

KITTITAS CO CDS
RECEIVED
10/01/2025

Wind Ridge Battery Energy Storage System (BESS)

Preliminary Stormwater Site Plan Report

September 19, 2025

Prepared for

Carolyn O'Brien
Black Mountain Energy Storage
1717 W 6th St., Suite 295
Austin, TX 78703



09/19/2025

Submitted by

ESM Consulting Engineers, LLC
32001 32nd Ave S, Ste 200
Federal Way, WA 98001

Laura Bartenhagen, P.E.
(253) 838-6113
laura.bartenhagen@esmcivil.com



www.esmcivil.com

Table of Contents

1. Project Overview	2
2. Existing Conditions	9
3. Offsite Analysis.....	11
4. Permanent Stormwater Control Plan.....	13
5. Discussion of Core Elements	15

FIGURES

1.1 Vicinity Map	
1.2 Existing Conditions	
1.3 Proposed Conditions & Developed Basin Map.....	
1.4 Web Soil Survey.....	
3.1 Downstream Analysis Flowpath	

TABLES

2.1 Precipitation Rates (inches)	
4.1 Existing Land Cover	
4.2 Proposed Land Cover	
4.3 Detention Pond #1	
4.4 Detention Pond #2	
4.5 Gravel Battery, Substation, and Pad Areas.....	

APPENDICES

A. Hydraulic / Hydrologic Analysis and Modeling Results	
B. Construction Stormwater Pollution Prevention Plan (with final engineering)	
C. Operations and Maintenance Manual (with final engineering)	
D. Declaration of Covenant for Privately Maintained Facilities (with final engineering)	

1. PROJECT OVERVIEW

The proposed Wind Ridge Battery Energy Storage System (BESS) project is located west of Stevens Road, north of Interstate 90, and east of the Palouse to Cascades State Park Trail corridor within Section 14, Township 17 North, Range 20 East (W.M.), in unincorporated area of Kittitas County. The site contains parcel 653936 zoned A-20 (Agriculture 20) with a land use designation of "rural working" for a total of 36.35 acres.

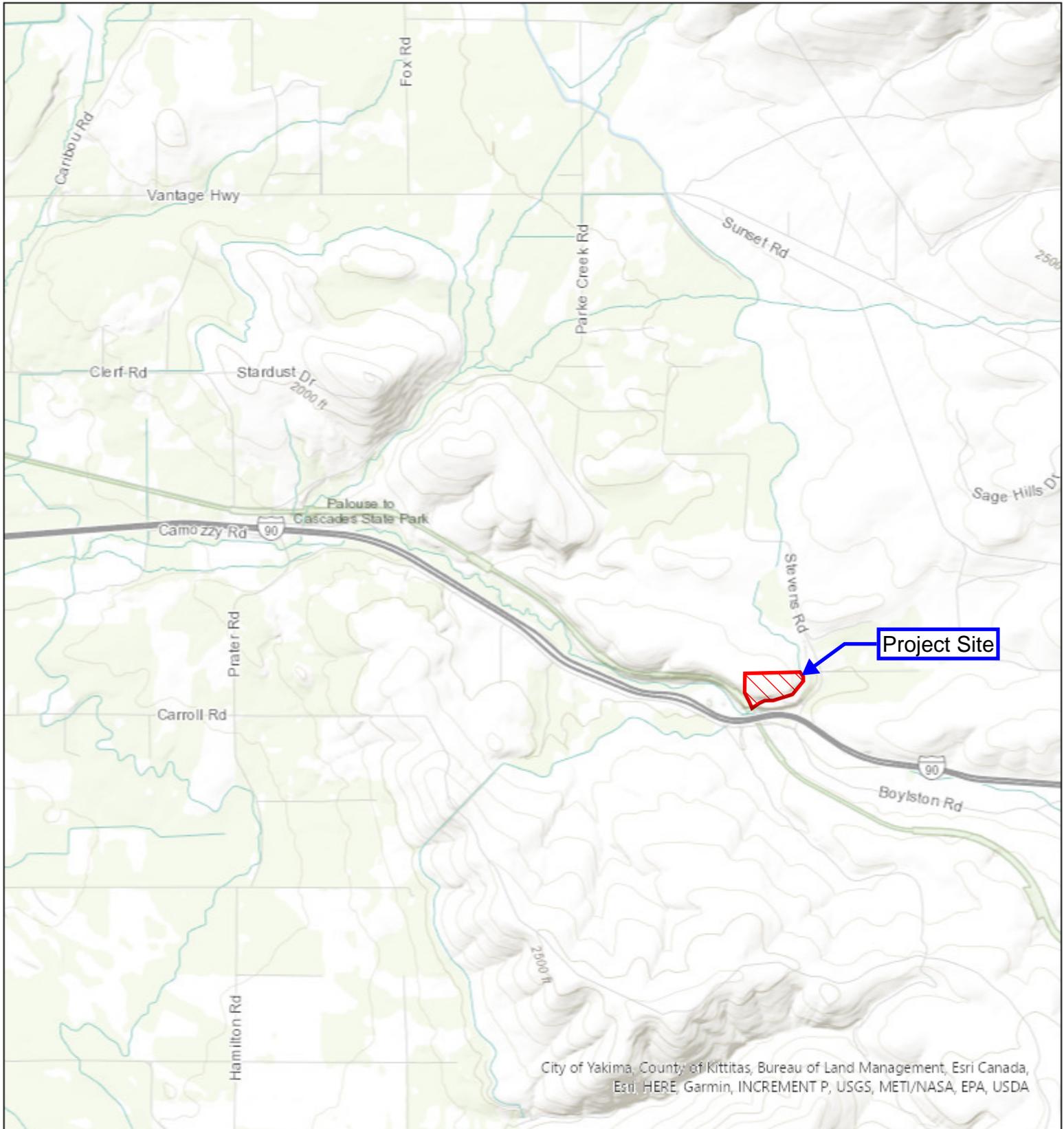
The proposed project is a stand-alone BESS site on approximately 25 acres that will interconnect directly to the neighboring substation (located to the southeast of the site) to charge and discharge electricity to and from the grid. The BESS consists of metal enclosed structures filled with lithium-ion battery modules in climate controlled containers. The project will also construct gravel vehicle access, power and telephone utility services, as well as swales and ponds for stormwater mitigation. Refer to Figure 1.1, 1.2, and 1.3 for a vicinity map, existing, and proposed conditions respectively.

