King County

Task 200.2

Route Options Review Report

V2.0

Foothills Trail
Amendment No. 7

Prepared for:

King County

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EXECUTIVE SUMMARY

This Report provides the results of an alternatives review for a portion of the proposed Foothills Trail between Enumclaw, Washington and Buckley, Washington. The objective of this review is to determine potential alternatives for a trail that connects from the existing Boise Creek Arch Bridge to the existing Foothills Trail terminus on the south side of the White River. This review considers factors such as user experience, environmental conditions, safety, ADA accessibility, maintenance requirements and initial costs. The results of these analyses are presented in two (2) memoranda, which discuss and review various aspects of each trail feature.

The specific trail features presented in this Report are as follows:

1. The trail crossing location at SE Mud Mountain Road
2. The trail route and improvements from the Boise Creek Arch Bridge to the SE Mud Mountain Road trail crossing
3. The trail approach from the SE Mud Mountain Road trail crossing to the northern White River Bridge pier
4. The trail approach from the existing Foothills Trail terminus in Buckley, Washington to the southern White River Bridge pier

Opinions of probable cost were also developed for each trail feature alternative as part of the review and are discussed within each trail feature's section of this Report.

Summary and review tables of the alternatives for each trail feature are provided after the discussion of the trail feature. The Trail Alternatives Summary begins on Page 34 of this report, and the Northern White River Bridge Trail Approach Alternatives Summary begins on Page 46. These tables are intended to assist King County Parks in determining which alternatives to pursue in the design phase by summarizing and rating features such as cost, safety, trail user experience, etc.

The recommended trail improvements alternative from the Boise Creek Arch Bridge to the south side of SE Mud Mountain Road is Alternative #2A. For this trail alternative, the alignment cuts through the King County Parks property tennis court area and connects into the existing southern driveway access. This trail alternative crosses SE Mud Mountain Road approximately midway between the east and west horizontal roadway curves. This alternative allows for more separation between the Trail and roadway, a new driveway that provides improved joint-use access for both properties, and an ADA-compliant trail crossing of SE Mud Mountain Road.

The northern trail approach configuration that is recommended, based on the review provided in this Report, is Alternative #1. This configuration of earth fill embankment and walls is more cost-effective and requires less maintenance than the other alternative. It also matches the existing embankment for the Foothills Trail on the south side of the White River.

The southern trail approach configuration recommended for this project is an extension of the existing embankment on the south side of the river up to the proposed/existing White River bridge pier. This approach will match the existing Foothills Trail terminus in Buckley, Washington.

INTRODUCTION / PROJECT OVERVIEW

Phase II of the Foothills Trail (Trail) project consists of a 1.1 mile segment of Foothills Trail that will connect the existing Foothills Trail terminus at 252nd Avenue SE near Enumclaw, Washington (north of the White River), to the existing Foothills Trail terminus in Buckley (south of the White River).

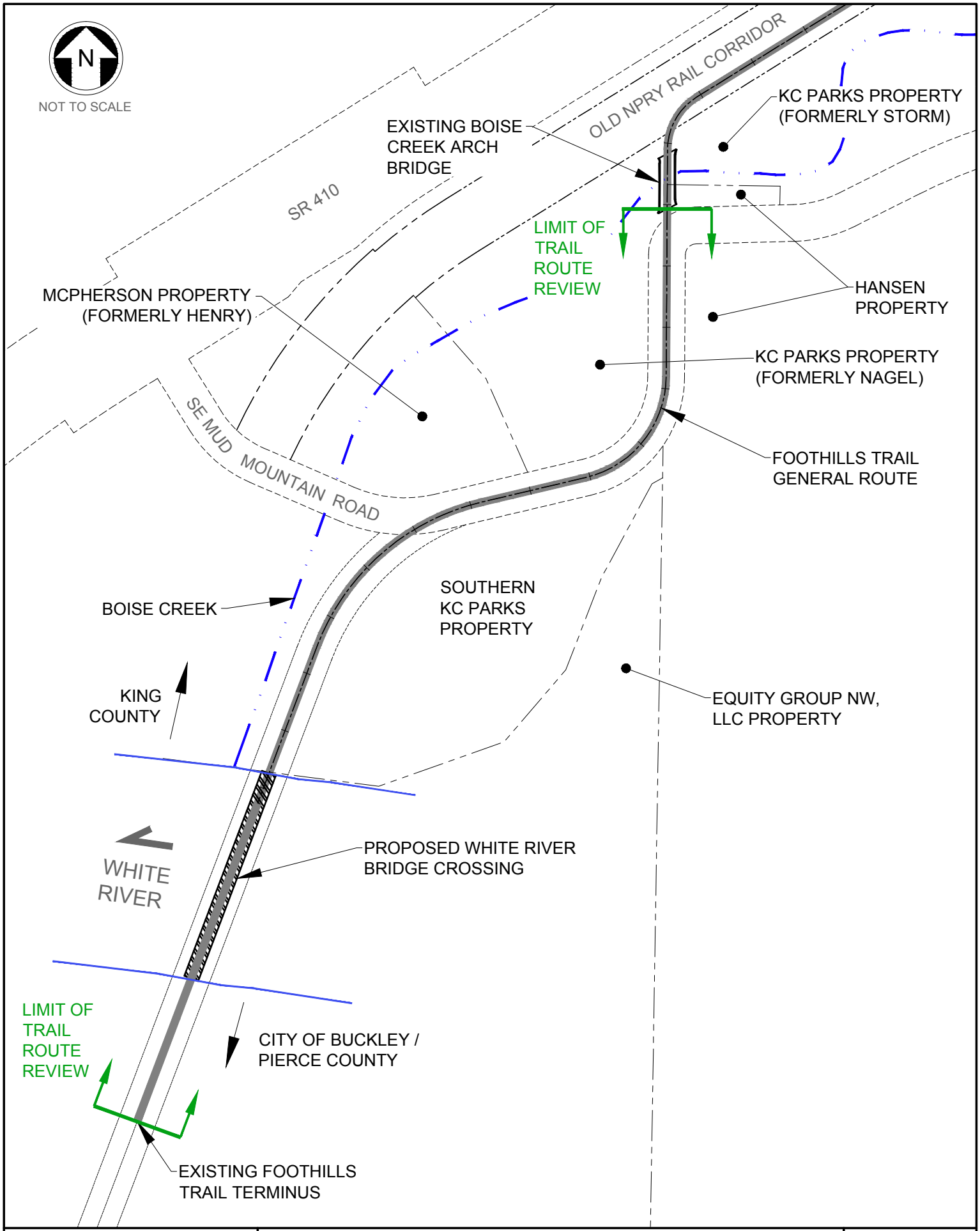
This Report assumes that the existing Boise Creek Arch Bridge is suitable for reuse and that the old SR 167 Puyallup River Bridge will be relocated and reused as the White River crossing, per the "BergerABAM SR 167 Puyallup River Bridge Reuse Assessment" report (2012). It is also assumed that King County Parks has acquired right-of-use for the portion of the existing Boise Creek Arch Bridge currently located within the Hansen property.

Alternatives are analyzed for the portion of the proposed Foothills Trail between the Boise Creek Arch Bridge and the existing Foothills Trail terminus in Buckley. Figure A provides a vicinity map of the portion of the Trail that is covered in this review.

This Report discusses the following analyses, presented in two memoranda:

1. Boise Creek Arch Bridge to SE Mud Mountain Road trail crossing
    a. Trail improvements from the existing Boise Creek Arch Bridge through the King County Parks (formerly Nagel) property at 24324 SE 473rd Street to the SE Mud Mountain Road trail crossing
    b. SE Mud Mountain Road trail crossing location
2. Approach to the White River Bridge
    a. Northern approach configuration to the White River Bridge from the SE Mud Mountain Road trail crossing
    b. Southern approach to the White River Bridge from the existing Foothills Trail terminus in Buckley, Washington

The goal of these analyses is to identify trail route alternatives for this portion of the Trail. The analyses provided in this review include considerations for safety, cost, environmental conditions, and project impacts.



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PROPOSED FOOTHILLS TRAIL
ROUTE OPTIONS VICINITY MAP

FIGURE A

RESEARCH / REFERENCES

In order to develop alternatives for the trail route and analyze the feasibility of each alternative, information regarding the project location, existing conditions and code requirements was gathered and reviewed.

The references and resources used for this review are as follows:

Design Guides

- King County, Road Design and Construction Standards, 2007
- Washington State Department of Transportation, Standard Specifications, 2014
- Washington State Department of Transportation, Standard Plans, August 2015
- Washington State Department of Transportation, Design Manual (M22-01.11), July 2014
- AASHTO, Guide for the Development of Bicycle Facilities, 2012
- U.S. Department of Transportation – Federal Highway Administration, Manual on Uniform Traffic Control Devices, 2012

Other References

- As-built drawings of SE Mud Mountain Road, February 1955
- Manual on Uniform Traffic Control Devices (MUTCD) Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons Memorandum, Federal Highway Administration, July 16, 2008
- SR 167 Puyallup River Bridge Reuse Assessment – Phase 1, BergerABAM, 2012
- Geotechnical Engineering Design Study, Foothills Trail Phase II, Hart Crowser, February 9, 2016
- Field observations/site visits (survey, notes and photos), 2010-2016
- Land survey/topographic information, 2008-2016

MEMORANDUM 1

BOISE CREEK ARCH BRIDGE TO SE MUD MOUNTAIN ROAD TRAIL CROSSING

This memorandum analyzes alternatives for the proposed Foothills Trail improvements from the existing Boise Creek Arch Bridge through the King County Parks (formerly owned by Nagel) property at 24324 SE 473rd Street and crossing to the south side of SE Mud Mountain Road.

A significant portion of the Trail from the Boise Creek Arch Bridge to the beginning of the White River Bridge approach is located adjacent to/within the King County Parks (Parks) property, as shown in Figure A. Existing structures on the Parks property include a residence, tennis court, and a swimming pool. Two private parcels remain adjacent to the proposed trail alignment: the McPherson and the Hansen properties. The McPherson property is the parcel to the west of the Parks property, and west of the proposed trail improvements. The Hansen property is east of the proposed trail improvements.

Currently, there are gravel driveways through the south and northeast portions of the Parks property that provide access from SE Mud Mountain Road to the Parks property. A 10-foot wide ingress and egress easement, Recording No. 8410040728, provides the McPherson property access to SE Mud Mountain Road across the Parks property.

Trail Route Considerations and Criteria

The proposed trail improvements through the Parks property will need to be designed based on the following considerations:

1. Driveway access from SE Mud Mountain Road to both the McPherson property and the Parks property will need to be maintained
2. With the consideration of Parks' potential resale of the property, the trail design should limit impact to the parcel.
3. The existing topography and number of specimen trees located on the property
4. ADA accessibility requirements, and AASHTO maximum allowable trail slope

For the purpose of this memorandum, it is assumed that King County Parks has acquired right-of-use for the portion of the existing Boise Creek Arch Bridge currently located on the Hansen property. In addition, an elevated trail crossing of SE Mud Mountain Road will not be considered by this review.

Trail Alternatives

Two alternatives for the proposed trail improvements, from the Boise Creek Arch Bridge to the SE Mud Mountain Road crossing location, have been identified and evaluated. Alternative 2 has two sub-options, "A" and "B", with regard to driveway improvements.

Trail Alternative 1

Alternative 1 is shown on Figure 1.1. The Trail will connect to the existing Boise Creek Arch Bridge and follow the alignment of SE Mud Mountain Road to the south. It will parallel the road, with a horizontal separation of 5 feet from the fog line, until it reaches the approximate midpoint of the east roadway curve (shown in Figure 1.1). The Trail will be 12-feet wide with 2-foot shoulders. It will be separated from the roadway by a 2-foot tall single-slope, vertical back concrete barrier (see Appendix B for applicable WSDOT Standard Plans) with a handrail. This portion of the Trail is similar to a section of trail constructed on the King County Soos Creek Trail, shown in Figure 1.2, which encountered comparable site conditions.

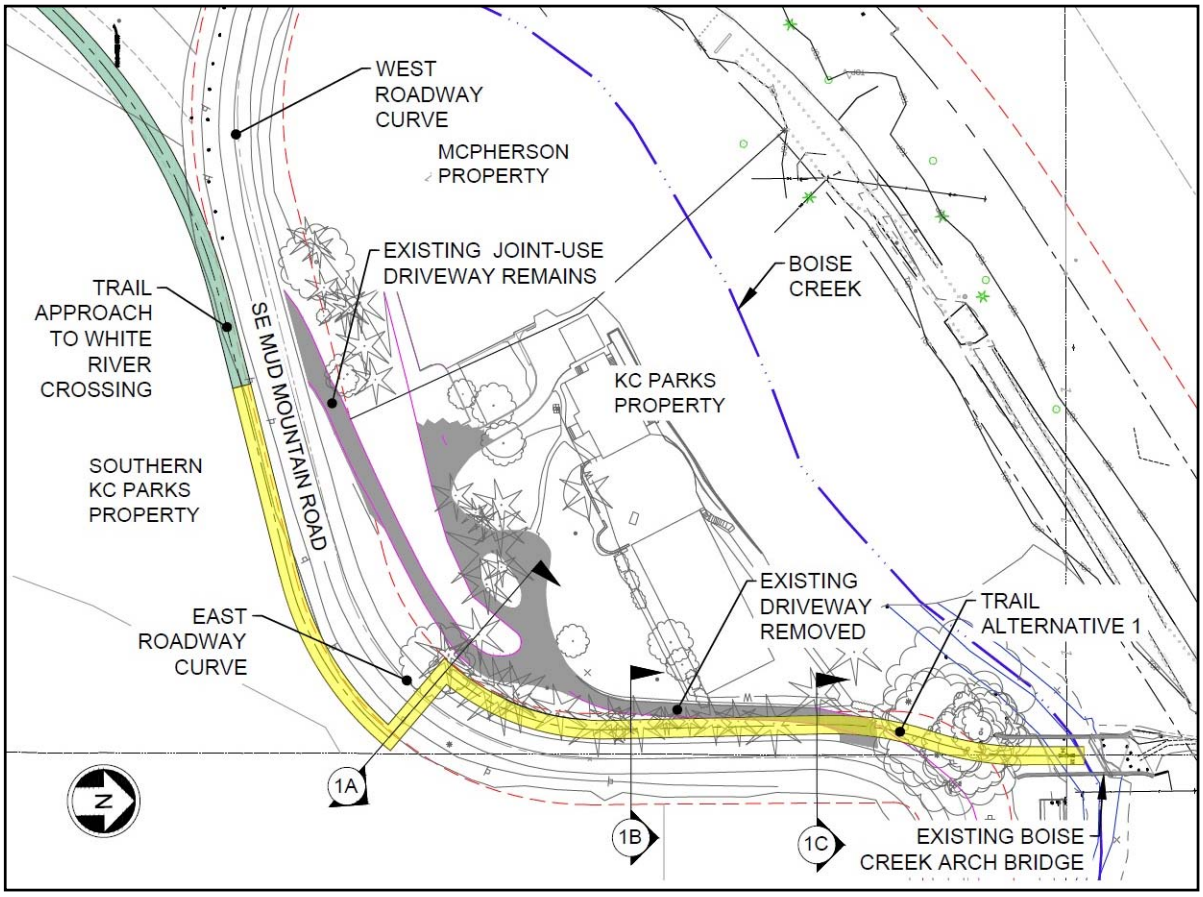

Figure 1.1: Trail Alternative 1 – Plan

Figure 1.2: King County Soos Creek Trail on SE Lake Youngs Way

At the approximate midpoint of the east roadway curve on SE Mud Mountain Road (adjacent to the Parks property), the Trail will cross the road to the south side, as shown in Figure 1.3. Although this location is within a horizontal curve, existing roadway geometries accommodate the minimum required stopping sight distance (based on a design speed of 35 MPH) for drivers approaching a proposed trail crossing from both directions. Photos of these approaches are provided in Figures 1.4 and 1.5. The trail will cross SE Mud Mountain Road and cross over the existing ditch before turning west through the southern King County Parks property. The Trail will parallel SE Mud Mountain Road until it reaches the west roadway curve, where it will diverge from the road and curve towards the White River Bridge.

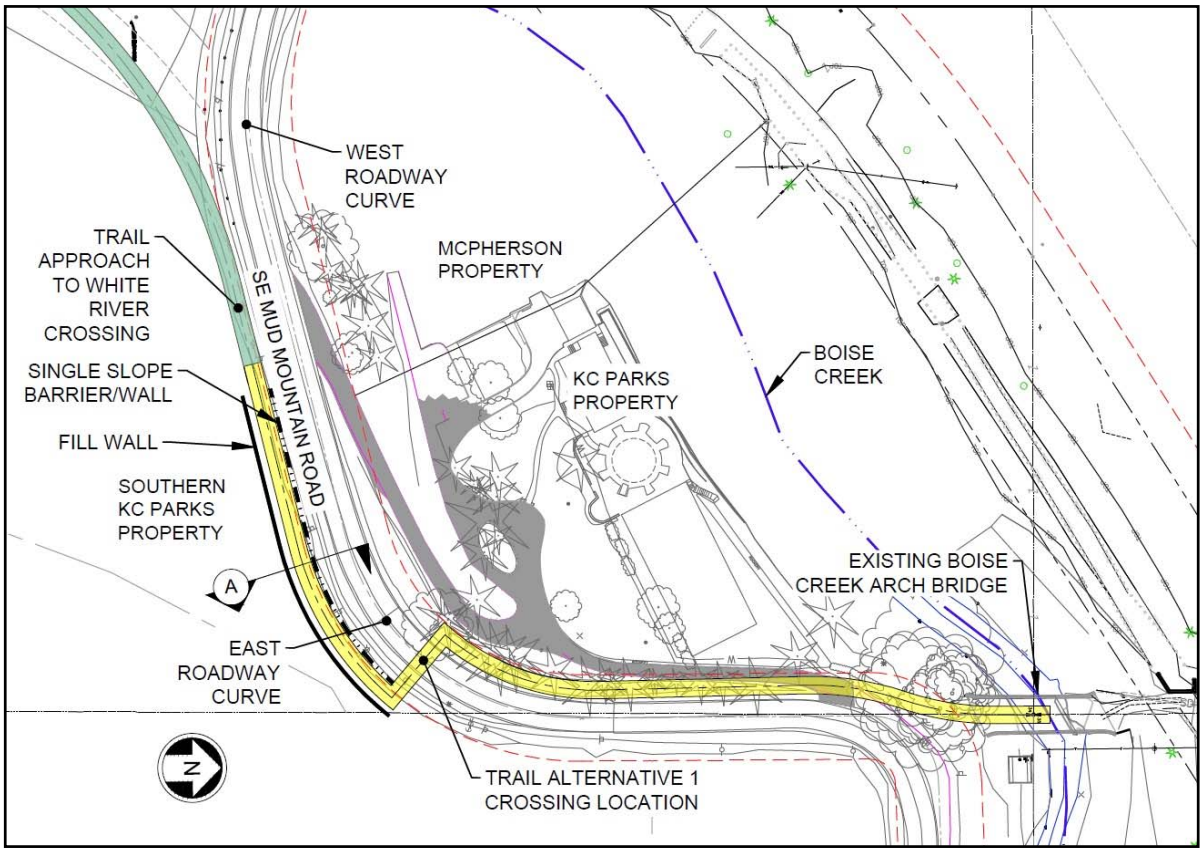

Figure 1.3: Trail Alternative 1 – Crossing Location

Figure 1.4: East Roadway Curve on SE Mud Mountain Road – Traveling Eastbound

Figure 1.5: East Roadway Curve on SE Mud Mountain Road – Traveling Westbound

A pedestrian landing will be provided on both sides of the road at the crossing. This crossing will require grading of the bank on the southeast corner of the Parks property to allow for an ADA-compliant pedestrian landing. In the design phase, consideration could be given to configuring the pedestrian landing, particularly on the north side of SE Mud Mountain Road, to encourage trail users to stop on the approach downgrade and take a clear look in each direction before crossing.

Figure 1.6 shows a typical trail section (Section A on Figure 1.3) for a significant portion of the Trail on the south side of SE Mud Mountain Road. The Trail will follow parallel to the roadway alignment, south of the existing ditch and on top of a wall structure. Depending on existing steep slope site conditions, a sub-option would be to construct the Trail closer to the roadway and replace the existing road ditch with a culvert, as shown in Figure 1.7.

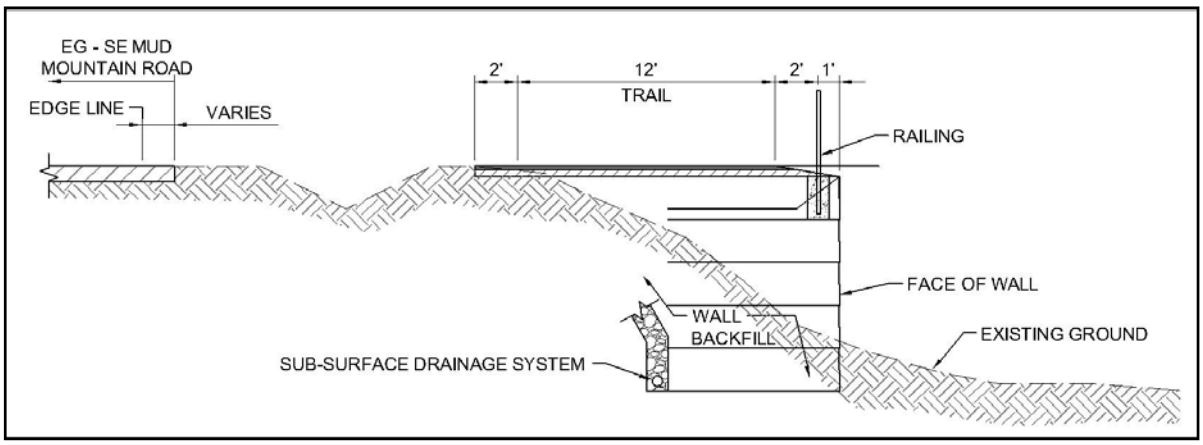

Figure 1.6: Section A - Trail South of SE Mud Mountain Road

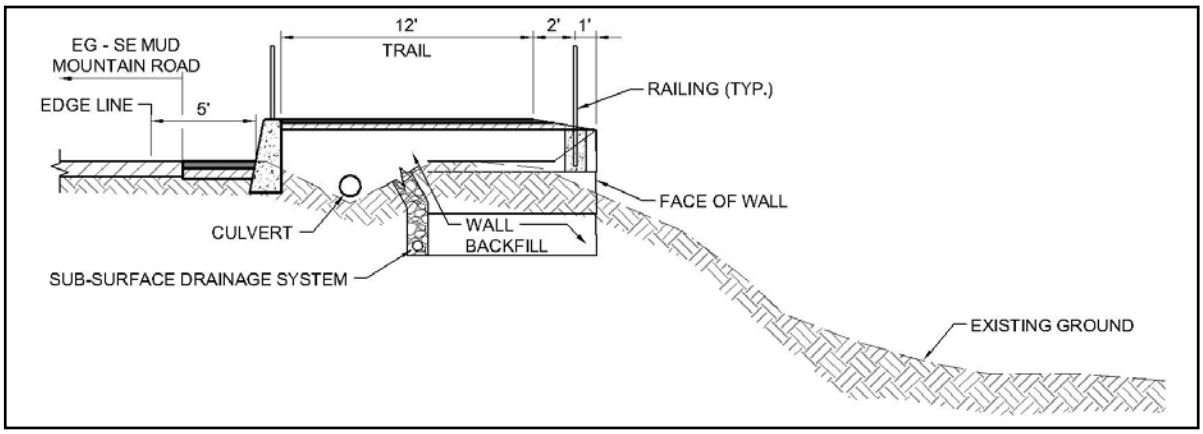

Figure 1.7: Section A Sub-Option - Trail with Culvert South of SE Mud Mountain Road

The grade of this trail alternative is generally about 5% throughout the Parks property, including the approach to the trail crossing. For approximate trail grades, see the profiles in Appendix A.

Trail Alternative 1 eliminates use of the northern driveway access to the Parks property. The southern driveway access, shown in Figure 1.8, will remain and be used as a joint-use access for both the King County Parks and McPherson properties. The southern driveway entrance may require additional modifications in order to accommodate multi-directional approaches since this will be the only access to SE Mud Mountain Road.

Figure 1.8: Existing Southern Driveway (also referenced in Alternative 2)

Figure 1.9 shows the limits of grading for Trail Alternative 1.

