge before proceeding. The bridge will provide a single lane that is 12 feet wide with 2 foot wide shoulders on each side, for a total roadway width of 16 feet. ITD's standard Two-Tube Curb Mounted Rail, with a curb width of 1'-7", is recommended on each side, resulting in a bridge out-to-out width of 19'-2".

DESIGN EXCEPTIONS

At this stage, no ITD design exceptions are anticipated.

BRIDGE ALTERNATIVES

MATERIAL SELECTION

Based on the understanding and requirements described above, a prestressed concrete bridge is recommended. For this application, a prestressed concrete structure has a lower cost and is more durable than a comparable steel structure, thus reducing initial and long-term costs.

The bridge alternatives developed for the Reconnaissance Report were based on an assumed structure length of 80 feet to 100 feet. The following superstructure alternatives were identified in the Reconnaissance Report as likely options to consider based on preliminary information:

- 27-inch Prestressed Concrete Box Beams
- 36-inch Prestressed Concrete Bulb Tee Girders
- 36-inch Prestressed Concrete Deck Bulb Tee Girders

As a result of preliminary surveying and hydraulics information, and as discussed above, a clear span of 60 feet has been determined to satisfy the hydraulics and permitting requirements. Therefore, this TS&L Report will evaluate modified alternatives to take into account the shorter structure length requirement. The deck bulb tee girder section is the smallest section of this type; however, the 36-inch prestressed concrete bulb tee girders can be reduced to a 30-inch section, due to the shortened structure length.

ITD does not have current precast box beam details; however, unit costs for these members are available, indicating that local precasters have the ability to produce these sections. ITD's standard 26-inch deep prestressed voided slabs can achieve this span length with the use of 0.6-inch diameter prestressing strand. Since box beams are not current ITD standard sections and the standard 26-inch voided slab can achieve the required span and actually reduce the structure depth by an inch, the 26-inch deep precast, prestressed voided slab will be carried forward in the type comparison.

Additionally, an AASHTO Type 2 prestressed concrete girder is an appropriate section for a crossing of this length, and was included in the initial comparison for this TS&L evaluation. Thus, four distinct prestressed concrete typical sections were initially compared for feasibility. The sections are as follows:

- 26-inch Prestressed Concrete Voided Slabs
- AASHTO Type 2 Prestressed Concrete Girders
- 30-inch Prestressed Concrete Bulb Tee Girders
- 36-inch Prestressed Concrete Deck Bulb Tee Girders

After an initial comparison, the AASHTO Type 2 Prestressed Concrete Girder typical section was eliminated due to its similarity and its higher cost per girder linear foot to the 30-inch Prestressed Concrete Bulb Tee Girder. The three remaining bridge alternatives were developed further in order to obtain preliminary plans and cost estimates, and are discussed below. Preliminary plan, elevation and typical sections drawings of each of these three alternatives are included in Appendix A.

26-INCH PRESTRESSED CONCRETE VOIDED SLABS

26-inch prestressed voided slabs can achieve the required span length of 60' with the use of 0.6-inch diameter prestressing strand. Standard precast voided sections are 4-feet wide and DEA has found that most precast suppliers in Idaho are not able to vary the standard slab width. Therefore, five standard slab sections will be required resulting in a total bridge width of 20 feet. Additionally, the curb on ITD's standard 2-tube rail overhangs the edge of the bridge 1½-inches on each side resulting in a total out-to-out bridge width of 20'-3". A waterproofing membrane would be applied to the top surface of the slabs, and then a 2-inch asphalt overlay would provide the wearing surface for traffic. The slabs would be transversely post-tensioned in order to limit differential deflections and the resulting longitudinal cracking of the asphalt wearing surface.

Conventional, pile-supported cap and backwall abutments would be utilized with this option. The small expansion joint between the slab ends and the backwall would be sealed with a properly sized joint seal and asphalt wearing surface will likely be continued over the joint and backwall, providing a smooth transition to the approach pavement. If it is determined that transverse cracking of the asphalt wearing surface over the expansion joints is anticipated, the asphalt can be sawcut and then sealed with a hot pour sealer in order to control the cracking. Integral abutments do not appear to be a valid option for this superstructure alternative due to the nature of the slab sections and the difficulties in providing a true integral relationship between the superstructure and the abutment for this superstructure type.

In the Reconnaissance Report, while both spread footings and driven steel pile foundations were discussed, the more cost effective spread footings were utilized in order to determine the initial cost estimate for the structure alternatives. However, taking into account the unknown subsurface conditions as well as the likelihood of

anticipated scour at this crossing, driven steel pile foundations appear to be the more appropriate foundation type to include in the analysis at this phase of the project.

Prestressed concrete voided slabs are a high-durable, closed section member, providing low future maintenance costs. Precast slabs can be erected fairly quickly and the added time savings of not having to form and cast a deck slab provides additional benefits. Longitudinal cracks will typically form in the asphalt wearing surface, reflective of the joints between each slab unit, but as long as the slabs are tied together transversely with the tie rods, these cracks are generally small in nature. However, there is always a potential for water and chlorides to infiltrate the waterproofing membrane and corrode the tie rods; differential deflection of the slabs and longitudinal cracking of the asphalt wearing surface are the result. This cracking then provides for an additional path for water and chlorides to infiltrate the slabs.

30-INCH PRESTRESSED CONCRETE BULB TEE GIRDERS

The use of 30-inch bulb tee prestressed girders is another appropriate superstructure configuration for this setting. This typical section would utilize three girders spaced at 6’-4” on center with an 8-inch cast-in-place concrete deck.

It is anticipated that integral backwall abutments would be utilized in order to reduce future maintenance costs by eliminating expansion joints located over the bearing areas and girder ends. It is assumed that the abutments would be supported on concrete caps with steel piles. In order to accommodate the anticipated expansion and contraction of the bridge, approach slabs will be utilized at both abutments along with sleeper beams at the free end.

As discussed above, driven steel piles appear to be the more appropriate foundation type at this phase in the project, rather than the proposed spread footings as discussed in the Reconnaissance Report. As the preferred abutment type for this alternative is an integral abutment, the steel piles are necessary to provide the flexibility inherent in the foundation so that the structure can expand and contract under thermal forces.

Bulb tee prestressed girders are another high-durability, widely used bridge girder. The IDT 30-inch bulb tee consists of a 24-inch wide bottom flange/bulb and a 37-inch wide top flange. Similar to voided slabs, these are common sections that can be cast, transported, and erected very efficiently. However, this typical section does call for a separately formed, cast, and cured concrete deck, which increases construction time.

36-INCH PRESTRESSED CONCRETE DECK BULB TEE GIRDERS

The IDT 36-inch deck bulb tee section is actually a 43-inch deep prestressed concrete section, where the top flange is 8-inch thick and serves as the deck for the typical section. These girders are erected side-by-side, the flange tips are connected together using field welds and a grouted keyway, and then a waterproofing membrane and a2-inch thick asphalt wearing surface is placed on top as the traffic surface. Similar to the 30-inch bulb tees, three of these sections would be utilized. The top flange of the deck bulb tee girders would be 6'-3½" to achieve the required bridge width. As with the bulb tee girder alternative described above, integral backwall abutments are anticipated for this superstructure configuration as well. It is assumed that the abutments would be founded on concrete caps with steel piles, and approach slabs with sleeper beams would be utilized in order to accommodate the anticipated bridge expansion and contraction.

Also similar to the bulb tee girders, the deck bulb tees are high-durability sections that are relatively efficient and easy to erect. However, they do generally exhibit the same types of longitudinal cracking in the asphalt wearing surface as the voided slab typical section, although typically the individual girders are less likely to deflect differentially and cause the more extensive and severe cracking in the wearing surface. As an added benefit, the girder top flanges, which also serve as the concrete deck, allow for shorter construction duration as a separate cast-in-place concrete deck is not required.

CONSTRUCTABILITY

All three superstructure alternatives exhibit a high degree of constructability. All consist of commonly produced and constructed prestressed concrete sections and all should be easily transported and erected. All superstructure alternatives utilize tried and true construction methods. However, slight differences in constructability do exist between the three alternatives.

The voided slab and deck bulb tee alternatives allow for slightly shorter construction durations since a separate concrete deck casting operation is not required. After the sections are erected and the secured together – either with tie bars as in the voided slabs or a longitudinally field welded connection in the deck bulb tees – a waterproofing membrane is placed and then an asphalt wearing surface is placed. However, this advantage in construction duration is relatively small as compared to the overall project duration.

CONSTRUCTION COST ESTIMATE

Preliminary construction cost estimates have been developed for the three bridge alternatives. These cost estimates are based upon the superstructures and substructures as discussed above; the preliminary plan and elevation and typical section drawings as shown in Appendix A; ITD cost estimate information as found in the ITD LRFD Bridge Manual Article 16.2, updated July 2015; and, where necessary, the ITD Bid Average Unit Price Report for 10/1/13 to 9/30/14 Projects.

- Alternative A: 26-inch Prestressed Concrete Voided Slabs
    - $239,300
- Alternative B: 30-inch Prestressed Concrete Bulb Tee Girders
    - $215,300
- Alternative C: 36-inch Prestressed Concrete Deck Bulb Tee Girders
    - $247,000

Note that the preliminary construction cost estimates include a 30% contingency.

The Preliminary Construction Cost Estimates are shown in Appendix B.

PREFERRED BRIDGE ALTERNATIVE

In order to combine a quantitative analysis with a more qualitative approach, the three bridge alternatives can be ranked from best to worst with regards to three main characteristics: Initial Cost, Future Maintenance Costs, and Constructability. As is generally the case, initial cost is an important factor, but not the only factor. The structure must allow for low future maintenance costs, and the structure must also allow for ease and timeliness in construction. The alternatives will be ranked in each of the three factors.

