APPENDIX D

2023 Mission Ridge Expansion - Secondary Access Report

2023 Analysis of 5 Secondary Road Options to Mission Ridge Ski and Board Resort

APPENDIX D - Secondary Access Road Reports

2023 Mission Ridge Expansion - Secondary Access Report

AEGIS Engineering

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Mill Creek, WA 98012-6366
www.AEGISengineering.com
phone 425.745.4700

January 20, 2023

Via E-Mail: jjorgensen@missionridge.com

Josh Jorgenson
Mission Ridge Resort, Inc.
7500 Mission Ridge Road
PO Box 1668
Wenatchee, WA 98807-1668

MISSION RIDGE EXPANSION
SECONDARY ACCESS – REVIEW OF OPTIONS

Dear Josh,

AEGIS Engineering has been retained to provide Mission Ridge Resort, Inc. ("Client") with fire protection engineering consulting services ("Services") regarding development of an expansion adjacent to the existing Mission Ridge Ski and Board Resort located at 7500 Mission Ridge Road in Wenatchee, Washington.

PROJECT CONDITIONS

The existing Mission Ridge Ski Resort (Resort) is provided a single route of access from South Wenatchee via Squilchuck Rd and Mission Ridge Rd. With the Mission Ridge Expansion (MRE) project area located near the Resort, consideration of secondary access provisions is required.

The project is subject to the Chelan County Code (CCC). Section 15.30.230(4) of CCC requires projects with more than 400 average daily traffic (ADT) address secondary access. Subsection A applies to development where secondary access and/or interconnectivity is possible. Subsection B addresses design criteria where secondary access within the development is not practical.

This document has been prepared by AEGIS Engineering to assess the secondary access options identified within the EcoSign study, and refers to our Fire Protection Plan, dated December 7, 2019.

SECONDARY ACCESS OPTIONS

EcoSign has prepared a study, received December 15, 2022 (attached), identifying five routes that could provide secondary access for the MRE project area, together with commentary on the feasibility of these routes. Routes are illustrated in Figure 1 below.