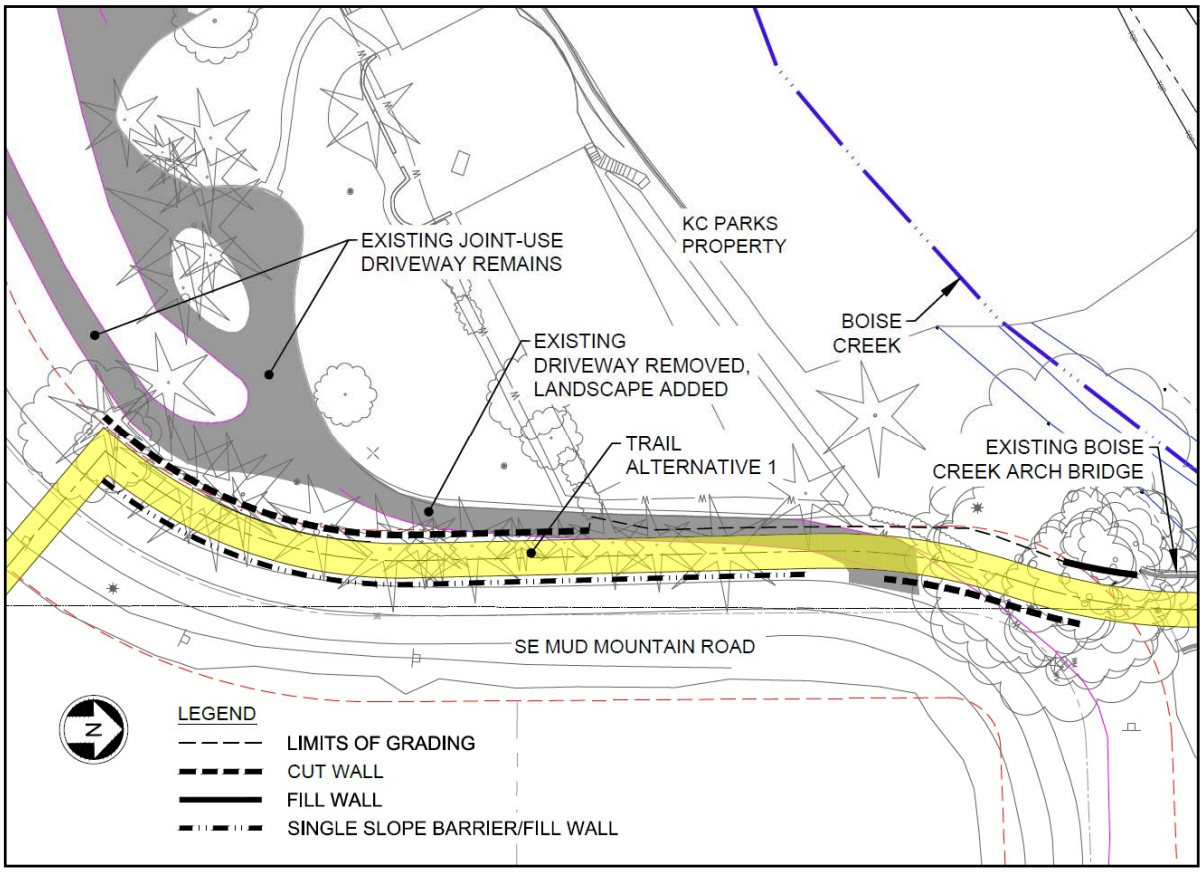

Figure 1.9: Trail Alternative 1 – Limits of Grading

Figure 1.10 illustrates the previously discussed features of Trail Alternative 1 at typical cross-sections along the trail alignment.

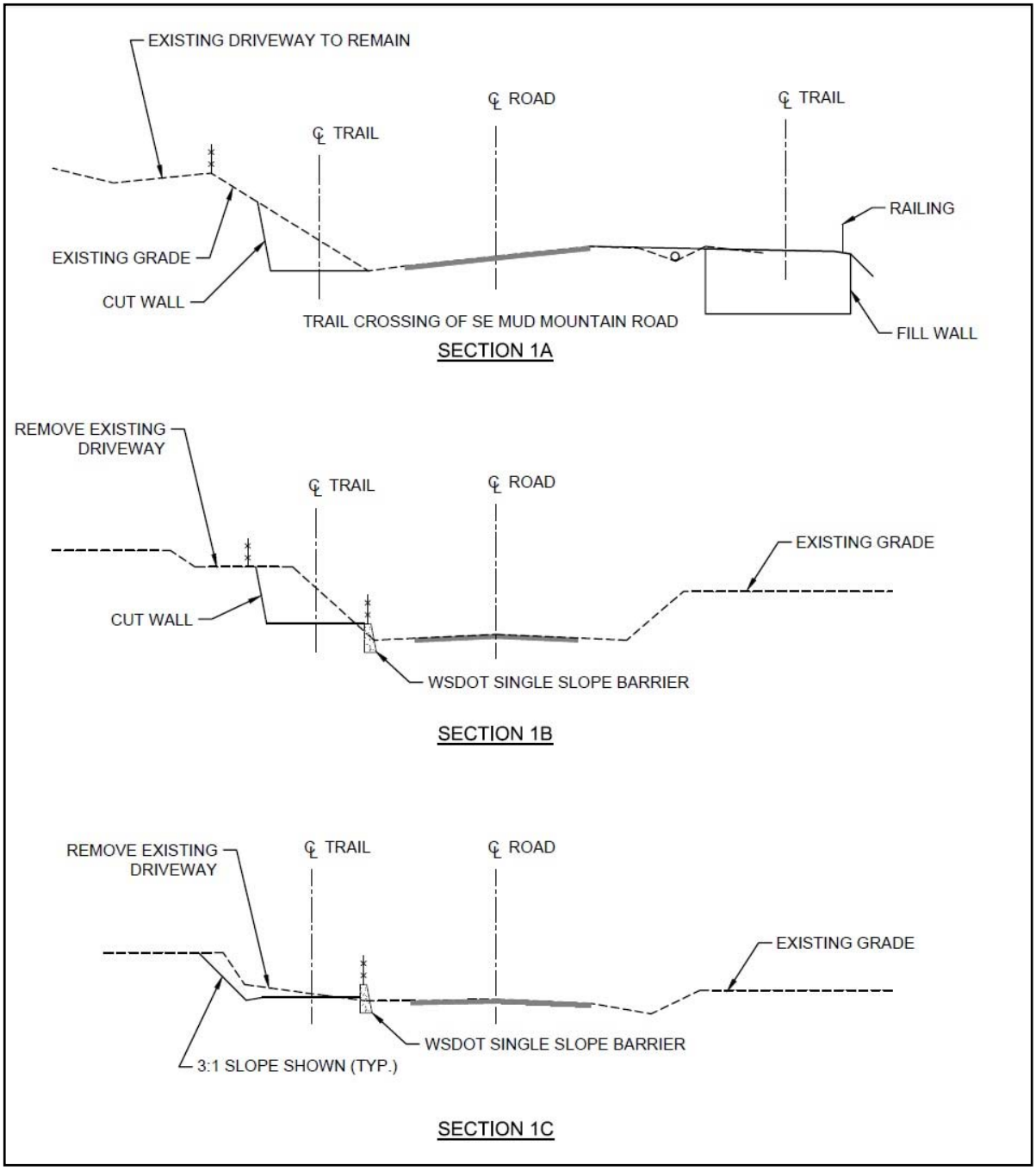

Figure 1.10: Trail Alternative 1 – Sections

Trail Alternative 1 - Advantages

- Minimal impacts to Parks property improvements/assets
- Minor grading/earthwork on Parks property
- Trail grades are 5% or less (see Appendix A for profile)
- Separation between trail and driveways
- Barrier/wall provides trail users protection from roadway traffic
- Crossing location meets the minimum stopping sight distance for both approaches

Trail Alternative 1 - Disadvantages

- Trail user experience is adjacent to the roadway
- Existing trees and vegetation are removed between trail and roadway
- Existing driveway entrance may require additional modifications for multi-directional approach
- Existing roadway superelevation results in a crosswalk running slope of approximately 10-11%; this running slope would not be ADA-compliant
- Grading and vegetation removal required along east edge of Parks property to provide sight distance and construction of pedestrian landing pad

Trail Alternative 1 - Opinion of Probable Cost

The approximate costs for Alternative 1 are as follows:

A) Alternative 1 trail improvements through the Parks property, installation of a trail crossing, and trail improvements on the south side of SE Mud Mountain Road per Figure 1.6 is $685,000
B) Alternative 1 trail improvements through the Parks property, installation of a trail crossing, and trail improvements on the south side of SE Mud Mountain Road per Figure 1.7 is $725,000

These opinions of probable cost include a 20% planning-level contingency, and do not include sales tax.

Trail Alternative 2

Alternative 2 is shown on Figure 1.11. The Trail, which will be 12-feet wide with 2-foot shoulders, will connect from the existing Boise Creek Arch Bridge to the northeast corner of the Parks property. It will curve southwest, away from SE Mud Mountain Road through the existing tennis court area, and connect into the existing southern driveway (see Figures 1.8 and 1.11). The Trail will then follow the southern driveway alignment to SE Mud Mountain Road, where it will cross approximately midway between the two horizontal curves on SE Mud Mountain Road (labeled "east roadway curve" and "west roadway curve" on Figure 1.11).

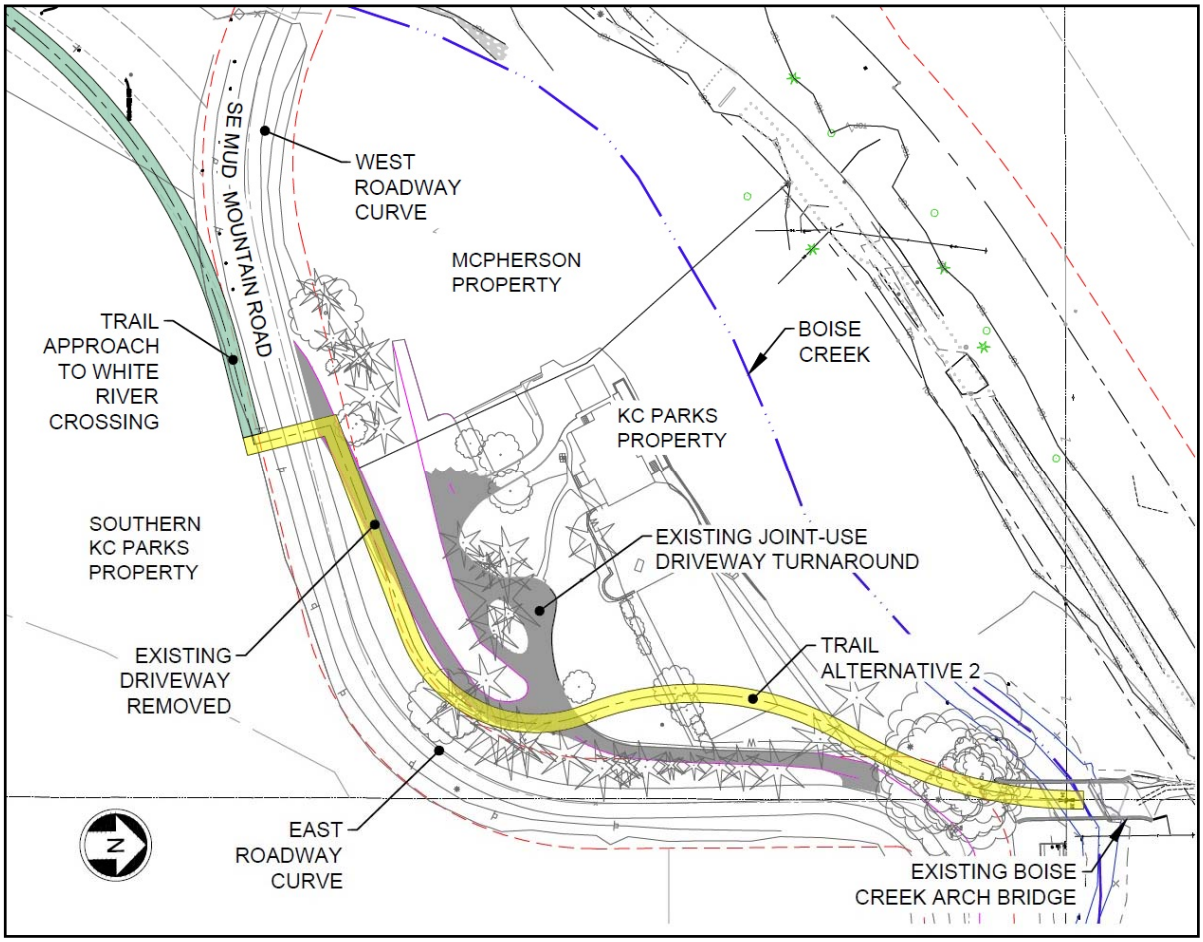

Figure 1.11: Trail Alternative 2 – Plan

The trail crossing location for this alternative, shown in Figure 1.12, is located approximately midway between the east curve and the west curve of SE Mud Mountain Road (see photos of both roadway curves in Figures 1.13 and 1.14). At this location, the existing roadway geometries do not accommodate the minimum required stopping sight distance (based on a design speed of 35 MPH) for drivers approaching a proposed trail crossing from both directions. The trail will cross SE Mud Mountain Road at this location and continue over the existing ditch before turning west through the southern King County Parks property. The Trail will parallel SE Mud Mountain Road until it reaches the west roadway curve, where it will diverge from the road and curve towards the White River Bridge.

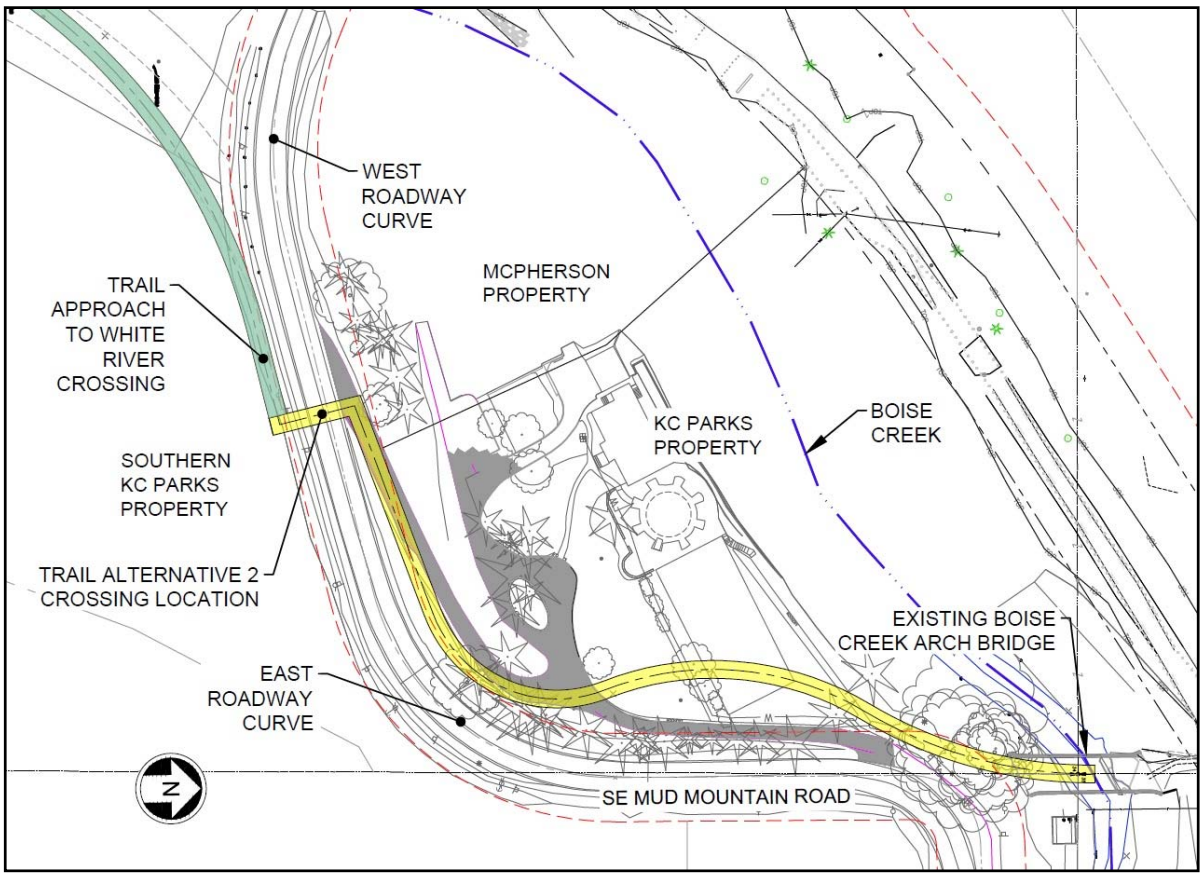

Figure 1.12: Trail Alternative 2 – Crossing Location

Figure 1.13: West Roadway Curve on SE Mud Mountain Road

Figure 1.14: East Roadway Curve on SE Mud Mountain Road

A pedestrian landing will be provided on both sides of the road to facilitate crossing. This option utilizes the existing southern joint-use driveway entrance onto SE Mud Mountain Road as part of a pedestrian landing on the north side of the crossing. The existing driveway entrance will be removed and modified to provide an ADA-compliant pedestrian landing. In the design phase, consideration could be given to configuring the pedestrian landing, particularly on the north side of SE Mud Mountain Road, to encourage trail users to stop on the approach downgrade and take a clear look in each direction before crossing.

The grade of this trail alternative is generally 5% along the portion of the trail that runs north/south from the Boise Creek Arch Bridge over the Parks property. The Trail will then transition into 8% matching the existing roadway as the Trail approaches the crossing at SE Mud Mountain Road on the south portion of the Parks property. For trail improvements profiles, see Appendix A.

Sub-Alternative A

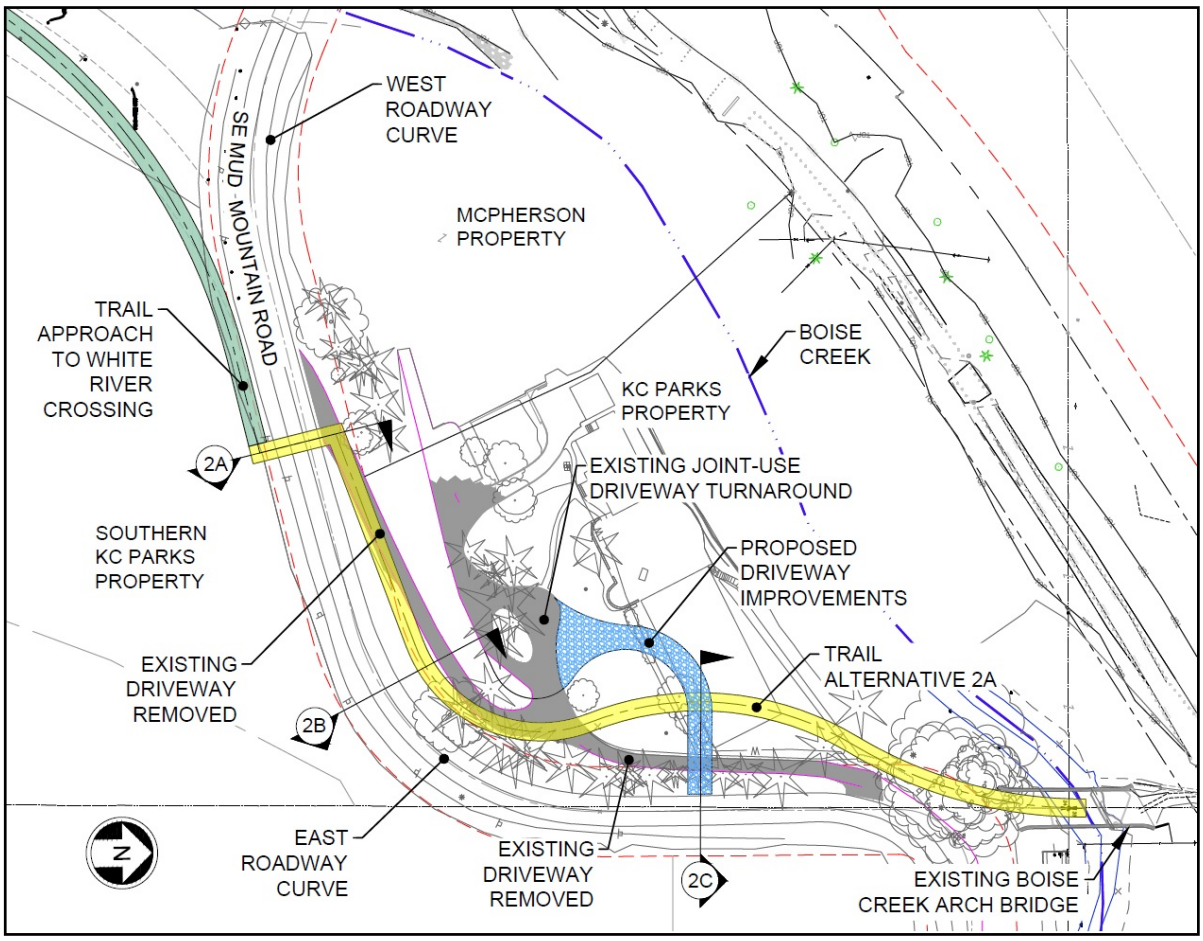

Figure 1.15: Trail Alternative 2A – Plan

For this alternative (Alternative 2A, shown in Figure 1.15), both of the existing driveway entrances onto the Parks property will be removed and a new joint-use driveway will be built that connects perpendicularly from SE Mud Mountain Road to the existing joint-use driveway turnaround (see photo in Figure 1.16). This new driveway will require regrading from the existing driveway turnaround, across the Foothills Trail, and to SE Mud Mountain Road. The existing driveway turnaround island and specimen trees, shown in Figure 1.17, will be preserved. The Trail will cross the new driveway perpendicularly and at-grade to facilitate desirable sight lines.

Figure 1.16: Existing Driveway Turnaround

Figure 1.17: Existing Driveway Turnaround Island

The geometrics of SE Mud Mountain Road, as well as the topography on the east side of the Parks property, limit the available entering sight distance for vehicles using the proposed driveway access to enter the roadway. Based on Table 2.2 of the King County Road Design and Construction Standards, the minimum required entering sight distance for this driveway approach is 280 feet using a 25 MPH design speed. Although the minimum entering sight distance is not met for this proposed driveway approach, the minimum required stopping sight distance is 155 feet, based on 25 MPH design speed, and can be accommodated provided that there is grading and vegetation removal on the eastern edge of the Parks property.

Figure 1.18 shows the limits of grading for Trail Alternative 2A.

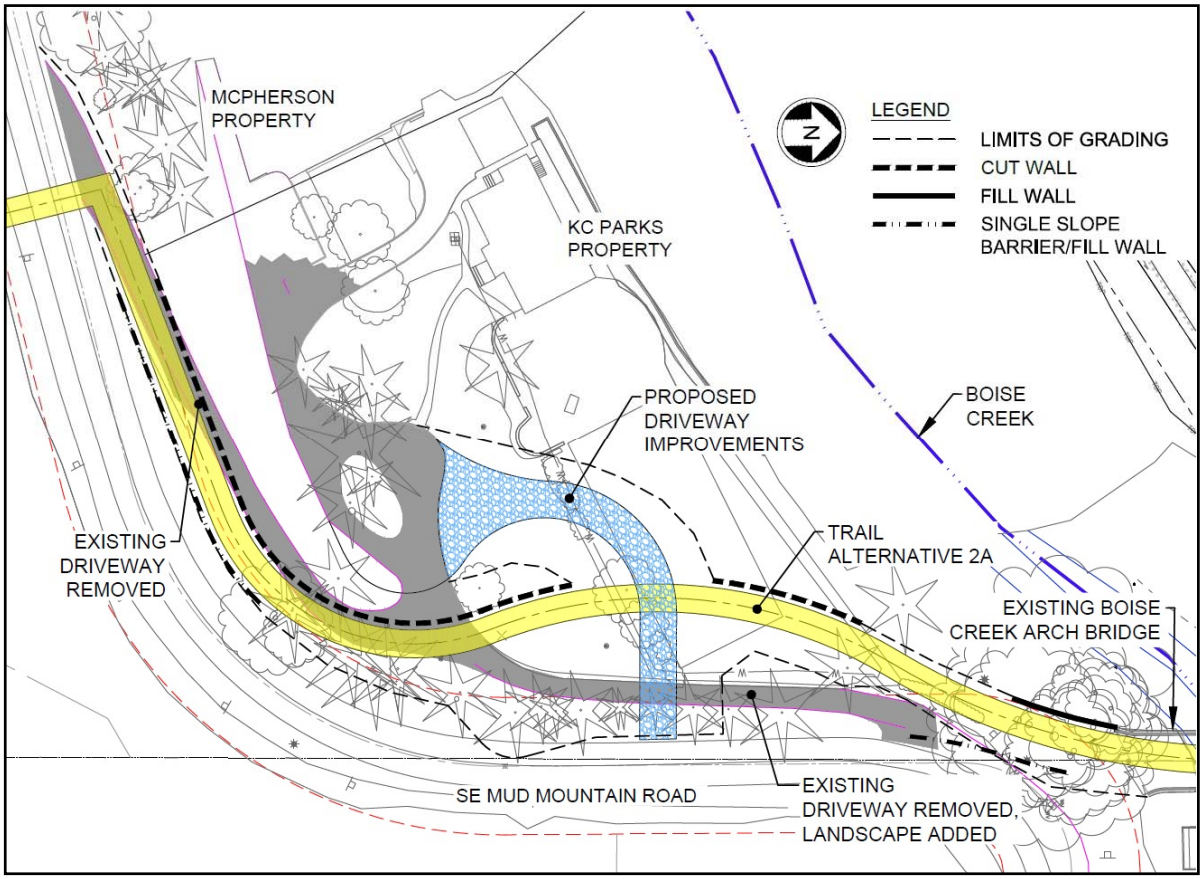

Figure 1.18: Trail Alternative 2A – Limits of Grading

Figure 1.19 illustrates the previously discussed features of Trail Alternative 2A at typical cross-sections along the trail alignment.