INITIAL COST

1. Alternative B: 30-inch Prestressed Concrete Bulb Tee Girders
2. Alternative A: 26-inch Prestressed Concrete Voided Slabs
3. Alternative C: 36-inch Prestressed Concrete Deck Bulb Tee Girders

In terms of initial cost only, the 30-inch bulb tee girders are the preferred option, resulting in a 10% reduction in cost over the 26-inch voided slabs.

FUTURE MAINTENANCE COSTS

1. Alternative B: 30-inch Prestressed Concrete Bulb Tee Girders
2. Alternative C: 36-inch Prestressed Concrete Deck Bulb Tee Girders
3. Alternative A: 26-inch Prestressed Concrete Voided Slabs

Again, the 30-inch bulb tee girders are the preferred option for future maintenance costs. This alternative utilizes a cast-in-place concrete deck along with integral abutments, virtually eliminating the likelihood of any moisture or chlorides onto the superstructure and bearing locations. The 36-inch deck bulb tees are slightly less attractive in terms of future maintenance costs, as they also utilize integral abutments; however, the asphalt wearing surface is prone to cracking, which allows for a path for moisture to possibly penetrate the waterproofing membrane and attack the connections between adjacent flanges. Note that this is still a very attractive typical section in terms of future maintenance costs, just not as ideal as Alternative B.

The voided slab section is the least desirable option in terms of future maintenance costs. Conventional abutments are required, thus introducing an expansion joint at the bridge ends and a possible path for moisture and chlorides to penetrate the beam ends and bearing locations. Moreover, the longitudinal cracking of the asphalt wearing surface reflective over the joints between adjacent slabs can provide an opportunity for additional moisture and chlorides to attack the transverse post-tensioning, which can lead to excessive differential deflection of the slabs and increased cracking.

CONSTRUCTABILITY

1. Alternative A: 26-inch Prestressed Concrete Voided Slabs
2. Alternative C: 36-inch Prestressed Concrete Deck Bulb Tee Girders
3. Alternative B: 30-inch Prestressed Concrete Bulb Tee Girders

In terms of constructability, the voided slabs are preferred slightly over the deck bulb tee girders, with the standard bulb tee girders as the least attractive option. Bridge construction with slabs is a standard, straight-forward process where the conventional abutments are constructed, the slabs are erected, and then the asphalt wearing surface is placed. The only additional difficulty present with Alternative C is that the integral abutments are slightly more time and labor intensive than conventional abutments. With Alternative B, the girders are erected and then a separate cast-in-place concrete deck is constructed, creating additional construction time and therefore cost. However, although the standard bulb tee girder construction requires a slightly longer construction duration than the other two alternatives, this construction remains very straight-forward, and is still considered a highly constructible solution.

RECOMMENDATION

Taking into account initial cost, future maintenance costs, and constructability, the recommended bridge alternative for the Moose Creek crossing of the Teton Centennial Trail Project is ***Alternative B, 30-inch Prestressed Concrete Bulb Tee Girders***. This alternative provides for the most cost effective solution in terms of both initial costs and future maintenance costs, while still providing for an extremely biddable and buildable bridge solution.

UNDERPASS CROSSINGS

As stated in the Report Objectives, a concept-level discussion of the underpass crossing options near the Mike Harris Campground and the Trail Creek Campground and the associated preliminary costs are a secondary objective of this report.

MIKE HARRIS CAMPGROUND UNDERCROSSING

At the Mike Harris Campground, the trail crosses from the north side of ID-33 to the south side. One of the crossing alternatives at this location is an underpass crossing. The proposed grade of the trail roughly matches the existing ground on the north side of ID-33, and then drops into a cut in order to provide the proper elevation difference for the underpass. On the south side, the existing ground is slightly higher than the north side. Therefore, the proposed grade slopes up out of the underpass to match up with existing ground about 200 feet away.

The underpass alternative crosses under ID-33, perpendicular to the highway alignment, just west of the Mike Harris Campground access road. Staged construction will be required for this option, as the undercrossing is constructed under an active highway and a full closure with detour route is not a feasible alternative. Typical staged constructed methods will call for temporary roadway to be constructed on one side of the alignment, traffic shifted to that side while the other side of the roadway and embankment is excavated and the culvert and roadway is constructed, traffic shifted back over the completed section while the remaining roadway is excavated and the newly constructed culvert is widened, and then traffic shifted back to the original alignment over the new culvert.

A very preliminary analysis of the staged construction methods indicates a necessary culvert length of approximately 50 feet. Based on ITD's latest cost estimate information and taking into account the additional cost associated with staged construction, a 10-foot x 10-foot precast concrete box culvert is estimated to cost $2,600 per foot, installed. This results in a preliminary cost of about $130,000.

The proposed precast concrete box culvert underpass would require significant excavation along both sides of the highway alignment in order to bring the trail down to the undercrossing elevation. This excavation results in steep grades with tight turning radii and retaining walls that would add cost to the project. Concrete cut walls to retain existing ground for excavation of the depressed trail typically range in cost from $90 to $125 per square foot of exposed wall surface. Based on the preliminary alignment and taking into account walls at all four corners of the culvert, a preliminary cost of approximately $300,000 would likely be added to the project in order to construct these walls.

Another consideration to take into account for the Mike Harris Campground undercrossing is the presence of Trail Creek and associated wetlands just south of the ID-33 alignment. In order to construct the trail as it emerges from the underpass culvert and rises up to meet existing grade, it is reasonable to assume that the adjacent wetlands and creek would likely be impacted during construction, and mitigation efforts will likely be necessary. This would undoubtedly add time and cost to the project for this alternative, and should be avoided if at all possible.

TRAIL CREEK CAMPGROUND UNDERCROSSING

After submittal of the Reconnaissance Report, it was determined that the project scope would also include the section of the Teton Centennial Trail along WYO 22 between the Idaho-Wyoming border and the Trail Creek Campground. The trail crosses from the north side of the WYO 22 alignment to the south side at the Trail Creek Campground. At this location, three possible crossing alternatives have been developed. The three alternative alignments across WYO 22 are shown in the Concept Plans. Undercrossing Alternative A is the preferred alternative, while the At-Grade Crossing Alternative and the Undercrossing Alternative B are the option alternatives. Undercrossing Alternatives A and B are undercrossings just east and west of the campground access road, respectively.

At this location of the WYO 22 alignment, the existing grade on the north side of the highway is significantly higher in elevation than both the highway and the south side. The existing grade on the south side slopes away from the highway alignment rather abruptly.

Undercrossing Alternative B consists of a skewed undercrossing just west of the Trail Creek Campground access road, while Undercrossing Alternative A places an undercrossing just east of the access road and perpendicular to the highway alignment. Staged construction will be required for both of these options, as the undercrossing is constructed under an active highway and a full closure with detour route is not a

feasible alternative. Typical staged construction methods for Alternatives A and B will call for temporary roadway to be constructed to the north of the alignment, traffic shifted to the north while the southern portion of the roadway and embankment is excavated and the culvert and roadway is constructed, traffic shifted back to the south over the completed section while the roadway to the north is excavated and the newly constructed culvert is widened to the north, and then traffic shifted back to the original alignment over the new culvert.

A very preliminary analysis of the staged construction methods for both Alternatives A and B indicates a necessary culvert length of approximately 50 feet for the perpendicular Alternative A and 75 feet for the skewed Alternative B. Based on ITD's latest cost estimate information and taking into account the additional cost associated with staged construction, a 10-foot x 10-foot precast concrete box culvert is estimated to cost $2,600 per foot, installed. This results in a preliminary cost of about $130,000 for the perpendicular crossing (Alternative A) and $195,000 for the skewed crossing (Alternative B).

The proposed 10-foot x 10-foot precast concrete box culvert underpass would require significant excavation along both sides of the highway alignment in order to bring the trail down to the undercrossing elevation. This excavation results in steep grades with tight turning radii and retaining walls that would add cost to the project. Concrete cut walls to retain existing ground for excavation of the depressed trail typically range in cost from $90 to $125 per square foot of exposed wall surface. Based on the preliminary alignments for both alternatives and taking into account walls at all four corners of the culvert, a preliminary cost of approximately $500,000 for either alternative would likely be added to the project in order to construct these walls.