The 2024 Stormwater Management Manual for Eastern Washington (hereafter referred to as SMMEW) was used to construct this Stormwater Site Plan Report, with additional guidance from the pre-application conference summary for the proposed development. A Geotechnical Report has been prepared for this project by PWR Geotechnical on June 27, 2025 and is included with this submittal under separate cover.

The area of the site to be developed is approximately 25 acres and is currently undeveloped and classified as "not prime farmland".

Flow control mitigation for the proposed Wind Ridge development will be provided using dispersion and detention. Refer to Sections 2 & 4 of this report for more information.

Figure 1.1 - Vicinity Map



Date: 8/21/2025

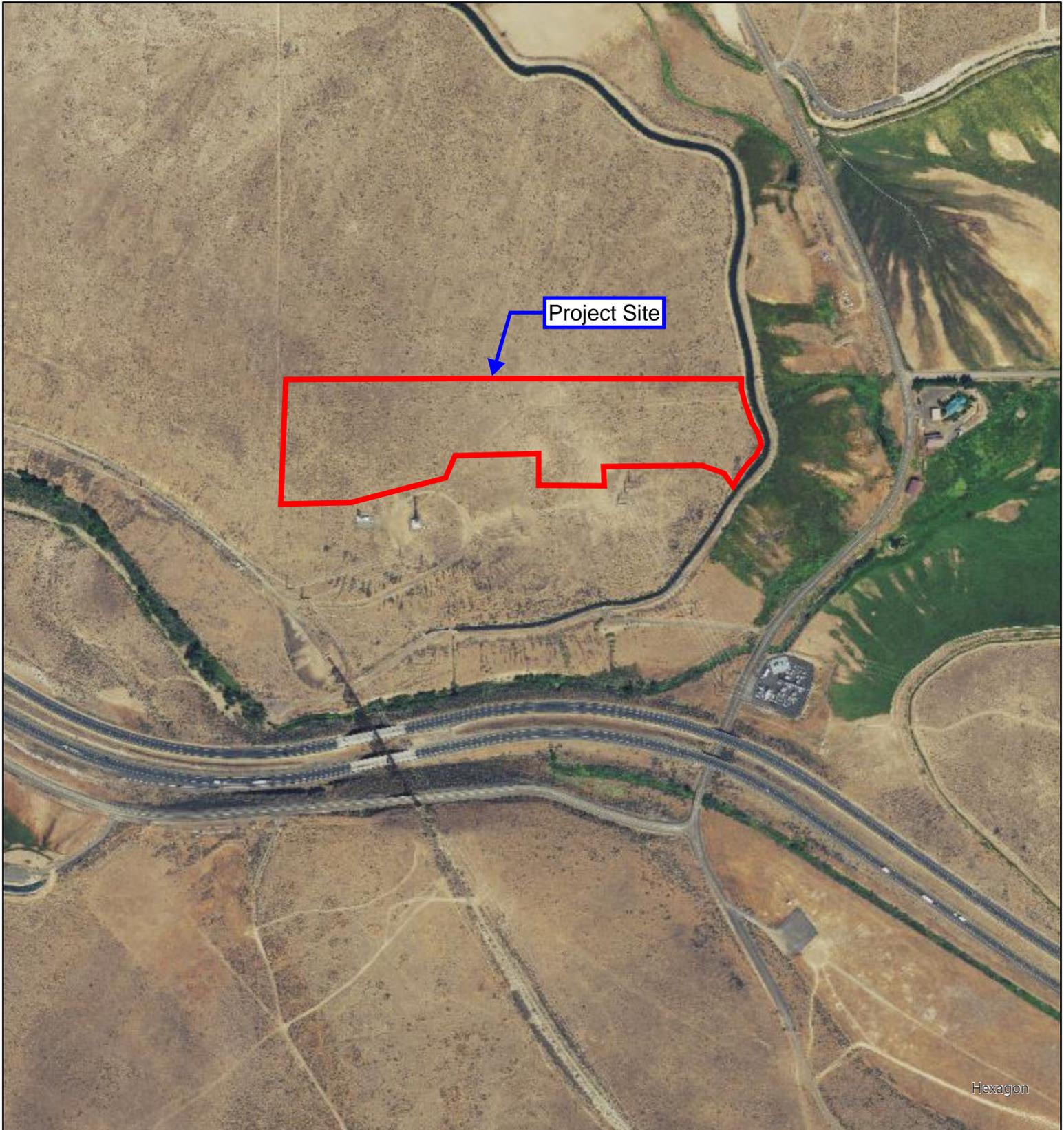
1 inch equals 6,019 feet



Disclaimer:
