

FLOODPLAIN MANAGEMENT BEST PRACTICES

Dennis Dixon, CFM
Pierce County Planning & Public Works
Surface Water Management

March 22, 2019

Planning Association of Washington
2019 Land Use Boot Camp

What is the problem?

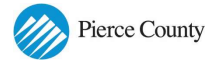


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2

What is the problem?



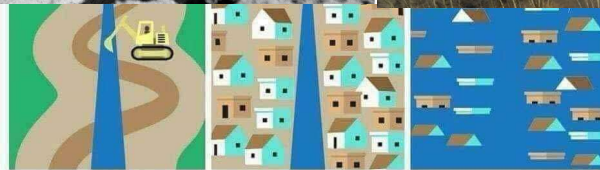
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Natural phenomenon versus Natural disaster



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5

What is the problem?



People suffer



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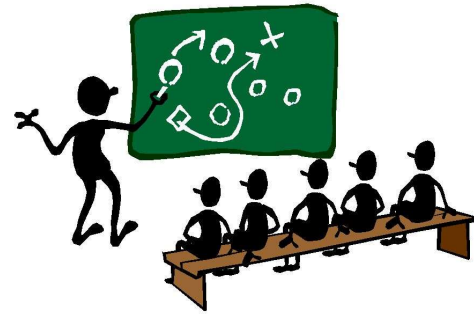
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6

Today's goals



- Different backgrounds with common goals
- Jargon and acronym avoidance
- Talk floods
- Mitigation strategies
- Floodplain management tools



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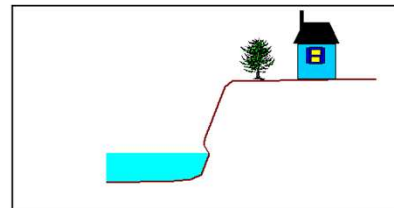
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What can I do?



- Know who is affected
- Identify the risk
- Understand the cost
- Build safer
- Mitigate what has been built



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Who does it affect



- Property owners
- Professionals (insurance agents, realtors, lenders, builders and surveyors)
- Business owners
- Tax payers
 - (local, state, federal)



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Identifying the risk



- How much water - Hydrology?
- How will it flow - Hydraulics ?
- Mapping it with better tools
- Flood maps include many assumptions

H & H

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Identifying the risk

Light Detection and Range LiDAR

Can be used for map changes



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Understand the cost



- Flood insurance premiums
- Clean up and repair cost
 - First inch of water = \$26,800
- Businesses closed
 - 40-60% small business never reopen following a disaster
- Opportunity cost – personal and community



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Build safer



- Don't build in the dangerous areas
 - Better zoning and land use rules
- Build higher
 - Building codes and critical area codes
- Freeboard for the unknowns
 - Modeling and mapping errors, climate change, nature doing nature
- Freeboard for the savings
 - Every foot higher cuts insurance nearly in half

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Mitigation



- Oxford Living Dictionary defines mitigate:
 - Lessen the gravity of an offence or mistake
- Move low lying structures - up or away
- Try to prevent water from flooding an area

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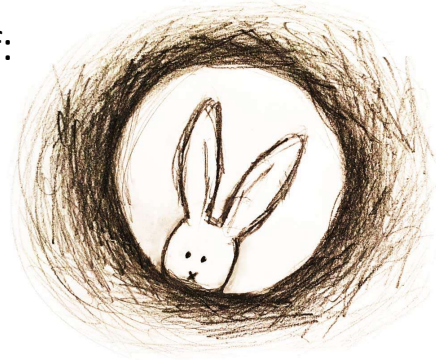
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16

Flood insurance



- Mitigates for financial losses
- Federal insurance available regardless of:
 - In or out of mapped flood hazard area
 - Number of times flooded
- Required when a loan is involved
- Too many people do not want it!



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Flood insurance factors



- Location related to mapped hazard
- Elevation of ground next to house and deck
- Elevation of items that could be damaged
- Date of construction – Could be pre-FIRM
- Community discounts – Community Rating System

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Location, location, location



- Digital Flood Insurance Rate Map – DFIRM
- All maps can be improved on
 - Letter of Map Change
 - New flood studies
 - New data or topography including LiDAR
 - Using best available data for permitting
 - When asked for a flood elevation, ask why?

