

September 2025 Lower Colony Creek Sub-basin Project, Phase II



# Implementation and Summary Report

Prepared for Skagit Conservation District

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#### **Prepared for**

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### **ABBREVIATIONS**

community Blanchard Community

Downstream Site Downstream Project Site

NAVD88 North American Vertical Datum of 1988
NRCS Natural Resources Conservation Service
Project Lower Colony Creek Sub-basin Project

Upstream Site Upstream Project Site

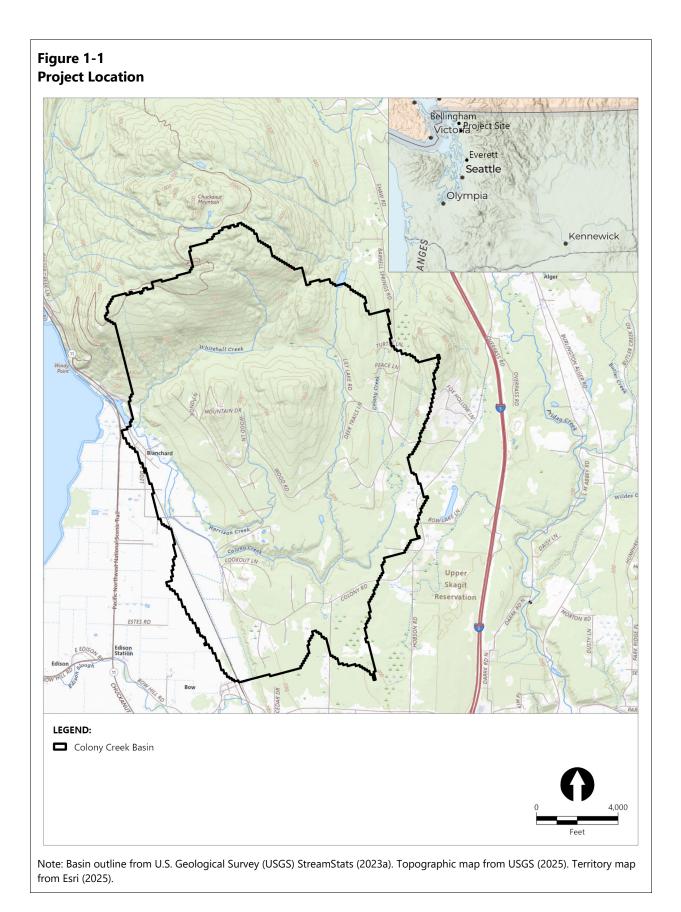
USACE U.S. Army Corps of Engineers

#### 1 Introduction

Colony Creek is composed of two branches that flow southwest from their headwaters on the southern slopes of the Chuckanut Mountains northeast of Bow, Washington (Figure 1-1). The creeks flow down a steep hillside before joining and entering the Samish River floodplain. As Colony Creek transitions from the steep hillside to the flat floodplain, the creek becomes channelized and flows to the northwest until it joins with Harrison Creek. With the combined flow of Harrison Creek, Colony Creek continues to the northwest and flows through the town of Blanchard, Washington. Whitehall Creek, another creek that drains the steep hillslopes to the east, converges with Colony Creek before it enters Puget Sound.

As described in Anchor QEA's Phase I report (Anchor QEA 2023), anthropogenic modifications along Colony Creek have limited natural geomorphic processes in the basin, and the creek's modified alignment and close proximity to residences and infrastructure have resulted in sedimentation issues, habitat degradation, and flooding along adjacent properties and roadways. Skagit Conservation District and Anchor QEA, in coordination with local landowners, are exploring solutions to improve riparian habitat condition while addressing the three major concerns in the Lower Colony Creek Subbasin: sedimentation, flooding, and habitat degradation.

During Phase 1 of the Lower Colony Creek Sub-basin Project (Project), Anchor QEA conducted an indepth study of the lower sub-basin and performed an alternatives analysis in which we evaluated four conceptual alternatives' impact on flood storage and water surface elevation, flood risk, riparian areas, in- and off-channel habitat, and sediment storage. Based on the findings from the Phase I alternatives evaluation, Anchor QEA recommended some potential first step projects that could be prioritized for further evaluation and implementation; these projects included restoration action at the Colony Mountain Road crossing area and Blanchard levee setbacks and inset floodplain creation. The results of the Phase I alternatives evaluation suggested that a combination of levee setbacks and inset floodplain, such as shown in Phase I Alternatives 3 and 4 (Anchor QEA 2023), is likely the best way to address flooding and improve riparian habitat in this area.



For Phase II of the Project, Anchor QEA built upon the Phase I investigation and sought to identify and refine two potential projects in the sub-basin that could be implemented in the future with the aim of reducing flooding, improving fish habitat and the riparian ecosystem, and preserving valuable agricultural land. This phase involved extensive stakeholder coordination and landowner outreach to identify and refine designs for two Project areas in the lower sub-basin. Like Phase I, the designs refined for Phase II are intended to meet the following site objectives:

- Restore more natural sediment transport processes
- Reduce flooding of valuable agricultural land and residential areas
- Remove invasive species and restore native vegetation in riparian areas
- Improve instream and off-channel/riparian wetland habitat

This report aims to summarize findings from all tasks completed as a part of Phase II, including, but not limited to:

- Colony Creek Drainage Network Assessment
- Lower Sub-basin Project Area Identification
- Stakeholder Outreach
- Hydraulic Analysis and Project Evaluation
- Recommendations for Implementation and Next Steps

Additional documents, including a Stream Crossing Recommendations Memorandum, Sediment Management Recommendations Memorandum, and 30% Design Plans will be included in Appendix A, B, and C, respectively.

# 2 Drainage Network Assessment

The hydraulic system of Colony Creek, Harrison Creek, Whitehall Creek, and the estuary is complex. The Project area's boundary roughly follows the bottom of the Chuckanut Mountains, Colony Road, and BNSF's railroad and is composed of levees, tide gates, culverts, and drainage ditches. An understanding of the inputs to the system is critical to determining where and why flooding is occurring. To understand the network, Anchor QEA completed a drainage network assessment.

To summarize and understand the hydraulic network in the Blanchard Community (community), Anchor QEA staff gathered drainage feature data. The data included location, type, and descriptions of the drainage features. Anchor QEA staff completed an on-site survey for drainage features, sent out a public survey for the community to submit drainage features, and researched online databases for drainage features in the Project area.

In summary, 31 different features were found during the assessment. The drainage assessment memorandum outlines the features found (Anchor QEA 2024). The memorandum also outlines the Lower Colony Creek Sub-basin's drainage system. The assessment found that Phase I assumptions for the hydraulic model were correct.

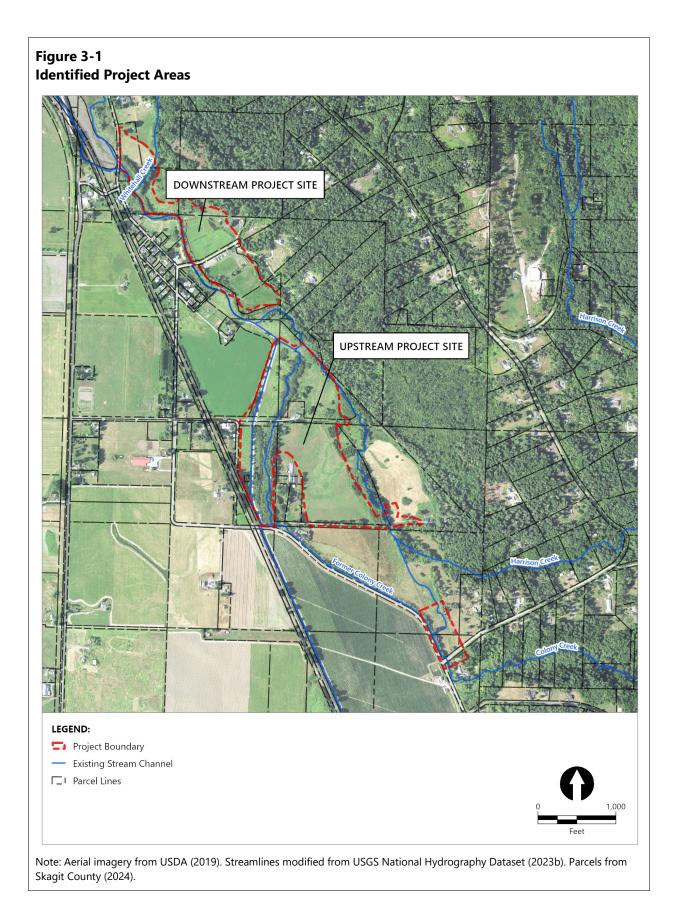
# 3 Project Area Identification

During Phase I of the Project, Anchor QEA laid out four conceptual alternatives with various proposed design elements aimed at improving habitat, creating sediment storage, and reducing flooding in unwanted areas. After evaluation of all alternatives, Anchor QEA identified two key Project actions that could be prioritized for implementation; this would serve as a starting point for Phase II of the Project, where Anchor QEA could continue coordinating with stakeholders and willing landowners and work to refine and draft more detailed designs along Colony Creek. The two key Project actions determined to be higher priority for implementation were improving flow and sediment conveyance in the vicinity of the Colony Mountain Drive crossing structure and creating inset floodplains with setback berms throughout the Lower Colony Creek Sub-basin.

Section 3.1 outlines the identified Project areas that were selected and includes a detailed description of the upstream and downstream Project areas. Section 3.2 provides detailed descriptions of the specific Project elements proposed throughout the two Project areas.

### 3.1 Identified Project Areas

Anchor QEA established two Project areas that each encompass multiple parcels. The Upstream Project Site (Upstream Site) includes design elements on a small portion of the Macken property and Wrucha Private Drive, and portions of the Thelen, Econopouly, and Morse properties (Figure 3-1). The Downstream Project Site (Downstream Site) includes design elements on the Gerrits and Werder properties, as well as properties owned by Super G Investments LLC and Blanchard Woodland LLC (Figure 3-1).



The proposed design at the Upstream Site includes clearing of the Colony Mountain Drive crossing and excavation of a small meandering channel through the upstream portion of the Macken property to establish a defined flow path (Figure 3-2). The design also includes raising the Wrucha Private Drive and installation of two crossing structures: a new structure for Colony Creek and an upgraded structure for Harrison Creek. More information about the recommended structure details for these crossings can be found in Section 6.

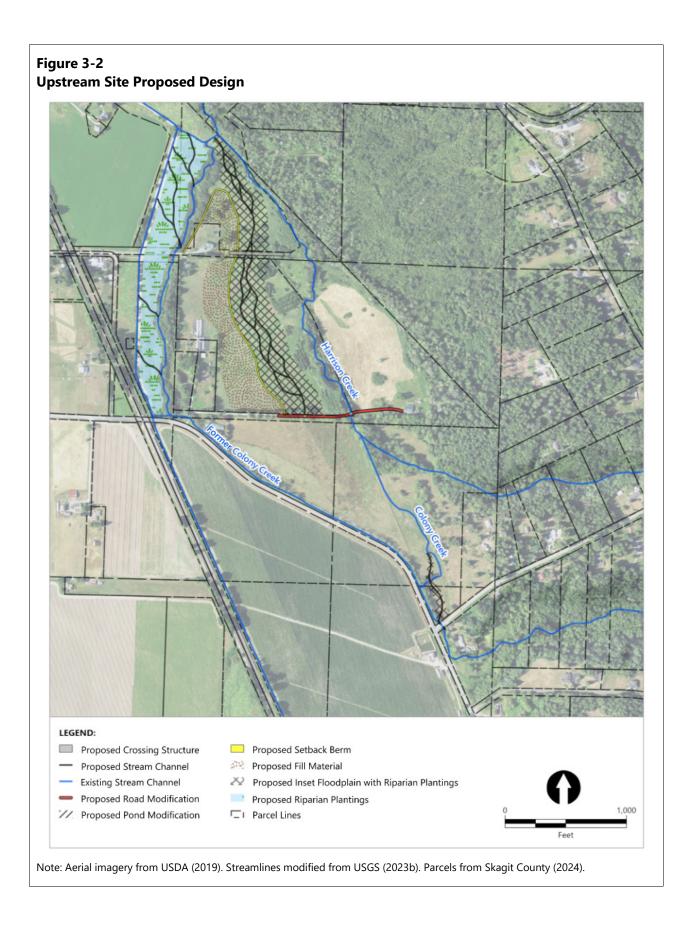
Just downstream of the Private Drive, on the Thelen, Morse, and Econopouly properties, an inset floodplain with riparian plantings is proposed, along with a setback berm that bounds the left bank of the inset floodplain. Within the proposed inset, a multithread Colony Creek channel is proposed. Fill material acquired from the inset floodplain excavation is proposed to be placed along the left side of the proposed setback berm. A boardwalk is proposed across the inset floodplain on the Morse property so access to the eastern portion of the property can be maintained after the inset floodplain is constructed. Lastly, side channel cuts and riparian plantings are proposed between a previously restored reach of Colony Creek and the old Colony Creek ditch on the west side of the Upstream Site (Figure 3-2).

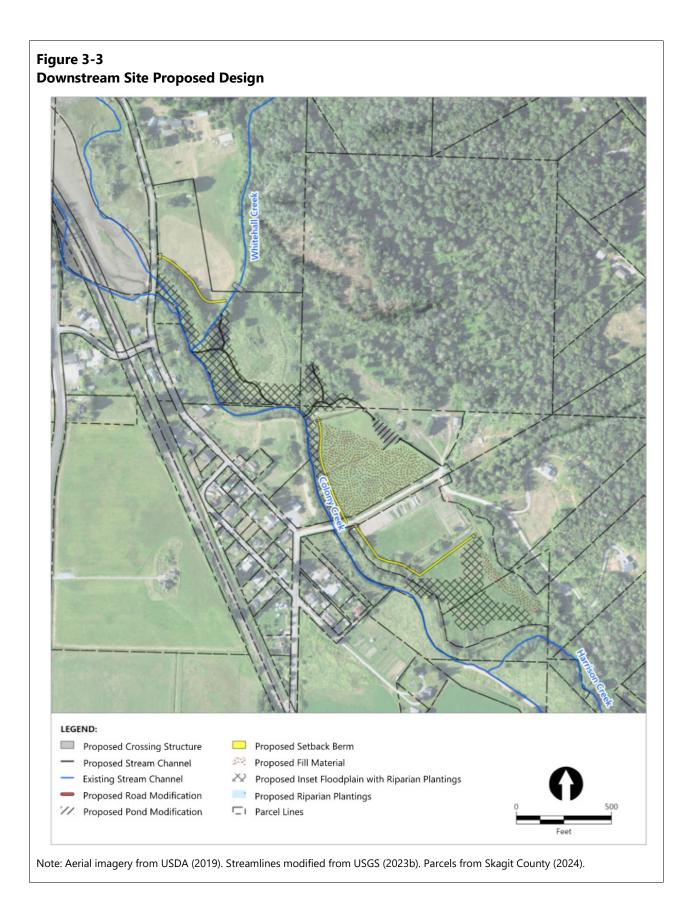
The proposed design at the Downstream Site includes similar design elements. At the upstream end, on the Gerrits property, an inset floodplain with riparian plantings is proposed, along with a setback berm that separates actively farmed land from the inset floodplain area (Figure 3-3). Three small crossing structures are proposed through the berm to encourage drainage of the areas behind the berm.