Kittitas County makes every effort to produce and publish the most current and accurate information possible. No warranties, expressed or implied, are provided for the data, its use, or its interpretation. Kittitas County does not guarantee the accuracy of the material contained herein and is not responsible for any use, misuse or representations by others regarding this information or its derivatives.

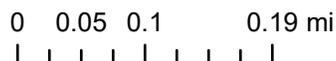


Figure 1.2 - Existing Site Conditions



Date: 8/21/2025

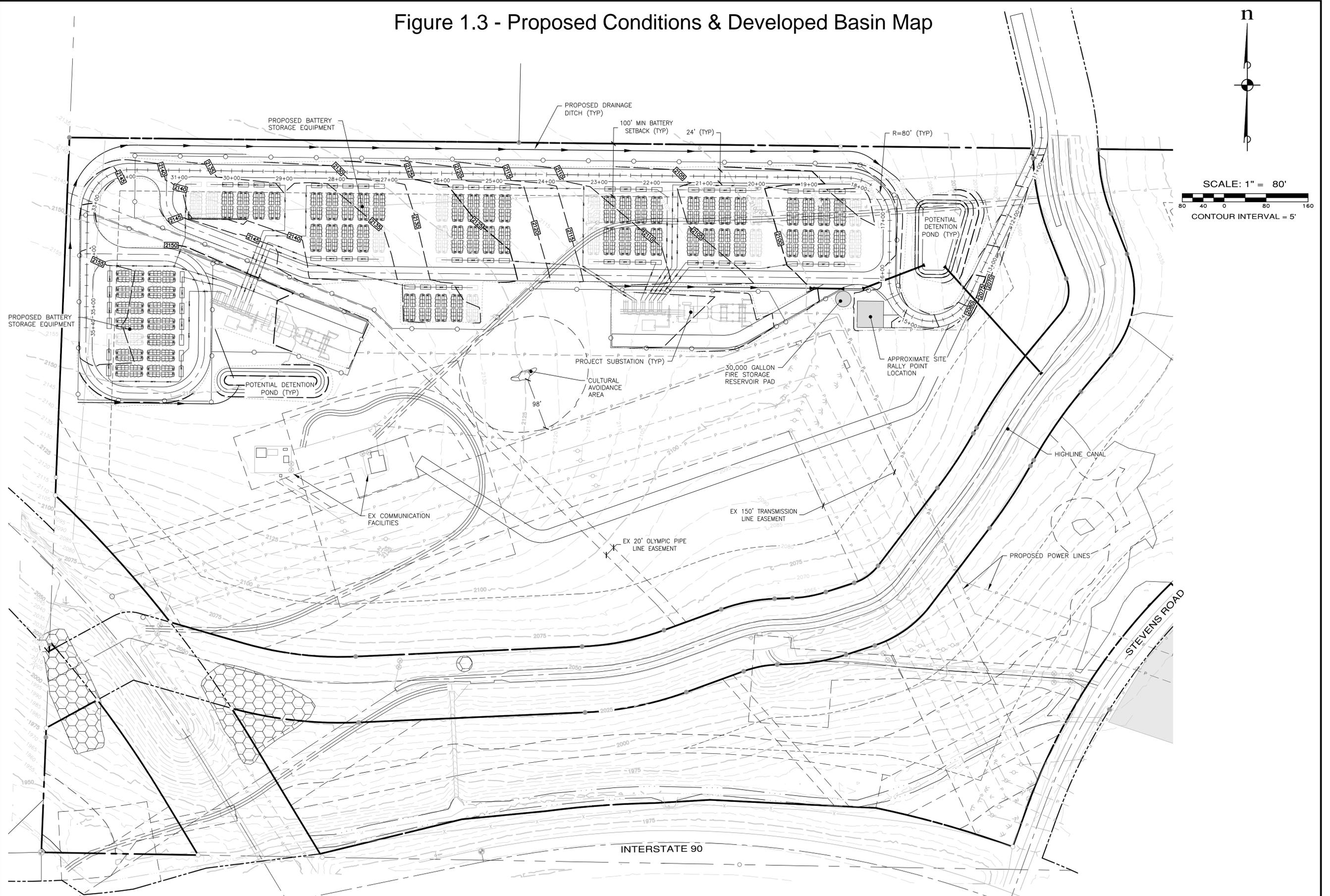
1 inch equals 752 feet



Disclaimer:
Kittitas County makes every effort to produce and publish the most current and accurate information possible. No warranties, expressed or implied, are provided for the data, its use, or its interpretation. Kittitas County does not guarantee the accuracy of the material contained herein and is not responsible for any use, misuse or representations by others regarding this information or its derivatives.