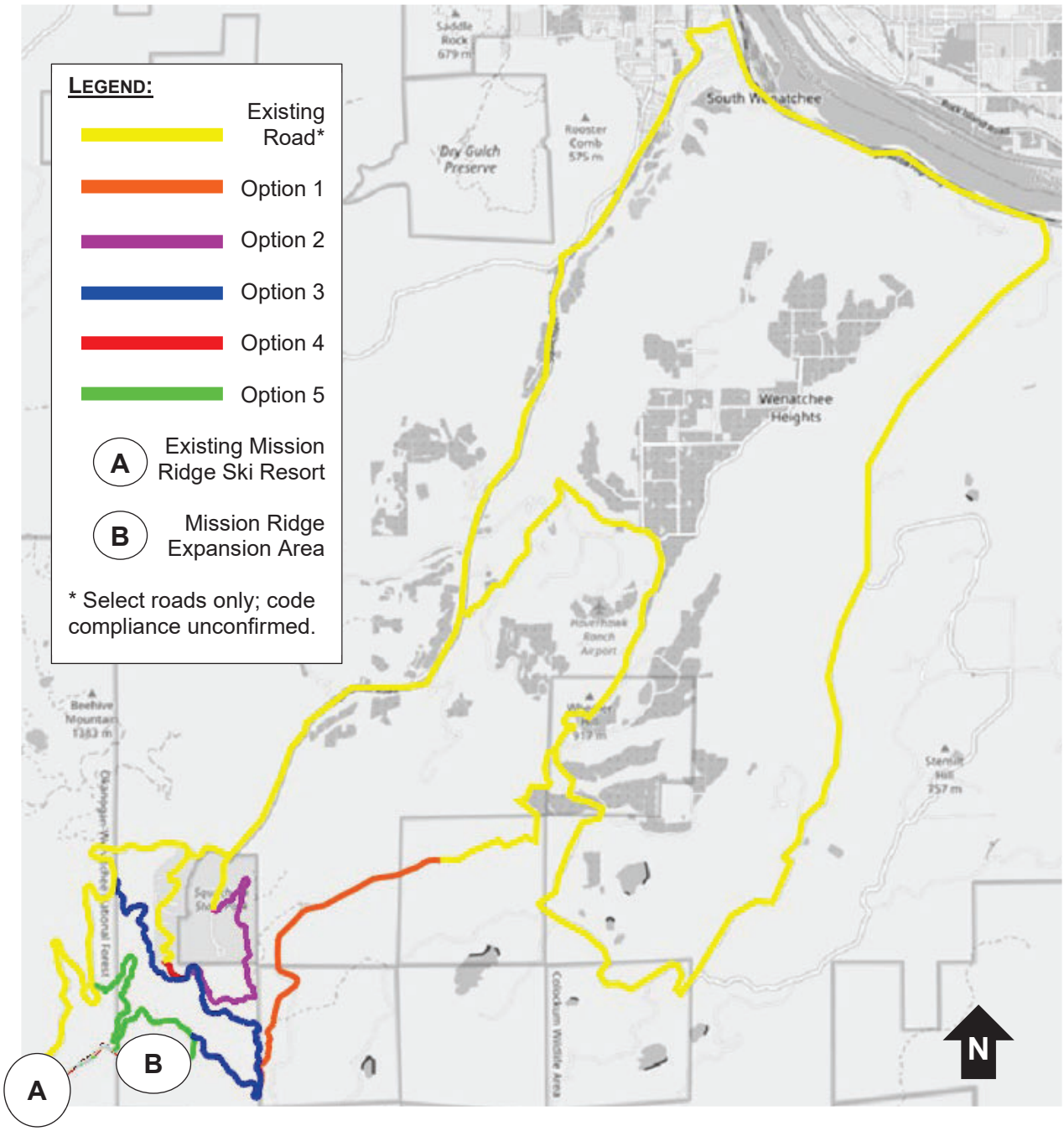


FIGURE 1: *ILLUSTRATION OF SECONDARY ROAD OPTIONS*
NOT TO SCALE

A summary of the study by EcoSign is presented in Table 1 below:

OPTION	ALIGNMENT	MAXIMUM GRADE	EARTHWORK (CU.YD.)	ECOSIGN CONCLUSION
Option 1	3.3 miles of new road that traverses property owned by others, including State of Washington.	12%	Over 79,000	*Practical?* No. Large imbalance of cut/fill earthwork (hauling about 60,000 cu.yd. excess cut). *Within the development?* No. Relies upon use of land (owned by others) outside of the development.
Option 2	4.0 miles of new road that traverses property owned by others, including State of Washington.	12%	Over 212,000	*Practical?* No. Substantial earthwork imbalance (hauling about 165,000 cu.yd. excess cut). *Within the development?* No. Relies upon use of land (owned by others) outside of the development.
Option 3	3.3 miles of new road that traverses property owned by others.	10%	Over 392,000	*Practical?* No. Extreme earthwork imbalance (hauling about 291,000 cu.yd. excess cut). *Within the development?* No. Relies upon use of land (owned by others) outside of the development.
Option 4	2.4 miles of new road that traverses property owned by others.	20%	Over 10,000	*Practical?* No. Excessive grade and earthwork (hauling about 9,000 cu.yd. excess cut). *Within the development?* No. Relies upon use of land (owned by others) outside of the development.
Options 5A & 5B	2.1 miles of new road along steep cross slopes.	10%	Over 196,000	*Practical?* No. Substantial earthwork imbalance (hauling about 153,000 cu.yd. excess cut). *Within the development?* No. Expands boundary of proposed development area.

TABLE 1: *SUMMARY OF ECOSIGN FINDINGS OF SECONDARY ROAD OPTIONS*

As indicated in the table above, secondary access within the development of the MRE project area is unreasonable and impractical for a combination of the following reasons:

- Road alignments traverse property owned by others (including State land).
- Construction of roads would require significant amounts of tree and vegetation removal, as well as substantial earthwork.

In addition to these findings from EcoSign, we understand the intent of the secondary access is to maintain ingress and egress routes in the event one route is blocked. However, only Option 1 offers a separate and distinct route, the other four options merely create larger loops at the end of Squilchuck Road.

With Option 1, after 3.3 miles of new road, this route is shown to join an extension of Upper Wheeler Road on State-owned land. From that intersection down to Loop Road, the existing 1.65 miles of the road is unpaved and appears to involve at least one turn with an inside radius of less than 20 feet. Therefore, we find the route as presented in Option 1 would not achieve code compliance.

ALLOWANCES

Based on the findings described above, consistent with CCC Section 15.30.230(4)(B), we find secondary access is not practical. Additionally, given the unusual circumstances of the site, such as the remoteness of the development and extreme terrain, no logical location for access for future connectivity with a surrounding property is apparent. Therefore, consistent with CCC Section 15.30.230(4)(B), interconnectivity is not provided, and Section 15.30.230(4)(A) should not apply.

Additionally, CCC Section 15.30.100 recognizes the prescribed standards indicate “appropriate practice under most conditions,” and allows deviations to prescribed criteria for “alternative solutions to real world situations.” As referenced in CCC 15.30.100(4):

> It is fully expected that creative engineering will continue to take place. Situations will present themselves where deviations may be preferred to allow conformance with existing conditions, to overcome adverse topography or to allow for more affordable solutions without adversely affecting safety, function, appearance, emergency vehicle response, and maintainability. These standards are intended to provide predictability yet still allow for the flexibility necessary for innovation.

AEGIS Engineering’s Fire Protection Report outlines a creative engineering approach for protection of the MRE project area which should be considered as an acceptable substitute to strict compliance with CCC Section 15.30.230, given the adverse topography present within and around the development.

