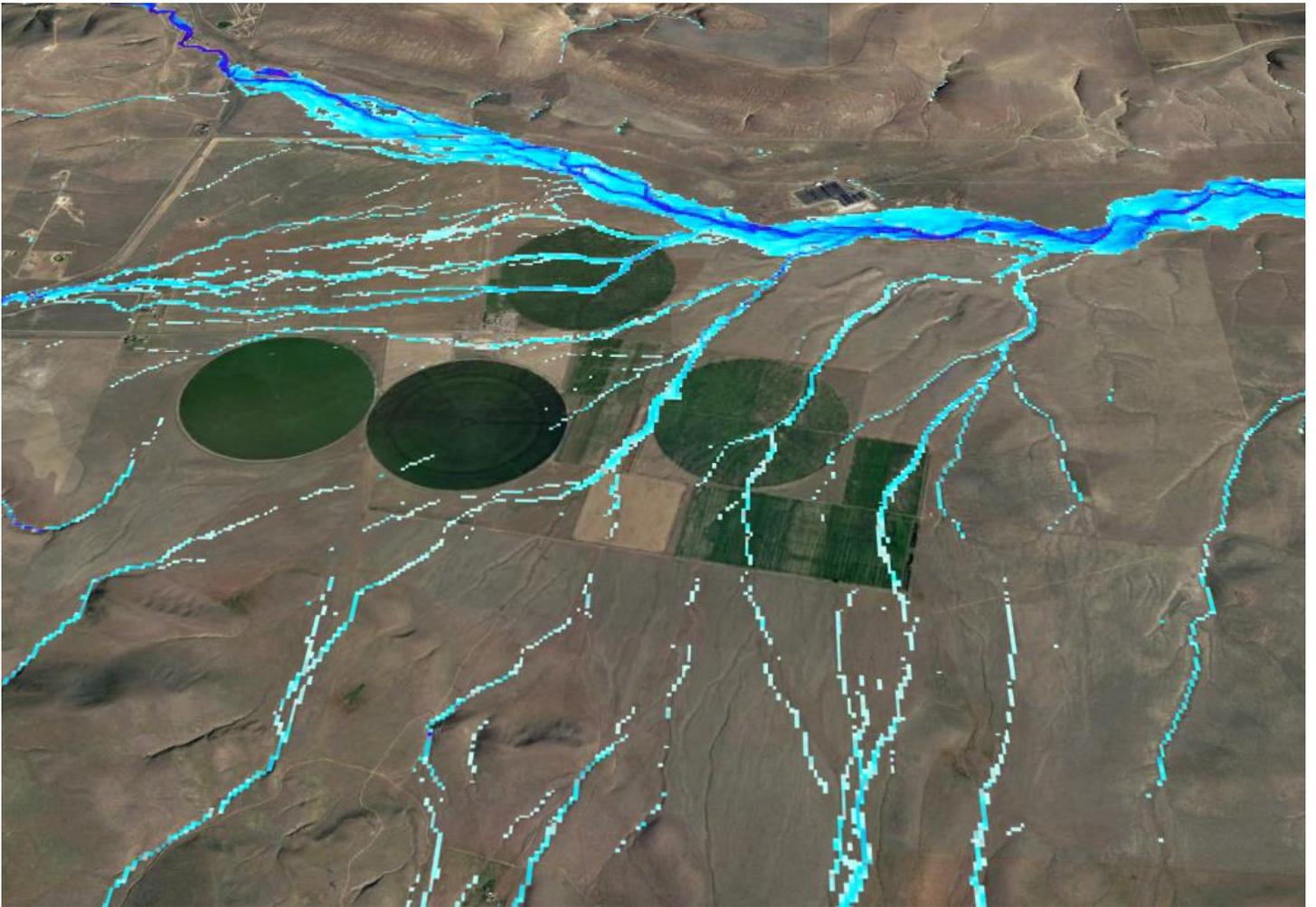


ATTACHMENT K: PRELIMINARY HYDROLOGY REPORT



PRELIMINARY HYDROLOGY STUDY

Wautoma Solar Project

Benton County, Washington

DECEMBER 9, 2021

PREPARED FOR:

INNERGEX

PREPARED BY:

Westwood

Westwood

Preliminary Hydrology Study

Wautoma Solar Project

Benton County, Washington

Prepared For:

Innergex Renewable Energy
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Project Number: R0033629.00

Date: December 9, 2021

Westwood

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Executive Summary

The purpose of this study is to analyze and review the existing hydrology of the Wautoma Solar Project (Project or Site) and any impacts that the hydrology may play in the design of the proposed solar array. This report was prepared to be used by the Project team in the design and layout of the Project and not intended for submittal to reviewing agencies for stormwater permitting.

The Site is proposed on approximately 4,875 acres and is located approximately 30 miles northwest of the city of Richland in Benton County, Washington. The Site is located on varying terrain that generally slopes to the north in the southern portion and east in the northern portion. The modeled watershed area encompasses approximately 101 square miles and generally slopes east.

The analysis shows low to moderate water depths and velocities (Exhibits 6 through 7A) across the majority of the site. Higher flood depths exist within Dry Creek and its surrounding areas located within and adjacent to the site. Minimal scour is expected onsite except within and adjacent to Dry Creek.

Based on experience with similar projects, the majority of the site is suitable for the planned development by avoiding or designing to areas of high flood depths.

1.0 Data Sources

Table 1 – Data Sources

Task	Format	Source	Use
Elevation	1-meter LiDAR data	USGS	FLO-2D Model Elevations
	10-meter DEM data	USGS	
Crop Data	Shapefile	USDA 2013 Crop Data Layer	Landcover
Soils	Shapefile	USGS SSURGO Dataset	Curve Numbers
Precipitation	PDF File	Atlas 2	Design Storms
HUC-12 Drainage Boundary	Shapefile	USGS	Define Model Extents
Site Boundary	KMZ	Innergex Renewable Energy	Define Model Extents
2014 Aerial Photography	ArcGIS Map Service	USDA FSA	Reference
FEMA Flood Zones	PDF	FEMA	Reference
Culvert Locating and Sizing	Aerial Imagery	Google Earth	Culvert Modeling

2.0 Coordinate System

Table 2 – Coordinate System Used

Projection	State Plane Coordinate System
Zone	Washington South (FIPS 4602)
Datum	NAD83
Planar Units	Feet (U.S. Survey)

3.0 Existing Conditions

3.1 Project Location

The Site is approximately 4,875 acres and is located within Benton County, Washington (Exhibit 1). The Project Site is located approximately 30 miles northwest of Richland, Washington, which is the closest city to the Project (Exhibit 1).

3.2 Watershed Hydrology

The modeled watershed area encompasses approximately 101 square miles that generally slopes to the east following Dry Creek. Dry Creek is a non-perennial stream that flows east through the northern portion of the Site and through the central portion of the modeled watershed.

3.3 Onsite Conditions

The Project is located within the valley that contains Dry Creek. The southern portion of the Site drains north along several concentrated flow paths towards Dry Creek. The northern portion of the Site drains east following Dry Creek. A small part of the eastern portion of the Project drains east. In general, the Site is on semi-flat terrain with slopes of less than 3%, although there are locations where the slopes reach roughly 10%.

US Fish and Wildlife Service National Wetlands Inventory (NWI Wetlands) provides information on the distribution of US wetlands and are shown in Exhibit 2. The NWI Wetlands dataset is not all-inclusive and other wetlands not shown may exist. The landcover on the Project area is primarily shrubland, pasture, and cropland (Exhibit 4), and the soils onsite primarily belong to Hydrologic Soil Groups A and B (Exhibit 3). Typically, A soils are Sands and B soils are Silty Sands.

The main potential hydrologic issues on Site are flooding and erosive velocities.

3.4 FEMA Flood Zones

FEMA has completed a study to determine flood hazards for part of the selected location; the Project area is covered by Flood Insurance Rate Map (FIRM) panels 5302370125B and 5302370250B (Appendix C). FIRM 5302370125B has been digitized and the flood zones can be seen in Exhibits 2 and 6-8. The flood hazards for the area within FIRM 5302370250B have not been studied. The Project contains areas of FEMA Zone A flood hazards surrounding Dry Creek (Exhibits 2 and 6-8). A FEMA Zone A flood hazard is a 100-year flood hazard with no defined base flood elevations. No preliminary or pending FEMA changes are proposed within the Project area.

4.0 Proposed Conditions

4.1 Proposed Conditions

The majority of the proposed solar facility will consist of above ground mounted solar modules. A climate-specific grass seed mix should be planted below the modules and would make up the majority of the land cover. A small amount of impervious surface will be added from the gravel access roads and electrical equipment pads. The Project should be designed to minimize grading and maintain existing drainage patterns. A flood analysis of pre-development and post development depths will need to be completed once civil design is finalized for permitting purposes.

4.2 Post-Construction Stormwater Management

Benton County has adopted the Washington Department of Ecology Stormwater Management Manual for Eastern Washington (SWMM EW) as their basis of design and review. In compliance with SWMM EW, the proposed development will require storage onsite for any increase in runoff for the 100-year, 24-hour storm. The basin design for any required storage will also follow the requirements outlined in the SWMM EW. As the project design advances, the post-construction stormwater management should be reviewed in further detail with the County Engineer.

