

FLOODPLAIN REGULATIONS

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Pierce County Surface Water Management

October 1st, 2010

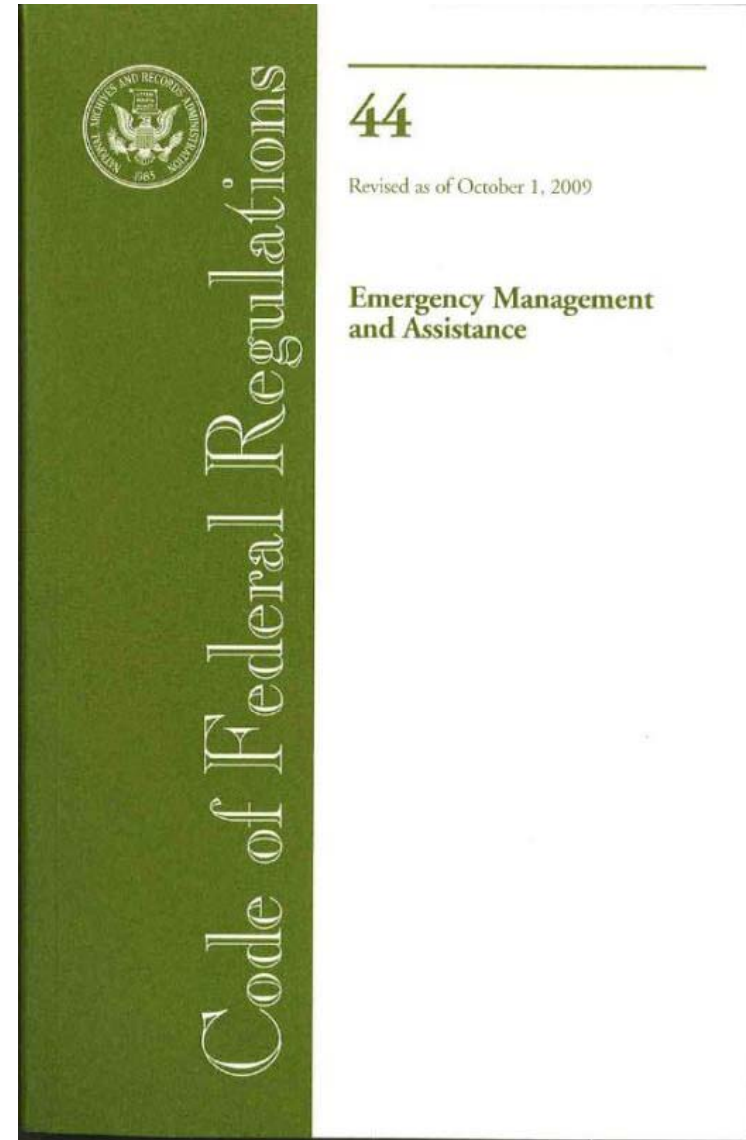
Puyallup River Executive Task Force

Floodplain Regulations

- Minimum Nationwide Standards – FEMA
- Higher Regulatory Standards
- Regional Floodplain Regulations
- Savings to Public

Minimum Nationwide Standard - FEMA

- Valid for all Communities in Nation
- 20,100 Member Communities
- Compromise For Some Communities Entirely within Floodplain
- Provides Starting Point For Reducing Flood Losses



Minimum Nationwide Standards - FEMA



- Build At or Above Base Flood Elevation - BFE
- Substantial Improvement/Damage Threshold 50% - Must Come up to Current Code
- No Encroachment, Fill or Structures In Floodway Unless Zero Flood Rise Shown



Meeting Just the FEMA Minimum Standards

- Allows Flood Levels to Increase up to 1 Foot
- Allows Homes Built at BFE or up to 1 Foot higher to be Flooded
- Does not Meet Endangered Species Act Requirement

Higher Regulatory Standards

- FEMA Encourages Higher Regulatory Standards
- Community Rating System (CRS) - Credits Communities who do More
- WAC 173-158-086 Local Option to Exceed Minimum Requirements
- Model Ordinance Developed and Endorsed by FEMA, Ecology and NOAA Fisheries*