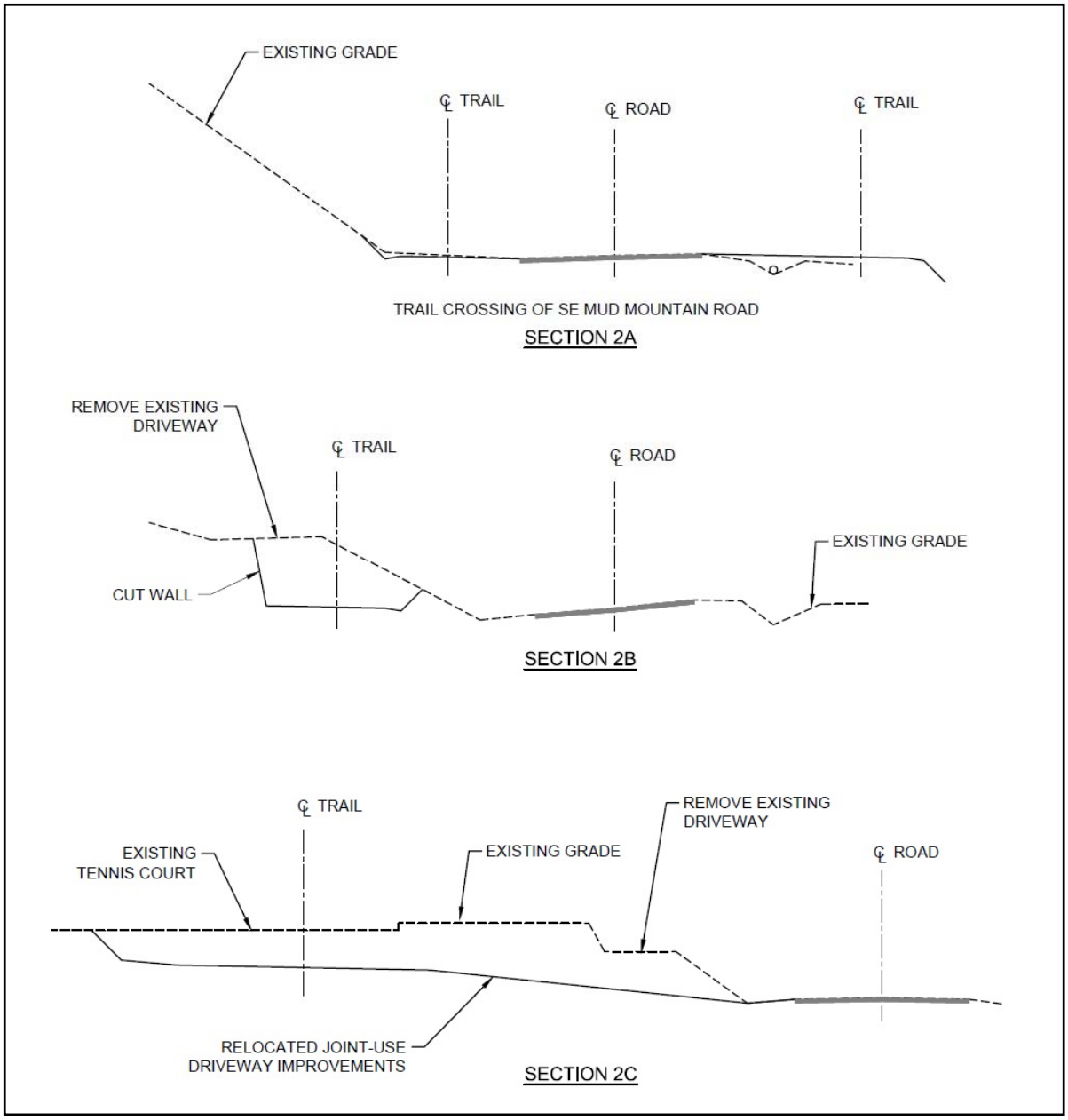

Figure 1.19: Trail Alternative 2A – Sections

Trail Alternative 2A - Advantages

- Trail users are separated from the roadway
- New driveway provides improved joint-use access for both properties
- Existing roadway results in a crosswalk running slope of approximately 3-4%
- Minimal grading and vegetation removal required along south edge of Parks property to provide sight distance and construction of pedestrian landing pad

Trail Alternative 2A - Disadvantages

- Impacts to Parks property improvements/assets
- At-grade trail and driveway crossing; trail users may encounter vehicles
- Requires significant grading on Parks property
- Trail grades for this alignment exceed 5% (see Appendix A for profile)
- Crossing location does not meet the minimum stopping sight distance for both approaches

Trail Alternative 2A - Opinion of Probable Cost

The approximate cost for Alternative 2A is $555,000. This includes trail and driveway improvements through the Parks property, installation of a trail crossing, and trail improvements on the south side of SE Mud Mountain Road. This opinion of probable cost includes a 20% planning-level contingency, and does not include sales tax.

Sub-Alternative B

Trail Alternative 2B is shown on Figure 1.20.

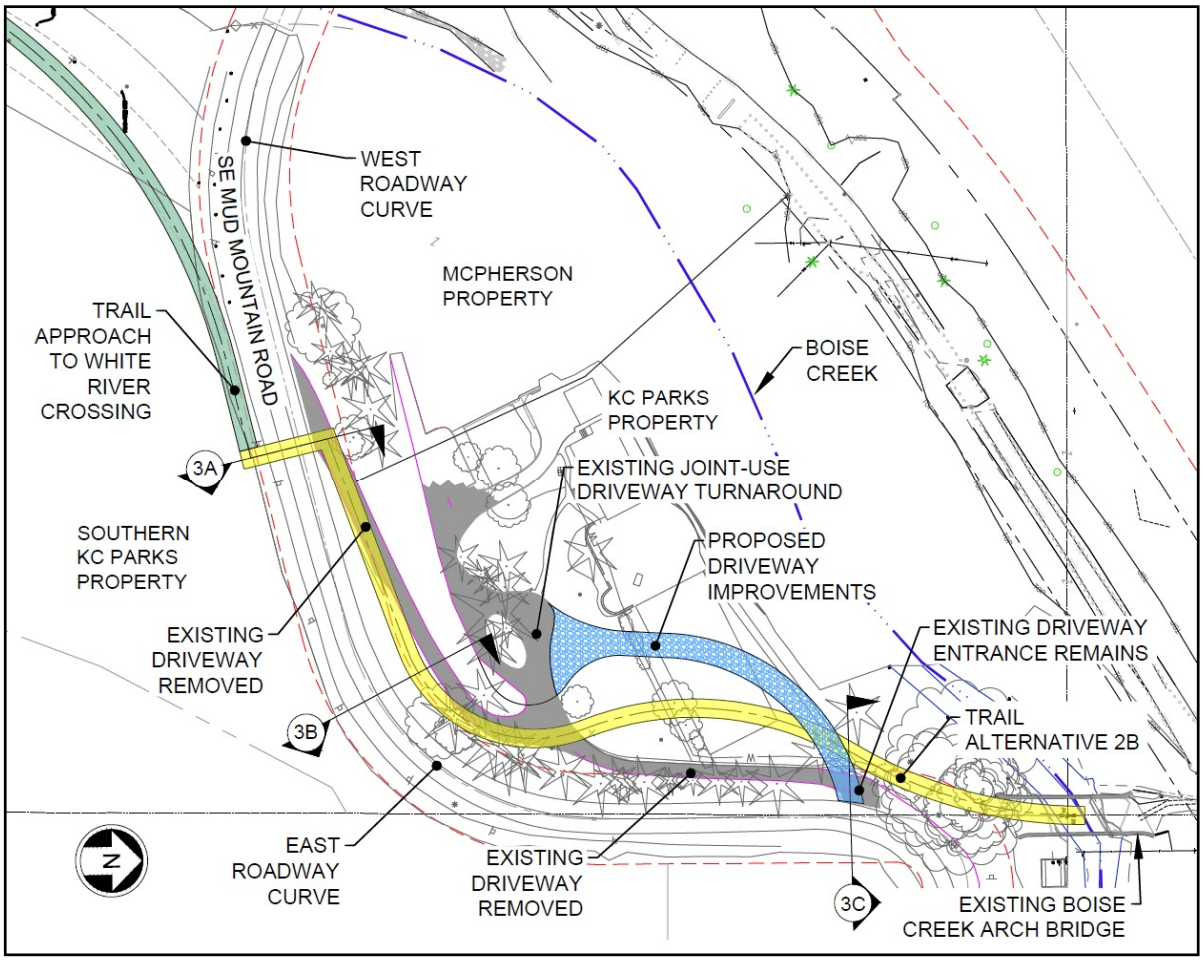

Figure 1.20: Trail Alternative 2B – Plan

For this alternative, both of the existing driveway entrances onto the Parks property will be removed and a new joint-use driveway approach will be built using the existing northern driveway entrance from SE Mud Mountain Road and connecting to the existing joint-use driveway turnaround (see Figures 1.16 and 1.21). This new driveway will require regrading as it cuts through the existing tennis court area to the existing driveway turnaround. The existing driveway turnaround island and specimen trees, shown in Figure 1.17, will be preserved. The Trail will cross this new driveway at-grade near the existing and proposed northern driveway entrance.

Figure 1.21: Existing Northern Driveway Entrance

Figure 1.22 shows the limits of grading for Trail Alternative 2B.

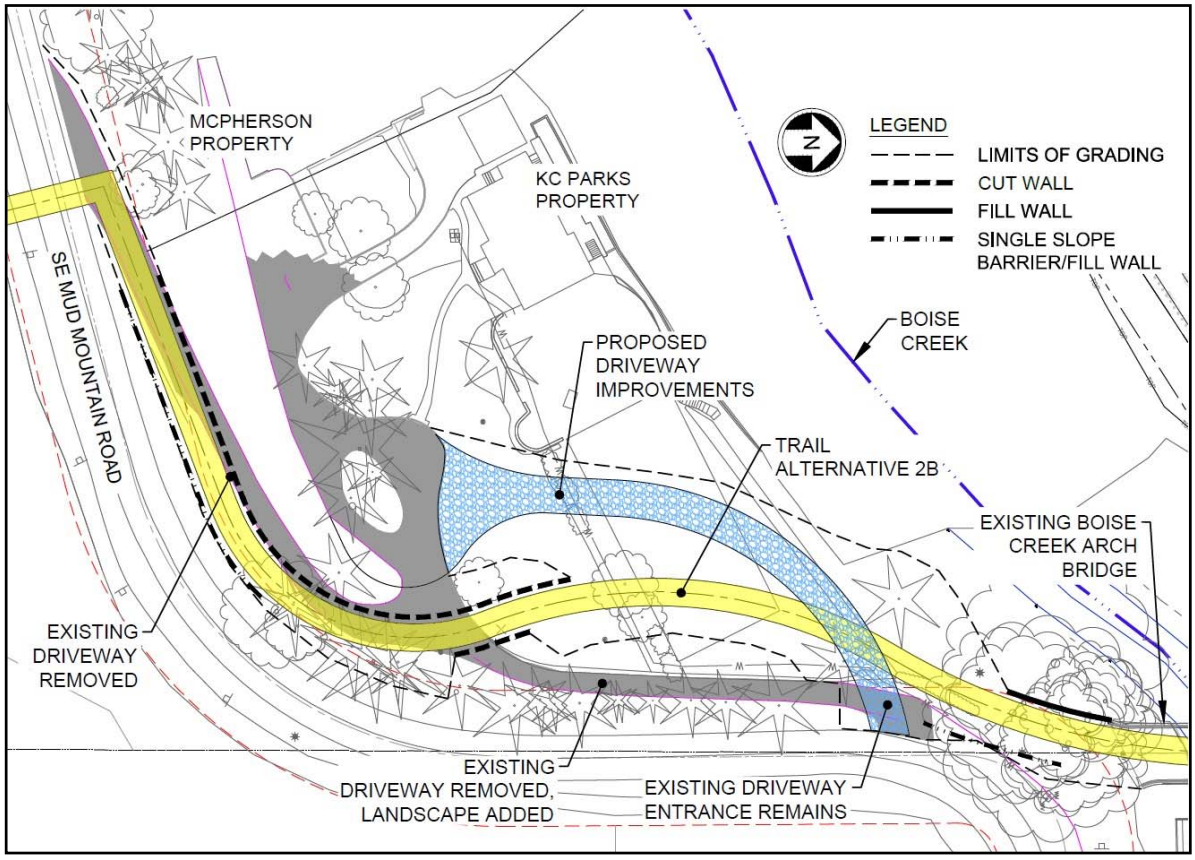

Figure 1.22: Trail Alternative 2B – Limits of Grading

Figure 1.23 illustrates the previously discussed features of Trail Alternative 2B at typical cross-sections along the trail alignment.

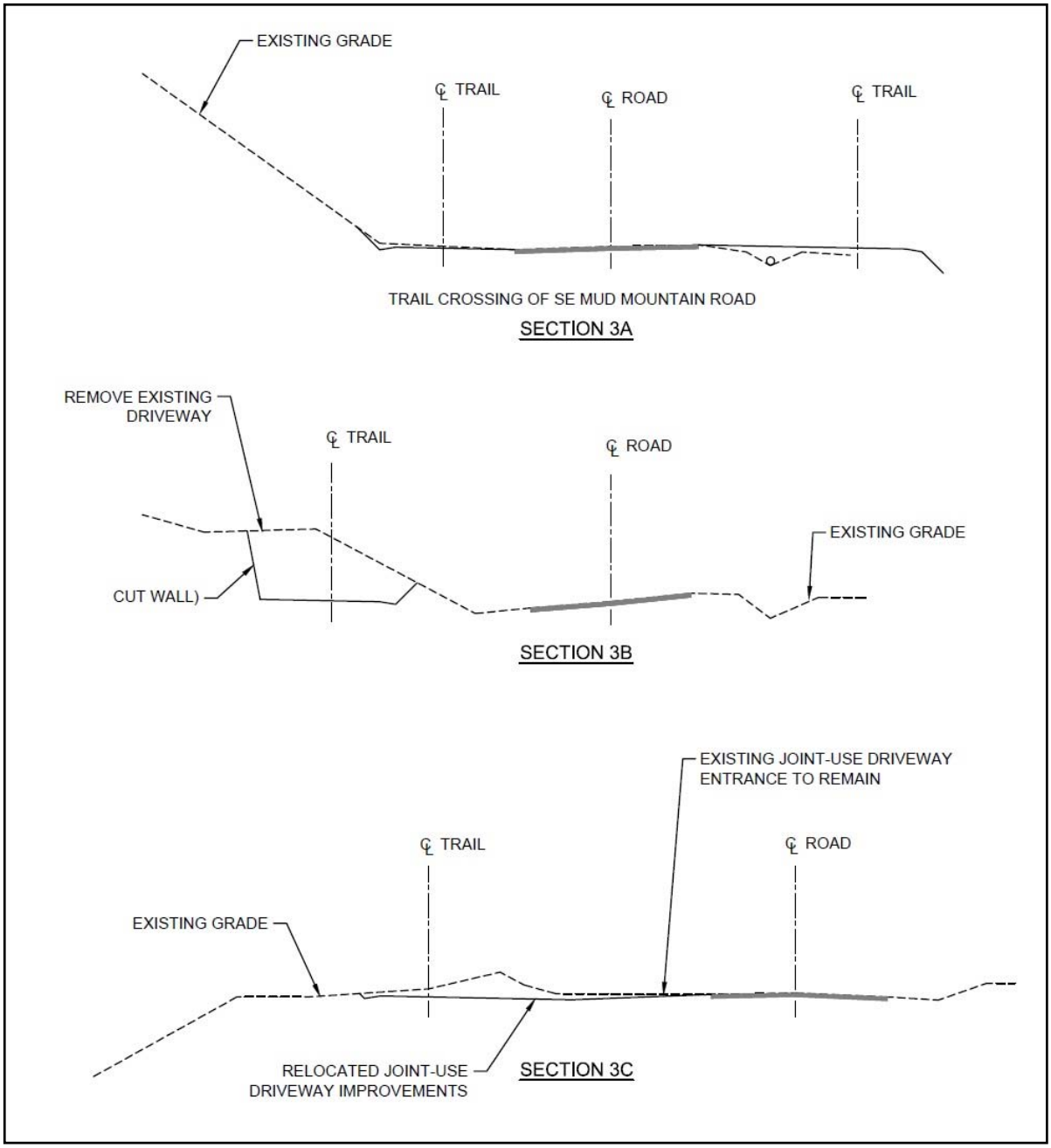

Figure 1.23: Trail Alternative 2B – Sections

Trail Alternative 2B - Advantages

- Trail users are separated from the roadway
- Preserves a portion of existing trees and vegetation between trail and roadway
- Existing roadway results in a crosswalk running slope of approximately 3-4%
- Minimal grading and vegetation removal required along south edge of Parks property to provide sight distance and construction of pedestrian landing pad

Trail Alternative 2B - Disadvantages

- Impacts to Parks property improvements/assets
- At-grade trail and driveway crossing; trail users may encounter vehicles
- Requires significant grading on Parks property
- Trail grades exceed 5% (see Appendix A for profile)
- Easterly sight distance is limited from existing driveway entrance
- Crossing location does not meet the minimum stopping sight distance for both approaches

Trail Alternative 2B - Opinion of Probable Cost

The approximate cost for Alternative 2B is $515,000. This includes trail and driveway improvements through the Parks property, installation of a trail crossing, and trail improvements on the south side of SE Mud Mountain Road. This opinion of probable cost includes a 20% planning-level contingency, and does not include sales tax.

Trail Crossing Considerations and Criteria

With either trail crossing location alternative, the crosswalk will be designed with the considerations and features outlined in this section.

For stopping sight distance exhibits and documents from the January 11, 2016 coordination meeting with King County Roads regarding the trail crossing options, see Appendix C.

Stopping Sight Distance

Per Section 1260.03 of the Washington State Department of Transportation (WSDOT) Design Manual, stopping sight distance is provided when the sight distance available to a driver equals or exceeds the stopping distance for a passenger car traveling at the design speed. The stopping sight distances for each approach on SE Mud Mountain Road have been calculated for both crossing location options using the Stopping Sight Distance on Grades equation in Exhibit 1260-3 of the WSDOT Design Manual. The design speed used for these calculations is 35 MPH.

For minimum and available stopping sight distances, see Table 1.1.

Crosswalk Slopes

Per WSDOT, the maximum cross slope for a crosswalk is 2%, or 5% for non-stop controlled (for roadway user), and the maximum running slope for a crosswalk is 5%. For both trail crossing location options, the existing roadway grade will be maintained. At the crossing, the trail will comply with the trail provisions in the Architectural Barriers Act Standards to the extent practicable, except where compliance is not practicable due to terrain.

For required and provided crosswalk slopes, see Table 1.1.

Table 1.1: Trail Crossing Features

Crossing Feature	Alternative 1	Alternative 2
Minimum Required Stopping Sight Distance (35 MPH Design Speed)	• 224 feet EB (+8.2% grade) • 250 feet WB (0-3% grade)	• 224 feet EB (+8.2% grade) • 282 feet WB (-8.2% grade)
Available Stopping Sight Distance*	• 224 feet EB • 346 feet WB	• 207 feet EB • 271 feet WB
Cross Slope Requirements	2% maximum, 5% for non-stop controlled (for driveway user)	2% maximum, 5% for non-stop controlled (for driveway user)
Provided Cross Slope	6-8% provided by existing roadway grades	7% provided by existing roadway grades
Running Slope Requirements	5% maximum	5% maximum
Provided Running Slope	10.5% provided by existing roadway grades	3.3% provided by existing roadway grades

*Taking into account grading and vegetation removal associated with trail alignment alternative and trail crossing location

Crosswalk Markings

The trail crossing will be a 12-foot wide crosswalk and will be marked per WSDOT Standard Plan M-15.10-01. The pedestrian landings on both sides of the crosswalk will be installed with detectable warning surfaces per the “Shared-Use Path Connection” detail on WSDOT Standard Plan F-45.10. As for the roadway, yield lines/yield ahead symbols will need to be installed to supplement the proposed pedestrian crossing signal, per WSDOT Standard Plan M-24.60-04. See Appendix B for applicable WSDOT Standard Plans.

Crosswalk Signage

Signs will be installed at the trail crossing to provide trail users, as well as drivers, information about the crossing location. Figure 1.24 shows a typical plan of the trail crossing layout.

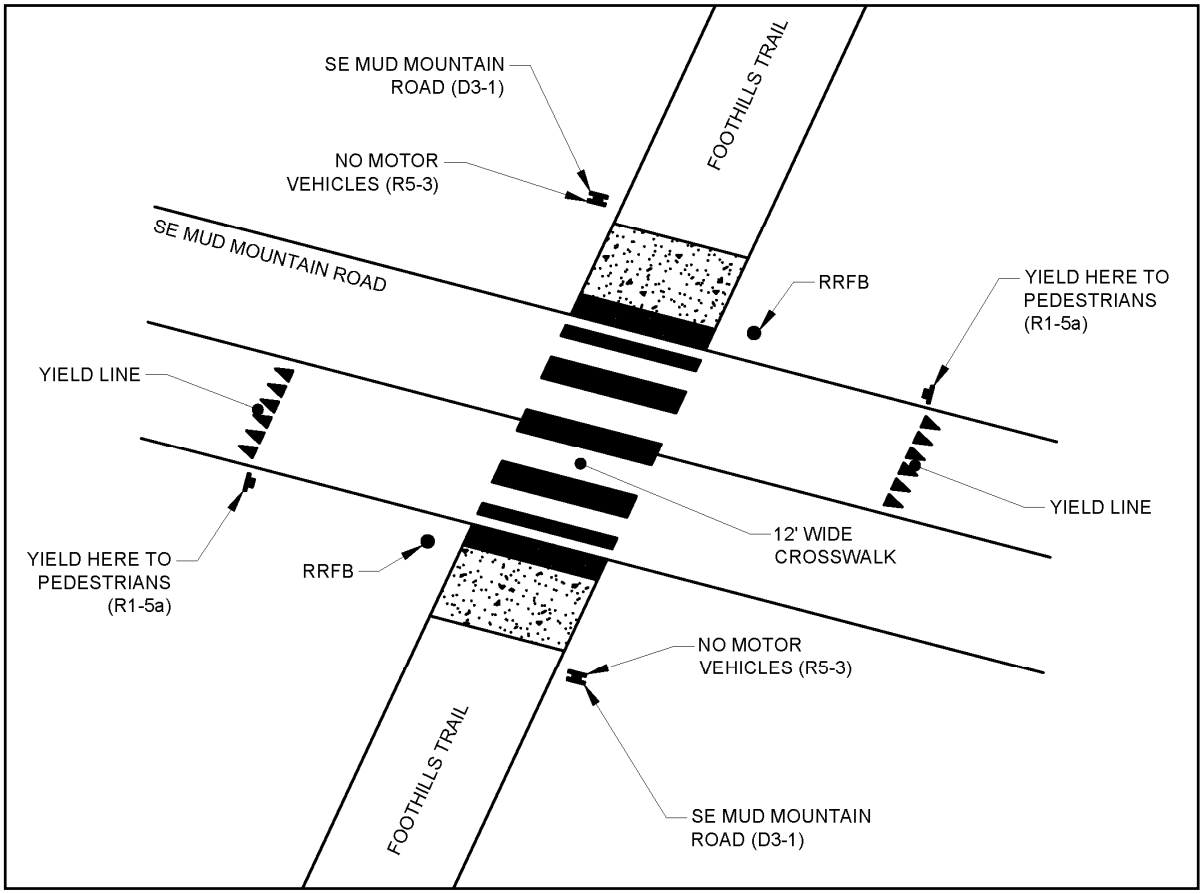

Figure 1.24: Trail Crossing Layout

Crosswalk Signal

The trail crossing will utilize a rectangular rapid flashing beacon (RRFB), shown in Figure 1.25, to increase driver awareness of pedestrians crossing the road. The warning beacon will be installed as a four-beacon system, with flashing beacons on both sides of the roadway for each approach.

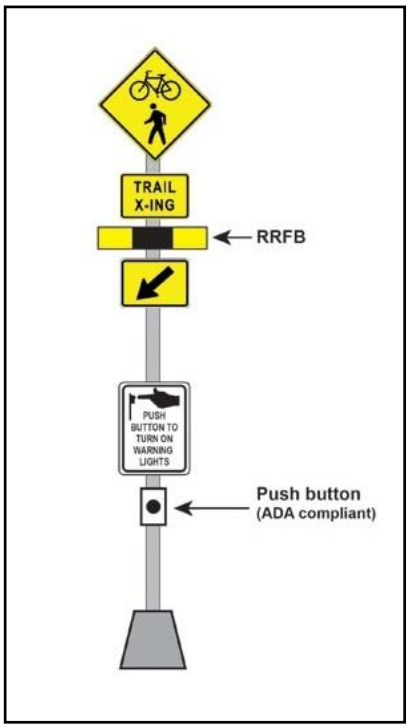

Figure 1.25: Rectangular Rapid Flashing Beacon (RRFB)

According to the Federal Highway Administration (FHWA), rectangular rapid flashing beacons are user-activated amber LEDs that supplement standard warning signs at unsignalized intersections or mid-block crosswalks. They can be activated either manually by a push button, or passively by a pedestrian detection system. RRFBs use an irregular flash pattern that is similar to emergency flashers on police vehicles. The flashing pattern has been shown to produce significantly higher rates of driver yielding behavior at crosswalks when supplementing standard pedestrian crossing warning signs and markings. RRFBs may be installed on either two-lane or multi-lane roadways.

In instances where the minimum stopping sight distance approaching the crosswalk may not be met by the crossing location option chosen, an additional RRFB may be installed on that particular approach in advance of the crosswalk, as a Warning Beacon to supplement a pedestrian warning sign (W11-2) with an “Ahead” (W16-9p) plaque. This additional RRFB would provide advance notice to drivers approaching the trail crossing if there are trail users that may not be visible from a distance.

While the RRFB improves visibility of pedestrians as well as their safety, it also provides for normal traffic flow when there are no pedestrians crossing. Figures 1.26 and 1.27 are examples of RRFB applications in Bend, Oregon and Mountlake Terrace, Washington.

