DRAFT FLOODPLAINS STATEMENT OF FINDINGS
Olympic Hot Springs (Elwha) Road
Environmental Assessment

Recommended

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Superintendent — Date
Olympic National Park

Certified for Technical Accuracy and Servicewide Consistency:

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Chief, Water Resources Division — Date
National Park Service

Concurred

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Regional Safety Officer — Date
National Park Service

Concurred

_____

Regional Director, National Park Service — Date
Interior Regions 8, 9, 10, 12

FLOODPLAINS STATEMENT OF FINDINGS: OLYMPIC HOT SPRINGS ROAD REROUTE

Background

Executive Order (EO) 11988, "Floodplain Management" (May 28, 1980), was issued "to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative." The EO requires federal agencies to develop agency specific guidance, provide leadership and take action to:

- Reduce the risk of flood loss;
- Minimize the impact of floods on human safety, health and welfare; and
- Restore and preserve the natural and beneficial values served by floodplains.

It is NPS policy to preserve floodplain values and to minimize potentially hazardous conditions associated with flooding. Floods can result from heavy precipitation (including rain-on-snow rapid melt events), unseasonably warm weather patterns, glacial outburst releases, mudflows or debris flows. NPS developments in areas affected by such flooding are subject to compliance with Executive Order 11988: Floodplain Management as specified by the NPS implementing policy, Directors Order 77-2, Floodplain Management.

NPS proposed actions are classified under one of three action classes. Depending on the action class, one of three *regulatory floodplains* applies (100-year, 500-year, and Extreme). For Class I actions, the base floodplain (100-year) applies; for Class II actions, the 500-year return floodplain applies and for Class III actions, the Extreme floodplain is the regulatory floodplain.

In general, Class I actions consist of most NPS developments (including administrative, residential, warehouse and maintenance buildings, parking areas, etc.) in non-high hazard settings. Class II actions are critical actions requiring a higher degree of protection, including schools, museums, hazardous materials and fuel storage areas and emergency services functions. Class III actions are Class I or Class II actions located in high hazard areas – where dangerous flooding can occur without warning.

If a proposed action is found to be in the applicable regulatory floodplain and relocating the action to a non-floodplain site is not considered a viable alternative, then flood conditions and associated hazards must be quantified as a basis for management decision-making and appropriate prescribed actions must be taken. If there is a compelling reason for NPS facilities to occupy a regulatory floodplain, NPS policy permits the activity when a *Statement of Findings* (SOF) is prepared to explain the rationale for the decision to use the floodplain. The SOF also discloses the risk from flooding and discusses how mitigation of the risk can be achieved.

A. Introduction

This Floodplains SOF is prepared for rerouting a portion of the Olympic Hot Springs (Elwha) Road. The proposed action is a Class I action.

> Class I includes the location or construction of administrative, residential, warehouse and maintenance buildings, non-excepted parking lots or other man-made features, which by their nature entice or require individuals to occupy the site, are prone to flood damage, or result in impacts to natural floodplain values. Actions in this class are subject

to the floodplain policies and procedures if they lie within the100-year regulatory floodplain (the Base Floodplain).

Brief description of the proposed action.
Under the proposed action, FHWA and NPS would construct a reroute (approximately one mile long) around a section of the Olympic Hot Springs Road, which is currently in the floodplain of the Elwha River. Another portion of the roadway (approximately 1,800 linear feet, 1.5 acres) near the park entrance is also in the floodplain and would remain so but portions would be raised slightly and realigned away from the river. This will restore approximately 0.8 miles of roadway in the floodplain.

With the reroute, public and administrative road access would be restored. Vehicle travel to several popular trailheads, the Altair picnic area, boat launch, and private lands would once again be available. The road would be used to maintain trails and other facilities, operate the Elwha Ranger Station, and access the pack stock operations area, housing, park maintenance area, and Elwha Ranger Station Historic District. The park's 2008 General Management Plan (GMP) and the 2005 Elwha River Ecosystem Restoration Implementation Supplemental Environmental Impact Statement (SEIS) call for continued road access to this area.

Brief site description.
The Olympic Hot Springs Road is 8.2 miles long and appeared on maps between 1892 and 1913. By 1919 there was a road as far as the McDonald Canyon Bridge, but beyond that on the east side of the valley, it remained a trail. In 1924, the Sixth Army Engineers built a bridge near Altair to access the Glines Canyon Dam site. By 1927, the road was improved as part of the dam construction and was extended to Boulder Hot Springs around 1930 (R. Hoffman pers. comm. 5-10-19). It is the only route to access the Whiskey Bend Road and associated trailheads, the Elwha Ranger Station Historic District, Elwha Maintenance Facility, park stock facilities, Glines Canyon Spillway Overlook, and Boulder Creek (Olympic Hot Springs) Trailhead. The road also provides access to several private parcels of land.

The road was reconstructed most recently c. 1982. Since that time, roadway maintenance has included replacement of at least one large culvert (Griff Creek in 2011) as well as a series of emergency repairs. Just prior to dam removal, there was an extensive repair/bank stabilization project at "Fisherman's Corner," which included reconstruction of the road base.

Glines Canyon Dam (removed in 2014) was located approximately 3.5 miles from the park entrance (river mile 13.5). The Elwha Dam (removed in 2012) was located 8.5 miles downstream, outside the park boundary (river mile 4.9). Construction of the dams disrupted natural river processes, and created the former Lake Mills and Lake Aldwell respectively. Dam construction and removal has restored natural river processes with resultant dramatic effects to the Elwha River channel and floodplain.