Higher Regulatory Standards

- Channel Migration Zone Floodway
- Deep and Fast Flowing Water Floodway
- Location Requirements
- Access – Egress Requirements
- No Adverse Impact Requirements
- Elevating Structures Above Base Flood

Higher Regulatory Standards - CMZ

Channel Migration Zone Floodway

- Recognizes Natural River Movement
- Recognizes Limitations of Levee System
- Severe Risk Defined as a Floodway
- Required in NMFS Biological Opinion - ESA

Higher Regulatory Standards - CMZ

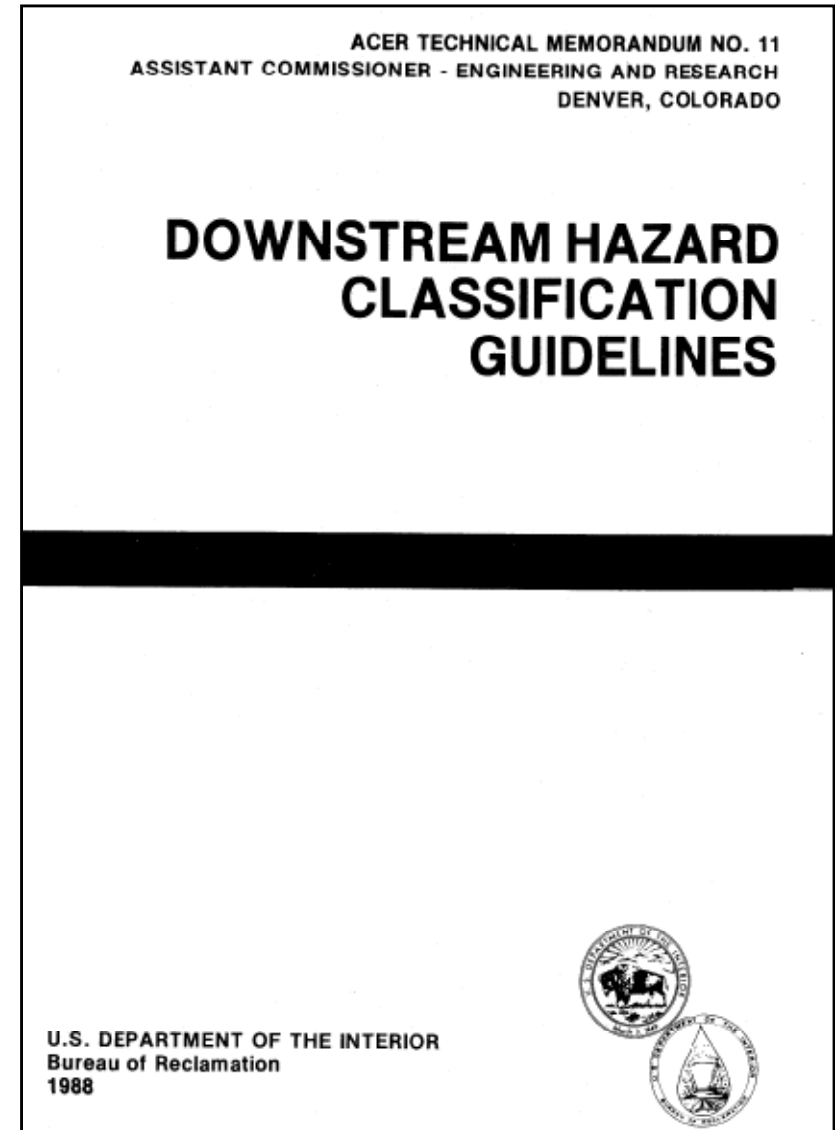
The Puyallup River - 1931 to 2005



Higher Regulatory Standards - DFF

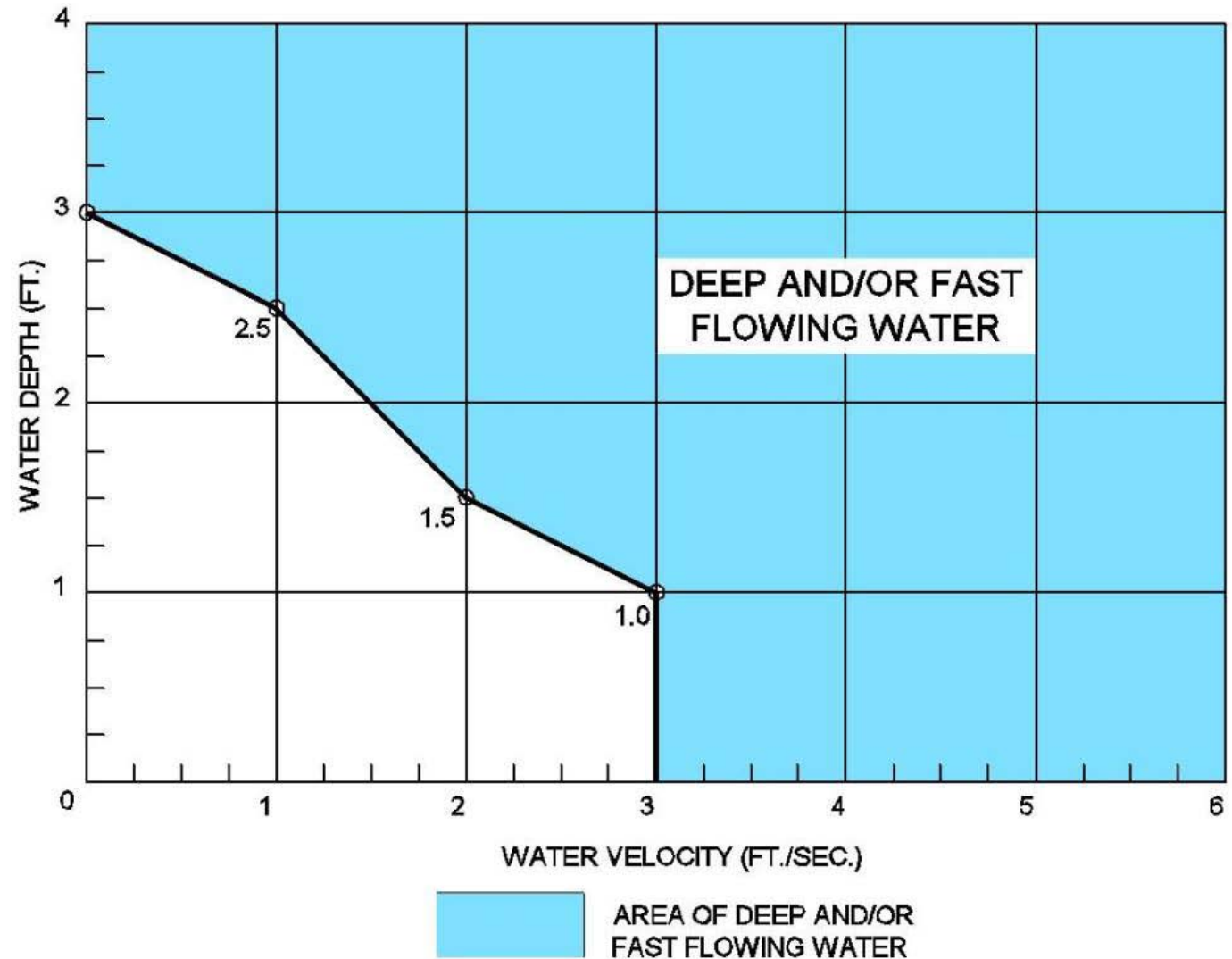
Deep and Fast Flowing Water Floodway

- Area With Greatest Risk to Life and Property
- Derived from US Bureau of Reclamation Dam Break Analysis – 1988
- Most Communities Regulate to Protect Structures but not Occupants



Higher Regulatory Standards - DFF

- 3 Feet Depth
- 3 Feet Velocity
- Combination



Higher Regulatory Standards

Location of Development

- Subdivisions - Retain High Ground for Homes
- Build New Homes on out of Floodplain



Higher Regulatory Standards

Access / Egress

- Elevate Driveway to Leave During Flood or for EMS to Assist
- Most Flooding Deaths Occur Driving Through Floodwater
- Prevents Expensive Rescue



Higher Regulatory Standards

No Adverse Impact

- Zero Rise Requirement – Development should not increase neighbors flooding
- Compensatory Storage - Mitigate added Fill with Excavation



