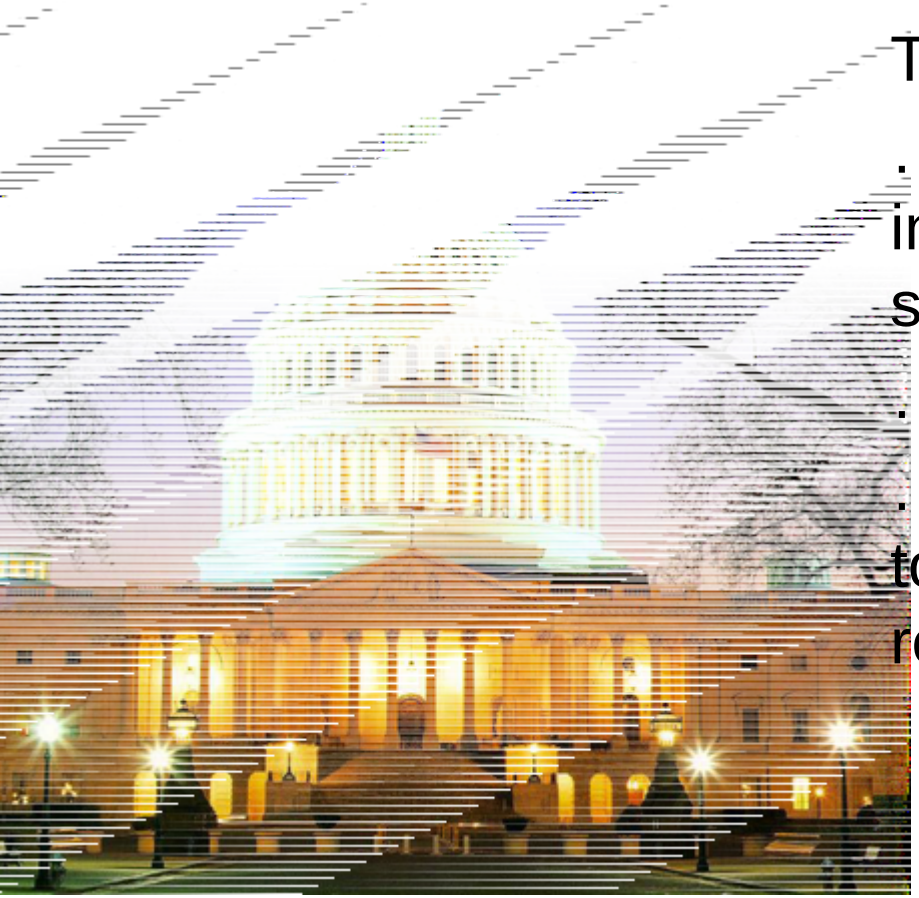
King County FCCO Meetings

October - November 2007

FEMA

What is Map Modernization?



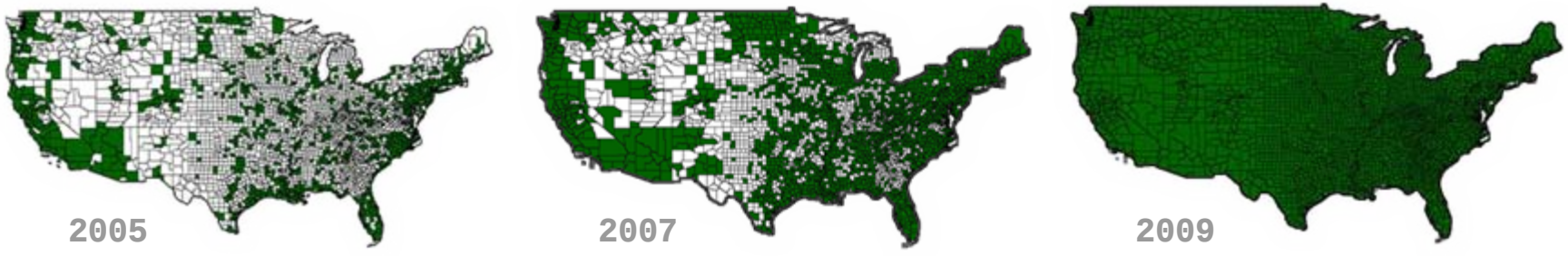
Through Map Modernization…

…FEMA will provide digital flood insurance rate maps and studies…

…for communities nationwide…

…that are more accurate, easier to use, and more readily available.