Prior to the most recent road washouts along the Olympic Hot Springs Road in November 2017, the road provided vehicle access to the Glines Canyon Spillway Overlook and multiple trailheads such as Whiskey Bend and the Boulder Creek Trailhead. Average daily traffic (ADT) on the roadway was measured as approximately 350 vehicles, with seasonal volume increasing to approximately 915. One of the most popular activities was viewing the Glines Canyon gorge from the Glines Canyon Spillway Overlook or from the East/Whiskey Bend Overlook, approximately one mile up the Whiskey Bend Road. The Elwha area has nine trailheads that

provide access to about 20 hiking trails (NPS 1994:3-64). In addition, rafting companies would use the former dam powerhouse site as a put-in for Elwha River trips. Camping in Altair and Elwha campgrounds was also a popular activity, with an estimated 5,000 – 8,000 participants annually (NPS 1994:3-83). Visitors also enjoyed boating and recreational fishing from below the dam.

With the road closed, visitors currently engage in a variety of recreational opportunities, including sightseeing, picnicking, hiking, backpacking, fishing, horseback riding, and kayaking/rafting. Visitors also use the bypass trail to hike, horseback ride, or carry their bikes around the closed roadway en route to upper roadway or trail hiking or riding.

The Elwha River basin is a large watershed on the Olympic Peninsula, covering 321 square miles, and encompassing 70 miles of river and tributaries. Most (83%) of the watershed is within the park. From north to south, the following tributaries drain into the Elwha River: Madison Creek (from the east), Freeman Creek and Hughes Creek (from the west), Griff Creek (from the east), Stukey Creek (from the west), Sege Creek (from the east), and Boulder Creek (from the west). After the road turns west to parallel Boulder Creek, Deer Creek, Deep Creek and Deadman's Gulch cross the roadway from the north (Figure 1). Freeman Creek, Hughes Creek, and Boulder Creek do not cross the road before entering the river. Sege Creek crosses the Whiskey Bend Road before draining into the river near the former Lake Mills.

From the park entrance, the Olympic Hot Springs Road, beginning at Madison Falls is within the floodplain and parallels the east side of the river channel. The former Elwha Campground was also on the east side of the river, and along with most of the Altair Campground on the west side, was also within the 100-year floodplain. The Elwha Ranger Station Historic District facilities are approximately one-foot above the 100-year floodplain. The Elwha and Altair campgrounds were closed following catastrophic damage from flooding in 2016. Removal of the remaining features in these campgrounds is also part of the proposed action. The Altair Campground was converted to a picnic area in 2016.

General characterization of the nature of flooding and associated floodplain processes in the area.

The portion of Olympic Hot Springs Road between the Elwha Boneyard and the Elwha Ranger Station Historic District has been damaged by flooding. This section has flooded repeatedly, most recently in March and December 2017. The river overtopped the roadway where it lies in the floodplain, destroying the road in two places[1]. It is at this location that the roadway is closed.

The Elwha River follows a steep slope down the valley. This is most apparent at the headwaters where the gradient is an average of 16%. That gradient generally decreases farther downstream after it flows through several steep, narrow, bedrock canyons. Between these canyons, the channel is less steep and has wider reaches within broad floodplains. At the outlet of the canyons, there are deltas where the channel widens, streamflow slows, and deposits are left behind by the river in these wider areas. In the floodplain, the river meanders, occasionally undercutting alluvial terrace and valley wall deposits (NPS 2005). The floodplain below the

[1] The lower reach of Sanders Creek formerly flowed through an old channel of the Elwha River, through a 3-foot culvert under the road. During a high flow event, floodwaters were captured by the old channel, resulting in the loss of the culvert and the need to install a Mabey bridge across the washout. Sanders Creek was previously the only water in the channel, except during high flow events. In 2017, the main flow of the Elwha River permanently diverted into the old channel previously occupied by Sanders Creek.

Glines Canyon Spillway Overlook is a largely undeveloped, relatively narrow valley confined by steep, forested hillsides where the river gradient is much lower (0.75%).

B. Justification for Use of the Floodplain
Description of why the proposed action must be located in floodplain. Investigation of alternative sites.
Access to the Elwha Valley for park staff, utility providers, and contractors is essential and time critical to maintain park operations, emergency services, employee housing, and maintenance facilities. Currently, there is no commercial power to the Elwha Valley and park facilities are vulnerable to mold impacts and damage without heat. Facilities include housing, ranger station, maintenance area, and stock operations area. Most structures in this area are part of the Elwha Ranger Station Historic District. Pack stock support maintenance and search and rescue efforts on the stock accessible portions of the park's approximately 620 miles of trails. They are also important to backcountry resource management, science and historic structure maintenance. Public access is important due to the high visibility of the Elwha restoration and fish passage project and abundance of educational opportunities. Access is also important for private property owners that have in-holdings within the Elwha Valley.

Although most of the road can be removed from the floodplain, existing topography is mountainous and requires that the road be laid along a line that is at the top of the slope above the east channel of the Elwha River. As a result, reinforcement of approximately 1,000 feet of riverbank with an embankment wall and engineered logjams is needed to hold the road in place.

Areas higher on the slope were evaluated during field site visits and geotechnical drilling, however, a location higher on the slope above the riverbank would be more costly, both in terms of resource impacts and in terms of actual costs.