Appendix A: Draft TS&L Plans

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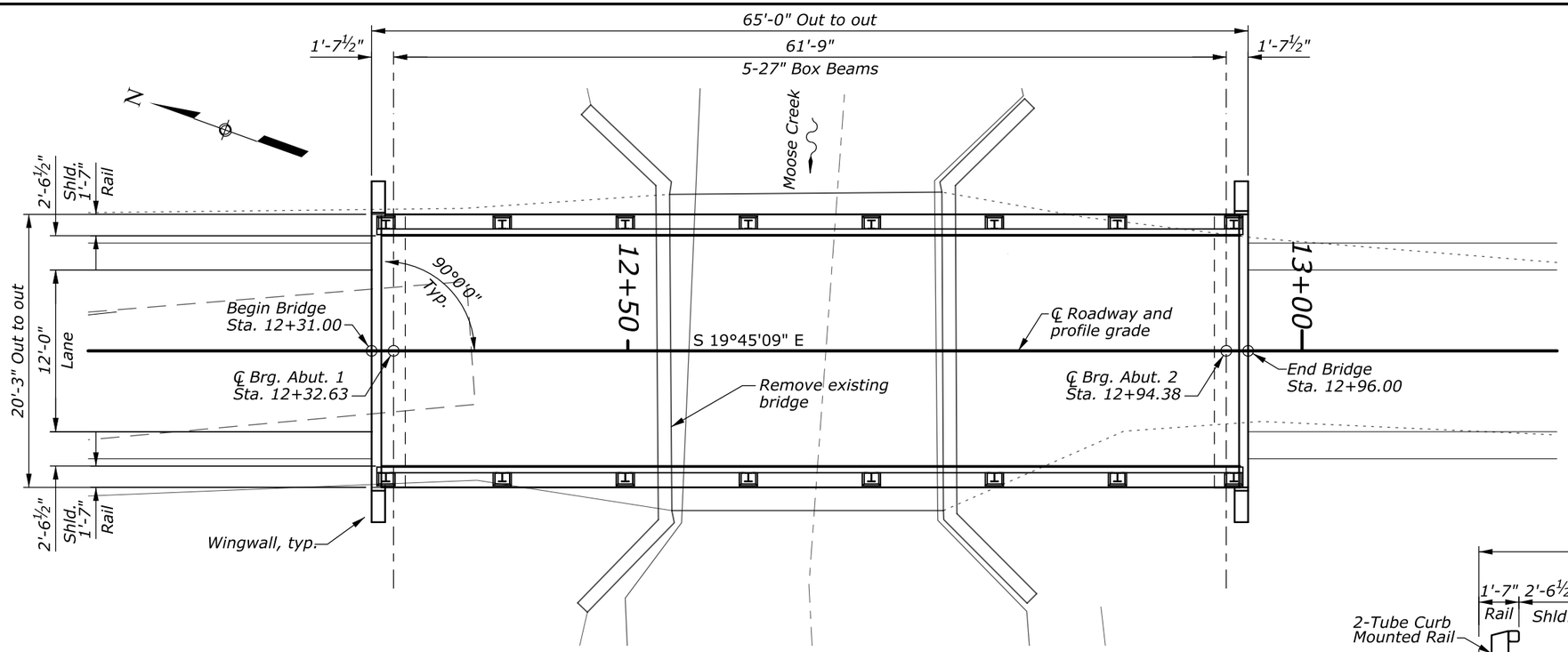

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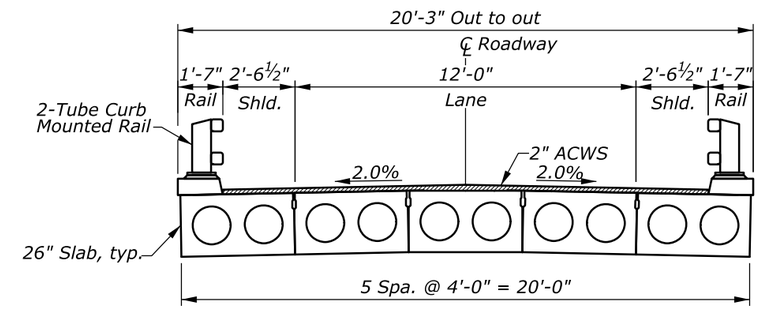

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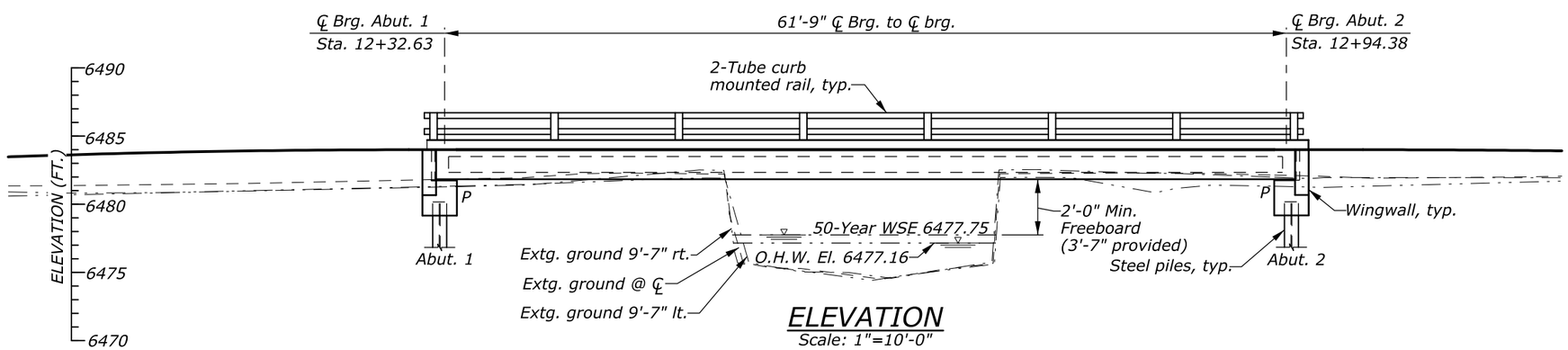

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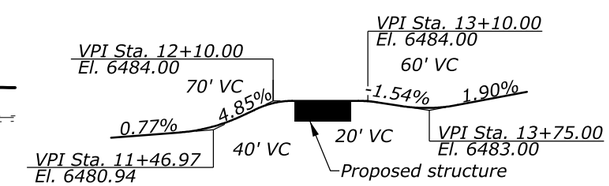

GRADELINE DIAGRAM
No Scale

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

TETON CENTENNIAL TRAIL

TARGHEE NATIONAL FOREST
TETON COUNTY

IDAHO

PLAN AND ELEVATION AND TYPICAL SECTION (ALTERNATIVE A)

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								M. HARLAN	D. ALTENBURG	T. STONES	AS SHOWN ON PLANS	K. Gray	01 of 03	DECEMBER 2015	XXXXXX-X

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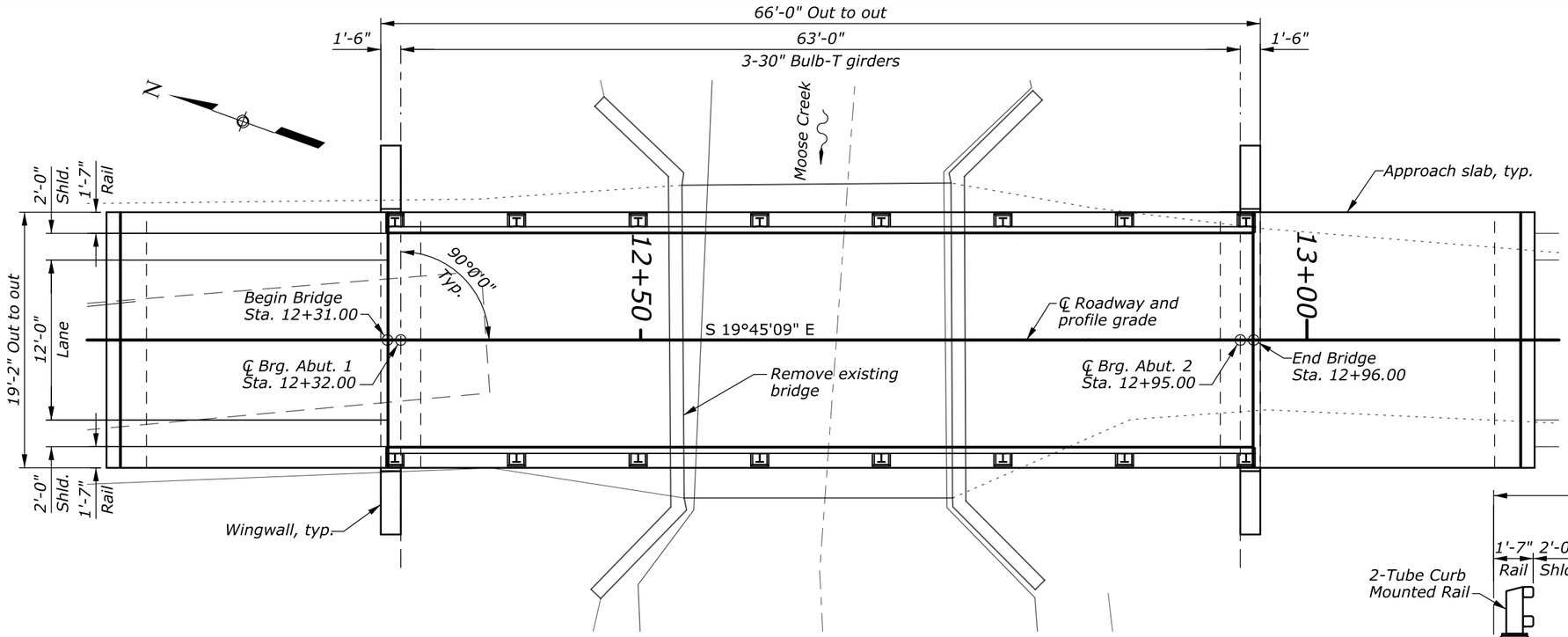

PLAN

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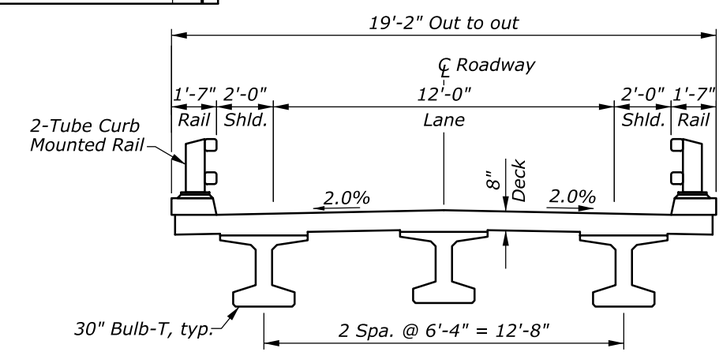