Higher Regulatory Standards

Elevation of Structures

- Freeboard Reduces Flood Risk to Structure and provides for:
 - Change in Conditions
 - Variations in Individual Floods
 - Lower Insurance Premiums
- 2' Freeboard Recommended in Model Ordinance
- 2' Freeboard Required in Pierce County
- 3' Freeboard Required in King County

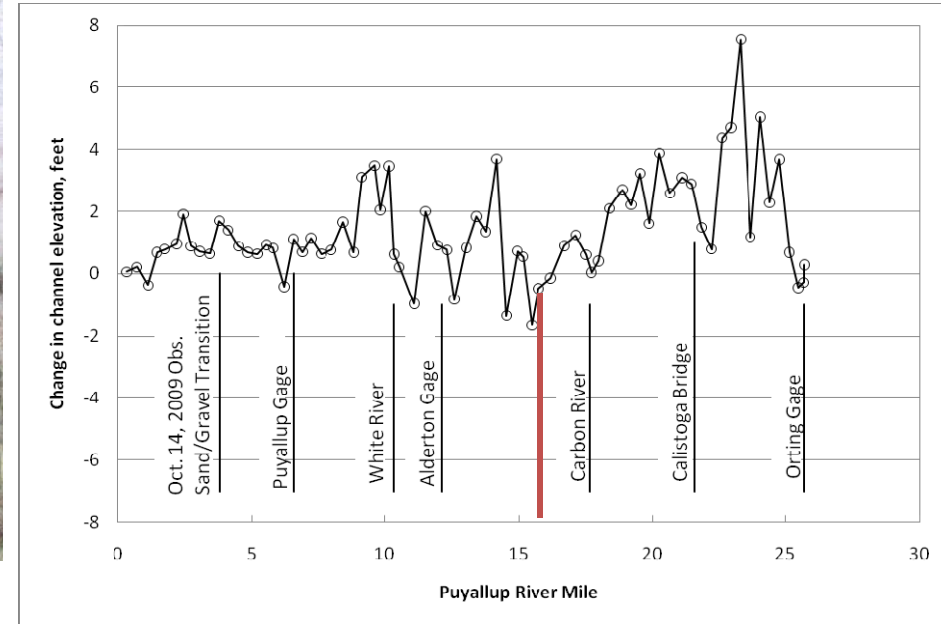
Higher Regulatory Standards

Elevation of Structures



Record Floods At Puyallup Gauge

2009	48,200 c.f.s.
2006	39,700 c.f.s.
1996	46,700 c.f.s.



High Water Marks on Puyallup River Mile 15.7

Regional Floodplain Regulations

- Summarized Jurisdictions in Puyallup Basin
- Comparison to Federal and State standards
- Highlighted Higher than Minimums
- Training and Consistent Enforcement Critical
- Public Aware of Different Standards