Just downstream on the Super G Investments LLC and Blanchard Woodland LLC parcels, an inset floodplain with riparian plantings is proposed along the right bank of Colony Creek and along an unnamed tributary that joins Colony Creek at the downstream end of the parcels. The design on these parcels also includes modification of the unnamed tributary channel by adding increased sinuosity through the inset floodplain, as well as enlargement and deepening of an existing pond. A setback berm and fill material are also proposed along the right bank Colony Creek inset floodplain. Three small crossing structures are also proposed on these parcels to encourage drainage: two along the setback berm and one along the unnamed tributary.

Along the Werder property, an inset floodplain with riparian plantings is proposed along the right bank of Colony Creek and along the lower reach of Whitehall Creek. Multiple side channel cuts are also proposed through the inset floodplain, and a setback berm is proposed along the downstreammost portion of the inset, bounding an adjacent agricultural field. One crossing structure is proposed along the setback berm for drainage, while another potential crossing structure is proposed across Whitehall Creek to improve access (Figure 3-3).

Section 3.2 includes descriptions of all Project elements proposed in the two Project areas and outlines their intended impact on the sites.

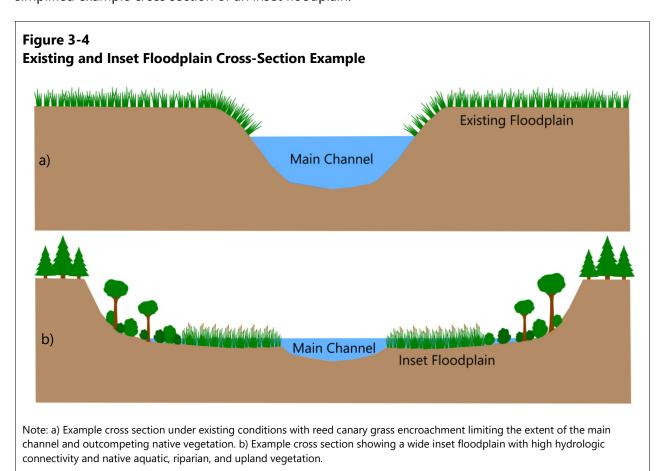




### 3.2 Description of Project Elements

#### 3.2.1 Inset Floodplains

Excavation of inset floodplains is one major design element that aims to meet all four site objectives. The intent of an inset floodplain is to excavate existing sediment from a defined floodplain area, which creates a recessed floodplain that allows for increased storage of both sediment and water, particularly during high flow events. By increasing sediment and flood storage, this inset floodplain can also reduce flooding on adjacent properties. Beavers are known to inhabit the project areas, and beaver dams often cause unwanted flooding on private property. Excavation of inset floodplains will increase flood storage, which is expected to help reduce flooding on properties adjacent to the inset floodplains if beavers utilize and alter the channel post-construction. Additionally, within the inset floodplain, flow from the main channel (or multithread channel) can spread out across the floodplain, improving floodplain connectivity and riparian habitat. In all areas where inset floodplains are proposed in the proposed Project areas, riparian plantings are also proposed. Figure 3-4 shows a simplified example cross section of an inset floodplain.



#### 3.2.2 Stream Channel Cuts

Stream channel cuts of some form are included in both identified Project areas. At the Upstream Site, the single-thread Colony Creek channel cut is intended to define a clear flow path as the creek exits the Colony Mountain Drive crossing structure to reduce the risk of flow rerouting into an undesirable location. This channel cut would also allow for this reach of Colony Creek, in the vicinity of the Colony Mountain Drive crossing, to be regraded to improve flow conveyance. Farther downstream at the Thelen, Morse, and Econopouly properties, a multithread channel is proposed through the proposed inset floodplain. The goal of the multithread channel cuts through the inset floodplain is to provide multiple flowpaths to increase in-channel habitat for salmonids, increase overall channel complexity and floodplain connectivity, and provide more storage capacity. Creating a multithread channel also allows the creek to migrate freely through the floodplain and adds resiliency to the channel network, which reduces the risk of unexpected avulsions, like those that have been documented along Colony Creek in the past. To the west of the inset floodplain and multithread channel, side channel cuts are proposed through the proposed riparian planting area; this aims to create off-channel habitat for salmonids, promote floodplain connectivity, and increase channel complexity.

At the Downstream Site, a single-thread unnamed tributary channel cut is proposed immediately upstream and downstream of the private pond. This channel cut is intended to establish a defined flow path and improve flow conveyance and fish passage along the unnamed tributary. Through the proposed inset floodplains in the downstream half of the Downstream Site, channel cuts are proposed with the intention of creating side channel habitat for salmonids and promoting connectivity and complexity through the inset floodplain areas.

#### 3.2.3 Setback Berms and Fill Material

In both the upstream and downstream sites, setback berms are proposed to provide a relatively high elevation barrier between active floodplain areas and agricultural lands/properties adjacent to these floodplain areas. The intent with these features is to reduce flooding in unwanted areas adjacent to the active floodplain while defining a larger active floodplain area. Throughout both Project sites, the location of these proposed setback berms is set back from the active channel flow in order to provide a larger floodplain corridor for the channel and restore natural channel and floodplain processes; establishing a larger corridor can allow the channel to migrate more freely through the floodplain, overtop its banks, deposit sediments across the floodplain, and promote increased connectivity to riparian habitat. It should be noted that in both Project areas, these berms are only proposed in areas where inset floodplains are also proposed; based on results of the Phase I evaluation, the combination of inset floodplains paired with setback berms is expected to yield the highest benefits when it comes to flood and sediment storage, flood reduction, and habitat improvements.

Because the creation of inset floodplains will result in excess fill material, placement of this fill material is proposed in strategic locations in both Project areas. Assuming the material is suitable for placement, this excess material can be placed in locations adjacent to the floodplain where landowners have requested it to raise elevations slightly outside of the active floodplain, for agricultural use, or both. It should be noted that due to the presence of reed canary grass in the area, particularly in the areas where excavation would occur, care should be taken to limit the spread of this invasive species to areas where it is not already established.

### 3.2.4 Riparian Plantings

As described in Anchor QEA's Phase I report (Anchor QEA 2023), reed canary grass has been observed throughout the Project areas. This invasive species poses a threat to native riparian species because it outcompetes other species and forms dense stands that restrict and slow flow, thus increasing sedimentation. The dense stands that form also reduce habitat quality and diversity. Based on field observations conducted during Phase I, native riparian vegetation is limited throughout Colony and Harrison creeks' floodplains due to the widespread presence of invasive species like reed canary grass. To address this issue in the Project areas, native riparian plantings are proposed throughout all areas where excavation of inset floodplains, and subsequent removal of reed canary grass, is proposed. In addition to planting in areas where inset floodplains are proposed, riparian plantings are also proposed at the Upstream Site to the west of the inset floodplain in an area where side channel cuts are proposed. These proposed plantings aim to improve habitat and floodplain connectivity.

In addition to improving riparian habitat quality and diversity and improving flow conveyance, removal of reed canary grass and planting native riparian vegetation also improves in-channel habitat conditions for salmonids as the plantings mature. Riparian vegetation can provide shade to streams, which allows salmonids some protection from predation and keeps water temperatures lower during warm months. Over time, as the plantings mature and eventually die, the vegetation can provide large wood and debris to the floodplain, which can provide structure and cover to salmonids while also encouraging complexity. Determination of riparian species to be planted within the Project areas will occur at later phases of the Project. Due to the prevalence of reed canary grass in the area, maintenance of the riparian planting areas may be recommended until plantings become well-established.

### 3.2.5 Crossing Structures

The proposed designs in the upstream and downstream Project areas include modifications to existing crossing structures, as well as placement of new crossing structures. At the Upstream Site, replacement of the existing Harrison Creek crossing structure along the Wrucha Private Driveway is proposed, as is a new crossing structure, just west of the Harrison Creek structure, on Colony Creek.

The goal of these two crossing structures on the Private Driveway is to improve flow conveyance along Colony and Harrison creeks and reduce flooding along the roadway and in the vicinity of the structures. Sizing recommendations for these crossing structures are described in Section 6 and Appendix A. Though the proposed design at the Upstream Site does not include replacement of the existing Colony Mountain Drive culvert, sediment management actions are recommended at the existing crossing to address sedimentation and flow conveyance concerns; these recommendations are discussed further in Section 6 and Appendix B.

At the Downstream Site, numerous small crossing structures are proposed, particularly along proposed setback berms. These structures are intended to maintain drainage of properties on the landward side of the proposed berms.

#### 3.2.6 Road Modifications

Road modifications are proposed at the Upstream Site along the relatively low-elevation eastern portion of the Wrucha Private Driveway. These modifications include raising the existing road elevation through the portion of the private road where crossing structure installations/replacements are proposed. These road modifications are expected to reduce flooding and encourage flow conveyance through the proposed structures; the modifications also aim to reduce the risk of fish stranding along the roadway and in adjacent areas.

### 3.2.7 Pond Modifications

Pond modifications are proposed at the Downstream Site on the Super G Investments LLC property. This site has an existing private pond that receives inflow from an unnamed tributary, and outflows to Colony Creek. The proposed modifications to the pond include enlargement/deepening of the existing pond to increase flood storage capacity and provide additional habitat for salmonids.

#### 4 Stakeholder Collaboration

To ensure local stakeholders were involved in the decision-making process throughout Phase II of the Project, Anchor QEA conducted community outreach and hosted monthly technical team meetings. This type of collaboration allowed Anchor QEA to garner input, information, and feedback and gage support for certain Project elements; information and feedback from stakeholders was used to identify the two Project areas and to inform our recommendations at the sites.

### 4.1 Community Outreach

Anchor QEA participated in community outreach by hosting, in conjunction with Skagit Conservation District, two community meetings and being available for conversations via email and phone.

The first community meeting on May 30, 2024, covered flooding, data collection, and the Project status. The main topics covering flooding and data collection included drainage assessment, transducer data, and sea-level rise. The Project status topics included a timeline, changes to the basin during design, and Skagit County's partnership with the Project.

The second community meeting on March 20, 2025, covered similar topics to the first meeting as well as additional topics. The technical team meetings were discussed; a summary of the meetings can be found in Section 4.2. Also, the proposed Project areas were presented to the community as well as the associated hydraulic model results.

The community meetings were an integral part of the decision-making process throughout Phase II because they provided an opportunity for information to be shared between the community, Skagit County, and Skagit Conservation District.

### 4.2 Technical Team Meetings

In addition to community outreach and presentations, Anchor QEA also hosted regular virtual calls with Project stakeholders who would play an important role in Project implementation. The "technical team" would typically meet on a monthly basis. Representatives from the Nooksack Tribe, Samish Tribe, Skagit Conservation District, Skagit County, Skagit Drainage Consortium, Skagit Fisheries Enhancement Group, and Washington Department of Fish and Wildlife were invited to be a part of the technical team at the start of Phase II; however, regular attendees of these meetings were typically representatives from Skagit Conservation District, Skagit County, and Skagit Fisheries Enhancement Group.

During these meetings, the technical team discussed data collection occurring in the Lower Colony Creek Sub-basin, relevant updates from landowners, recent geomorphic changes or storm events, Project permitting, and potential roadblocks to Project implementation. Anchor QEA also used these meetings to solicit feedback from the technical team on upcoming community presentations or

Project deliverables. Information and feedback from these regular technical team meetings were used to inform all aspects of Phase II and aid in moving the Colony Creek projects toward implementation.

# 5 Hydraulic Analysis and Project Evaluation

### 5.1 Hydrology

Similar to Phase I, hydrologic inputs used in the hydraulic modeling evaluation included both peak flow data for Colony Creek and its tributaries and tidal data for Samish Bay. The hydrologic data used in the model were developed using regression equations and stream and tide gage data. In order to model specific streamflow and tidal scenarios, the timing of the streamflow and tidal hydrographs were modified to simulate the potential impacts specific scenarios have on water storage, flows, and inundation under both existing and proposed conditions.

#### 5.1.1 Streamflow Inputs

There are numerous tributaries draining to the Colony floodplain channel known as McElroy Slough and emptying into Samish Bay near the town of Blanchard. Colony Creek is the primary tributary, Harrison Creek is a smaller tributary that enters the valley downstream of Colony Creek, and Whitehall Creek is the third major tributary entering the slough just upstream of the Blanchard tide gate. Another unnamed tributary input enters between Harrison Creek and Whitehall Creek, and a final hydrologic input includes agricultural ditches coming from the blueberry fields to the south adjacent to Colony Road. Initially, the sub-basins were delineated using the U.S. Geological Survey (USGS) StreamStats application (USGS 2023a). The hydrology package in ArcMap 10.8.2 was used to manually refine basin delineation (Esri 2023). The manually delineated basin areas and average annual precipitation from USGS StreamStats were used as inputs to the peak flow regression equations for Western Washington Region 3 to develop hydrologic return intervals (Mastin et al. 2017). All tributaries to McElroy Slough are ungaged, so the nearby Lake Whatcom tributary, Brannian Creek, was used to develop a simulated hydrograph. The USGS Brannian Creek gage collected data from water year 2001 to present, and a return interval analysis was conducted to find a storm event that was close to the 2-year flow value of 205 cubic feet per second (USGS 2023c). The February 4, 2018, storm event on Brannian Creek was smoothed using rolling averaging and scaled to the peak of 225 cubic feet per second to develop a unit hydrograph. This unit hydrograph was then multiplied by the return intervals for each of the Colony Creek tributaries to develop a series of synthetic hydrographs for the 2-year storm in McElroy Slough. A similar process was repeated for the 10-year hydrograph.

### 5.1.2 Tidal Inputs

Tidal data used in the model was obtained from the nearest continuously operating tidal gage at Cherry Point, Washington (NOAA 2023). Typically, the peak tides or king tides in the year occur near the first of the year when the earth is closest to the sun. The exact 6-minute tidal series from December 31, 2022, to January 2, 2023, was used as the tidal hydrograph for the model. This was

considered an acceptable assumption because no continuous tidal data was available for Samish Bay, and tides should be similar. Tidal peaks reached as high as 10.21 feet North American Vertical Datum of 1988 (NAVD88) and peak low tide was -0.27 feet NAVD88. Due to the boundary in the model having an elevation of 1.29 feet NAVD88, the tidal cycle input oscillates between 1.29 feet to 10.21 feet.

#### 5.1.3 Modeled Streamflow and Tidal Scenarios

Six different hydrologic scenarios were modeled as a part of the hydraulic modeling evaluation. These scenarios were chosen to simulate combinations of streamflow events and tidal events aimed at better understanding impacts to habitat, geomorphology, and flooding under existing and proposed conditions. Table 5-1 lays out the six different hydrologic scenarios modeled in the hydraulic evaluation. Two hydrologic scenarios were modeled for each "purpose."