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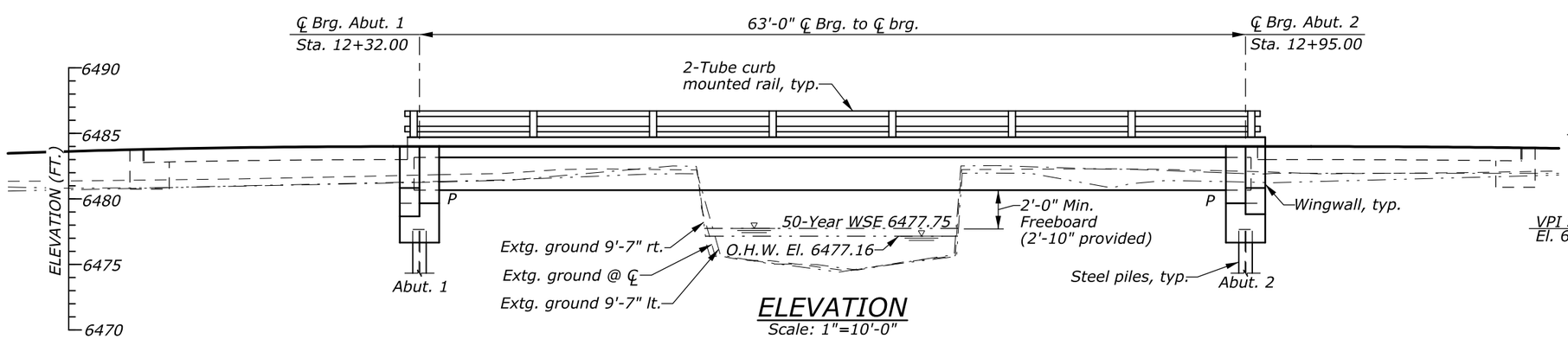

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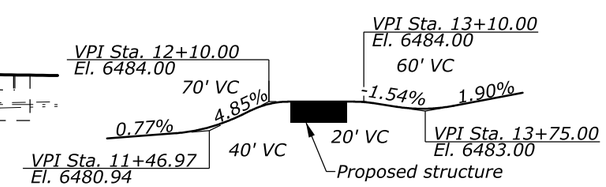

GRADELINE DIAGRAM

No Scale

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

TETON CENTENNIAL TRAIL

TARGHEE NATIONAL FOREST
TETON COUNTY

IDAHO

PLAN AND ELEVATION AND TYPICAL SECTION (ALTERNATIVE B)

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								M. HARLAN	D. ALTENBURG	T. STONES	AS SHOWN ON PLANS	K. Gray	02 of 03	DECEMBER 2015	XXXXXX-X

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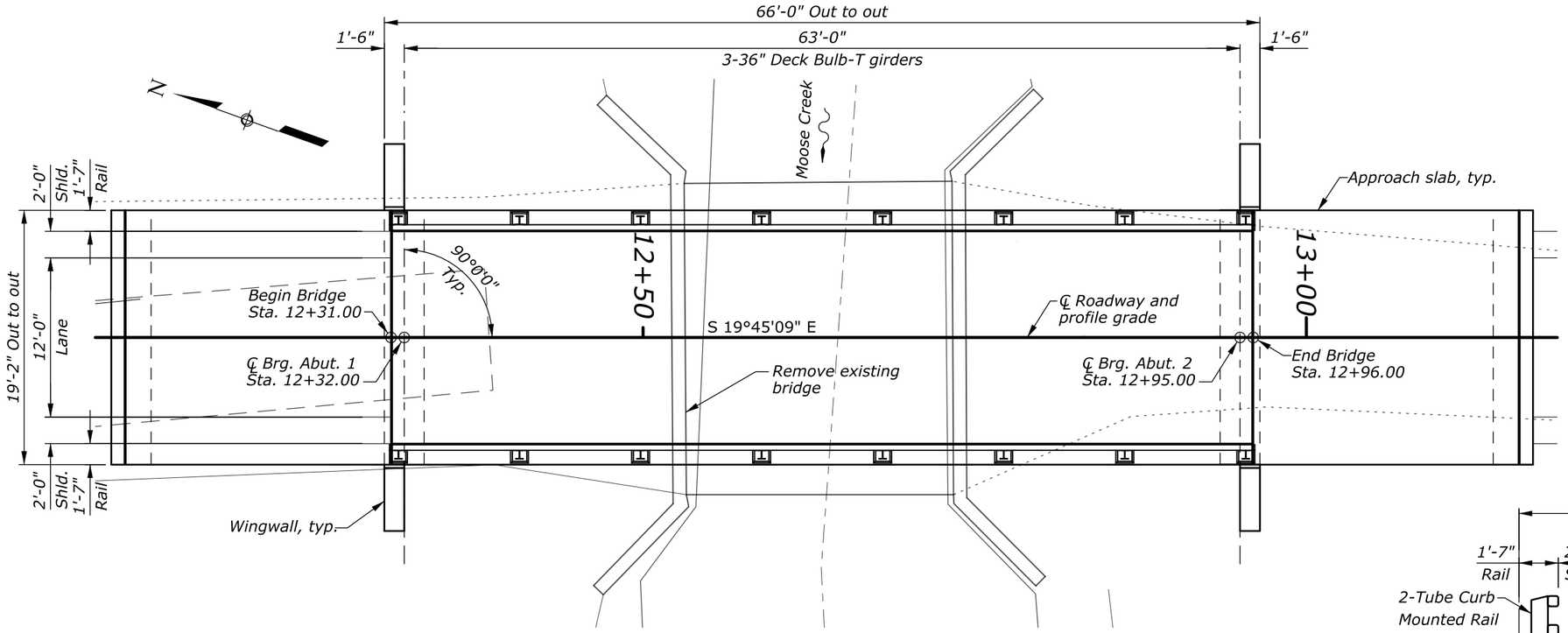

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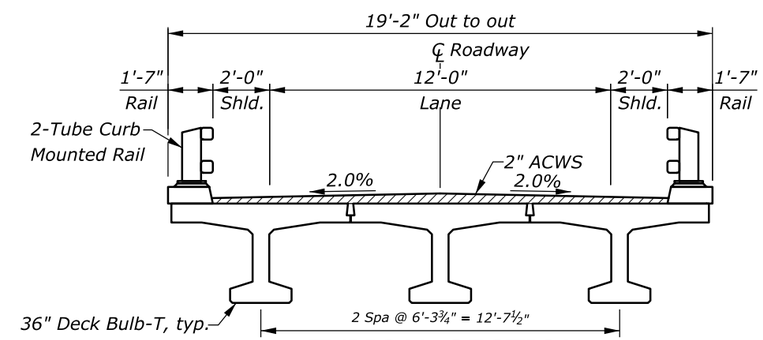

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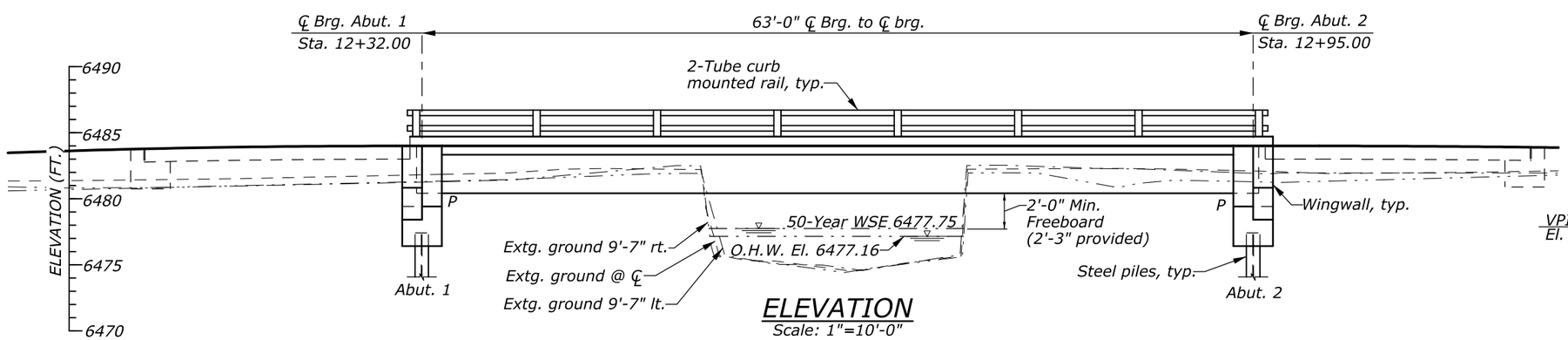

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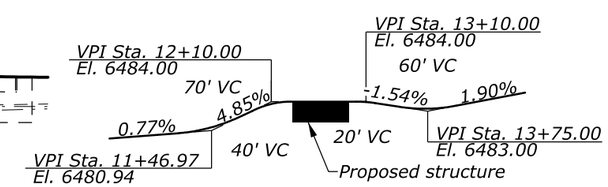

GRADELINE DIAGRAM
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U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
WESTERN FEDERAL LANDS HIGHWAY DIVISION

TETON CENTENNIAL TRAIL

TARGHEE NATIONAL FOREST
TETON COUNTY

IDAHO

PLAN AND ELEVATION AND TYPICAL SECTION (ALTERNATIVE C)

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								M. HARLAN	D. ALTENBURG	T. STONES	AS SHOWN ON PLANS	K. Gray	03 of 03	DECEMBER 2015	XXXXXX-X

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Appendix B: Draft Preliminary Cost Estimates

Preliminary Cost Estimate

Teton Centennial Trail Project
Moose Creek Crossing
Project No: FHAX0220
Bridge No:

Alternative A: 26" Prestressed Concrete Voided Slab Units
Layout Description: Five 48" wide slab units.