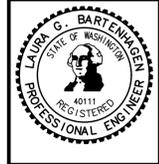


Figure 1.3 - Proposed Conditions & Developed Basin Map



STORM DRAINAGE FACILITY
 DETENTION POND VOLUME:
 REQUIRED 18,000 CF
 PROVIDED 25,900 CF

REVISIONS		
NO.	DESCRIPTION/DATE	BY



ESM CONSULTING ENGINEERS, LLC
 FEDERAL WAY LIMITED LIABILITY COMPANY
 32001 32nd Ave S, Suite 200
 Federal Way, WA 98001
 www.esmcivil.com
 Civil Engineering, Public Works
 Land Surveying, Project Management
 Land Planning, Landscape Architecture

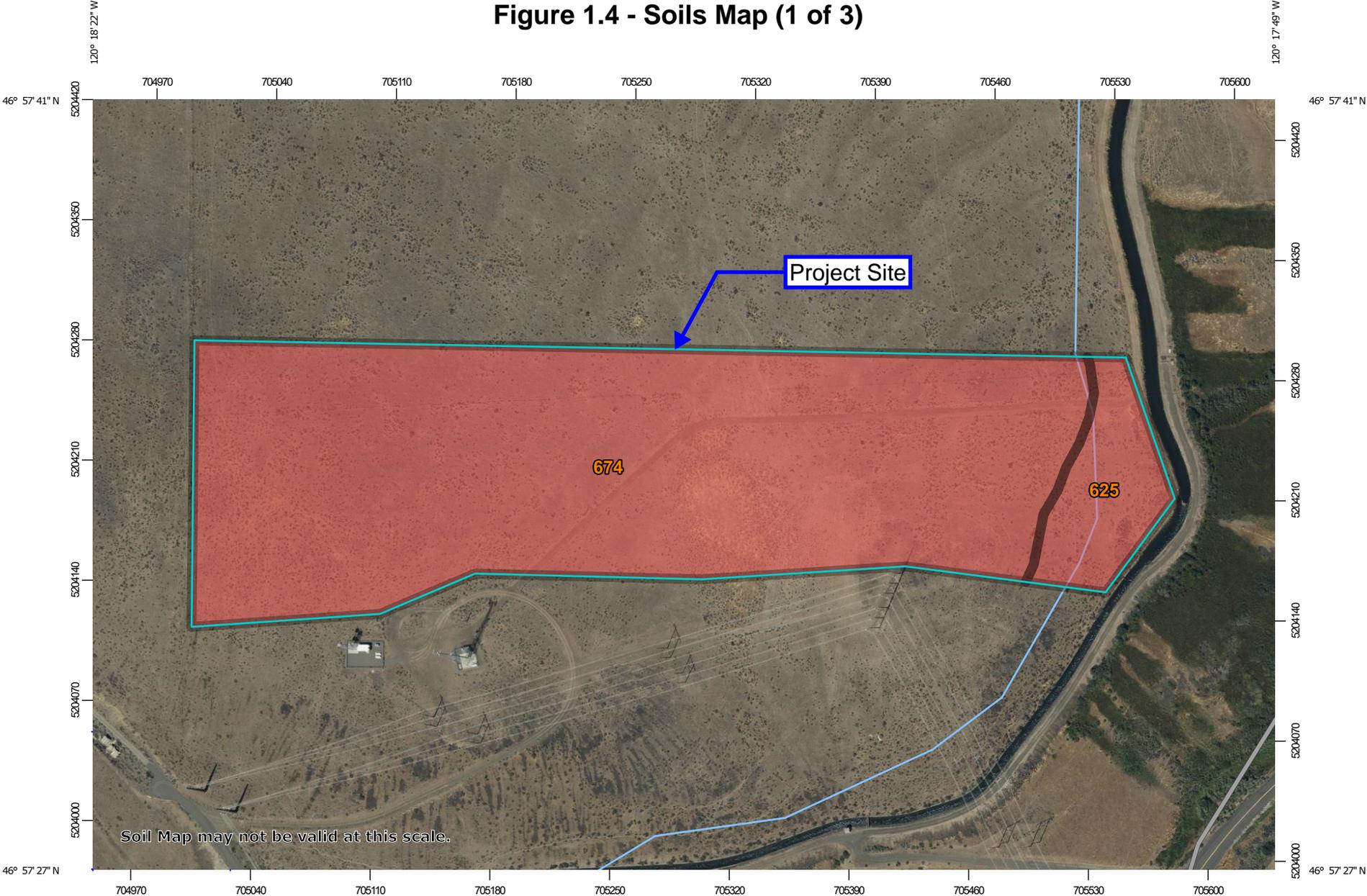
BLACK MOUNTAIN ENERGY STORAGE II, LLC
WIND RIDGE BESS
 PRELIMINARY UTILITY PLAN
 KITTITAS COUNTY WASHINGTON