Page 1 of 2		Date: February 20, 2019	Case No.: 19-10-0361A	LCM#				
Federal Emergency Management Agency Washington, D.C. 20472								
LETTER OF MAP AMENDMENT DETERMINATION DOCUMENT (REMOVAL)								
COMMUNITY AND MAP PANEL INFORMATION		LEGAL PROPERTY DESCRIPTION						
COMMUNITY	PIERCE COUNTY, WASHINGTON (Unincorporated Areas)	Lot 215, Grand Firs, Phase 2, as shown on the Plat recorded as Document No. 559294, Pages 1 through 9, and Lots 204 through 210, 240, 241, 244, 247, 248, and 254 through 259, Grand Firs, Phase 3, as shown on the Plat recorded as Document No. 585781, Pages 1 through 15; all in the Office of the Auditor, Pierce County, Washington.						
AFFECTED MAP PANEL	NUMBER: 605000587E DATE: 3/7/2017	COMMUNITY NO.: 530138						
FLOODING SOURCE: MUCK CREEK		APPROXIMATE LATITUDE & LONGITUDE OF PROPERTY: 47.842411, -122.228913 SOURCE OF LOT & LONG: LOMA LOGIC DATUM: NAD 83						
DETERMINATION								
LOT	BLOCK/SECTION	SUBDIVISION	STREET	OUTCOME WHAT IS REMOVED FROM THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NAVD 88)	LOWEST ADJACENT GRADE ELEVATION (NAVD 88)	LOWEST LOT ELEVATION (NAVD 88)
215	--	Grand Firs, Phase 2	21009 77th Avenue East	Structure	X (unshaded)	480.5 feet	480.5 feet	--
Special Flood Hazard Area (SFHA) - The SFHA is an area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).								

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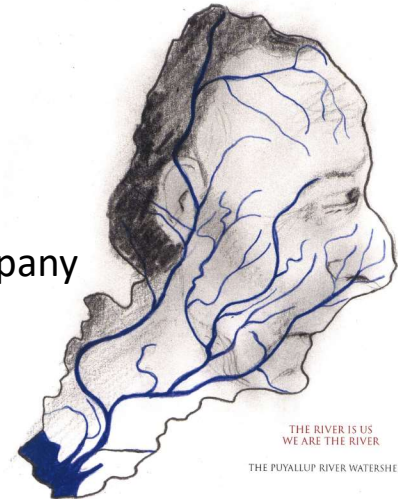
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19

Location, location, location



- Local data
 - Pierce County: PublicGIS
 - Thurston County: GeoData Permitting Map
- Lender will use a map determination company
 - These can be revisited
 - You will need data to prove the point
 - Understand determination company's risk



Antonio José García Cano - 2017
Antonio José García Cano

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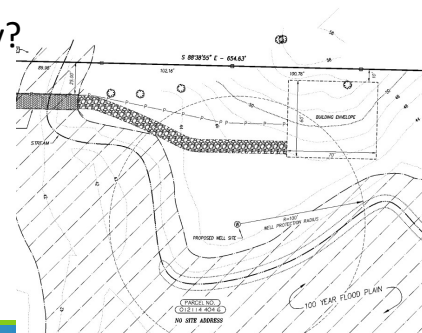
Time for something new



Flood permit review strategies

- Does the site map will show the floodplain limit?
- Is the base flood elevation known?
- Are there opportunities to save the owner money?

FLOOD BOUNDARY DELINEATION SURVEY
for
Mr. Michael Hill
Located in the
NE 1/4 SE 1/4, Sec. 14, T. 21 N, R. 1 E, W.M.
Pierce County, Washington



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21

Benefit cost analysis - BCA



- Extra permit fees and inspection holds
- Elevation certificate cost (\$800 - \$2,000)
- Higher foundation cost vs insurance premiums
- Flood insurance standard vs preferred risk policy cost

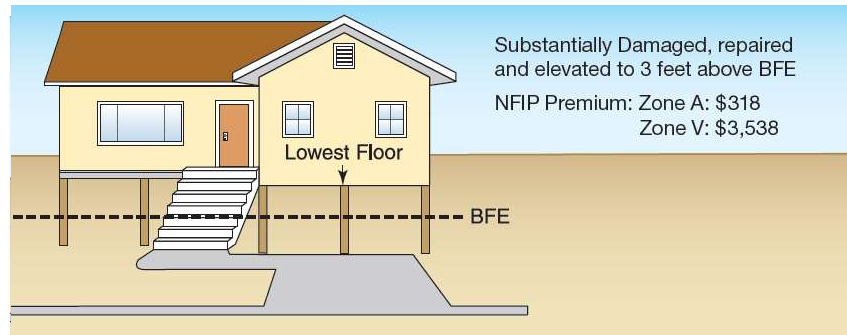


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22

Floodplain savings



Subsidized \$2,247/yr. Below BFE \$6,751/yr. Above BFE \$318/yr.