Scenarios 1 and 2 aimed to simulate steady state winter and summer flow events paired with an average tidal cycle as these low, more frequent flow scenarios are important for salmonids and other fish species. These scenarios can help us understand how the proposed projects may impact fish passage and habitat connectivity compared to existing conditions. Scenarios 3 and 4 aimed to simulate somewhat frequent, but higher flow events, the 2-year and 5-year flow events, that are expected to result in geomorphic change and mobilize sediment. These events were paired with a low, steady state tidal scenario to help us understand where we might expect erosion, deposition, and geomorphic change under proposed conditions. Scenarios 5 and 6 represent the "flooding" scenarios. Scenario 5 simulates a more frequent flood scenario where the 2-year flow event is paired with a mean tidal cycle, and the peaks of the flow hydrograph and tidal cycle are aligned. Scenario 6 simulates a less frequent scenario where the 10-year flow event is paired with a mean tidal cycle and the peaks are aligned. The intention with these two scenarios is to help us understand the impacts the proposed design may have on flooding and flood storage compared to existing conditions.

It should be noted that proposed design elements intended to reduce flooding in unwanted areas and increase flood storage in designated areas aim to achieve these improvements under more frequent flood conditions, rather than extreme flood conditions. Stream corridors and floodplains, especially those in tidally influenced areas, are particularly vulnerable to more extreme events (e.g. king tides, major storm events, and high tides that align with major flow events). It is not expected that implementation of the proposed projects will result in major improvements during these extreme events.

Table 5-1 Modeled Hydrologic Scenarios

Scenario Number	Streamflow Event	Tidal Event	Purpose
1	Winter Flow (Steady State)	Mean (Tidal Cycle)	Habitat
2	Summer Flow (Steady State)	Mean (Tidal Cycle)	Habitat
3	2-Year Flow Event (Hydrograph)	*MLLW (Steady State)	Geomorphic Change and Sediment Transport
4	5-Year Flow Event (Hydrograph)	*MLLW (Steady State)	Geomorphic Change and Sediment Transport
5	2-Year Flow Event (Hydrograph)	Mean (Tidal Cycle, Match Streamflow/Tidal Peaks)	Flooding
6	10-Year Flow Event (Hydrograph)	Mean (Tidal Cycle, Match Streamflow/Tidal Peaks)	Flooding

Note:

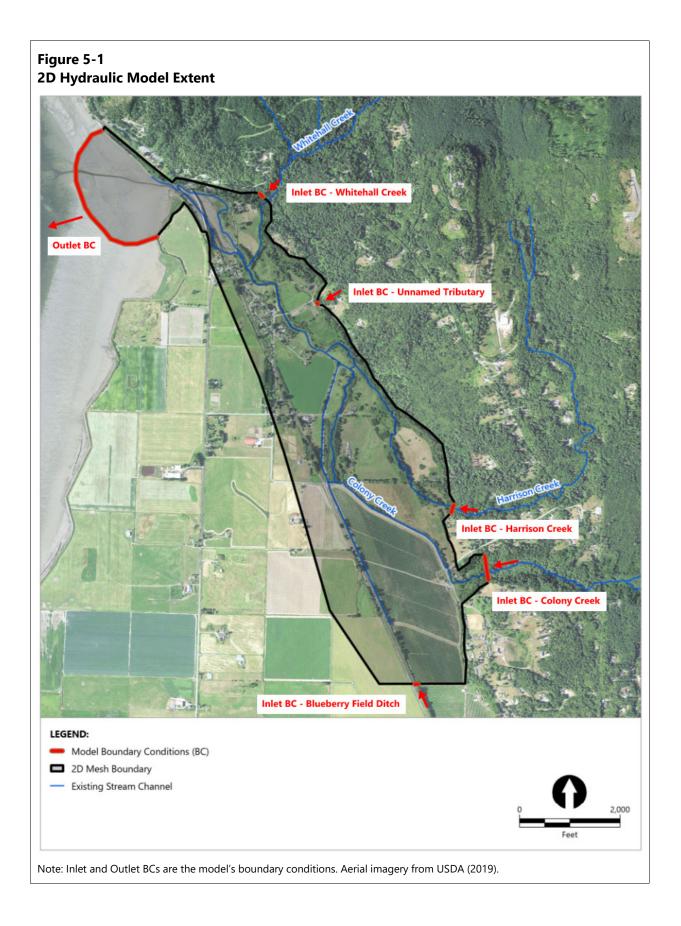
### 5.2 Hydraulic Model Development

Two-dimensional (2D) hydraulic modeling was performed to assess the two proposed projects' potential impacts on habitat and flooding under various hydrologic and tidal scenarios. Both the upstream and downstream proposed projects include Project elements intended to create habitat, improve sediment storage, and reduce flood risk on adjacent property.

The hydrodynamic modeling platform selected for the analysis was the U.S. Army Corps of Engineers' (USACE) HEC-RAS version 6.4.1. HEC-RAS was selected because of the 2D model's computational accuracy and capability to resolve multidirectional floodplain flow, allowing the model to better predict floodplain inundation and connectivity. HEC-RAS was also selected, in part, because of the ease of integrated surface modification to model the proposed Project elements, like inset floodplains, side channels, setback berms, etc.

A single 2D model grid was developed for the existing conditions and modified for the proposed conditions. The existing conditions 2D mesh contains 104,950 cells and covers an area of 0.96 square mile. The model extents and inlet and outlet boundary conditions are shown in Figure 5-1. The grid was aligned parallel to flow within the channel and active flow paths to improve computational accuracy and efficiency. Levees, roads, and floodplain areas critical to Project goals were given increased grid resolution.

<sup>\*</sup>MLLW: mean lower low water



Like the hydraulic model for Phase I, for Phase II, a merged dataset was used as the underlying topographic data for the model. The dataset includes a 3-foot resolution North Puget Sound digital terrain model from 2017 (QSI 2017) and a 1-meter resolution National Oceanic and Atmospheric Administration digital elevation model of the Skagit River Delta from 2019 (NOAA 2020). This merged dataset was used to develop the existing conditions model. For the proposed conditions model, the terrain modification tools in HEC-RAS 6.4.1 were used to modify the existing surface to simulate the proposed Project elements.

Terrain modifications for the two proposed designs included adding setback berms, inset floodplains and channel cuts, removing existing levees, and raising roads/driveways. The berm and road modifications were made using the *High Ground* line modification in HEC-RAS 6.4.1, while channel cut, levee removal, and inset floodplain modifications were made using the *Channel* line modification.

Default Manning's roughness values were assigned based on the USGS National Land Cover Database 2019 dataset (USGS 2019) and modeling guidance provided by USACE (USACE 2021). The existing conditions model domain was manually classified into the categories shown in Table 5-2 using guidance from aerial imagery and site visits performed during Phase I. For proposed conditions, an additional Manning's roughness value was added to model the proposed setback berms (0.06), while floodplain areas with proposed riparian plantings were modeled with a value of 0.045. All existing and proposed conditions Manning's roughness values are presented in Table 5-2.

Table 5-2
Existing and Proposed Conditions Manning's N Values

Category	Manning's N Value
Forest	0.10
Woody Wetlands	0.07
Developed Land, Low Intensity	0.06
Setback Berms	0.06
Cultivated Crops	0.06
Pasture and Hay	0.05
Channels and Floodplain	0.045
Road	0.03
Delta	0.03

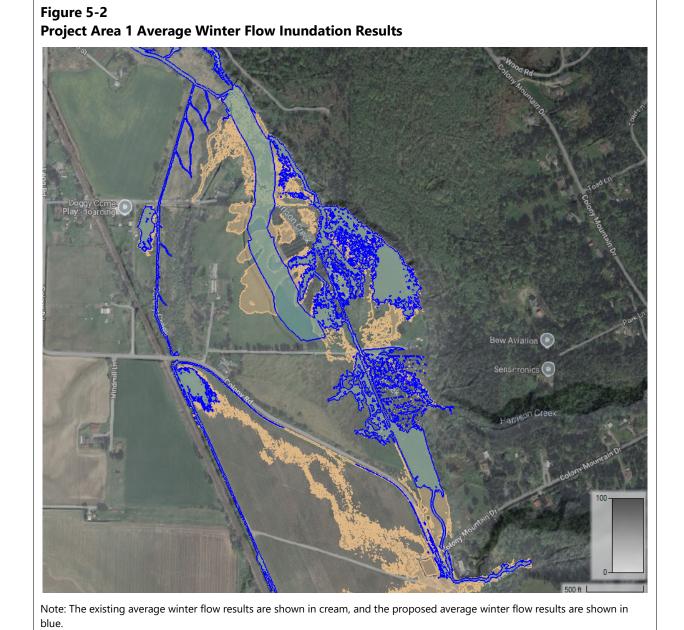
### 5.3 Project Benefits

The following presents the two proposed Project benefits to salmonid habitat. The evaluation compares existing and proposed hydraulic model results as well as compares spatial habitat complexity data.

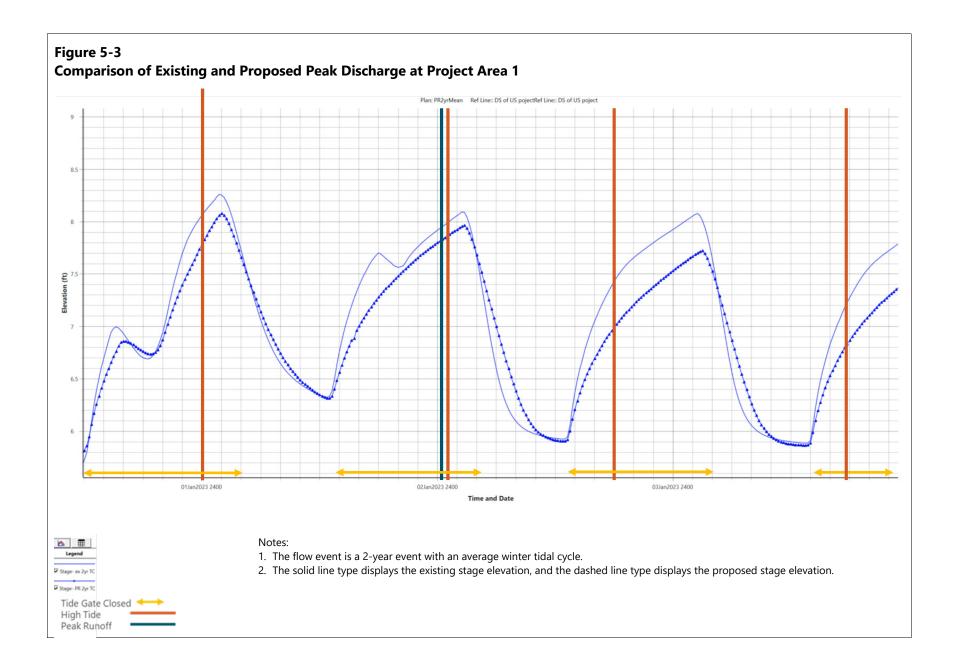
#### 5.3.1 Project Area 1

Project Area 1 includes Project elements that are described in Section 3.2. The proposed elements benefit salmonoids by creating complex habitat, and the elements reduce flooding. Figure 5-2 displays the existing winter average flow modeling results and the proposed winter average flow modeling results. The proposed conditions exhibit the flow directed into channels and inset floodplains instead of agricultural fields.

The proposed side channel cuts and proposed inset floodplains provide winter habitat for the salmonoid. The elements help reduce fish stranding in surrounding fields and increase suitable habitat area. Also, the side channel cuts, and inset floodplains are proposed in conjunction with riparian plantings, creating habitat for the insects that salmonoids eat. Therefore, the elements provide a complex habitat for the salmonoid.



Project Area 1 Project elements help reduce flooding during small flood events. Figure 5-3 shows a reduction in the water surface elevation and a delayed peak downstream of the Project area during the 2-year flood event. The reduction in water surface elevation and delay in peak during high flow events with a high tide show that the proposed Project area elements improve flooding conditions.



### 5.3.2 Project Area 2

Project Area 2 includes Project elements that are described in Section 3.2. The proposed elements benefit salmonoids by creating complex habitat, and the elements reduce flooding. Figure 5-4 displays the existing winter average flow modeling results and the proposed winter average flow modeling results. The proposed conditions exhibit the flow directed into channels and inset floodplains instead of across agricultural fields.

The proposed side channel cuts and proposed inset floodplains provide winter habitat for the salmonoid. The elements help reduce fish stranding in surrounding fields and increase suitable habitat area. Also, the inset floodplains are proposed in conjunction with riparian plantings, creating habitat for the insects that salmonoids eat. Therefore, the elements provide a complex habitat for the salmonoid.

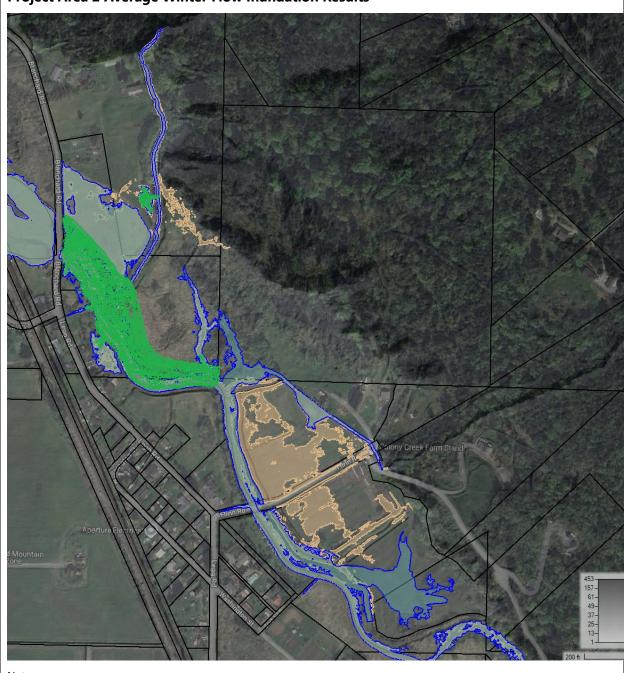


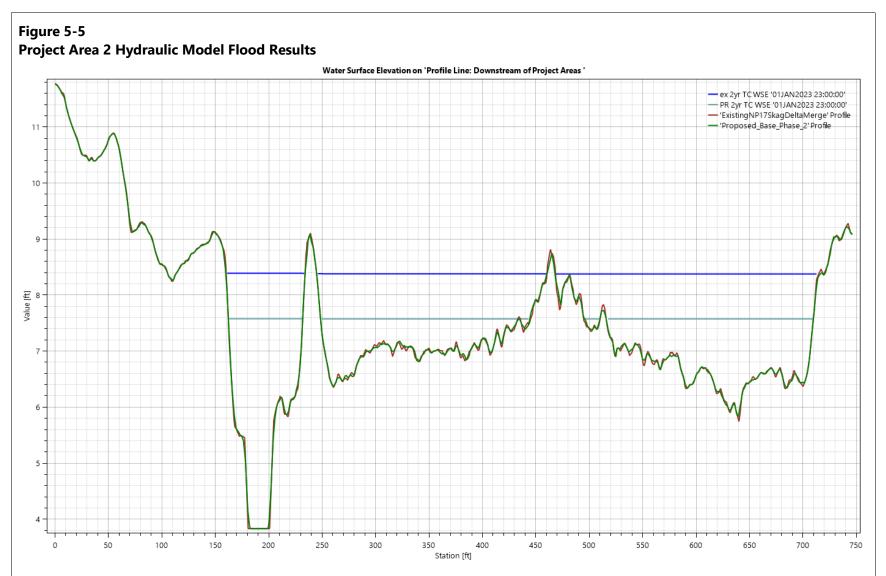
Figure 5-4
Project Area 2 Average Winter Flow Inundation Results

#### Notes:

- 3. The existing average winter flow results are shown in cream, and the proposed average winter flow results are shown in blue.
- 4. Hydraulic modeling was completed prior to the inclusion of the Werder property. Expected inundation for average winter flow on their property is in green.