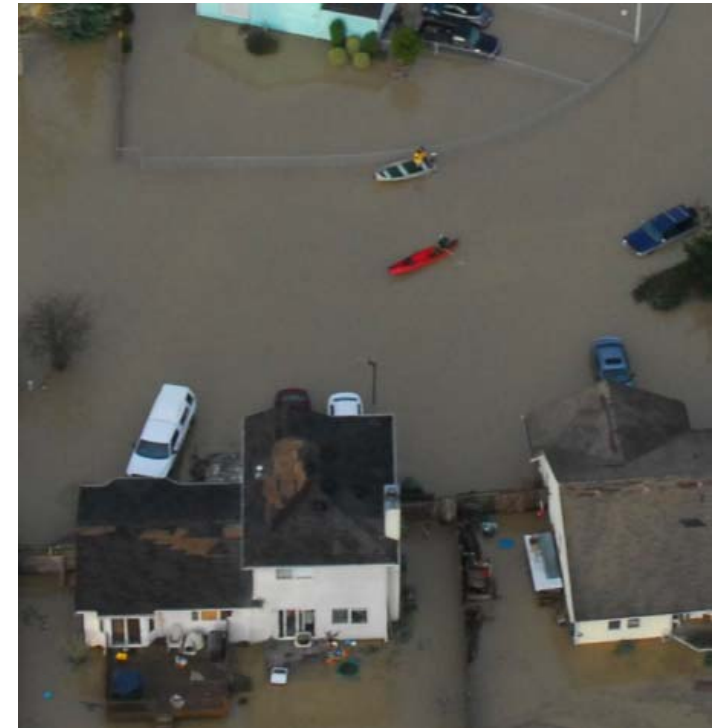
Regional Floodplain Regulations

	FEMA Minimums	Washington State	FEMA Model	Fife	Orting	Pacific	Pugallup	South Prairie	Sunmer	Tacoma	Pierce County	King County	Pugallup Tribe
Floodplain Mapping Data Utilized	Effective FIS/FIRM, latest Letter of Map Change, Prelim DFIRM BFE when no previous BFE Established (44 CFR § 60.3)	Most recent FIS/FIRM or Best Available Information if maps are not available or sufficient. RCW 86.16.051	Effective FIS/FIRM, latest Letter of Map Change, Prelim DFIRM BFE when no previous BFE Established (3.2_A, 3.3_F, 3.5)	FEMA FIS/FIRM of 1980 or Best Available Data including Preliminary DFIRMs (15.40.120_B)	FEMA FIS/FIRM of 1985 or Best available information (14-1-B-5)	FEMA FIS/FIRM of 1980 (23.40.070) 1987 Pierce Co. and 1989 King Co. FIRMs, or best available data if maps are not sufficient (23.40.120_B)	FEMA 1980 FIS/FIRM (21.07.040(2))	FEMA FIRM of 1961 (FDPO 3.2) where a BFE is not provided may reasonably use other data sources (FDPO 4.3-5)	FEMA FIRM of 1987 (15.52.070)	FEMA FIRM of 1983 (2.12.030_B) or best available information including 1987 FIRM & 2007 Prelim DFIRM (15.11.250_D_2_c)	Most restrictive of 1987 FIS/FIRM or Best available data including Preliminary DFIRMs (18E.10.140_H(3))	Best available Effective FIRM, Prelim DFIRM where it is known to correct Draft Work Maps. Plus any other verifiable data. (21A.24.230_B)	Not Participating Member of NFIP - No FIS/FIRMs issued
Plan Review - Data Requirements	Parcels 5 Acres or 50 lots must develop BFE (44 CFR § 60.3_b_3)	FEMA minimum	FEMA minimum and show Channel Migration & Riparian Habitat Zone for any development within 300' of stream or shoreline, (3.4_C_2), show 10-, 50-, 100-, and 500-year floods.(4.2_A_3)	FEMA Minimum and Director interprets true boundary location (15.40.120_E). In SFHA, Plan includes elevation of structures, location of proposed structures, fill, storage, drain fields (15.40.100)	FEMA Minimum and Plan to include site grading (before and after), building elevations and Floodplain elevations. (14-1-B-2)	FEMA minimum	FEMA Minimum and site plan to include site, building and Floodplain elevations (21.07.050(b))	FEMA minimum (FDPO 5.1-4)	FEMA Minimum and Plan to include site, building and Floodplain elevations. (15.52.120)	FEMA Minimums, plus information to determine if site is in Flood hazard area, plus to develop a BFE for all sites in unnumbered A Zones. Additionally, development effects are to be considered in combination with future development and use. (2.12.070)	FEMA Minimum and Floodplain boundary plotted by surveyor required if site within 300' of mapped hazard or 5' Vertical of BFE. (18E.10.030_B)	FEMA Minimum and Engineer shall prepare BFE and Velocity for all structures except Agricultural not used for habitation. (21A.24.240_C)	not specifically regulated
Floodway	No structure or fill in Floodway; exception for zero rise. (44 CFR § 60.3_d_3)	Prohibits Single Family Residences in the Floodway. Exception for farmhouses.	CMZ recommended mapping CMZ then not placing structures at risk	FEMA & State Minimums, no farmhouses exception (15.40.230)	FEMA & State Minimums, no farmhouses exception (14-1-B-6-C)	FEMA & State Minimums, no farmhouses exception (23.40.150)	FEMA & State Minimums (21.07.060_3)	FEMA minimum (FDPO 5.3)	FEMA minimum, allows for Substantial Improvement if no increase in ground flood area or overall square footage (16.58.110_A_3 & 15.52.250)	Both FEMA and State minimums, no farmhouses exception (2.12.040.F)	FEMA and State standards. Exceptions for replacement of Agricultural buildings (18E.10.040_B(7) & (8))	FEMA and State standards and exceptions for Agricultural accessory buildings (21A.24.260)	not specifically regulated
