Appendix G: Camas Solar Project Site Reports and Permit Applications

G-1: Camas Solar Project Critical Areas Report

G-2: Camas Solar Project Cultural Resources Report

G-3: Camas Solar Project Permit Applications

G-4: Camas Solar Project Geotechnical Engineering Study

G-5: Camas Solar Project Drainage Report

Appendix G-1: Camas Solar Project Critical Areas Report

CRITICAL AREAS WETLAND AND WATERS DELINEATION REPORT FOR THE CAMAS SOLAR PROJECT

July 10, 2017

SWCA ENVIRONMENTAL CONSULTANTS
SEATTLE, WASHINGTON

CRITICAL AREAS WETLAND AND WATERS DELINEATION REPORT FOR THE CAMAS SOLAR PROJECT KITTITAS COUNTY, WASHINGTON

Sections 18 and 19, Township 17 North, Range 19 East
Parcel Numbers 920233, 050233, 10566, 20568

Report Prepared for

TUUSSO Energy, LLC

By
Evan Dulin

July 10, 2017

Project Number 38727.05

SWCA Environmental Consultants
221 1st Ave W, Suite 205
Seattle, Washington 98119

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 INTRODUCTION

This report describes the methods and findings of wetland, stream, and other critical areas delineation for the proposed Camas Solar Project. The report was prepared by SWCA Environmental Consultants (SWCA), and is intended to address permitting requirements under Energy Facility Site Evaluation Council (EFSEC) Washington Administrative Code (WAC) 463-60-322, -332, and -333, and to show compliance of the proposed project with Kittitas County's Code for Critical Areas Ordinance (KCC Chapter 17A).

1.1 Background

TUUSSO Energy, LLC (TUUSSO) is proposing to construct a new photovoltaic solar facility installation on approximately 52.6 acres of private agricultural land, which would connect into the existing Puget Sound Energy (PSE) distribution transmission line along Tjossem Road, located southeast of Ellensburg, Kittitas County, Washington. The project is intended to provide up to 5 MW of solar energy to PSE for use within their service area.

1.2 Project Setting

The Camas Solar Project site is active agricultural land located immediately southeast of the intersection of Tjossem Road and Interstate 82 (I-82) in unincorporated Kittitas County, Washington. The project would be located approximately 2.25 miles southeast of the Ellensburg city center, in Sections 18 and 19 of Township 17 North, Range 19 East, Willamette Meridian (Figure 1). The project site totals approximately 52.6 acres. Topography of the site is fairly flat and slopes to the south towards Little Naneum Creek, with surface elevations ranging from 1,465 to 1,455 feet above mean sea level.

2 METHODS

2.1 Study Area

The Camas Solar Project site is approximately 52.6 acres in size (Figure 1). Wetlands and streams outside of the project site but that occur within 200 feet of the project site boundary and had the potential to have buffers extend into the project site were included in the study area. Wetlands and streams outside of the project site and within the study area were visually inspected but not formally delineated.

2.2 Review of Existing Information

Prior to conducting fieldwork, background materials were reviewed to determine the potential for wetlands, floodplains, habitats, and other critical areas and their buffers that may occur within the study area. Materials referenced during the desktop study are listed below. The list below follows the KCC Critical Areas required checklist outlined in KCC Chapter 17A.03.035.

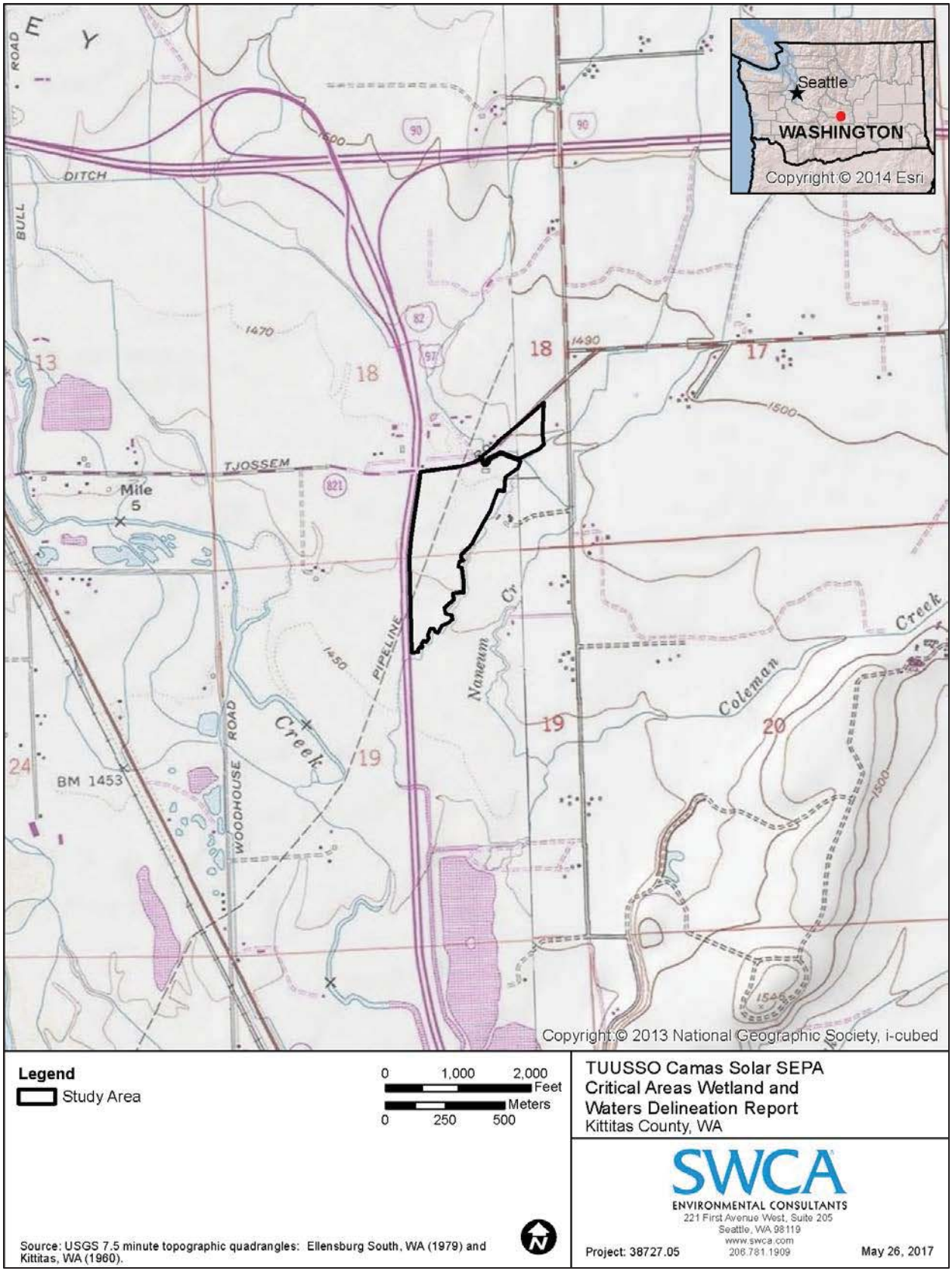


Figure 1. Project vicinity map.

Wetlands (KCC Chapter 17A.04)

- Historical Google Earth aerial photography (2000–2016).
- U.S. Department of Agriculture (USDA) historical imagery (USDA 1954).
- U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle map for Ellensburg South, Washington, included in Figure 1.
- USFWS National Wetlands Inventory (NWI) data and USGS National Hydrography Dataset (NHD), included in Figure 2.
- Natural Resources Conservation Service (NRCS) Soil Survey of Kittitas County Area, Washington and NRCS Web Soil Survey map of the study area, included in Figure 3.

Frequently flooded areas (KCC Chapter 17A.05)

- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel 5300950558B, included in Figure 2.

Geologically hazardous areas (KCC Chapter 17A.06)

- Includes erosion, landslide, mine, and seismic hazard areas.
- Kittitas County COMPAS mapping tool.

Habitats (KCC Chapter 17A.07)

- Includes riparian habitats and streams and rivers.
- Washington State Department of Fish and Wildlife (WDFW) SalmonScape online mapper.
- WDFW Priority Habitats and Species (PHS) online mapper, included in Figure 3.

Aquifer recharge areas (KCC Chapter 17A.08)

- No critical aquifer recharge locations have been identified in Kittitas County.

Spatial data obtained during the review of existing information were incorporated into the Camas Solar Project base maps (Figures 1 through 3).

2.3 Field Investigation

Following the desktop review of existing information, a team of two biologists conducted a site visit on April 10, 2017, to assess the Camas Solar Project study area for the presence of wetland and non-wetland water features and to record data relevant to the Washington State Department of Ecology's (Ecology's) most recently approved version of the *Washington State Wetland Rating System for Eastern Washington, 2014 Update* (Hruby 2014). Visual observations were recorded within 200 feet of the project site, and included wildlife and habitat data.

Precipitation data were obtained from the closest wetlands climate analysis (WETS) climate station, the Ellensburg National Weather Service (NWS) station (ELBW1), approximately 1.75 miles to the northwest of the project site in southern Ellensburg, Washington. Historical (1971–2000) average annual rainfall is 8.96 inches. Table 1 shows the monthly precipitation at the Ellensburg NWS weather station for the 3 months prior to the April 10, 2017, site visit. Table 2 shows the rainfall received 2 weeks prior to the site visit, and the water-year-to-date (WYTD) rainfall. Rainfall recorded 3 months prior to fieldwork was wetter than normal.

Figure 2. NWI, NHD, and floodplain mapping.