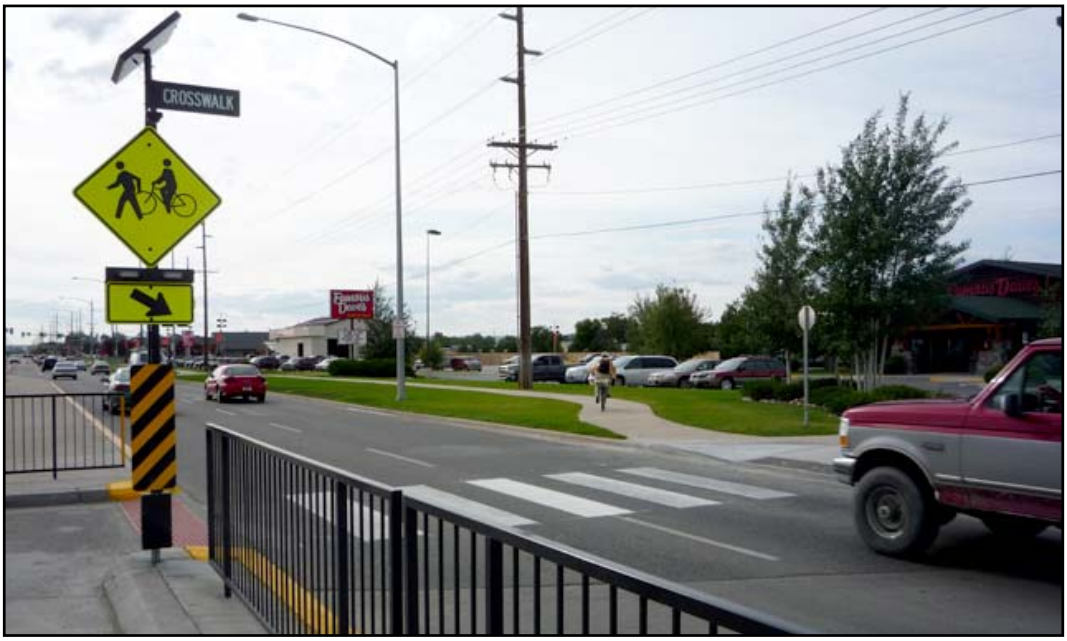

Figure 1.26: Application of RRFBs in Bend, Oregon

Figure 1.27: Application of RRFBs in Mountlake Terrace, Washingto

Trail Alternatives Summary

Figure 1.28 shows an overall plan view of Trail Alternatives 1 and 2, as well as the two driveway options, 2A and 2B.

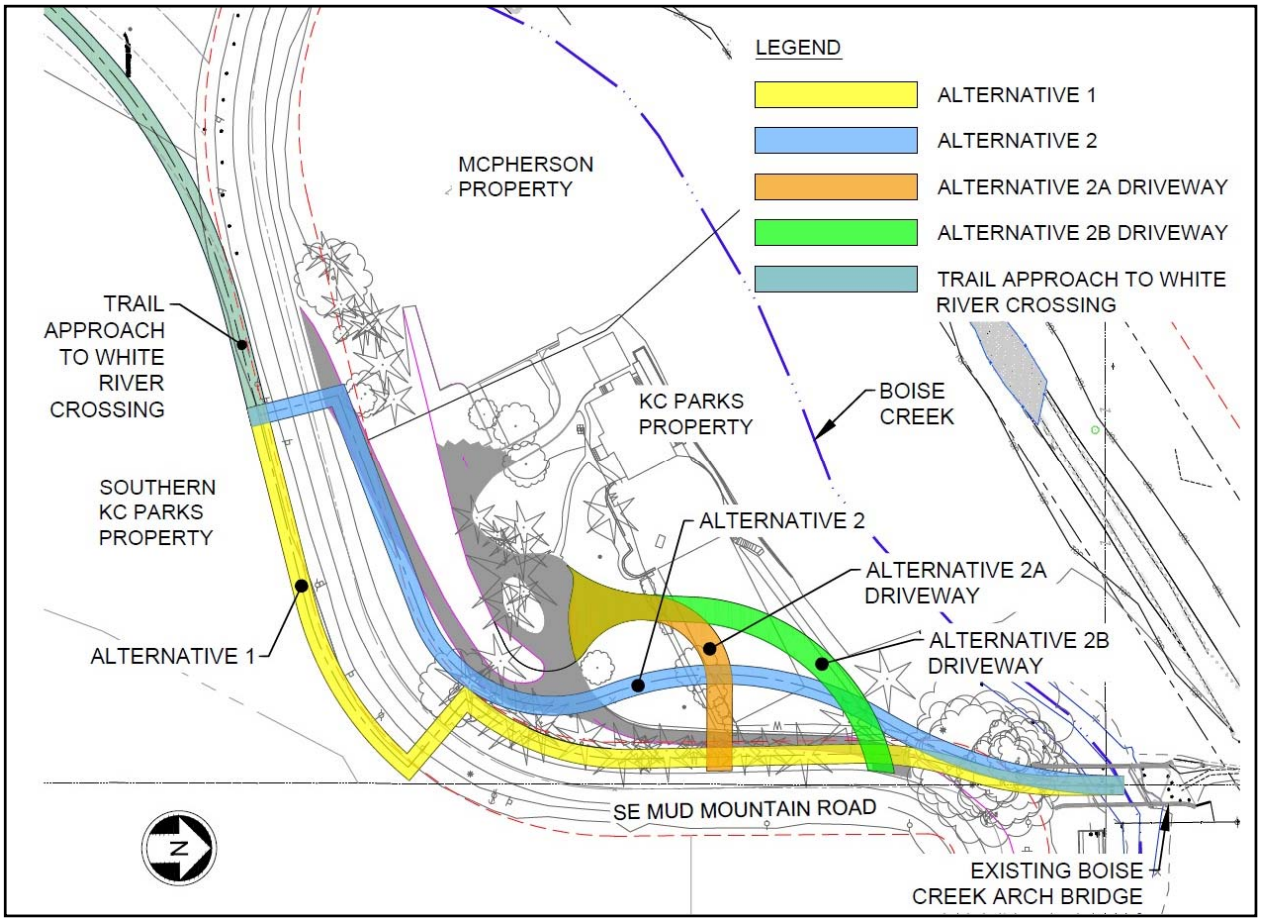

Figure 1.28: Trail Alternatives Overview

Table 1.2 summarizes the two trail alternatives as discussed in this memorandum. Table 1.3 provides advantages and disadvantages of the key components outlined in Table 1.2, and opinions of probable cost for each alternative. These tables will assist King County Parks in determining which improvements alternative to pursue in the design phase.

Table 1.2: Trail Alternatives Summary

Feature	Trail Improvements Alternatives Summary		
	Alternative 1	Alternative 2	
		A	B
Trail Alignment Description	• Approximately 730 LF • Trail connects from existing Boise Creek Arch Bridge and follows parallel to SE Mud Mountain Road • Horizontal separation of 5 feet from the road with the trail separated by wall/barrier • Trail stops at approximate midpoint of east roadway curve for trail crossing	• 700 LF • Trail connects from existing Boise Creek Arch Bridge and curves through existing Parks property tennis court • Trail connects into and follows the existing southern driveway alignment • Trail stops approximately midway between east and west roadway curves for trail crossing At-grade crossing with new driveway	
Trail Crossing Location	• Trail crossing location is near the midpoint of the east roadway curve on SE Mud Mountain Road • Trail connects from the southeast corner of the Parks (formerly Nagel) property to the northeast corner of the southern King County Parks property	• Trail crossing is located midway between the east and west roadway curves on SE Mud Mountain Road Trail connects from the south edge of the Parks (formerly Nagel) property to the north edge of the southern King County Parks property	
Grading and Vegetation Impacts	• Trees and shrubs on east side of Parks property removed for trail improvements • Grading required on east side of Parks property to allow for ADA compliant trail slopes • Vegetation removed on east edge of Parks property for sight distance and pedestrian landing	• Trees and shrubs on east side of Parks property will remain; vegetation only removed where new driveway will be constructed • Grading required on east side of Parks property to allow for ADA compliant trail slopes Existing southern driveway modified for pedestrian landing	
Existing Driveway Impacts	• Northern driveway removed and used for trail improvements • Southern driveway remains as joint-use access for both McPherson and Parks properties	• Both driveway accesses removed and used for trail improvements • New joint-use driveway access on east side of Parks property, connecting perpendicularly into SE Mud Mountain Road	• Both driveway accesses removed and used for trail improvements • New joint-use driveway access on east side of Parks property, utilizing existing northern driveway entrance

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Table 1.3: Trail Alternatives Comparison

Feature	Trail Alternatives Comparison		
		Alternative 2	
	Alternative 1	A	B
Advantages	• Minimal impacts to Parks property improvements/assets • Separation between trail and driveways • Minor grading/earthwork on Parks property • Trail grades are 5% or less • Barrier/wall provides trail users protection from roadway traffic • Crossing location meets the minimum stopping sight distance for both approaches	• Trail users are separated from the roadway • New driveway provides improved joint-use access for both properties • Existing roadway results in crosswalk running slope of approximately 3-4% • Minimal grading and vegetation removal required to provide sight distance and construction of pedestrian landing pad	• Trail users are separated from the roadway • Preserves a portion of existing trees and vegetation between trail and roadway • Existing roadway results in crosswalk running slope of approximately 3-4% • Minimal grading and vegetation removal required to provide sight distance and construction of pedestrian landing pad
Disadvantages	• Trail user experience is adjacent to the roadway • Existing trees and vegetation are removed between trail and roadway • Existing driveway entrance may require additional modifications for multi-directional access • Existing roadway superelevation results in a crosswalk running slope of approximately 10-11%; this running slope would not be ADA-compliant • Grading and vegetation removal required to provide sight distance and construction of pedestrian landing pad	• Impacts to Parks property improvements/assets • At-grade trail and driveway crossing; trail users may encounter vehicles • Requires significant grading on Parks property • Trail grades exceed 5% • Crossing location does not meet the minimum stopping sight distance for both approaches	• Impacts to Parks property improvements/assets • At-grade trail and driveway crossing; trail users may encounter vehicles • Requires significant grading on Parks property • Trail grades exceed 5% • Easterly sight distance is limited from existing driveway entrance • Crossing location does not meet the minimum stopping sight distance for both approaches
Opinion of Probable Cost	• $685,000 per Figure 1.6 • $725,000 per Figure 1.7 These costs include a 20% planning-level contingency, and do not include sales tax.	$555,000 This cost includes a 20% planning-level contingency, and does not include sales tax.	$515,000 This cost includes a 20% planning-level contingency, and does not include sales tax.

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Table 1.4 reviews the three alternatives for proposed trail improvements from the Boise Creek Arch Bridge to the SE Mud Mountain Road trail crossing that were evaluated as part of this memorandum's review. Each alternative component is rated as either favorable, neutral, or unfavorable in comparison to the other alternatives within each trail feature category. This table is intended to assist King County Parks in determining which alternatives to pursue in the design phase.

Table 1.4: Trail Alternatives Review

Component	Trail from Boise Creek Arch Bridge to SE Mud Mountain Road Trail Crossing		
		Alternative 2	
	Alternative 1	A	B
Cost	🔴	🟡	🟡
Safety	🟢	🟡	🔴
Aesthetics	🟡	🟡	🟡
Trail Experience	🟡	🟡	🟡
Impact to Property Area	🟡	🔴	🔴
Impact to traffic	🟡	🟡	🔴
Hydraulic Impact	🟡	🟡	🟡
Grading on Property	🟡	🔴	🔴
Geotechnical	N/A	N/A	N/A
Environmental Conditions	🟡	🟡	🟡
Maintenance	🟡	🟡	🟡

Note: Components are rated in comparison to the alternatives

Legend: 🟢 Favorable 🟡 Neutral 🔴 Unfavorable

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MEMORANDUM 2

WHITE RIVER BRIDGE APPROACHES

For the purpose of this memorandum, the Berger ABAM State Route 167 Puyallup River Bridge Reuse Assessment – Phase 1 Final Report, dated July 13, 2012, was used to establish the location and bridge structure to be used for the King County Parks Foothills Trail crossing of the White River. The assumption is that the former SR 167 bridge structure will be relocated for use as the Foothills Trail's crossing over the White River at the old SR 410 bridge location. There are three existing concrete bridge piers that remain from the former SR 410 steel truss bridge, which was removed in 1955. These piers were designed to support a load significantly less than the former SR 167 bridge structure, so new bridge piers will be required.

This memorandum provides the following:

1. A review of the suitability of northern trail approach configurations to the White River Bridge from the SE Mud Mountain Road trail crossing
2. A description of the southern trail approach to the White River Bridge from the existing Foothills Trail terminus in Buckley, Washington

Trail Approach Considerations and Criteria

Two potential northern trail approach alignments to the White River Bridge crossing, as well as the southern trail approach alignment, are shown in Figure 2.1. The southern approach will be designed to match from the existing grade at the Foothills Trail terminus in Buckley to an assumed bridge deck elevation on the south end of the White River Bridge crossing.

For the northern trail approach to the White River Bridge crossing, consideration will be given to the close proximity of the eastern Boise Creek bank to the trail improvements. There will need to be adequate horizontal separation from the top of the eastern Boise Creek bank to the edge of the trail improvements. The northern approach will be designed to match the existing roadway grade at the SE Mud Mountain Road trail crossing to an assumed bridge deck elevation at the north end of the White River Bridge crossing.

For this review, it is assumed that King County will acquire right-of-use for the trail to cross the property near the existing northern SR 410 bridge pier, currently owned by Equity Group NW, LLC.

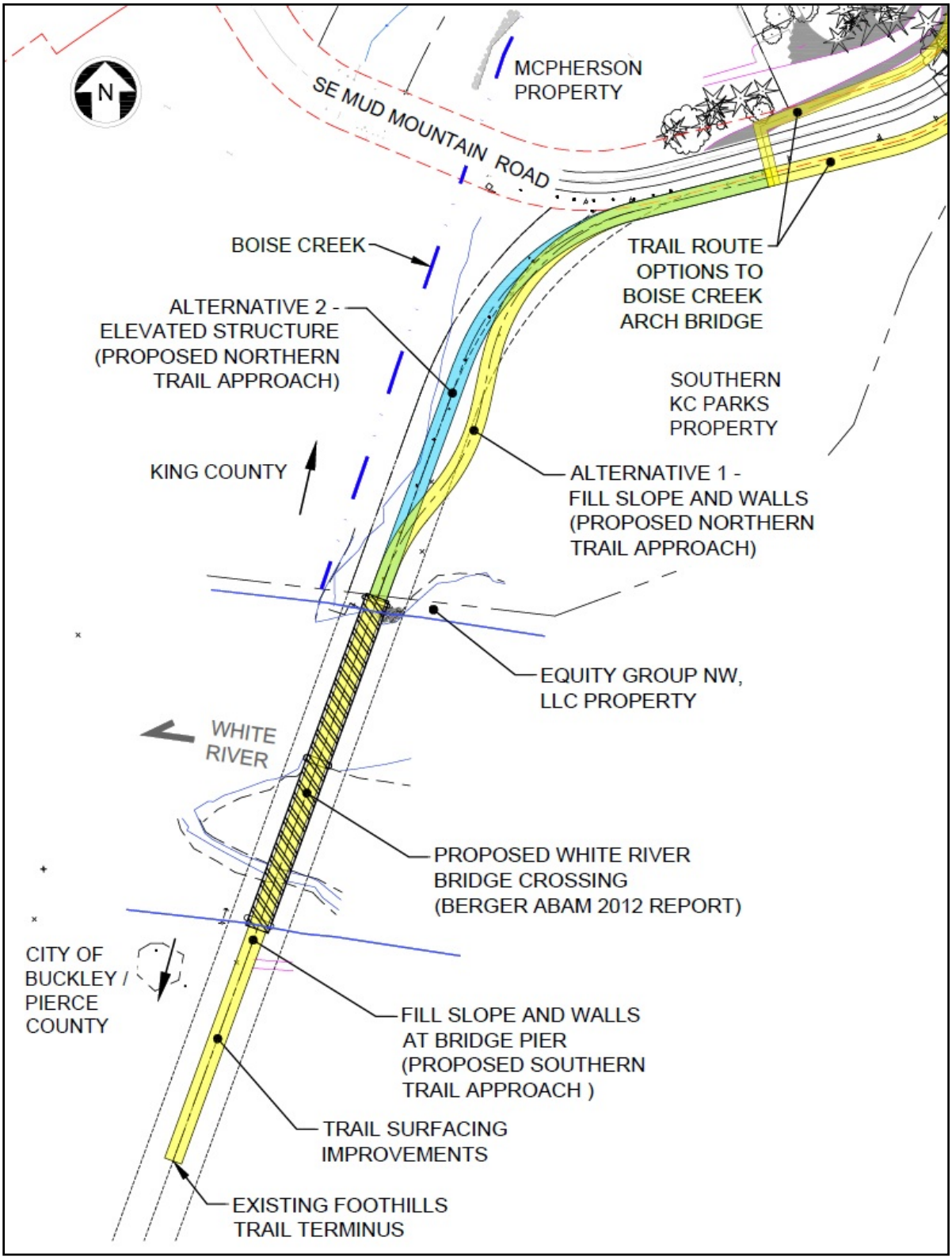

Figure 2.1: White River Bridge Trail Approaches

Northern White River Bridge Approach

Once the proposed Foothills Trail diverges from SE Mud Mountain Road, it begins its approach towards the White River Bridge. The proposed trail generally follows the old SR 410 Highway alignment towards the river. The Trail must decrease in elevation from SE Mud Mountain Road to where it meets the White River Bridge at a bridge deck finish grade elevation of 650 feet (assumed for this review). There are two alternatives that were identified for this approach.

Alternative 1: Fill Slope and Walls

The first alternative for this approach, shown in Figure 2.2, consists of a combination of fill slopes and retaining walls. After the Trail diverges from SE Mud Mountain Road, it will curve southwest towards the White River Bridge. The Trail will be 16-feet wide, lined with a fence on both sides, on top of an earth embankment and will extend from the existing grade of SE Mud Mountain Road to the assumed bridge deck finish grade elevation.

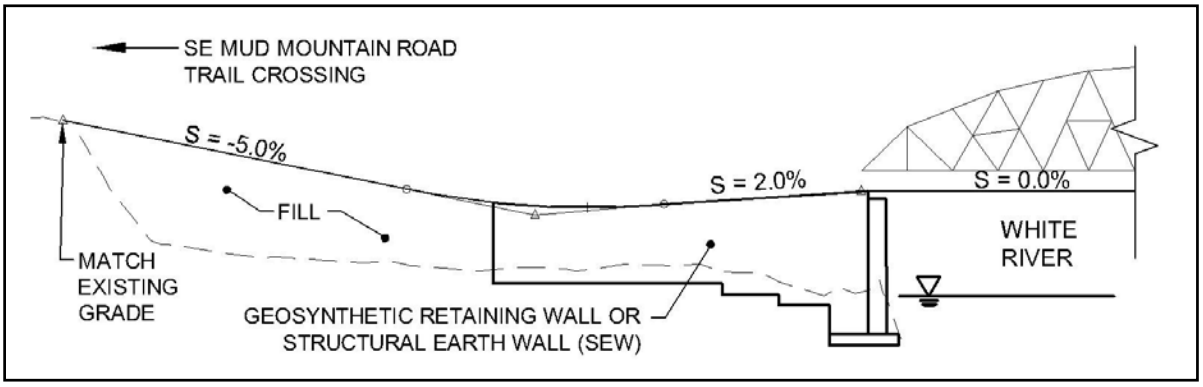

Figure 2.2: Northern White River Bridge Trail Approach – Alternative 1, Fill Slope and Walls

For this review, the fill slopes used for the embankment in this alternative are 3H:1V. The geotechnical consulting engineer (Hart Crowser) recommends that permanent fill slopes should not be made steeper than 2H:1V (Geotechnical Engineering Design Study, 2016), in order to minimize long-term erosion and to facilitate revegetation. Based on this recommendation, the fill slopes may be modified during the design phase to decrease the embankment fill quantity and/or amount of wall required.

As the Trail approaches the White River, it also comes near to the top of the Boise Creek bank, where embankment side slopes will need to be steeper than Hart Crowser's recommendation in the Geotechnical Study. For this portion of the Trail, either a geosynthetic retaining wall or structural earth wall (SEW) system will be installed to provide stability for the embankment up to the White River Bridge pier. Hart Crowser recommends that there be horizontal separation equal to twice the retaining wall height between the top of the Boise Creek bank and the toe of the wall. The base of this wall system will be armored on the upstream portion of the White River in order to protect the wall from bank erosion in the case of an unanticipated flood event.

The Trail in this alternative will diverge from SE Mud Mountain Road at a running slope of -5.0%. The Trail will then approach the northern end of the bridge deck at a +2.0% slope. A concrete panel will be used for the Trail's transition from the bridge deck to the fill embankment, asphalt-paved trail surface.

Alternative 1 - Advantages

- Earth fill embankment will require less maintenance than an elevated structure
- Most cost-effective approach to support the trail
- This alternative would match the aesthetics of the existing approach embankment on the south side of the proposed White River Bridge crossing

Alternative 1 - Disadvantages

- The fill embankment and side slopes result in a larger project footprint than the alternative of an elevated structure

Alternative 1 - Opinion of Probable Cost

The approximate cost for Alternative 1 is $870,000. This opinion of probable cost includes a 20% planning-level contingency, and does not include sales tax.

Alternative 2: Elevated Structure

Figure 2.3 illustrates the second alternative for the trail approach from SE Mud Mountain Road to the northern White River Bridge pier. This alternative consists of a structurally supported elevated deck for the trail that will extend from SE Mud Mountain Road to the White River Bridge deck.

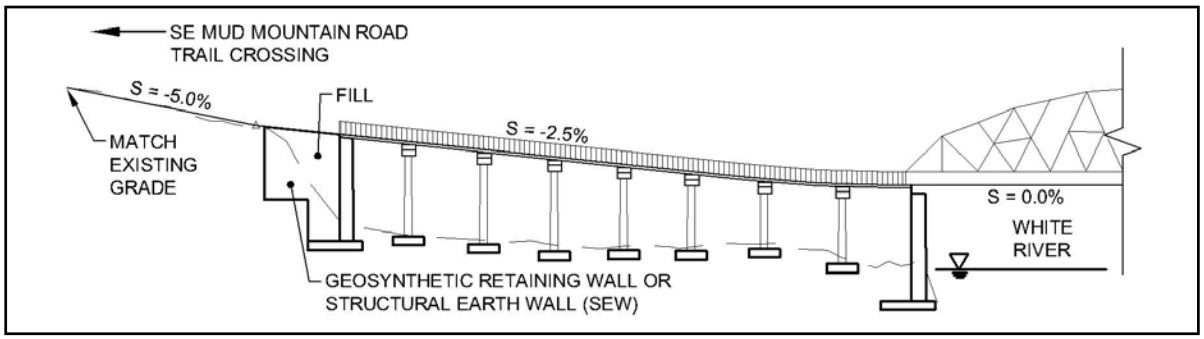

Figure 2.3: Northern White River Bridge Trail Approach – Alternative 2, Elevated Structure

The elevated structure type reviewed by this memorandum would use dual prestressed concrete I-girders (see Figure 2.4 for a typical section of the elevated structure). The structure will be founded on spread footings spanning approximately 60 to 80 feet along the alignment of the trail towards the White River Bridge. This results in a total of 6-8 spans to the bridge. The deck itself will be cast-in-place concrete topping slab, along with handrails. Because Hart Crowser has reported that the soil in this area would not be suitable for driving pin piles

deep enough to develop adequate lateral capacity required for the structure, concrete footings are assumed for the foundation of this structure.

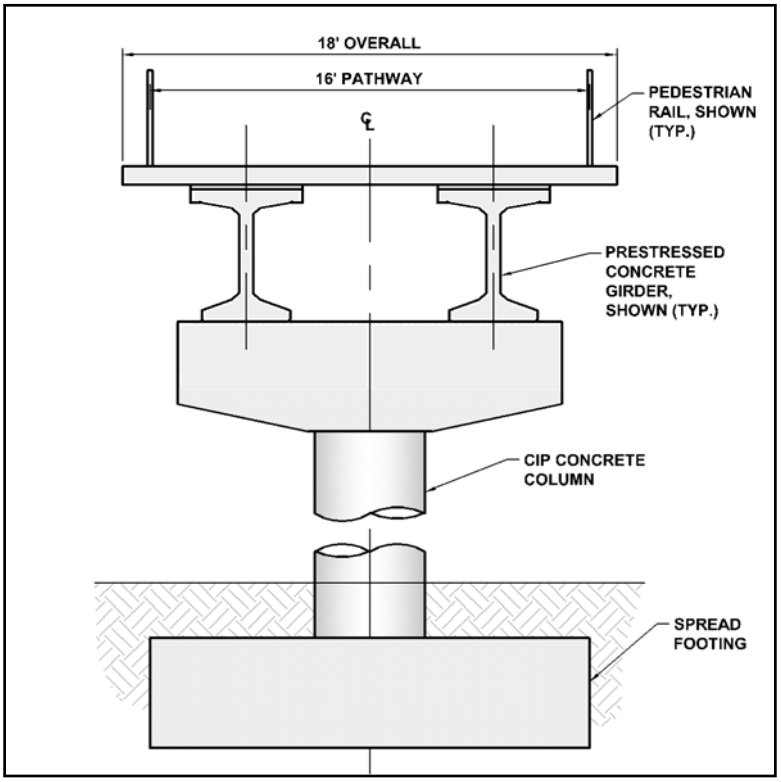

Figure 2.4: Northern White River Bridge Trail Approach – Girder Section

For an elevated structure option that will visually match the entrance towards the White River Bridge crossing, a weathered steel truss system may also be considered. The truss will potentially add interest to the trail user experience as the bolt connections will match the aesthetics of the White River Bridge. However, with this option, the steel members will result in higher costs and require greater long-term maintenance than the concrete girder option, as corrosion, member connections, vandalism and the effort to remedy vandalism may be issues.

Alternative 2 - Advantages

- The project footprint of the final trail approach is smaller than a fill embankment approach

Alternative 2 - Disadvantages

- Structure will require some maintenance, as opposed to an earth fill embankment
- Construction may take a significant amount of time: the reinforcing cage needs to be set, the formwork placed, the concrete poured and cured, and then the formwork removed
- Potential constructability issues depending on the type of foundation used. Test pit and boring explorations have identified numerous randomly distributed cobbles, and boulders

Alternative 2 - Opinion of Probable Cost

The approximate cost for Alternative 2 is $1,825,000. This opinion of probable cost includes a 20% planning-level contingency, and does not include sales tax.