CMZ Floodway	Flood related erosion prone areas. If not provided by FEMA, the Community shall obtain erosion data and new structures must be located out of hazard. (44 CFR § 60.5)	CMZ Floodway not defined.	CMZ plus 50'	not specifically regulated	not specifically regulated	not specifically regulated	not specifically regulated	not specifically regulated	not specifically regulated	not applicable	Regulates Severe CMZ as Floodway. 1 major river mapped or required to be mapped (18E.10.020_B(4)). Development regulated same as FEMA Floodway with exception for damage by fire. (18E.10.040_D(1))	Regulated severe & moderate CMZ. Four major rivers currently mapped. (21A.24.275)	not specifically regulated
Deep and Fast Flowing Floodway	not specifically regulated	DFP Floodway not defined. Considers 3 ft depth & 3 ft velocity to determine at-risk property (WAC 173-158-076(1) 3)	DFP Floodway not defined.	DFP Floodway not defined, development must be protected from velocities greater than 2 ft/sec (15.40.050_D_3)	DFP Floodway not defined, when velocity is greater than 5 ft/sec, crawl space construction not allowed. (14-1-B-E-4)	not specifically regulated	Mitigate for effects of hazardous velocities (21.07.060_5_d(1))	not specifically regulated	Calls the FEMA Floodway Deep and Fast Flowing Water but DFP is not defined as floodway. (16.58.060)	Crawl space not allowed when velocity is greater than 5 ft/sec (2.12.050_A.1.d.iv)	Development not allowed where Depth exceeds 3 ft OR Velocity exceeds 3 ft/sec OR combination of the two. (18E.10.020_B(2))	Development not allowed where depth exceeds 3 ft And velocity exceeds 3 ft/sec (21A.24.240_C)	not specifically regulated
Floodplain Relevant Code	44 CFR § 60.3	RCW 86.16 & WAC 173-158 & WAC 173-26	FEMA Region 10 Draft Model Ordinance Jan 2010	Chapter 15.40 & 17.03	Title 14, 15, 12, 11	Title 23.40	PMC 21.07	Chapters 15.16, 15.18 & Ordinance 167 & Ordinance #253 & FEMA Region X Flood Damage Prevention Ordinance-1986 (FDPO)	Chapters 15.52, 16.16, 16.130, 16.58, 11.16.050 & 11.28.300	Municipal Code Chapter 2.12 and 13.11, IRC section 1612, and IRC section R322.	Title 18, 18E, 18E.10	King County Code Chapter 21A.24 Critical Areas, 21A.06 (Definitions)	None
Subdivision of land	Determine if proposed subdivision is reasonably safe from flooding or is consistent with need to minimize flood damages. (44 CFR § 60.3_d_5)	Should not happen where foreseeable that structural flood hazard measures are necessary for protection. WAC 176-26-22(3)(c)(i)	FEMA minimums and set aside lot(s) as open space from Regulatory Floodplains (5.1_LB). No subdivision of land that creates a lot without buildable space out of Regulatory Floodplain if one exists on another lot (5.1_C)	FEMA minimums (15.40.170)	Consistent with the need to minimize flood damage. (14-1-B-A-4); subdivision may be disapproved because of flood, no subdivisions in Floodway (12-9-1E)	Consistent with the need to minimize flood damage. (23.40.130_D_1)	FEMA Minimums (21.07.060(d))	FEMA minimum (FDPO 5.1-4)	Consistent with the need to minimize flood damage. Subdivision must meet FEMA standards. (15.52.190_A & 11.16.050)	Consistent with the need to minimize flood damage. (2.12.040_D) Subdivision limited in Steam buffers (13.11.430.2)	New lots must fully comply with Critical Area Maps (18E.10.050_B)	New lots must have 5,000 sq. ft. outside of Floodplain (21A.24.240_D-1)	not specifically regulated