Project Area 2 Project elements help reduce flooding during small flood events. Figure 5-5 shows a reduction in the water surface elevation downstream of the Super G Investments LLC and Blanchard

Woodland LLC inset floodplain Project area during the 2-year flood event. The reduction in the water surface elevation occurs due to the flood storage opportunity that is occurring from the inset floodplains and side channels. The reduction in the water surface elevation during the 2-year flow events with a high tide show that the proposed Project area elements improve flooding.



Note: The existing 2-year flow event water surface elevation results are shown in dark blue and the proposed 2-year flow event water surface elevation results are shown in teal. There is approximately 1 foot of a reduction in the proposed conditions.

### 5.3.3 Summary

Overall, the Project elements proposed provide benefits such as floodplain reconnection, increased riparian area, improved channel complexity, flood reduction, and culvert improvements. The proposed Project elements provide complex habitat, as quantified in Table 5-3. The stream channel cuts and inset floodplains provide flood and sediment storage as well as in- and off-channel habitat.

The increase in flood and sediment storage provides many benefits to salmonoids. Sediment storage from the inset floodplains allows for natural retention of various sediment sizes, rather than excess fine sediment, which can negatively impact spawning grounds. The increased sediment storage can enhance the potential for sediment exchange. This in turn creates habitat complexity that supports different salmonoid life stages, such as gravels beds that are used for spawning.

Additionally, flood storage from floodplain connections and side channels provides in- and offchannel habitat. Flood storage promotes natural flow regimes and channel migration, restoring access to historical spawning and rearing habitats.

The increase in riparian planting area provides critical shading that helps regulate stream temperatures, maintaining the cool water conditions essential for salmonoid survival. Root systems stabilize banks and filter sediments and pollutants, improving overall water quality and protecting spawning habitat. During high flows, the vegetation slows water velocities and enhances floodplain roughness, creating low energy refuge areas for juvenile salmon. Additionally, riparian plants contribute organic matter and support food webs by fostering insect populations that serve as key prey for rearing fish.

Table 5-3
Proposed Project Area Benefits Compared to Existing Conditions

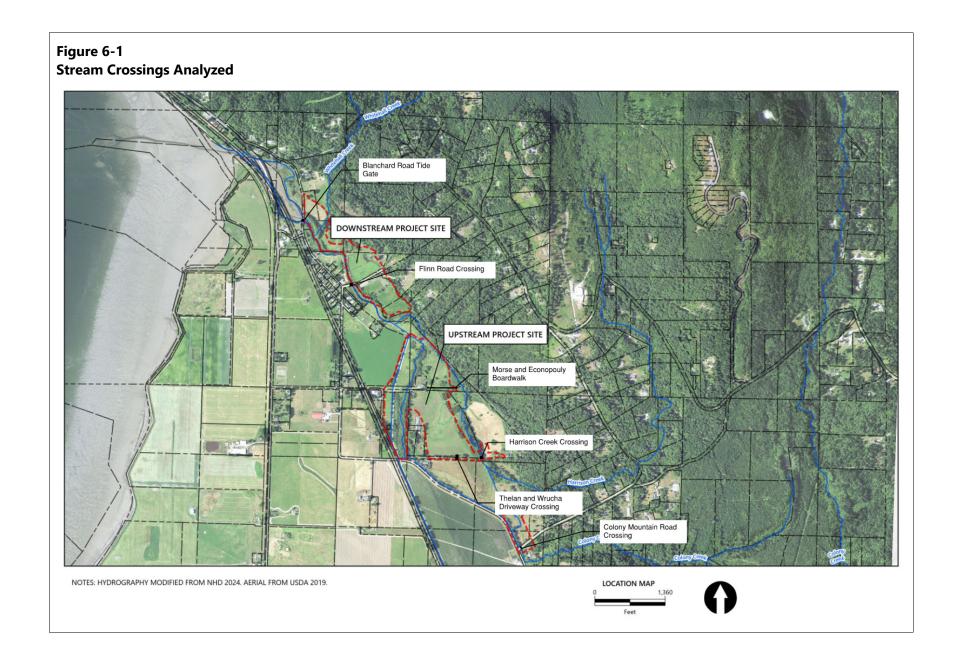
Benefit	Quantity
Increase in Flood and Sediment Storage Volume	*53,652.76 cubic yards
Increase in Riparian Planting Area	32.78 acres
Increase in In- and Off-Channel Habitat	8,696.52 linear feet
Total Area Covered by Inset Floodplain	22.94 acres

<sup>\*</sup>Note: Increase in flood and sediment storage volume is 33.26 acre-feet.

# 6 Recommendations for Implementation and Next Steps

### 6.1 Stream Crossing Recommendations

Due to the flood-prone nature of the Project area, existing and proposed stream crossing were analyzed. The goal of analysis was to identify and recommend stream crossings that are compatible with the ecological, hydrologic, community objective established under the Floodplains by Design framework. Figure 6-1 shows the hydraulic structures that were evaluated. Appendix A outlines the crossings and the recommendations associated with them.



### 6.2 Sediment Management Recommendations

In order to manage sedimentation and reduce risk of subsequent flooding, Anchor QEA has developed sediment management recommendations for the upstream and downstream Project areas. These recommendations are outlined in the Sediment Management Recommendations Memorandum in Appendix B, and key recommendations are summarized below:

#### **Upstream Site**

- The Colony Mountain Drive crossing was constructed at the transition point where Colony
  Creek exits a steep hillslope and enters a flat floodplain; therefore, sediment deposition is
  expected to continue at the crossing structure. It is recommended that Skagit County and
  Skagit County Conservation District prepare and participate in an adaptive management plan
  that lays out thresholds for sedimentation within the culvert and channel based on observed
  sedimentation rates.
- Where inset floodplains are proposed, it is recommended that Skagit County and Skagit
  Conservation District monitor aggradation and apply adaptive management for areas with 1
  to 1.5 feet of aggradation to reduce sediment loading to the downstream Colony Creek
  system.

#### **Downstream Site**

Though significant aggradation is not anticipated at the Downstream Site, in areas where
inset floodplains are proposed, it is recommended that Skagit County and Skagit
Conservation District monitor aggradation and apply adaptive management for areas with 1
to 1.5 feet of aggradation to limit excessive sedimentation that may result in subsequent
increases in flooding.

### 6.3 Pathway Toward Permitting and Implementation

### 6.3.1 Permitting Considerations

The following permits and approvals are expected to be required for both the Upstream Site and Downstream Site. It is recommended that permits are acquired for the upstream and downstream Project areas separately to allow for Project implementation to proceed individually and to reduce the risk of potential permitting-related slowdowns at both sites.

- Clean Water Act Section 404 Nationwide 27 permit from USACE
- Section 106 National Historic Preservation Act approval required for Section 404 permit
- Endangered Species Act and Magnuson-Stevens Fisheries Conservation and Management Act, Essential Fish Habitat consultation on salmonids with National Oceanic and Atmospheric Administration Fisheries and U.S. Fish and Wildlife Service

Hydraulic Project Approval: Fish Habitat Enhancement, or Habitat Restoration Pilot Program
 Streamlined Process

Some parcels within the Upstream Site are under Natural Resources Conservation Service (NRCS) Conservation Easements, and designs on those parcels are likely subject to NRCS modification and approval. Coordination between Skagit Conservation District and NRCS staff has already begun and will continue through the next phase of the Project.

# 6.3.2 Implementation Strategy

Though the two Project areas are proximal to each other, it is recommended that the Upstream Site and Downstream Site be permitted and implemented separately. Because the Upstream Site will likely require further coordination with NRCS and potential modification, a staged implementation strategy, starting with the Downstream Site, is recommended. Project elements proposed at the Downstream Site should be constructed from downstream to upstream, with all floodplain/channel excavation activity (inset floodplains, channel cuts, pond modifications) prioritized during the inwater work window to avoid and minimize impacts to salmonids. Riparian vegetation should be planted within the inset floodplains closely following excavation to reduce the risk of invasive species, like reed canary, becoming established in the newly excavated area. Project elements proposed at the Upstream Site should also be constructed from downstream to upstream, with all floodplain/channel work happening during the in-water work window.

Implementation of sediment management recommendations at the Colony Mountain Drive crossing and on the Macken property could happen on a separate, more expedited timeline than construction at the upstream and downstream sites. Because the crossing structure is owned and maintained by Skagit County, the permitting and implementation strategy for sediment management at the crossing will be different than the proposed Project areas' and will be handled by Skagit County.

### 7 References

- Anchor QEA, 2023. Colony Creek and Harrison Creek Assessment and Modeling Summary and Recommendations Report. Prepared for Skagit Conservation District. July 2023.
- Anchor QEA, 2024. Colony Creek Drainage Assessment Memorandum. Prepared for Skagit Conservation District. September 2024.
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- USGS (U.S. Geological Survey National Land Cover Database), 2019. Multi-Resolution Land Characteristics Consortium. Available at: https://www.mrlc.gov/viewer/.

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- USGS, 2023b. National Hydrography Dataset. Available at: <a href="https://www.usgs.gov/national-hydrography-products">https://www.usgs.gov/national-hydrography-products</a>.
- USGS, 2023c. Monitoring Location 12201960, Brannian Creek at S Bay Dr Near Wickersham, WA. Accessed January 2023. Available at:

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- USGS, 2025. Topographic Map. Available at: <a href="https://www.usgs.gov/tools/national-map-viewer">https://www.usgs.gov/tools/national-map-viewer</a>

# Appendix A Stream Crossing Recommendations Memorandum

# Memorandum

September 15, 2025

To: Emmett Wild, Skagit Conservation District

From: Tracy Drury, PE, Clare Yurchak, PE, and Alyssa DeMott, Anchor QEA

**Re:** Stream Crossing Structure Recommendations

# **Stream Crossing Structure Recommendations**

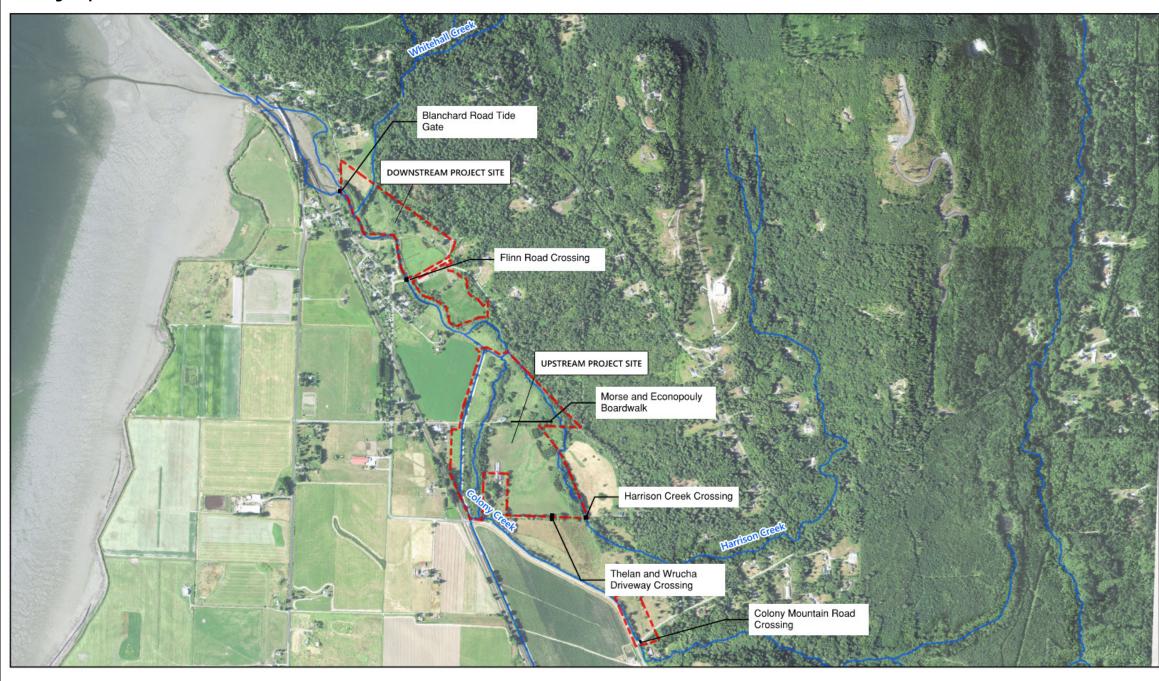
Due to the proximity of Colony Creek to the Blanchard community, proposed stream crossings impact the proposed Lower Colony Creek Sub-basin Project results. This memorandum outlines the crossings evaluated and our approach to evaluating them. Each crossing will be informed by the results of hydraulic modeling, as well as input from landowners, stakeholders, and the local community. The goal is to identify and recommend stream crossing solutions that are compatible with the ecological, hydrologic, and community objectives established under the Floodplains by Design framework. Anticipated crossing needs may vary from basic farm equipment access points to complete county culvert replacements.

The following stream crossing was identified as poor functioning in Phase 1 of the project, but has since been updated and is no longer under evaluation.

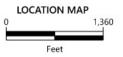
South Blanchard Road Crossing

Figure 1 shows the hydraulic structures in the project area that were evaluated to be improved or added.

Figure 1 Crossing Map



NOTES: HYDROGRAPHY MODIFIED FROM NHD 2024. AERIAL FROM USDA 2019.



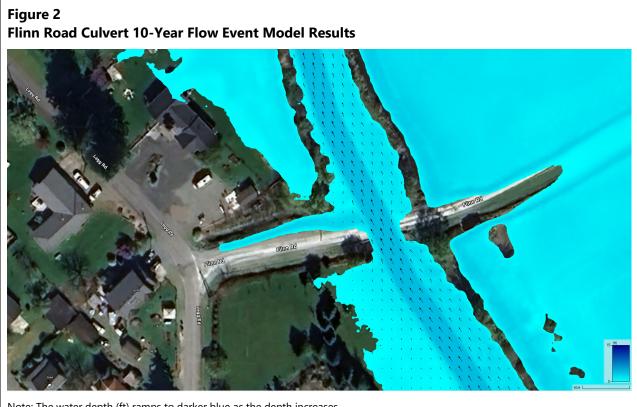


### **Blanchard Road Tide Gate**

As mentioned in the Phase 1 report (Anchor QEA 2023), the hydraulic analysis suggests that improving the flaps on the tide gates would provide only a marginal increase in the tide gates' efficiency, but the results should be confirmed with actual data. Presently, Skagit Conservation District and Skagit County are partnering to collect water surface elevation (WSE) data immediately upstream and downstream of the tide gate that would allow an accurate picture of the hydraulic capacity of the tide gates to be established and ensure the gate is closing at 5 feet. However, based on analyses, it is unlikely that any modification to this level for the self-regulating tide gate would result in a significant difference for either flood inundation or habitat values.

### Flinn Road Crossing

The culvert under Flinn Road was evaluated at the 10-year flow event combined with a winter average tidal cycle and was found to cause constriction. Figure 2 shows the wider water surface upstream and downstream of the culvert under Flinn Road during the 10-year flow event combined with a winter average tidal cycle. It is recommended that the crossing is enlarged to be able to drain large flow events combined with tidal influxes, but further analysis is needed to understand the potential downstream impacts the enlarged culvert would have.