Why Modernize?



- Outdated maps (10+ years old)
- Physical changes in floodplains – man-made and natural
- Digital format enables overlays/analysis
- Easier to update maps
- Maps are foundation for flood risk reduction and insurance (4.5 million policies, 650 billion coverage)

Purpose of the NFIP

Reduce economic loss caused by flood events

- Create a partnership
- Map the flood risk and assign insurance rates;
- Reduce dependency on structural flood control;
- Promote floodplain management practices;
- Set minimum floodplain construction standards;
- Make flood insurance available.

Ordinances

Cornerstone of floodplain management

- Influenced by level of FIS & FIRM
- Must be legally enforceable
- Applied uniformly
- Take precedence over any less restrictive conflicting laws, ordinances, or codes
- WA Model ordinances available - not mandatory
- Address requirements of Section 60.3 of the NFIP regulations
- Can be administered via ICC (caveat)

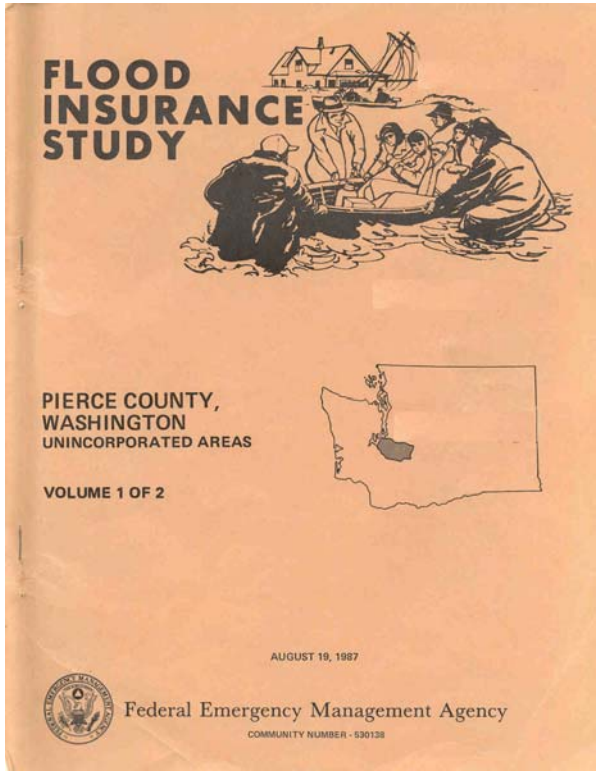
Who Benefits From NFIP?

Other beneficiaries include:

- Risk Managers & Hazard Mitigation Planners
- Emergency Responders

Preliminary FIS: Sept 28, 2007

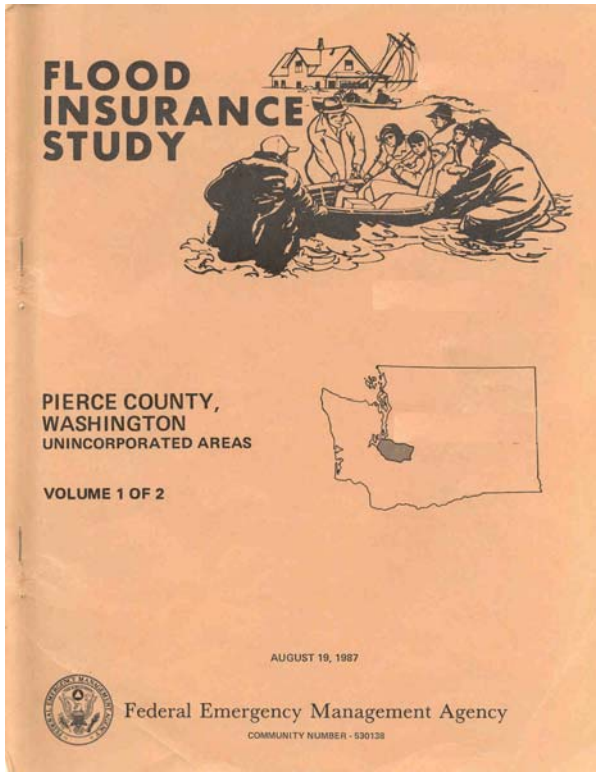
Purpose of Flood Insurance Study



- 1968 law requires FEMA to identify the nation's floodplains and establish flood risk zones
- Set insurance rates for insurance purposes
- Establishes SFHA for lender requirements
- Gives communities data on which to enforce the FPM ordinances required in the NFIP
- Converts the community to the Regular Program