AEGIS Engineering's Fire Protection Report presents a combination of prescriptive and performance-based elements, including features which exceed the level of safety prescribed by the code. Through the report, consistent with CCC Section 15.30.100(2), it is demonstrated that the subject fire protection strategy should meet the level of safety prescribed without adversely affecting safety, maintainability, or aesthetics.

CONCLUSION

AEGIS Engineering has reviewed the summary provided by EcoSign with respect to secondary access options for the MRE project area. Based on our review, we concur that providing for secondary access within the development is unreasonable and impractical. Accordingly, CCC Section 15.30.230(4)(A) should not be applicable. Further, as accommodated in CCC Section 15.30.100, the Fire Protection Report prepared by AEGIS Engineering should be considered toward assessment of code compliance with the MRE.

Please contact Brian Thompson by e-mail at BrianT@AEGISengineering.com or at 425.745.4700 for any clarification of the information presented in this document.

Prepared by,

AEGIS ENGINEERING

Grant Lilly, EIT-MD
Fire Protection Associate II

Reviewed By,

AEGIS ENGINEERING

Brian C. Thompson, P.E.
Principal

BRIAN C. THOMPSON
STATE OF WASHINGTON
41425
REGISTERED
PROFESSIONAL ENGINEER

Digitally signed by Brian C Thompson
DN: cn=Brian C Thompson, o=AEGIS Engineering, ou=Principal, email=briant@aegisengineering.com, c=US
Date: 2023.01.20 09:20:17 -08'00'

APPENDIX D

2023 Analysis of 5 Secondary Road Options to Mission Ridge Ski and Board Resort

ecosign
Mountain Resort Planners Ltd.

With Ecosign Analysis of 5 Secondary Road Options to Mission Ridge Ski and Board Resort

Introduction

Ecosign has been asked by Mission Ridge Ski and Board Resort to provide a review and analysis of 5 secondary road options for ingress / egress to their proposed future development site**.** The primary goal of this analysis is to determine whether these proposed routes are reasonable or practical while considering potential construction cost and overall impact of each alignment. This analysis is based off draft profiles, alignments, and earthworks estimation of the 5 road Options supplied by Torrence Engineering LLC which have been appended. For this analysis, Ecosign has referenced the following definitions of reasonable and practical which will be used throughout this analysis:

Meriam-Webster
https://www.merriam-webster.com/dictionary/practical
https://www.merriam-webster.com/dictionary/reasonable

Reasonable adjective

1a: being in accordance with reason
a *reasonable* theory
b: not extreme or excessive
reasonable requests
c: MODERATE, **FAIR**
a *reasonable* chance
a *reasonable* price
d: INEXPENSIVE

2a: having the faculty of reason
b: possessing sound judgment
a *reasonable* man

Practical adjective

1a: of, relating to, or manifested in practice or action: not theoretical or ideal
a *practical* question
for all *practical* purposes
b: being such in practice or effect: **VIRTUAL**
a *practical* failure

2: actively engaged in some course of action or occupation
a *practical* farmer

3: capable of being put to use or account: **USEFUL**
he had a *practical* knowledge of French

4a: disposed to action as opposed to speculation or abstraction
b (1): qualified by practice or practical training
a good *practical* mechanic
(2): designed to supplement theoretical training by experience

5: concerned with voluntary action and ethical decisions
practical reason

Design Criteria:

As supplied by the client, the minimum design criteria for the access route options are as follows: The road must be twenty-eight feet wide, paved, have a maximum slope of 8-12% and be open and maintained all year.

Route Option 1:

Alignment:

This proposed route option approaches the future development site from the east and follows the existing alignment of Wheeler Ridge Road. The upper portion of the access route links onto upper Route 3 for the remainder of the approach to site. In total, this access route option requires ~3.3 miles of refurbished and newly constructed road. The alignment is physically the most divergent relative to the existing access road, and therefore provides the largest physical separation / redundancy from a fire escape perspective. As this option minimizes impact by following the existing alignment of Wheeler Creek Rd for that majority of its length, Ecosign rates the alignment of Route Option 1 as Reasonable and Practical. However, the alignment travels through adjacent properties owned by Wheeler Ridge LLC and WDWF. As ownership of the land is not controlled by Mission Ridge, it is Unreasonable and Impractical to consider this alignment.

Profile:

In general, the profile of Route Option 1 conforms to the design criteria. This route has a maximum slope of 12% and conforms to natural gradients. Since this profile conforms well to natural ground and avoids excessive steep grades, Ecosign rates the profile of Route Option 1 as Reasonable and Practical.

Earthworks:

Route Option 1 requires total estimated earthworks of 69,453 yd^3 cut and 9,927 yd^3 fill, leaving a net surplus of 59,527 yd^3 material to be trucked off-site. Due to the large excess of material to be removed from site, Ecosign rates the earthworks of Route Option 1 as Unreasonable and Impractical.