Note: The water depth (ft) ramps to darker blue as the depth increases.

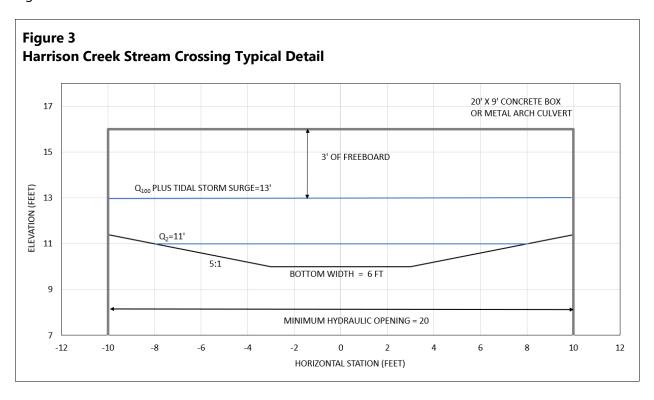
### Morse and Econopouly Boardwalk

The property owner of the downstream property of Project Area 1 has requested a boardwalk crossing over the proposed inset floodplain to access the southeast area of the property. Based on the Draft Coastal Flood Hazard Area (FEMA 2014) the property is in an area of high flood risk. The 100-year flood elevation is at 8 feet National Geodetic Vertical Datum (NGVD) and 13 feet North American Vertical Datum of 1988 (NAVD88) for a coastal flood. It is recommended that the structure is higher than the flood elevation. Naturally durable woods such as western red cedar, Alaska yellow cedar, and Douglas fir are suitable materials for the boardwalk.

## **Harrison Creek Crossing**

The stream crossing, under a private driveway, for Harrison Creek has been found to cause backwatering conditions and road overtopping. Based on preliminary hydraulic analysis, it is recommended that the culvert undergoes further analysis to be replaced. The replacement culvert should be designed to follow Washington Department of Fish and Wildlife (WDFW) Culvert Design Guidelines for Fish passage (WDFW 2013) and typical Skagit County standards.

A preliminary typical cross section based on hydraulic analysis and typical design features is shown in Figure 3.



The replacement crossing structure width of 20 feet is calculated to meet the U.S. Forest Service (USFS) Stream Simulation guidelines culvert design as well as the National Oceanic and Atmospheric

Administration (NOAA) Guidelines for Salmonid Passage at Stream Crossings in Oregon, Washington, and Idaho (USFS 2008; NMFS 2022). The stream simulation design option recommends that culvert width be sized relative to the channel bankfull width and the NOAA guidance.

Equation 1:

Crossing Width = 
$$1.5 \times Bankfull Width$$

$$20 - feet = 1.5 \times 13 - feet$$

The bankfull width was calculated from the 2-year results in HEC-RAS.

The vertical clearance under the structure is based on two design criteria:

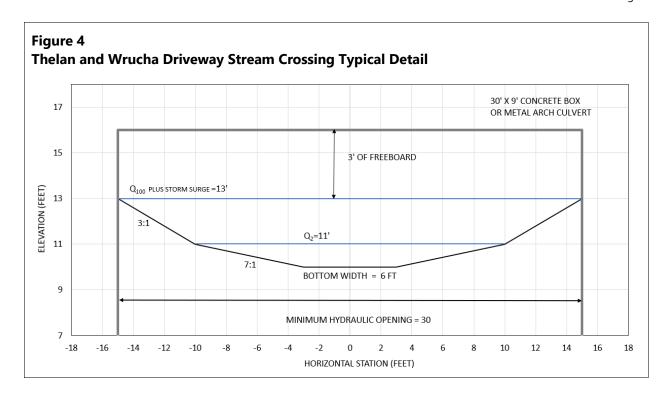
- Providing 6 feet of vertical clearance relative to the channel thalweg for access and maintenance purposes
- 2. Providing 3 feet of freeboard above the proposed 100-year WSE to ensure safe passage of debris

Based on the Draft Coastal Flood Hazard Area (FEMA 2014) the crossing is in an area of high flood risk. The 100-year flood elevation is at 8 feet NGVD and 13 feet NAVD88 for a coastal flood. Therefore, it is recommended that the structure is at or above 16 feet NAVD88, to allow for freeboard during coastal flooding. However, the amount freeboard could change during the design process due to existing road elevations. It is typical that at least 3 feet of stream sediment covers the bottom of the culvert. Therefore, the proposed inside dimensions of the culvert are 20 feet by 9 feet.

# Thelan and Wrucha Driveway Crossing

Colony Creek has avulsed into the Macken property downstream of the Colony Mountain Drive culvert. During high flood events, the Macken property floods due to insufficient drainage. It is proposed that a stream crossing is constructed under the private driveway to drain the Macken property towards the proposed inset floodplain. Based on preliminary hydraulic analysis, the proposed crossing would reduce flooding and connect Colony Creek to complex habitat, meeting some of the Floodplain by Design goals. The culvert should be designed to follow WDFW Culvert Design Guidelines for Fish passage (WDFW 2013) and typical Skagit County standards.

A preliminary typical cross section based on hydraulic analysis and typical design features is shown in Figure 4.



A crossing structure width of 30 feet is calculated to meet the USFS Stream Simulation guidelines culvert design as well as the NOAA Guidelines for Salmonid Passage at Stream Crossings in Oregon, Washington, and Idaho (USFS 2008; NMFS 2022). The stream simulation design option recommends that culvert width be sized relative to the channel bankfull width and the NOAA guidance. Using Equation 1, the crossing width should be 30 feet. The bankfull width of 20 feet was calculated from the 2-year results in HEC-RAS.

The vertical clearance under the structure is based on two design criteria:

- 1. Providing 6 feet of vertical clearance relative to the channel thalweg for access and maintenance purposes
- 2. Providing 3 feet of freeboard above the proposed 100-year WSE to ensure safe passage of debris

Based on the Draft Coastal Flood Hazard Area (FEMA 2014) the crossing is in an area of high flood risk. The 100-year flood elevation is 8 feet NGVD and 13 feet NAVD88 for a coastal flood. Therefore, it is recommended that the structure is at or above 16 feet NAVD88, to allow for freeboard during coastal flooding. However, the amount freeboard could change during the design process due to existing road elevations. It is typical that at least 3 feet of stream sediment covers the bottom of the culvert. Therefore, the proposed inside dimensions of the culvert are 30 feet by 9 feet.

# **Colony Mountain Drive Crossing**

The Colony Mountain Drive crossing has been identified as a crossing that could be replaced to better suit the Floodplain by Design goals. In conjunction with sediment management, an enlarged crossing would increase drainage capacity and reduce flooding. As shown in Figure 5, when the culvert causes backwatering, during the 10-year flow event combined with a winter average tidal cycle, overtopping of the adjacent road occurs and flow is directed into the agricultural field. The black arrows in the figure depict flow direction. If replaced, the culvert design should abide by Skagit County and WDFW standards.

Figure 5 Colony Mountain Road Crossing Model Results for the 10-Year Flow Event Note: The water surface elevation (ft) ramps to darker blue as the elevation increases.

### Summary

It is recommended that each design considers fish passage and climate resilience, as well as federal, state, and local regulations. All proposed crossing improvements and additions will need to be led by or designed in close coordination with Skagit County Public Works to ensure all permitting requirements are met.

### References

- Anchor QEA, 2023. *Phase 1 Summary and Recommendations Report*. Colony Creek and Harrison Creek Assessment and Modeling Project. Prepared for Skagit Conservation District. July 2023.
- NMFS (National Marine Fisheries Service), 2022. Guidelines for Salmonid Passage at Stream Crossings in Oregon, Washington, and Idaho. NMFS. WCR. Portland, Oregon.
- FEMA (Federal Emergency Management Agency), 2014. Skagit County, Washington Draft Floodplains (Coastal). Risk MAP Program. Available at:

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# Appendix B Sediment Management Recommendations Memorandum

# Memorandum

September 15, 2025

To: Emmett Wild, Skagit Conservation District

From: Tracy Drury, PE, Alyssa DeMott, and Clare Yurchak, PE, Anchor QEA

**Re:** Sediment Management Recommendations

The influx of sediment into the lower Colony Creek system is a major concern for the local community and is perceived as a primary reason for flooding and recent channel avulsions. The low slope of the valley floor sediment deposition and confinement between roads, railroad, and valley wall all play a role in where flooding occurs. This memorandum lays out how sediment will be managed for the two alternatives for the Colony Creek Sub-basin Project, Phase II, and how it will impact the entire system.

Sediment delivery to Colony Creek is driven by upstream erosion and bank instability, and infrequent but extreme flood events (beaver dam failures). It is likely that clearing and development of the right bank hillslope will continue to be a driver of sediment delivery to Colony Creek. In the existing alignment, sediment transport and deposition processes have changed. Though the channel is still confined and channelized as it exits the hillside, the channel is now unconfined through the Macken property downstream of the 2022 avulsion location.

# 1 Project Area 1

Project Area 1 proposes a defined channel cut in Macken's field and sediment clearing through the Colony Mountain Road culvert. Due to the channelization and confinement as Colony Creek exits the steep hillside, Colony Mountain Road's culvert will continue to experience sediment deposition. It is recommended that Skagit County and Skagit Conservation District prepare and participate in an adaptive management plan. This plan will lay out thresholds for sedimentation and deposition within the culvert and channel. The plan will provide a road map for additional analysis based on found sedimentation rates. The analysis will determine adaptive management actions.

Project Area 1 also proposes an inset floodplain in Thelan's field and in Morse's field. The inset floodplain will establish floodplain connectivity, construct side channels, and allow for overbank flow paths. These actions will allow for sediment storage during high-flow events, spread sediment across a broader area, reduce sediment build-up, and promote sediment attenuation. It is not anticipated that a comprehensive management plan is needed for the inset floodplain; however, in the areas where there is an inset floodplain, it is recommended that Skagit County and Skagit Conservation District monitor aggradation and apply adaptive management for areas with 1 to 1.5 feet of aggradation.

The adaptive management actions will reduce sediment loading to downstream areas within the system.

# 2 Project Area 2

Project Area 2 proposes inset floodplains, side channels, and levee setbacks. These actions will allow for sediment storage during high-flow events, spread sediment across a broader area, reduce sediment build-up, and promote sediment attenuation. It is not anticipated that a comprehensive management plan is needed for the inset floodplain; however, in the areas where there is an inset floodplain, it is recommended that Skagit County and Skagit Conservation District monitor aggradation and apply adaptive management for areas with 1 to 1.5 feet of aggradation.

# Appendix C 30% Design Plans

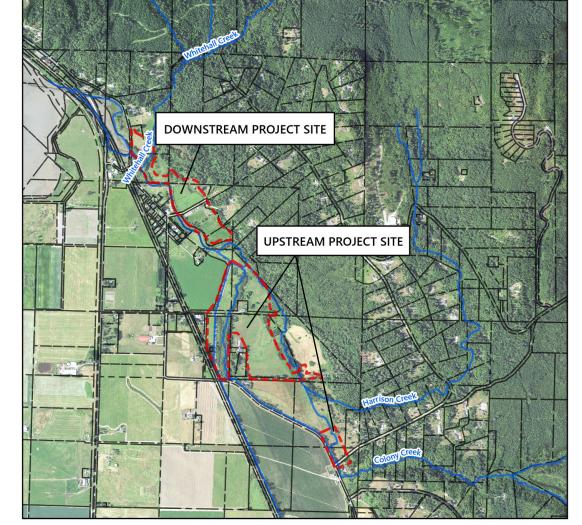
# **30% DESIGN SUBMITTAL**

# **LOWER COLONY CREEK SUB-BASIN PROJECT, PHASE II**

# **SKAGIT CONSERVATION DISTRICT**



NOTES: TOPOGRAPHIC MAP FROM USGS 2025. TERRITORY INSET MAP FROM ESRI 2025.



NOTES: HYDROGRAPHY MODIFIED FROM NHD 2024. AERIAL FROM USDA 2019.



	SHEET	INDEX
SHEET NO.	DRAWING NO.	TITLE
1	G01	COVER SHEET
2	G02	GENERAL NOTES
3	C01	UPSTREAM EXISTING
		CONDITIONS
4	C02	UPSTREAM ACCESS AND
		STAGING PLAN
5	C03	UPSTREAM PROPOSED
		CONDITIONS
6	C04	UPSTREAM PROPOSED
		SECTIONS AND PROFILES
7	C05	UPSTREAM PROPOSED
		CROSSING STRUCTURE
		DETAILS
8	C06	UPSTREAM TEMPORARY
		EROSION AND SEDIMENT
		CONTROL
9	C07	DOWNSTREAM EXISTING
		CONDITIONS
10	C08	DOWNSTREAM ACCESS
		AND STAGING PLAN
11	C09	DOWNSTREAM PROPOSED
		CONDITIONS
12	C10	DOWNSTREAM PROPOSED
		SECTIONS AND PROFILES
13	C11	DOWNSTREAM
		TEMPORARY EROSION AND
		SEDIMENT CONTROL

### PROJECT INFORMATION:

PROJECT LOCATION: COLONY ROAD & COLONY

MOUNTAIN DRIVE BOW, WA 98232

CONTRACTING AGENCY: SKAGIT CONSERVATION DISTRICT 2021 EAST COLLEGE WAY, SUITE 203

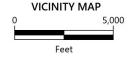
> MOUNT VERNON, WA 98273 PHONE: (360) 428-4313 CONTACT: EMMETT WILD

ENGINEER: ANCHOR QEA

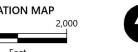
20 BELLWETHER WAY, SUITE 101

BELLINGHAM, WA 98225 PHONE: (360) 733-4311 CONTACT: TRACY DRURY, P.E.