Superstructure:

Item	Quantity	Unit	Unit Cost	Total
Voided Slabs	317.5	FT	$ 308.00	$ 97,790.00
2 Tube Curb Mount Rail	125.8	FT	$ 125.00	$ 15,718.75
Superpave HMA Pavement	13.9	Ton	$ 63.00	$ 874.45
Conc Waterproofing System, Type A or D	123.4	SY	$ 18.00	$ 2,220.83
Compression Seal only <2"	43.5	FT	$ 19.00	$ 826.50
			Superstructure Total:	**$ 117,430.54**

Substructure:

Abutments:

Item	Quantity	Unit	Unit Cost	Total
Concrete Class 40A Sch. No. 1	13.7	CY	$ 500.00	$ 6,842.08
Metal Reinforcement Sch. No. 1	1847	LB	$ 0.95	$ 1,754.99
Provide & Drive HP 12x74 Piling	400	FT	$ 85.00	$ 34,000.00
Loose Riprap	47	CY	$ 55.00	$ 2,580.25
Riprap/Erosion Control Geotextile	70.4	SY	$ 3.00	$ 211.11
			Substructure Total:	**$ 45,388.43**

Mixcellaneous:

Item	Quantity	Unit	Unit Cost	Total
Removal of Single Span Bridges	480	SF	$ 14.00	$ 6,720.00
Structure Excavation Sch. No. 1	70	CY	$ 14.00	$ 985.65
Compacting Backfill	28	CY	$ 15.00	$ 417.81
			Miscellaneous Total:	**$ 8,123.45**

Subtotal:		**$ 170,942.42**
Contingency:	30%	$ 51,282.73
Mobilization:	10%	$ 17,094.24
GRAND TOTAL:		**$ 239,300.00**

Preliminary Cost Estimate

Teton Centennial Trail Project
Moose Creek Crossing
Project No: FHAX0220
Bridge No:

Alternative B: 30" Prestressed Concrete Bulb Tee Girders
Layout Description: Single span, three 30" bulb tees spaced at 6'-4" on center.

Superstructure:

Item	Quantity	Unit	Unit Cost	Total
Concrete Class 40A Sch. No. 2	33.9	CY	$ 580.00	$ 19,677.68
Bulb Tee Girders	191.5	FT	$ 148.00	$ 28,342.00
Metal Reinforcement Sch. No. 2	6955	LB	$ 0.95	$ 6,607.29
2 Tube Curb Mount Rail	127.8	FT	$ 125.00	$ 15,968.75
			Superstructure Total:	**$ 70,595.72**

Substructure:

Abutments:

Item	Quantity	Unit	Unit Cost	Total
Concrete Class 40A Sch. No. 1	30.6	CY	$ 500.00	$ 15,304.55
Metal Reinforcement Sch. No. 1	4132	LB	$ 0.95	$ 3,925.62
Provide & Drive HP 12x74 Piling	400	FT	$ 85.00	$ 34,000.00
Loose Riprap	49	CY	$ 55.00	$ 2,702.47
Riprap/Erosion Control Geotextile	73.7	SY	$ 3.00	$ 221.11
			Substructure Total:	**$ 56,153.74**

Mixcellaneous:

Item	Quantity	Unit	Unit Cost	Total
Approach Slab	89.4	SY	$ 200.00	$ 17,888.89
Removal of Single Span Bridges	480	SF	$ 14.00	$ 6,720.00
Structure Excavation Sch. No. 1	126	CY	$ 14.00	$ 1,765.61
Compacting Backfill	42	CY	$ 15.00	$ 629.75
			Miscellaneous Total:	**$ 27,004.26**

Subtotal:		**$ 153,753.72**
Contingency:	30%	$ 46,126.12
Mobilization:	10%	$ 15,375.37
GRAND TOTAL:		**$ 215,300.00**

Preliminary Cost Estimate

Teton Centennial Trail Project
Moose Creek Crossing
Project No: FHAX0220
Bridge No:

Alternative C: 36" Prestressed Concrete Deck Bulb Tee Girders
Layout Description: Single span, three 36" deck bulb tees (43" total depth including 8" top flange/deck) with 6'-3 1/2" wide flanges.

Superstructure:

Item	Quantity	Unit	Unit Cost	Total
Prestr. Deck Bulb Tee Girder	191.5	FT	$ 393.00	$ 75,259.50
2 Tube Curb Mount Rail	127.8	FT	$ 125.00	$ 15,968.75
Superpave HMA Pavement	13.2	Ton	$ 63.00	$ 831.60
Conc Waterproofing System, Type A or D	117.3	SY	$ 18.00	$ 2,112.00
			Superstructure Total:	**$ 91,228.25**

Substructure:

Abutments:

Item	Quantity	Unit	Unit Cost	Total
Concrete Class 40A Sch. No. 1	33.8	CY	$ 500.00	$ 16,888.18
Metal Reinforcement Sch. No. 1	4560	LB	$ 0.95	$ 4,331.82
Provide & Drive HP 12x74 Piling	400	FT	$ 85.00	$ 34,000.00
Loose Riprap	49	CY	$ 55.00	$ 2,702.47
Riprap/Erosion Control Geotextile	73.7	SY	$ 3.00	$ 221.11
			Substructure Total:	**$ 58,143.58**

Mixcellaneous:

Item	Quantity	Unit	Unit Cost	Total
Approach Slab	89.4	SY	$ 200.00	$ 17,888.89
Removal of Single Span Bridges	480	SF	$ 14.00	$ 6,720.00
Structure Excavation Sch. No. 1	130	CY	$ 14.00	$ 1,825.80
Compacting Backfill	43	CY	$ 15.00	$ 645.96
			Miscellaneous Total:	**$ 27,080.65**

Subtotal:		**$ 176,452.48**
Contingency:	30%	$ 52,935.74
Mobilization:	10%	$ 17,645.25
GRAND TOTAL:		**$ 247,000.00**

APPENDIX D

Conceptual Geotechnical and Geologic Hazard Assessment Memo

9750 SW Nimbus Avenue
Beaverton, OR 97008-7172
p | 503-641-3478 f | 503-644-8034

TECHNICAL MEMORANDUM

To: John Maloney, PE / David Evans and Associates, Inc.

Date: December 16, 2015
(REVISED 02-02-16)

GRI Project No.: 5728

From: Scott Schlechter, PE, GE; Lindsi Hammond, PE; and George Freitag, CEG

Re: Concept Geotechnical and Geologic Hazard Memorandum
Federal Highway Administration (FHWA)
ID DOT T 33(1), Teton Centennial Trail
Teton County, Idaho

This technical memorandum summarizes our concept-level geotechnical and geological hazard assessment for a portion of the Teton Centennial Trail project that starts in Teton County, Idaho and extends into Teton County, Wyoming. The Vicinity Map, Figure 1, shows the general location of the proposed trail alignment described above. The purpose of this phase of work was to assist David Evans and Associates, Inc. (DEA), with preliminary evaluation of current geotechnical and geological conditions along the proposed trail alignment, and provide concept-level geotechnical and pavement recommendations for design and construction of this portion of the trail. Our work was completed in accordance with our agreement with David Evans and Associates, Inc. (DEA) under FHWA contract DTFH70-10-D-00019, Task Order No. DTFH7015F19006. This memorandum also provides recommendations for geotechnical and geological investigation work, which is required for the final design and construction of the project.

PROJECT DESCRIPTION

The overall Teton Centennial Trail project will extend along the Teton Pass Highway from Victor, Idaho, to Wilson, Wyoming, a distance of about 17 miles. This phase of the project involves an approximate 2.3-mile-long section of the Teton Centennial Trail that starts near Moose Creek in Teton County, Idaho and extends past the Idaho/Wyoming state border to the Trail Creek Campground in Teton County, Wyoming. The Site Plan, Figure 2, shows the general location of the proposed trail alignment included in this phase of the project. The trail will be constructed along the north side of the Teton Pass Highway and will include design and construction of a new bicycle/pedestrian path using portions of the Old Jackson Highway and an existing unimproved dirt trail.

As currently planned, the project elements include:

- A10-ft-wide asphalt concrete surfaced path;
- Replacement of the Moose Creek Bridge and new pavement construction at Moose Creek;
- New aggregate surfaced parking area southeast of the Moose Creek Bridge;
- Possible retaining walls; and

- Possible structures or improvements to allow pedestrian crossing of the Teton Pass Highway near the Mike Harris Campground in Teton County, Idaho and the Trail Creek Campground in Teton County, Wyoming.

Conceptual plans provided by you, indicate the trail will begin immediately north of Moose Creek at station 10+00 and extend to Trail Creek Campground at station 131+72.76. Based on our review of the conceptual plans, we anticipate the maximum height of cuts and fills to establish final grades along the trail alignment will typically be less than about 4 ft. However, we anticipate some areas may require retaining structures where the height of cuts and fills to establish final grades will exceed about 4 ft.

SITE DESCRIPTION

The proposed trail alignment runs parallel to the north side of the Teton Pass Highway and is located on the southwest-facing slope of the Taylor Mountain Upland, which rises to an elevation of 10,352 ft (WGS 84). The trail will begin near Moose Creek at about elevation 6,480 ft (WGS 84) and extend southeast to the Trail Creek Campground at about elevation 6,680 ft (WGS 84). The trail will traverse the hillside with grades typically ranging from 2 to 3% and 10 to 15% along relatively flat and rolling areas, respectively.

