

# Attachment F

## Floodplains Compliance Technical Memorandum



## TECHNICAL MEMORANDUM

**DATE:** July 29, 2021  
**TO:** Jane W. Hewitt, Principal Planner  
Grays Harbor County  
**FROM:** Taya MacLean, PWS, and Paul Fendt, PE  
**SUBJECT:** Floodplain Permitting  
**CC:**  
**PROJECT NUMBER:** 217-7132-001  
**PROJECT NAME:** Lower Satsop Right Bank Conservation Project

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### INTRODUCTION

This technical memorandum describes how the Satsop Right Bank Conservation Project (project) complies with Grays Harbor County's (County) flood protection ordinance. The project area is located along the right (west) bank of Lower Satsop River, approximately 2,000 feet upstream from the confluence with the Chehalis River, within unincorporated Grays Harbor County, Washington. The project purpose is to provide protection for approximately 1,950 feet of riverbank along the lower Satsop River in order to reduce the current aggressive rate of erosion, conserve the right bank line, and generally preserve the river's migration corridor until the Lower Satsop Restoration and Protection Program's Phase II project is constructed (summer 2022). Through extensive coordination with WDFW, the project has also been designed to be self-mitigating and will provide enhanced habitat structure for fish.

### PROJECT DESCRIPTION

The project purpose is to provide protection of approximately 1,950 feet of streambank along the Lower Satsop River in order to reduce the current aggressive rate of erosion, conserve the right bank line, and generally preserve the river's migration corridor until the Lower Satsop Restoration and Protection Program's Phase II project is constructed (summer 2022).

Multiple projects have recently been completed along the Lower Satsop River, focusing on flood protection and restoration. In 2019 and 2020, WDFW completed substantial restoration projects in the floodplain to remove dikes, revetments, and return river flows to floodplain areas previously inaccessible for decades. In 2020, Grays Harbor County constructed the Keys Road Flood Protection Project (i.e., Phase I of the Lower Satsop Restoration and Protection Program) that involved installation of engineered log jams and setback log structure revetments to protect Keys Road and associated infrastructure. Phase II of the Lower Satsop Restoration and Protection Program is currently in design and will be constructed in summer 2022. Recent significant bank erosion within the right bank project area has occurred, resulting in current and anticipated future loss of riparian habitat and adjacent farmland. Construction of this project in fall 2021 is intended to slow the rate of erosion until the Phase II project can be constructed.

The right bank of the Satsop River within the project area is anticipated to experience estimated rates of erosion at 115 feet per year from June 2021 to June 2022 and again from June 2022 to June 2023. This represents a total of 4.39 acres by June 2022 and another 5.06 acres by June 2023. The erosion will result in complete loss of

valuable farmland and the erosion will directly result in downstream sedimentation which will negatively affect fish habitat and downstream dredge management operations in Grays Harbor. Table 1 below provides additional detail pertaining to this anticipated bank loss and the volume of sediment anticipated to be eroded in the next two years.

**Table 1. Anticipated Erosion Rate and Quantities.**

Year	Approximate Acres of High-Quality Farmland Lost	Approximate Sediment Volume (cubic yards)	Equivalent Dump Truck Loads of Sediment
2019-2021	3.3	100,000	6,700
2022 Estimate	4.4	130,000	8,600
2023 Estimate	5.0	150,000	9,950
Total 2019-2023	12.7	380,000	25,250

The project will consist of installation of four log jack spurs, continuous log rows, and log jacks with boulder ballast to be installed in uplands set back 5 to 6 feet from the top of bank. The project will result in a total of approximately 52,000 square feet of excavation of native soil material (approximately 17,500 cubic yards), placement of approximately 2,300 cubic yards of rock and log material, and backfilling with native soil. Log structures (jacks, rows, spur pieces) will be assembled in a separate construction staging area well back from the County's designated shoreline zone and trucked in for placement at time of construction. All excavated soil will remain on-site and will be backfilled directly into excavated areas or spread and graded in upland adjacent to the completed installation. Excavation will occur to a depth of up to 20 feet below ground surface. No impacts will occur waterward of the bank or below the OHWM of the Satsop River. A 15-foot-wide temporary access road consisting of geotextile fabric and hog fuel (wood chips) will be installed at the beginning of construction and will be removed in Year 3. The temporary road will include placement of 2,400 cubic yards of hog fuel surfacing over 1.43 acres within the project area. Excavation, placement, backfilling of assembled log structures, and the temporary access road will require 2 to 3 weeks in October.