**DRAFT - NOT FOR CONSTRUCTION** 









### **GENERAL CONSTRUCTION NOTES:**

- 1. ALL WORK SHALL COMPLY WITH WSDOT STANDARD SPECIFICATIONS.
- 2. CONTRACTOR SHALL FURNISH ALL MATERIALS, EQUIPMENT, AND LABOR NECESSARY TO COMPLETE ALL WORK AS INDICATED ON THE CONTRACT DOCUMENTS.
- 3. CONTRACTOR SHALL VISIT THE JOB SITE AND BE RESPONSIBLE FOR ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION
- 4. ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE CONTRACTING OFFICER PRIOR TO PROCEEDING WITH THE WORK
- 5. THE CONTRACTOR SHALL RECEIVE, IN WRITING, AUTHORIZATION TO PROCEED BEFORE STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONTRACT DOCUMENTS.
- 6. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OTHERWISE BY THE CONTRACTING OFFICER OR WHERE LOCAL CODES OR REGULATIONS TAKE PRECEDENCE.
- 7. ALL WORK PERFORMED AND MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.
- 8. CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
- 9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK, USING THE BEST SKILLS AND ATTENTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THIS CONTRACT.
- 10. DETAILS ARE INTENDED TO SHOW THE FINAL RESULT OF THE DESIGN. MINOR MODIFICATIONS MAY BE REQUIRED TO SUIT JOB SITE DIMENSIONS OR CONDITIONS AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.
- 11. THE CONTRACTOR SHALL MAKE ALL NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, ROADWAY, DRAINAGE WAYS, CULVERTS, AND VEGETATION UNTIL SUCH ITEMS ARE TO BE DISTURBED OR REMOVED AS INDICATED ON THE CONTRACT DOCUMENTS.
- 12. CONTRACTOR SHALL KEEP PROJECT AREA CLEAN AND HAZARD-FREE. CONTRACTOR SHALL DISPOSE OF ALL DIRT, DEBRIS, AND RUBBISH FOR DURATION OF THE WORK. UPON COMPLETION OF WORK, CONTRACTOR SHALL REMOVE ALL MATERIAL AND EQUIPMENT NOT SPECIFIED AS REMAINING WITHIN THE PROJECT AREA.
- 13. REPRESENTATIONS OF TRUE NORTH SHALL NOT BE USED TO IDENTIFY OR ESTABLISH THE BEARING OF TRUE NORTH AT THIS JOB SITE
- 14. WHERE A CONSTRUCTION DETAIL IS NOT SHOWN OR NOTED, THE DETAIL SHALL BE THE SAME AS FOR OTHER SIMILAR WORK.
- 15. NOTES AND DETAILS ON THE CONTRACT DOCUMENTS SHALL TAKE PRECEDENCE OVER GENERAL NOTES HEREON.
- 16. DIMENSION CALLOUTS SHALL TAKE PRECEDENCE OVER SCALES SHOWN ON THE CONTRACT DOCUMENTS.
- 17. THE CONTRACT DOCUMENTS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURES, WORKERS, AND THE PUBLIC DURING CONSTRUCTION.
- 18. TRAFFIC CONTROL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR THROUGHOUT THE DURATION OF THE PROJECT AND SUBJECT TO ALL LOCAL, STATE, AND/OR FEDERAL REGULATIONS.
- 19. DATES FOR IN-STREAM WORK TO BE DETERMINED.
- 20. CONTRACTOR SHALL ATTEND A PRE-CONSTRUCTION MEETING PRIOR TO COMMENCEMENT OF THE CONSTRUCTION. MEETING LOCATION, DATE, AND TIME TO BE DETERMINED BY THE CONTRACTING AGENCY.

### **STANDARD CIVIL NOTES:**

- 1. ALL SITE WORK SHALL BE AS INDICATED ON THE CONTRACT DOCUMENTS.
- $2. \ \mathsf{DO} \ \mathsf{NOT} \ \mathsf{EXCAVATE} \ \mathsf{OR} \ \mathsf{DISTURB} \ \mathsf{BEYOND} \ \mathsf{THE} \ \mathsf{JOB} \ \mathsf{SITE} \ \mathsf{AREA} \ \mathsf{UNLESS} \ \mathsf{NOTED} \ \mathsf{OTHERWISE}.$
- 3. RUBBISH, DEBRIS, GARBAGE, AND OTHER REFUSE SHALL BE REMOVED FROM THE JOB SITE AND DISPOSED OF LEGALLY.
  4. NO TOPSOIL, ORGANIC SPOILS, FILL, EXCAVATED MATERIAL, RIP RAP, CONSTRUCTION MATERIAL, EQUIPMENT, OR ANY OTHER SUCH ITEMS SHALL BE PLACED, STOCKPILED, OR PARKED IN THE ROADWAY SUCH THAT IT WOULD PREVENT A MINIMUM WIDTH OF 12-FEET FOR TRAFFIC CLEARANCE.
- 5. ANY BACKFILL, NOT OTHERWISE DESCRIBED ON THE CONTRACT DOCUMENTS, MUST BE PLACED WITH A MAXIMUM LIFT DEPTH OF 12-INCHES OR AS INSTRUCTED BY CONTRACTING OFFICER.
- 6. CONTRACTOR AND ITS EMPLOYEES SHALL PROVIDE SAFETY TRAINING FOR THE WORK CREW PRIOR TO STARTING THE PROJECT.
  7. THE AREAS OF THE JOB SITE DISTURBED BY THE WORK SHALL BE GRADED SMOOTH TO THE PRE-CONSTRUCTION GRADE,
  DECOMPACTED AND PROTECTED AND/OR REVEGETATED AS SPECIFIED HEREON.
- 8. ALL MATERIALS SHALL BE NEW AND UNDAMAGED, UNLESS OTHERWISE APPROVED BY THE CONTRACTING OFFICER. THE SAME MANUFACTURER OF EACH ITEM SHALL BE USED THROUGHOUT THE WORK UNLESS OTHERWISE APPROVED BY THE CONTRACTING OFFICER.

### **UTILITY NOTES:**

1. LOCATIONS OF EXISTING UTILITIES HAVE NOT BEEN FIELD VERIFIED. THE CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CONTACT THE UTILITY LOCATION REQUEST CENTER (ONE-CALL CENTER) AT 1-800-424-5555 FOR UTILITY LOCATIONS NOT LESS THAN TWO (2) BUSINESS DAYS BEFORE THE SCHEDULED DATE FOR EARTHWORK OR TRENCHING THAT MAY IMPACT EXISTING UTILITIES, UNLESS OTHERWISE NOTED.

### **SURVEY AND PROJECT DATUM NOTES:**

- 1. TOPOGRAPHY PRESENTED IN DRAWINGS IS A MERGED DATASET WHICH INCLUDES A 2017 3-FOOT RESOLUTION NORTH PUGET SOUND DIGITAL TERRAIN MODEL FROM QUANTUM SPATIAL (2017) AND A 2019 1-METER RESOLUTION DIGITAL ELEVATION MODEL OF THE SKAGIT RIVER DELTA FROM NOAA (2020).
- 2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988, FEET.
- 3. HORIZONTAL DATUM IS WASHINGTON STATE PLANE SOUTH ZONE, NORTH AMERICAN DATUM OF 1983, U.S. FEET.
- 4. PARCEL DATA ACQUIRED FROM SKAGIT COUNTY GIS.

### **OTHER NOTES:**

- 1. ORDINARY HIGH WATER MARK BASED ON THE MODELED HIGH TIDE AND MEAN WINTER FLOW SCENARIO.
- 2. INVASIVE SPECIES REMOVAL IS INCLUDED IN ALL AREAS WHERE RIPARIAN PLANTINGS ARE PROPOSED.

### **ABBREVIATIONS:**

FEE

APPROX. APPROXIMATELY

T FEET

NAD NORTH AMERICAN DATUM

NAVD NORTH AMERICAN VERTICAL DATUM

NO. NUMBER

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NHD NATIONAL HYDROGRAPHY DATASET NWI NATIONAL WETLAND INVENTORY

Q DISCHARGE

USDA U.S. DEPARTMENT OF AGRICULTURE

### **DRAWING VERSION NOTE:**

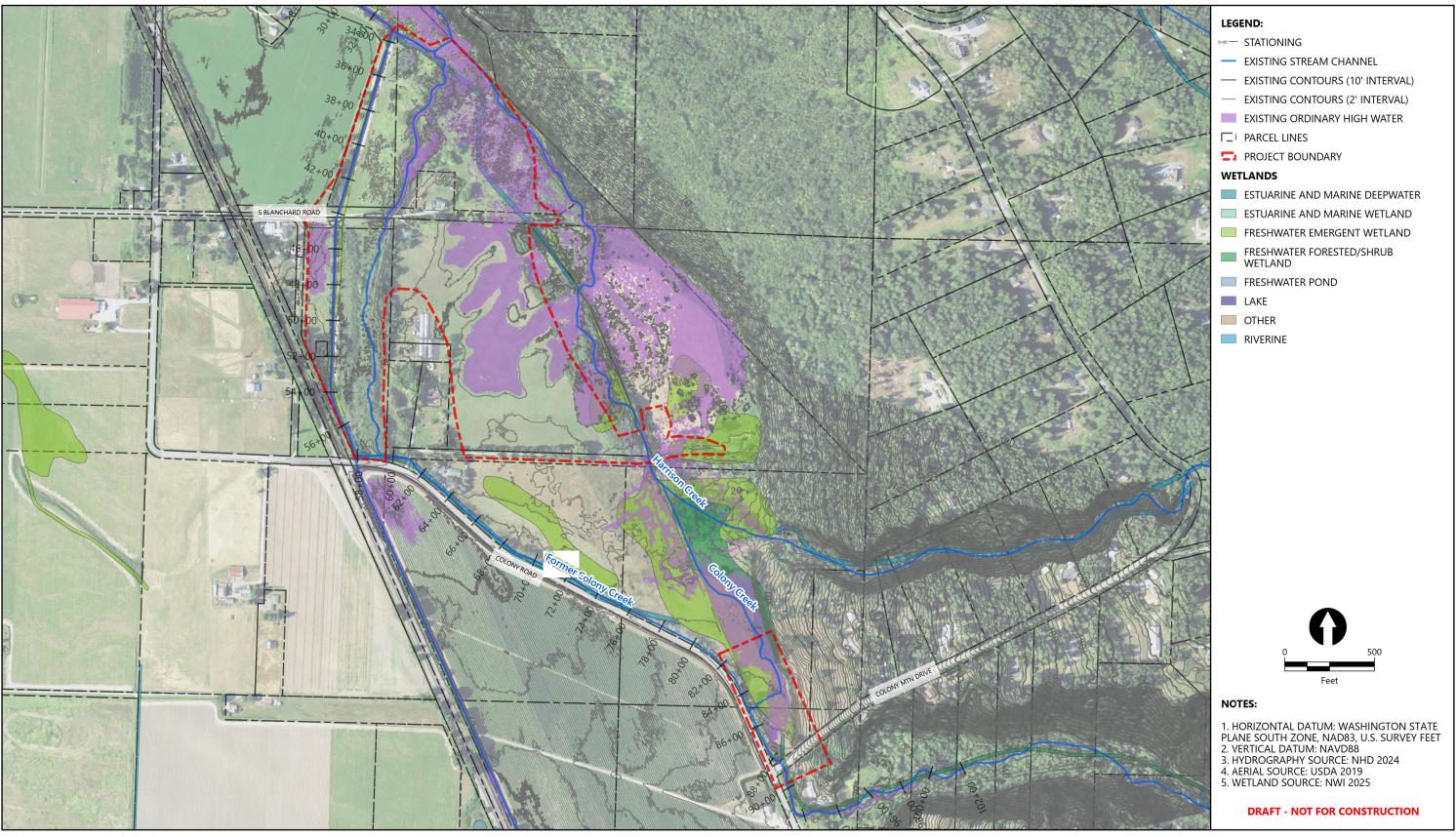
THESE PLANS HAVE BEEN DEVELOPED FOR 30% DESIGN. FURTHER DETAIL AND POTENTIAL CHANGES ARE EXPECTED DURING LATER DESIGN PHASES.

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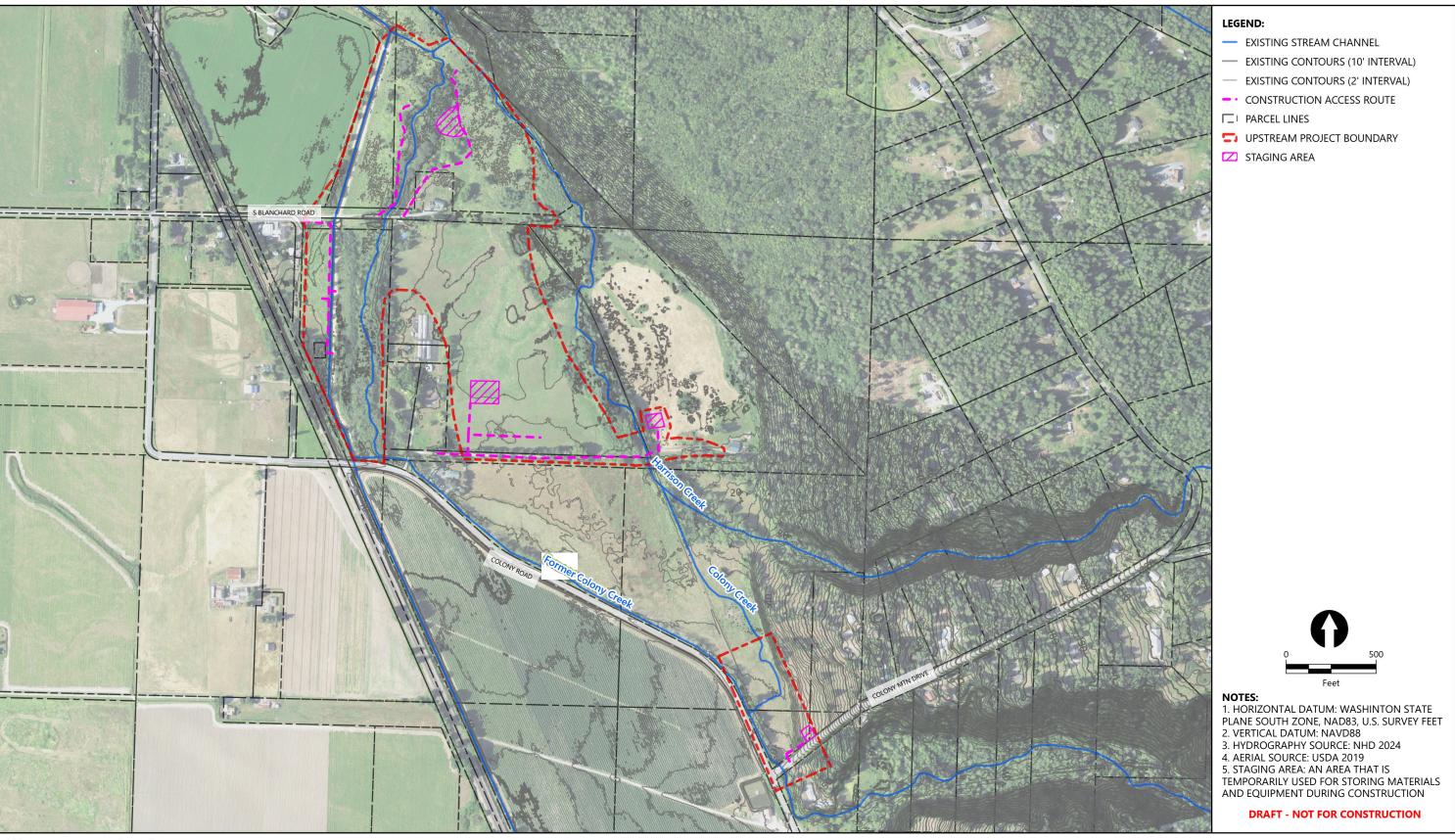
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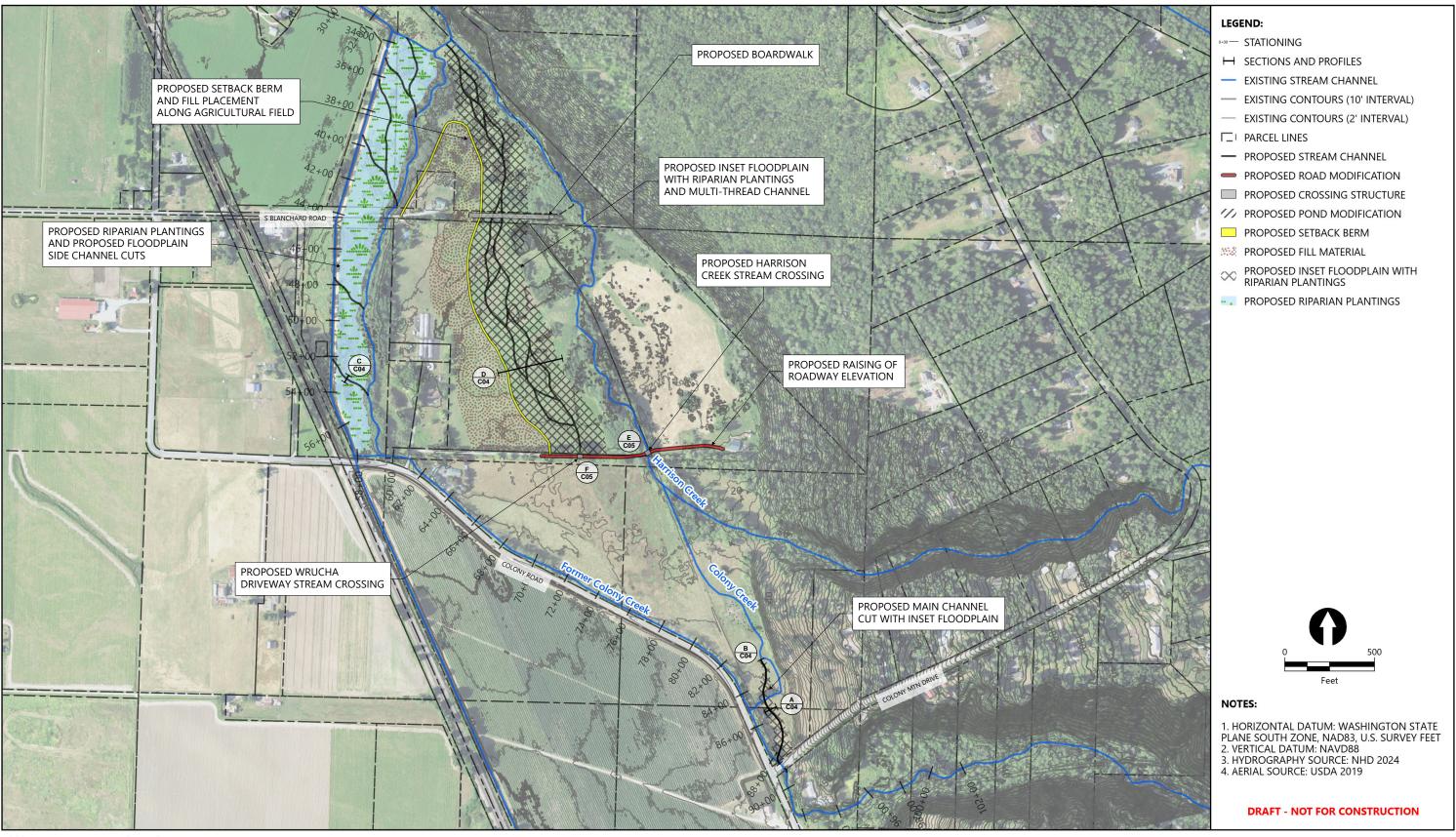
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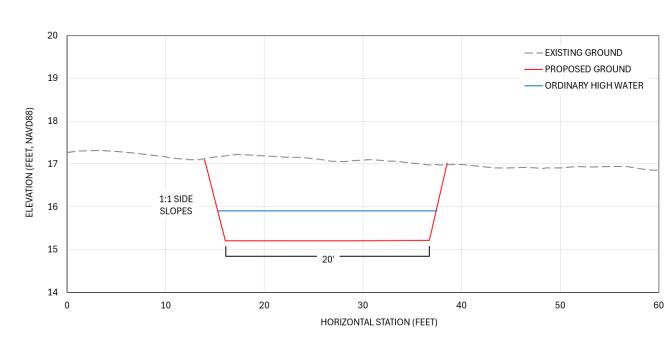
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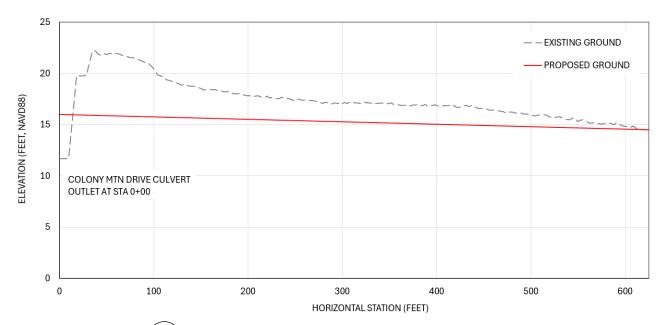