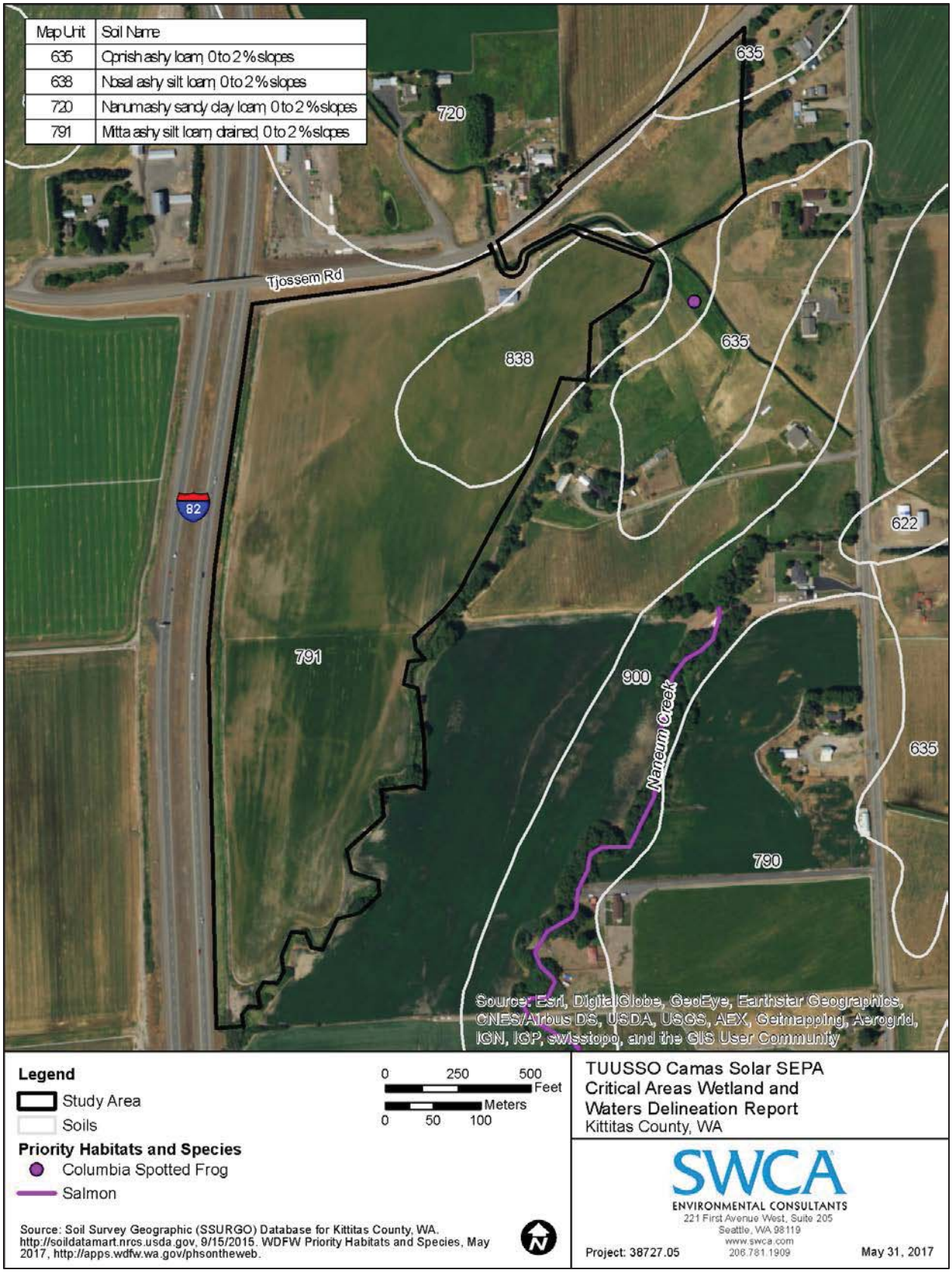


Figure 3. Soils and PHS mapping.

Table 1. Precipitation for 3 Months Prior to Site Visits (in inches)

Month	Average	30% Chance Will Have		Observed Precipitation	Within Normal Range?
		Less Than	More Than		
March	0.76	0.36	0.93	1.49	Above
February	0.91	0.59	1.10	2.04	Above
January	1.19	0.65	1.45	1.54	Above

Source: NRCS 2017b.

Table 2. Precipitation 2 Weeks Prior to Site Visits (in inches)

Field Study	Precipitation 2 Weeks Prior	WYTD	Inches Above or Below Normal WYTD*
April 9–March 27, 2017	0.76	9.37	3.11 above

*Based on average precipitation from 1981 to 2010.
Source: NRCS 2017b.

2.3.1 Wetlands

The Camas Solar Project study area was investigated for wetlands in accordance with the current methodology of the U.S. Army Corps of Engineers' (USACE's) 2008 *Arid West Regional Supplement (Version 2)* and the *Wetlands Delineation Manual* (Environmental Laboratory 1987). A detailed description of the field methods used in this study is provided in Appendix A.

A Trimble Geo XT global positioning system (GPS) unit was used by the field team to assist in identifying the project site boundaries and to record site spatial data. This device is capable of submeter accuracy. The full extent of the study area was covered by the team of biologists. Photographs were collected and vegetation, soil, and hydrology characteristics were documented. The boundaries for wetlands located outside of the project site but within the study area were approximated using field observations and aerial imagery to determine the extent of on-site wetland buffers.

Geographic information system (GIS) software were used to analyze data and to produce the report figures (Figures 4 and 5). Per WAC 463-60-333 and KCC Chapter 17A, wetlands were rated using the *Washington State Wetland Rating System for Eastern Washington, 2014 Update*. Per KCC 17A.04.020, the resulting wetland ratings were used to determine the County-prescribed range of wetland buffers for each wetland. Table 3 lists Ecology's wetland rating criteria. Kittitas County's definition of a wetland is based on the Revised Code of Washington (RCW) 36.70A.030, which states:

> *(21) "Wetland" or "wetlands" means areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from nonwetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificial wetlands intentionally created from nonwetland areas created to mitigate conversion of wetlands.*

A detailed analysis of wetland functions is not included in this report; however, a brief description of wetland functions is provided as part of the general description for each wetland.

Table 3. Washington State Department of Ecology Wetland Rating System

Category			
I	**II**	**III**	**IV**
Category I wetlands: Represent a unique or rare wetland type; are more sensitive to disturbance than most wetlands; are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime; or provide a high level of functions. Specific wetlands that meet the Category I criteria include: 1. alkali wetlands, characterized by the presence of shallow saline water with a high pH; 2. natural heritage wetlands, specifically, wetlands identified by the Washington Natural Heritage Program/DNR as high quality relatively undisturbed wetlands; and wetlands that support state-listed threatened or endangered plants; 3. bogs and calcareous fens; 4. mature and old-growth forested wetlands with slow growing trees that are over 0.25 acre in size; and 5. wetlands that perform many functions very well, as indicated by a score of 22 or more points out of 27 on the wetland rating form.	Category II wetlands: Wetlands that are difficult, though not impossible, to replace, and provide high levels of some functions. Specific wetlands that meet the Category II criteria include: 1. forested wetlands in the floodplains of rivers; 2. mature and old-growth forested wetlands with fast growing trees that are over 0.25 acre in size; 3. vernal pool that are located in a landscape with other wetlands and that are relatively undisturbed during the early spring; and 4. wetlands scoring between 19 and 21 points, out of 27, on the wetland rating form.	Category III wetlands: Wetlands that provide a moderate level of functions. Specific wetlands that meet the Category III criteria include: 1. wetlands scoring between 16 and 18 points, out of 27, on the wetland rating form.	Category IV wetlands: Wetlands that have the lowest levels of functions and are heavily disturbed. Specific wetlands that meet the Category IV criteria include: 1. wetlands scoring less than 16 points out of 27 on the wetland rating form.

Source: Hruby (2014).
Kittitas County wetland category definitions defer to Washington Administrative Code for guidance.
Appendix F includes the County-issued guidance.

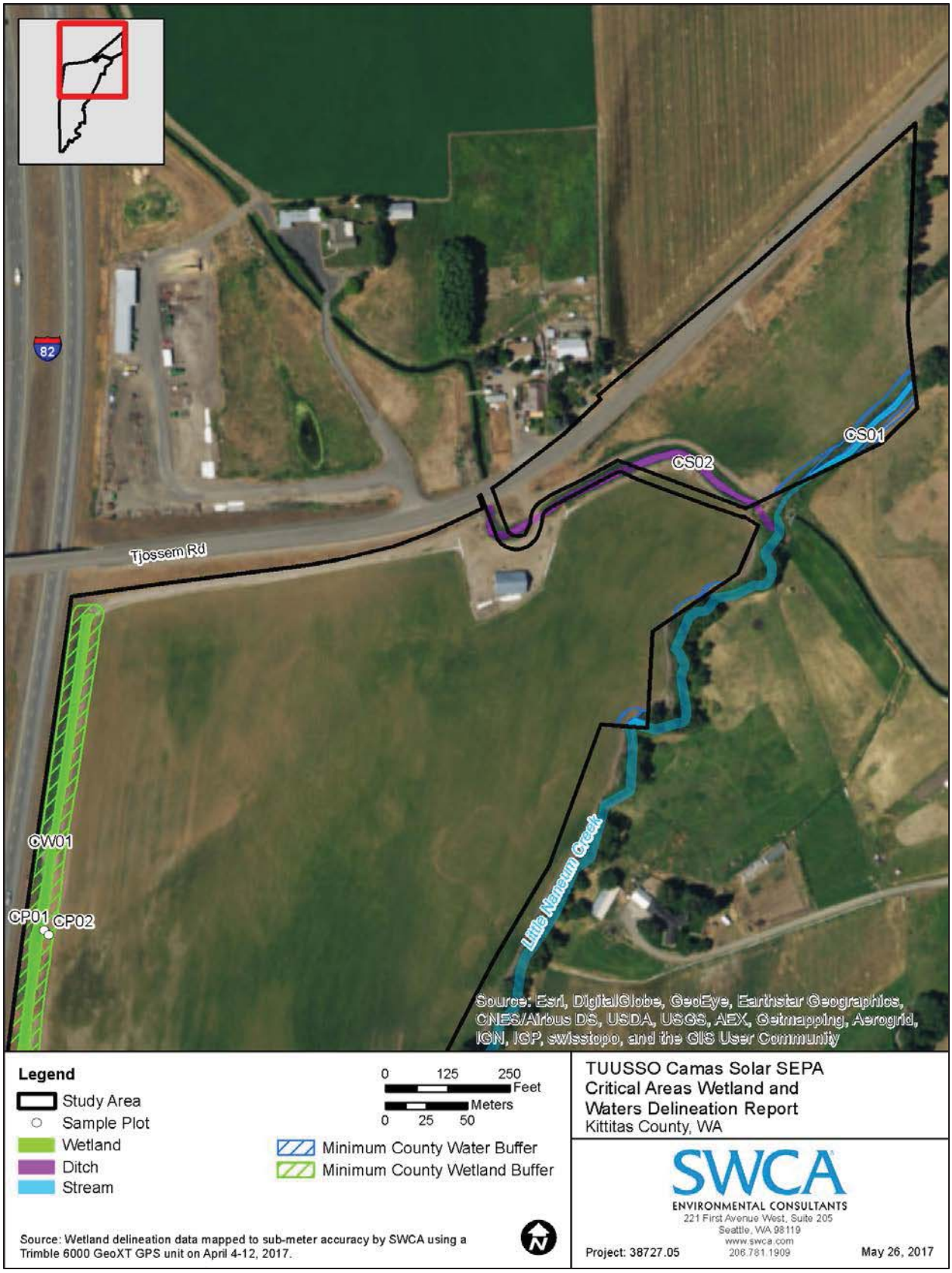


Figure 4. Wetland and waters delineation map, north portion.

Figure 5. Wetland and waters delineation map, south portion.

2.3.2 Riparian Habitats

Biologists also investigated the Camas Solar Project study area for the presence of non-wetland waters and used a GPS device to delineate the ordinary high water marks (OHWMs) of streams per the definitions in WAC 173-22-030 (Figure 5). The OHWMs of streams and rivers outside of the project site but within the study area were approximated using field observations and aerial imagery to determine the extent of on-site stream buffers.