Beginning the road from the Elwha Boneyard was considered but dismissed for the following reasons:

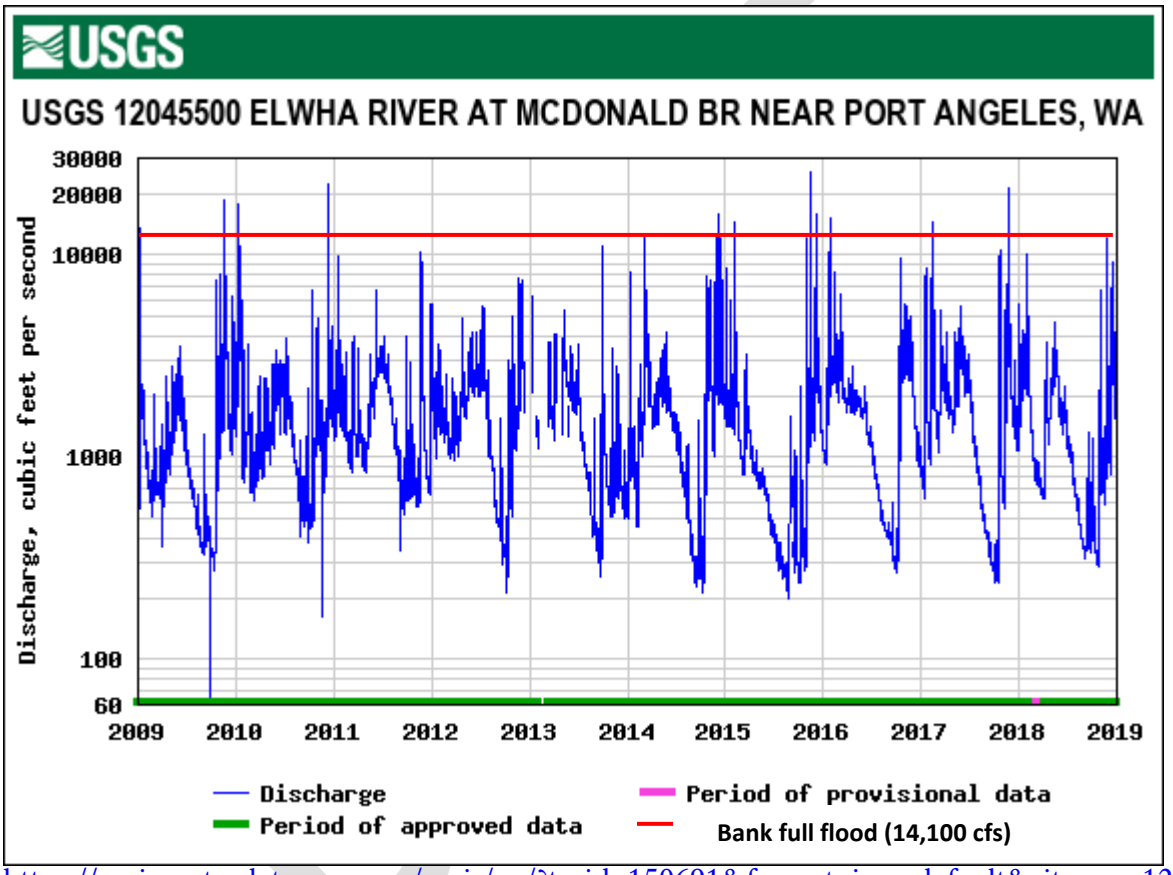
> This area was found to possess areas too steep for road construction, based on the need to balance cut and fill slopes and avoid importation of extensive amounts of road fill. This alternative would have far greater costs and impacts than the proposed action. Based on the steepness of the terrain between the boneyard and the southern part of the reroute alignment, it is not considered feasible without extensive walls, cuts, and fills that would adversely affect more vegetation and wildlife habitat.

C. Description of Site-Specific Flood Risk Recurrence interval of flooding at the site.
Over the past six years, the Elwha River has experienced three instances of flooding beyond the typical expected annual maximums. This has included two 5-year floods and a 25-year flood. Flooding in the vicinity of the existing roadway has been more severe than in past years due to the release of the huge sediment and large woody debris loads stored behind the Glines Canyon Dam. This has resulted in major channel shifts in the river floodplain.

Since removal of the Glines Canyon Dam in 2014, the Elwha River has fluctuated and has caused damage to the Olympic Hot Springs Road within the park due to frequent overtopping of the roadway and resultant embankment erosion and/or slope failures. The profile of the road is closer to the river in three general areas: 1) near the Elwha Ranger Station Historic District; 2) at

the east channel; and 3) near the Madison Falls Trailhead. Since removal of the dam, these areas have been subject to more flood damage (FHWA [Morehouse] 2017:2).

Hydraulics of flooding at the site (depths, velocities).
In midsummer 2018, the channel near the former Mabey Bridge location was four feet deep and flowing at about nine feet per second, when the total river discharge was measuring about 750 cfs. As shown by the figure below, the estimated discharge at bankfull flow (2-year recurrence flow) is approximately 14,100 cfs. The estimated weighted 100-year flood is approximately 41,400 cfs. The range of flow for the 100-year flood is 39,100 – 59,000 cfs (https://streamstatsags.cr.usgs.gov/gagepages/html/12045500.htm).



https://nwis.waterdata.usgs.gov/nwis/uv/?ts_id=150691&format=img_default&site_no=12045500&begin_date=20090101&end_date=20190101

Time required for flooding to occur (amount of warning possible).
The park would continue to use the NOAA forecast model (https://www.nwrfc.noaa.gov/rfc/) to determine the potential for flooding on the Elwha River. The model is generally accurate up to 24 hours out (once the model updates, which is about 4 times a day), it is somewhat accurate 3 days out, and is about as good as a long range weather forecast over longer periods of time. It uses snow pack, local temperature data, local rainfall patterns, and storm trajectories to determine flooding potential.

Opportunity for evacuation of site in the event of flooding.

Because flooding on the Elwha River typically occurs in winter when there are fewer people using the area, and because it is an area routinely used by park staff, due to the horse corrals and other facilities that require daily management, conditions requiring evacuation would be quickly noted and actions implemented. Previous flooding in the Elwha Valley has not resulted in stranded or injured visitors. To ensure that flood conditions are being monitored, the park would develop a standard operating procedure to warn staff and visitors about the potential for flooding.