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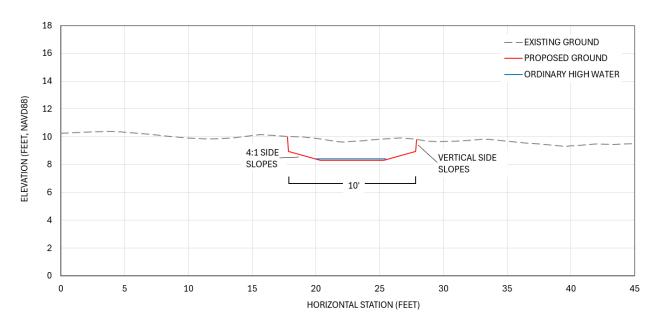




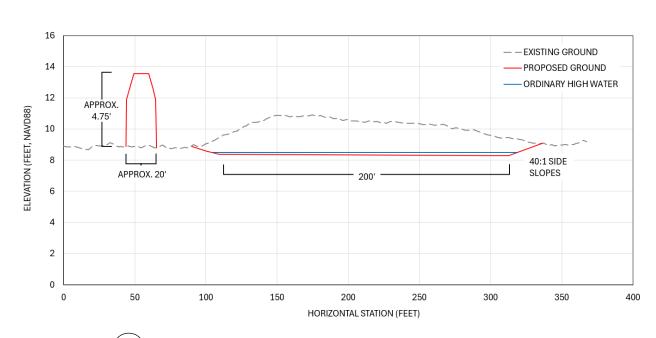










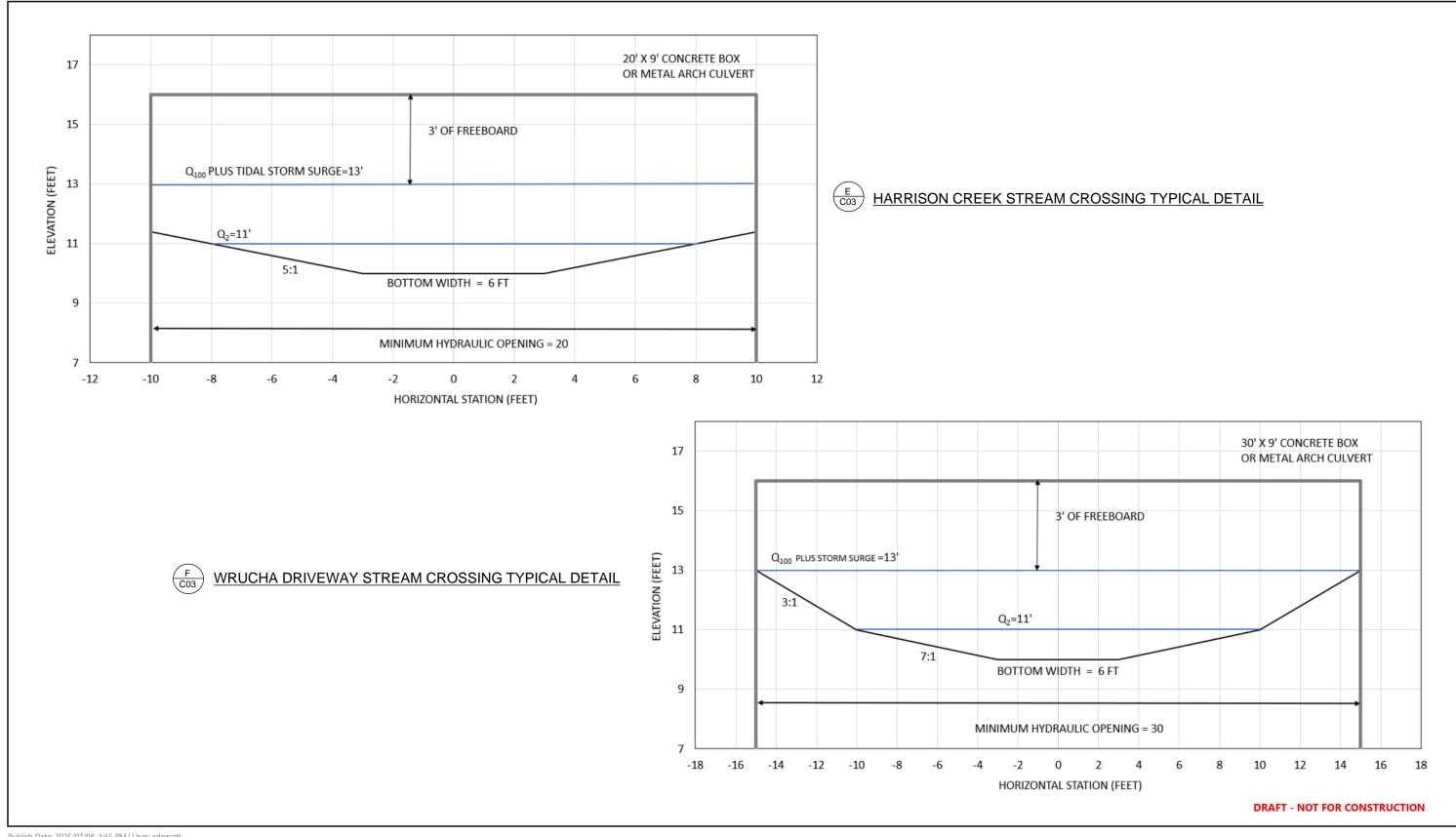


SETBACK BERM AND INSET FLOODPLAIN CROSS SECTION "D"

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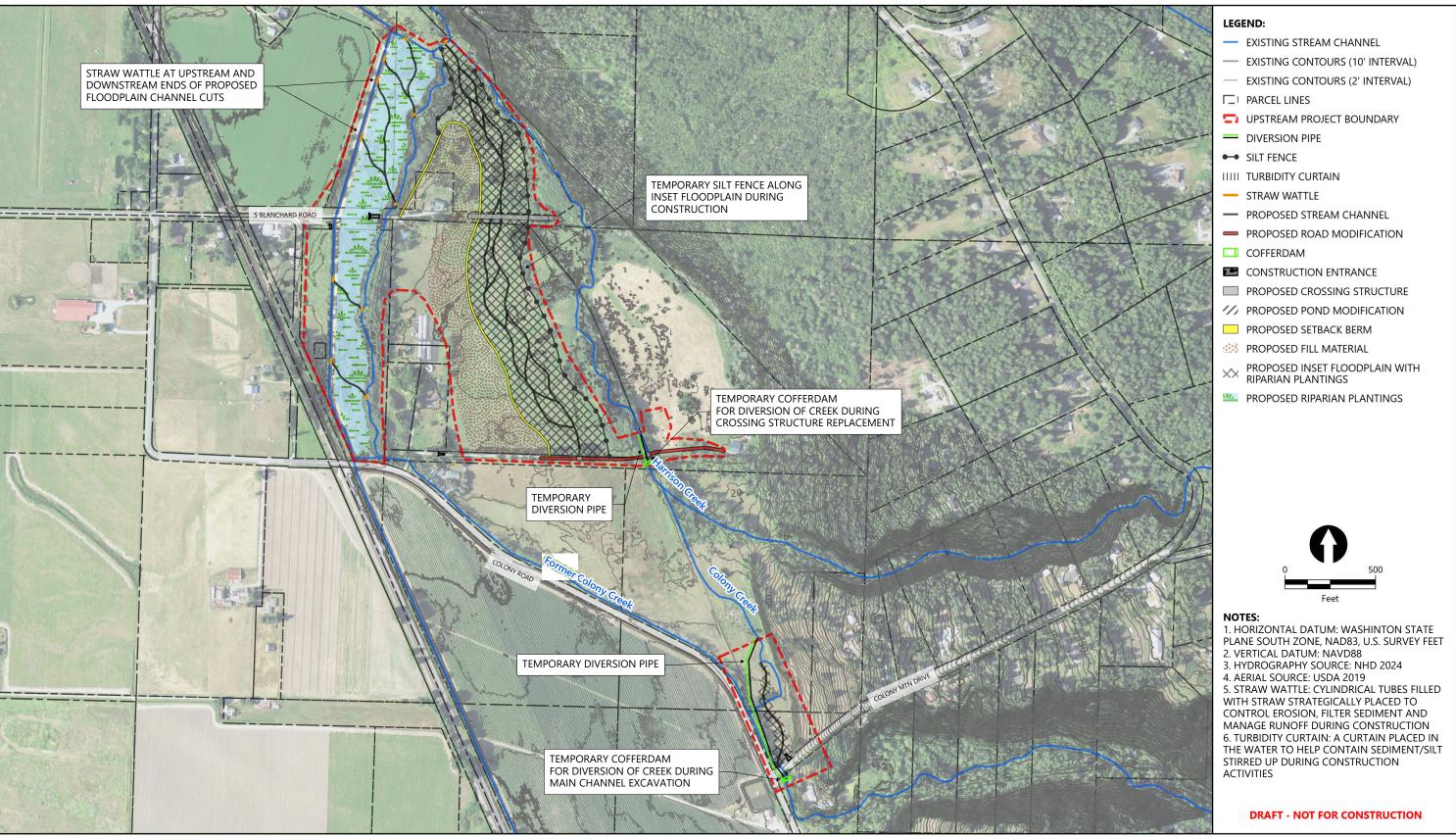
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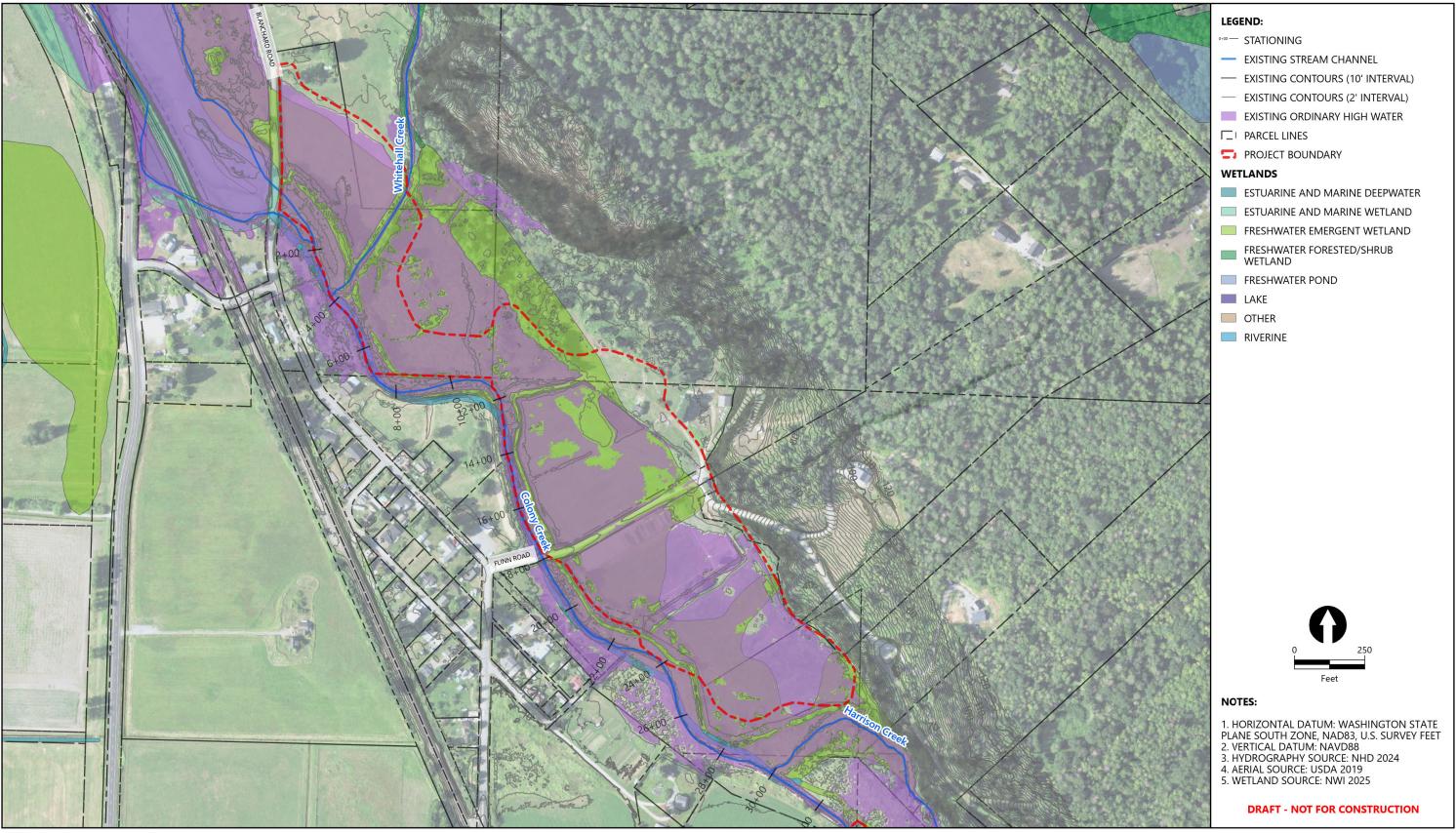