The majority of the ground surface along the proposed trail alignment is vegetated with wild grass, brush, and trees. Several drainages fed from the Taylor Mountain Upland cross the proposed trail alignment and drain into Trail Creek. Portions of the trail will be located at the top of rock cut slopes that were likely created during construction of the Teton Pass Highway. We estimate the rock slopes were cut at about 1H:1V to 1.5H:1V (Horizontal:Vertical) and based on our review of aerial imagery, the slopes appear to be stable.

GEOLOGIC SETTING

The project is located in the Idaho-Wyoming thrust belt geologic province, which is a segment of the Cordilleran thrust belt that is comprised of folded and faulted Paleozoic and Mesozoic sedimentary rocks. The path is located on the west flank of Taylor Mountain, which is a prominent southern peak of the Teton Range.

The path will cross over several geologic units. Near Moose Creek, the path is located on Quaternary alluvial deposits, consisting of unconsolidated silt, sand, and gravel. As the path gains elevation to the southeast, the upland rock units consist of Quaternary colluvium, Mesozoic sedimentary rocks, and Neogene volcanic rocks (Mitchell and Bennett, 1979). Quaternary colluvium consists of partially consolidated or cemented silt, sand and gravel that accumulate on sloping ground due to weathering and erosional processes. The sedimentary rocks are mapped as Gannett Group, and consist of sandstone and limestone. The volcanic rocks are mapped as Kirkham Hollow Volcanics, and consist of tuff and rhyolite.

GEOLOGIC HAZARD REVIEW

An Environmental Assessment (EA) for the entire 17-mile Teton Centennial Trail was completed by the Teton Basin Ranger District, Caribou-Targhee National Forest in 2001. The EA identified several geologic hazards that could potentially affect the overall project including unstable soils/landslides, avalanches, and seismicity.

As shown on Figure 3, the mapping provided in the EA does not show identified areas of unstable soils/landslides or avalanche zones along this portion of the trail. The EA did not identify rockfall hazards

along the trail alignment. Preliminary team comments regarding rockfall hazard are provided in the Site Reconnaissance Findings section of this memorandum, below.

U.S. Geological Survey mapping does not show Quaternary faults that coincide with the trail (U.S. Geological Survey, 2006). The Teton fault is located about 10 miles east of the east end of the trail and is considered to have been active in the last 15,000 years (U.S. Geological Survey, 2006) and capable of generating a maximum earthquake of Mw 7.5 (Pickering, et al, 2009). Hydrogeological work for the City of Victor has documented the influence of faults on groundwater sources near the north portion of the project (Wylie et al, 2005). The faulting associated with the groundwater controls is pre-Quaternary in age.

SITE RECONNAISSANCE FINDINGS

A site reconnaissance was completed on June 15 and 16, 2015, by DEA personnel (John Maloney, PE) and several other team members. The reconnaissance included viewing the proposed path from the Teton Pass Highway and a walking traverse over the majority of the path alignment.

The following list summarizes possible new structures, and preliminary geotechnical- and geological-considerations, made by the team during the reconnaissance.

- The existing Moose Creek Bridge will be removed and replaced.
- Geotechnical testing along the Old Jackson Highway should be included to determine material and depth.
- The existing rock slope cuts generate limited rockfall.
- Geotechnical testing and evaluation of the rock slope stability will affect the path alignment. Wire mesh installed on the rock cuts may be necessary where the path is located below rock faces.
- Culverts under the Teton Pass Highway or other structures near the Mike Harris and Trail Creek Campgrounds may be considered for pedestrian access.

The team also made note of the need for testing of the existing Moose Creek Bridge structure for hazardous materials.

CONCLUSIONS AND FUTURE SCOPE CONSIDERATIONS

Preliminary Geotechnical Recommendations

Based on the preliminary work completed for this assessment, it is our opinion that the planned improvements will not have an adverse effect on existing geologic hazards along the trail alignment.

The following conceptual geotechnical and geologic design recommendations are provided; however, it must be understood that design-level geotechnical and geologic investigations must be completed as the project moves forward.

- New cut slopes less than 3 ft in height to be constructed in colluvium deposits can likely be planned for 1.5H:1V or flatter. Cuts of this height in sedimentary rock deposits or volcanic rock deposits can likely be completed at 1H:1V, if necessary.

Taller, unretained cut slopes, if needed, should be planned for 2H:1V until additional site-specific evaluations are completed.

- Two trail alternatives are being considered between stations 21+00 and 33+00. One alternative is located above an existing, 300-ft-long, 10- to 85-ft-tall, approximately 1 to 1.5H:1V rock cut near the intersection of Old Jackson Highway and Highway 33. A second trail alternative is located along the base of this rock cut. There is limited space, typically 10 ft or less, between Highway 33 and the toe of the existing slope. A combination program of scaling, draped or pinned mesh, rockfall fencing, or similar active protection measures will likely be required if the second trail alternative is pursued. If additional space is required at the toe of the slope, new rock cuts can be planned at about 1 to 1.5H:1V as required to match existing slopes, provided detailed rock slope mapping, investigation drilling, and rock slope design is accomplished in this area as the project proceeds.

- We estimate a cut of about 20 to 25 ft will be required at station 128+50 to construct the underpass beneath the highway that leads to the Trail Creek Campground. Given the height of the cut slope and proximity to the highway, we anticipate this cut slope may require some type of retaining structure, such as a mechanically stabilized earth (MSE) wall system.

- Fill slopes should be planned for no steeper than 2H:1V. We anticipate the planned fill slopes at stations 34+50 and 127+25 will have a maximum height of about 8 ft and can be sloped at 2H:1V.

- Areas where it is impractical to construct cut and fill slopes as discussed above may require retaining structures. We anticipate the types of retaining structures for this project will be likely be gravity and/or MSE wall systems. MSE walls are commonly used in fill applications where there is space for the reinforcing elements behind the front face of the wall . For preliminary planning purposes, the reinforcing lengths are commonly on the order of 80% of the wall height. For cut locations and relatively small wall heights, gravity retaining structures will likely be more appropriate.

- Areas of the trail alignment that are located in seasonal or permanent wetlands may encounter soft or otherwise unsuitable subgrade conditions. Any soft soils or areas of unsuitable material should be overexcavated to firm undisturbed soil and replaced with compacted granular fill. In areas where unsuitable material is encountered, we anticipate the overexcavation depth will be less than 12 in. Alternatively, a woven geotextile fabric or geogrid may be considered to supplement a portion of the overexcavation.

- Depending on the estimated depth of scour, the new Moose Creek Bridge over Moose Creek may be founded on conventional or "deep" spread footings established in colluvium, sedimentary rock, or volcanic rock, which we anticipate underlies the alluvial deposits in this area. If the depth of scour is considerable, spread footings with micropiles to resist uplift may be a cost-effective option.

In our opinion, the risks of landslides, slumps, or other features affecting the global slope stability of the proposed improvements is low.

Conceptual Pavement Design

We developed preliminary pavement sections for: 1) the Centennial Trail Path, 2) the approaches to the Moose Creek Bridge, and 3) the aggregate surfaced parking area located near the Moose Creek Bridge. Our preliminary pavement design recommendations are based upon subsurface information from the Natural Resources Conservation Service (NRCS) Soil Survey data and traffic data from the Idaho Department of Transportation. The preliminary design analysis was accomplished in general accordance with the procedures outlined in the Federal Lands Highway Division Project Development Design Manual (PDDM) and the 1993 AASHTO *Guide for Design of Pavement Structures* (AASHTO Guide).

The Soil Survey information indicates that the predominant near surface soil (approx. 95% of the alignment) consists of the Koffgo/Rhylow/Povey soil series. In a typical profile the Koffgo/Rhylow/Povey Series consists of a low plastic silty, sandy gravel or sandy, gravelly silt. The remainder of the alignment (approx. 5%) consists of the Cryaquolls or Foxcreek Soil Series. In a typical profile, the Cryaquolls Series consists of a fine, sandy silt to a depth of 30-in. over a sandy, silty gravel or sandy, gravelly silt. In a typical profile the Foxcreek Series consists of a thin layer of peat over clayey silt to a depth of 21 in. over a sandy, silty gravel.

Our preliminary assessment indicates that the Koffgo/Rhylow/Povey Soil Series is not a *problem soil* from a construction standpoint and it should be feasible to moisture condition and compact this soil during the normal summertime construction window. On the other hand, the upper 2 to 2$^1/_2$ feet of both the Cryaquolls and Foxcreek Soil Series may be difficult to moisture condition for compaction or may not provide suitable subgrade support. Hence, for preliminary scoping purposes, we recommend that subgrade stabilization (as shown below) be planned for up to 5% of the Centennial Trail Path.

Our preliminary design recommendations are summarized below.

<u>Centennial Trail path</u>

- 2.0-in.-thick Superpave HMA SP-2, $^1/_2$-in. size (placed in one lift)
- 4.0-in.-thick $^3/_4$-in.-minus Aggregate Base Course (AB), Gradation A
- Upper 12 in. of subgrade compacted in accordance with Section 205.03-1 (F) for Class A compaction.

<u>Moose Creek Bridge Approaches</u>

- 5.0-in.-thick Superpave HMA SP-2, $^1/_2$-in. size (placed in two equal lifts)
- 6.0-in.-thick 3/4-in.-minus Aggregate Base Course (AB) "A" Gradation
- Upper 12 in. of subgrade compacted in accordance with Section 205.03-1 (F) for Class A compaction.

