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### **432.01 Introduction**

This chapter addresses the potential impact of WSDOT projects on special flood hazard areas. The National Environmental Policy Act (NEPA), requires that all actions sponsored, funded, permitted, or approved by federal agencies undergo planning to ensure that environmental considerations are given due weight in project decision making. For work in special flood hazard areas that requires permit approval, environmental documentation must explain the impacts the project will have on these areas, and on the resources within those areas. The State Environmental Policy Act (SEPA), mandates a similar procedure for state and local actions.

The primary concern with projects located in floodplains is increasing the frequency or severity of flooding caused by obstructing flood flows or filling floodplain storage. Flood flows are obstructed by under sizing hydraulic structures or blocking natural flow paths causing flood water to back up behind the highway. Filling floodplain storage can also increase off-site flooding by reducing the ability to store water, potentially sending more flow downstream.

Consequently, all WSDOT projects that encroach upon a regulatory special flood hazard area must have a floodplain discipline report. All stream projects, regardless whether they are in a FEMA SFHA, shall complete a [Flood Risk Assessment](#). The Flood Risk Assessment is a communication tool used to identify if there are potential risks of meeting FEMA, local jurisdiction, and public health and safety requirements in the preliminary stages of design. In addition, during the design process, the Project Engineer must contact the HQ Hydraulics Section, to determine the appropriate analysis to evaluate the project's potential effects on the floodplain and floodway.

The WSDOT [Floodplain Discipline Report Checklist](#) includes floodplain issues to be addressed in project development, and sources of information. Other references, documents, MOUs, Interagency Agreements, and permits are included in this chapter.

The [Hydraulics Manual](#) M 23-03 provides details and requirements for preparing various floodplain analyses and reports.

A process guidance document "Outreach to Local Governments on Flood Risk Assessment for WSDOT Fish Passage Projects ([Exhibit 432-2](#))" has been prepared and is discussed further in Sections [432.04](#) and [432.05](#), respectively. The current version of this document has been attached as an exhibit in [Section 432.11](#).

## 432.02 Applicable statutes, regulations, executive orders, and agreements

### 432.02(1) *Federal*

- 42 United States Code (USC) Chapter 55. National Environmental Policy Act of 1969 (NEPA)
- 16 USC Chapter 35. Endangered Species Act of 1973 (ESA)
- 42 USC Chapter 50. National Flood Insurance
- 23 CFR 771 Environmental Impact and Related Procedures
- 23 CFR 650 Subpart A; Location and Hydraulic Design of Encroachments on Flood Plains
- 40 CFR 1500-1508 National Environmental Policy Act Implementing regulations
- 44 CFR 60.3 Flood plain management criteria for flood-prone areas
- Public Law 92 234, 87 Stat. 975. Flood Disaster Protection Act (1973)
- Presidential Executive Order (E.O.) 11988 Floodplain Management (May 24, 1977)
- FHWA Technical Advisory T 6640.8A (October 1987)
- USDOT Policy statement on climate change adaption. (2011)
- USDOT Climate Adaption Plan - Ensuring Transportation Infrastructure and System Resilience (2014)
- FHWA Order 5520. Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Events (2014)

### 432.02(2) *State*

- [RCW 47.01.260](#) Authority of WSDOT on state highway system design
- [RCW 77.55](#) Construction Projects in State Waters
- [RCW 77.57](#) Fishways, Flow, and Screening
- [RCW 86.16](#) The Flood Control Management Act of 1935
- [RCW 86.26](#) State Participation in Flood control Maintenance
- [WAC 173-145](#) Administration of the flood control assistance account program
- [WAC 173-158](#) Flood Plain Management
- [WAC 197-11](#) SEPA Rules
- [WAC 220-660](#) Hydraulic Code Rules
- [WAC 468-12](#) Transportation Commission and Transportation Department State Environmental Policy Rules
- Governor's Directive on Acquisitions of Agricultural Resource Land
- WDFW Memorandum of Agreement (MOA) for Transportation Activities

### 432.02(3) *Local*

- **Floodplain Development Permit** – Specifics vary for each jurisdiction (Contact HQ Hydraulics Section for assistance).