5.0 FLO-2D Modeling

5.1 FLO-2D Modeling Overview

FLO-2D is a physical process model that routes rainfall runoff and flood hydrographs over flow surfaces or in channels using the dynamic wave approximation to the momentum equation. FLO-2D offers advantages over 1-D models and unit hydrograph methods by allowing for breakout flows and visualization of flows across a potential site. The primary inputs are a DTM (elevation data), curve numbers, and precipitation. No culverts were included in the model; all roadways and berms were assumed to overtop.

A FLO-2D model with 50-foot grid cells was utilized to model the watershed within and directly impacting the Site.

5.2 Elevation Data

The elevation data input into the FLO-2D model was a blend of 1-meter LiDAR data from USGS and 10-meter DEM data from USGS (Exhibit 5). The 1-meter LiDAR data was used for topographic coverage of the eastern portion of the modeled watershed, including onsite areas, and the 10-meter DEM data was used for topographic coverage of the western portion of the contributing watershed

(Exhibit 5). This data was incorporated into the DTM using the export to XYZ function in Global Mapper. These XYZ files are read directly into FLO-2D.

5.3 Watershed Soils and Land Cover

USDA-NRCS SSURGO soil data provides soil types within the Project boundary and full coverage of the contributing watershed. Soils are primarily classified as Hydrologic Soil Groups A and B within the Project boundary (Exhibit 3). Land cover was obtained from the USDA 2013 Crop Data Layer. Exhibit 4 displays the land cover classes for the entire watershed. Curve numbers were applied to each grid cell in the FLO-2D model based on intersecting the grid with the curve numbers (Exhibit 5).

5.4 Precipitation

Precipitation data was downloaded from NOAA Atlas 2 (Appendix A) and used for the FLO-2D analysis for the 100-Year, 24-Hour storm event. Using the 100-Year rainfall depth of 2.29 inches for this location allows for the best initial analysis in order to determine the worst areas of flooding and erosion. Rainfall inputs were distributed based on a SCS Type II distribution pattern.

6.0 Flood Analysis Results

6.1 Existing Conditions Flood Analysis

The analysis shows low to moderate water depths and velocities (Exhibits 6 through 7A) across the majority of the Site. During a 100-year storm, the flood depths across the majority of the Project area are less than 0.5 feet with velocities less than 1 foot/second, with the exception of within and adjacent to Dry Creek where the depths can reach as high as 6 feet. Several concentrated flow paths in the southern portion of the Site have higher flood depths but are generally less than 2.5 feet. See Table 3 below for a breakdown of flood depths within the Project.

Table 3 – Flood Depths Onsite

Peak Flow Depth (ft)	Percentage of Project Area
0.00 - 0.49	89.6%
0.50 - 1.00	4.6%
1.01 - 1.50	2.4%
1.51 - 2.00	1.4%
2.01 - 2.50	0.7%
2.51 - 3.00	0.5%
3.01 - 4.00	0.6%
4.01 - 6.00	0.2%
6.01+	0.0%

See Exhibits 6 through 7A for areas within the Project with higher flood depths and velocities.

6.2 Scour

Minimal scour is expected onsite except within and adjacent to Dry Creek (Exhibit 8). The scour depths calculated for this project are based on HEC-18 Pier Scour Equations of a 6-inch-wide pile perpendicular to flow. Scour calculations consist of local scour only with unarmored soils and pile bases to provide the conservative local scour results. These scour results do not account for general, rill, or gully scour.

7.0 Recommendations

Based on experience on similar projects, the Site is suitable for the planned development and hydrologic concerns can be addressed by either avoiding areas of high flood depths or through detailed engineering design.

8.0 Next Steps

1. Final engineering design should account for the flood depths and velocities presented in Exhibits 6-7A.
2. Facilities to be elevated 1' above the 100-year, 24-hour peak flood elevations.
3. Proposed facilities should avoid FEMA Flood Zones located onsite.
4. Stormwater management should be revisited to ensure the final design meets the local and state requirements.

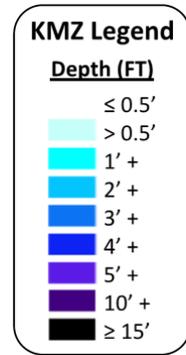
9.0 Included Output Files

1. Shapefile of 100-Year Rain Event Flow Depth
2021-11-24_Wautoma_100YearFlowDepth.shp
 Attribute "ID" = Grid Cell Number
 Attribute "VAR" = Max Flow Depth (Feet)

2. KMZ of 100-Year Rain Event Flow Depth
2021-11-24_Wautoma_100YearFlowDepth.kmz
 Overlay in Google Earth for graphical representation.

3. Shapefile of 100-Year Rain Event Velocity
2021-11-24_Wautoma_100YearVelocity.shp
 Attribute "ID" = Grid Cell Number
 Attribute "VAR" = Max Velocity (Feet)

4. KMZ of 100-Year Rain Event Velocity
2021-11-24_Wautoma_100YearVelocity.kmz
 Overlay in Google Earth for graphical representation.



10.0 References Cited

National Engineering Handbook, Part 630 Hydrology. Chapter 9 Hydrologic Soil-Cover Complexes. USDA. NRCS. 210-VI-NEH, July 2004

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Web soil survey. Retrieved December 2021, from <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

NOAA Atlas 2 Precipitation Frequency Estimates. Retrieved December 2021, from <https://www.nws.noaa.gov/oh/hdsc/noaaatlas2.htm>

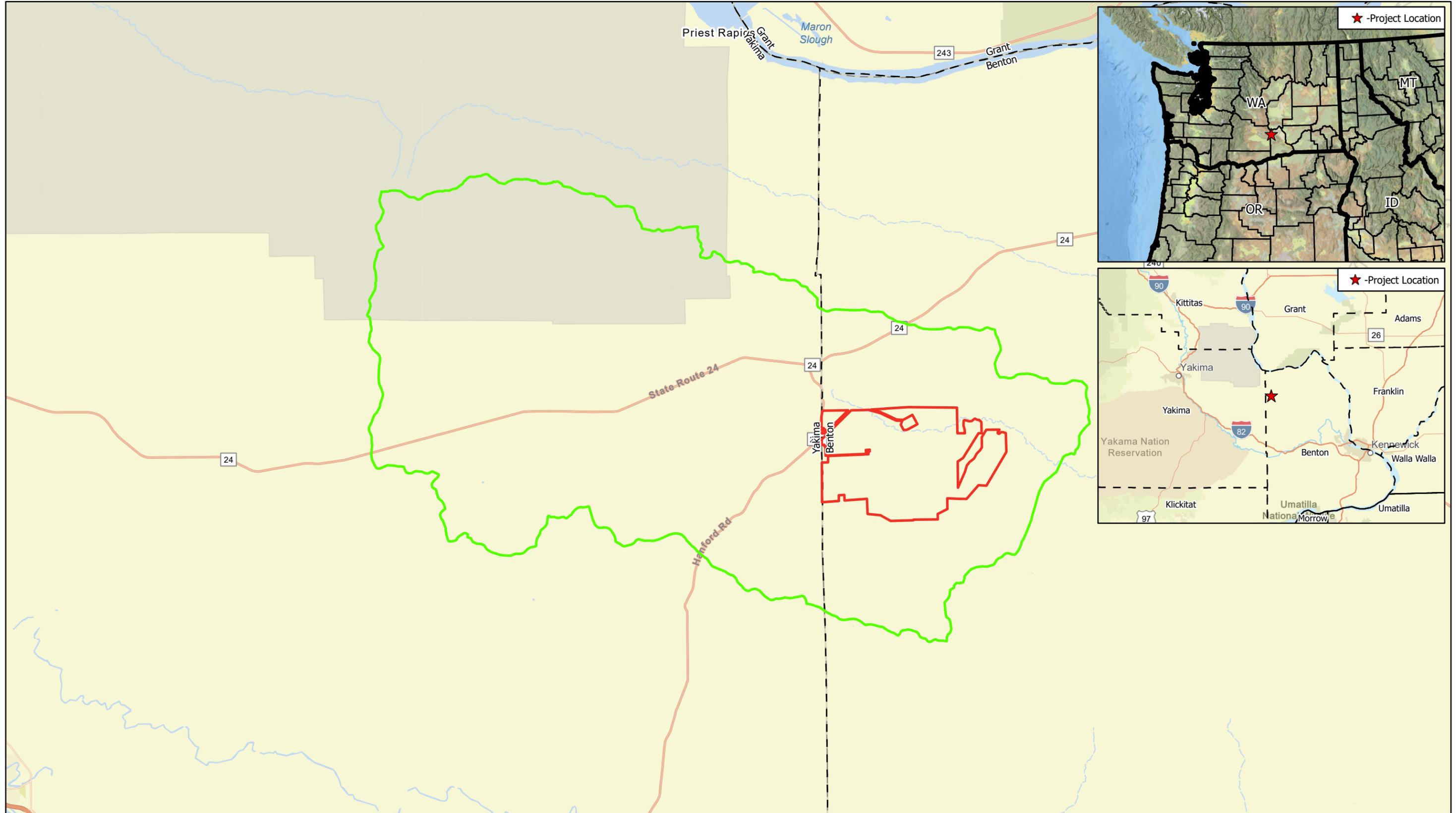
USGS. USGS water resources: About USGS water resources. Retrieved December 2021, from <https://water.usgs.gov/GIS/huc.html>

USDA 2013 Crop Data Layer, Landcover data, retrieved December 2021, from https://www.nass.usda.gov/Research_and_Science/Cropland/SARS1a.php

FEMA Flood Insurance Rate Maps, retrieved December 2021, from <https://msc.fema.gov/portal/advanceSearch#searchresultsanchor>

The background of the page is a dark red topographic map with intricate contour lines. A dashed red line runs vertically through the center, starting from a solid red dot at the bottom and ending with a red 'X' near the top. The word "Exhibits" is printed in white serif font on the left side of the map.