JOB NO.:	2444-001-025
DWG. NAME:	UT
DESIGNED BY:	LGB
DRAWN BY:	JH
CHECKED BY:	
DATE:	09/10/2025
DATE OF PRINT:	

UT-01
 7 OF 7 SHEETS

File: \\smc\ENGR\ESM-JOBES\2444\001\025\plans\corp\UT-01.dwg
 Plotted: 9/9/2025 6:55 AM
 Plotted By: jeff hilton

Figure 1.4 - Soils Map (1 of 3)



Soil Map may not be valid at this scale.

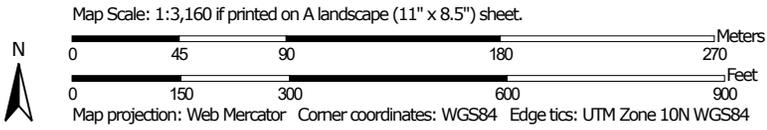


Figure 1.4 - Soils Map (1 of 3)

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Lines

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Points

-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available

Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kittitas County Area, Washington
 Survey Area Data: Version 17, Aug 27, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 26, 2022—Aug 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Figure 1.4 - Soils Map (3 of 3)

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
625	Manastash-Durtash complex, 5 to 10 percent slopes	D	1.6	8.4%
674	Durtash gravelly loam, 3 to 10 percent slopes	D	17.6	91.6%
Totals for Area of Interest			19.2	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

2. EXISTING CONDITIONS

The existing property is currently used for agriculture. The property also contains the Renslow Microwave Tower, constructed in 2006, and above-ground power transmission lines and associated power poles. The existing topography of the property generally slopes to the south and east to an existing concrete-lined irrigation canal (Highline Canal) located along the south and east sides of the property. The Highline Canal is operated by the Kittitas Reclamation District and drains from northeast to southwest along the property.

A Critical Areas Report for Black Mountain Energy Storage, dated August 2025, was prepared by Environmental Science Associates (ESA). The report describes the two wetlands and Type Ns stream located within the project limits on the eastern side of the property.

Wetland A is rated as a Category IV wetland which is subject to a standard 40-foot buffer width. Wetland A is approximately 6 acres in total size with approximately 5 acres of the wetland area located on the property. Wetland A is classified as a Slope and Riverine Wetland and it ultimately drains to the southwest along a watercourse located along the lower, western edge of the wetland.

Wetland B is rated as a Category IV wetland which is subject to a standard 40-foot buffer width. Wetland B is approximately 0.02 acres in total size and entirely located on the property. Wetland B is classified as a Slope Wetland and it appears that any hydrology leaving the wetland infiltrates into the ground.

A Type Ns stream runs through the northeastern corner of the property and has a standard buffer width of 40 feet.

The wetlands and the stream, along with their associated buffers, are not located within the area of the property where development is being proposed. Refer to Environmental Science Associates assessment for further information included in the application submittal package.

According to FEMA mapping (Panel # 53037C1350D), the site is not located within a 100-year flood hazard zone.

There are no superfund areas in the vicinity, or upstream, of the project.

Precipitation for the project site was obtained from the SMMEW as shown on Table 2.1 below.

2-year 24 hour	0.80
10-year 24 hour	1.20
25-year 24 hour	1.60
50-year 24 hour	1.80
100-year 24 hour	2.00

A Geotechnical Engineering Study has been completed by PWR Geotechnical dated June 27, 2025 and is included under separate cover with this submittal. A total of 19 exploration pits were dug across the project site by PWR Geotechnical. See Plate 2 in the Geotechnical Engineering Study (Appendix E) provided by PWR Geotechnical for test pit locations.

Based on the findings from the geotechnical investigation performed by PWR Geotechnical, the site contains potential landslide hazard areas and potential erosion hazard areas based on County mapping. However, PWR Geotechnical has deemed the risk of landslides as low based on the presence of a shallow and stable bedrock layer underlying the surficial deposits. PWR Geotechnical has determined that there is potential for erosion on the property, but the risk is reduced due to competent bedrock and shallow surficial soils.

The Geotechnical Engineering Study also indicates that the site is unsuitable for infiltration due to the presence of a shallow native bedrock layer. Refer to the Geotechnical Report for more information.

3. OFFSITE ANALYSIS

Upstream Tributary Run-On

There are no upstream offsite areas draining to the project.

Downstream Basin

The existing project site slopes predominantly to the south and east toward an existing concrete-lined irrigation canal (Highline Canal). Site runoff is conveyed along the canal toward the southwest and reaches a distance of one mile downstream from the project site within the canal.