<u>Aggregate Surfaced Parking Area</u>

- 4.0-in.-thick $^1/_2$-in.-minus Aggregate Base Course (AB)
- 12.0-in.-thick $^3/_4$-in.-minus Aggregate Base Course (AB) "A" Gradation
- Geotextile Fabric

- Upper 12 in. of subgrade compacted in accordance with Section 205.03-1 (F) for Class A compaction.

Subgrade Stabilization (assumed for 5% of the Centennial Trail Path)

In areas where the subgrade is unstable or it is not feasible to compact the subgrade, subgrade stabilization should be done in lieu of subgrade compaction. The following alternative sections are recommended for subgrade stabilization:

- 4-in.-thick, 3/4in.-minus size Aggregate Base (Gradation A)
- 12-in.-thick, 2-in.-minus size Aggregate Base
- TX5 Geogrid
- Subgrade Geotextile
- On undisturbed subgrade

or

- 4-in.-thick, 3/4-in.-minus size Aggregate Base (Gradation A)
- 18-in.-thick, 2-in.-minus size Aggregate Base
- Subgrade Geotextile
- On undisturbed subgrade

Construction materials and procedures should comply with the applicable sections of the 2012 Idaho Department of Transportation (IDOT) Standard Specifications for Construction.

Material Resource Reconnaissance

Through online review, we identified two sources for aggregate materials and one source for hot mix asphalt concrete. The aggregate and hot mix asphalt concrete sources are located in Driggs, Idaho, which is about 20 minutes north of the trail alignment. Other aggregate sources were identified in Jackson, Wyoming; which is about 30 minutes away from the beginning of the trail.

Additional Pavement Construction Considerations

The recommended AC thickness of 2.0 in. for the trail provides the required structural capacity and is the minimum practical lift thickness from a construction standpoint. However, given the relatively high altitude of the site, there is the potential for cool weather well into the construction season and therefore, care will be necessary in scheduling paving to ensure that the 2.0-in.-thick mat doesn't cool too quickly before compaction can be achieved. The time before the mat reaches the cessation temperature (the temperature at which the asphalt binder becomes stiff enough to prevent any further reduction in air voids regardless of compactive effort) is a function of several factors, including air temperature base temperature, wind speed, initial mat temperature upon delivery and mat thickness.

Some measures that can be taken to increase the potential for successful compaction include paving on warm days with little to no wind, ensuring the mix delivery temperature is high enough to allow sufficient time to compact the mat, and not allowing the paver to operate far in advance of the rollers. If the contractor is having difficulty compacting the mat and none of the above measures are sufficient, it may be necessary to increase the lift thickness from 2.0 in. to 3.0 in., since a 3.0-in. mat typically allows approximately double the time for compaction before the cessation temperature is reached.

CONCEPTUAL INVESTIGATION PLAN

As part of the next phase of work, we recommend a detailed geotechnical and geological investigation and design work to be completed for the project. The investigation should include subsurface explorations at the new Moose Creek Bridge, along the Old Jackson Highway roadway, near the pedestrian access across the Teton Pass Highway to the Mike Harris and Teton Creek Campgrounds, and in the vicinity of new retaining walls. The engineering and geology evaluation should include mapping and assessment of existing rock slopes and rockfall hazards that could impact the proposed path. Final design may include installation of wire mesh or other protection measures along rock slopes that could generate rockfall, which could affect path users.

For planning purposes, the following list provides more detailed scope items for the next phase of design:

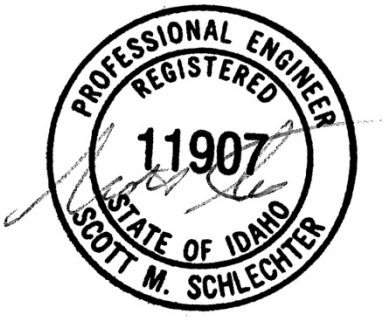
- Drill a boring at each end of the Moose Creek Bridge to a depth of about 40 ft below surface grade. Collect geotechnical samples and complete laboratory testing and engineering analyses for the new Moose Creek Bridge.
- Drill two borings at the location of the new pedestrian access across the Teton pass Highway near the Mike Harris Campground. Collect geotechnical samples and complete laboratory testing and engineering analyses for the new structure.
- Drill two borings at the location of the new pedestrian access across the Teton pass Highway near the Teton Trail Campground. Collect geotechnical samples and complete laboratory testing and engineering analyses for the new structure.
- Excavate test pits to depths of about 5 to 10 ft with a trackhoe at about 500-ft-intervals in select areas along the proposed trail alignment (approximately 25 test pits). Collect geotechnical samples and complete laboratory testing and engineering analyses for the new trail. Document field observations from the test pits regarding the likely the occurrence and distribution of subsurface water that could affect trail design.
- Depending on the location and size of the proposed retaining walls, additional borings or test pits should be completed as part of the next phase of design. Collect geotechnical samples and complete laboratory testing and engineering analyses for the new retaining walls.
- Complete a geological reconnaissance and perform geological mapping of existing rock slopes and rockfall hazards for the entire new trail alignment using the mapping criteria outlined in Miller and Silverman (2000). Rock slope design and rockfall mitigation criteria should be completed in accordance with the Idaho Transportation Department (ITD) Materials Manual (2015). Complete detailed observations and record location of rock outcrops, springs, wet ground, slope instability, and other geological and geotechnical features.
- Summarize the geotechnical and geological field work, laboratory testing, engineering analyses, and design information in a project report. Engineering recommendations should include bridge and highway crossing foundation recommendations, seismic design parameters, retaining wall geotechnical design parameters, slope stability analyses, and trail pavement section recommendations. Report will be consistent with guidelines provided by ITD (2015) and FHWA (2003).

In addition to the above, the existing Moose Creek Bridge structure should be visually evaluated for the possible presence of hazardous materials. Suspected materials with lead based paint and asbestos should be sampled and tested. Visual documentation of chemically treated wood should be documented. A summary report with the field observations, chemical test results, and recommendations for construction management should be prepared.

LIMITATIONS

This technical memorandum has been prepared to aid with the planning of the proposed improvement project with respect to geotechnical issues and geologic hazards. The scope is limited to the specific project and location described herein, and the description of the project elements represents our present understanding of the significant aspects of the project relative to geotechnical and geological matters. In the event that any changes in the project are planned, we should be given the opportunity to review the changes and modify or reaffirm the information provided in this memorandum. No warranty, expressed or implied, is provided.

Submitted for GRI,



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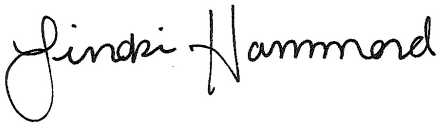

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This document has been submitted electronically.

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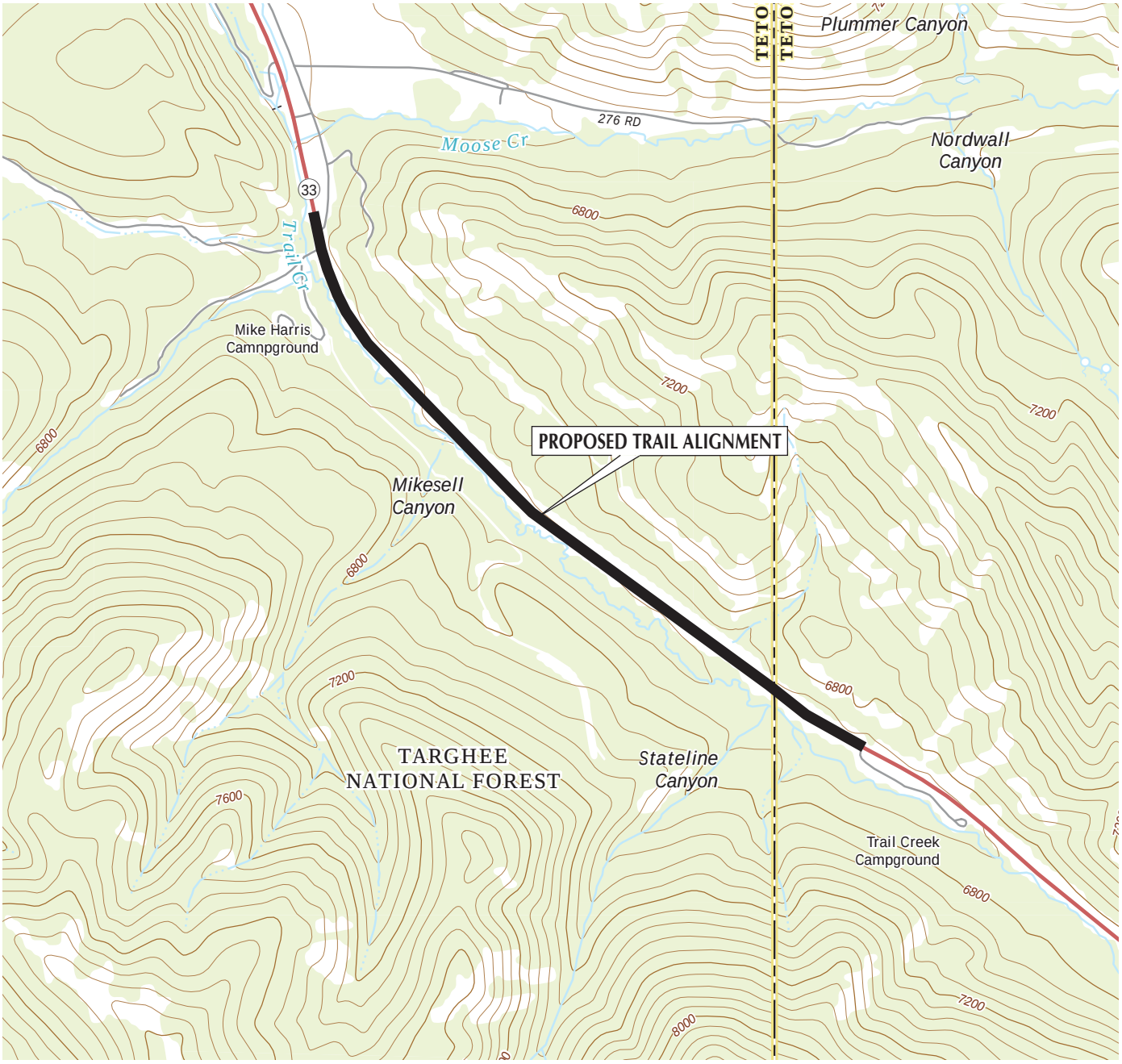