Exhibits



Data Source(s): Westwood (2021); Esri WMS Basemap Imagery (Accessed 2021); USGS (2021); FEMA (2021); USDA (2021)

Westwood
Toll Free (888) 937-5150 westwoodps.com

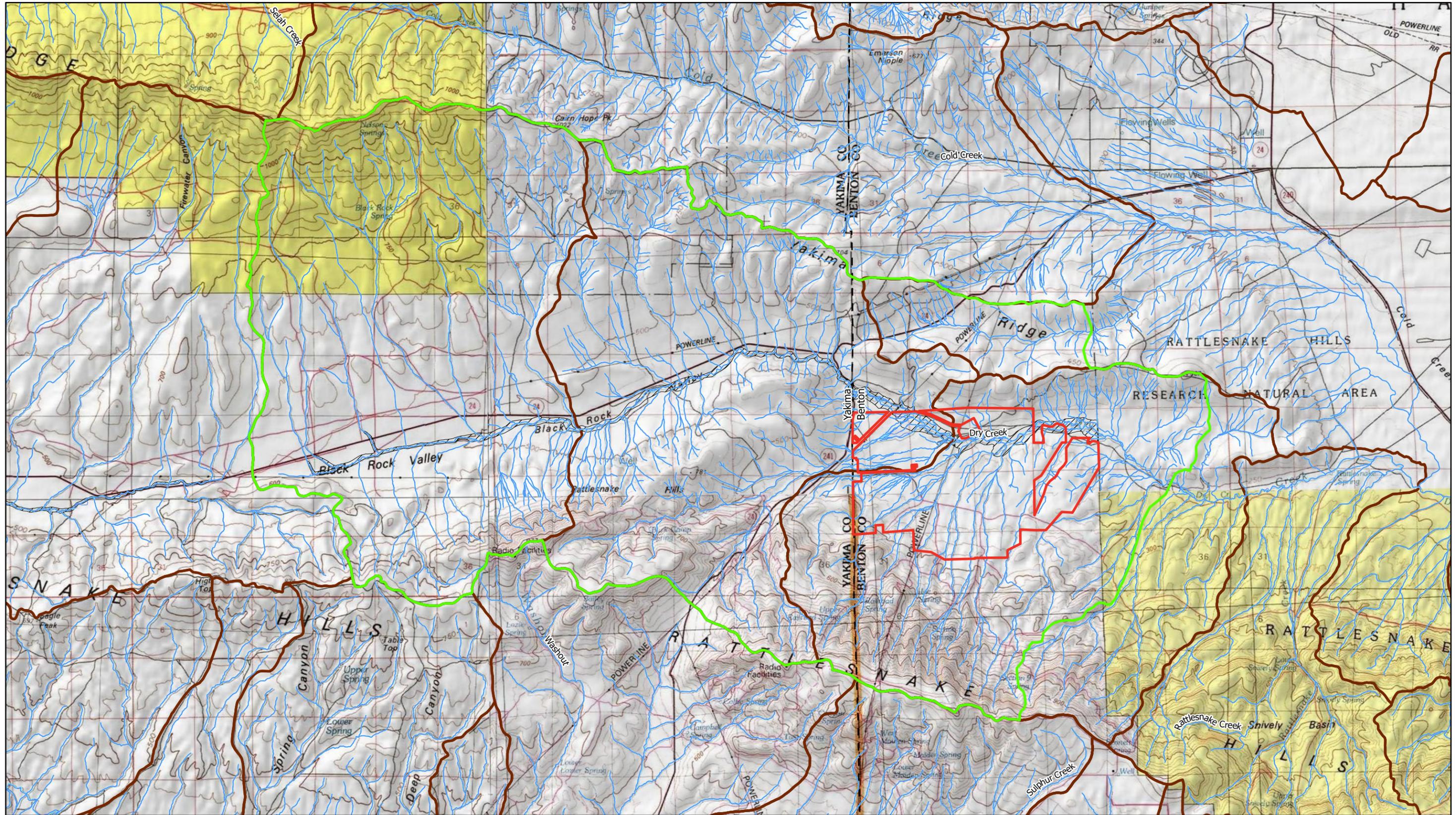
Legend

- Project Boundary
- County Boundary
- FLO-2D Boundary



Wautoma Solar Project
Benton County, Washington

Exhibit 1: Location Map
December 7, 2021



Data Source(s): Westwood (2021); Esri WMS BaseMap Imagery (Accessed 2021); USGS (2021); FEMA (2021); USDA (2021)

- Legend**
- Project Boundary
 - HUC 12 Boundary
 - NHD Flowline
 - FLO-2D Boundary
 - FEMA Zone A*
 - County Boundary
 - NWI Wetlands

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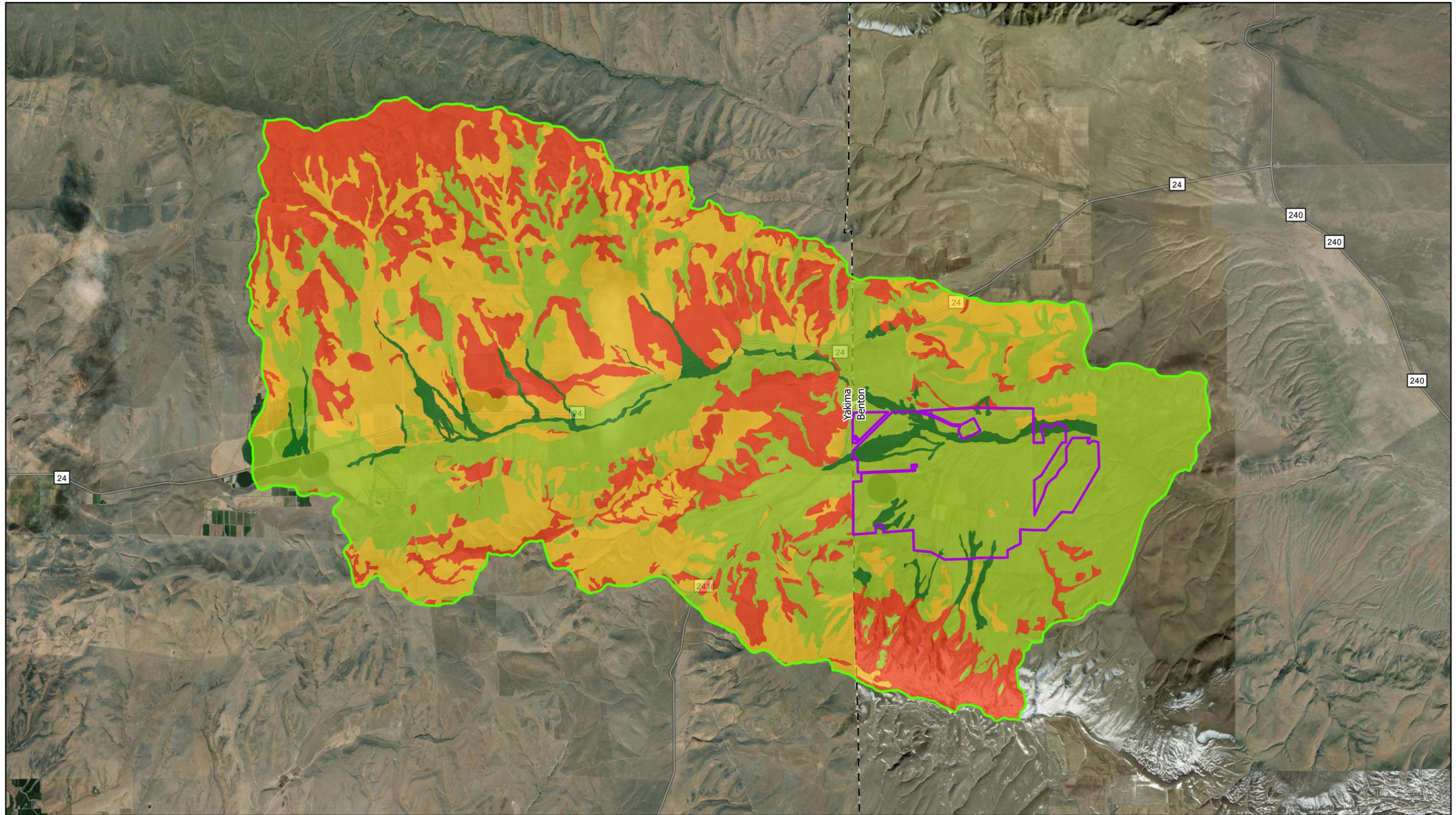
Wautoma Solar Project

Benton County, Washington

Exhibit 2: Base Map
December 8, 2021

*FEMA Data not available for the southern portion of the site

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Base Map - Base Map 1/28/2021 1:23 PM JKL:Hauser



Data Source(s): Westwood (2021); Esri WMS Basemap Imagery (Accessed 2021); USGS (2021); FEMA (2021); USDA (2021)