4. PERMANENT STORMWATER CONTROL PLAN

This project site has one Threshold Discharge Area (TDA). Detention for the project site will be provided for the gravel roadways in two ponds and the remaining gravel areas will store and disperse stormwater. The detention ponds will be sized to retain the 100 year storm and overflow to an existing irrigation canal (Highline Canal).

The SCS method was used with a Type 1A storm to size the onsite stormwater detention facilities.

Predeveloped Site Hydrology

The project site has a single natural discharge location and a single threshold discharge area. Since the project is located at a topographical highpoint, no offsite runoff is expected to enter the site. The total parcel area is 36.35 acres; however, the project disturbance limit area is approximately 25 acres and it includes 11.35 acres of proposed impervious area. Under existing conditions, stormwater from the project site sheet flows toward the southern and eastern limits of the property to an existing irrigation canal, the site's natural discharge location. The pre-developed condition for the project site used in the hydrology analysis is existing land cover.

Developed Site Hydrology

In the developed condition, the property will continue to drain to the site's natural discharge location. As previously discussed, no upstream runoff is expected to enter the site based on the topography of the site and adjacent areas.

The following tables represent the pre-developed and developed conditions for the project.

Table 4.1 - Existing Land Cover			
Area	Pervious (ac)	Impervious (ac)	Total (ac)
Pre-Developed	36.35	0.00	36.35

Developed Basin ID	Table 4.2 - Proposed Land Cover	
	Impervious (ac)	Storm Drainage BMP
Gravel Road Basin #1	2.90	Detention Pond #1
Gravel Road Basin #2	0.51	Detention Pond #2
Gravel Battery Area	6.21	Storage/Dispersion
Gravel Substation Area	1.65	Storage/Dispersion
Additional Gravel Pads	0.07	Storage/Dispersion
Total	11.35	

The remaining disturbed pervious area of approximately 13.65 acres will be graded and re-vegetated to naturally disperse, matching pre-developed conditions.

Flow Control System

Flow control for the proposed gravel roadways will be provided using detention of the 100 year storm in ponds to be located at a low points at the western and eastern ends of the project site. The ponds will be designed to mitigate runoff generated from the project per the requirements of the SMMEW as discussed in Section 5 of this report, Core Element #6. The proposed ponds have been preliminarily designed based on the design criteria and methods of analysis found in Section 2.4.6 of the SMMEW.

Table 4.3 - Detention Pond #1		
Gravel Road Basin Area (ac)	100-year Volume (cf)	Provided Volume (cf)
2.90	18,730	18,800

Table 4.4 - Detention Pond #2		
Gravel Road Basin Area (ac)	100-year Volume (cf)	Provided Volume (cf)
0.51	3,290	9,300

Detention Pond #2 will overflow to proposed swale and culverts to Detention Pond #1 which will overflow to the existing Highline Canal.

Stormwater runoff from the remaining gravel areas (battery storage and substations) will remain dispersed with storage provided within the estimated 12" gravel section voids of the gravel storage, estimated conservatively at 20%.

Table 4.5 - Gravel Battery, Substation, and Pad Areas		
Gravel Area (ac)	100-year Volume (cf)	Provided Volume (cf)
7.94	51,250	69,140

Refer to Appendix A for the hydrology model output. Further detail will be provided in this section of the report with final engineering submittal.

Water Quality System

The project will have gravel impervious surfaces for access, battery storage, and substations. These will be infrequently used (3 to 5 times a month) and thus are considered non-pollution generating impervious surface (NPGIS) based on the SMMEW definition.

Conveyance System Analysis and Design

The proposed conveyance system for the gravel roadways will consist of stormwater swales and culverts. Further details and conveyance calculations for the proposed stormwater swales and culverts will be included in this section of the report with final engineering submittal. The conveyance calculations will be designed to manage twenty-five-year peak flows in accordance with the WSDOT Hydraulics Manual.

5. DISCUSSION OF CORE ELEMENTS

All applicable Core Elements (as determined from Figure 2.1 of the SMMEW and included here) are discussed in this section of the report.

Core Element #1 - Preparation of Stormwater Site Plans

A preliminary Stormwater Site Plan Report (this document) and stormwater site plans are being provided with this submittal. Additional design information will be provided with final engineering submittal.

Core Element #2 - Construction Stormwater Pollution Prevention Plan

The Stormwater Pollution Prevention Plan (SWPPP) will be provided with final engineering submittal.

Core Element #3 - Source Control of Pollution

Applicable source control BMPs for the project will be provided during final engineering submittal.

Core Element #4 - Preservation of Natural Drainage Systems and Outfalls

The project site will maintain the natural drainage pattern of the existing site by discharging onsite stormwater that ultimately flows existing irrigation canal located downstream of the property.

Core Element #5 - Runoff Treatment

The proposed gravel impervious surfaces will be infrequently used (3 to 5 times a month) and are therefore considered non-pollution generating impervious surfaces (NPGIS) based on the SMMEW definition.