Geomorphic considerations (erosion, sediment deposition, channel adjustments). Although most of the sediment has been eroded from the former Lake Mills Reservoir, some remains and continues to affect the Elwha River bed load during heavy runoff from storms. Channel migration limits are not yet predictable due to natural river fluctuation and the complicated interaction of stream flows, sediment erosion and transport, woody debris recruitment, and deposition. Large sediment releases during heavy rain and rain-on-snow events have altered the course of the river within its channel migration zone.

The Elwha SEIS described both the Olympic Hot Springs Road and the Elwha Ranger Station as vulnerable to loss through flooding and bank erosion following dam removal (NPS 2005). Although the Elwha Restoration Plan recommended monitoring bank erosion during dam removal, protecting the riverbank with large angular rock, engineered log jams, or a combination of the two, this would have been insufficient to prevent the major flood damage that occurred in November 2015 and in November-December 2016.

The Elwha River is currently flowing along its east bank with a former small, low gradient stream (Sanders Creek). This "east channel" flows from west to east within the project area and then onto the terrace of the floodplain, where it enters an oxbow channel along the east valley wall. Beginning in 2015, this oxbow channel captured approximately half the river's flow (NMFS 2016: 36). The Elwha River is now relatively confined, compared to its historic extent in this part of the valley. Similarly, the east channel is also confined, with a width of 45-65 feet at flows around 1,000 cfs (NMFS 2016:36). During 2017 widths in the main channel were 70-140 feet at similar flows. The channel is now about 500 feet shorter. The east channel is deeper, with a steeper gradient and higher velocities than the river (NMFS 2016:36). The Mabey Bridge abutments and a logjam at the downstream end confine flow.

Since dam removal, the Elwha River has accumulated more large woody debris, which has blocked old braids in the main river channel. During flooding, the river has been forced around deposits of large wood into areas within the broader river valley, including the roadway and the east bank in the east channel.

Before capturing the Elwha River, the lower reach of the east channel had a broad bank-full width and a somewhat unconstrained active channel with an average ordinary high water mark (OHWM) width of 35 feet with areas of high flow. The substrate was a mix of gravel, sand, and silt with scattered cobble and boulders. Juvenile salmon were observed in small pools during the wetlands survey. Good habitat included stable banks, pools, cover, woody material, tributaries, and a somewhat stable substrate. The riparian buffer was also in good condition and was dominated by big-leaf maple and red alder. Due to human use, Sanders Creek formerly was slightly degraded due to its location adjacent to the former Elwha Campground and the constriction of the channel at the Mabey Bridge (AECOM 2017: 10). The area also has fairly high

degree of sediment accumulation due to the relatively recent removal of the Glines Canyon Dam.

D. A description of how the action will be designed or modified to minimize (1) harm to floodplain natural resources and (2) risk to life and property to the applicable regulatory floodplain level. (In the event that risk to property or human life cannot be eliminated in high hazard areas, a clear statement to that effect must be included in the SOF.)

The proposed reroute has been designed to minimize long-term impacts to the floodplain by removing much of the roadway from the channel migration zone of the Elwha River. With the reroute there would be minimal risks to life and property from future flooding of the Elwha River. Approximately 1,800 linear feet near the entrance would remain in the floodplain.

The decision was made for the following reasons:

- Road access to the area is supported by previous planning (GMP, Elwha Restoration Plan). For example, the GMP states: "Road access would be retained to the Boulder Creek trailhead. Trailhead and parking would be improved and may be relocated nearby. Road access would be retained to Whiskey Bend."
- Closing the roadway at the entrance (near Madison Falls) would not allow visitors to adequately see and understand the Elwha River restoration (recovery following the removal of the Elwha and Glines Canyon dams).
- Closing the roadway would significantly increase the distance to popular trailheads, which provide visitor access to the interior of the park.
- Closing the roadway would eliminate needed access to important park facilities, including the Elwha Ranger Station, park housing, maintenance facilities, and corral. Analysis of other areas to relocate the roadway found that they were unsuitable.
- Public comments favored restoring access.

E. Summary

Consistent with the GMP decision to maintain road access to the Elwha River Valley, there is a need for a public roadway. Administrative facilities in the area also require a high degree of maintenance. Historic structures in the area are listed on the National Register and have been evaluated in the park's list of classified structures as "must be preserved."

There would be no overnight occupation of the area. Floodplain-located campgrounds (Elwha and Altair) have been closed and not replaced. Although future consideration could be given to locating a campground along the reroute alignment, there are no current plans to do so.

The proposed location was chosen after careful consideration of other natural and cultural resources impacts as described above.

The NPS accepts the risk associated with the placement of this roadway close to the Elwha River, and with elements still in the floodplain. The NPS accepts the possibility that a rare event will result in the loss of the roadway and will therefore prepare a contingency plan to address continuation of park operations.

The NPS would also develop an evacuation plan with posted signs to warn NPS staff, volunteer emergency staff, and others of the potential danger of flood events that could occur without warning.

Upon official notification, from its monitoring of the USGS site, or a noticeable rise in flood stage, the NPS will take prudent measures to remove necessary communications systems and emergency vehicles from the area. The building users will naturally maintain a higher degree of alert than other NPS staff, however, they will also practice planned evacuations more frequently. The park has taken prudent steps, consistent with public input to minimize the risk to staff and visitors up front.