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Legend

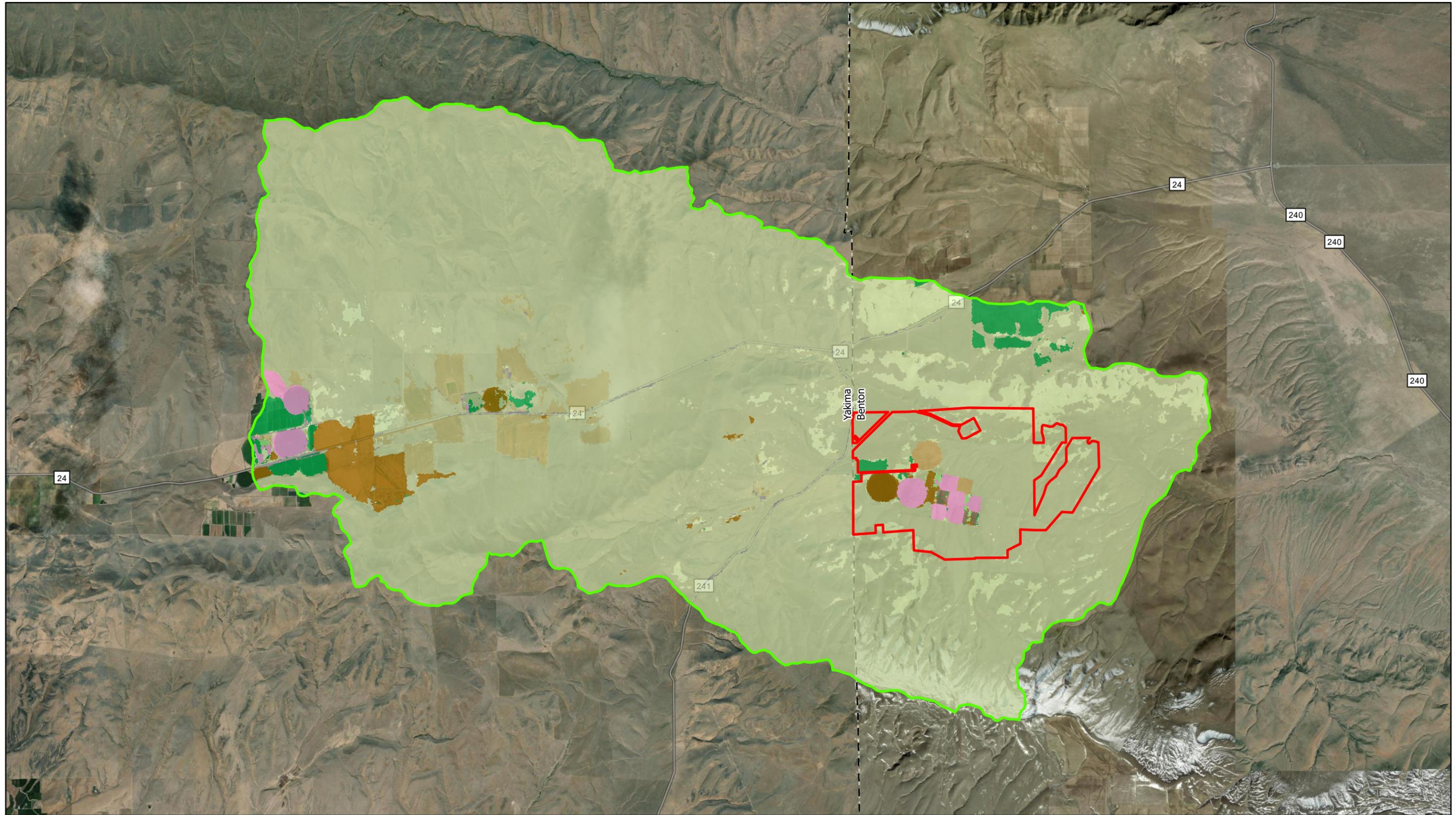
- Project Boundary
- County Boundary
- B
- FLO-2D Boundary
- Hydrologic Soil Group**
- C
- D
- A



Wautoma Solar Project
Benton County, Washington

Exhibit 3: Soils Map
December 8, 2021

N:\0033629_00_GIS_Working\Hydro_Exhibits\2021-12-06_Hydro_1-5\Wautoma Solar Project\Wautoma Solar Project.aprx
Soils Map - Soils Map 1/28/2021 10:32 AM JKH:Hauser



Data Source(s): Westwood (2021); Esri WMS Basemap Imagery (Accessed 2021); USGS (2021); FEMA (2021); USDA (2021)

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Legend

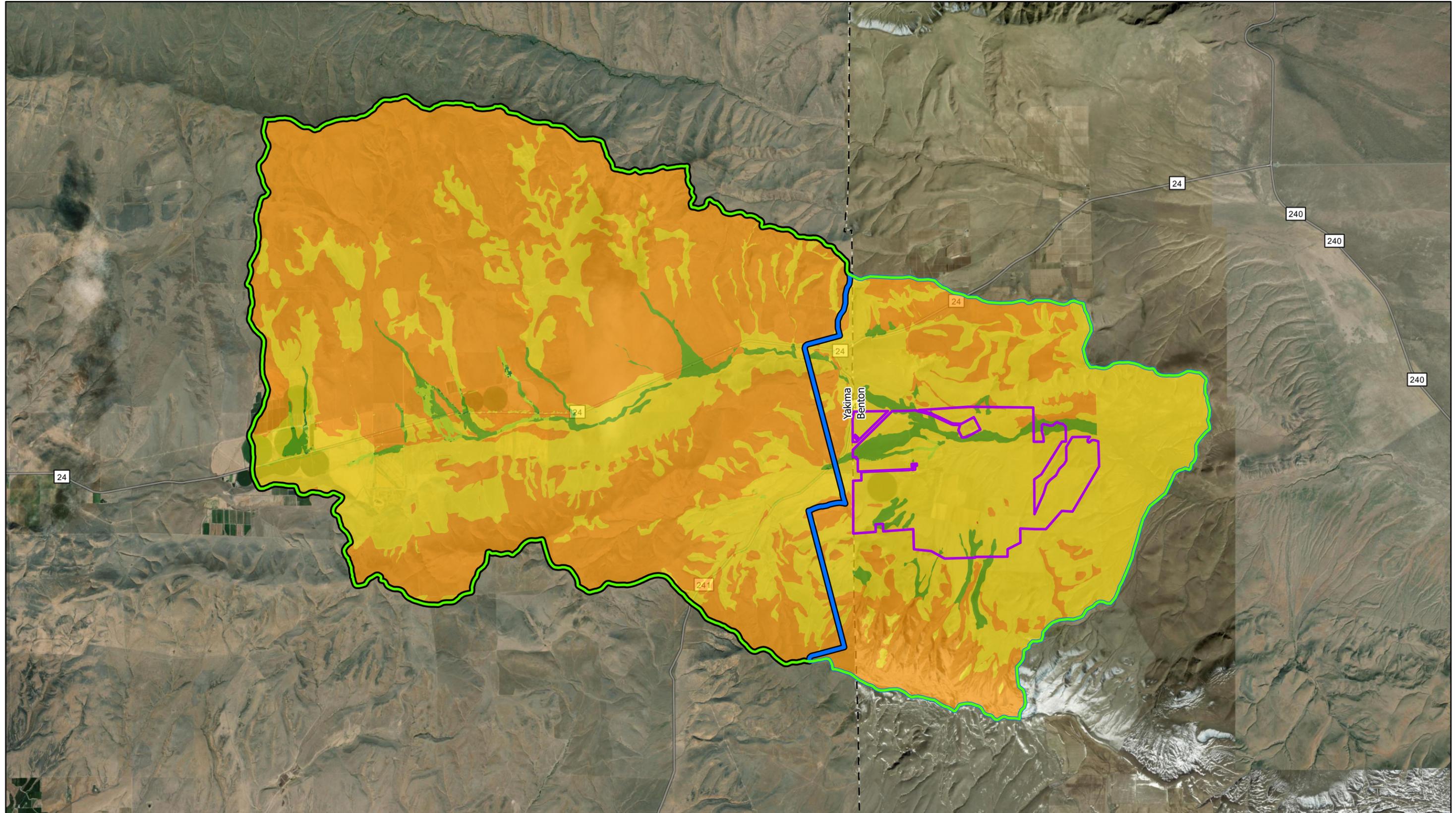
- | | | | |
|------------------|------------------|-----------------------|--------------|
| Project Boundary | Landcover | Fallow/Idle Cropland | Shrubland |
| FLO-2D Boundary | Alfalfa | Other Cropland | Spring Wheat |
| County Boundary | Developed | Grassland/Pasture | Winter Wheat |
| | Forest | Other Hay/Non Alfalfa | |



Wautoma Solar Project
Benton County, Washington

Exhibit 4: Landcover Map
December 8, 2021

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Landcover_Landcover_12/08/2021 10:57 AM | KCH:hauser



Data Source(s): Westwood (2021); Esri WMS Basemap Imagery (Accessed 2021); USGS (2021); FEMA (2021); USDA (2021)

Westwood
Toll Free (888) 937-5150 westwoodps.com

Legend

- | | | | |
|------------------|------------------|---------------------|---------|
| Project Boundary | 1-Meter Extents | Curve Number | 70 - 79 |
| FLO-2D Boundary | 10-Meter Extents | 40 - 49 | 80 - 89 |
| County Boundary | | 50 - 59 | 90 - 99 |
| | | 60 - 69 | |