Northern White River Bridge Trail Approach Summary

Table 2.1 below summarizes the two northern White River Bridge trail approach alternatives, listing the general description of each approach, as well as the advantages, disadvantages and opinions of probable cost.

Table 2.1: Northern Trail Approach Alternatives Summary

Feature	Northern White River Bridge Trail Approach Summary	
	Alternative 1	**Alternative 2**
Description	Combination of earth fill embankment and retaining wall system	Elevated concrete deck structure
Advantages	• Earth fill embankment will require less maintenance than an elevated structure • Most cost-effective approach to support the trail • This alternative will match the aesthetics of the existing approach embankment on the south side of the proposed White River Bridge crossing	• The project footprint of the final elevated structure approach is smaller than a fill embankment with side slopes
Disadvantages	• The fill embankment and side slopes result in a larger project footprint than the alternative of an elevated structure	• Structure will require some maintenance, as opposed to an earth fill embankment • Construction may take a significant amount of time: the reinforcing cage needs to be set, the formwork placed, the concrete poured and cured, and then the formwork removed • Potential constructability issues depending on the type of foundation used. Test pit and boring explorations have identified numerous randomly distributed cobbles, and boulders
Opinion of Probable Cost	$730,000, not including sales tax and contingencies	$1,520,000, not including sales tax and contingencies

Table 2.2 reviews the two alternatives for a proposed northern trail approach from the SE Mud Mountain Road trail crossing to the White River Bridge that were evaluated as part of this memorandum's review. Each alternative component is rated as either favorable, neutral, or unfavorable in comparison to the other alternative. This table is intended to assist King County Parks in determining which alternatives to pursue in the design phase.

Table 2.2: Northern Trail Approach Alternatives Review

Component	Northern Trail Approach to White River Bridge	
	Alternative 1 Fill Slope/Walls	**Alternative 2 Elevated Structure**
Cost	🟡	🔴
Safety	🟡	🟡
Aesthetics	🟡	🔴
Trail Experience	🟡	🟡
Impact to Property Area	🔴	🟡
Impact to traffic	N/A	N/A
Hydraulic Impact	🟡	🟡
Grading	🔴	🟡
Geotechnical	🟡	🔴
Environmental Conditions	🟡	🔴
Maintenance	🟡	🔴

Note: Components are rated in comparison to the alternatives

Legend: 🟢 Favorable 🟡 Neutral 🔴 Unfavorable

Southern White River Bridge Approach

Once the proposed Foothills Trail crosses the White River Bridge and reaches the City of Buckley in Pierce County, Washington, it will continue towards the existing Foothills Trail terminus. For this approach, one trail configuration has been identified for the proposed design (see Figure 2.5).

Since an approach embankment already exists on the south side of the proposed White River Bridge crossing, the existing earth fill embankment will be used and extended to connect the proposed southern White River Bridge pier to the existing Foothills Trail improvements terminus, which is approximately 250 feet south of the proposed bridge pier. As the Trail leaves the bridge, a concrete panel will be used for the transition from the bridge deck to the fill embankment, asphalt-paved trail surface.

The Trail will be 16-feet wide and lined with a fence on both sides. The Trail will be on top of an earth fill embankment and maintain a constant +1.5% grade from the bridge deck elevation to match the embankment grade at the Foothills Trail terminus. A portion of the embankment, near the southern bridge pier, will be retained by either a geosynthetic retaining wall or structural earth wall system, in order to reduce impacts to nearby critical areas.

For this review, the fill slopes used for the embankment in this alternative are 3H:1V. The geotechnical consulting engineer (Hart Crowser) recommended that permanent fill slopes should not be made steeper than 2H:1V (Geotechnical Engineering Design Study, 2016), in order to minimize long-term erosion and to facilitate revegetation. Based on this recommendation, the fill slopes may be modified during the design phase to decrease the amount of wall required.

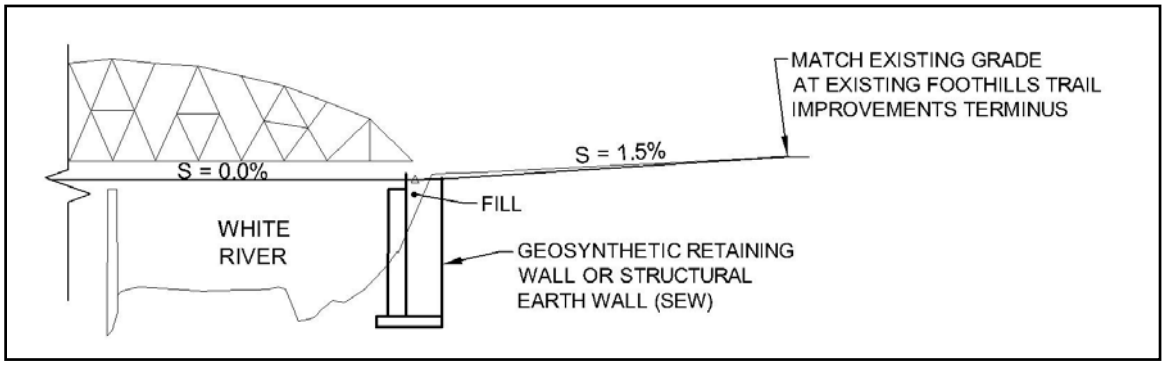

Figure 2.5: Southern White River Bridge Trail Approach – Fill Slope and Walls

Opinion of Probable Cost

The approximate cost for this approach is $140,000. This opinion of probable cost includes a 20% planning-level contingency, and does not include sales tax.

RECOMMENDATIONS

This Report, which consists of two memoranda, analyzes a number of trail features for the proposed Foothills Trail connection between the existing Boise Creek Arch Bridge and the existing Foothills Trail terminus in Buckley, Washington.

Based on the results of the reviews discussed in this Report, the recommended trail improvements alternative from the Boise Creek Arch Bridge to the south side of SE Mud Mountain Road is Alternative #2A. For this trail alternative, the alignment cuts through the King County Parks property tennis court area and connects into the existing southern driveway access. This trail alternative crosses SE Mud Mountain Road approximately midway between the east and west horizontal roadway curves. This alternative allows for more separation between the Trail and roadway, a new driveway that provides improved joint-use access for both properties, and an ADA-compliant trail crossing of SE Mud Mountain Road.

The northern trail approach configuration that is recommended, based on the review provided in this Report, is Alternative #1. This configuration of earth fill embankment and walls is more cost-effective and requires less maintenance than the other alternative. It also matches the existing embankment for the Foothills Trail on the south side of the White River.

The southern trail approach configuration recommended for this project is an extension of the existing embankment on the south side of the river up to the proposed/existing White River bridge pier. This approach will match the existing Foothills Trail terminus in Buckley, Washington.

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Appendix A

Trail Alternative Plan and Profile Views

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MCPHERSON PROPERTY

EXISTING JOINT-USE DRIVEWAY TO REMAIN

PROPERTY LINE

EXISTING JOINT-USE DRIVEWAYS TO REMAIN

EXISTING HOUSE

EXISTING SWIMMING POOL

KC PARKS PROPERTY

EXISTING DRIVEWAY TURNAROUND

EXISTING TENNIS COURT

ROCKERY

SE MUD MOUNTAIN ROAD

707+98

707+50

707+00

706+50

706+00

SOUTHERN KC PARKS PROPERTY

705+50

705+00

704+50

704+00

703+50

703+00

702+50

702+00

701+50

701+00

700+50

700+00

REMOVE EXISTING JOINT-USE DRIVEWAY AND REPLACE AREA WITH TRAIL IMPROVEMENTS

EDGE OF CREEK

EXISTING BOISE CREEK BRIDGE

LEGEND

- LIMITS OF GRADING
- CUT WALL
- FILL WALL
- SINGLE SLOPE BARRIER/FILL WALL

N

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HUITT-ZOLLARS

RROPOSED FOOTHILLS TRAIL
TRAIL ALTERNATIVE 1
PLAN

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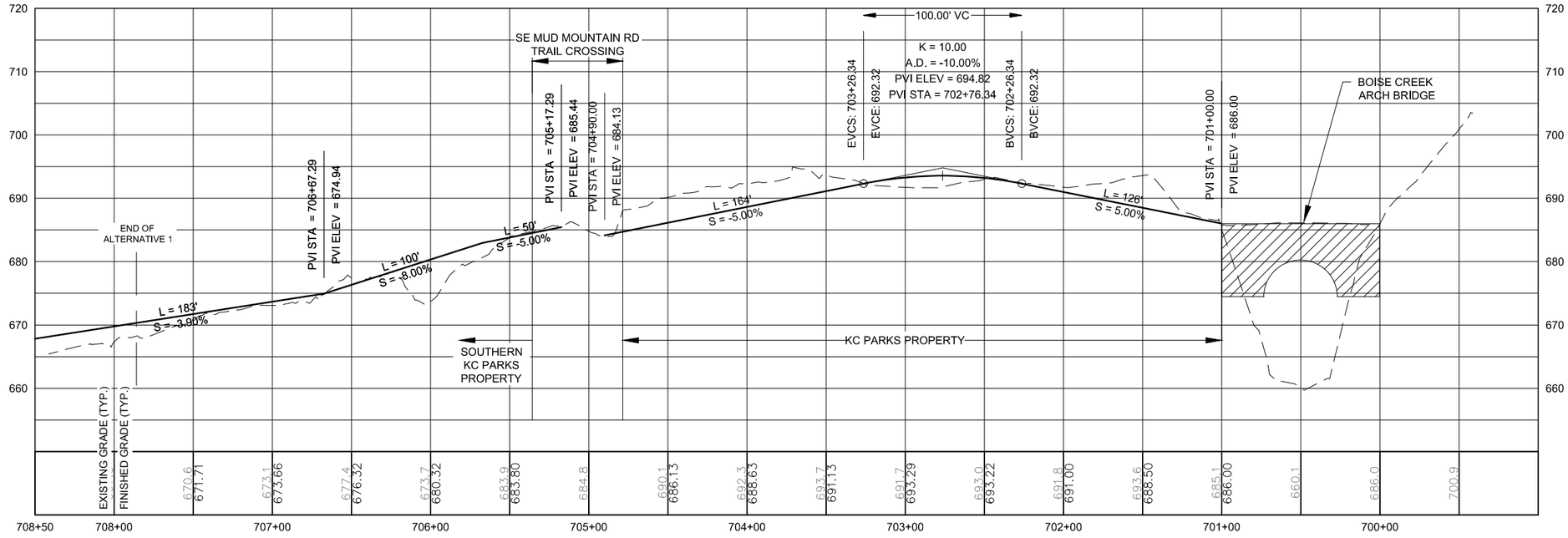
A-1-PLAN



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HUITT-ZOLLARS

RROPOSED FOOTHILLS TRAIL
TRAIL ALTERNATIVE 1
PROFILE

EXHIBIT NUMBER:
A-1-PROFILE

MCPHERSON PROPERTY

REMOVE EXISTING JOINT-USE DRIVEWAY AND REPLACE AREA WITH TRAIL IMPROVEMENTS

PROPERTY LINE

EXISTING JOINT-USE DRIVEWAYS TO REMAIN

EXISTING HOUSE

KC PARKS PROPERTY

EXISTING SWIMMING POOL

EXISTING DRIVEWAY TURNAROUND

EXISTING TENNIS COURT

SE MUD MOUNTAIN ROAD

707+39

707+00

706+50

706+00

705+50

705+00

704+50

704+00

703+50

703+00

702+50

702+00

701+50

701+00

700+50

700+00

RELOCATED JOINT-USE DRIVEWAY IMPROVEMENTS

EXISTING BOISE CREEK BRIDGE

EXISTING JOINT-USE DRIVEWAY TO BE REMOVED

SOUTHERN KC PARKS PROPERTY

EDGE OF CREEK

ROCKERY

LEGEND

- LIMITS OF GRADING
- CUT WALL
- FILL WALL
- SINGLE SLOPE BARRIER/FILL WALL

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HUITT-ZOLLARS

PROPOSED FOOTHILLS TRAIL
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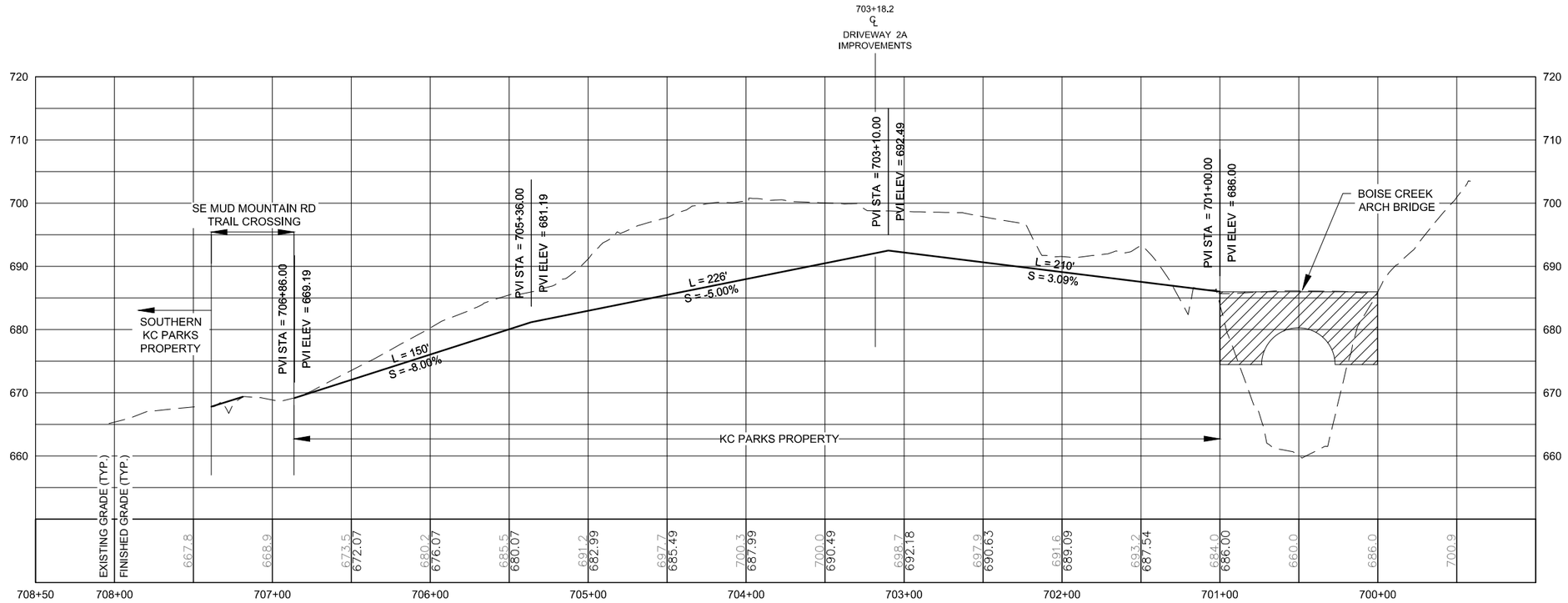

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HUITT-ZOLLARS

RROPOSED FOOTHILLS TRAIL
TRAIL ALTERNATIVE 2A
PROFILE

EXHIBIT NUMBER:
A-2A-PROFILE

MCPHERSON PROPERTY

REMOVE EXISTING JOINT-USE DRIVEWAY AND REPLACE AREA WITH TRAIL IMPROVEMENTS

PROPERTY LINE

EXISTING JOINT-USE DRIVEWAYS TO REMAIN

EXISTING HOUSE

KC PARKS PROPERTY

EXISTING DRIVEWAY TURNAROUND

EXISTING SWIMMING POOL

EXISTING TENNIS COURT

SE MUD MOUNTAIN ROAD

SOUTHERN KC PARKS PROPERTY

RELOCATED JOINT-USE DRIVEWAY IMPROVEMENTS

TRAIL IMPROVEMENTS

EXISTING BOISE CREEK BRIDGE

EXISTING JOINT-USE DRIVEWAY TO BE REMOVED

EXISTING JOINT-USE DRIVEWAY ENTRANCE TO REMAIN

707+39
707+00
706+50
706+00
705+50
705+00
704+50
704+00
703+50
703+00
702+50
702+00
701+50
701+00
700+50
700+00

ROCKERY

EDGE OF CREEK

STREAM

LEGEND

- LIMITS OF GRADING
- CUT WALL
- FILL WALL
- SINGLE SLOPE BARRIER/FILL WALL

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HUITT-ZOLLARS

PROPOSED FOOTHILLS TRAIL
TRAIL ALTERNATIVE 2B
PLAN

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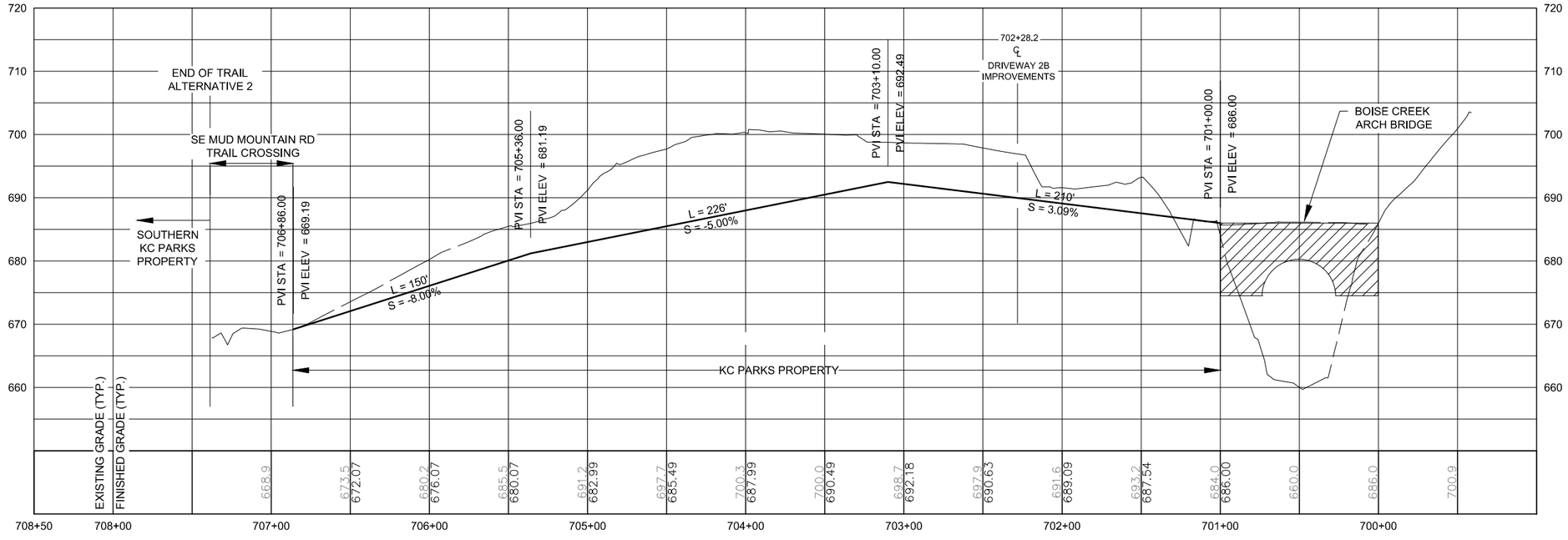

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HUITT-ZOLLARS

RROPOSED FOOTHILLS TRAIL
TRAIL ALTERNATIVE 2B
PROFILE

EXHIBIT NUMBER:
A-2B-PROFILE

Appendix B

WSDOT Standard Plans

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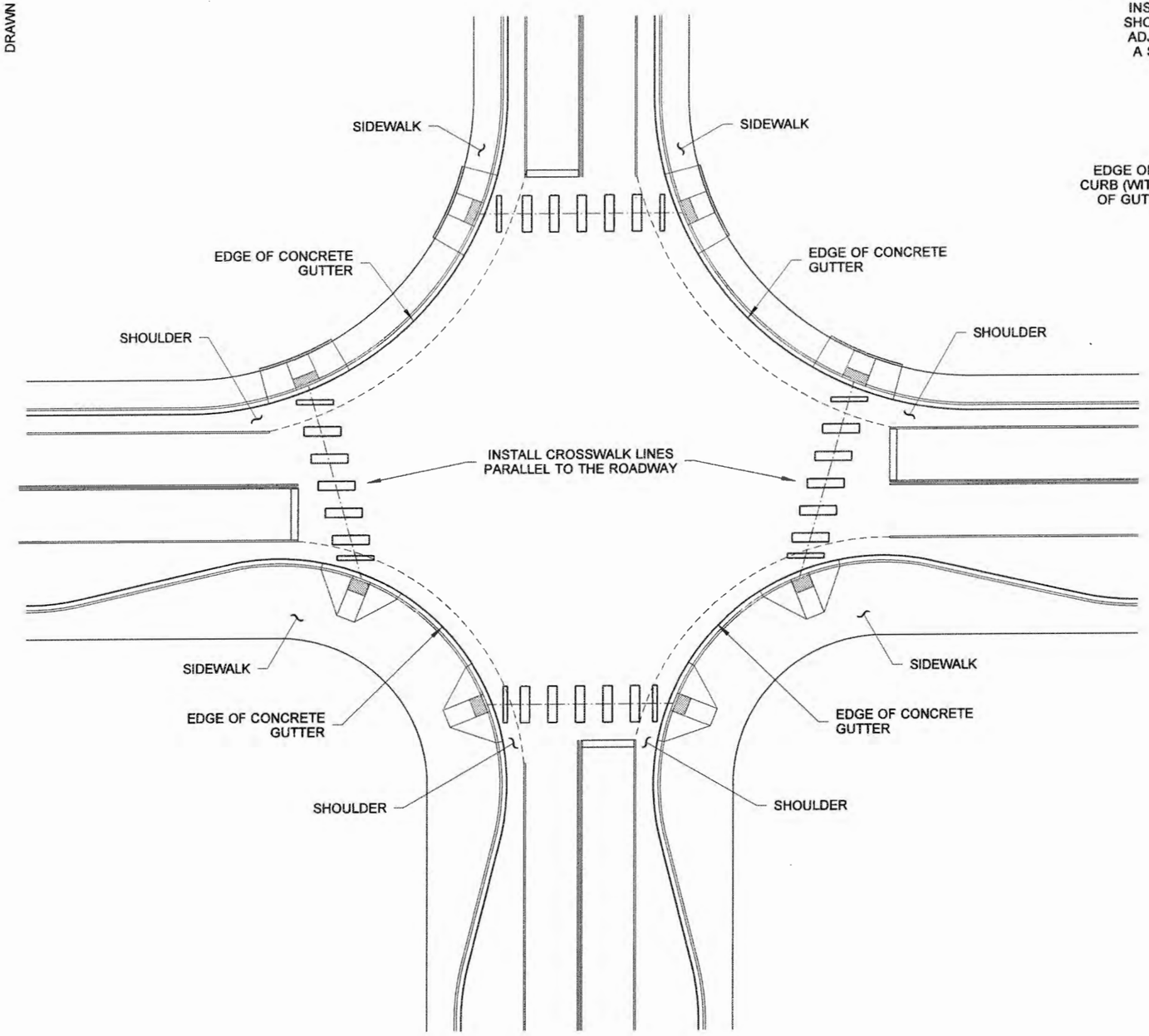
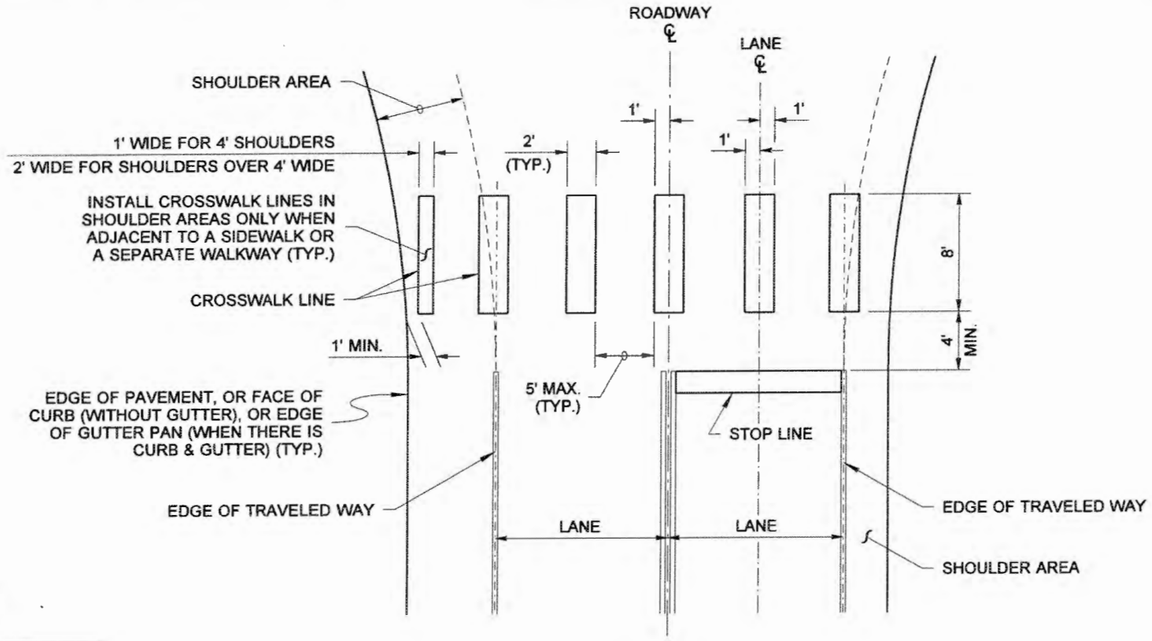
DRAWN BY: FERN LIDDELL



TYPICAL APPLICATIONS



DETAIL

NOTES

1. See the Contract Plans for locations of crosswalk centerlines.
2. To the maximum extent possible, curb ramp centerline should be perpendicular to the crosswalk centerline.
3. To the maximum extent possible, crosswalks should be perpendicular to the centerline of the traveled way.