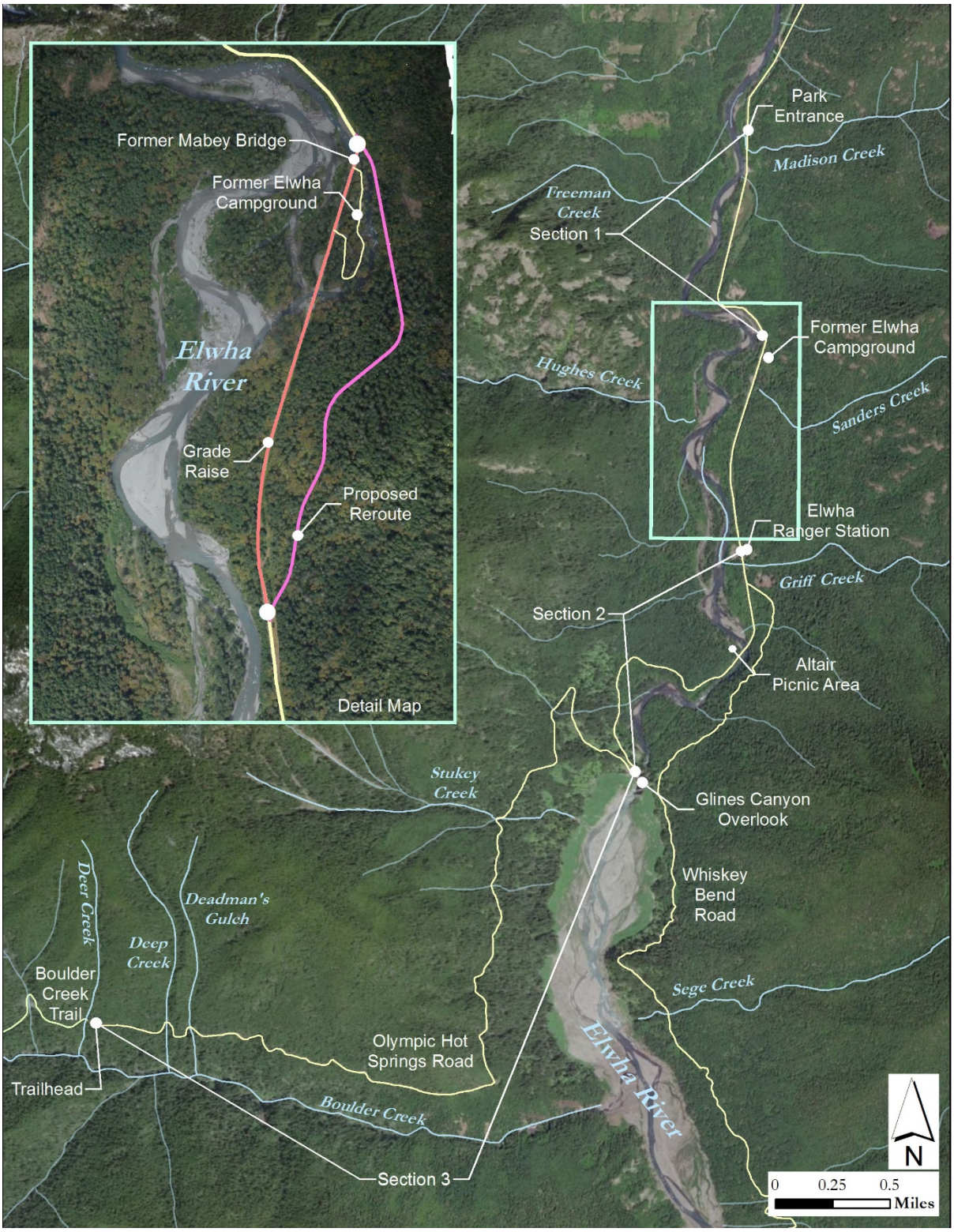


Figure 1: Project Area Location Map

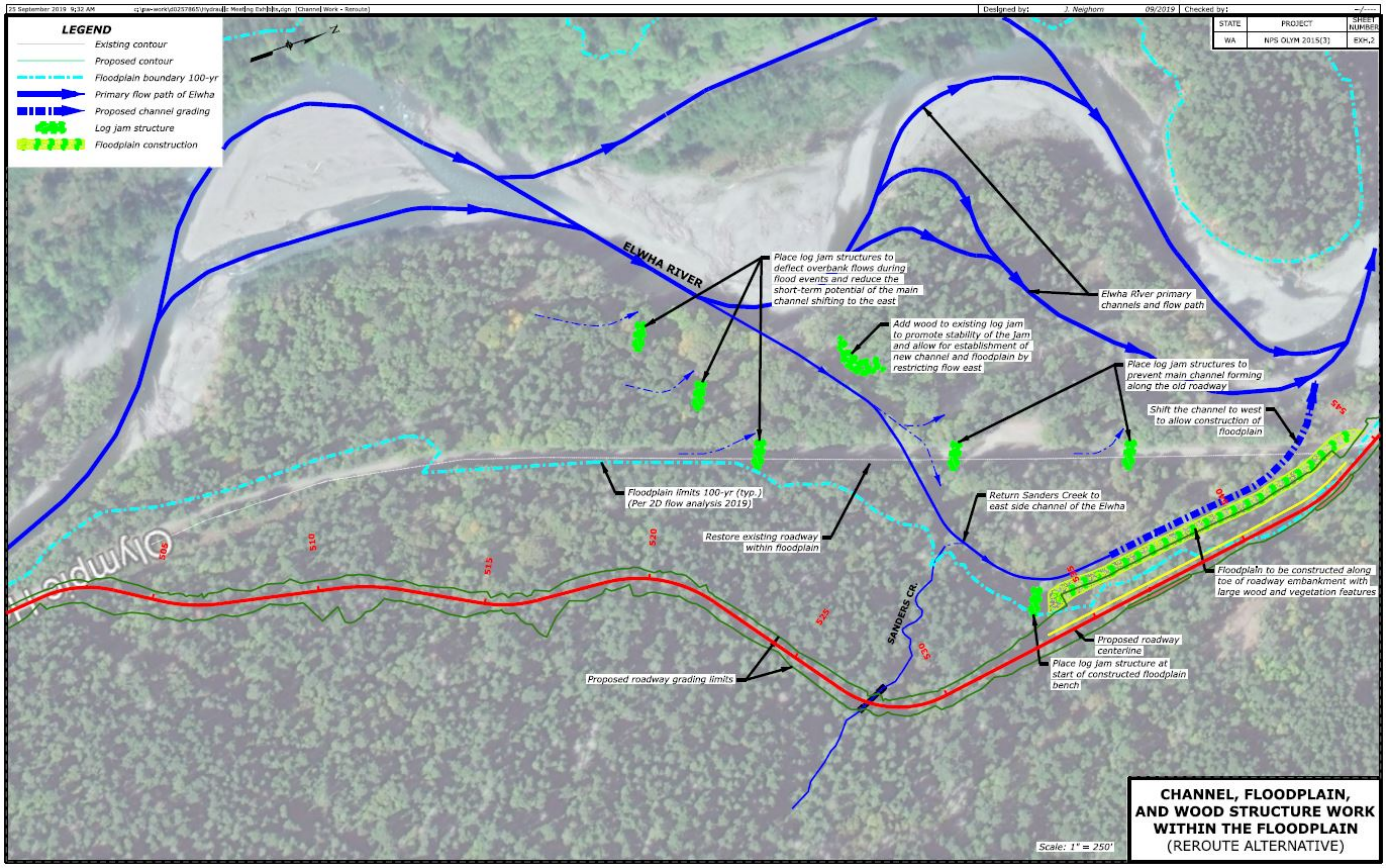


Figure 2: Reroute Floodplain Proposed Work