Assumes \$250,000 home with \$2,000 deductible

FEMA publication 213 - 2018

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23

Elevation Certificate



- For compliance, map changes and insurance
- Required for participation in the NFIP and CRS
- Three step development process
 - Verify ground elevation and base flood elevation
 - Verify top of stemwall, slab or pier before releasing hold on sub-floor inspection
 - Verify compliance at finished construction



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24

Elevation Certificate

- Fill out information you know
 - Sections A & B

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U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

OMB No. 1660-0008
Expiration Date: November 30, 2016

ELEVATION CERTIFICATE

Important: Follow the instructions on pages 1-9

Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner.

SECTION A – PROPERTY INFORMATION		FOR INSURANCE COMPANY USE
A1. Building Owner's Name		Policy Number
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.		Company NAIC Number
City	State	ZIP Code
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.)		
A5. Latitude/Longitude: Lat. _____ Long. _____ Horizontal Datum: <input type="checkbox"/> NAD 1927 <input type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number _____		
A8. For a building with a crawlspace or enclosure(s):		
a) Square footage of crawlspace or enclosure(s) _____ sq ft		
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____		
c) Total net area of flood openings in A8.b _____ sq in		
d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No		
A9. For a building with an attached garage:		
a) Square footage of attached garage _____ sq ft		
b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade _____		
c) Total net area of flood openings in A9.b _____ sq in		
d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No		
SECTION B – FLOOD INSURANCE RATE MAP (FIRM) INFORMATION		
B1. NFIP Community Name & Community Number		B2. County Name
		B3. State
B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date
B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use Base Flood Depth)
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in item B9: <input type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____		
B11. Indicate elevation datum used for BFE in item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input type="checkbox"/> Other/Source: _____		
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA		

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Elevation Certificate

- Surveyor only required for Section C
 - When the base flood elevation is known
- Section D must describe equipment or utilities

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U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

OMB No. 1660-0008
Expiration Date: November 30, 2016

ELEVATION CERTIFICATE

IMPORTANT: In these spaces, copy the corresponding information from Section A.

FOR INSURANCE COMPANY USE	
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.	Policy Number
City	State
ZIP Code	Company NAIC Number
SECTION C – BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)	
C1. Building elevations are based on: <input type="checkbox"/> Construction Drawings* <input type="checkbox"/> Building Under Construction* <input type="checkbox"/> Finished Construction	
*A new Elevation Certificate will be required when construction of the building is complete.	
C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete items C2.a-h below according to the building diagram specified in item A7. In Puerto Rico only, enter meters. Benchmark Utilized: _____ Vertical Datum: _____ Indicate elevation datum used for the elevations in items a) through h) below: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input type="checkbox"/> Other/Source: _____	
Datum used for building elevations must be the same as that used for the BFE.	
Check the measurement used.	
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<input type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<input type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<input type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<input type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<input type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<input type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<input type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<input type="checkbox"/> feet <input type="checkbox"/> meters
SECTION D – SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION	
This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.	
Were latitude and longitude in Section A provided by a licensed land surveyor? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Check here if attachments.	
Certifier's Name	License Number
Title	
Company Name	
Address	
City	State
	ZIP Code
Signature	Date Telephone Ext.
Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner.	
Comments (including type of equipment and location, per C2(e), if applicable)	

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Elevation Certificate

- Fill out information you know
 - Section G for permit information
 - Important to grandfather insurance rates
- Photographs of building for insurance &