## **432.03 Considerations during project development**

The level of analysis for special flood hazard areas changes with the stage of project development. Analysis may be very generalized and qualitative during planning and become very detailed and quantitative during design. The *Hydraulics Manual* M 23-03 provides details and requirements for preparing various floodplain analyses and reports through project development.

### **432.03(1) Planning**

During the planning phase of a project, it is expected that the project planners identify special flood hazard areas. EO 11988 requires that floodplains be avoided when practicable, consequently documentation is required to demonstrate that alternatives have been considered to minimize floodplain impacts. Local floodplain development permit requirements should also be identified.

### **432.03(2) Scoping**

During the scoping process it is expected that Project Engineers are considering project designs that accommodate floodplain issues that were identified in the planning stage. These considerations include sizing hydraulics structures to minimize flood flow obstruction and identifying locations that may need to be acquired for compensatory storage. It is also expected that project engineers will consult with the ESO Fish Passage Program to determine if hydraulic structures are located on fish bearing water courses that will require specialized design to ensure fish passage.

### **432.03(3) Design**

During the design process it is expected that Project Engineers and HQ Hydraulics Section will be working together, to provide a quantitative analysis of the project impacts on floodplains including changes in flood flows, sizing of hydraulics structures and provisions for compensatory storage if needed. In addition, the design team shall consider the effects of scour and climate change to ensure the project is resilient to changes that may occur over the design life of the project. The design team is also responsible for preparation of the technical engineering materials to support the Federal, State and local permits from the Federal Emergency Management Agency, the US Army Corps of Engineers, the US Coast Guard, Washington Department of Fish and Wildlife, as well as the local jurisdiction.

### **432.03(4) Construction**

There are no construction requirements for floodplains. However, if a project requires a Letter of Map Revision (LOMR) as-built survey data is required to comply with the local permits.

### **432.03(5) Maintenance and Operations**

There are no maintenance and operations requirements for floodplains.

## 432.04 Analysis and documentation requirements

This section describes analysis and documentation requirements based on regulatory requirements. Determine level of detail based on complexity/size of project, expected severity of impacts, and potential for public controversy.

### 432.04(1) *Analysis and documentation for NEPA*

A [Floodplain Discipline Report](#) must be completed whenever a proposed project intersects with, or is located in, a special flood hazard area, particularly when the placement of new fill, structures, in-water structures (such as wood, barbs or weirs), bridges, channel modifications or re-locations are involved within a floodway.

The WSDOT Floodplain Discipline Report Checklist ensures that floodplain issues are considered in the design of projects. The discipline report should provide the information required for an EIS, EA, or CE, and for floodplain development permits. The extent of analysis should be proportionate to the level of impact without over analyzing or providing unnecessary information.

The checklist includes these sections:

1. Introduction and preliminary drainage survey.
2. Affected environment, shown mainly by mapping regulatory floodplains.
3. Studies and coordination including flood history, climate impacts vulnerability assessment and identification of permits required.
4. Summary should include enough detail so it can be included in an EIS with only minor modifications.

The 1998 FHWA Environmental Flowchart on Floodplains ([Exhibit 432-1](#)) provides an overview of floodplain issues.

### 432.04(2) *Analysis and documentation for SEPA only (No federal nexus)*

The requirements are the same as federal.

### 432.04(3) *Analysis and documentation for local floodplain development permits*

As described further in [Section 432.07](#), local floodplain development ordinances are the key regulatory instrument governing floodplain management. Local ordinances must comply with minimum federal standards set by FEMA in the NFIP; however, local jurisdictions may adopt more stringent regulations.

This process is described in [Sections 432.05](#) and [432.07](#) and the current guidance document is attached as [Exhibit 432-2](#). However, ESO and the HQ Hydraulics Section should be contacted to obtain the most up to date guidance.