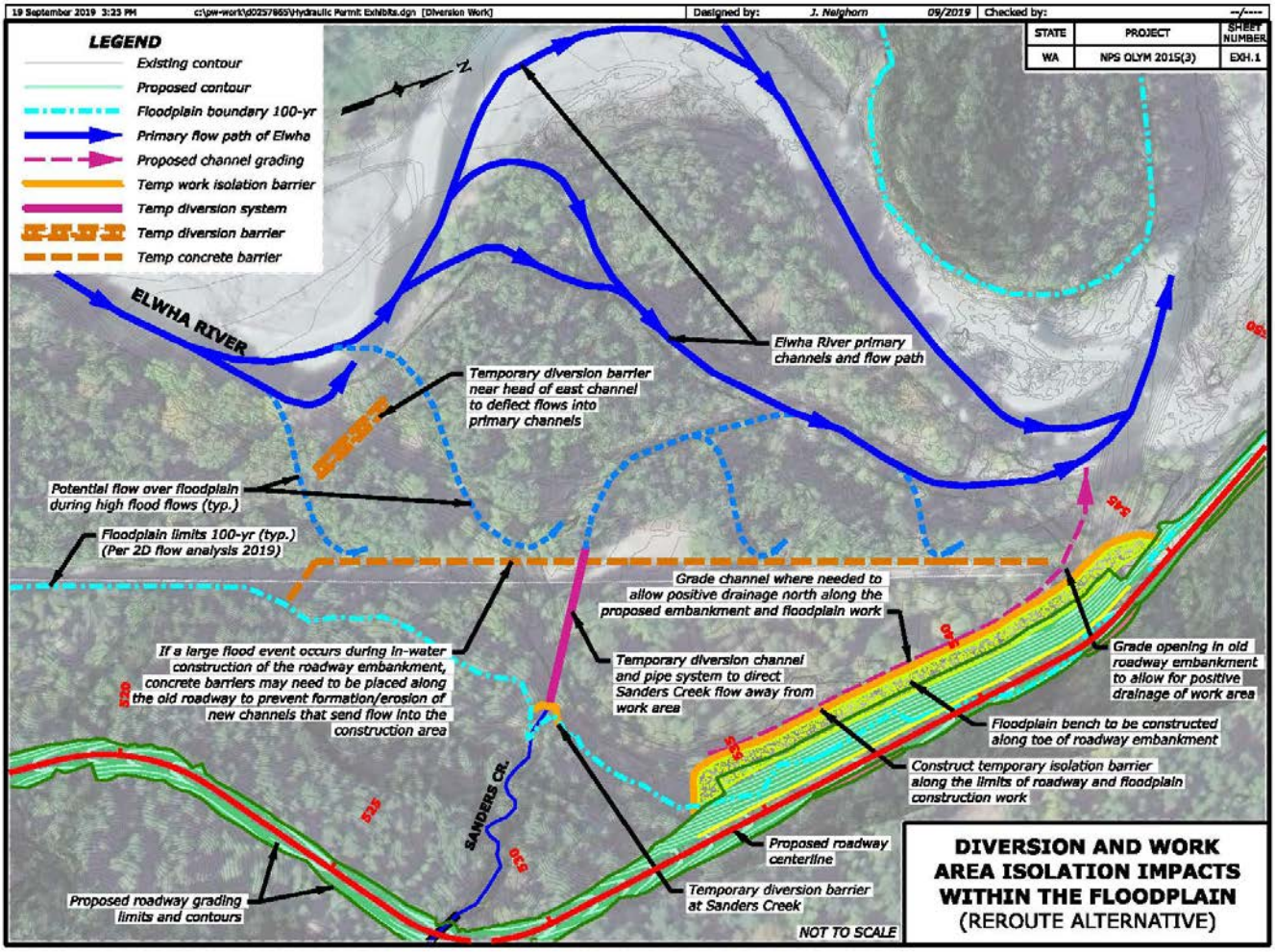


Figure 3: Reroute Diversion and Work Area Isolation Impacts in Floodplain

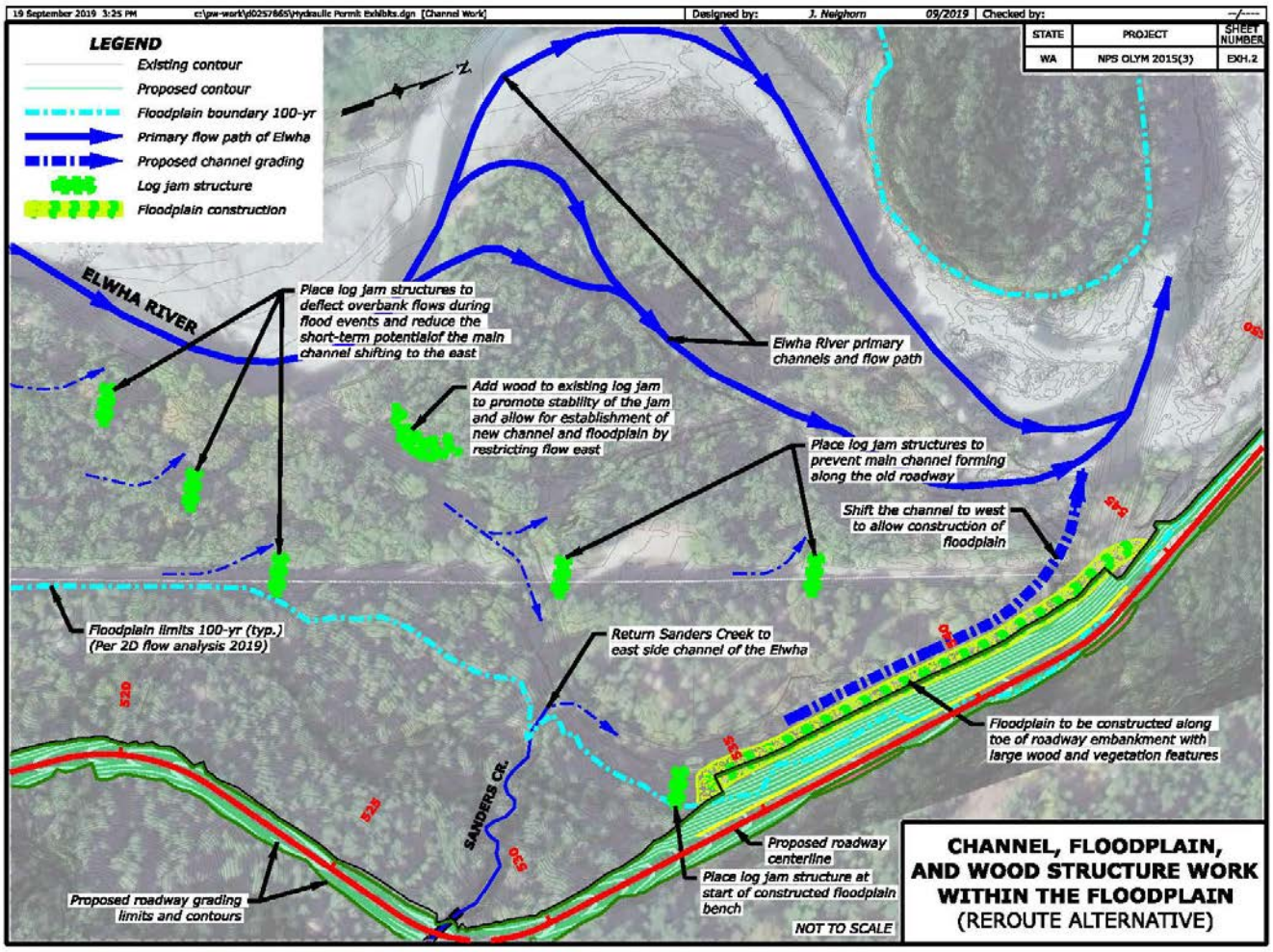