## BACKGROUND AND REGULATORY REQUIREMENTS

The County regulates floodplain development in Title 18, Chapter 18.06, Article V, Frequently Flooded Areas (as amended by Ordinance No. 456). In general, for this code "development" means any fill, excavation, or construction in the designated floodplain. The project applicant and the County are required to use the best available information to identify the flood hazard area to which the floodplain regulations will be applied. The *Flood Insurance Study for Grays Harbor County and Incorporated Areas* dated September 18, 2020, is used for this analysis (FEMA 2020).

The project site is located on the Satsop River in a frequently flooded area as designated on Flood Insurance Rate Maps (FIRM), which are determined and published by FEMA. The effective FIRM for the location of the project is dated September 18, 2020, map number 530270976E.

FEMA designates areas of special flood hazard zones A, A1-30, AH, and AE. Within the zones with a detailed flood study, a "floodway" is also determined. Development occurring in the zones requires different evaluation and protection measures depending on which zone, and if the development is located in the designated floodway. The project site is located within a Zone A on the FIRM (Figure 1). This is a zone for which no base flood elevation

was determined, and there is no designated floodway. Note that there is a detailed flood study upstream with a mapped floodway upstream of the project site.

County Code, 18.06.490.A.1.d, indicates that for areas where no regulatory floodway has been designated, it must be determined if "...proposed development adversely affects the flood carrying capacity of the area of special flood hazard. For purposes of this chapter, "adversely affects" means... the anticipated development will not increase the water surface elevation of the base flood by more than one foot."

County Staff have indicated that Section 18.06.490.A.4, Alteration of Watercourses, would apply to this project (Hewitt, Email communication; July 19, 2021). It is not clear that this is the appropriate section for this project, and therefore, we recommend that this the Code section to be applied is 18.06.490.A.1.d. This section provides that:

*For areas where a regulatory floodway has not been designated but may be designated in the future, review all permits in the area of special flood hazard except in the coastal high-hazard area to determine if the proposed development adversely affects the flood carrying capacity of the area of special flood hazard. For purposes of this chapter, "adversely affects" means that the cumulative effect of the proposed development where combined with all other existing and anticipated development will not increase the water-surface elevation of the base flood more than one foot at any point.*

## DISCUSSION AND COMPLIANCE

As described above and shown on Figure 1, the project area is in a Zone A area of special flood hazard on the FIRM. There is no floodway determined by a detailed study. The provisions of the Code in Section 18.06.490.A.1.d. will be applied, which require that this proposed development action not raise the base flood elevation by more than one foot.

The project area is in a unique location of the Satsop River floodplain. A detailed flood study has been prepared for the Satsop River from a location about 8,300 feet from its confluence with the Chehalis River (about at Hiram Hall Road) upstream about 35,000 feet. From the lower limit of the detailed flood study to the Chehalis River, there is no detailed flood study and the area is designated as Zone A (See Figure 1). The Flood Insurance Study (FEMA 2020) indicates that the area between the confluence and the limits of the detailed study are in the backwater flooded area of the Chehalis River with a water surface elevation of about 37 feet (see Panel 32P). There is no detailed flood study on this reach of the Chehalis River.

The entire project area is within floodplain and the proposed development is limited to excavation of land below the base flood elevation that would be backfilled with log structures that consist of wood and rock. A significant portion of the log structures will be buried below existing grade. Approximately 5,300 cubic yards (23,000 square feet; 0.53 acres) of log and boulder ballast material will be imported for construction and it is assumed that this same volume of material, consisting of both log/boulder and backfilled native soil, will extend above the existing grade.

This method was chosen for riverbank protection specifically due to its low impact on conveyance and floodplain storage. The exposed portion of the log structures may locally change the roughness of the floodplain, but it is expected to have minimal measurable impact to the floodplain conveyance.

As noted earlier, this reach of the Satsop River has no detailed flood study and is subject to backwater effects from the Chehalis River. The backwater results in a level pool at the Satsop River mouth; therefore, modeling of the Satsop River to evaluate encroachment would show no change in the base flood stage because the level is

solely established by the Chehalis River. The limits of the detailed study coincide approximately with the limits of the backwater limit; therefore, no additional detailed evaluation or floodway delineation was conducted.

## CONCLUSION

The proposed log structures and temporary access road wood chip material will result in minimal floodplain encroachment that is limited to a small portion of the exposed wood. The position of the log structures in this backwater area cannot be evaluated for change because the flood stage is established by the Chehalis River, not the Satsop River; the log structures are unlikely to have any effect on the base flood elevation. The project will not have an adverse effect of more than one foot of rise.

## REFERENCES

FEMA (Federal Emergency Management Agency). 2020. Flood Insurance Study For Grays Harbor County and Incorporated Areas.