Core Element #6 - Flow Control

The project will create more than 10,000 square feet of effective impervious surface area and therefore, the project is subject to the requirements of Core Element #6. The flow control standard will be met using dispersion and two detention ponds. The proposed ponds have been preliminarily designed based on the design criteria and methods of analysis found in Section 2.4.6 of the SMMEW. Further detail will be provided in this section of the report with final engineering submittal.

Refer to Section 4: Flow Control System and Appendix A for more information.

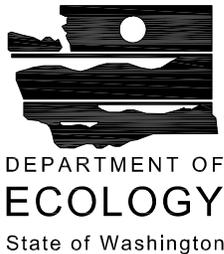
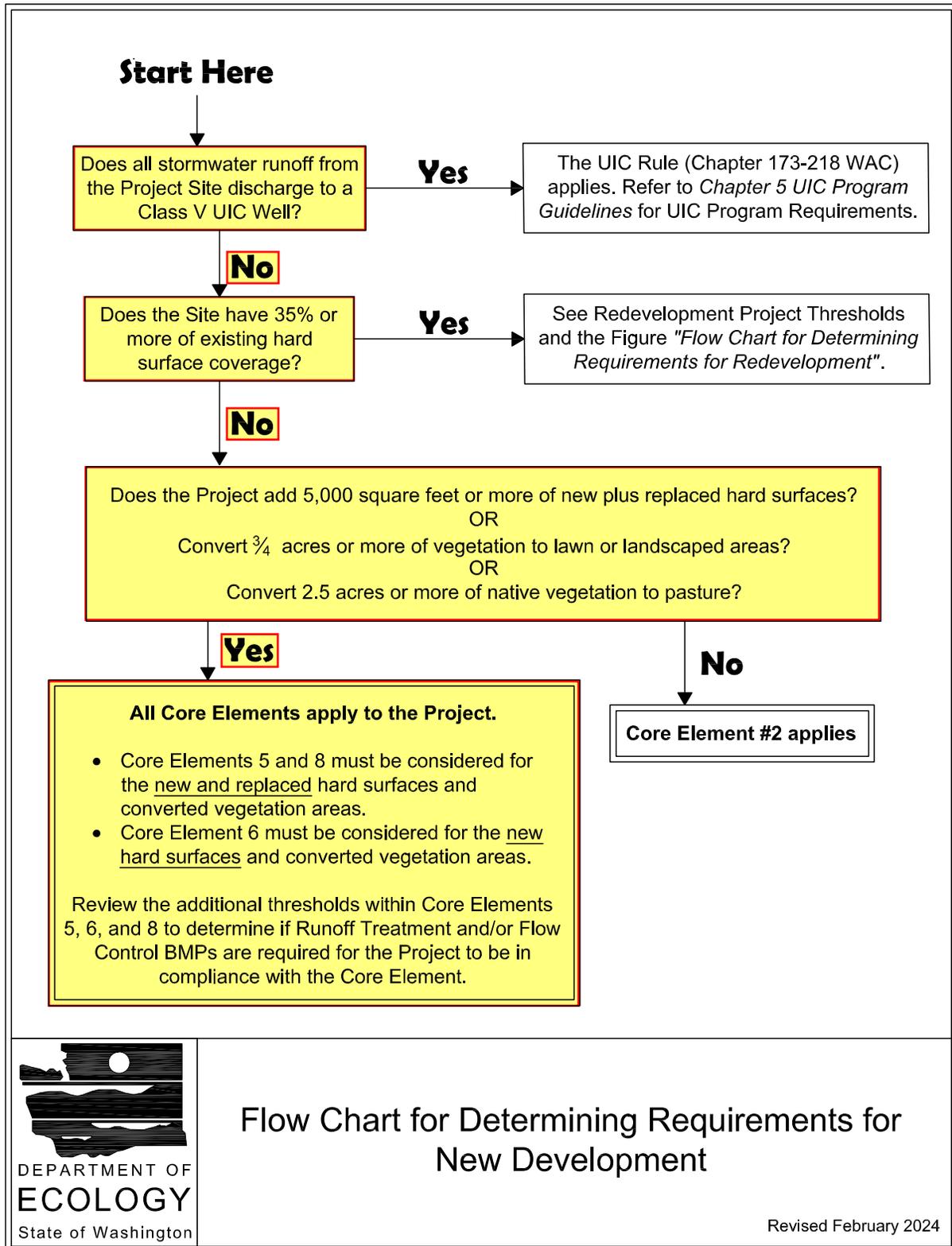
Core Element #7 - Operations and Maintenance

The Operations and Maintenance Manual will be provided with final engineering submittal.

Core Element #8 - Local Requirements

Local requirements are satisfied with the preparation of this report and site plan in accordance with the guidelines established in the SMMEW.

Figure 2.1: Flow Chart for Determining Requirements for New Development



Flow Chart for Determining Requirements for
New Development

Revised February 2024

APPENDIX A - HYDRAULIC / HYDROLOGIC ANALYSIS AND MODELING RESULTS

The project was modeled using the SCS method in StormSHED 3G, which is an approved hydrology model.

Relevant model input and output has been included in this appendix.