THEODORE J. TREPANIER
STATE OF WASHINGTON
22510
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EXPIRES AUGUST 9, 2007

CROSSWALK LAYOUT

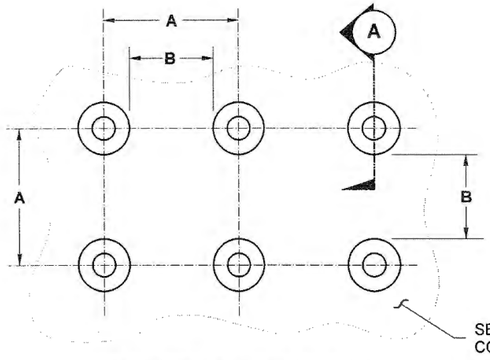
STANDARD PLAN M-15.10-01

SHEET 1 OF 1 SHEET

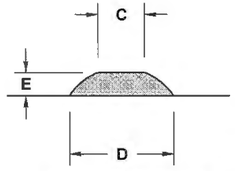
APPROVED FOR PUBLICATION

STATE DESIGN ENGINEER — DATE 02/06/07

Washington State Department of Transportation



TRUNCATED DOME SPACING
SEE NOTE 3

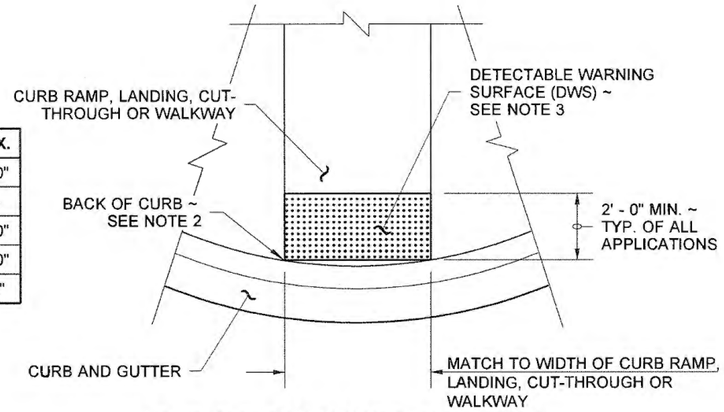


TRUNCATED DOME

SECTION (A)

	MIN.	MAX.
A	1.60"	2.40"
B	0.65"	—
C	0.45"	0.90"
D	0.9"	1.40"
E	0.2"	0.2"

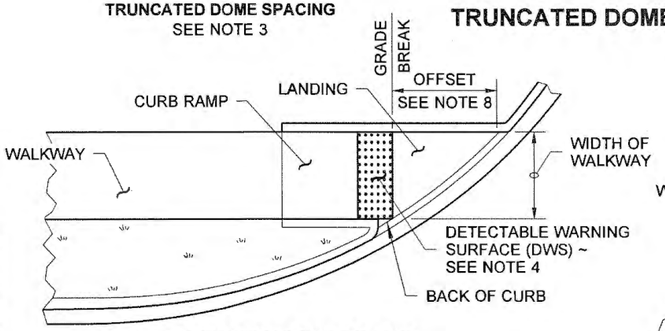
TRUNCATED DOME DETAILS



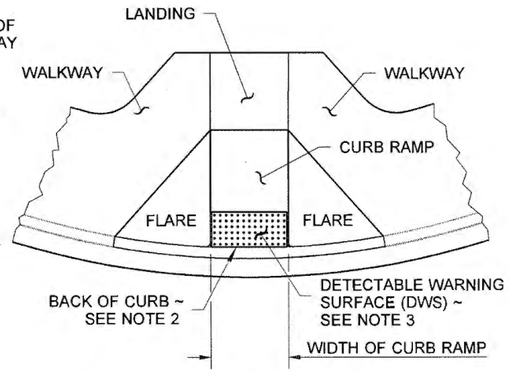
DETECTABLE WARNING SURFACE DETAIL

NOTES

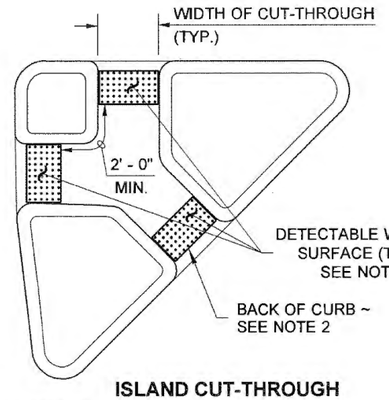
1. The Detectable Warning Surface (DWS) shall extend the full width of the curb ramp (exclusive of flares) or the landing.
2. The Detectable Warning Surface shall be placed at the back of curb, and need not follow the radius.
3. The rows of truncated domes shall be aligned to be perpendicular to the grade break at the back of curb.
4. The rows of truncated domes shall be aligned to be parallel to the direction of travel.
5. If curb and gutter are not present, such as a shared-use path connection, the Detectable Warning Surface shall be placed at the pavement edge.
6. See **Standard Plans** for sidewalk and curb ramp details.
7. If a curb ramp is required, the location of the Detectable Warning Surface must be at the bottom of the ramp and within the required distance from the rail.
8. When the grade break between the curb ramp and the landing is less than or equal to 5 ft. from the back of curb at all points, place the Detectable Warning Surface on the bottom of the curb ramp.



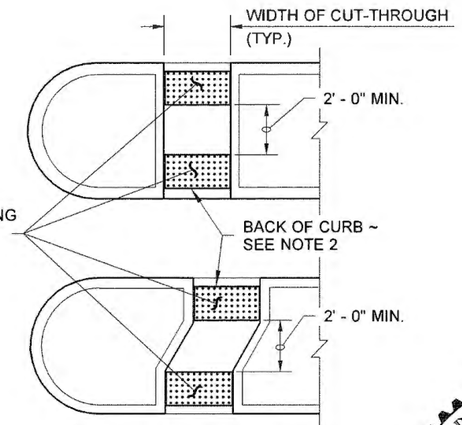
SINGLE DIRECTION CURB RAMP
(GRADE BREAK BETWEEN CURB AND LANDING ≤ 5 FT. FROM BACK OF CURB)
(SEE NOTE 6)



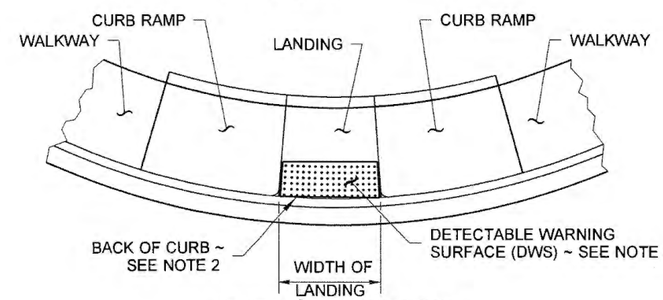
PERPENDICULAR CURB RAMP
(SEE NOTE 6)



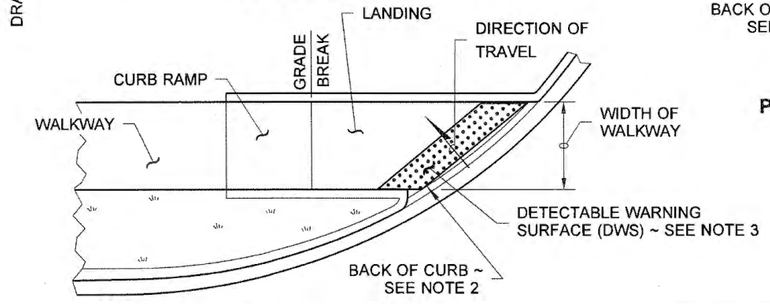
ISLAND CUT-THROUGH



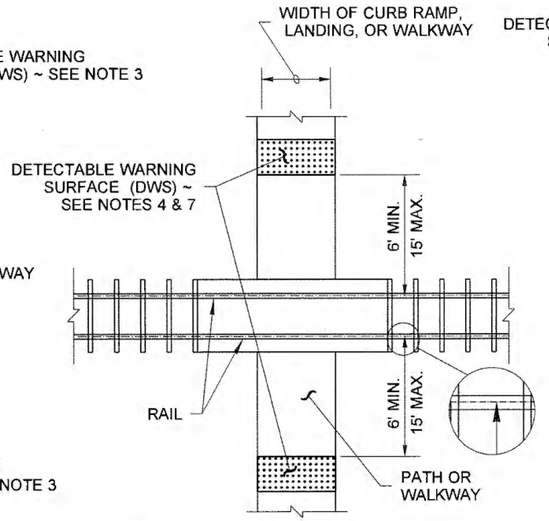
MEDIAN CUT-THROUGH



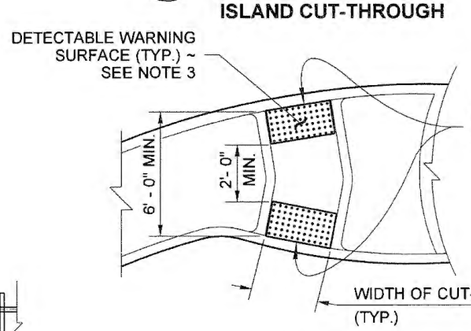
PARALLEL CURB RAMP
(SEE NOTE 6)



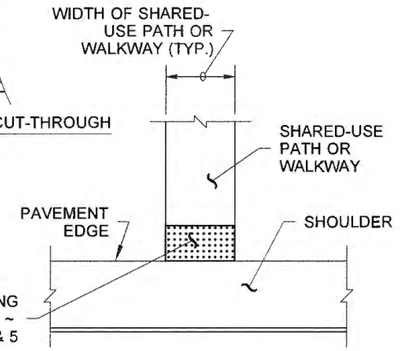
SINGLE DIRECTION CURB RAMP
(GRADE BREAK BETWEEN CURB AND LANDING > 5 FT. FROM BACK OF CURB)
(SEE NOTE 6)



PEDESTRIAN RAILROAD CROSSING



ROUNDABOUT SPLITTER ISLAND



SHARED-USE PATH CONNECTION

PLACEMENT GUIDELINES

6·18·2012

DETECTABLE WARNING SURFACE

STANDARD PLAN F-45.10-01

SHEET 1 OF 1 SHEET

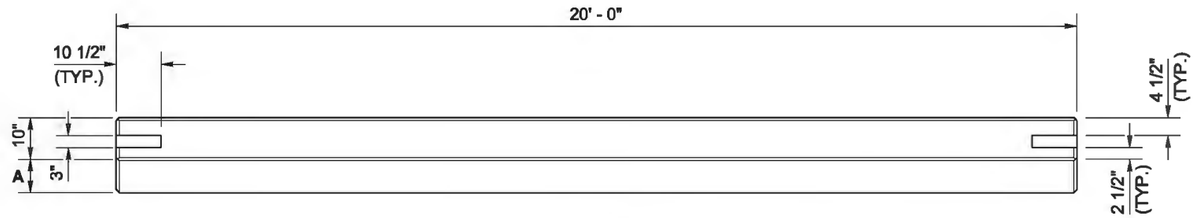
APPROVED FOR PUBLICATION

STATE DESIGN ENGINEER — DATE 6/21/12

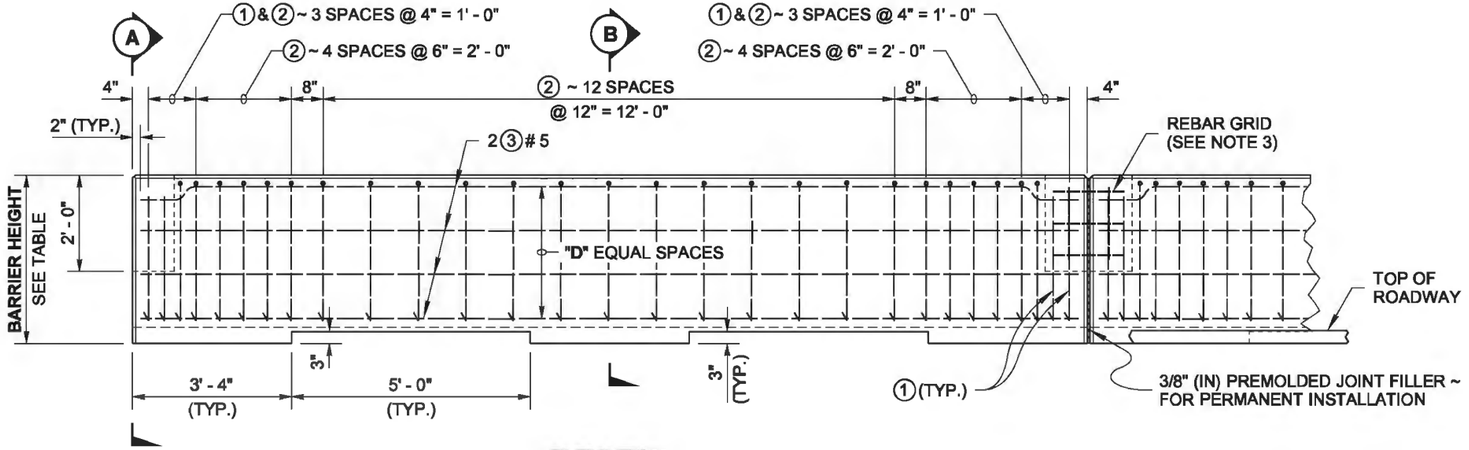
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

DRAWN BY: LISA CYFORD

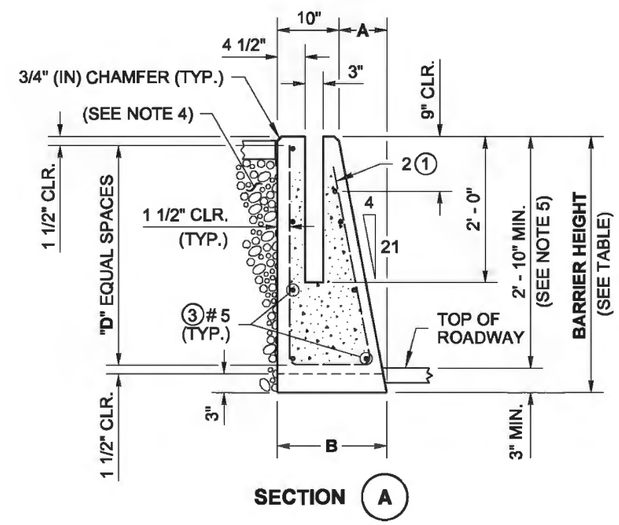


PLAN



ELEVATION

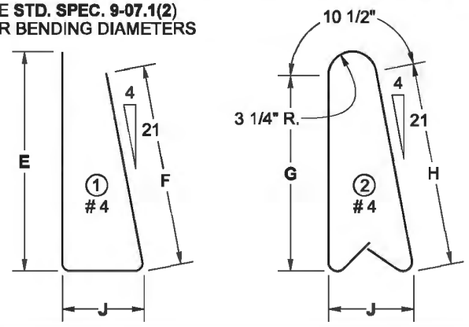
NOTE:
STEEL WELDED WIRE REINFORCEMENT DEFORMED FOR CONCRETE MAY BE SUBSTITUTED FOR REINFORCING STEEL IN ACCORDANCE WITH **STANDARD SPECIFICATION 6-10.3**



SECTION (A)

REINFORCING STEEL BENDING DIAGRAM

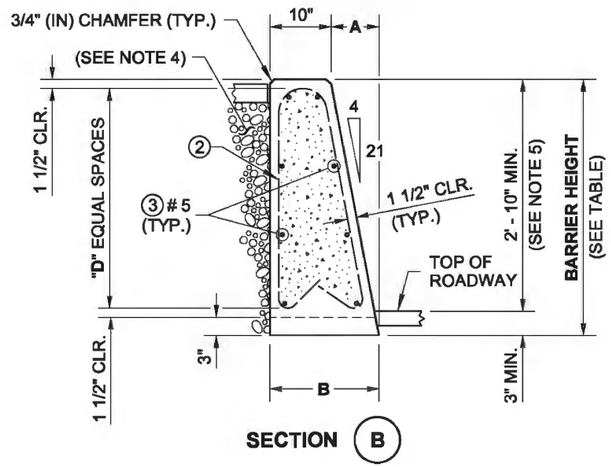
SEE **STD. SPEC. 9-07.1(2)** FOR BENDING DIAMETERS



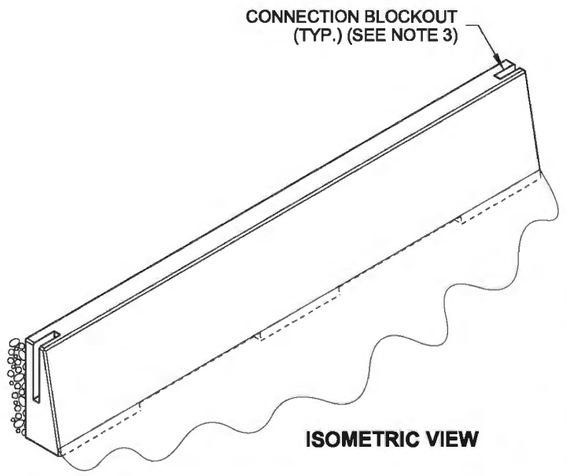
DIMENSION TABLE (SEE NOTE 5)										
	BARRIER HEIGHT	A	B	D	E	F	G	H	J	HORIZONTAL BARS (QTY.)
STD.	3' - 6"	8"	1' - 6"	3	3' - 0"	2' - 8 1/2"	2' - 8"	2' - 9 1/2"	1' - 2"	8
H/P	4' - 0"	9 1/8"	1' - 7 1/8"	4	3' - 6"	3' - 2 1/2"	3' - 2"	3' - 3 1/2"	1' - 3"	10

NOTES

1. PERMANENT INSTALLATION requirements: Embed barrier 3" (in) minimum; install 3/8" (in) Premolded Joint Filler between segments; fill the Connection Blockout with grout, centering the Rebar Grid in the blockout before adding grout.
2. TEMPORARY INSTALLATION requirement: Place a Rebar Grid in the Connection Blockout between barrier segments.
3. See **Standard Plan C-70.10** for REBAR GRID DETAIL and BARRIER CONNECTION DETAIL.
4. Vertical Back barrier is used only in the configurations shown in **Standard Plans C-85.10** and **C-85.20**, and when placed against a retaining wall.
5. When **High-Performance Concrete Barrier** is specified in the Contract, use the dimensions given in the H/P row in the DIMENSION TABLE, with a minimum height above roadway of 3' - 6" and a minimum embedment of 3" (in).



SECTION (B)



ISOMETRIC VIEW

EDWARD PATRICK BARRY
STATE OF WASHINGTON
34363
REGISTERED PROFESSIONAL ENGINEER

Barry, Ed
May 19 2014 8:28 AM

SINGLE-SLOPE CONCRETE BARRIER (PRECAST) VERTICAL BACK

STANDARD PLAN C-75.20-01

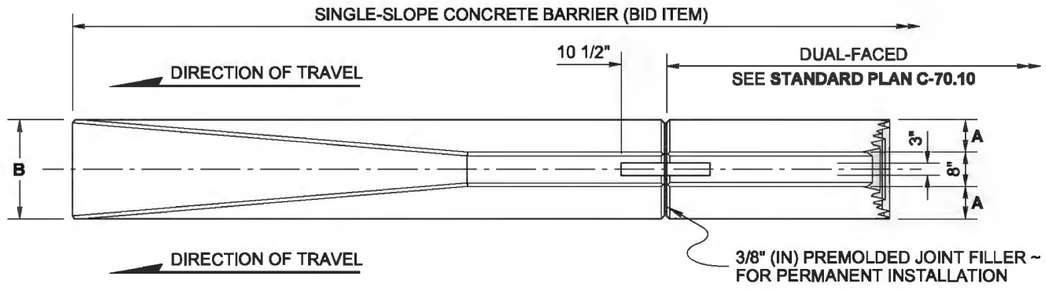
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Bakotich, Pasco
Jun 11 2014 1:13 PM

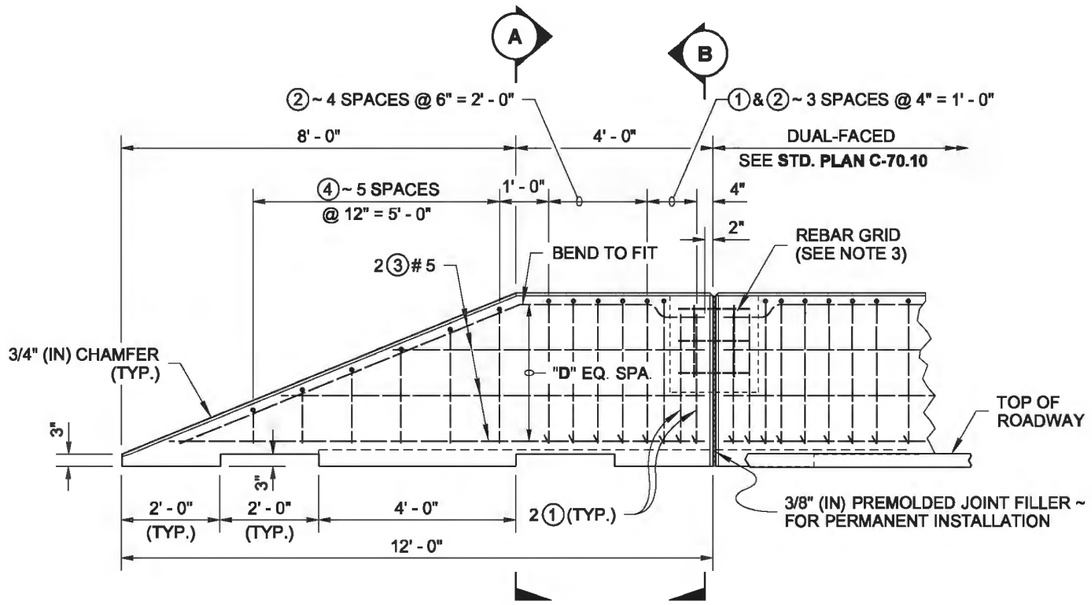
STATE DESIGN ENGINEER

Washington State Department of Transportation

DRAWN BY: LISA CYFORD



PLAN

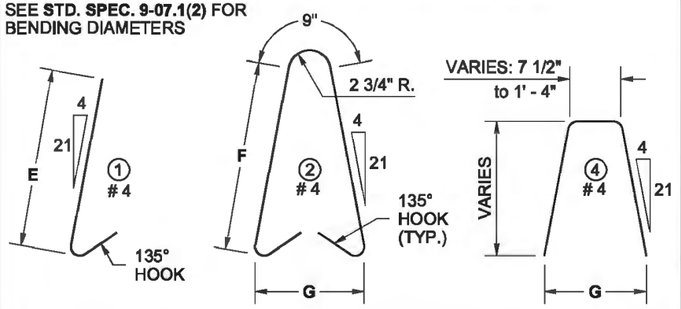


ELEVATION

NOTE:
STEEL WELDED WIRE REINFORCEMENT DEFORMED FOR CONCRETE MAY BE SUBSTITUTED FOR REINFORCING STEEL IN ACCORDANCE WITH **STANDARD SPECIFICATION 6-10.3**

REINFORCING STEEL BENDING DIAGRAM

SEE **STD. SPEC. 9-07.1(2)** FOR BENDING DIAMETERS

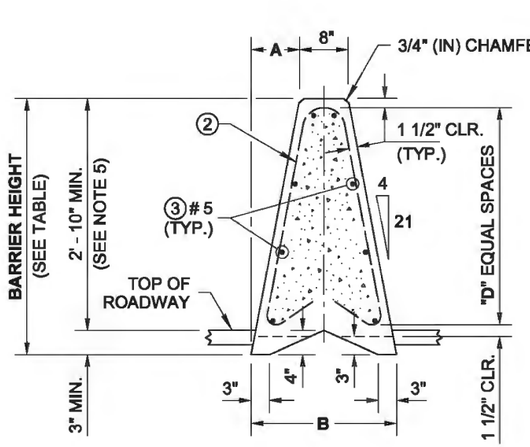


DIMENSION TABLE (SEE NOTE 5)

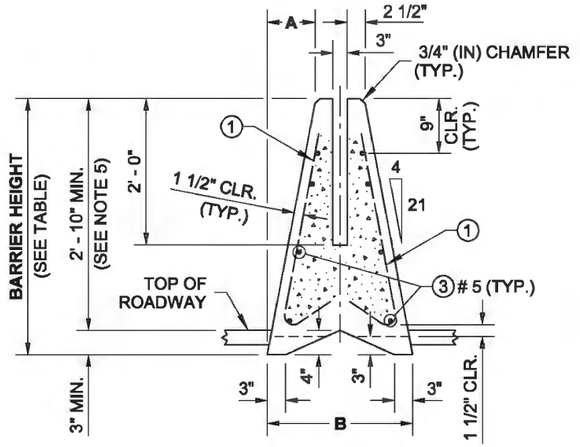
	BARRIER HEIGHT	A	B	D	E	F	G	HORIZONTAL BARS (QTY.)
STD.	3' - 6"	8"	2' - 0"	3	2' - 8"	2' - 9"	1' - 7"	8
H/P	4' - 0"	9 1/8"	2' - 2 1/4"	4	3' - 2"	3' - 3"	1' - 9"	10

NOTES

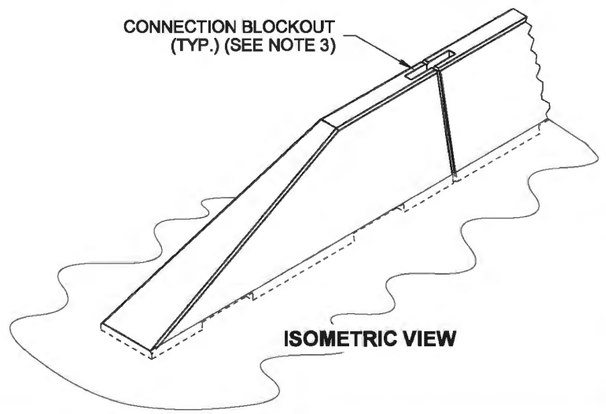
1. PERMANENT INSTALLATION requirements: Embed barrier 3" (in) minimum; install 3/8" (in) Premolded Joint Filler between segments; fill the Connection Blockout with grout, centering the Rebar Grid in the blockout before adding grout.
2. TEMPORARY INSTALLATION requirement: Place a Rebar Grid in the Connection Blockout between barrier segments.
3. See **Standard Plan C-70.10** for REBAR GRID DETAIL and BARRIER CONNECTION DETAIL.
4. The Terminal is used only on the trailing end of a barrier, unless otherwise shown in the Contract.
5. When **High-Performance Concrete Barrier** is specified in the Contract, use the dimensions given in the H/P row in the DIMENSION TABLE, with a minimum height above roadway of 3' - 6" and a minimum embedment of 3" (in).