## 432.05 External engagement

Floodplain impacts follow the standard NEPA/SEPA scoping, public noticing, accepting agency and public comments, and responding to comments appropriate to the level of the environmental review process. However, all floodplain development requires to follow the local jurisdiction code. In addition, external engagement may, however, inform the development of the projects as other resources such as cultural, wetland, and farmland are commonly found in floodplains. Altering the floodplain may also trigger Environmental Justice concerns.

It is necessary, however, to engage with the local floodplain management agency early in the development process to determine what is necessary to obtain a floodplain development permit in the affected community ([Exhibit 432-2](#)). This guidance lays out a process for the Regions to reach out to local governments about fish passage projects that have been identified within their jurisdiction. The Regions should share the fish passage delivery plan with the local government representatives and discuss the FEMA effective FIRMs for each crossing in their jurisdiction, WDSOT's flood risk assessment process, and WSDOT's hydraulic modeling approach. As fish passage projects are developed, the Regions should meet with the local jurisdictions, as needed, throughout the design process to share modeling results; zero rise analyses; CLOMR and LOMR processes, if needed and the overall floodplain development permitting approach. Generally, the special flood hazard area that the project encroaches upon determines the levels of analysis required to obtain a floodplain development permit.

## 432.06 Internal roles and responsibilities

### 432.06(1) *Region/Modal Environmental Manager*

The Region/Modal environmental manager's role is to oversee the general preparation of environmental review documents, providing expert guidance to Region staff as to the type of analysis needed and identifying need for specialized analysis. The manager provides quality assurance and quality control. The manager is responsible for disseminating new or updated guidance and verifying that the guidance is being followed. The manager is also responsible for reporting to ESO when guidance is not adequate, confusing, or in need of revision.

### 432.06(2) *Project Engineer*

It is the Project Engineer's role and responsibility to oversee that all engineering studies and technical reports are prepared consistent with the [Design Manual M 22-01](#) and provide appropriate levels of analysis to support the environmental review process and permitting activities to the environmental staff.

It is also the Project Engineers responsibility to reach out to local floodplain development managers to secure floodplain development permits.

### **432.06(3) Region Environmental Coordinator**

The region environmental coordinator role is to oversee the development of the environmental review documents. The coordinator is responsible for exchange of information between the project engineer and the environmental review specialists on the team and to ensure that any environmental requirements are incorporated into the project design as well as engineering information needed for permits and other agency approvals is provided.

### **432.06(4) ESO**

ESO role is primarily to keep the guidance current with evolving and changing rules and regulations. ESO staff also provide expert assistance for developing scopes of work for consultants and internal WSDOT staff as well as reviewing floodplain discipline reports and environmental review documents.

### **432.06(5) Headquarters Hydraulics Section**

HQ Hydraulics role is to provide guidance to Project Engineers, other WSDOT engineering staff, and consultants in the preparation of hydrologic and hydraulic analyses as described in [Chapter 1](#) of the [Hydraulics Manual](#). The HQ Hydraulics Section also prepares specialized hydraulic studies and reviews consultant work products for concurrence by the State Hydraulic Engineer.

The HQ Hydraulics Section oversees the preparation of Preliminary and Final Hydraulic Design (PHD and FHD) for all hydraulic projects. The PHD or flood risk assessment memorandum is used to coordinate with local agency floodplain managers to facilitate the floodplain development permit process. Floodplain mitigation measures (compensatory storage or larger structures), if needed, would be included in the FHD.

## **432.07 Applicable permits and approval process**

Local floodplain development ordinances are the key regulatory instrument governing floodplain management. Local ordinances must comply with minimum federal standards set by FEMA in the NFIP; however, local jurisdictions may adopt more stringent regulations. The specifics of each permit are unique to each community.

For more information on the permitting process, see [Chapter 500](#).

## **432.08 Mitigation**

NFIP prohibits encroachments within the regulatory floodway unless it can be demonstrated that the proposed encroachments would not increase the 100-year flood levels. Hydrologic and hydraulic analyses are required to document a No-Rise Certification.