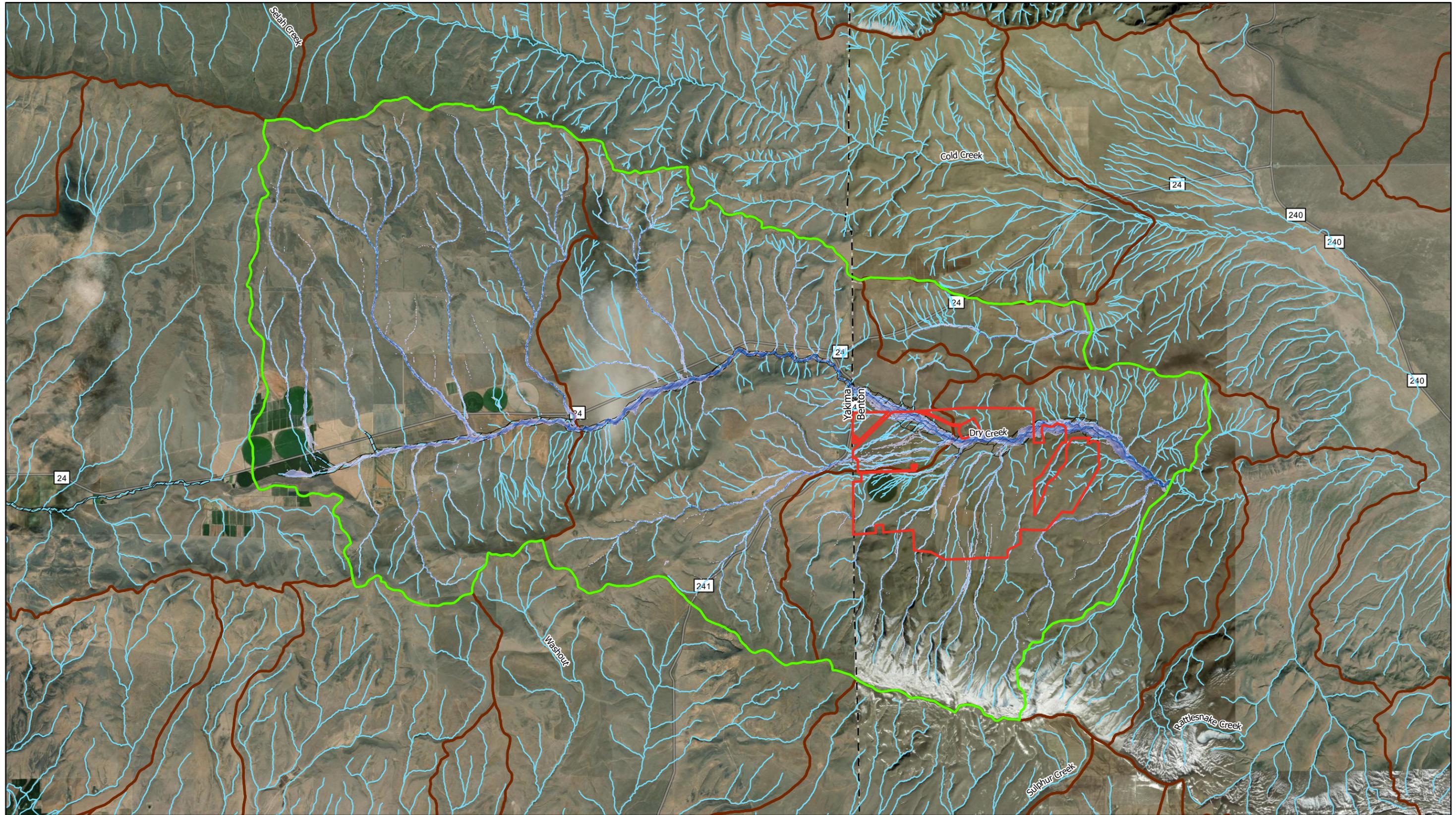


Wautoma Solar Project

Benton County, Washington

Exhibit 5: Curve Number and Topographic Source Map

December 8, 2021



Data Source(s): Westwood (2021); Esri WMS Basemap Imagery (Accessed 2021); USGS (2021); FEMA (2021); USDA (2021)

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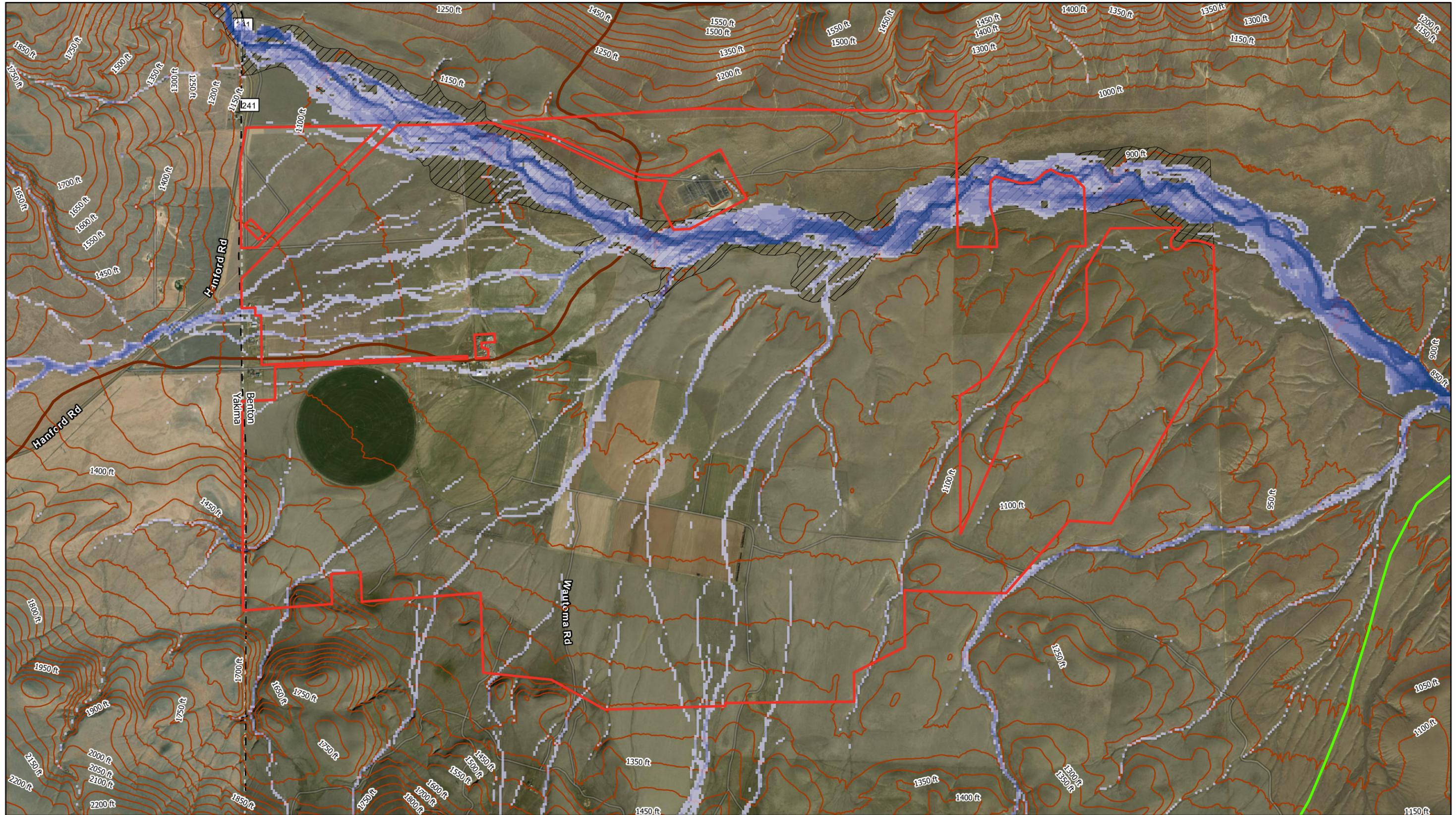
Legend

Project Boundary	FEMA Zone A*	1.01 - 1.50	3.01 - 4.00
FLO-2D Boundary	NHD Flowline	1.51 - 2.00	4.01 - 6.00
County Boundary	Peak Flow Depth (ft)	2.01 - 2.50	6.01 +
HUC 12 Boundary	0.50 - 1.00	2.51 - 3.00	

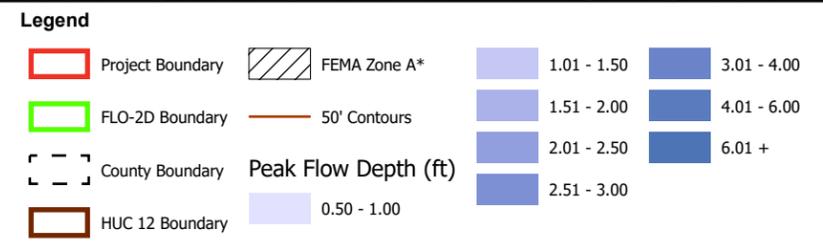
*FEMA Data not available for the southern portion of the site

Wautoma Solar Project
Benton County, Washington
Exhibit 6: 100-Year Max Flood Depth Map
December 9, 2021