Appended on: Wednesday, September 10, 2025 4:43:18 PM

Road Basin 1 Event Summary

Event	Peak Q (cfs)	Peak T (hrs)	Hyd Vol (acft)	Area (ac)	Method
WQ	0.2488	8.0235	0.0831	2.90	SCS
2 yr 24 hr	0.4412	8.0235	0.1449	2.90	SCS
10 year	0.7254	8.0117	0.2387	2.90	SCS
25 year	1.0069	8.0117	0.3339	2.90	SCS
50 year	1.1466	8.0117	0.3817	2.90	SCS
100 year	1.2857	8.0117	0.4297	2.90	SCS

All results based on storm duration of **24.0** hours. This is ok if all precipitations are appropriate for the storm duration. If some design event precipitations are for different duration storms, those results are incorrect

Record Id: Road Basin 1

Design Method	SCS	Rainfall type	TYPE1A.RAC
Hyd Intv	10.00 min	Peaking Factor	484.00
Storm Duration	24.00 hrs	Abstraction Coeff	0.20
Pervious Area	0.00 ac	DCIA	2.90 ac
Pervious CN	0.00	DC CN	98.00
Pervious TC	0.00 min	DC TC	10.00 min

DCI - CN Calc

Description	SubArea	Sub cn
Impervious surfaces (pavements, roofs, etc)	2.90 ac	98.00
DC Compositied CN (AMC 2)		98.00

DCI - TC Calc

Type	Description	Length	Slope	Coeff	Misc	TT
Sheet		0.00 ft	0.0%	10.0	0.00 in	10.00 min
Pervious TC						10.00 min

Licensed to: ESM Consulting Engineers, LLC. - Federal Way

Appended on: Wednesday, September 10, 2025 4:47:57 PM

Road Basin 2 Event Summary

Event	Peak Q (cfs)	Peak T (hrs)	Hyd Vol (acft)	Area (ac)	Method
WQ	0.0438	8.0235	0.0146	0.51	SCS
2 yr 24 hr	0.0776	8.0235	0.0255	0.51	SCS
10 year	0.1276	8.0117	0.042	0.51	SCS
25 year	0.1771	8.0117	0.0587	0.51	SCS
50 year	0.2016	8.0117	0.0671	0.51	SCS
100 year	0.2261	8.0117	0.0756	0.51	SCS

All results based on storm duration of 24.0 hours. This is ok if all precipitations are appropriate for the storm duration. If some design event precipitations are for different duration storms, those results are incorrect

Record Id: Road Basin 2

Design Method	SCS	Rainfall type	TYPE1A.RAC
Hyd Intv	10.00 min	Peaking Factor	484.00
Storm Duration	24.00 hrs	Abstraction Coeff	0.20
Pervious Area	0.00 ac	DCIA	0.51 ac
Pervious CN	0.00	DC CN	98.00
Pervious TC	0.00 min	DC TC	10.00 min

DCI - CN Calc

Description	SubArea	Sub cn
Impervious surfaces (pavements, roofs, etc)	0.51 ac	98.00
DC Compositied CN (AMC 2)		98.00

DCI - TC Calc

Type	Description	Length	Slope	Coeff	Misc	TT
Sheet		0.00 ft	0.0%	10.0	0.00 in	10.00 min
Pervious TC						10.00 min

Licensed to: ESM Consulting Engineers, LLC. - Federal Way

Appended on: Wednesday, September 10, 2025 4:49:10 PM

Gravel Areas Event Summary

Event	Peak Q (cfs)	Peak T (hrs)	Hyd Vol (acft)	Area (ac)	Method
WQ	0.6812	8.0235	0.2277	7.94	SCS
2 yr 24 hr	1.2081	8.0235	0.3967	7.94	SCS
10 year	1.9861	8.0117	0.6535	7.94	SCS
25 year	2.7568	8.0117	0.9141	7.94	SCS
50 year	3.1392	8.0117	1.0451	7.94	SCS
100 year	3.5201	8.0117	1.1764	7.94	SCS

All results based on storm duration of 24.0 hours. This is ok if all precipitations are appropriate for the storm duration. If some design event precipitations are for different duration storms, those results are incorrect

Record Id: Gravel Areas

Design Method	SCS	Rainfall type	TYPE1A.RAC
Hyd Intv	10.00 min	Peaking Factor	484.00
Storm Duration	24.00 hrs	Abstraction Coeff	0.20
Pervious Area	0.00 ac	DCIA	7.94 ac
Pervious CN	0.00	DC CN	98.00
Pervious TC	0.00 min	DC TC	10.00 min

DCI - CN Calc

Description	SubArea	Sub cn
Impervious surfaces (pavements, roofs, etc)	7.94 ac	98.00
DC Compositied CN (AMC 2)		98.00

DCI - TC Calc

Type	Description	Length	Slope	Coeff	Misc	TT
Sheet		0.00 ft	0.0%	10.0	0.00 in	10.00 min
Pervious TC						10.00 min

Licensed to: ESM Consulting Engineers, LLC. - Federal Way