ELEVATION CERTIFICATE		BUILDING PHOTOGRAPHS	
See Instructions for Item A6.		OMB No. 1660-0008 Expiration Date: November 30, 2018	
IMPORTANT: In these spaces, copy the corresponding information from Section A.		FOR INSURANCE COMPANY USE	
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.		Policy Number:	
City	State	ZIP Code	Company NAIC Number
If using the Elevation Certificate to obtain NFIP flood insurance, affix at least 2 building photographs below according to the instructions for Item A6. Identify all photographs with date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." When applicable, photographs must show the foundation with representative examples of the flood openings or vents, as indicated in Section A6. If submitting more photographs than will fit on this page, use the Continuation Page.			
Photo One			

ELEVATION CERTIFICATE			OMB No. 1660-0008 Expiration Date: November 30, 2018
IMPORTANT: In these spaces, copy the corresponding information from Section A.			FOR INSURANCE COMPANY USE
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.			Policy Number:
City	State	ZIP Code	Company NAIC Number
SECTION G – COMMUNITY INFORMATION (OPTIONAL)			
The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable items) and sign below. Check the measurement used in Items G8-G10. In Puerto Rico only, enter meters.			
G1. <input type="checkbox"/> The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)			
G2. <input type="checkbox"/> A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.			
G3. <input type="checkbox"/> The following information (Items G4-G10) is provided for community floodplain management purposes.			
G4. Permit Number	G5. Date Permit issued	G6. Date Certificate of Compliance/Occupancy Issued	
G7. This permit has been issued for: <input type="checkbox"/> New Construction <input type="checkbox"/> Substantial Improvement			
G8. Elevation of as-built lowest floor (including basement) of the building: _____ <input type="checkbox"/> feet <input type="checkbox"/> meters Datum _____			
G9. BFE or (in Zone AO) depth of flooding at the building site: _____ <input type="checkbox"/> feet <input type="checkbox"/> meters Datum _____			
G10. Community's design flood elevation: _____ <input type="checkbox"/> feet <input type="checkbox"/> meters Datum _____			
Local Official's Name		Title	
Community Name		Telephone	
Signature		Date	
Comments (including type of equipment and location, per C2(e), if applicable)			
<input type="checkbox"/> Check here if attachments.			

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Resources

- FEMA Region X NFIP Specialist Scott Van Hoff
 - 425 487-4677 Email: scott.vanhoff@fema.dhs.gov
- Ecology NFIP Coordinator David Radabaugh
 - 425 649-4260 Email: david.radabagh@ecy.wa.gov
- Elevation Certificate review tool
 - Community Rating System –CRS “gig sheet”

https://crsresources.org/files/300/2015_ec_checklist.pdf



Resources		ELEVATION CERTIFICATE		Pierce County	
		Important: Follow the instructions on pages 1-9.			
		Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner.			
		SECTION A – PROPERTY INFORMATION		FOR INSURANCE COMPANY USE	
A1. Building Owner's Name		CRS EC Checklist		Policy Number:	
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.		Either A2 or A3 must be completed, with City, State, and Zip		Company NAIC Number:	
City		State		ZIP Code	
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)		Either A2 or A3 must be completed, with City, State, and Zip			
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.)					
A5. Latitude/Longitude: Lat. _____ Long. _____		Horizontal Datum: <input type="checkbox"/> NAD 1927 <input type="checkbox"/> NAD 1983			
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.					
A7. Building Diagram Number		Must be full Diagram Number (e.g., "1A" or "1B", not just "1")			
A8. For a building with a crawlspace or enclosure(s):		If there is no crawlspace or enclosure, or garage, you may leave the fields blank or enter "0" if that's the correct value.			
a) Square footage of crawlspace or enclosure(s)		_____ sq ft			
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade		_____			
c) Total net area of flood openings in A8.b		_____ sq in			
d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No		If there are engineered flood openings, attach the certification from the engineer or the ICC Evaluation Service			
A9. For a building with an attached garage:		If there is no garage, you may leave the fields blank or enter "0" if that's the correct value.			
a) Square footage of attached garage		_____ sq ft			
b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade		_____			
c) Total net area of flood openings in A9.b		_____ sq in			
d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No		If there are engineered flood openings, attach the certification from the engineer or the ICC Evaluation Service			
		SECTION B – FLOOD INSURANCE RATE MAP (FIRM) INFORMATION			
B1. NFIP Community Name & Community Number		B2. County Name		B3. State	
B4. Map/Panel Number		B5. Suffix		B6. FIRM Index Data	
B7. FIRM Panel Effective/Revised Date		B8. Flood Zone(s)		B9. Base Flood Elevation(s) (Zone AO, use Base Flood Depth)	
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in item B9:		<input type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____			
B11. Indicate elevation datum used for BFE in item B9:		<input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input type="checkbox"/> Other/Source: _____			
March 22, 2019				29	