N:\0033629_00_GIS_Working\Hydro\Exhibits\2021-12-08_Hydro-6-Wautoma Solar Project\Wautoma Solar Project.aprx 100 Yr Max Water Depth | 12/9/2021 3:49 PM | KLHauer



Data Source(s): Westwood (2021); Esri WMS Basemap Imagery (Accessed 2021); USGS (2021); FEMA (2021); USDA (2021)



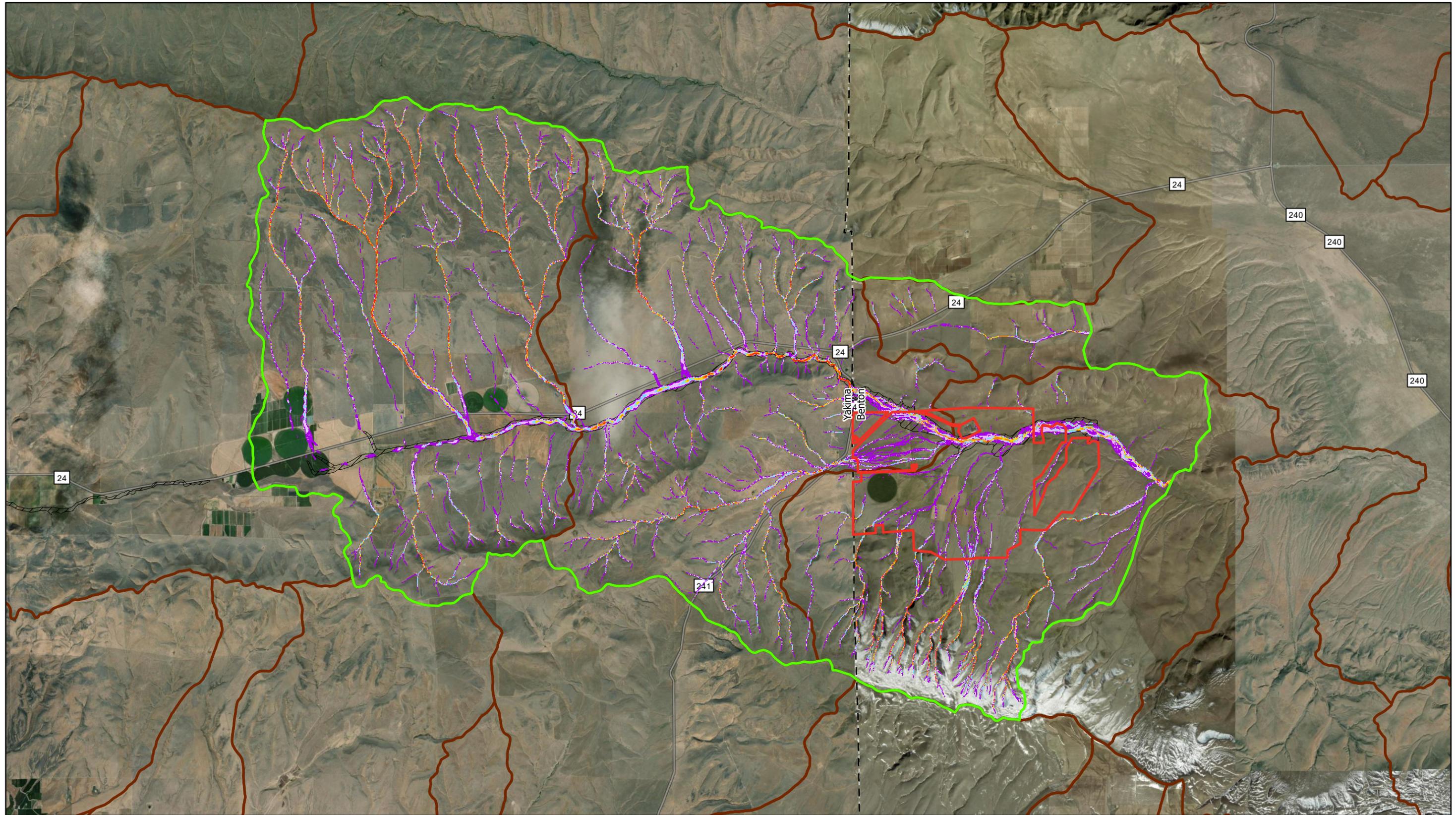
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Wautoma Solar Project
Benton County, Washington
Exhibit 6A: 100-Year Max Flood Depth Project Area Map
December 9, 2021

*FEMA Data not available for the southern portion of the site

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100 Yr Max Water Depth Project Area.aprx - 100 Yr Max Water Depth Project Area | 12/9/2021 3:55 PM | KLI:hauser



Data Source(s): Westwood (2021); Esri WMS Basemap Imagery (Accessed 2021); USGS (2021); FEMA (2021); USDA (2021)

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Legend

- Project Boundary
 - HUC 12 Boundary
 - FLO-2D Boundary
 - County Boundary
 - FEMA Zone A*
- | Peak Velocity (fps) | Color |
|---------------------|---|
| 1.00 - 1.50 | |
| 1.51 - 2.00 | |
| 2.01 - 2.50 | |
| 2.51 - 3.00 | |
| 3.01 - 4.00 | |
| 4.01 + | |

*FEMA Data not available for the southern portion of the site



Wautoma Solar Project
Benton County, Washington
Exhibit 7: 100-Year Peak Velocity Map
December 9, 2021

N:\0033629_00_GIS_WorkingHydro\Exhibits\2021-12-08_Hydro-6-8\Wautoma Solar Project\Wautoma Solar Project.aprx
100 Yr Peak Velocity Map - 100 Yr Peak Velocity | 12/9/2021 3:58 PM | KLI_Hauser



Data Source(s): Westwood (2021); Esri WMS Basemap Imagery (Accessed 2021); USGS (2021); FEMA (2021); USDA (2021)

Legend

- | | | | |
|------------------|-----------------|----------------------------|-------------|
| Project Boundary | HUC 12 Boundary | Peak Velocity (fps) | 2.51 - 3.00 |
| FLO-2D Boundary | FEMA Zone A* | 1.00 - 1.50 | 3.01 - 4.00 |
| County Boundary | 50' Contours | 1.51 - 2.00 | 4.01 + |
| | | 2.01 - 2.50 | |

*FEMA Data not available for the southern portion of the site

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Wautoma Solar Project
Benton County, Washington
Exhibit 7A: 100-Year Peak Velocity Project Area Map
December 9, 2021

N:\0033629_00_GIS_Working\Hydro\Exhibits\2021-12-08_Hydro-6-8\Wautoma Solar Project\Wautoma Solar Project.aprx
100 Yr Peak Velocity Project Area Map - 100 Yr Peak Velocity Project Area | 12/9/2021 4:05 PM | KJ.Hauser



Data Source(s): Westwood (2021); Esri WMS Basemap Imagery (Accessed 2021); USGS (2021); FEMA (2021); USDA (2021)

Legend

- | | | | |
|--|---|---|--|
|  Project Boundary |  HUC 12 Boundary | Scour (ft) |  2.01 + |
|  FLO-2D Boundary |  FEMA Zone A* |  1.00 - 1.50 | |
|  County Boundary |  50' Contours |  1.51 - 2.00 | |

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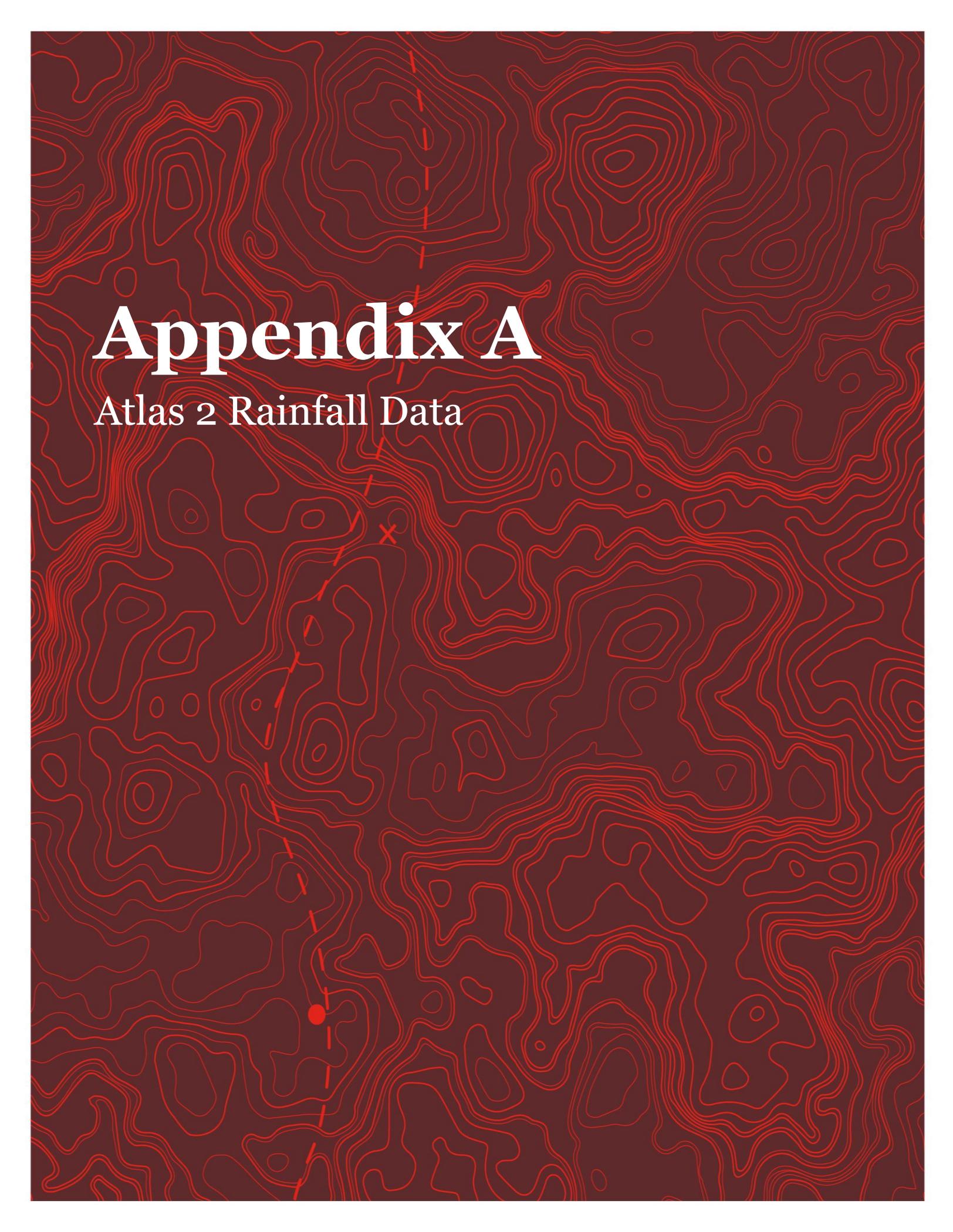
Wautoma Solar Project
Benton County, Washington