USGS TOPOGRAPHIC MAP
VICTOR, ID-WY IDAHO (2013)

North

0 1/2 1 MILE

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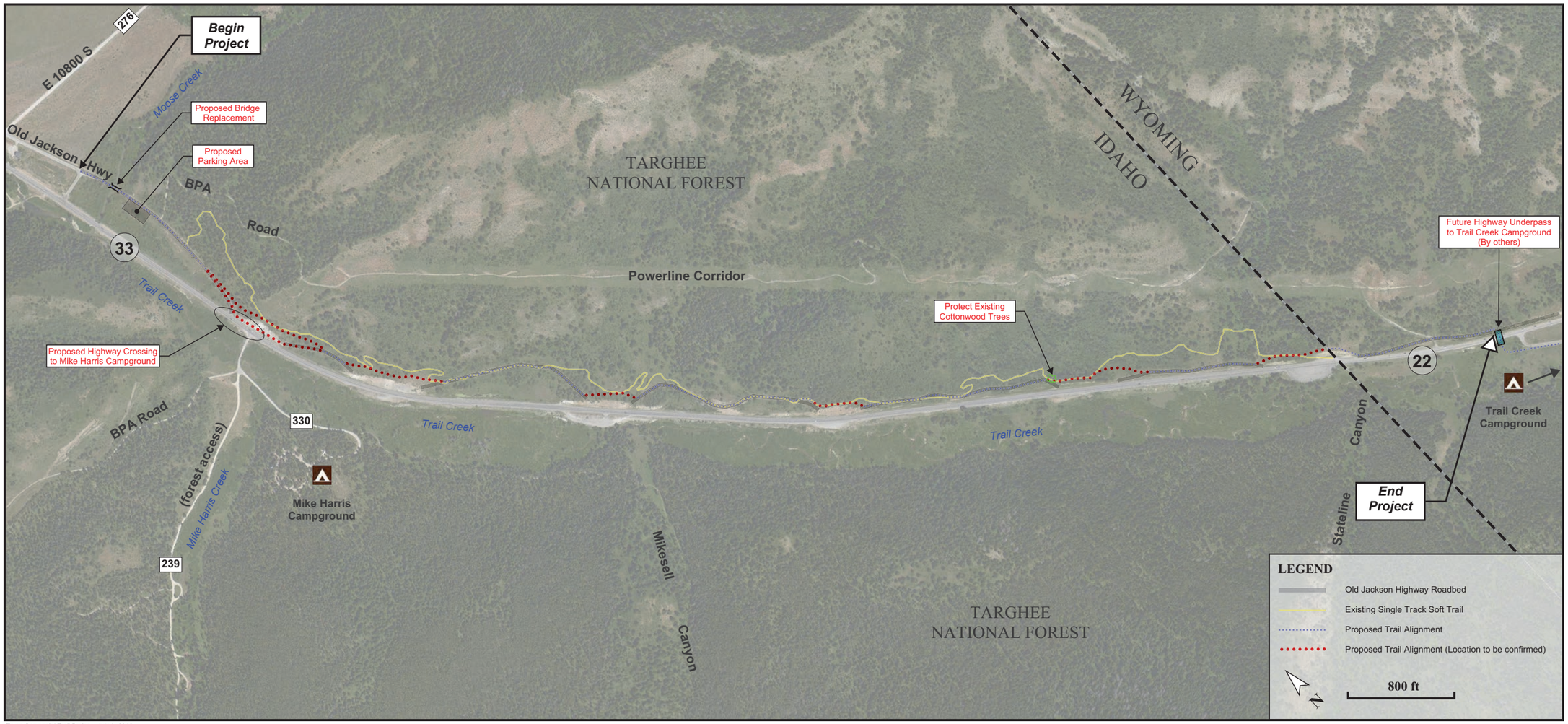
DAVID EVANS AND ASSOCIATES, INC.
TETON CENTENNIAL TRAIL

VICINITY MAP

DEC. 2015 JOB NO. 5728 FIG. 1



Teton Centennial Trail Project, July 8, 2015

SITE PLAN FROM FILE BY DAVID EVANS AND ASSOCIATES, INC. (DATED NOVEMBER 10, 2015)

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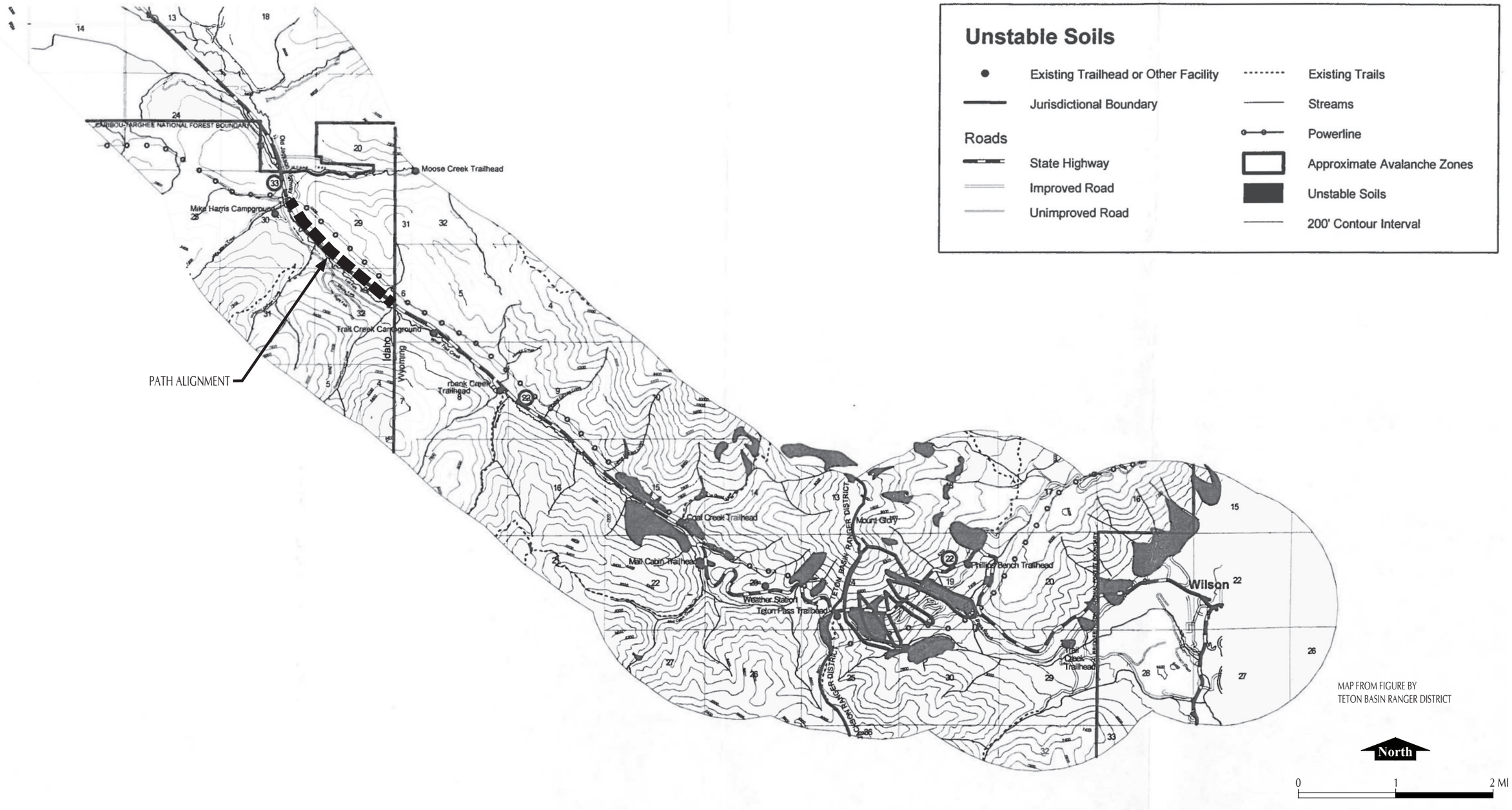
DAVID EVANS AND ASSOCIATES, INC.
TETON CENTENNIAL TRAIL

SITE PLAN

DEC. 2015 JOB NO. 5728 FIG. 2



MAP FROM FIGURE BY
TETON BASIN RANGER DISTRICT

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TETON CENTENNIAL TRAIL

UNSTABLE SOILS MAP

DEC. 2015 JOB NO. 5728 FIG. 3

APPENDIX E

Concept Environmental Memo

APPENDIX F

Culvert Inventory