Figure 4: Reroute Channel, Floodplain and Wood Structure Work in Floodplain

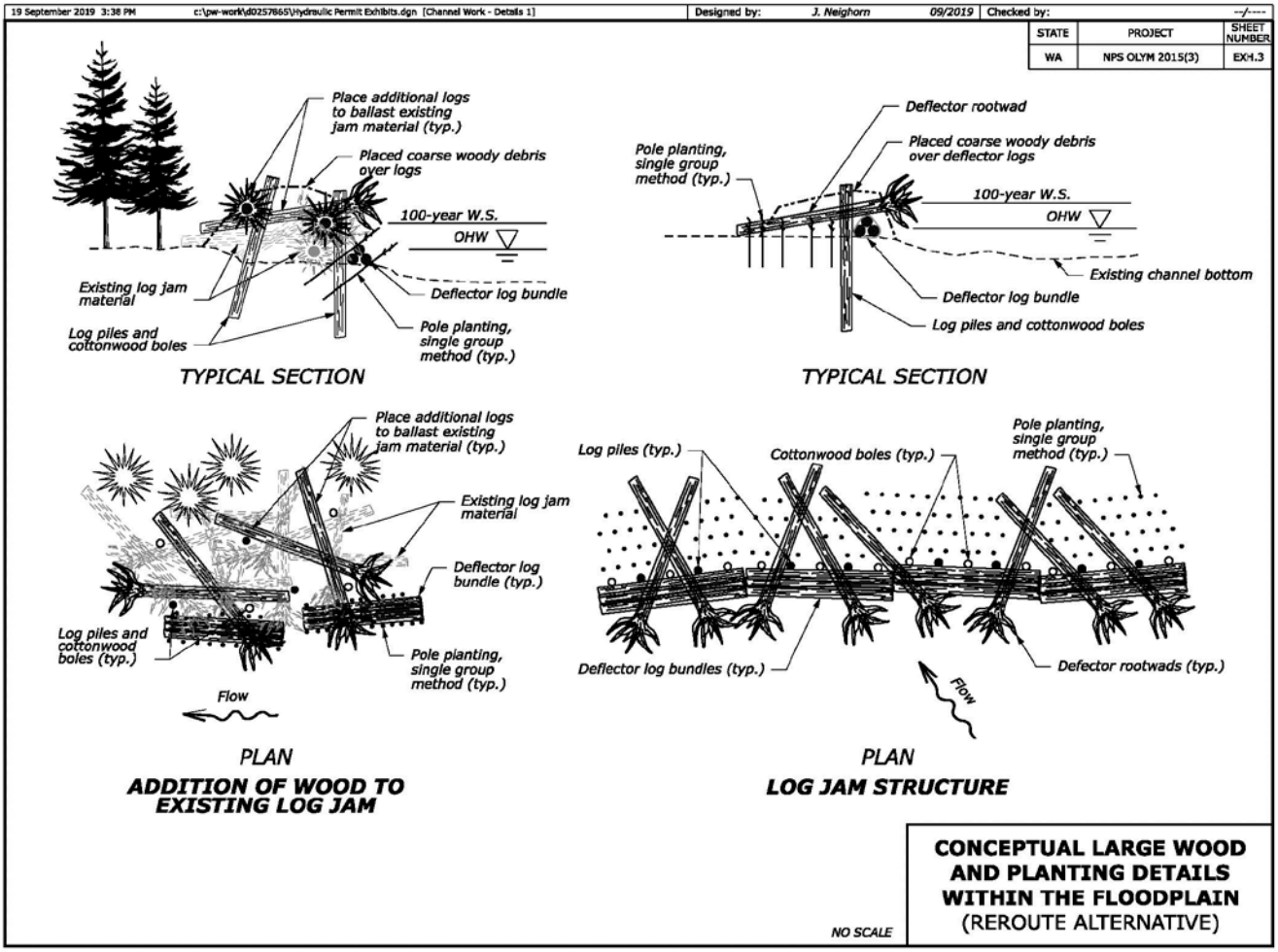