Streams identified in the study area were classified according to the WAC stream typing system (WAC 222-16-030). Criteria for this typing system are described in Table 4. The stream types described in this report are based on the stream reaches within the study area; downstream reaches may be rated higher.

Table 4. Summary of the Water Typing System

Stream Type	Definition [a]
S	All waters, within their bankfull width, as inventoried as "shorelines of the state" under Chapter 90.58 RCW and the rules promulgated pursuant to Chapter 90.58 RCW including periodically inundated areas of their associated wetlands.
F	All segments of natural waters that are not Type S waters, and that contain fish or fish habitat, including: 1) waters diverted for domestic use by more than 10 residential or camping units or by a public accommodation facility; 2) waters diverted for use by a federal, state, or Tribal fish hatchery from the point of diversion for 1,500 feet or the entire tributary if the tributary is highly significant for protection of downstream water quality; 3) waters that are within a federal, state, local, or private campground having more than 10 camping units; or 4) riverine ponds, wall-based channels, and other channel features that are used by fish for off-channel habitat.
Np	All segments of natural waters within the bankfull width of defined channels that are perennial non–fish habitat streams. Perennial streams are flowing waters that do not go dry any time of a year of normal rainfall and include the intermittent dry portions of the perennial channel below the uppermost point of perennial flow.
Ns	All segments of natural waters within the bankfull width of the defined channels that are not Type S, F, or Np waters. These are seasonal, non–fish habitat streams in which surface flow is not present for at least some portion of a year of normal rainfall and the stream is not located downstream from any stream reach that is a Type Np water. Ns waters must be physically connected by an above-ground channel system to Type S, F, or Np waters.

[a] Definitions are summarized from WAC 222-16-030. Kittitas County stream type definitions defer to WAC for guidance.

3 RESULTS AND DISCUSSION

The Camas Solar Project site primarily consists of actively managed agriculture for growing alfalfa (*Medicago sativa*). An irrigation canal (Bull Ditch) enters the northern project site through a culvert beneath Tjossem Road, flows through the northeast corner of the project site for 675 feet, and exits the project site along the eastern boundary. Naneum Creek flows into the project site on the eastern boundary and flows southwest within the study area for about 4,250 feet, and exits the study area through a box culvert beneath I-82.

Some species of weeds and non-native herbaceous species occur around the edges of the agricultural land and in the interspace between planted alfalfa, including downy cheat grass (*Bromus tectorum*), common dead-nettle (*Lamium amplexicaule*), prickly lettuce (*Lactuca serriola*), garden yellow-rocket (*Barbarea vulgaris*), hairy cat's-ear (*Hypochaeris radicata*), and common dandelion (*Taraxacum officinale*), with some native species, such as common panic grass (*Panicum capillare*) and Gorman's desert-parsley (*Lomatium gormanii*). The portion of the study area north of Bull Ditch is dominated by mowed reed canary grass (*Phalaris* arundinacea) and blue grass (*Poa* sp.). Refer to Appendix B for a complete list of vegetation observed within the study area.

The proposed Camas Solar Project site is bordered by Tjossem Road to the north, I-82 to the west, and agricultural fields to the south and east. The project site is approximately 1.4 miles east of the Yakima River and is surrounded by active agricultural land and rural residences in all directions. Access to the proposed project site is via an access road from Tjossem Road, near the on-site barn.

According to NRCS, the Camas Solar Project study area encompasses three different soil map units (Table 5). These soil map units range from somewhat poorly drained to moderately well drained soils that occur on alluvial fans, flood plains, inset fans, fan skirts, and fan aprons. None of the soil units within the study area are on the National Hydric Soils list (NRCS 2015), which is a list of soils that can be indicative of saturated, flooded, or ponded areas that could meet the definition of a hydric soil.

Table 5. Soil Mapping within the Study Area

Map Unit Symbol	Map Unit Name	Hydric
635	Opnish ashy loam, 0 to 2 percent slopes	No
838	Nosal ashy silt loam, 0 to 2 percent slopes	No
791	Mitta ashy silt loam, drained, 0 to 2 percent slopes	No

Source: NRCS 2015 and 2017b.

3.1 Wetlands

One wetland was delineated within the Camas Solar Project study area. The wetland was distinguished from adjoining uplands by a significant change in topography and plant community. Wetland delineation data sheets are provided in Appendix C, photographs are provided in Appendix D, and wetland rating forms are provided in Appendix E.

Table 6 summarizes the size, rating, and classification of the wetland found within the Camas Solar Project study area. The delineated wetland would fall under the jurisdiction of the USACE, Ecology, and Kittitas County. Figures 4 and 5 show the locations of the wetlands, streams, data plots, and their associated minimum protection buffers. The minimum wetland protection buffers were calculated per KCC guidance, based on Ecology's Wetland Rating for each wetland. Detailed descriptions of each wetland are provided in the following sections.

Table 6. Wetland Size, Rating, and Classification for Wetlands within the Study Area

Wetland Name	Delineated Area within Project Site (Wetland Rating Unit Size) [a] (acres)	Wetland Rating [b]	Hydrogeomorphic Classification	Cowardin Classification [c]	Dominant Species Observed within Wetland
CW01	1.62 (1.72)	III	Riverine	PEM	Reed canary grass, broad-leaf cat-tail, pale-yellow iris

a Wetland rating unit size is the total area of wetland delineated or estimated based on aerial photograph interpretation and field reconnaissance. Area of delineated portions of the wetlands is based on SWCA survey data.

b Wetland ratings are based on *Washington State Wetland Rating System for Eastern Washington – Revised* (Hruby 2014).

c Cowardin et al. (1979).

3.1.1 Wetland CW01

Palustrine emergent
Category III
1.62 acres within the project site, approximately 1.72 acres in total

Wetland CW01 is a long, linear riverine wetland that parallels the western project site boundary (see Figures 4 and 5; and wetland rating Figures 1 through 5 in Appendix E). Delineation data were recorded at sample plots CP01 through CP03, provided on datasheets in Appendix C. The majority of the wetland is within the project site, with a small portion extending outside of the project site to the south where it connects to Little Naneum Creek. The upland boundary is defined by an obvious rise in elevation, a transition from hydric to non-hydric soils, and the absence of wetland hydrology indictors.

Wetland CW01 is a palustrine emergent (PEM) wetland habitat type (Cowardin et al. 1979). Refer to Table A-1 in Appendix A for definitions of wetland indictor statuses listed in this section (i.e., FACW and OBL). The wetland was dominated by reed canary grass (FACW), with smaller amounts of pale-yellow iris (*Iris pseudacorus*, OBL) and broad-leaf cat-tail (*Typha latifolia*, OBL) in the areas of longer inundation.

Soils in Wetland CW01 are mapped as Mitta ashy silt loam, drained, with 0% to 2% slopes (NRCS 2017a) (see Figure 3). The soil profile observed within 16 inches of the soil surface consisted of very dark grayish brown (2.5Y 3/2) silt loam over a black (2.5Y 2.5/1) silt loam with redoximorphic features starting at 8 inches (Munsell Color 2009). The soils in Wetland CW01 meet the hydric soil indicator for Redox Dark Surface (F6).

Primary indicators of hydrology within the wetland included surface water, and high water table and saturation within 12 inches. Surface water, 1 foot away from the sample pit, was 5 inches deep. Secondary indicators observed within the wetland included drift deposits (riverine). The presence of these indicators meets wetland hydrology criteria.

Wetland CW01 is rated as a Category III wetland in the Ecology rating system (see Table 3), with a moderately low score for water quality improvement (5/9 points) and moderate scores for hydrologic function and habitat function (6/9 points). Wetland CW01 has moderate potential to provide water quality function and hydrologic function because it has ungrazed herbaceous vegetation, a floodplain wider than its channel, it is located in an area with intensive land use that generates pollutants, and it discharges to a fork of Naneum Creek with water quality and flooding issues. Wetland CW01 has moderate potential to provide habitat function because it contains some vegetation structure diversity and open water, and is adjacent to three priority habitats including biodiversity areas and corridors, riparian, and instream habitat in Little Naneum Creek.

3.2 Frequently Flooded Areas

FEMA floodplain mapping depicts two 100-year floodplains within the Camas Solar Project study area (see Figure 2). The northernmost 100-year floodplain appears to have been a former overflow channel of Little Naneum Creek. The floodplain enters the study area in the north, heads west slightly, makes a gradual curve to the south, and follows the edge of the highway, encompassing Wetland CW01, to its confluence with Little Naneum Creek. The southernmost 100-year floodplain within the study area is associated with Little Naneum Creek. This floodplain encompasses the creek and trends from the northeast corner to the southwest corner of the study area. In total, the FEMA-mapped 100-year floodplain occupies 11.15 acres of the project site. Based on observations during the site visit, this mapped floodplain area does not appear to match the current site conditions and may be unreliable.

Regardless, development within the 100-year floodplain will be avoided or reduced to the maximum extent possible; therefore, no net loss of floodplain storage is expected as a result of the proposed project.

3.3 Geologically Hazardous Areas

The Camas Solar Project site is not within any mapped geologically hazardous areas. No erosion/landslide geologic hazard areas, snow avalanche hazards, or mine hazard areas are mapped on any of the parcels that encompass the project site (Kittitas County 2017). The project will not require specialized engineering to ascertain that the property is suitable for development.

3.4 Habitats

Based on the criteria provided in KCC Chapter 17A.07, the Camas Solar Project study area only includes riparian habitat. The project is not located on federal land or land owned or leased by the WDFW, and therefore is not considered big game winter range. An occurrence of the priority species, Columbia spotted frog (*Rana luteiventris*), is mapped about 200 feet southeast of the project site, adjacent to Bull Ditch.

3.4.1 Riparian Habitat

One perennial stream (Little Naneum Creek) and one irrigation ditch (Bull Ditch) are located in the Camas Solar Project study area. Both of these features continue outside of the project site, to the south and east. Based on the field observations, Little Naneum Creek would be considered a jurisdictional water by the USACE, Ecology, and Kittitas County because it satisfies the definition of "waters of the United States" under the Clean Water Rule 40 CFR 230.3. Bull Ditch is an irrigation canal and does not fall under the purview of the County, Ecology, or USACE. Table 7 summarizes the size, rating, and classification of the streams found in the study area (see Figures 4 and 5). Photographs of these features are provided in Appendix D.

Table 7. Summary of Streams in the Study Area

Stream Name	Tributary to	Stream Type [a]	USACE Jurisdiction [b]	Average Width in Study Area (feet) [c]	Approximate Length in Project Site (feet) [c]
Little Naneum Creek	Naneum Creek	F	RPW	19	2050
Bull Ditch	N/A	N/A	N/A	14	690

[a] F =fish-bearing stream (WAC 222-16-030), N/A = not applicable, due to canals being excluded from the WAC typing system.

[b] RPW = relatively permanent water, N/A = not applicable, due to exclusion from jurisdiction.

[c] Average widths and approximate lengths were determined based on SWCA survey data and field observations.