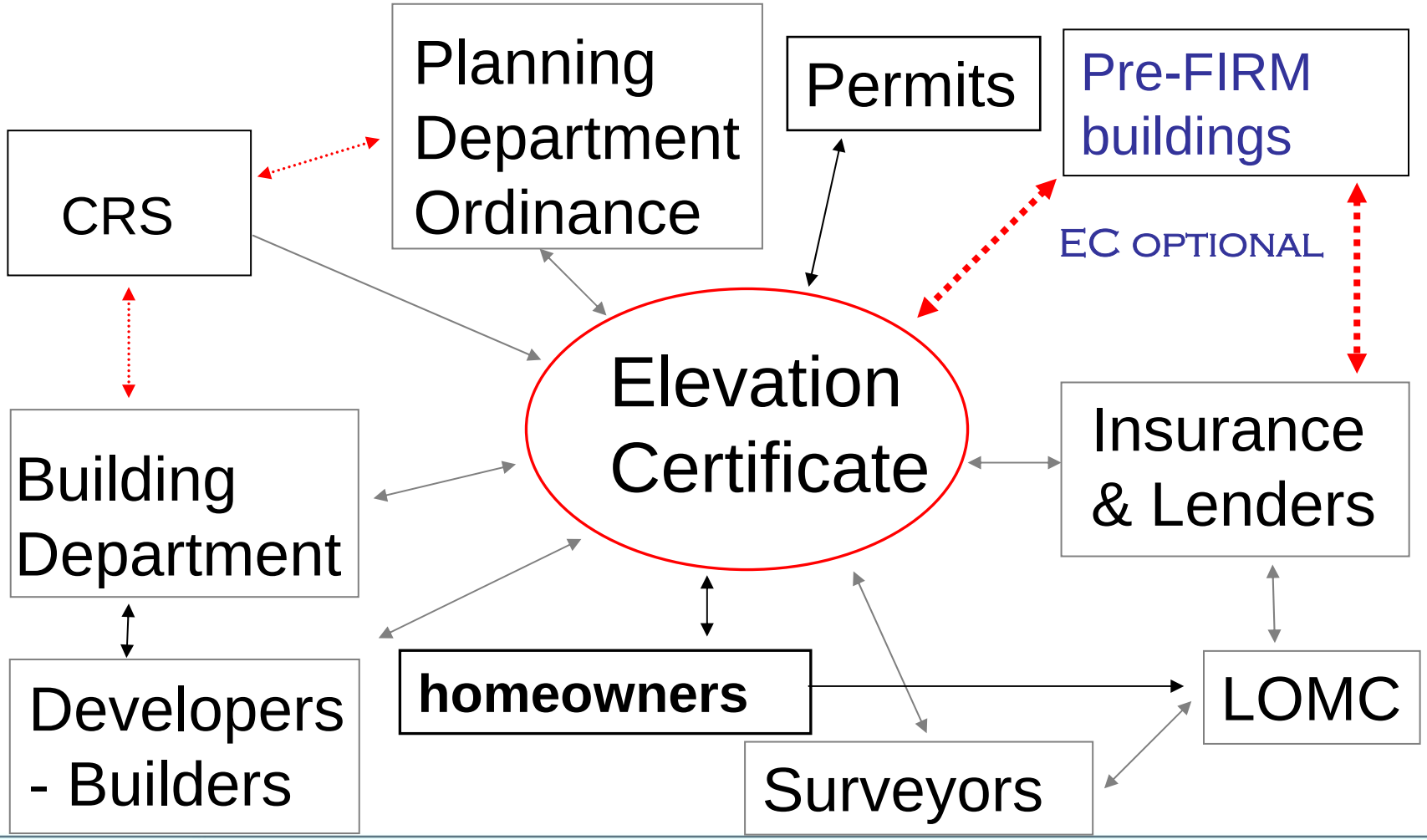
Preliminary FIS: Sept 28, 2007

Flood Insurance Study (FIS) products



- narrative report of study
- stream profiles for 10, 50 100, 500-yr floods
- Most accurate BFE:
  FIRM is estimated BFE!
- Engineering methods used
- floodway data table contains the BFE within .1’
- Elevations govern over zone!