Resources		Pierce County	
<ul style="list-style-type: none"> • www.msc.fema.gov <ul style="list-style-type: none"> – For flood insurance rate maps and map changes • https://hazards.fema.gov/femaportal/onlinelomc <ul style="list-style-type: none"> – On line submittal for map changes • http://crsresources.org/ <ul style="list-style-type: none"> – Community Rating System program resources • https://www.norfma.org/ <ul style="list-style-type: none"> – Northwest Regional Floodplain Management Association – CRS Users Group committee 			
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		30	

More training



Becca Fricke-Croft, CFM

Training & Outreach Lead - STARR II - FEMA Region 10 Service Center

(425) 329-3699 Email: becca.croft@starr-team.com | Web: www.starr-team.com

The screenshot shows the Webex Training website interface. The main content area is titled "Live Sessions" and displays a table of upcoming sessions. The table includes columns for Date & Time, Topic, Presenter, and Duration. A "Register" button is provided for each session. The sessions listed are:

Date & Time	Topic	Presenter	Duration	Register
Mar 20, 2019 10:00 am	CRS Webinar Series: Credit fo...	Cristina Martinez	1 hour	Register
Mar 28, 2019 10:00 am	STARR Elevation Certificates	Becca Fricke-Croft	2 hours 30 mins	Register
Apr 11, 2019 10:00 am	STARR Tools for Determining...	Becca Fricke-Croft	1 hour	Register
Apr 16, 2019 10:00 am	CRS Webinar Series: Preparing...	Scott Cofold	1 hour 15 mins	Register
Apr 17, 2019 10:00 am	CRS Webinar Series: Flood Ins...	Dave Arkens	1 hour	Register
Apr 25, 2019 10:00 am	STARR NFIP Basics	Becca Fricke-Croft	1 hour	Register
May 16, 2019 10:00 am	STARR Elevation Certificates	Becca Fricke-Croft	2 hours 30 mins	Register
May 30, 2019 9:00 am	STARR Floodplain Development...	Becca Fricke-Croft	1 hour	Register
May 30, 2019 10:30 am	STARR Inspecting Floodplain...	Becca Fricke-Croft	1 hour 30 mins	Register
Jun 5, 2019 10:00 am	STARR Tools for Data Mapping...	Becca Fricke-Croft	1 hour	Register
Jun 18, 2019 10:00 am	CRS Webinar Series: Credit fo...	Mully O'Toole	1 hour	Register

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31

What did we learn



- Avoid becoming a disaster
- Guide applicants to long term savings
- Mitigate what has been built starting with insurance

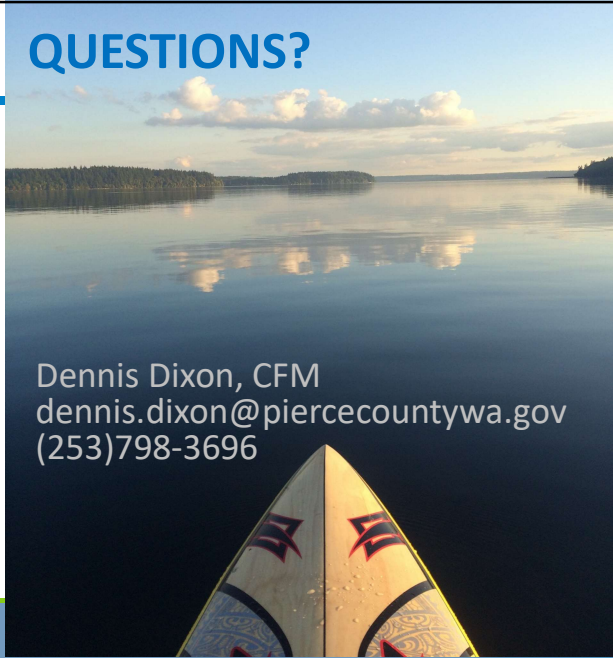


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32

QUESTIONS?



Dennis Dixon, CFM
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(253)798-3696

March 22, 2019

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33