3.4.1.1 Little Naneum Creek

Little Naneum Creek is a perennial tributary to the Naneum Creek and the Yakima River. Little Naneum Creek is the north fork of Naneum Creek and combines with Naneum Creek about 0.5 mile south of the Camas Solar Project site. This fork of Naneum Creek is not mapped as having anadromous fish present (WDFW 2017a); however, a former fish passage barrier preventing anadromous fish from accessing this fork of Naneum Creek has recently been removed between the project site and Naneum Creek, which is documented to possess anadromous fish. Therefore, Little Naneum Creek is designated as a Type F water, based on the Washington Water Typing Criteria (WAC 222-16-030) and the presence of potential fish habitat.

The reach of Little Naneum Creek, within the Camas Solar Project study area, is somewhat altered from its natural condition. The creek flows unimpeded into the study area from the property to the northeast, where the creek flows southwest along the eastern project site boundary for about 150 feet, where a diversion channel captures and conveys some water parallel to the creek for about 200 feet, to Bull Ditch. Little Naneum Creek crosses over the top of Bull Ditch, which has been routed beneath the creek through a culvert.

Little Naneum Creek continues to travel a tightly meandering sinuous path southeast along the remainder of the eastern project site boundary, and then passes through a box culvert beneath I-82. The reach of the creek southwest of the Bull Ditch has moderate shrub cover for about 2,000 feet that gradually diminishes as the creek flows southwest. A small bridge crosses the creek. The southern 1,000 feet of the creek has little tree or shrub cover. Riparian vegetation along Little Naneum Creek consists mainly of crack willow (*Salix* X *fragilis*), Nootka rose (*Rosa nutkana*), black hawthorn (*Crataegus douglasii*), reed canary grass, Canadian thistle (*Cirsium arvense*), Fuller's teasel (*Dipsacus fullonum*), and singing nettle (*Urtica dioica*). The banks of the creek are relatively stable where adequate larger vegetation has stabilized the silt loam soils. The substrate of the creek consists of cobble, gravel, and sediment. There are many areas where large woody debris has fallen into the creek, which has caused moderate channel complexity. The creek is not constrained within the channel and floodplain roughness is relatively high, with abundant large woody debris, shrubs, and trees present along most of the reach.

Bull Ditch is an irrigation canal within the Camas Solar Project study area that was initially created in 1886 to serve 1,300 acres (Kittitas Reclamation District 2017). The canal enters the northern study area boundary through a culvert beneath Tjossem Road, flows through the northeastern portion of the project site for 675 feet, and exits the study area along the eastern boundary. The plant community is regularly sprayed with herbicide and dominated entirely by reed canary grass. Ditches and canals are excluded from the WAC typing system, therefore, Bull Ditch within the study area has not been assigned a stream type.

3.4.2 Priority Habitats and Species

There is one PHS-mapped occurrence of Columbia spotted frog about 200 feet southeast of the Camas Solar Project site, adjacent to Bull Ditch (WDFW 2017a). This occurrence is outside of the project site and the species would not likely be affected by the proposed project. In addition, salmon have been recorded in Naneum Creek downstream of the project site. Former fish barriers have been removed between this fish occurrence and Little Naneum Creek; therefore, fish could potentially utilize Little Naneum Creek now and in the future. For this reason, Little Naneum Creek could be subject to additional buffers requested by WDFW and Kittitas County. PHS mapping is depicted in Figure 3.

According to the PHS mapper, two species habitat areas overlap the Camas Solar Project study area. The PHS mapper shows an overlay for greater sage-grouse (*Centrocercus urophasianus*) breeding habitat at an accuracy level of quarter/quarter (1/8) Land Survey System (PLSS) section and encompasses the entire Camas Solar Project site. The PHS mapper also shows an overlay for sharp-tailed snake (*Contia tenuis*) at an accuracy level of quarter (1/4) PLSS section and overlaps the southern portion of the project site (WDFW 2017a). However, there is no suitable habitat for either of these species within the study area, and there is no potential habitat for sage grouse within 1 mile of the project site.

3.5 Aquifer Recharge Areas

As described in KCC 17A.08.010, no critical aquifer recharge locations have been identified in Kittitas County. Additionally, the Camas Solar Project will not involve any hazardous materials or disposal of on-site sewage. No well-heads have been identified within the study area.

4 CONCLUSIONS AND RECOMMENDATIONS

EFSEC will provide permitting requirements for the Camas Solar Project, but this report evaluates and shows compliance with County requirements. A review of the Camas Solar Project study area determined that the following Kittitas County defined critical areas have the potential to be affected by the project:

- Wetlands
- Frequently Flooded Areas
- Habitats:
    - Riparian Habitat

A summary of all wetlands, waters, and critical area buffers documented within the Camas Solar Project study area is provided in Table 8. The wetland and non-wetland waters identified in and adjacent to the study area will likely be determined jurisdictional by Ecology and the USACE. Although EFSEC will provide permitting requirements for the proposed project, to show compliance with County requirements, KCC guidance (Chapter 17A.07.010) defines a minimum 20-foot protection buffer for Type F waters, such as Little Naneum Creek. However, up to a 100-foot protection buffer could be requested once Kittitas County has had the opportunity to review the results of this study, and has had discussions with TUUSSO Energy (see Figures 4 and 5). KCC guidance does not define protection buffers for irrigation canals, such as Bull Ditch, because it does not qualify as a stream.

To show compliance with County requirements, the minimum and maximum wetland protection buffers defined by the KCC (Chapter 17A.04.020) are listed in Appendix F, and are provided for these wetlands in Table 8, but only the minimum protection buffers are depicted on Figures 4 and 5.

Table 8. Wetland and Waters Summary

Critical Area	Wetland Rating/Water Typing [a]	Kittitas County Minimum/Maximum Buffer Distances (feet) [b]	Total Size of Feature Within the Project Site (acres) [c]
Wetlands			
Wetland CW01	III	20 / 80 [d]	1.62
Frequently Flooded Areas			
100-year flood zone	N/A	N/A	11.15
Riparian Habitat			
Little Naneum Creek	F	20 / 100	0.57
Bull Ditch	N/A	None	0.14

[a] III = Category III (Hruby 2014); F = fish bearing water (WAC 22-16-030);
[b] Only minimum buffer distances are depicted on maps;
[c] Does not include buffer areas;
[d] No Kittitas County buffer is defined because the wetland area is below the minimum size threshold for protection; however, building setbacks may be required based on zoning lot line setbacks, but would not exceed 25 feet.

Design plans are incomplete for the proposed Camas Solar Project; however, TUUSSO Energy will attempt to design the project to avoid, reduce, or eliminate impacts to wetlands, waters, and their buffers. Following the finalization of the design footprint, all removal-fill activities proposed within jurisdictional features would require a Joint Aquatic Resources Permit Application (JARPA) submitted for USACE and Ecology review.

There is no minimum threshold to implement mitigation sequencing for potential impacts to wetland and waters features. Where possible, the Camas Solar Project should demonstrate avoidance of jurisdictional features and then minimization of impacts. Avoidance and minimization could be achieved by making minor design alterations around delineated feature boundaries.

Where impact avoidance is not possible, mitigation measures should be implemented to minimize temporary construction disturbance and other permanent alterations to the features. Mitigation would include the implementation of construction best management practices. Where permanent alterations to wetland and water features are unavoidable, wetland mitigation measures to achieve “no net loss” would be required. Desktop research shows that there are no approved mitigation banks or in-lieu fee programs in Kittitas County; therefore, any mitigation that would be required must be conducted as Advance Permittee-Responsible Mitigation. Under KCC guidance (Chapter 17A.04.050), the mitigation ratio for a Category III wetland is 1:1.

5 DISCLAIMER

This report documents the investigation, best professional judgment, and conclusions of the investigators. This should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and is not a final determination.

6 LITERATURE CITED AND REVIEWED

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. Washington, D.C.: U.S. Fish and Wildlife Service. Available at: http://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. Online edition. Vicksburg, Mississippi: U.S. Army Engineer Waterways Experiment Station. Available at: http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf.

Hruby, T. 2014. *Washington State Wetland Rating System for Eastern Washington – Revised.* Washington State Department of Ecology Publication No. 14-06-030. Olympia, Washington: Department of Ecology. Available at: https://fortress.wa.gov/ecy/publications/SummaryPages/1406030.html. Accessed March 10, 2017.

Kittitas County Code (KCC). 2017. Kittitas County, Washington, Ordinances and Resolutions. Available at: http://co.kittitas.wa.us/boc/countycode/. Accessed March 13, 2017.

Kittitas County. 2017. COMPAS Mapping Tool Parcel Report. Available at: https://gis.co.kittitas.wa.us/compas/default.aspx. Accessed May 15, 2017.

Kittitas Reclamation District. 2017. KRD History. Available at: http://krdistrict.org/history.htm. Accessed May 31, 2017.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List: 2016 Wetland Ratings.* Phytoneuron 2016-30:1–17. Available at: http://www.phytoneuron.net/ and http://rsgisias.crrel.usace.army.mil/NWPL/. Accessed May 3, 2016.

Munsell Color. 2009. Munsell Soil-Color Charts. Revised Edition. Grand Rapids, Michigan: Munsell Color.

Natural Resources Conservation Service (NRCS). 2008. *Hydrogeomorphic Wetland Classification System: An Overview and Modification to Better Meet the Needs of the Natural Resources Conservation Service*. Technical Note No. 190-8-79. Available at: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_010784.pdf.

———. 2015. List of Hydric Soils. December 2015. Available at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/. Accessed March 9, 2016.

———. 2017a. Web soil survey. Available at: http://websoilsurvey.nrcs.usda.gov/app/. Accessed March 10, 2017.

———. 2017b. WETS and precipitation data for Ellensburg, Washington. Available at: http://agacis.rcc-acis.org/. Accessed May 2, 2017.

Olson, P., and E. Stockdale. 2010. *Determining the Ordinary High Water Mark on Streams in Washington State*. Second Review Draft. Ecology Publication No. 08-06-001. Lacey, Washington: Washington State Department of Ecology, Shorelands and Environmental Assistance Program.

U.S. Army Corps of Engineers (USACE). 2008. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*, edited by J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-08-28. Vicksburg, Mississippi: U.S. Army Engineer Research and Development Center.

U. S. Department of Agriculture (USDA). 1954. Kittitas County. Central Washington Historical Aerial Photograph Project. Central Washington University, Department of Geography. Available at: http://www.gis.cwu.edu/geog/historical_airphotos/. Accessed on June 23, 2017.

U. S. Fish and Wildlife Service (USFWS). 2017. National Wetland Inventory. Wetlands Online Mapper. Available at: http://wetlandsfws.er.usgs.gov/wtlnds/launch.html. Accessed March 10, 2017.

Washington State Department of Ecology (Ecology). 1997. Washington State Wetland Identification and Delineation Manual. Publication No. 96-94. Olympia, Washington: Washington State Department of Ecology.