SECTION (A)



SECTION (B)



EDWARD PATRICK BARRY
STATE OF WASHINGTON
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REGISTERED
PROFESSIONAL ENGINEER

Barry, Ed
May 19 2014 8:28 AM

SINGLE-SLOPE CONCRETE BARRIER (PRECAST) TERMINAL

STANDARD PLAN C-75.30-01

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
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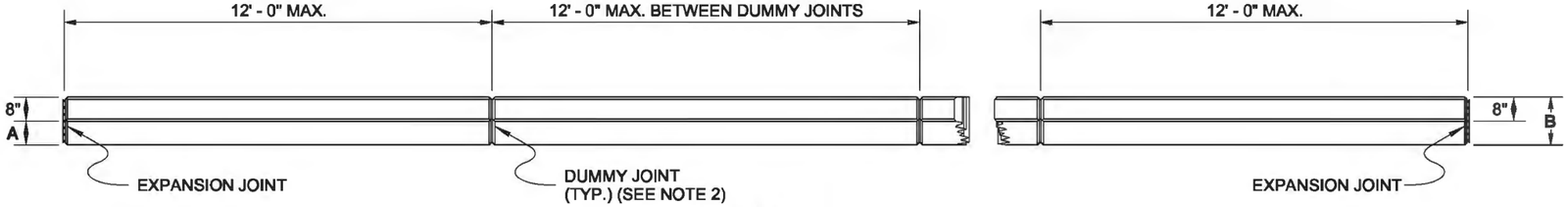
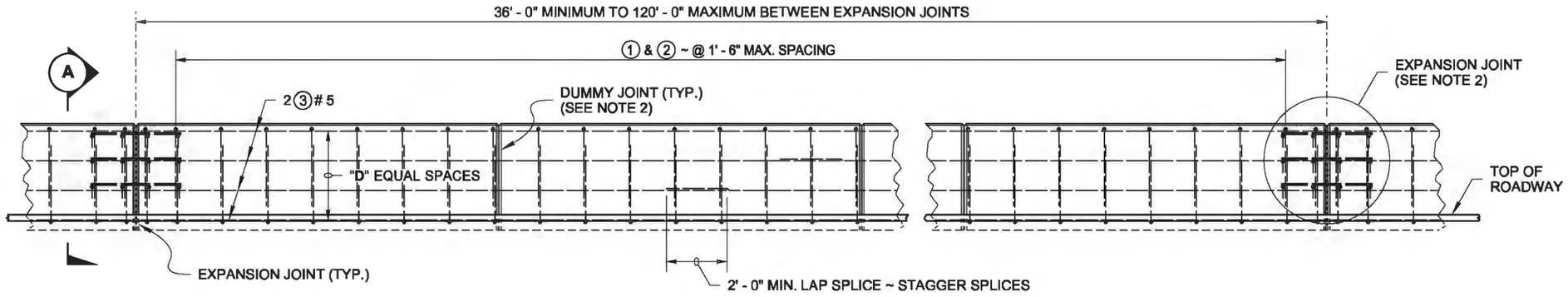
STATE DESIGN ENGINEER

Washington State Department of Transportation

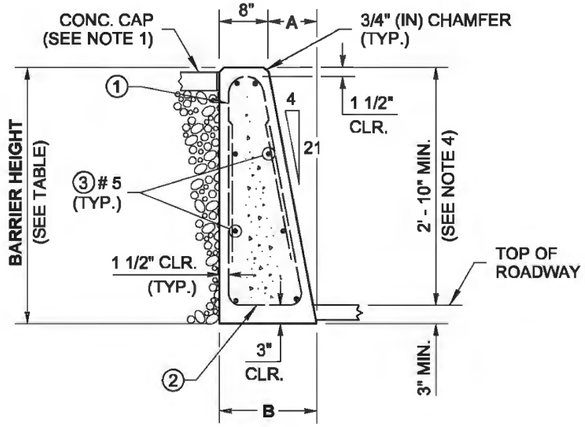
DRAWN BY: LISA CYFORD



PLAN



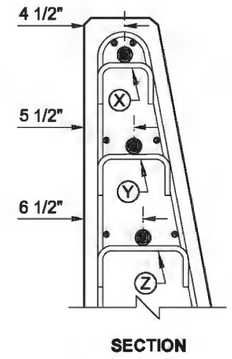
ELEVATION



SECTION (A)

NOTES

1. The Vertical Back barrier is used only in the configurations shown in **Standard Plans C-85.10** and **C-85.11,** and when placed against a retaining wall.
2. See **Standard Plan C-80.10,** Sheet 1, for EXPANSION JOINT and DUMMY JOINT details. Modify rebar as shown in EXPANSION JOINT MODIFICATION.
3. Reinforcing steel dimensions and clearances are shown for stationary form construction. When slip-form construction is used, increase reinforcing steel clearances to the outside surfaces of the barrier to 2 1/2" (in) and adjust steel dimensions as required.
4. When **High-Performance Concrete Barrier** is specified in the Contract, use the dimensions given in the H/P row in the DIMENSION TABLE, with a minimum height above roadway of 3' - 6" and a minimum embedment of 3" (in).



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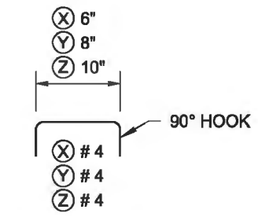


REINFORCING STEEL BENDING DIAGRAM

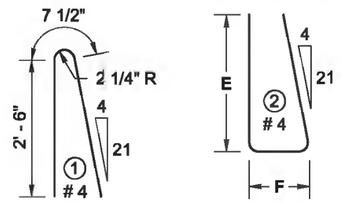
EXPANSION JOINT MODIFICATION

(SEE NOTE 2)

NOTE:
STEEL WELDED WIRE REINFORCEMENT DEFORMED FOR CONCRETE MAY BE SUBSTITUTED FOR REINFORCING STEEL IN ACCORDANCE WITH **STANDARD SPECIFICATION 6-10.3**

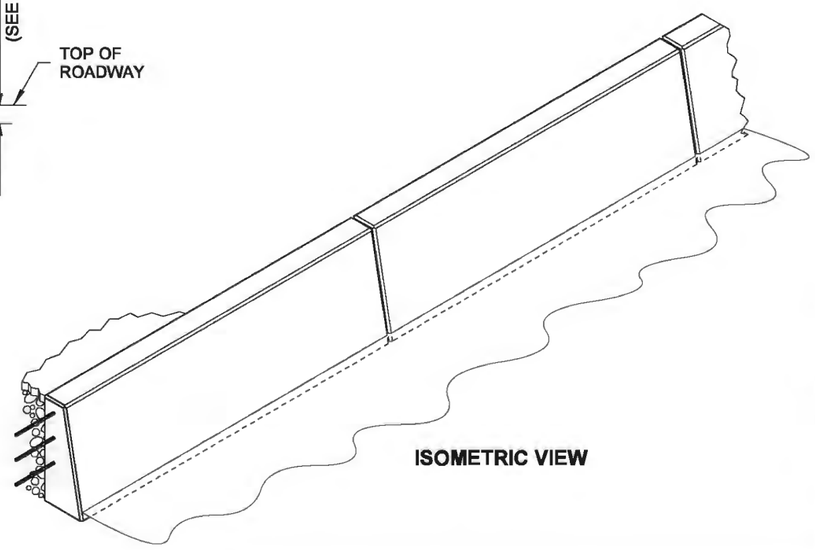
REINFORCING STEEL BENDING DIAGRAM

SEE STD. SPEC. 9-07.1(2) FOR BENDING DIAMETERS



DIMENSION TABLE (SEE NOTE 4)

	BARRIER HEIGHT	A	B	D	E	F	HORIZONTAL BARS (QTY.)
STD.	3' - 6"	8"	1' - 4"	3	2' - 6"	1' - 0 1/4"	8
H/P	4' - 0"	9 1/8"	1' - 5 1/8"	4	3' - 0"	1' - 1 1/2"	10



ISOMETRIC VIEW

EDWARD PATRICK BARRY
STATE OF WASHINGTON
34363
REGISTERED
PROFESSIONAL ENGINEER

Barry, Ed
May 19 2014 8:33 AM

SINGLE-SLOPE CONCRETE BARRIER (CAST-IN-PLACE) VERTICAL BACK

STANDARD PLAN C-80.40-01

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Bakotich, Pasco
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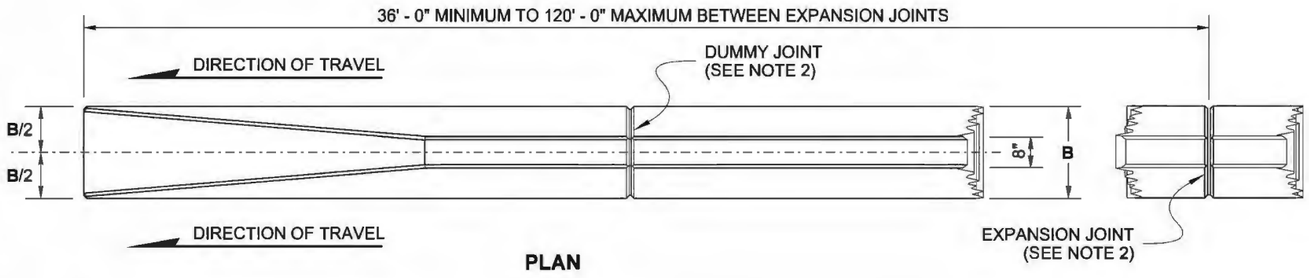
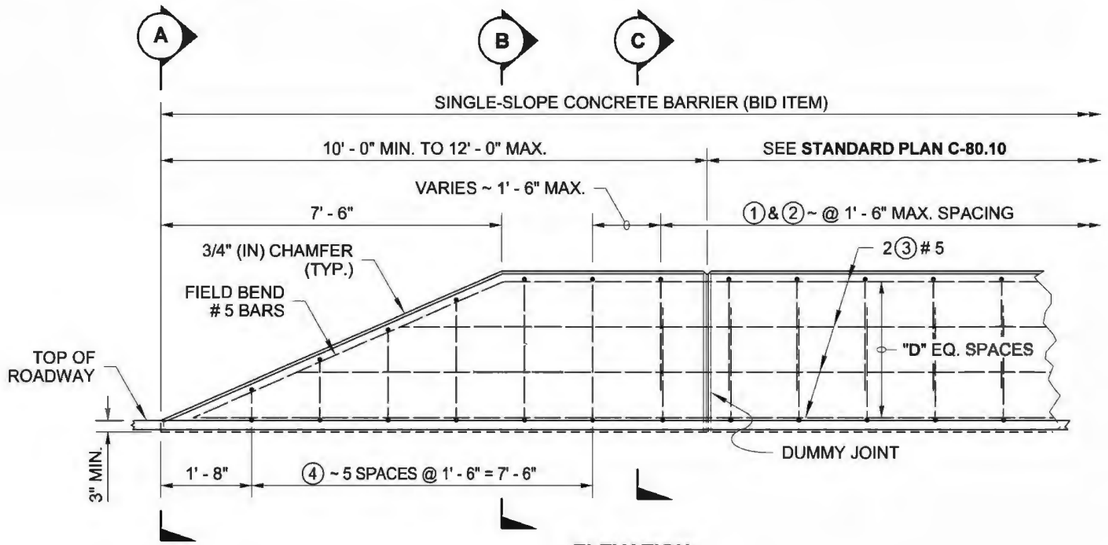
STATE DESIGN ENGINEER
Washington State Department of Transportation

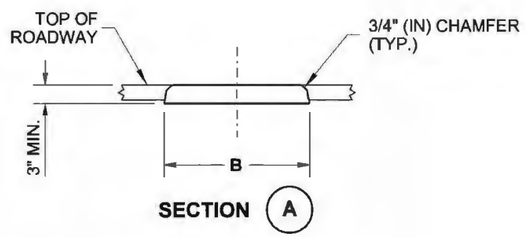
DRAWN BY: LISA CYFORD



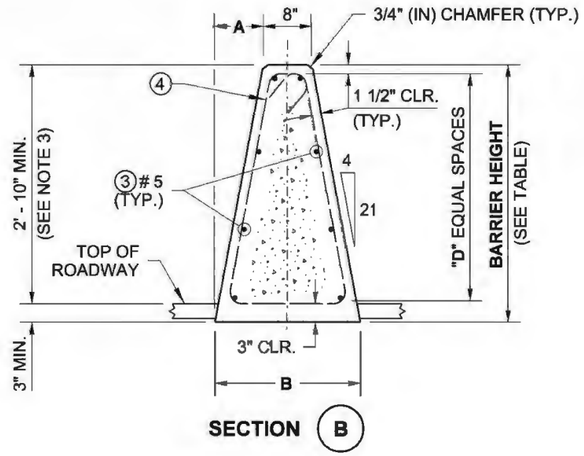
PLAN



ELEVATION



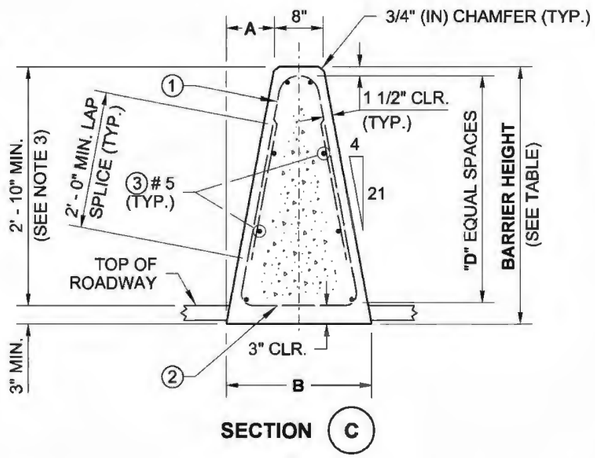
SECTION (A)



SECTION (B)

NOTES

1. The Terminal is used only on the trailing end of a barrier, unless otherwise shown in the Contract.
2. See **Standard Plan C-80.10**, Sheet 1, for EXPANSION JOINT and DUMMY JOINT details.
3. When **High-Performance Concrete Barrier** is specified in the Contract, use the dimensions given in the H/P row in the DIMENSION TABLE, with a minimum height above roadway of 3' - 6" and a minimum embedment of 3" (in).

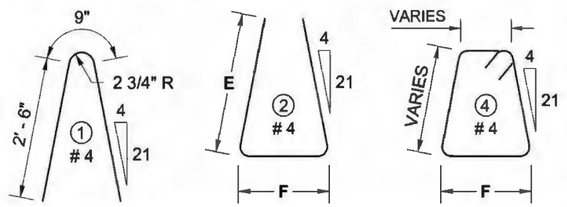


SECTION (C)

NOTE:
STEEL WELDED WIRE REINFORCEMENT DEFORMED FOR CONCRETE MAY BE SUBSTITUTED FOR REINFORCING STEEL IN ACCORDANCE WITH **STANDARD SPECIFICATION 6-10.3**

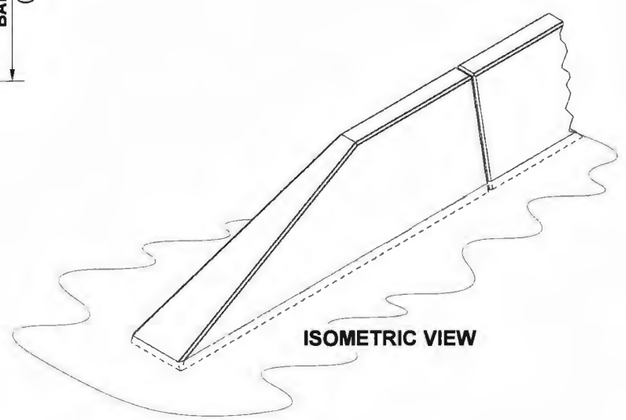
REINFORCING STEEL BENDING DIAGRAM

SEE **STD. SPEC. 9-07.1(2)** FOR BENDING DIAMETERS



DIMENSION TABLE (SEE NOTE 3)

	BARRIER HEIGHT	A	B	D	E	F	HORIZONTAL BARS (QTY.)
STD.	3' - 6"	8"	2' - 0"	3	2' - 6"	1' - 8"	8
H/P	4' - 0"	9 1/8"	2' - 2 1/4"	4	3' - 0"	1' - 10"	10



ISOMETRIC VIEW

EDWARD PATRICK BARRY
STATE OF WASHINGTON
34363
REGISTERED
PROFESSIONAL ENGINEER

Barry, Ed
May 19 2014 8:31 AM

SINGLE-SLOPE CONCRETE BARRIER (CAST-IN-PLACE) TERMINAL

STANDARD PLAN C-80.20-01

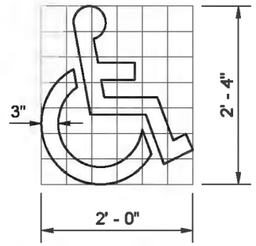
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Bakotich, Pasco
Jun 11 2014 1:18 PM

STATE DESIGN ENGINEER

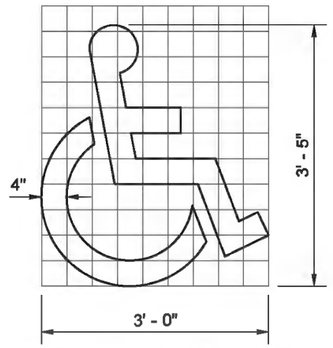
Washington State Department of Transportation

DRAWN BY: LISA CYFORD



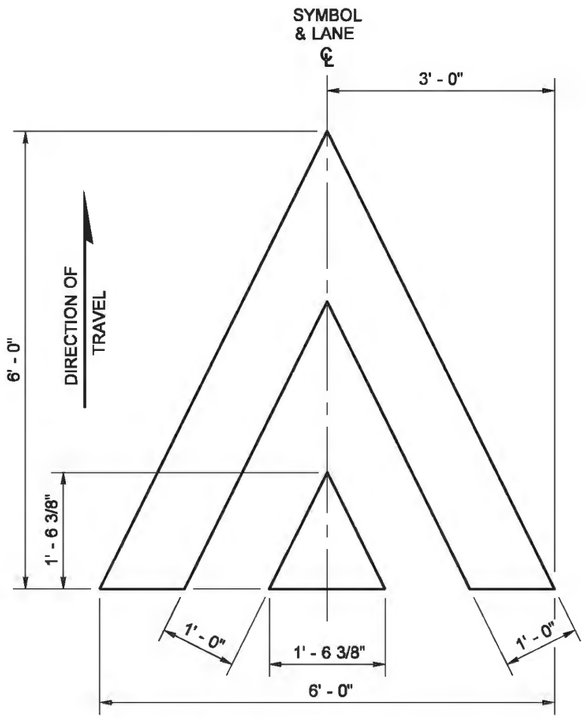
GRID IS 4" (IN) SQUARE MARKING AREA = 1.41 SQ.FT.

ACCESS PARKING SPACE SYMBOL (MINIMUM)



GRID IS 4" (IN) SQUARE MARKING AREA = 3.09 SQ.FT.

ACCESS PARKING SPACE SYMBOL (STANDARD)

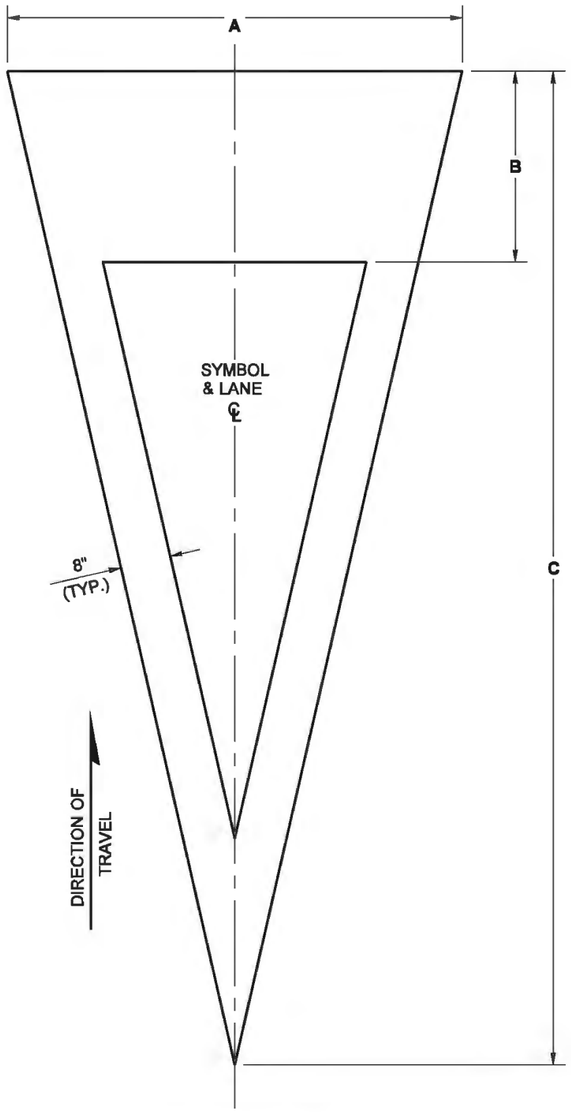


MARKING AREA = 12.08 SQ.FT.

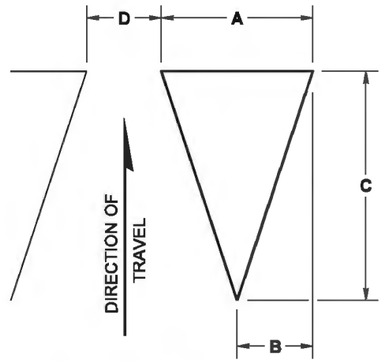
SPEED BUMP SYMBOL

SYMBOL MARKING		A	B	C	D	USE	MARKING AREA
YIELD AHEAD SYMBOL	TYPE 1	6' - 0"	2' - 6"	13' - 0"	N/A	LESS THAN 45 MPH	25.90 SQ.FT.
	TYPE 2	6' - 0"	3' - 0"	20' - 0"	N/A	45 MPH OR GREATER	36.54 SQ.FT.
YIELD LINE SYMBOL	TYPE 1	1' - 0"	6"	1' - 6"	6"	LESS THAN 45 MPH	0.75 SQ.FT.
	TYPE 2	2' - 0"	1' - 0"	3' - 0"	1' - 0"	45 MPH OR GREATER	3.00 SQ.FT.
	TYPE 2	2' - 0"	1' - 0"	3' - 0"	1' - 0"	ROUNDABOUT ENTRY *	3.00 SQ.FT.

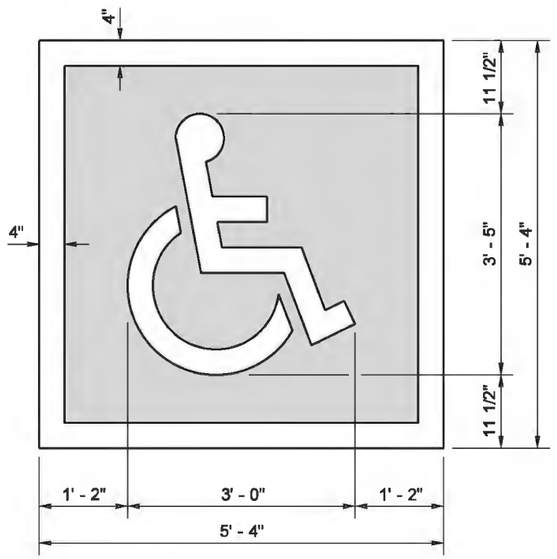
* MINIMUM OF 4 IN LANE



YIELD AHEAD SYMBOL

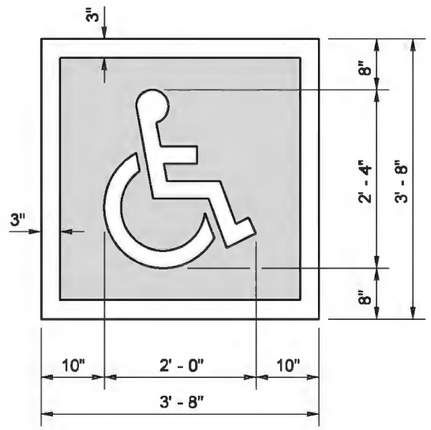


YIELD LINE SYMBOL
(MULTIPLE SYMBOLS REQUIRED FOR TRANSVERSE YIELD LINE ~ SEE CONTRACT)



TOTAL MARKING AREA = 28.44 SQ.FT.
WHITE = 9.76 SQ.FT. BLUE = 18.69 SQ.FT.

ACCESS PARKING SPACE SYMBOL (STANDARD)
WITH BLUE BACKGROUND AND WHITE BORDER
(REQUIRED FOR CEMENT CONCRETE SURFACES)



TOTAL MARKING AREA = 13.44 SQ.FT.
WHITE = 4.82 SQ.FT. BLUE = 8.62 SQ.FT.