Route Option 2:

Alignment:

This proposed route option approaches the future development site from the north and traverses' steep cross slopes through Squilchuck State Park. The upper portion of the access route links onto upper Route 3 for the remainder of the approach to site. In total, this access route option requires ~4.0 miles of newly constructed road. As this option traverses very steep terrain and disturbs land within Squilchuck State Park, Ecosign rates the alignment of Route Option 2 as Unreasonable and Impractical.

Profile:

In general, the profile of Route Option 2 conforms to the design criteria. This route has a maximum slope of 12% and conforms to natural gradients, except for some deep cuts at the switchback turn onto upper Route 3. Since this profile conforms mostly well to natural ground and avoids excessive steep grades, Ecosign rates the profile of Route Option 2 as Reasonable and Practical.

Earthworks:

Route Option 2 requires total estimated earthworks of 188,375 yd^3 cut and 23,707 yd^3 fill, leaving a net surplus of 164,668 yd^3 material to be trucked off-site. Due to the large cut volumes and excess of material to be removed from site, Ecosign rates the earthworks of Route Option 2 as Unreasonable and Impractical.

Route Option 3:

Alignment:

This proposed route option approaches the future development site from the northwest and traverses' steep cross slopes, especially along the mid portion of the route. The alignment also encroaches very close to existing properties on Forest Ridge Drive. In total, this access route option requires ~3.3 miles of newly constructed road. As this option traverses very steep terrain and encroaches on properties off Forest Ridge Drive, Ecosign rates the alignment of Route Option 3 as Unreasonable and Impractical.

Profile:

In general, the profile of Route Option 3 conforms to the design criteria. This route has a maximum slope of 10% and conforms to natural gradients. Since this profile conforms mostly well to natural ground and avoids excessive steep grades, Ecosign rates the profile of Route Option 3 as Reasonable and Practical.

Earthworks:

Route Option 3 requires total estimated earthworks of 342,029 yd^3 cut and 50,613 yd^3 fill, leaving a net surplus of 291,415 yd^3 material to be trucked off-site. Due to the large cut volumes and excess of material to be removed from site, Ecosign rates the earthworks of Route Option 3 as Unreasonable and Impractical.

Route Option 4:

Alignment:

This proposed route option is a short connector road which branches off Forest Ridge Drive and connects into the upper half of Route 3. This route traverses directly through at least one existing private property at the top of Forest Ridge Drive. In total, this access route option requires ~2.4 miles of newly constructed road. As this option directs traffic through an existing subdivision and traverses directly through an existing private property

off Forest Ridge Drive, Ecosign rates the alignment of Route Option 4 as Unreasonable and Impractical.

Profile:

The profile of Route Option 4 does not conform to the design criteria. This route has a maximum slope of 20% for ~700 ft length. Since this profile does not conform to the design criteria, Ecosign rates the profile of Route Option 4 as Unreasonable and Impractical.

Earthworks:

Route Option 4 requires total estimated earthworks of 10,272 yd^3 cut and 445 yd^3 fill, leaving a net surplus of 9,927 yd^3 material to be trucked off-site. In addition, approximately half of the earthworks for Route 3 will be required to reach the site. Due to the large cut volumes and excess of material to be removed from site, Ecosign rates the earthworks of Route Option 4 as Unreasonable and Impractical.

Route Option 5A & 5B:

Alignments:

Route Option 5A is a shortened Route which branches off the proposed development access road, this alignment serves little purpose as a redundant fire egress Route and is therefore rated as Unreasonable and Impractical

The 5B proposed Route Option branches west from Mission Ridge Rd just before the "Hairpin" turn and traverses' steep cross slopes for most of its length. In total, this access route option requires ~2.1 miles of newly constructed road. Option 5B also provides the least amount of fire egress redundancy or alternative emergency access / ingress, as Route Options 5A and 5B require most of the travel to occur along the existing Mission Ridge Road. Furthermore, this option traverses very steep terrain for most of its length. For these reasons, Ecosign rates the alignment of Route Option 5B as Unreasonable and Impractical.

Profile:

In general, the profile of Route Option 5A and 5B conform to the design criteria. These routes have a maximum slope of 10% and conform to natural gradients. Since this profiles conform mostly well to natural ground and avoid excessive steep grades, Ecosign rates the profiles of Route Option 5A and 5B as Reasonable and Practical.

Earthworks:

Route Option 5A and 5B require total estimated earthworks of 174,691 yd^3 cut and 21,413 yd^3 fill, leaving a net surplus of 153,279 yd^3 material to be trucked off-site. Due to

the large cut volumes and excess of material to be removed from site, Ecosign rates the earthworks of Route Option 5A and 5B as Unreasonable and Impractical.