Washington State Department of Fish and Wildlife (WDFW). 2017a. Priority Habitats and Species on the Web. Available at: http://wdfw.wa.gov/mapping/phs/. Accessed March 10, 2017.

———. 2017b. SalmonScape. Available at: http://wdfw.wa.gov/mapping/salmonscape. Accessed March 10, 2017.

APPENDIX A: WETLAND DELINEATION METHODOLOGY

Wetlands are defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and which under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The methods used to delineate wetlands within the study area conform to guidance in the *Washington State Wetland Identification and Delineation Manual* (Ecology 1997), the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008).

To be considered a wetland by the U.S. Army Corps of Engineers (USACE), an area must express hydrophytic vegetation, hydric soils, and wetland hydrology. SWCA Environmental Consultants (SWCA) staff documented site conditions for these parameters in areas representative of the project site and in areas most likely to exhibit wetland features. Staff collected additional data in associated uplands, as needed, to confirm wetland boundaries. Wetland boundaries, stream boundaries, and wetland data plot locations in the study area were recorded with a Trimble Geo XT global positioning system (GPS) unit. All delineated wetlands and streams were processed and projected onto existing base maps using ArcGIS software.

Vegetation

The dominant and sub-dominant plants were identified and recorded at each sample plot location. These plants were evaluated based on their wetland indicator status to determine if the vegetation was hydrophytic. SWCA biologists utilized the 50/20 rule per USACE recommendations to determine which plants were dominant at each sample plot. Under this guidance, absolute cover estimates were made for each species found rooted within the sample plot radius for each vegetative strata found in the habitat (tree, sapling/shrub, herb, and woody vine). Refer to the USACE regional supplement for exact applications of this method of determining dominance (USACE 2008).

Sample plot radii varied in size depending on site topography and habitat complexity. When documenting vegetation in smaller or oddly-shaped wetlands or habitat features, vegetation strata radii may be adjusted to more accurately depict vegetation rooted within the wetland or habitat feature being delineated.

Hydrophytic vegetation is defined as vegetation adapted to wetland conditions, such as inundation or prolonged saturation. To meet the hydrophytic vegetation criterion, more than 50% of the total dominant plants across all stratums must have a wetland indicator status of Facultative (FAC), Facultative Wetland (FACW), or Obligate (OBL). The wetland indicator status is assigned to plant species that have the potential to occur in wetlands by the USACE (Lichvar et al. 2016). Table A-1 lists the definitions for each wetland indicator status.

Table A-1. Definitions for Each Wetland Plant Indicator Status

Wetland Indicator Status	Symbol	Definition
Obligate Wetland Plants	OBL	Plants that almost always (> 99% of the time) occur in wetlands, but which may rarely (< 1% of the time) occur in non-wetlands.
Facultative Wetland Plants	FACW	Plants that often (67 to 99% of the time) occurs in wetlands, but sometimes (1 to 33% of the time) occur in non-wetlands.
Facultative Plants	FAC	Plants with a similar likelihood (34 to 66% of the time) of occurring in both wetlands and non-wetlands.
Facultative Upland Plants	FACU	Plants that sometimes (1 to 33% of the time) occur in wetlands, but occur more often (67 to 99% of the time) in non-wetlands.
Upland Plants	UPL	Plants that rarely (< 1% of the time) occur in wetlands, and almost always (> 99% of the time) occur in non-wetlands.

Source: Lichvar et al. (2016).

SWCA biologists identified plants found in the field to species whenever possible, when adequate vegetative or flowering characteristics were available. Scientific and common plant names were reported with the currently accepted nomenclature.

Soils

An area typically must contain hydric soils to be considered a wetland, except when problematic site conditions occur. Hydric soils typically form under an area that experiences durations of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper portion of the soil profile. Chemical and biological processes in saturated soil result in reduced oxygen concentrations and promote anaerobic metabolism in microorganisms. These prolonged anaerobic conditions often create mottling and other distinct patterns in the soil, which are used as indicators of hydric soils. The hue, value, and chroma and relative percentage of mottling are recorded in the field at each data plot location. Other important hydric soil indicators include organic matter accumulations in the surface horizon, reduced sulfur odors, and organic matter staining in the soil profile (Natural Resource Conservation Service [NRCS] 2017a).

SWCA staff examined soil profiles at each data plot location by excavating sample pits to a depth of 16 to 20 inches to observe the soil profile, colors, and textures. In some cases, a shallower soil pit was used due to shovel refusal from obstructions in the soil profile, such as gravel, bedrock, thick roots, or clay hardpan. Munsell color charts (Munsell Color 2009) were used to determine soil colors in the field.

Hydrology

SWCA staff investigated the entire project site for evidence of wetland hydrology. Where data plot locations were taken, additional notes were recorded to fully document the presence of primary and secondary wetland hydrology indicators at the sample location. According to the USACE, wetland hydrology criteria were considered to be satisfied if the soil was seasonally inundated or saturated to the surface for a consecutive number of days greater than or equal to 12.5% of the growing season. The growing season for the area was determined based on the period in which temperatures are above 28 degrees Fahrenheit 5 out of 10 years (Ecology 1997) using the long-term climatological data collected by the NRCS (2017). Using the wetlands climate analysis (WETS) table for the nearest station (Ellensburg, Washington), the growing season was approximated as typically between April 20 and October 10, or a total of 173 days (NRCS 17b).

However, often times multiple site visits to determine the duration of seasonal inundation or saturation are not possible. Therefore, field indicators are used in an attempt to determine an area's hydro-period through field observations. Wetland hydrology indicators are divided into two categories: primary and secondary indicators (USACE 2008). Primary indicators of hydrology include, but are not limited to, surface inundation and high water table and saturated soils within 12 inches of the soil surface. The presence of one primary indicator is sufficient to conclude that wetland hydrology is present. Secondary hydrology indicators are also recorded and may substitute in the case of a lack of any primary indicators if multiple secondary indicators are observed. Secondary indicators of hydrology include, but are not limited to, drainage patterns, crayfish burrows, and dry-season water table (USACE 2008). If no primary indicators, and fewer than two secondary indicators, are observed within the sample area, then it is likely that the area is not considered a wetland, unless problematic conditions exist on-site. Aerial and historic imagery are often reviewed before and after site visits to ensure all possible hydrology indicators are taken into account.

References

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. Online edition. Vicksburg, MSMississippi: U.S. Army Engineer Waterways Experiment Station. Available at: http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List: 2016 Wwetland Rratings.* Phytoneuron 2016-30:1–17. Available at: http://www.phytoneuron.net/ and http://rsgisias.crrel.usace.army.mil/NWPL/. Accessed May 3, 2016.

Munsell Color. 2009. Munsell Soil-Color Charts. Revised Edition. Grand Rapids, Michigan: Munsell Color.

Natural Resources Conservation Service (NRCS). 2017a. *Field Indicators of Hydric Soils in the United States, a Guide for Identifying and Delineating Hydric Soils, Version 8.1*. Edited by L.M. Vasilas, G.W. Hurt, and J.F. Berkowitz. Available at: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_053171.pdf. Accessed March 10, 2017.

———. 2017b. WETS and precipitation data for Ellensburg, Washington. Available at: http://agacis.rcc-acis.org/. Accessed May 2, 2017.

U.S. Army Corps of Engineers (USACE). 2008. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*, edited by. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-08-28. Vicksburg, Mississippi: U.S. Army Engineer Research and Development Center.

United States Geological Survey (USGS). 2017. Kittitas Quadrangle, Washington – Kittitas County, 7.5 Minute Series. Available at: https://store.usgs.gov/map-locator

Washington State Department of Ecology (Ecology). 1997. Washington State Wetland Identification and Delineation Manual. Publication No. #96-94. Olympia, Washington: Washington State Department of Ecology.

APPENDIX B: VEGETATION LIST

Camas Solar Project
Vegetation Table
April 10, 2017

Common Name	Scientific Name	Wetland Indicator Status[1]	Native / Introduced and Invasive / Noxious
Lesser Burrdock	*Arctium minus*	FACU	non-native
Garden Yellow-Rocket	*Barbarea vulgaris*	FAC	non-native
Devil's-Pitchfork	*Bidens frondosa*	FACW	native
downy cheat grass	*Bromus tectorum*	NOL	non-native
Canadian Thistle	*Cirsium arvense*	FACU	invasive, noxious
Black Hawthorn	*Crataegus douglasii*	FAC	native
Fuller's Teasel	*Dipsacus fullonum*	FAC	invasive, noxious
tall annual willowherb	*Epilobium brachycarpum*	NOL	native
Sticky-Willy	*Galium aparine*	FACU	native
Hairy Cat's-Ear	*Hypochaeris radicata*	FACU	non-native, noxious
Pale-Yellow Iris	*Iris pseudacorus*	OBL	noxious
Prickly Lettuce	*Lactuca serriola*	FACU	non-native
common dead-nettle	*Lamium amplexicaule*	NOL	non-native
Gorman's desert-parsley	*Lomatium gormanii*	NOL	native
alfalfa	*Medicago sativa*	UPL	non-native
Spearmint	*Mentha spicata*	FACW	non-native
True Forget-Me-Not	*Myosotis scorpioides*	FACW	non-native
scotch thistle	*Onopordum acanthium*	NOL	noxious
Common Panic Grass	*Panicum capillare*	FACU	native
Dock-Leaf Smartweed	*Persicaria lapathifolia*	FACW	non-native
Reed Canary Grass	*Phalaris arundinacea*	FACW	invasive, noxious
English Plantain	*Plantago lanceolata*	FAC	non-native
bluegrass	*Poa species*	FAC ?	-
Nootka Rose	*Rosa nutkana*	FACU	native
Curly Dock	*Rumex crispus*	FAC	non-native
crack willow	*Salix X fragilis*	FAC	non-native
Narrow-Leaf Willow	*Salix exigua*	FACW	native
Russian thistle	*Salsola kali*	NOL	non-native
maidenstears	*Silene vulgaris*	NOL	non-native
Common Dandelion	*Taraxacum officinale*	FACU	non-native
False Mayweed	*Tripleurospermum maritimum*	FACU	non-native, noxious
Broad-Leaf Cat-Tail	*Typha latifolia*	OBL	native
Stinging Nettle	*Urtica dioica*	FAC	native
Great Mullein	*Verbascum thapsus*	FACU	non-native

[1]Wetland Indicator Status (WIS) from the NWPL AW Region - see below.

A question mark (?) preceded by a space indicates our default assumption that the plant is FAC.