Figure 5: Reroute Conceptual Wood Structure and Planting Details

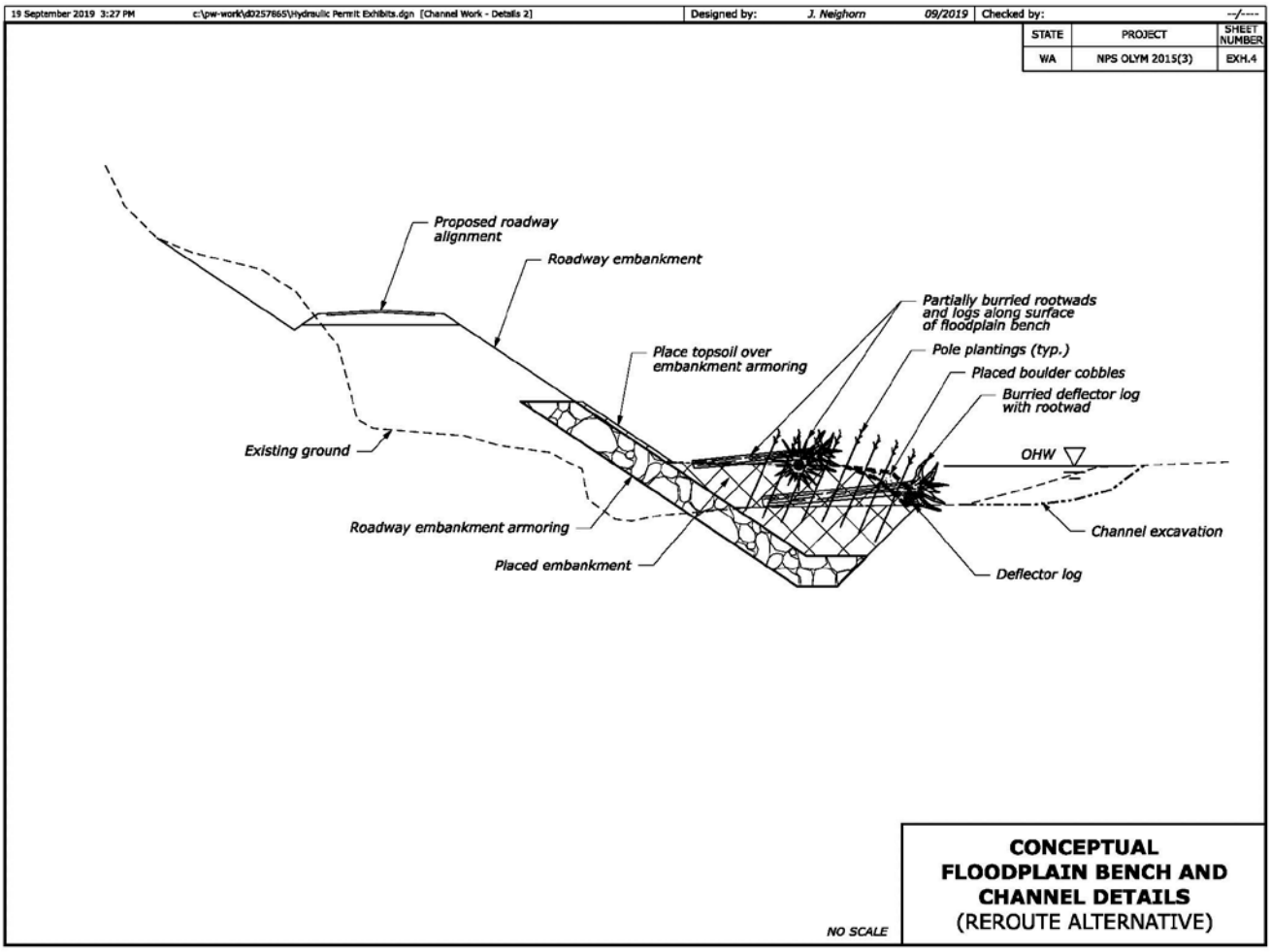


Figure 6: Reroute Conceptual Floodplain Bench and Channel Details