Floodplain Management



King County FIS Details: Snoqualmie Valley

FEMA & NHC

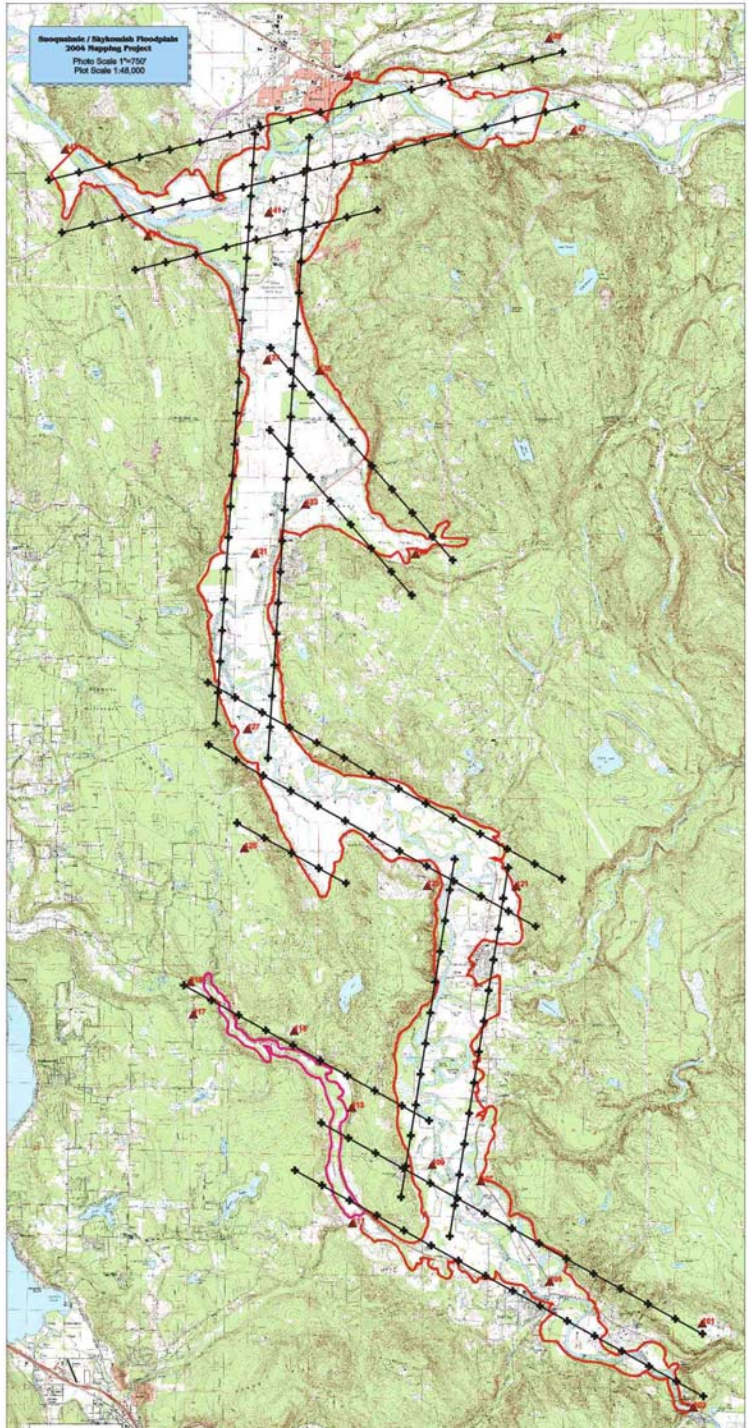
What's new

Flood Insurance Study

- Work done in partnership between FEMA and others…
- FEMA funded
- King and Snohomish County participation
- NHC conducted the analysis…

Key Technical Tasks

- New Bathymetric (Channel) surveys
- New Aerial Photography
- New Topographic Mapping
- Hydrologic Analysis
- Hydraulic Modeling
- Flood Inundation Mapping
- Study Reporting