ACCESS PARKING SPACE SYMBOL (MINIMUM)
WITH BLUE BACKGROUND AND WHITE BORDER
(REQUIRED FOR CEMENT CONCRETE SURFACES)

BRIAN J. WALSH
STATE OF WASHINGTON
36103
REGISTERED
PROFESSIONAL ENGINEER

Walsh, Brian
Jun 24 2014 2:37 PM

SYMBOL MARKINGS MISCELLANEOUS

STANDARD PLAN M-24.60-04

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION
Bakotich, Pasco
Jun 24 2014 4:43 PM
STATE DESIGN ENGINEER
Washington State Department of Transportation

Appendix C

Documents from January 11, 2016 Meeting with
King County Roads for Trail Crossing Options

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HUITT-ZOLLARS

HUITT-ZOLLARS, INC. ı 818 Stewart Street ı Suite 1120 ı Seattle, WA 98101-1479 ı 206.324.5500 phone ı 206.328.1880 fax ı huitt-zollars.com

Meeting Minutes

PROJECT: Foothills Trail LOCATION: King County – 3rd Floor

PROJECT NO.: 15-0953-03 DATE: January 11, 2016

OWNER: King County Parks TIME: 10:30 AM to 11:30 AM

PURPOSE: Discuss trail alignment and crossing options for SE Mud Mountain Road

ATTENDEES:

Name	Representing
Chris Erickson	King County Parks (Parks)
Norton Posey	King County Roads
Don Helling	Huitt-Zollars (HZ)
Gordy Simmons	HZ
Leslie-Ann Jorge	HZ

NOTES:

1) Attendee introductions
2) HZ gave an overview of the project and introduction to the SE Mud Mountain Road portion of the trail
3) HZ provided an overview of the following two potential trail crossing locations on SE Mud Mountain Road
    a. Crossing location near the midpoint of east curve along SE Mud Mountain Road around
    b. Crossing location at tangent between east and west curves on SE Mud Mountain Road

   HZ briefly went over the major considerations for each crossing location option (sight distance, impacts to existing conditions, etc.)
4) Norton explained that the approval of a trail crossing location and the pedestrian crossing system to be used will depend on the traffic volume, in addition to the topography of the site.
5) Discussion occurred regarding rectangular rapid flashing beacons (RRFB)
    a. Norton stated that not many RRFB's have been installed on King County roads; they are currently not overused on roads.

   b. Although advance warning signage would be required for a “Trail Crossing Ahead”, additional mitigation measures could be taken to increase driver awareness to the upcoming trail crossing, such as advance flashing beacons.
6) It was stated that solar-powered RRFB’s are not currently used by King County Roads.
7) Review of the two options
   a. Norton noted that both crossing options are possible/potentially acceptable. He agreed that many factors were considered in the design of the alternatives as far as traffic and pedestrian safety. As long as grading is taken to the maximum extent feasible in an attempt to meet the minimum stopping sight distances, a design variance may be needed in the event that the minimum is still not met.
   b. A pedestrian-activated signal will likely be provided for either option, as well as an advance warning system that increases safety for pedestrians and drivers considering the topography of the road.
   c. Norton will review the concepts internally with KC Roads and provide comments to Chris, so that the comments may be incorporated into the Route Options Review Report and 60% design.
8) Driveway conditions
   a. Crossing location #1 (Near midpoint curve)
      i. Results in removing the existing northern driveway access and allowing the southern driveway access to remain.
      ii. KC Roads would have to review the existing driveway conditions before approving its use for both entering and exiting the properties to be acceptable.
      iii. After looking at photos of the driveway, Norton stated that it appears the southern driveway may have enough room for cars to make desired turns to and from SE Mud Mountain Road and the properties.
   b. Crossing location #2 (Near tangent of both curves)
      i. Results in removal of both existing driveways
      ii. Provides a single, joint-use driveway

FOLLOW UP: to be done, what, who, when, etc.

1) HZ to send Norton electronic (PDF) copies of the handouts and exhibits provided at the meeting today.
2) Norton to route the trail crossing concerns and handouts within King County Roads, and meet internally to discuss the options and provide Parks/HZ with comments to be incorporated into the design and report.


SE 468th Way
SE 468th St
SE 469th St
SE 470th St
Enumclaw Buckley Rd
248th Ave SE
241st Ave SE
SE 471st St
SE 473rd St
SE Mud Mountain Rd
© 2015 Google
Google earth
Imagery Date: 4/19/2015 47°10'41.95" N 122°00'59.16" W elev 718 ft eye alt 4718 ft


5/2009
Image U.S. Geological Survey
Google earth
1994
Imagery Date: 4/30/2009 47°10'38.66" N 122°00'59.32" W elev 667 ft eye alt 2246 ft

KC ROADS PROPERTY

MCPHERSON PROPERTY

KC PARKS PROPERTY

SE MUD MOUNTAIN ROAD

STATE ROUTE 410

N

Date: Jan 11, 2016 8:19:14 AM
Drawing: J:\15095301 FOOTHILLS TRAIL\11_DESIGN_CAD\EXHIBITS\20160108-SE MMR CROSSING OPTIONS 2.DWG

HUITT-ZOLLARS

SE MUD MOUNTAIN ROAD
CROSSING LOCATION 1

EXHIBIT NUMBER:
EX-1

KC ROADS PROPERTY

MCPHERSON PROPERTY

KC PARKS PROPERTY

SE MUD MOUNTAIN ROAD

STATE ROUTE 410

N

Date: Jan 11, 2016 8:32:14 AM
Drawing: J:\15095301 FOOTHILLS TRAIL\11_DESIGN_CAD\EXHIBITS\20160108-SE MMR CROSSING OPTIONS 2.DWG

HUITT-ZOLLARS

SE MUD MOUNTAIN ROAD
CROSSING LOCATION 2

EXHIBIT NUMBER:
EX-2

MCPHERSON PROPERTY

SE MUD MOUNTAIN ROAD

EXISTING JOINT-USE DRIVEWAY TO REMAIN

PROPERTY LINE

EXISTING DRIVEWAY

KC PARKS PROPERTY

EXISTING HOUSE

EXISTING SWIMMING POOL

EXISTING TENNIS COURT

KC ROADS PROPERTY

HANSEN PROPERTY

REMOVE EXISTING DRIVEWAY AND REPLACE AREA WITH TRAIL IMPROVEMENTS

24" COTTONWOOD

24" FIR

UTILITY POLE W/ UNDERGROUND POWER & METERS

ROCKERY

DOUBLE YELLOW LINES

FOG LINE

DITCH

CURVE AHEAD 15 MPH

CURVE AHEAD 25 MPH

DIRECTION

PP W/ OH COMM

PP

SCALE (IN FEET)
0 10 20 40

Date: Jan 11, 2016 8:55:02 AM
Drawing: J:\15095301 FOOTHILLS TRAIL\11_DESIGN_CAD\EXHIBITS\SE MUD MOUNTAIN ROAD\20160108-SE MMR CROSSING OPTIONS.DWG

HUITT-ZOLLARS

SE MUD MOUNTAIN ROAD
CROSSING LOCATION 1

EXHIBIT NUMBER:
EX-1A

STOPPING SIGHT DISTANCE			
DESIGN SPEED	GRADE		
	0-3%	-8.2%	+8.2%
25 MPH	155 FT	170 FT	141 FT
30 MPH	200 FT	224 FT	181 FT
35 MPH	250 FT	282 FT	224 FT

POSTED SPEED LIMIT: 25 MPH

SE MUD MOUNTAIN ROAD

MINIMUM AND AVAILABLE
STOPPING SIGHT DISTANCE = 224 FT
(35 MPH, +8.2% GRADE)

EXISTING CONDITIONS

PROPOSED LINE OF
SIGHT CLEAR ZONE

MINIMUM STOPPING
SIGHT DISTANCE = 250 FT
(35 MPH, 0-3% GRADE)

AVAILABLE STOPPING
SIGHT DISTANCE = 346 FT

SCALE (IN FEET)
0 10 20 40

Date: Jan 11, 2016 8:18:00 AM
Drawing: J:\15095301 FOOTHILLS TRAIL\11_DESIGN_CAD\EXHIBITS\SE MUD MOUNTAIN ROAD\20160108-SE MMR CROSSING OPTIONS.DWG

HUITT-ZOLLARS

SE MUD MOUNTAIN ROAD
CROSSING LOCATION 1
SIGHT DISTANCE

EXHIBIT NUMBER:
EX-1B

SE MUD MOUNTAIN ROAD

MCPHERSON PROPERTY

REMOVE EXISTING DRIVEWAY
AND REPLACE AREA WITH
TRAIL IMPROVEMENTS

PROPERTY LINE

KC PARKS PROPERTY

EXISTING DRIVEWAY

EXISTING
HOUSE

EXISTING
SWIMMING
POOL

EXISTING
TENNIS
COURT

KC ROADS PROPERTY

HANSEN PROPERTY

RELOCATED JOINT-USE
DRIVEWAY IMPROVEMENTS

TRAIL IMPROVEMENTS

REMOVE EXISTING DRIVEWAY

SE 473 ST
PRIVATE ROAD

DITCH

CURVE AHEAD
25 MPH

PP W/ OH COMM

DIRECTION

DOUBLE YELLOW LINES

ROCKERY

FOG LINE

CURVE AHEAD
15 MPH

DIRECTION
15 MPH

UTILITY POLE
W/UNDERGROUND
POWER & METERS

24" COTTONWOOD

24" FIR

WETLAND
AREA A

WETLAND
AREA B

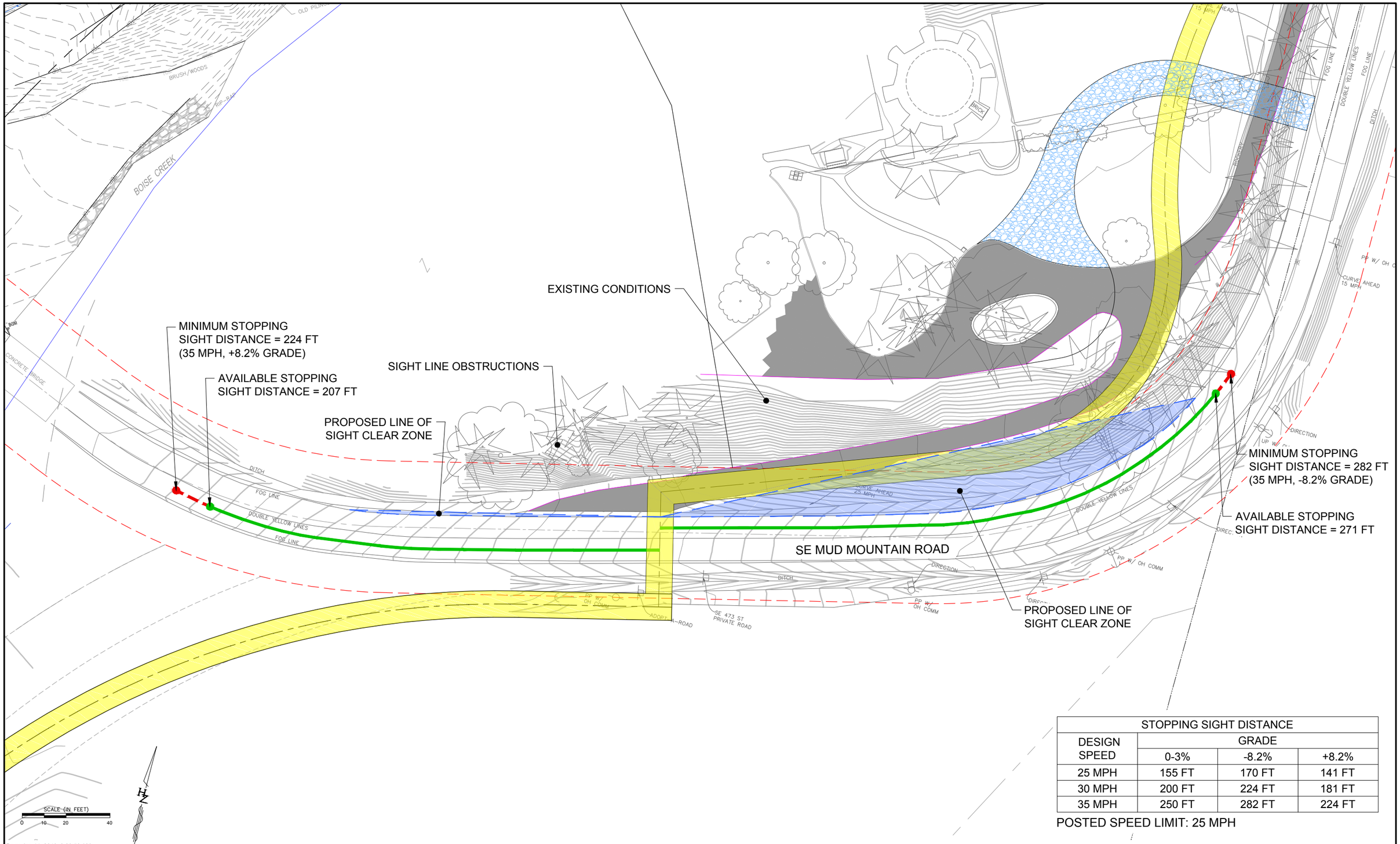
SCALE (IN FEET)
0 10 20 40

Date: Jan 11, 2016 8:56:14 AM
Drawing: J:\15095301 FOOTHILLS TRAIL\11_DESIGN_CAD\EXHIBITS\SE MUD MOUNTAIN ROAD\20160108-SE MMR CROSSING OPTIONS.DWG

HUITT-ZOLLARS

SE MUD MOUNTAIN ROAD
CROSSING LOCATION 2

EXHIBIT NUMBER:
EX-2A



STOPPING SIGHT DISTANCE			
DESIGN SPEED	GRADE		
	0-3%	-8.2%	+8.2%
25 MPH	155 FT	170 FT	141 FT
30 MPH	200 FT	224 FT	181 FT
35 MPH	250 FT	282 FT	224 FT

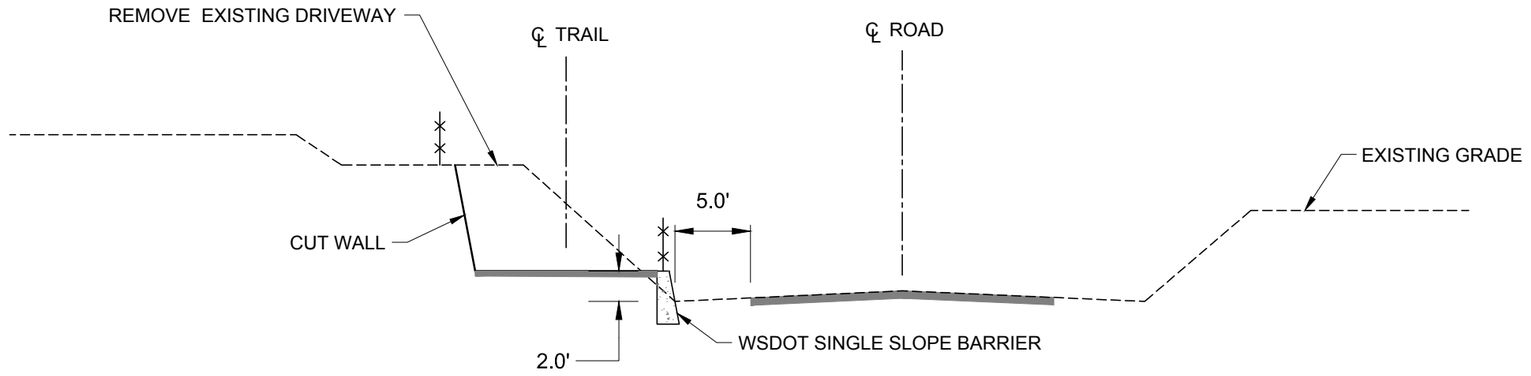
POSTED SPEED LIMIT: 25 MPH

Date: Jan 11, 2016 8:20:53 AM
Drawing: J:\15095301 FOOTHILLS TRAIL\11_DESIGN_CAD\EXHIBITS\SE MUD MOUNTAIN ROAD\20160108-SE MMR CROSSING OPTIONS.DWG

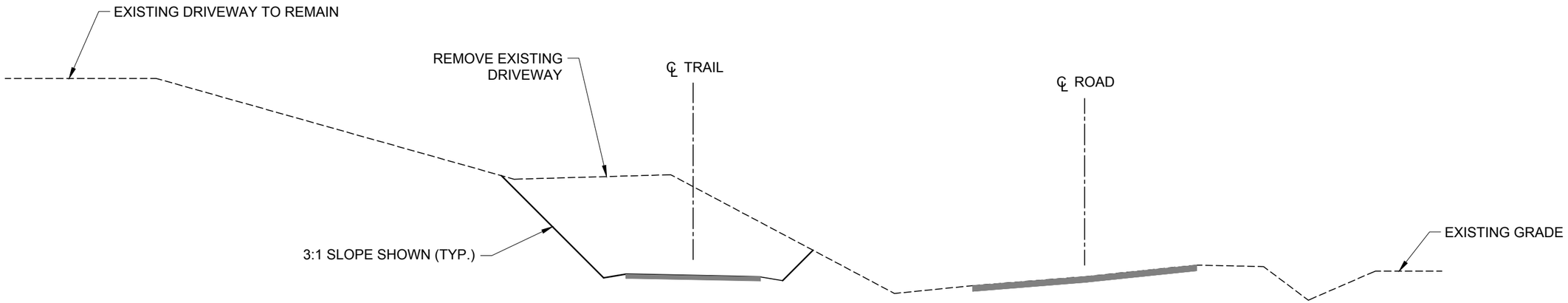
HUITT-ZOLLARS

SE MUD MOUNTAIN ROAD
CROSSING LOCATION 2
SIGHT DISTANCE

EXHIBIT NUMBER:
EX-2B



SECTION 1



SECTION 2

N

SCALE (IN FEET)
0 10 20 40

Date: Jan 11, 2016 8:48:32 AM
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HUITT-ZOLLARS

SE MUD MOUNTAIN ROAD
CROSSING SECTIONS

EXHIBIT NUMBER:
EX-1&2 C

Appendix D

King County Parks (Formerly Nagel) Property Information
McPherson (formerly Henry) Driveway Easement
KC Parks Septic System Field Report

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McPherson (Formerly Henry) Driveway Easement

84/10/04 [illegible]

RECD F 5.00
CNSHSL 5.00
11

AGREEMENT ON EASEMENT

8410040723

THIS AGREEMENT, made and entered into this 28th day of August, 1984, by and between DONNA J. DURGIN, who acquired title as her separate estate as DONNA J. NAGEL, hereinafter designated "First Party", and KENNETH GAZE and BARBARA GAZE, his wife, hereinafter designated "Second Parties".

WITNESSETH:

WHEREAS, There is a certain easement for 10 foot road across the property of First Party, which road is used for the property of First Party and for the property of Second Parties, as described herein, which easement is referred to by numerous instruments, being instruments under Auditor's File Nos. 3628582, 3764315, 3863650, and 5481884, and possible other instruments effecting properties herein, and

WHEREAS, It is the desire and intention herein to cancel present easement as same exists and establishing an easement for the benefit of First Party's property and Second Parties' property, as hereinafter stated.

NOW, THEREFORE, in consideration of mutual benefits and conditions herein contained, it is hereby agreed by and between the parties, for themselves, their heirs and assigns, as follows;

1. There is hereby established a non-exclusive easement for ingress and egress, over and across a strip of land 10.00 feet in width located in the SE¼ of Section 34, Township 20 North, Range 6 EWM, in King County, Washington. The centerline of said strip described as follows: Beginning at the East ¼ corner of said Section 34; thence, South 0°55'11" East, along the East line of said section, a distance of 457.33 feet; thence, South 89°04'48" West, a distance of 176.38 feet to a point on the Northwesterly margin of the County Road known as S.E. Mud Mountain Road and the true point of beginning; thence, North 62°11'48" East, a distance of 74.92 feet to a point of curvature; thence, on a curve to the left having a radius of 135.69 feet, a central angle of 30°48'07", an arc length of 72.95 feet to a point of compound curvature; thence, on a curve to the left having a radius of 75.70 feet, a central angle of 47°25'54", an arc length of 62.67 feet to a point of tangency; thence, South 73°26'29" West, a distance of 118.25 feet, more or less, to a point on the Southwesterly line of a tract of land described in an instrument recorded under Recording Number 5481884 and the terminus of this easement.

2. This easement is, as stated, non-exclusive, and is for the benefit of First Party's property as same runs across First Party's property, yet remaining of property acquired under deed under Auditor's File No. 5481884, and for Second Parties' property as being the following, to-wit:

That portion of the NE¼ of the SE¼ of Section 34, Township 20 North, Range 6 EWM, in King County, Washington, lying Southerly of the NPRR right of way, Northerly of the Buckley Bridge County Road, and Westerly of the following described line: Beg. at a point of intersection of the Southeasterly line of NPRR Co. right of way with the West line of a privace gravel road said

pt. of intersection 145 ft. South and 40 ft. West of the ¼ Section corner of the NE corner of said NE¼ of the SE¼; th. S along the said W line of the private gravel road 125 ft. to a pt. of curve; th. continuing along said road on a curve to the right with a radius of 53 ft. through a central angle of 68°, a distance of 62.90 ft. to a pt. of tangency; th. continuing along said road S 68°00' W 46.2 ft. to a pt. of curve; th. continuing along said road on a curve to the left with a radius of 78.5 feet through a central angle of 35°20' a distance of 48.51 ft. to a pt. of reverse curve; th. continuing along said road on a curve to the right with a radius of 32.9 ft. through a central angle of 117°04' a distance of 67.22 ft. to a pt. of tangency; th. continuing along said road N 30°16' W 32.6 ft. to a pt. of curve; th. continuing along said road on an irregular curve to the left, a distance of 70.7 ft. to a pt. 10 ft. N of the end of a concrete wall used as a landmark (said distance of 70.7 ft. being measured along 10 foot chords, with deflections as follows: all from the P.C. of said curve; first 10 ft. chord, 10°15'; second 10 ft. chord, 16°10'; third 10 ft. chord, 21°15'; fourth 10 ft. chord, 26°20'; fifth 10 ft. chord, 31°34'; sixth 10 ft. chord, 37°00'; seventh 10 ft. chord, 42°13', and a final chord 0.7 feet, 42°30'; th. S 10 ft. to end of said concrete wall used as a landmark; thence N 24°00' W along a wire fence now in place, and continuing beyond sd. fence N 24°00' W to the Southerly line of said RR right of way and the true point of beginning; th. S 24°00' East to the Northerly margin of said County Road and the terminus of said line. TOGETHER WITH an undivided one-half interest in that certain 10 foot gravel road described in instruments recorded under Auditor's File Nos. 3628582, 3764315 and 3863650.

8410040728

3. It is further agreed that the parties hereto shall share equally the costs of maintaining and improving the roadway situate upon the aforementioned easement, except that if any repairs necessary as the result of damage other than ordinary usage, the costs of repairs shall be borne by the party causing said damage.

4. This agreement shall be considered an encumbrance running with the land and shall be binding upon and inure to the benefit of their respective heirs, successors and assigns.

5. That said 10 foot gravel road easement referred to in other instruments herein and any other instrument that might be applicable thereto is hereby declared cancelled in all respects.

WITNESS the hands of the parties this the day and year first above written.

Donna J. Durgin
DONNA J. DURGIN

KENNETH GAZE

Barbara Gaze
BARBARA GAZE

STATE OF WASHINGTON)
) ss.
COUNTY OF KING)

On this day personally appeared before me DONNA J. DURGIN, to me known to be the individual(s) described in and who executed the within and foregoing instrument, and acknowledged that she signed the same as her free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal this 31 day of August, 1984.

Sheila R. Lindsay
NOTARY PUBLIC for Washington
residing at Enumclaw

8410040728

STATE OF WASHINGTON)
) ss.
COUNTY OF KING)

On this day personally appeared before me KENNETH GAZE and BARBARA GAZE, his wife, to me known to be the individual(s) described in and who executed the within and foregoing instrument, and acknowledged that they signed the same as their free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal this 25th day of September, 1984.

Nancy M. Edwards
NOTARY PUBLIC for Washington
residing at Kirkland

8411040729

Return to:
Donna Durgin
24324 SE 473rd St.
Enumclaw, WA 98022

FILED for Record at Request of

KC Parks Property
Septic System Field Report

Jorge, Leslie-Ann

From: Simmons, Gordy
Sent: Friday, February 05, 2016 10:46 AM
To: Jorge, Leslie-Ann
Cc: Ly, Viet
Subject: FW: Enumclaw Foothills Neagle Property
Attachments: neagle septic 1.jpg; septic tank lid viewed from back door.jpg; septic tank lid.jpg; septic tank and drainfield back of house.jpg; drainfield north of walkway.jpg

fyi

From: Erickson, Chris [mailto:Chris.Erickson@kingcounty.gov]
Sent: Friday, February 05, 2016 10:24 AM
To: Simmons, Gordy <GSimmons@Huitt-Zollars.com>; Helling, Don <DHelling@Huitt-Zollars.com>
Subject: FW: Enumclaw Foothills Neagle Property

Hi Don and Gordy… FYI on the Neagle septic drainfield location. It appears that we are in the clear.

Chris Erickson | Project Manager | King County DNRP
Parks Division | CIP Unit
201 South Jackson Street, #700, Seattle, WA 98104
PH: 206-477-4564 | CL: 425-931-6319 | FX: 206-263-6217

From: Sizemore, David
Sent: Friday, February 05, 2016 10:17 AM
To: Erickson, Chris
Subject: Enumclaw Foothills Neagle Property

The septic tank and drainfield have been found.

The septic tank in in the concrete walkway at the back side of the house (above Boise Creek).
It is near the back door.

The drainfield is about 5 feet away directly north just past the walkway towards Boise Creek from the septic tank.
The drain field pipes only run about 3 feet east and 3 feet west.

The drainfield is not under the tennis courts or in the grass field at the front of the house.

Dave Sizemore
206-391-7682

King County iMap

Date: 2/5/2016 Notes:

King County
GIS Center