Conclusion

Through our analysis we have found that each of the 5 route options have some portion of their design, be it alignment, profile and/or earthworks which makes them Unreasonable and Impractical due to land ownership issues, cost of construction, non-conformity to design criteria, overall impact, or lack of providing a meaningful secondary emergency ingress- egress Route. It is therefore our recommendation that the project be permitted in accordance with the Chelan County Code with a single access, using the existing Mission Ridge Road as the single route of ingress-egress to and from the proposed development site.

Mission Ridge Rd.

Squilchuck Rd.

State Parks

Scout A Vista Scout Camp

Squilchuck State Park

Upper Wheeler Rd.

ROUTE OPTION 1

Forest Ridge Dr.

Mission Ridge Rd.

ROUTE OPTION 3

ROUTE OPTION 2

Wheeler Ridge LLC

ROUTE OPTION 4

ROUTE OPTION 5

Tamarack Saddle

WDWF

Mission Ridge Ski Area

MISSION RIDGE
SKI & BOARD RESORT

ecosign
Mountain Resort Planners Ltd.
Box 63 Whistler, B.C. Canada V0N 1B0 (604)932-5976 Fax:(604)932-1897
www.ecosign.com info@ecosign.com

Contour Interval: 25 ft

Date: 10/21/2022

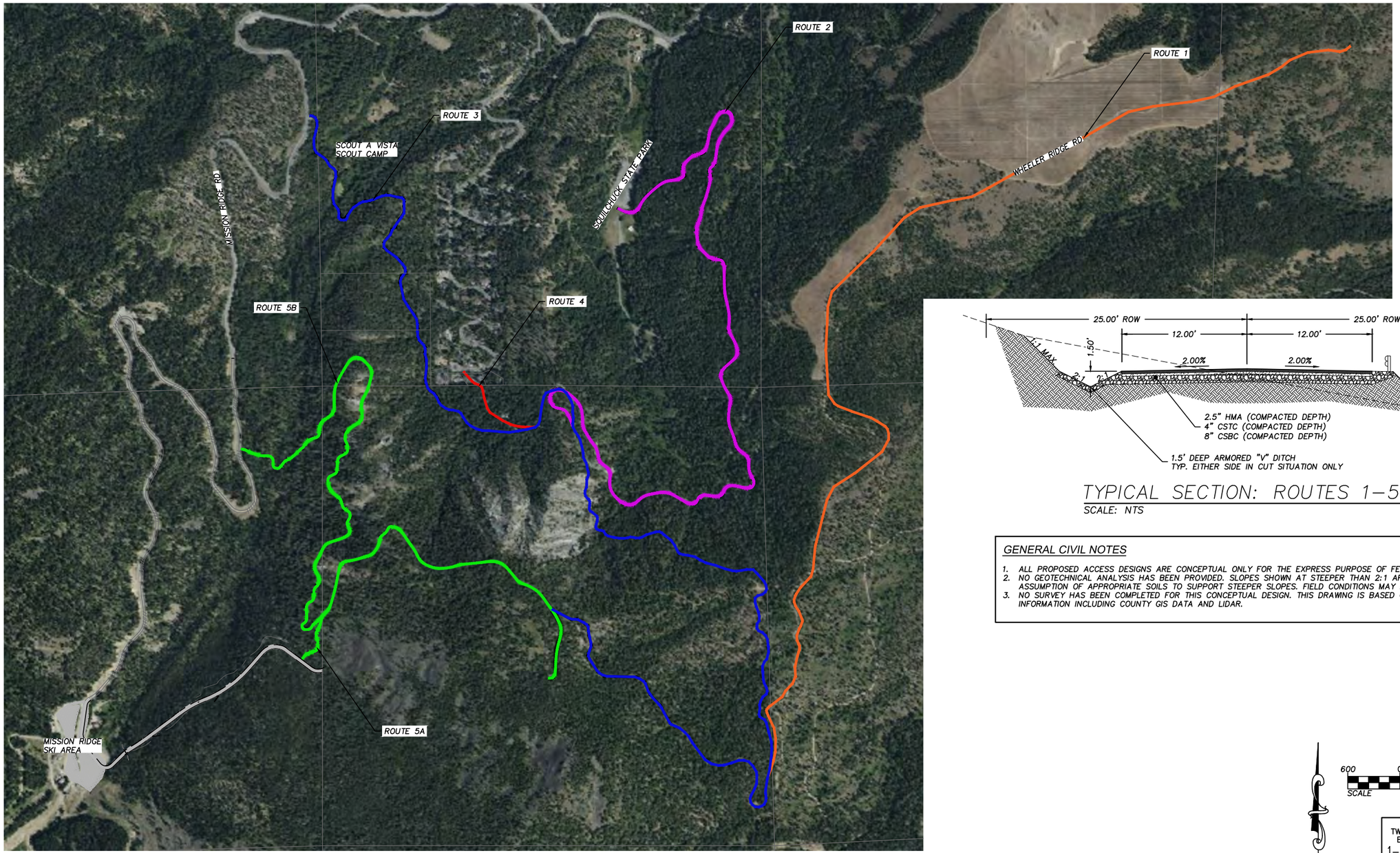
0ft 500 1000 1500 2000

MISSION RIDGE - SECONDARY ROAD ALIGNMENT OPTIONS ----

MISSION RIDGE EXPANSION PLAN

SECONDARY ACCESS - CONCEPTS

CHELAN COUNTY, WASHINGTON



TYPICAL SECTION: ROUTES 1–5

SCALE: NTS

GENERAL CIVIL NOTES

1. ALL PROPOSED ACCESS DESIGNS ARE CONCEPTUAL ONLY FOR THE EXPRESS PURPOSE OF FEASIBILITY ANALYSIS.
2. NO GEOTECHNICAL ANALYSIS HAS BEEN PROVIDED. SLOPES SHOWN AT STEEPER THAN 2:1 ARE BASED ON THE ASSUMPTION OF APPROPRIATE SOILS TO SUPPORT STEEPER SLOPES. FIELD CONDITIONS MAY REQUIRE RETAINING WALLS
3. NO SURVEY HAS BEEN COMPLETED FOR THIS CONCEPTUAL DESIGN. THIS DRAWING IS BASED ON BEST AVAILABLE INFORMATION INCLUDING COUNTY GIS DATA AND LIDAR.

600 0 600 1200
SCALE FEET
1" = 600'

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ROUTE 1 - PLAN

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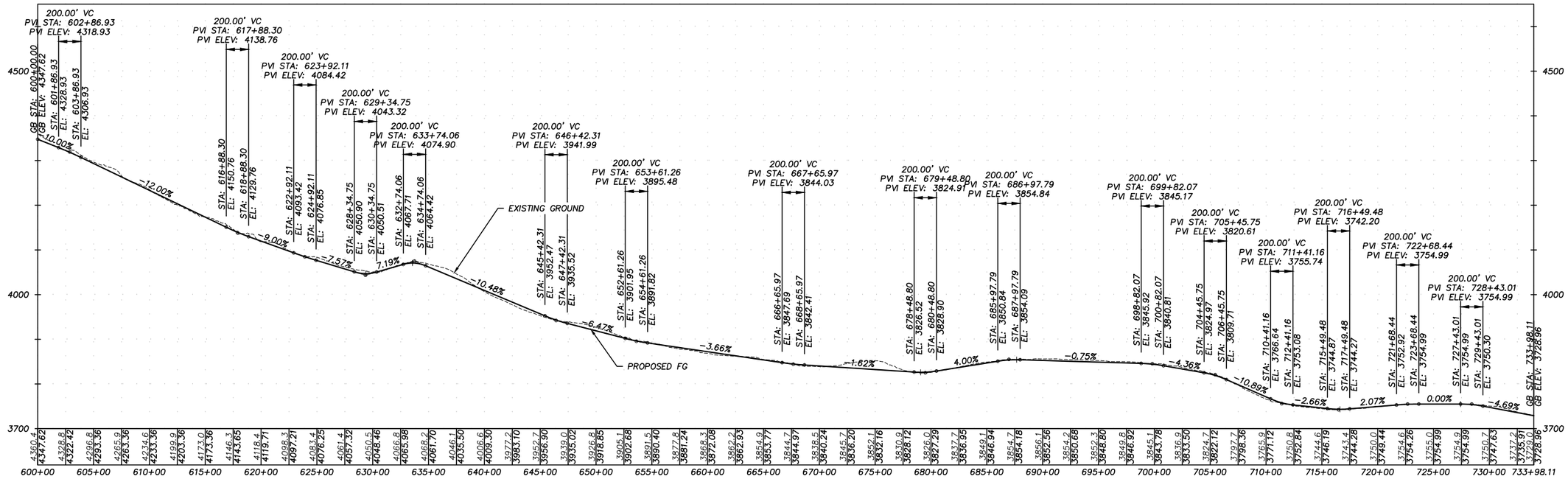

VERTICAL SCALE IS
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500 0 500 1000
SCALE 1" = 500' FEET