Some local jurisdictions are also adding “compensatory storage” requirements to their floodplain ordinances. These statutes require the excavation of floodplain storage areas to compensate for fill placed in floodplains. They may also stipulate elevation requirements for the location of the compensatory storage area.

## 432.09 Abbreviations and acronyms

BFE	Base Flood Elevation
CLOMR	Conditional Letter of Map
CMZ	Channel Migration Zone
FAPG	Federal Aid Policy Guide
FCAAP	Flood Control Assistance Account Program
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
LOMC	Letter of Map Change
LOMR	Letter of Map Revision
NFIP	National Flood Insurance Program
SFHA	Special Flood Hazard Area

## 432.10 Glossary

**Avulsion** – A sudden, dramatic shift of the river into a new course or channel.

**Base Flood Elevation (BFE)** – The elevation of surface water resulting from a flood that has a 1% chance of equaling or exceeding that level in any given year. The BFE is shown on the Flood Insurance Rate Map (FIRM) for zones AE, AH, A1–A30, AR, AR/A, AR/AE, AR/A1– A30, AR/AH, AR/AO, V1–V30 and VE.

**Compensatory Storage** – The NFIP floodway standard in 44CFR 60.3 (d) restricts new development from obstructing the flow of water and increasing flood heights. However, this provision does not address the need to maintain flood storage. Especially in flat areas, the floodplain provides a valuable function by storing floodwaters. When fill or buildings are placed in the flood fringe, the flood storage areas are lost and flood heights will go up because there is less room for the floodwaters. This is particularly important in smaller watersheds which respond sooner to changes in the topography.

**Community** –

1. A group of people living in the same locality and under the same government, or a political subdivision of a state or other authority that has zoning and building code jurisdiction over a particular area.
2. A political entity that has the authority to adopt and enforce floodplain ordinances for the area under its jurisdiction.
3. A network of individuals and families, businesses, governmental and nongovernmental organizations and other civic organizations that reside or operate within a shared geographical boundary and may be represented by a common political leadership.

**Flood** – A general and temporary condition of partial or complete inundation of 2 or more acres of normally dry land area or of 2 or more properties (at least 1 of which is the policyholder's property) from:

1. Overflow of inland or tidal waters; or
2. Unusual and rapid accumulation or runoff of surface waters from any source; or
3. Mudslides (i.e., mudflows) which are proximately caused by flooding and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.; or
4. Collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined above.

A flood inundates a floodplain. Most floods fall into three major categories: riverine flooding, coastal flooding, and shallow flooding. Alluvial fan flooding is another type of flooding more common in the mountainous western states.

**Floodplain** – Any land area susceptible to being inundated by flood waters from any source; usually the flat or nearly flat land on the bottom of a stream valley or tidal area that is covered by water during floods.

**Floodplain Boundaries** – Lines on flood hazard maps that show the limits of the 100- and 500-year floodplains.

**Floodway** – A “Regulatory Floodway” means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations.

**Regulatory Floodplain** – The currently effective floodplain that has been mapped under the NFIP.

**Special Flood Hazard Area** – An area having special flood, mudflow or flood-related erosion hazards and shown on a Flood Hazard Boundary Map (FHBM) or a Flood Insurance Rate Map (FIRM) Zone A, AO, A1-A30, AE, A99, AH, AR, AR/A, AR/AE, AR/AH, AR/AO, AR/A1-A30, V1-V30, VE or V. The SFHA is the area where the National Flood Insurance Program's (NFIP's) floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. For the purpose of determining Community Rating System (CRS) premium discounts, all AR and A99 zones are treated as non-SFHAs.

**Zone A** – Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.

**Zones AE and A1- A30** – Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.

**Zone AH** - Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between one and three feet. Base Flood Elevations (BFEs) derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply.

**Zone AO** - Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet. Average flood depths derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply.

Some Zone AO have been designated in areas with high flood velocities such as alluvial fans and washes. Communities are encouraged to adopt more restrictive requirements for these areas.