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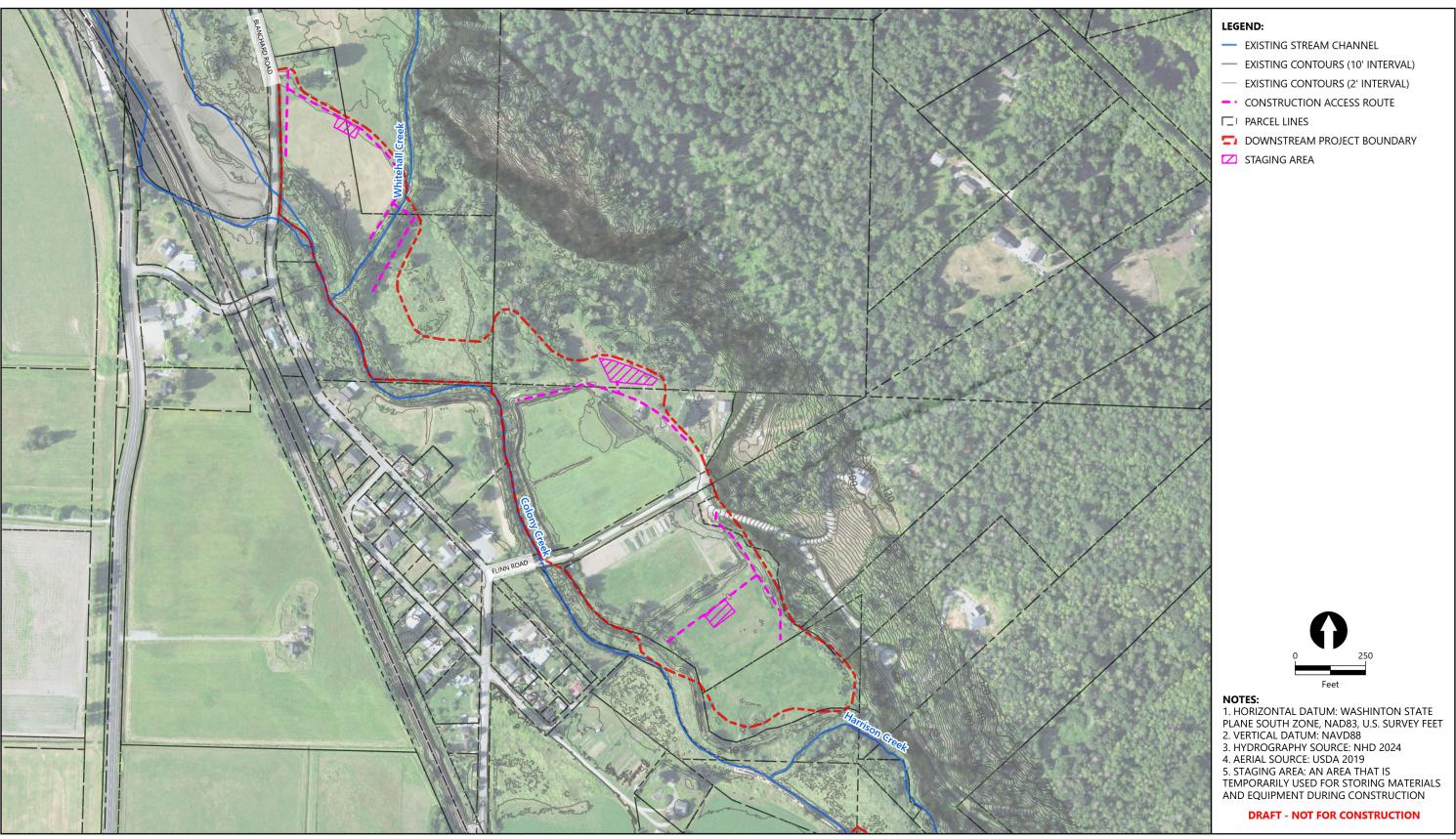
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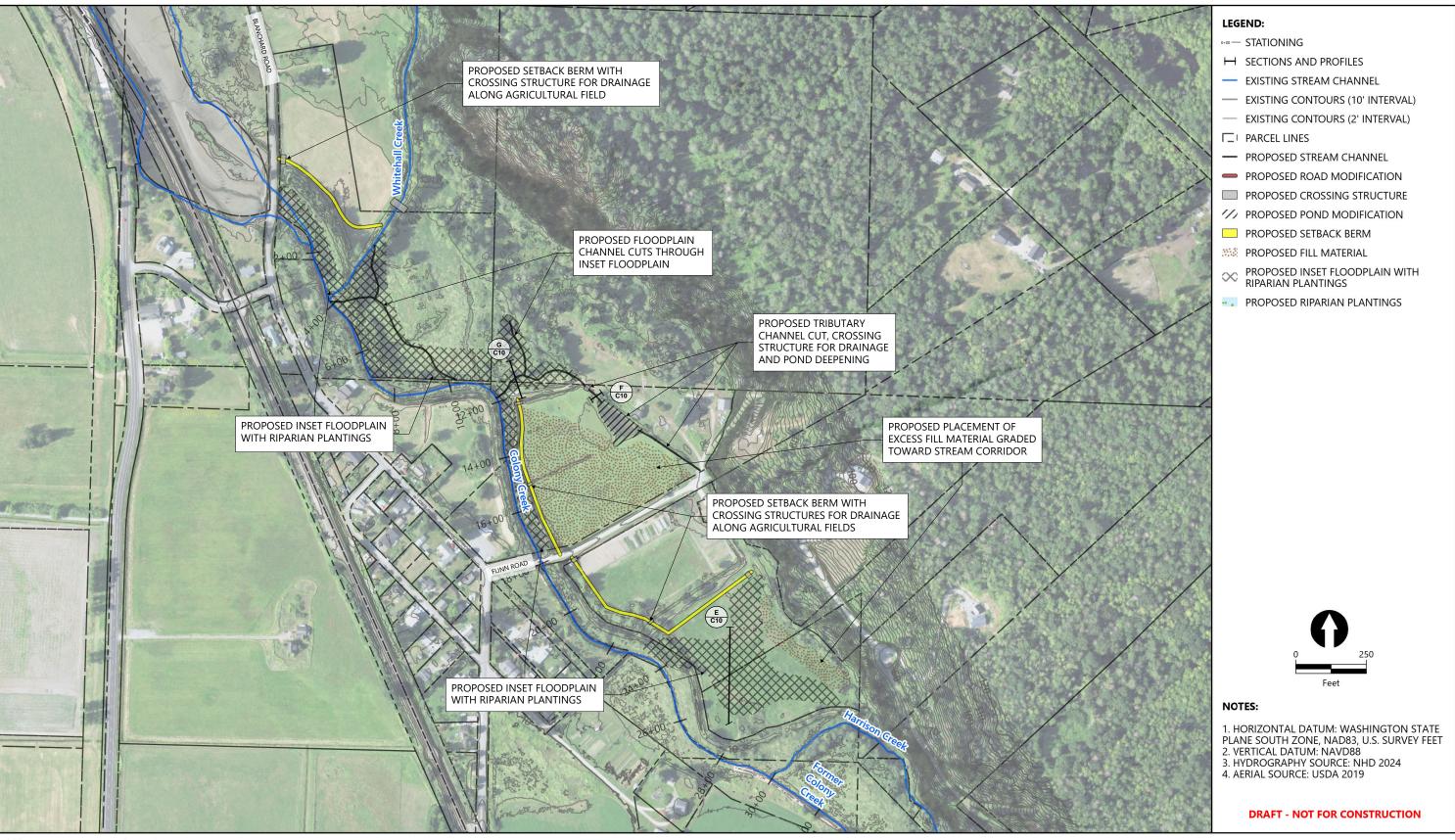
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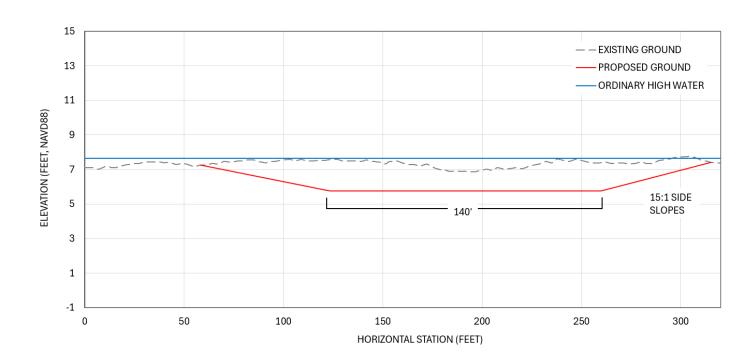




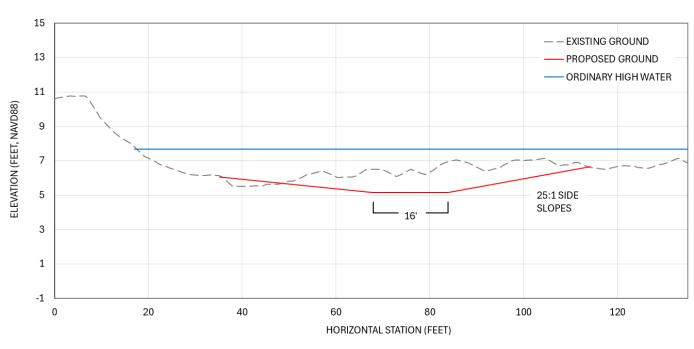
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INSET FLOODPLAIN CROSS SECTION "G"

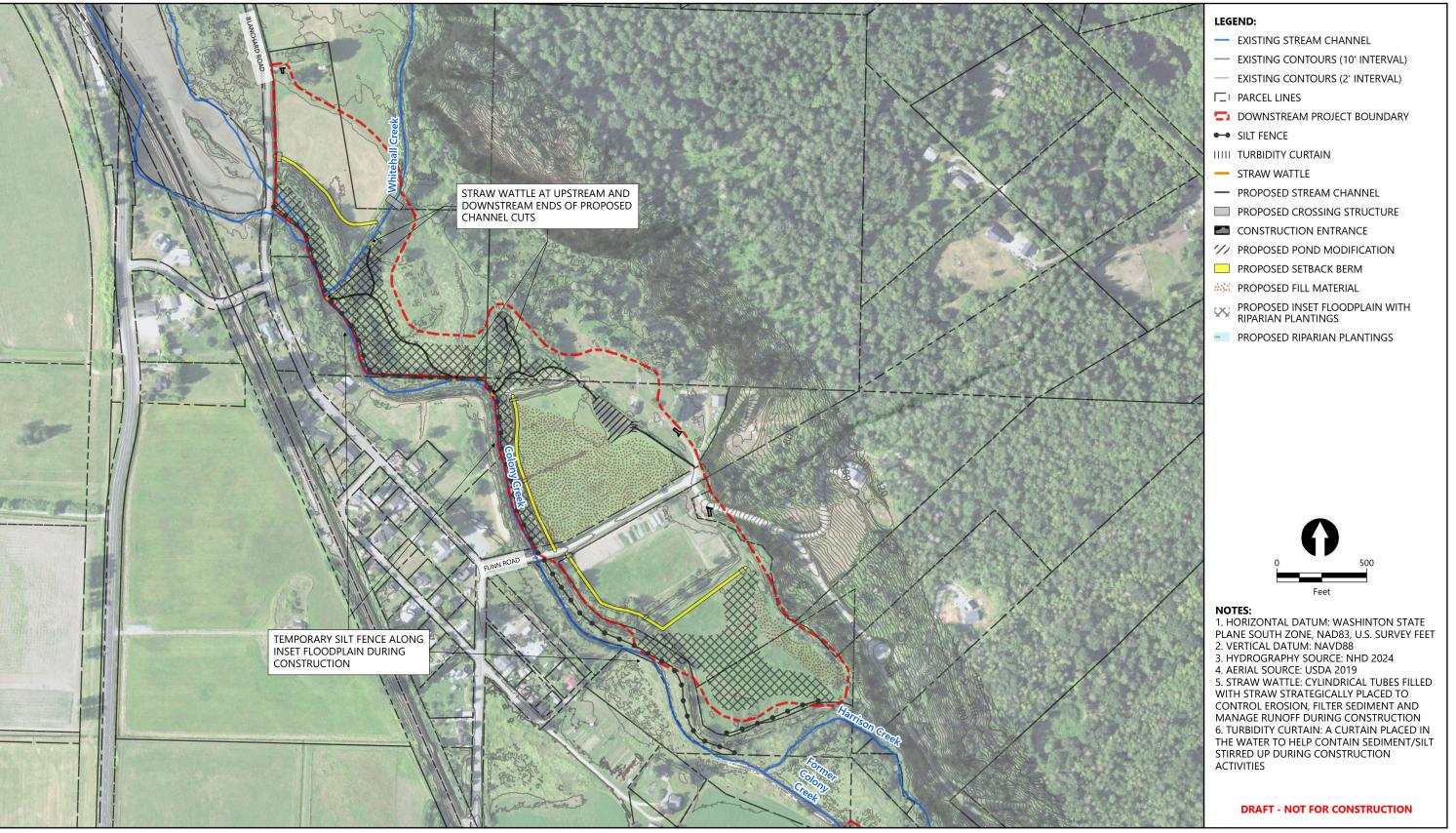
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INSET FLOODPLAIN CROSS SECTION "E"





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