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ROUTE 1 - PROFILE

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ROUTE 2 - PLAN

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4 OF: 11

ROUTE 2

SQUILCHUCK STATE PARK

200 0 200 400
SCALE 1" = 200' FEET

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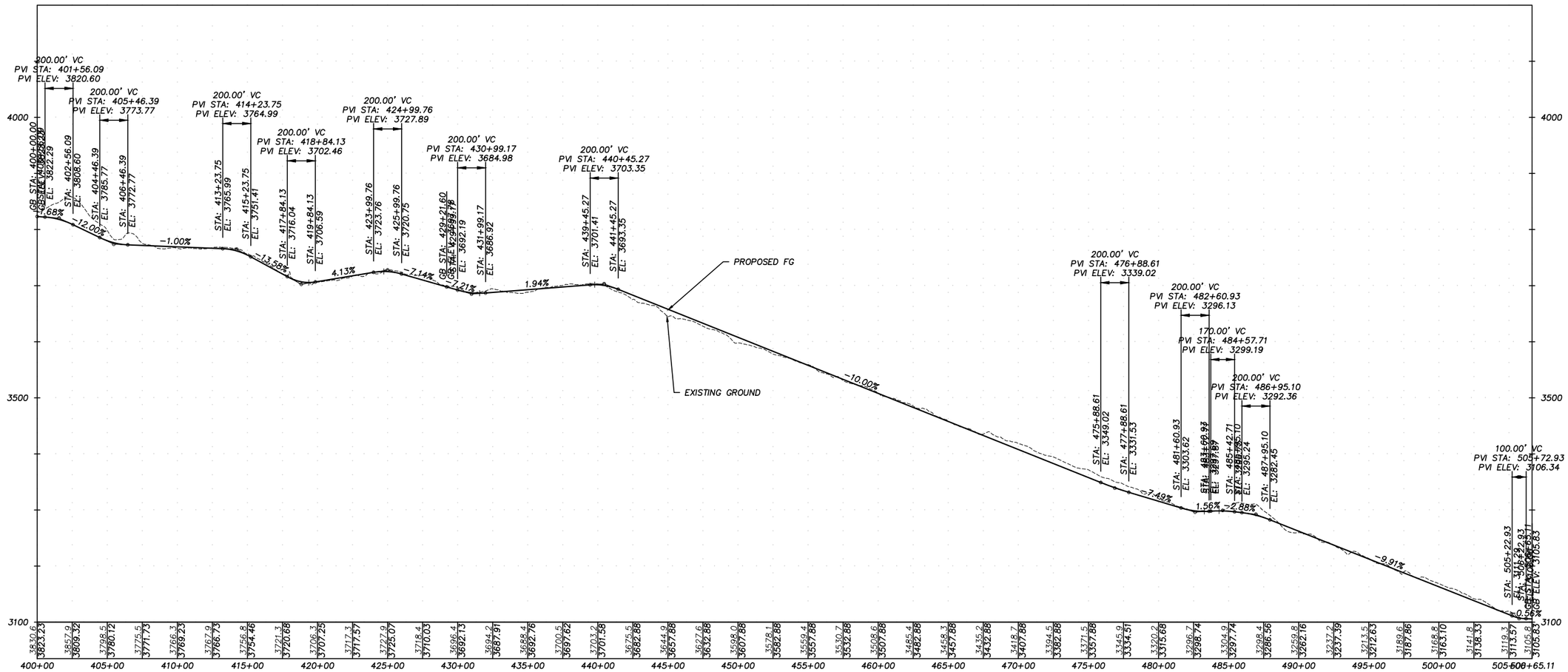

VERTICAL SCALE IS
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SCALE 1" = 400' FEET

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ROUTE 2 - PROFILE
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300 0 300 600
SCALE 1" = 300' FEET

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100-FT MAJOR

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25-FT MAJOR

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SCALE FEET
1" = 60'

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ROUTE 4 - PLAN

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VERTICAL SCALE IS
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SCALE FEET
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SECONDARY ACCESS - CONCEPTS
ROUTE 4 - PROFILE
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MISSION RIDGE - SKI AREA
SECONDARY ACCESS - CONCEPTS
ROUTE 5 - PLAN