Placement of Structures in Flood Triage (excluding Critical Facilities)	not specifically regulated	not specifically regulated	Must be outside Floodplain where feasible (5.2_A_1) if no site exist must site on highest ground or area with least impact on habitat (5.2_A_2)	not specifically regulated	not specifically regulated	not specifically regulated	not specifically regulated	not specifically regulated	not specifically regulated	not specifically regulated	Must be outside floodplain where feasible (18E.10.040_C_2)	Subdivision must show setbacks restricting structures to designated buildable areas (21A.24.240_D-5-a)	not specifically regulated
Access	not specifically regulated	not specifically regulated	minimum of one access road elevated 1 ft above the BFE for each buildable lot (5.1_E). Access to Critical Facilities protected to 500-year flood elevation (5.4_B_2).	not specifically regulated	not specifically regulated	not specifically regulated	Regulated for Critical Facilities only (21.07.060(2)(c)).	not specifically regulated	not specifically regulated	Access to Critical Facilities shall be protected to higher of BFE-2 or 500 yr flood. (2.12.040_G)	Access routes: roads, bridges*, driveways and emergency vehicle access. 1 ft above BFE. *lowest chord of bridge 1 ft above BFE on minor streams and 6' above on major rivers. (18E.10.040_C_3_c)	Access to all lots must cross to a moderate CMZ ((21A.24.275_C-4-b)	not specifically regulated
Substantial Damage/Improvement Threshold	50% market value before damage/improvement (44 CFR § 59.1)	FEMA minimum	FEMA minimum with totaled cumulatively over 10 year (Sec 2 - Definitions)	FEMA Minimum (15.40.230)	FEMA minimum (14-1-5)	FEMA Minimum (23.40.050_X, Y)	FEMA Minimum (21.07.060)	FEMA minimum (FDPO Sec. II)	FEMA minimum (15.52.050)	FEMA minimum (2.12.020)	FEMA minimum with totaled cumulatively over 5 years (18E.20.070)	FEMA minimum (21A.06.1270 definitions)	not specifically regulated
Zero Rise Analysis	Zero Rise in Floodway (44 CFR § 60.3_d_3)	FEMA minimum	FEMA Minimum (1.5)	Zero Rise for any Floodplain development (15.40.050_D)	FEMA minimum (14-1-B-C-1)	FEMA minimum (23.40.150_A)	FEMA minimum (21.07.060)	FEMA minimum (FDPO 5.3-1)	FEMA minimum (15.52.250_A)	FEMA minimum (2.12.040.F)	Requires no change in BFE to 0.007 for any development in floodplains (18E.10.050_V(1))	zero rise across the entire 100 year except for the modeled flood fringe. (21A.24.240)	not specifically regulated
Compensatory Storage	not specifically regulated	not specifically regulated	Required; 1-to-1 replacement matching volume at 10-yr, 50-yr & 100yr flood elevations, prevent fish stranding & hydraulically connected (7.6)	Required; 1-to-1 replacement & hydraulically connected (7.6)	not specifically regulated	not specifically regulated	not specifically regulated	not specifically regulated	Activities that reduce the effective flood storage must be mitigated with compensatory storage (16.16.130)	Development shall not reduce base flood water storage ability (13.11.620)	Required; 1-to-1 replacement at same elevation as fill & hydraulically connected (18E.25.030)	Required; 1-to-1 replacement at same elevation as fill & hydraulically connected (21A.24.240_A-4)	not specifically regulated
Variates	(44 CFR § 60.5)	Appeals per RCW 43.21B.310	FEMA Minimum (4.3)	FEMA minimum (15.40.260)	FEMA minimum (14-1-1-D)	Not floodplain specific (23.10.140)	FEMA minimum - None issued to date (21.07.050(4))	Variance per Town Code (#235-XX.10.090) Reasonable Use Exception (#253-XX.10.070_A)	FEMA minimum (15.52.270)	Beyond FEMA minimum. Compatible with DOE recommended wording. (2.12.080 & 2.12.030)	FEMA minimum - None issued to date. (18E.20.060_D_4)	not allowed. Alterations Exceptions allowed in wet meadows for agricultural buildings (non residential)	not specifically regulated