Exhibit 8: 100-Year Scour Map
December 9, 2021

*FEMA Data not available for the southern portion of the site

N:\0033629_00_GIS_Working\Hydro\Exhibits\2021-12-08_Hydro-6-8\Wautoma Solar Project\Wautoma Solar Project.aprx
100-Yr Scour Map - 100 Yr Scour | 12/9/2021 4:08 PM | JKH/raiser



Appendix A

Atlas 2 Rainfall Data

Precipitation Frequency Data Output

NOAA Atlas 2

Washington 46.59017908°N 120.04977851°W
Site-specific Estimates

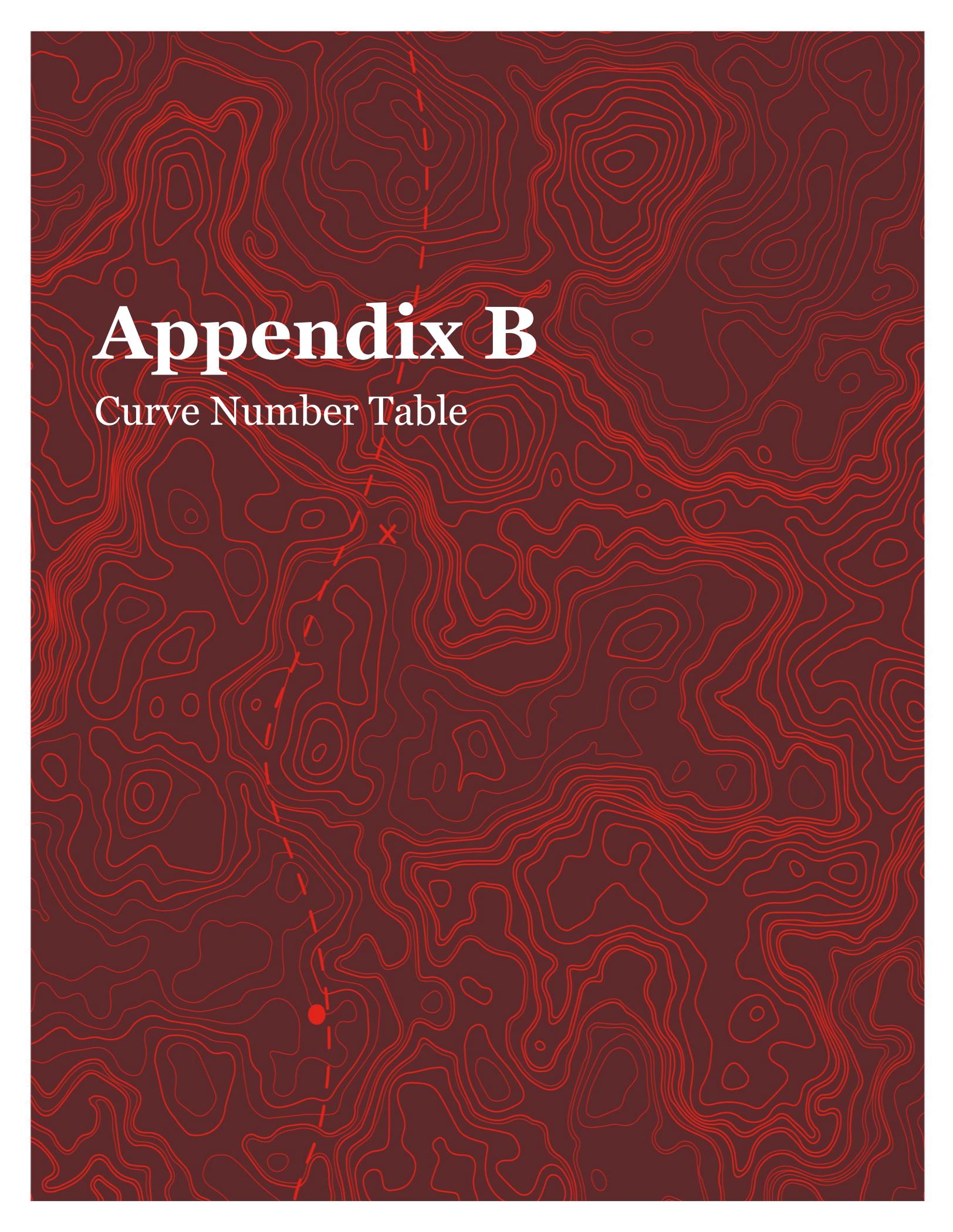
Map	Precipitation (inches)	Precipitation Intensity (in/hr)
2-year 6-hour	0.68	0.11
2-year 24-hour	1.04	0.04
100-year 6-hour	1.48	0.25
100-year 24-hour	2.29	0.10

[Go to PFDS](#)[Go to NA2](#)

Hydrometeorological Design Studies Center - NOAA/National Weather Service

1325 East-West Highway - Silver Spring, MD 20910 - (301) 713-1669

Mon Nov 22 15:08:51 2021



Appendix B

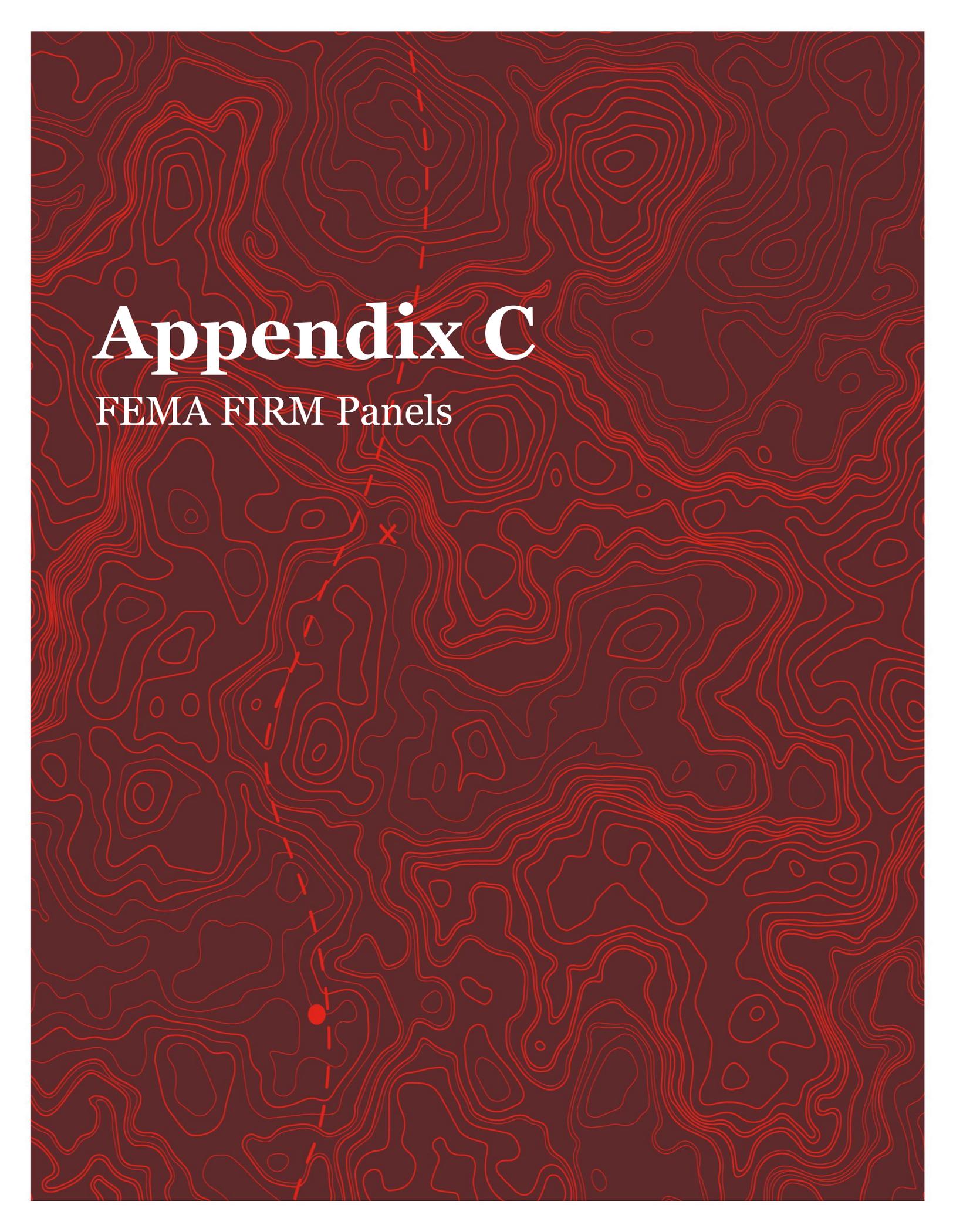
Curve Number Table

Table 2. Semi-Arid Curve Numbers (adapted from NEH 630)