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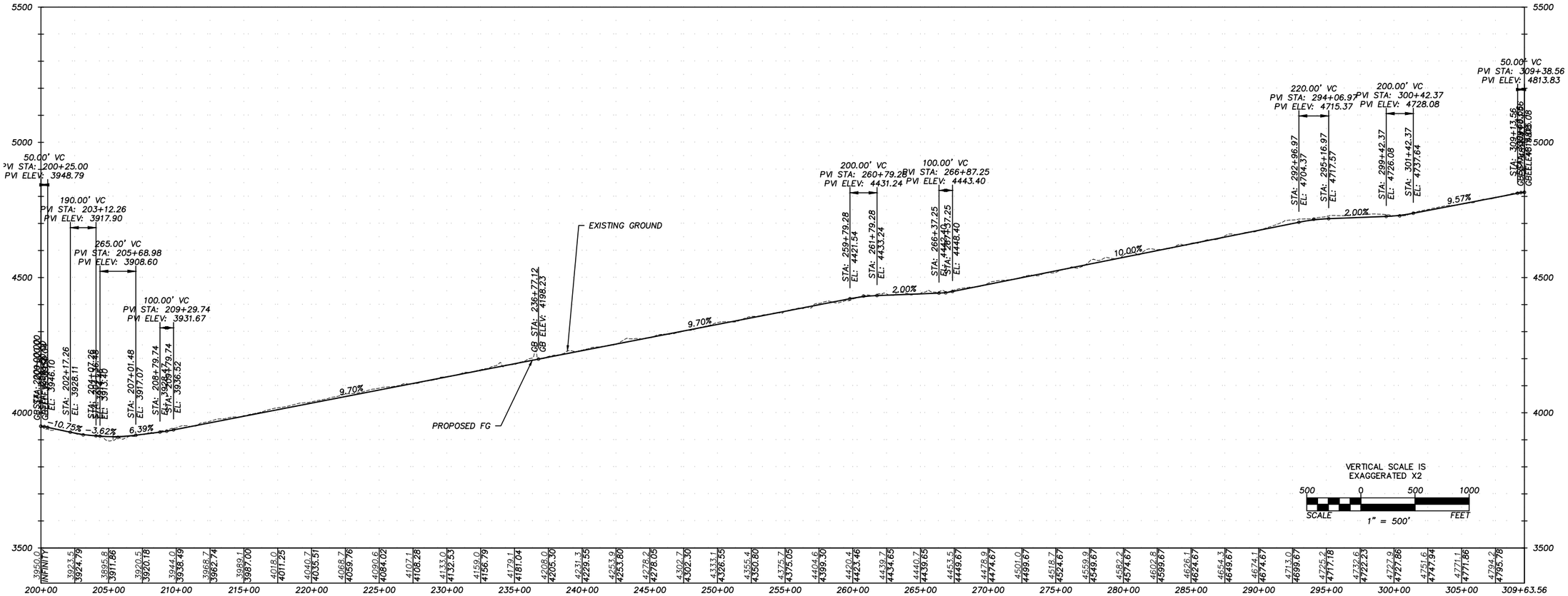

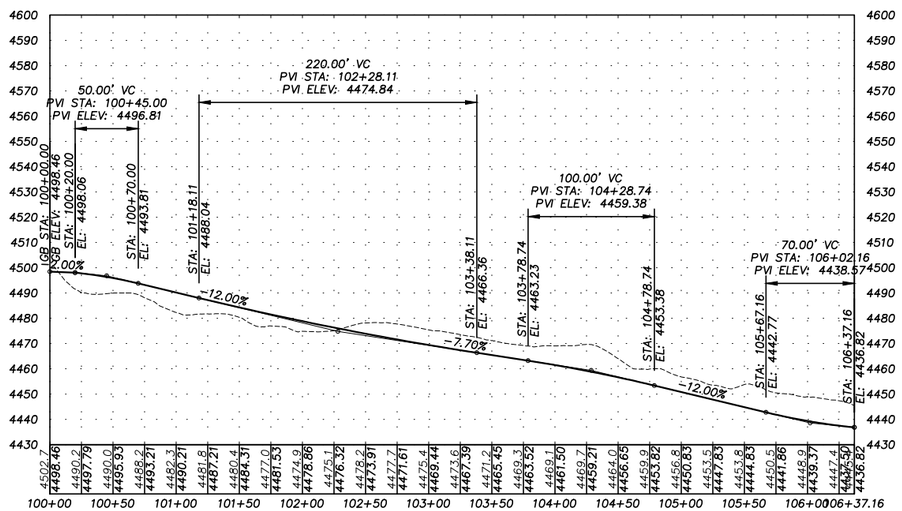

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MISSION RIDGE - SKI AREA
SECONDARY ACCESS - CONCEPTS
ROUTE 5 - PROFILE

CHELAN COUNTY, WA

REV	DATE	BY	DESCRIPTION

PROJECT NUMBER: 2016009

DESIGNED/DRAWN BY: SRA

CHECKED BY: JAT

ISSUE DATE: 12/14/2022

11
OF: 11

Cut/Fill Report

Generated: 2022-12-09 15:02:27

By user: Sam

Drawing: P:\PROJECTS\2016\2016009 Mission Ridge\WORKING DWG__SECONDARY ACCESS\P:\PROJECTS\2016\2016009 Mission Ridge\WORKING DWG__SECONDARY ACCESS\20221209-MISSION-SECONDARY ACCESS.dwg

Volume Summary

Name	Type	Cut Factor	Fill Factor	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
ROUTE 1 EARTHWORKS	full	1.000	1.000	557749.35	69453.54	9926.78	59526.76<Cut>
ROUTE 2 EARTHWORKS	full	1.000	1.000	708223.21	188375.46	23707.17	164668.29<Cut>
ROUTE 3 EARTHWORKS	full	1.000	1.000	1228957.73	342028.75	50612.86	291415.89<Cut>
ROUTE 4 EATHWORKS	full	1.000	1.000	54941.89	10272.02	444.97	9827.05<Cut>
ROUTE 5 EARTHWORKS	full	1.000	1.000	784688.98	174691.11	21412.55	153278.55<Cut>

APPENDIX E

2019 Mission Ridge Hydrology Memo (WNR Group)

2022 Water Resources Memo (American Land and Water)