Wetland Indicator Status (WIS) and taxonomy for the AW Region per the National Wetland Plant List 2016v3.3:
(common names are capitalized) http://wetland-plants.usace.army.mil/ Accessed January 10, 2017
WIS for non-wetland plants and taxonomy from Reed 1988 and Reed et al. 1993, and the USDA PLANTS database:
(common names are not capitalized) http://plants.usda.gov/ Accessed multiple dates

Native per Hitchcock & Cronquist 1973 and http://plants.usda.gov/
Noxious per Washington State NWCB 2017 http://www.nwcb.wa.gov/

WETLAND INDICATOR STATUS - Arid West Region	
OBL	**Obligate Wetland** – Almost always is a hydrophyte, rarely in uplands. Examples: broad-leaf cat-tail, yellow-skunk-cabbage
FACW	**Facultative Wetland** - Usually is a hydrophyte but occasionally found in uplands. Examples: Oregon ash, red osier
FAC	**Facultative** – Commonly occurs as either a hydrophyte or non-hydrophyte. Examples: red alder, salmon raspberry
FACU	**Facultative Upland** - Occasionally is a hydrophyte but usually occurs in uplands. Examples: big-leaf maple, Himalayan blackberry
UPL	**Upland** - Rarely is a hydrophyte, almost always in uplands. These plants have been removed from the NWPL WMVC Region.
NOL	**Not Listed** - Not on the list; assumed to be UPL.

APPENDIX C: WETLAND DATA SHEETS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Camas Solar Project City/County: - / Kittitas Sampling Date: 4/10/2017

Applicant/Owner: TUUSSO Energy, LLC State: WA Sampling Point: **CP01**

Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 18, T17N, R19E

Landform (hillslope, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): B, Columbia/Snake River Plateau Lat: 46.956698 Long: -120.506806 Datum: NAD 1983

Soil Map Unit Name: Mitta ashy silt loam, drained, 0 to 2 percent slopes (791) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X* (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?**	**Yes X No ____**
Hydric Soil Present?	Yes X	No ____		
Wetland Hydrology Present?	Yes X	No ____		

Precipitation prior to fieldwork: 0.76" two weeks prior, 2.65" above normal for CYTD, 3.11" above normal for WYTD. *Wetter than normal.

Remarks:

CW01. Wetland is in a man-made irrigation ditch between an ag. field and Interstate-82, but meets all wetland criteria.

VEGETATION

Tree Stratum (Plot size: 30' r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 10' r)			
1.			
2.			
3.			
4.			
5.			
	0% = Total Cover		
Herb Stratum (Plot size: 5' r)			
1. *Phalaris arundinacea*	35%	Yes	FACW
2. *Epilobium brachycarpum*	5%	No	NOL
3. *Iris pseudacorus*	5%	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	45% = Total Cover		
Woody Vine Stratum (Plot size: 10' r)			
1.			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	5	x 1 =	5
FACW species	35	x 2 =	70
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	45 (A)		100 (B)

Prevalence Index = B/A = 2.22

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

55% open water.

Entered by: KL/ED QC by: TJD

SOIL

Sampling Point: **CP01**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	2.5Y 3/2	100					SiL	
8-14	2.5Y 2.5/1	98	5YR 3/4	2	C	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distrubed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): N/A

Hydric Soil Present? Yes X No ___

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)
Very faint H_2S smell.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- X Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches):	5
Water Table Present?	Yes X	No ___	Depth (inches):	11
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches):	to surface

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Surface water within one foot of sample plot.

Entered by: KL/ED QC by: TJD

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Camas Solar Project City/County: - / Kittitas Sampling Date: 4/10/2017

Applicant/Owner: TUUSSO Energy, LLC State: WA Sampling Point: **CP02**

Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 18, T17N, R19E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): 1

Subregion (LRR): B, Columbia/Snake River Plateau Lat: 46.956672 Long: -120.506767 Datum: NAD 1983

Soil Map Unit Name: Mitta ashy silt loam, drained, 0 to 2 percent slopes (791) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X* (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No **X**	**Is the Sampled Area within a Wetland?**	**Yes** ____ **No** **X**
Hydric Soil Present?	Yes ____	No **X**		
Wetland Hydrology Present?	Yes ____	No **X**		

Precipitation prior to fieldwork: 0.76" two weeks prior, 2.65" above normal for CYTD, 3.11" above normal for WYTD. *Wetter than normal.

Remarks:
Sample plot located in planted alfalfa field.

VEGETATION

Tree Stratum (Plot size: 30' r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 10' r)			
1.			
2.			
3.			
4.			
5.			
	0% = Total Cover		
Herb Stratum (Plot size: 5' r)			
1. *Medicago sativa*	50%	Yes	UPL
2. *Hypochaeris radicata*	30%	Yes	FACU
3. *Panicum capillare*	10%	No	FACU
4. *Lactuca serriola*	5%	No	FACU
5. *Bromus tectorum*	5%	No	NOL
6.			
7.			
8.			
9.			
10.			
11.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: 10' r)			
1.			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species 0	x 1 =	0
FACW species 0	x 2 =	0
FAC species 0	x 3 =	0
FACU species 45	x 4 =	180
UPL species 55	x 5 =	275
Column Totals: 100 (A)		455 (B)

Prevalence Index = B/A = 4.55

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vascular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ____ **No** **X**

Remarks:

Entered by: KL/ED QC by: TJD

SOIL

Sampling Point: **CP02**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/2	100					SiL	
7-14	10YR 2/2	98	10YR 5/2	2	D	PL	SiCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distrubed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): N/A

Hydric Soil Present? Yes ___ **No X**

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	N/A
Water Table Present?	Yes ___	No X	Depth (inches):	>14
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	>14

Wetland Hydrology Present?

Yes ___ **No X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Entered by: KL/ED QC by: TJD

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Camas Solar Project City/County: - / Kittitas Sampling Date: 4/10/2017

Applicant/Owner: TUUSSO Energy, LLC State: WA Sampling Point: **CP03**

Investigator(s): Evan Dulin, Jamie Young Section, Township, Range: Section 19, T17N, R19E

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Convex Slope (%): 2

Subregion (LRR): B, Columbia/Snake River Plateau Lat: 46.951764 Long: -120.507035 Datum: NAD 1983

Soil Map Unit Name: Mitta ashy silt loam, drained, 0 to 2 percent slopes (791) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X* (If no, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?**	**Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X		

Precipitation prior to fieldwork: 0.76" two weeks prior, 2.65" above normal for CYTD, 3.11" above normal for WYTD. *Wetter than normal.

Remarks:
Sample plot located on the stream terrace between CW01 and CS01, just north of the confluence.

VEGETATION

Tree Stratum (Plot size: 30' r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0% = Total Cover		
Sapling/Shrub Stratum (Plot size: 10' r)			
1. *Salix X fragilis*	5%	Yes	FAC
2.			
3.			
4.			
5.			
	5% = Total Cover		
Herb Stratum (Plot size: 5' r)			
1. *Phalaris arundinacea*	100%	Yes	FACW
2. *Lactuca serriola*	5%	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105% = Total Cover		
Woody Vine Stratum (Plot size: 10' r)			
1.			
2.			
	0% = Total Cover		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	5	x 3 =	15
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	110 (A)		235 (B)

Prevalence Index = B/A = 2.14

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: Entered by: KL/ED QC by: TJD

SOIL

Sampling Point: **CP03**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-15	10YR 3/2	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distrubed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): N/A

Hydric Soil Present? Yes ___ **No X**

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	N/A
Water Table Present?	Yes ___	No X	Depth (inches):	>15
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	>15

Wetland Hydrology Present?

Yes ___ **No X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Entered by: KL/ED QC by: TJD

APPENDIX D: WETLAND AND STREAM PHOTOGRAPHS

Photo A. View north of northern portion of Wetland CW01.

Photo B. View south of the middle portion of Wetland CW01, with fellow flag iris.

Photo C. View south of southern portion of Wetland CW01.

Photo D. View south of the southern study area extent of Little Naneum Creek.

Photo E. View northeast of old bridge crossing of Little Naneum Creek.

Photo F. View east of beaver chew over Little Naneum Creek.

Photo G. View northwest of Bull Ditch at road crossing.

Photo H. View down of tree frog in Wetland CW01.

APPENDIX E: ECOLOGY RATING FORMS

Wetland name or number CW01

RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): CW01 Date of site visit: 4/10/17

Rated by N. Evan Dulin Trained by Ecology? ✓ Yes ___ No Date of training 3/24/17

HGM Class used for rating Riverine Wetland has multiple HGM classes? ___ Y ___ N

NOTE: Form is not complete without the figures requested (*figures can be combined*).

Source of base aerial photo/map Google Earth

OVERALL WETLAND CATEGORY III (based on functions ✓ or special characteristics ___)

1. Category of wetland based on FUNCTIONS

___ **Category I** – Total score = 22-27

___ **Category II** – Total score = 19-21

✓ **Category III** – Total score = 16-18

___ **Category IV** – Total score = 9-15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	Circle the appropriate ratings			
Site Potential	H M (L)	(H) M L	H (M) L	
Landscape Potential	H (M) L	H M (L)	H M (L)	
Value	H (M) L	H (M) L	(H) M L	TOTAL
Score Based on Ratings	5	6	6	17

Score for each function based on three ratings *(order of ratings is not important)*

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY *Circle the appropriate category*
Vernal Pools	II III
Alkali	I
Wetland of High Conservation Value	I
Bog and Calcareous Fens	I
Old Growth or Mature Forest – slow growing	I
Aspen Forest	I
Old Growth or Mature Forest – fast growing	II
Floodplain forest	II
None of the above	✓

Wetland name or number CW01

Maps and figures required to answer questions correctly for Eastern Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	D 1.3, H 1.1, H 1.5	
Hydroperiods (including area of open water for H 1.3)	D 1.4, H 1.2, H 1.3	
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	
Map of the contributing basin	D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	1
Hydroperiods	H 1.2, H 1.3	1
Ponded depressions	R 1.1	1
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	1
Map of the contributing basin	R 2.2, R 2.3, R 5.2	2
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	1
Width of wetland vs. width of stream *(can be added to another figure)*	R 4.1	1
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	3
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	4
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	5

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	L 1.1, L 4.1, H 1.1, H 1.5	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants *(can be added to figure above)*	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	S 3.3	

Wetland name or number CW01

HGM Classification of Wetland in Eastern Washington

For questions 1-4, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-4 apply, and go to Question 5.

1. Does the entire unit **meet both** of the following criteria?
   ___The vegetated part of the wetland is on the water side of the Ordinary High Water Mark of a body of permanent open water (without any plants on the surface) that is at least 20 ac (8 ha) in size
   ___At least 30% of the open water area is deeper than 10 ft (3 m)

   NO – go to 2 **YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

2. Does the entire wetland unit **meet all** of the following criteria?
   ✓ The wetland is on a slope (*slope can be very gradual*),
   ✓ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks;
   ___The water leaves the wetland **without being impounded**.

   NO - go to 3 YES – The wetland class is **Slope**
   NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).

3. Does the entire wetland unit **meet all** of the following criteria?
   ✓ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river;
   ✓ The overbank flooding occurs at least once every 10 years.

   NO - go to 4 YES – The wetland class is **Riverine**
   NOTE: The Riverine wetland can contain depressions that are filled with water when the river is not flooding.

4. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

   NO – go to 5 YES – The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-4 APPLY TO DIFFERENT AREAS IN THE WETLAND UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

Wetland name or number CW01

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the wetland unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM Class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine (the riverine portion is within the boundary of depression)	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number CW01

RIVERINE WETLANDS **Water Quality Functions** - Indicators that the site functions to improve water quality	Points (only 1 score per box)
R 1.0. Does the site have the potential to improve water quality?	
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions cover > 1/3 area of wetland — points = 6 Depressions cover > 1/10 area of wetland — points = 3 Depressions present but cover < 1/10 area of wetland — points = 1 No depressions present — points = 0	0
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height; **not** Cowardin classes): Forest or shrub > 2/3 the area of the wetland — points = 10 Forest or shrub 1/3 – 2/3 area of the wetland (5% shrub) — points = 5 Ungrazed, herbaceous plants > 2/3 area of wetland (100% ungrazed) — points = 5 Ungrazed herbaceous plants 1/3 – 2/3 area of wetland — points = 2 Forest, shrub, and ungrazed herbaceous < 1/3 area of wetland — points = 0	5
Total for R 1 — Add the points in the boxes above	5

Rating of Site Potential If score is: ___ **12-16 = H** ___ **6-11 = M** ✓ **0-5 = L** *Record the rating on the first page*

R 2.0. Does the landscape have the potential to support the water quality function of the site?	
R 2.1. Is the wetland within an incorporated city or within its UGA? Yes = 2 (No = 0)	0
R 2.2. Does the contributing basin include a UGA or incorporated area? Yes = 1 (No = 0)	0
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years? (Yes = 1) No = 0	1
R 2.4. Is > 10% of the area within 150 ft of wetland in land uses that generate pollutants (Yes = 1) No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1-R 2.4? Source_____ Yes = 1 (No = 0)	0
Total for R 2 — Add the points in the boxes above	2

Rating of Landscape Potential If score is: ___ **3-6 = H** ✓ **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

R 3.0. Is the water quality improvement provided by the site valuable to society?	
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi? (within 1 mile of Nanem...) (Yes = 1) No = 0	1
R 3.2. Does the river or stream have TMDL limits for nutrients, toxics, or pathogens? Yes = 1 (No = 0)	0
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? *Answer YES if there is a TMDL for the drainage in which wetland is found.* Yes = 2 (No = 0)	0
Total for R 3 — Add the points in the boxes above	1

Rating of Value If score is: ___ **2-4 = H** ✓ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number CW01

RIVERINE WETLANDS **Hydrologic Functions** - Indicators that site functions to reduce flooding and stream erosion		Points (only 1 score per box)
R 4.0. Does the site have the potential to reduce flooding and erosion?		
R 4.1. Characteristics of the overbank storage the wetland provides: *Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).* — If the ratio is more than 2 (ditch = 6', wetland = 20') If the ratio is 1-2 If the ratio is ½-<1 If the ratio is ¼-< ½ If the ratio is < ¼	points = 10 points = 8 points = 4 points = 2 points = 1	10
R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have > 90% cover at person height. These are NOT Cowardin classes).* Forest or shrub for more than $^2/_3$ the area of the wetland Forest or shrub for $>^1/_3$ area OR emergent plants $>^2/_3$ area (5% shrub 66% emergent (90%)) — Forest or shrub for $>^1/_{10}$ area OR emergent plants $>^1/_3$ area Plants do not meet above criteria	points = 6 points = 4 points = 2 points = 0	2
Total for R 5	Add the points in the boxes above	12

Rating of Site Potential If score is: ✓ **12-16 = H** ___ **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

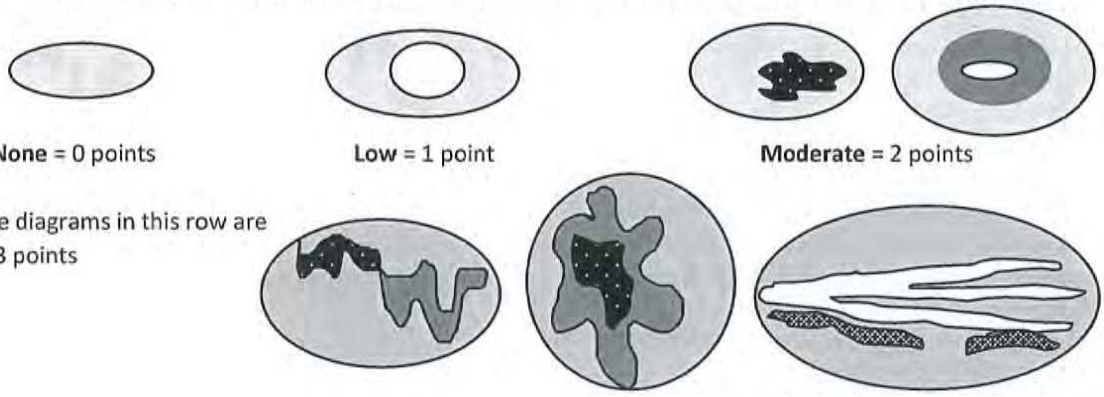
R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?		
R 5.1. Is the stream or river adjacent to the wetland downcut?	(Yes = 0) No = 1	0
R 5.2. Does the up-gradient watershed include a UGA or incorporated area?	Yes = 1 (No = 0)	0
R 5.3. Is the up-gradient stream or river controlled by dams? No, but highly controlled	(Yes = 0) No = 1	0
Total for R 5	Add the points in the boxes above	0

Rating of Landscape Potential If score is: ___ **3 = H** ___ **1 or 2 = M** ✓ **0 = L** *Record the rating on the first page*

R 6.0. Are the hydrologic functions provided by the site valuable to society?		
R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* The sub-basin immediately down-gradient of site has surface flooding problems that result in damage to human or natural resources — Surface flooding problems are in a basin farther down-gradient No flooding problems anywhere downstream	points = 2 points = 1 points = 0	1
R 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 (No = 0)	0
Total for R 6	Add the points in the boxes above	1

Rating of Value If score is: ___ **2-4 = H** ✓ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number CW01

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat	(only 1 score per box)
H 1.0. Does the wetland have the potential to provide habitat for many species?	
H 1.1. Structure of the plant community: *Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is >= ¼ ac or >= 10% of the wetland if wetland is < 2.5 ac.* ✓ Aquatic bed 10% ___ Emergent plants 0-12 in (0-30 cm) high are the highest layer and have > 30% cover ✓ Emergent plants >12-40 in (>30-100 cm) high are the highest layer with >30% cover 66% ✓ Emergent plants > 40 in (> 100 cm) high are the highest layer with >30% cover 10 % ___ Scrub-shrub (areas where shrubs have >30% cover) 5% ___ Forested (areas where trees have >30% cover) 4 or more checks: points = 3 — 3 checks: points = 2 2 checks: points = 1 1 check: points = 0	2
H 1.2. Is one of the vegetation types Aquatic Bed? (Yes = 1) No = 0	1
H 1.3. Surface water H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least ¼ ac **OR** 10% of its area during the March to early June **OR** in August to the end of September? *Answer YES for Lake Fringe wetlands.* 17% (Yes = 3 points & go to H 1.4) No = go to H 1.3.2 H 1.3.2. Does the wetland have an intermittent or permanent, and unvegetated stream within its boundaries, or along one side, over at least ¼ ac or 10% of its area? *Answer yes only if H 1.3.1 is No.* vegetated intermittent flow through wetland Yes = 3 (No = 0)	3
H 1.4. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft². *Different patches of the same species can be combined to meet the size threshold. You do not have to name the species.* *Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Russian olive, Phragmites, Canadian thistle, yellow-flag iris, and saltcedar (Tamarisk)* # of species ____ Scoring: > 9 species: points = 2 4-9 species: points = 1 — < 4 species: points = 0	0
H 1.5. Interspersion of habitats Decide from the diagrams below whether interspersion among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none. *Use map of Cowardin and emergent plant classes prepared for questions H 1.1 and map of open water from H 1.3. If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points **Low** = 1 point **Moderate** = 2 points All three diagrams in this row are **High** = 3 points Riparian braided channels with 2 classes	Figure__ 1

Wetland name or number CW01

H 1.6. Special habitat features	
Check the habitat features that are present in the wetland. The number of checks is the number of points. ___Loose rocks larger than 4 in OR large, downed, woody debris (> 4 in diameter) within the area of surface ponding or in stream. _✓_Cattails or bulrushes are present within the wetland. ___Standing snags (diameter at the bottom > 4 in) in the wetland or within 30 m (100 ft) of the edge. ___Emergent or shrub vegetation in areas that are permanently inundated/ponded. ___Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 45 degree slope) OR signs of recent beaver activity ___ Invasive species cover less than 20% in each stratum of vegetation *(canopy, sub-canopy, shrubs, herbaceous, moss/ground cover)*	1
Total for H 1 — Add the points in the boxes above	8

Rating of Site Potential If score is: ___**15-18 = H** _✓_**7-14 = M** ___**0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support habitat functions of the site?	
H 2.1. Accessible habitat (only area of habitat abutting wetland). If total accessible habitat is: *Calculate:* % undisturbed habitat 0 + [(% moderate and low intensity land uses)/2] 0 = 0 % > 1/3 (33.3%) of 1 km Polygon — points = 3 20-33% of 1km Polygon — points = 2 10-19% of 1km Polygon — points = 1 _✓_<10% of 1km Polygon — points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around wetland. (5+ Patches) *Calculate:* % undisturbed habitat 2 + [(% moderate and low intensity land uses)/2] 12 = 14 % Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches — points = 2 _✓_ Undisturbed habitat 10 - 50% and > 3 patches — points = 1 Undisturbed habitat < 10% of Polygon — points = 0 undis: 21 / 1150 ac = 2%; mid: 280 / 1150 ac = 24%	1
H 2.3. Land use intensity in 1 km Polygon: > 50% of Polygon is high intensity land use 74% — points = (- 2) Does not meet criterion above — points = 0	-2
H 2.4. The wetland is in an area where annual rainfall is less than 12 in, and its water regime is not influenced by irrigation practices, dams, or water control structures. *Generally, this means outside boundaries of reclamation areas, irrigation districts, or reservoirs* — Yes = 3 (No = 0)	0
Total for H 2 — Add the points in the boxes above	-1

Rating of Landscape Potential If score is: ___**4-9 = H** ___**1-3 = M** _✓_**< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose the highest score that applies to the wetland being rated* Site meets ANY of the following criteria: — points = 2 _✓_— It has 3 or more priority habitats within 100 m (see Appendix B) — It provides habitat for Threatened or Endangered species (any plant or animal on state or federal lists) — It is mapped as a location for an individual WDFW species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (see Appendix B) — points = 1 Site does not meet any of the criteria above — points = 0	2

Rating of Value If score is: _✓_**2 = H** ___**1 = M** ___**0 = L** *Record the rating on the first page*

Appendix B: WDFW Priority Habitats in Eastern Washington

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland: ***NOTE:*** *This question is independent of the land use between the wetland and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

✓— **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Old-growth/Mature forests:** Old-growth east of Cascade crest – Stands are highly variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. In general, stands will be >150 years of age, with 10 trees/ac (25 trees/ha) that are > 21 in (53 cm) dbh, and 1-3 snags/ac (2.5-7.5 snags/ha) that are > 12-14 in (30-35 cm) diameter. Downed logs may vary from abundant to absent. Canopies may be single or multi-layered. Evidence of human-caused alterations to the stand will be absent or so slight as to not affect the ecosystem's essential structures and functions. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west and 80-160 years old east of the Cascade crest.