Class	Value	Classification Description	Curve Number				
			Soil Type*				
			A	B	C	D	W
Water	11	Open Water - areas of open water, generally with less than 25% cover of vegetation or soil.	98	98	98	98	100
	12	Perennial Ice/Snow - areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover.	98	98	98	98	100
Developed	21	Developed, Open Space - areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.	46	65	77	82	100
	22	Developed, Low Intensity - areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.	61	75	83	87	100
	23	Developed, Medium Intensity - areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.	77	85	90	95	100
	24	Developed High Intensity - highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.	89	92	94	95	100
Barren	31	Barren Land (Rock/Sand/Clay) - areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.	77	86	91	94	100
Forest	41	Deciduous Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.	43	55	70	77	100
	42	Evergreen Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.	43	55	70	77	100
	43	Mixed Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.	43	55	70	77	100
Shrubland	51	Dwarf Scrub - Alaska only areas dominated by shrubs less than 20 centimeters tall with shrub canopy typically greater than 20% of total vegetation. This type is often co-associated with grasses, sedges, herbs, and non-vascular vegetation.	55	71	81	89	100
	52	Shrub/Scrub - areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.	55	71	81	89	100
Herbaceous	71	Grassland/Herbaceous - areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.	55	71	81	89	100
	72	Sedge/Herbaceous - Alaska only areas dominated by sedges and forbs, generally greater than 80% of total vegetation. This type can occur with significant other grasses or other grass like plants, and includes sedge tundra, and sedge tussock tundra.	55	71	81	89	100
	73	Lichens - Alaska only areas dominated by fruticose or foliose lichens generally greater than 80% of total vegetation.	55	71	81	89	100
	74	Moss - Alaska only areas dominated by mosses, generally greater than 80% of total vegetation.	55	71	81	89	100
Planted/Cultivated	81	Pasture/Hay - areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.	55	71	81	89	100
	82	Cultivated Crops - areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively tilled.	67	78	85	89	100
	83	Small Grains	63	75	83	87	100
Wetlands	91	Woody Wetlands - areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	45	66	77	83	100
	92	Emergent Herbaceous Wetlands - Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	45	66	77	83	100

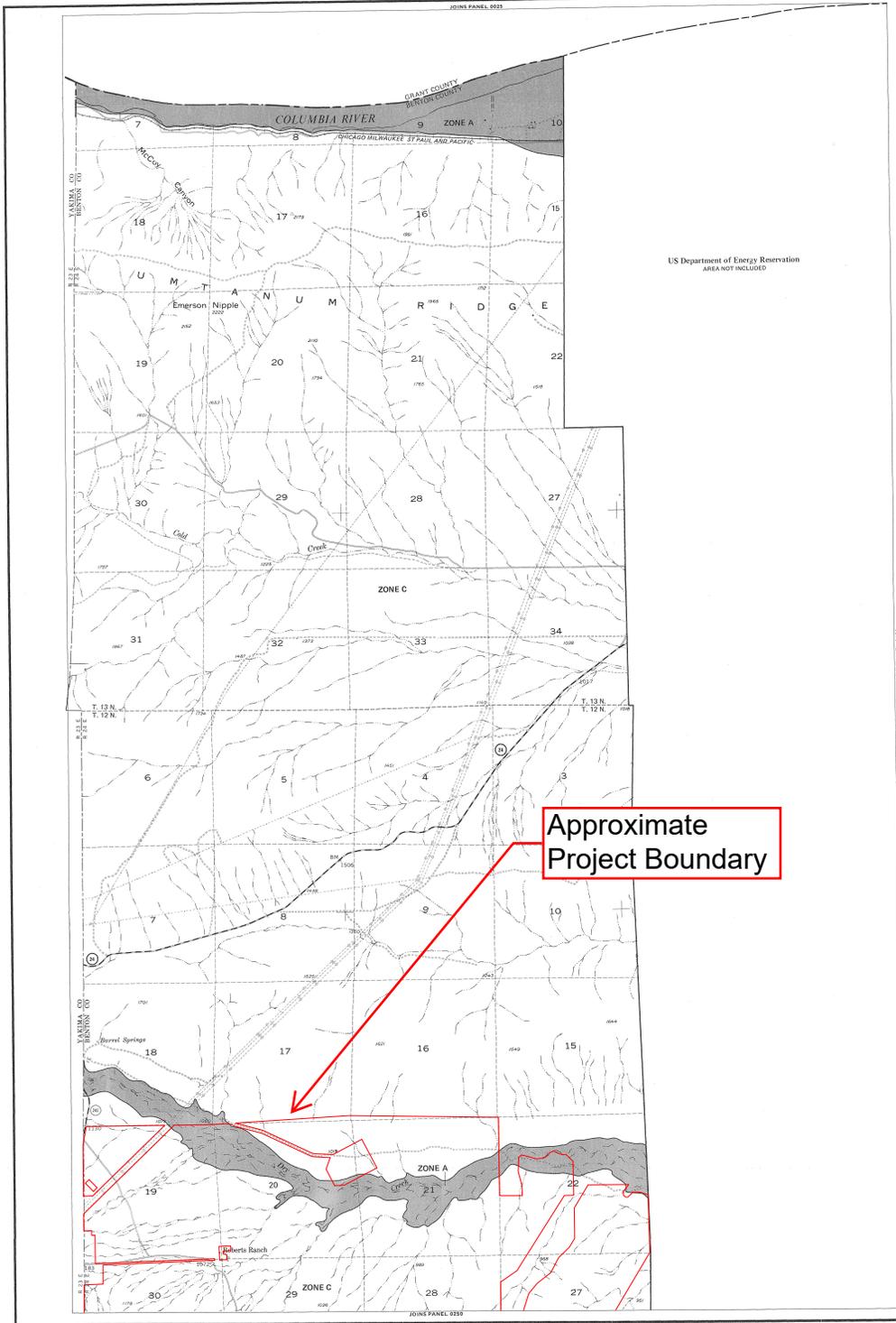
*A/D, B/D and C/D soils lumped as D soils, W denotes water

**Curve Numbers for NLCD Codes 41-43 have been increased from 30 to 43 as many of these areas are partially grazed Woods-grass combination.

The background of the page is a topographic map with red contour lines on a dark red background. A dashed red line runs vertically through the center of the page. There is a solid red dot on the dashed line in the lower-left quadrant and a red 'X' mark on the dashed line in the upper-left quadrant.

Appendix C

FEMA FIRM Panels



KEY TO MAP

500-Year Flood Boundary	ZONE B
100-Year Flood Boundary	ZONE A1
Zone Designations*	ZONE A2
100-Year Flood Boundary	ZONE B
500-Year Flood Boundary	ZONE B
Base Flood Elevation Line With Elevation in Feet**	EL 997.1
Base Flood Elevation in Feet Where Uniform Within Zone**	RM7.2
Elevation Referenced Mark	
Zone D Boundary	
River Mile	•M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

***EXPLANATION OF ZONE DESIGNATIONS**

ZONE

A Areas of 100-year flood; base flood elevations and flood hazard factors not determined.

A0 Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.

AH Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.

A1/A20 Areas of 100-year flood; base flood elevations and flood hazard factors determined.

A20 Areas of 100-year flood to be protected by flood protection systems; average elevations; base flood elevations and flood hazard factors not determined.

B Areas between limits of the 100-year flood and 500-year flood or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Median shading)

C Areas of minimal flooding (No shading)

D Areas of unincorporated, not possible, flood hazards.

V Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.

VI/V20 Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas may be in special flood hazard areas (zones A and V) and be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For additional map panels, see separately printed index to Map Panel.

INITIAL IDENTIFICATION:
AUGUST 1987

FLOOD HAZARD BOUNDARY MAP REVISIONS:

FLOOD INSURANCE RATE MAP EFFECTIVE:
JULY 19, 1982

FLOOD INSURANCE RATE MAP REVISIONS:

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when structural code apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at 800-638-6626.



Approximate Project Boundary

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

BENTON COUNTY, WASHINGTON
(UNINCORPORATED AREAS)

PANEL 125 OF 1075
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
530237 0125 B

EFFECTIVE DATE:
JULY 19, 1982

Federal Emergency Management Agency