**Zone AR** - Areas that result from the decertification of a previously accredited flood protection system that is determined to be in the process of being restored to provide base flood protection. Mandatory flood insurance purchase requirements and floodplain management standards apply.

**Zone A99** - Areas subject to inundation by the 1-percent-annual-chance flood event, but which will ultimately be protected upon completion of an under-construction Federal flood protection system. These are areas of special flood hazard where enough progress has been made on the construction of a protection system, such as dikes, dams, and levees, to consider it complete for insurance rating purposes. Zone A99 may only be used when the flood protection system has reached specified statutory progress toward completion. No Base Flood Elevations (BFEs) or depths are shown.

**Zone V** - Areas along coasts subject to inundation by the 1-percent-annual-chance flood event with additional hazards associated with storm-induced waves. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.

**Zone VE and V1-30** - Areas subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. Base Flood Elevations (BFEs) derived from detailed hydraulic analyses are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply. indicates additional coastal flooding hazards such as storm waves. Study is detailed and BFEs are shown.

**Zone X, B (moderate-rise zones)** - An area of moderate flood hazard that is determined to be outside the Special Flood Hazard Area between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood.

**Zone X, C (low-rise zones)** - An area of minimal flood hazard that is determined to be outside the Special Flood Hazard Area and higher than the elevation of the 0.2-percent-annual-chance (or 500-year) flood.

## 432.11 Exhibits

<a href="#">Exhibit 432-1</a>	The 1998 FHWA Environmental Flowchart on Floodplains
<a href="#">Exhibit 432-2</a>	Outreach to Local Governments on Flood Risk Assessment for WSDOT Fish Passage Projects

# Exhibit 432-1 The 1998 FHWA Environmental Flowchart on Floodplains



## **Exhibit 432-2      Outreach to Local Governments on Flood Risk Assessment for WSDOT Fish Passage Projects**

WSDOT's flood risk assessment includes coordinating with local governments early in project development. Note: pursuing a floodplain development permit does not preclude a project from qualifying for a Fish Habitat Enhancement Project (FHEP) hydraulic project approval (HPA). The following are suggested talking points and considerations for coordination with local governments:

- Prepare for outreach with the local government (local):
  - Region reviews FEMA's effective flood maps at each barrier site to determine if it's within a FEMA regulatory floodway or special flood hazard area (SFHA) zone.
  - Region reviews the local code. It is important to note whether the local's floodplain development regulations fall under their Critical Areas Ordinance (CAO). If the flood regulations are included within the CAO and the project ultimately qualifies for FHEP, the project will apply for a floodplain development permit but should not be subject to any other local permits.
  - Prior to meeting with the local, it is recommended to have a prep meeting that includes the PEO, HQ Hydraulics, and Region Environmental to discuss the agenda for meeting with the local. Suggested topics include:
    - Project overview
    - WSDOT's Flood Risk Assessment Process and modeling approach with SRH2D
    - Permitting approach
  - The sooner the Region engages with the local, the better, to keep the hydraulic work progressing.
- When reaching out to the local, request that the local's floodplain manager attend the meetings.
- Initially provide the local with a list of upcoming projects within their jurisdiction. Update the list as needed and refer to the list as the projects develop. Contact the ESO Fish Passage Delivery Team for any questions on the delivery plan.
- If the local says that a project does NOT need a floodplain development permit, contact ESO Permitting & Compliance Program Manager and the HQ Hydraulics Section regarding next steps.
- For projects within a FEMA regulatory floodway or SFHA, coordinate with the local throughout the no-rise analysis and CLOMR or LOMR (if needed) processes, as well as the floodplain development permitting process.

For reference:

- [44 CFR 60.3](#) Flood plain management criteria for flood-prone areas
- [RCW 47.01.260](#) Authority of WSDOT on state highway system design
- ORIA's Floodplain Development Permit webpage, which has links to WAC, RCW and CFR
- [RCW 77.55.181](#) Fish habitat enhancement project (WDFW code)

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