— **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

✓— **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

✓— **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

— **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 12 in (30 cm)in eastern Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

— **Shrub-steppe:** A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).

— **Eastside Steppe:** Nonforested vegetation type dominated by broadleaf herbaceous flora (i.e., forbs), perennial bunchgrasses, or a combination of both. Bluebunch wheatgrass (*Pseudoroegneria spicata*) is often the prevailing cover component along with Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa secunda*), rough fescue (*F. campestris*), or needlegrasses (*Achnatherum* spp.).

— **Juniper Savannah:** All juniper woodlands.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.


CW01
Figure 1a
Legend
Aquatic bed/Emergent (>40") mix
CW01
Emergent cover (>90%/12-40")
Scrub-shrub
Width
G-1-60
197
Google earth
© 2016 Google
N
700 ft


CW01
Figure 1b
Legend
Aquatic bed/Emergent (>40") mix
CW01
Emergent cover (>90%/12-40")
Scrub-shrub
Width
82
G-1-61
Google earth
© 2016 Google
N
700 ft


CW01
Figure 2
Legend
CW01
Contributing Basin
Tjossem Rd
G-1-62
97
Woodhouse Loop
Number 8 Rd
Google earth
© 2016 Google
N
2000 ft


CW01
Figure 3
Legend
CW01
Mid-intensity
Undisturbed
82
Berry Rd
Tipsem Rd
Woodhouse Loop
G-1-63
Canyon Rd
Stone Rd
Number 6 Rd
97
Canyon View Ln
UT
Heron Ln
Google earth
© 2016 Google
N
4000 ft

April 28, 2017

CW01 - Figure 4

Assessed Waters/Sediment

Water
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Sediment
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Miles
0 0.25 0.5 1

DEPARTMENT OF ECOLOGY
State of Washington

Water Quality Improvement Projects (TMDLs)

WATER QUALITY IMPROVEMENT PROJECTS (TMDLs)

Overview of the process
Project Catalog
- by WRIA
- by County

Funding Opportunities
Project Development Priority Lists
Related Information
TMDL Contacts

RELATED ECOLOGY PROGRAMS

Water Quality

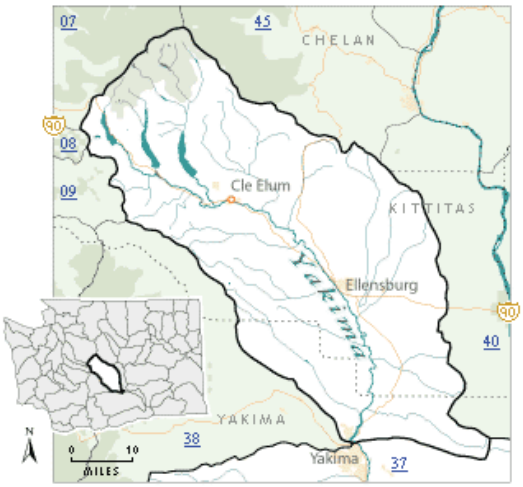
Water Quality Improvement > Water Quality Improvement Projects by WRIA > WRIA 39: Upper Yakima

WRIA 39: Upper Yakima

The following table lists overview information and links to specific water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area (WRIA). Please use links (where available) for more information on a project.

Yakima River basin project index:
www.ecy.wa.gov/programs/wq/tmdl/yakima_wq/index.html
Counties

- Kittitas
- Yakima



Project Name	Pollutants	Status**	TMDL Lead
Crystal Creek	Ammonia-N BOD (5-day) Chlorine Fecal Coliform	EPA approved	Jane Creech 509-454-7860
Selah Ditch	Fecal Coliform Temperature	EPA approved	Greg Bohn 509-454-4174
Teanaway River segments: • Upper West Fork Teanaway River • Upper Middle Fork Teanaway River • Upper North Fork Teanaway River • Stafford Creek • Lower West Fork Teanaway River • Lower Middle Fork Teanaway River • Lower North Fork Teanaway River • Mainstem Teanaway River	Temperature	EPA approved	Jane Creech 509-454-7860
Wilson/Cooke Creek Tributaries: • Badger Creek • Bull Ditch • Caribou Creek • Cherry Creek • CID Canal • Coleman Creek • Cook Creek • EWC Canal • Johnson Drain • KRD Canal	Fecal Coliform	EPA approved Has an implementation plan Post-TMDL monitoring report	Jane Creech 509-454-7860 Greg Bohn 509-454-4174

Mercer Creek • Naneum Creek • Parke Creek • Whiskey Creek • Wilson Creek • Wipple Wasteway			
Yakima River, Upper	Dieldrin DDT Suspended Sediments Turbidity	EPA approved	Jane Creech 509-454-7860
	Temperature	EPA approved Has an implementation plan	Jane Creech 509-454-7860
Yakima River	Toxics	Under development	Jane Creech 509-454-7860

**** Status** will be listed as one of the following: Approved by EPA, Under Development or Implementation. No status means project work has not yet started.*

For more information about WRIA 39:

- Waterbodies in WRIA 39 - using the Water Quality Assessment Query Tool
- Watershed Information for WRIA 39

* The Department of Ecology and other state resource agencies frequently use a system of 62 "Water Resource Inventory Areas" or "WRIAs" to refer to the state's major watershed basins.

Back to top of page

Last updated December 2016

APPENDIX F: KITTITAS COUNTY WETLAND BUFFER GUIDANCE

Chapter 17A.04
CRITICAL AREAS DESIGNATION AND DEVELOPMENT STANDARDS

Sections

17A.04.010 Wetlands.
Wetlands in Kittitas County are defined in Section 17A.02.310 and classified in four categories: Category I (extreme high value), Category II (high value), Category III (average value), Category IV (less than average value). Critical area wetlands in Kittitas County are defined as Category I, Category II, Category III and Category IV wetlands as determined by the planning manager.

Category IV wetlands may be determined by the director to constitute a critical area based upon application of the criteria in this chapter. (Ord. 95-15 (part), 1995; Ord. 94-22 (part), 1994).

17A.04.015 No net loss of wetland areas.
Kittitas County shall require, to the extent practical, and except for Category IV wetlands, a zero net loss of natural wetlands functions and values together with, if reasonably possible through voluntary agreements or government incentives, a gain of wetlands in the long term. (Ord. 94-22 (part), 1994).

17A.04.020 Buffer width requirements.
Wetland buffer requirements apply to all nonexempt activities on regulated wetlands. All wetland buffers shall be measured from the wetland boundary.

Category	**Size of Wetland**	**Required Buffer**
I	any size	50 - 200 feet
II	over 2,000 sq. ft.	25 - 100 feet
III	over 10,000 sq. ft.	20 - 80 feet
IV*	43,560 sq. ft. (1 acre)	Building setbacks will be determined by the zoning lot line setbacks, but shall not exceed 25 feet.

*Includes only nonirrigation induced or enhanced Category IV wetlands. Irrigation water does influence ground water table elevations in Kittitas County.

(Ord. 96-14 (part), 1996; Ord. 95-15 (part), 1995; Ord. 94-22 (part), 1994).

17A.04.025 Wetland buffer ranges.
The wetland buffer ranges have been established to reflect the impact of certain intense land uses on wetland function and values. The director shall base the buffer size on the following criteria and shall establish the least restrictive width of buffer necessary to account for all of the following considerations:

1. The overall intensity of the proposed use;
2. The presence of threatened, endangered, or sensitive species;
3. The site's susceptibility to severe erosion;
4. The use of a buffer enhancement plan by the applicant which uses native vegetation or other measures which will enhance the functions and values of the wetland or buffer. (Ord. 94-22 (part), 1994).

17A.04.030 Wetland buffer averaging.
Wetland buffers may be modified by averaging buffer widths. Wetland buffer width averaging shall be allowed only where the applicant demonstrates that the following exists:

1. That averaging is necessary to avoid an extraordinary hardship to the applicant caused by circumstances peculiar to the property;
2. That the wetland contains variations in sensitivity due to existing physical characteristics;
3. That the proposed use would be located adjacent to areas where buffer width is reduced, and that such land uses are low in impact;
4. That width averaging will not adversely impact wetland function and values. (Ord. 9422 (part), 1994).

17A.04.035 Natural condition of wetland buffer.
Natural condition of wetland buffer. Wetland buffer areas shall be retained in their natural condition or may be improved to enhance buffer functions and values. Where buffer disturbance has occurred during construction, revegetation with native vegetation may be required. The Kittitas County noxious weed ordinance shall be adhered to. (Ord. 94-22 (part), 1994).

17A.04.040 Allowed uses.
In addition to exempt activities otherwise identified herein, the following activities are allowed to occur on wetland and wetland buffer areas: nonmotorized outdoor recreational activities including hunting and fishing; educational activities; existing and ongoing agricultural activities, silviculture and mining; and maintenance of existing facilities, structures, ditches, roads, bridges and other utility systems. Up to two acres of Class IV wetlands may be filled, drained or modified with no approval required from the planning manager. If more than two acres of Class IV wetlands are filled, drained or modified, approval of the planning manager is required. Such development activity shall provide mitigation in accordance with Section 17A.04.050 for that portion of the wetland fill or modification that exceeds two acres. Category IV wetlands may be used for secondary stormwater management facilities having no reasonable alternative on-site location, provided there is no significant adverse impact to the functions and values of those wetlands. (Ord. 95-15 (part), 1995; Ord. 94-22 (part), 1994).

17A.04.045 Building setback lines from wetland buffers.
A building setback line equal to the side yard setback requirement of the applicable zoning district is required from the edge of any wetland buffer. Minor intrusions into the area of the building setback may be allowed if the director determines that such intrusions will not negatively impact the wetland. The setbacks shall be shown on all site plans submitted with the application. (Ord. 94-22 (part), 1994).

17A.04.050 Wetland replacement ratios.
Wetland replacement ratios are expressed in gross area required for replacement. The actual replacement, enhancement or rehabilitation of wetlands shall be determined by the director and meet all applicable standards for such. Replacement areas shall be determined according to function, acreage, type, location, time factors, ability to be self sustaining and projected success. Wetland functions and values shall be calculated using the Kittitas County critical areas policy document and the professional judgment of the director.

Category of Wetland	**Replacement Ratio**
I	3:1
II	2:1
III	1.5:1
IV	1:1 for the portion of a wetland fill or modification

(Ord. 96-14 (part), 1996; Ord. 95-15 (part), 1995; Ord. 94-22 (part), 1994).