Elevation above BFE	Lowest floor (including basement) built at or above BFE. Areas below BFE have min of 2 openings with 1 sq in of opening per 1 sq foot of area enclosed (44 CFR § 60.3_c_2)	FEMA minimum	FEMA Minimum plus Elevate 1 foot above BFE (3.3_D)	FEMA Minimum plus Elevate 1 foot above BFE (15.40.200_A)	FEMA Minimum plus Elevate 1 foot above BFE (14-1-B-1-3)	Lowest floor 1 foot above BFE (23.40.140_A_1). Manufactured homes 1 foot above BFE or 3 ft above grade on reinforced pier (23.40.140_D)	FEMA Minimum plus Elevate 1 foot above BFE (21.07.060_2(s))	FEMA minimum (FDPO 5.2-1)	FEMA minimum (15.52.220_A)	FEMA minimum except Coastal A Zone 1 foot above BFE (2.12.050_A_1)	FEMA Minimum plus Elevate 2 feet above BFE (18E.10.040_C_6)	Lowest floor including basement built to Flood Protection Elevation (21A.24.240 E3) Flood Protection Elevation is 3 ft above BFE (21A.06.430)	not specifically regulated
Commercial/Industrial - Lowest floor including basement	Built at or above BFE or dry Floodproofed to BFE. (44 CFR § 60.3_c_3)	FEMA minimum	Built or Dry Floodproof to 1 ft above BFE (6.3)	Elevate 1 ft above BFE or dry Floodproofed to 1 ft above BFE (15.40.120)	Elevate 1 ft above BFE or dry Floodproofed to 1 ft above BFE (14-1-B-2-a)	Elevate 1 ft above BFE or dry Floodproofed to 1 ft above BFE (23.40.140_B_1)	Elevate 1 foot or more above BFE or dry Floodproof to 1 ft above BFE (21.07.060_2(b))	FEMA minimum (FDPO 5.2-2)	Dry floodproofed at BFE or Lowest floor including basement elevated 1 ft above BFE (15.52.230_A)	Located out of SFHA to extent possible otherwise elevate 3 ft above BFE (15.52.255)	Located out of SFHA to extent possible otherwise elevate 3 ft above BFE (18E.10.040_C_5)	Elevate or Dry Floodproof to Flood Protection Elevation - 3 ft above BFE. (21A.24.240_F)	not specifically regulated
Critical Facilities	Located out of 500 year Floodway when using federal funding. (44 CFR § 3.4 & § 206.226)	FEMA minimum	Located out of Regulatory Floodplain to extent possible, elevate to or above the higher of the 500-year or 3 ft. above the 100-year Floodplain.	Located out of SFHA to extent possible otherwise elevate 3 ft above BFE (15.40.215)	Located out of SFHA to extent possible otherwise elevate 3 ft above BFE (14-1-B-5-B)	Located out of SFHA to extent possible otherwise elevate 3 ft above BFE (23.40.140_C)	Located outside of SFHA, unless no feasible alternative (21.07.060)	not specifically regulated	Located out of SFHA to extent possible otherwise elevate 3 ft above BFE (15.52.255)	Located out of SFHA to extent possible otherwise elevate 3 ft above BFE (15.52.255)	Located out of SFHA to extent possible otherwise elevate 3 ft above BFE (18E.10.040_C_5)	Locate outside 100 YR Floodplain where feasible otherwise elevate 3 ft above BFE or above 500 year, which ever is higher. (21A.24.240_J)	not specifically regulated
Other		Requires Livestock Flood Sanctuary Areas established but within NFIP minimum requirements. RCW 86.16.190			Elevation Certificates required if Floodplain encroaches 5 ft onto property. (14-1-1-A-3). Crawl space must not be more than 2 ft below lowest grade. (14-1-B-E-1)						Parking lots no deeper than 0.5' below BFE (18E.10.040_C_3_b)	Farm Pads allowed (21A.24.240_K) Regulate Zero-Rise Floodway (21A.24.250)	not specifically regulated

Higher Regulatory Standards

Savings to Public

- Reduced Flood Losses
- Fewer Homes Needing
Emergency Response and Recovery
- Less Public Infrastructure to Repair
- Reduced Flood Insurance Premiums
- CRS Discount on Flood Insurance
35% in Pierce County - 25% in Fife - 20% Orting



QUESTIONS?

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October 1st, 2010

Puyallup River Executive Task Force