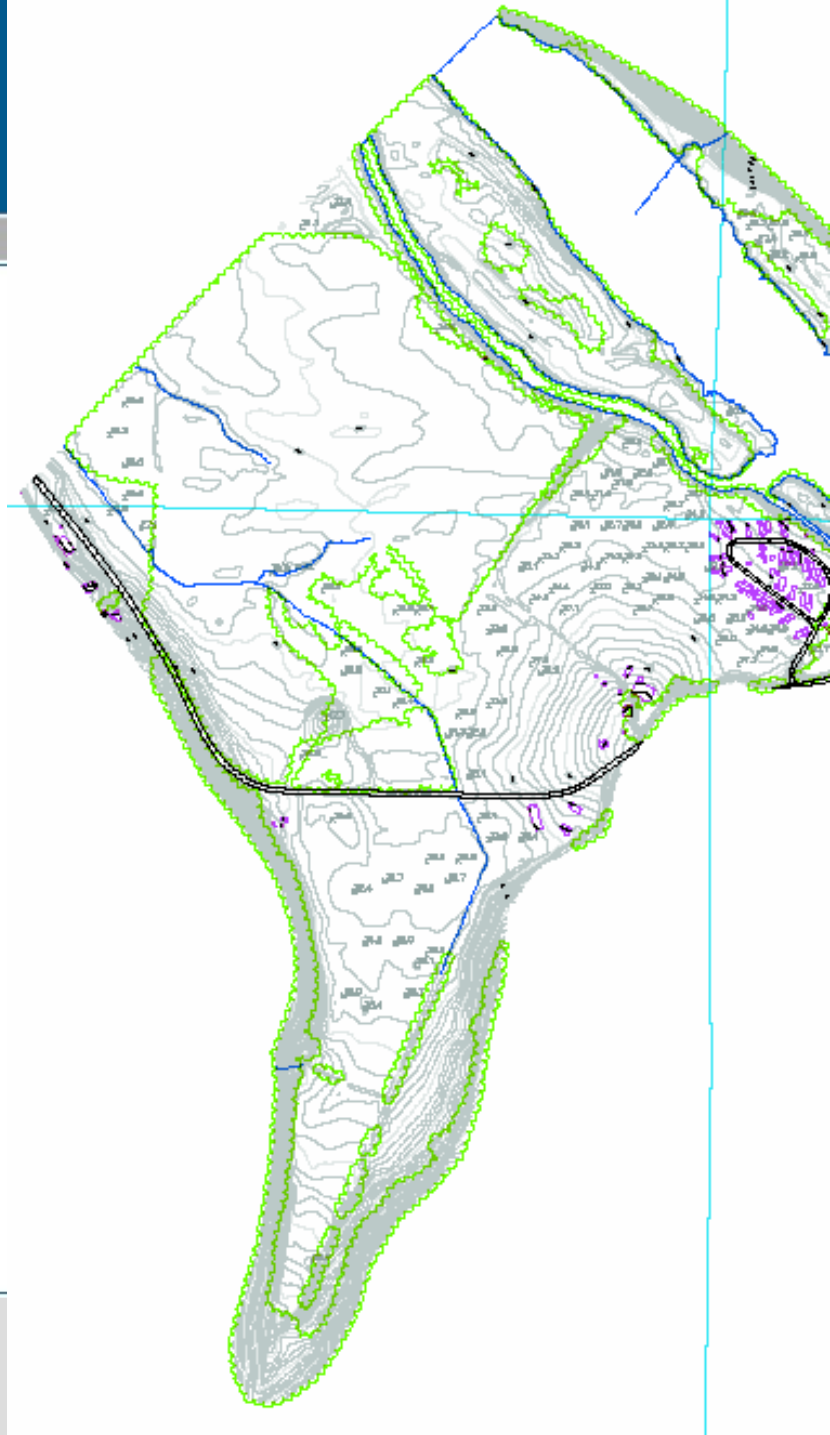


New Bathymetric Surveys

- Lower 40 Miles of Snoqualmie River
- Lower 10 Miles of Skykomish River
- Surveyed from boat using GPS and depth sounding equipment
- 250 cross sections surveyed including resurvey of those from previous FIS
- 9 detailed bathymetric survey areas (deltas and scour holes)

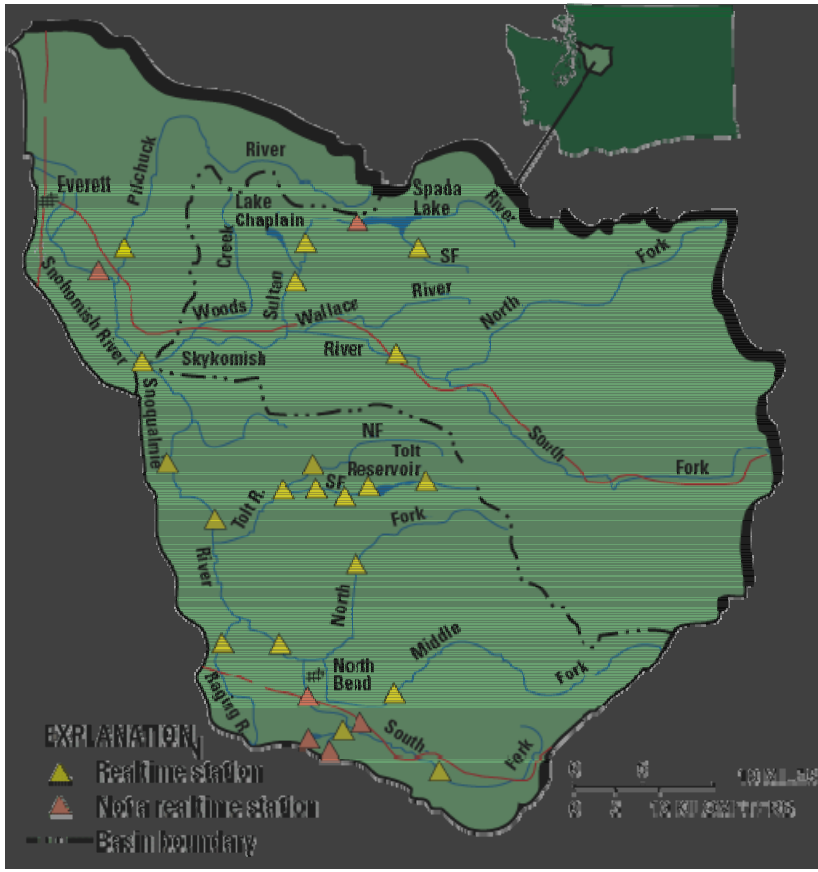
Topographic Mapping

- New Aerial Photography flown in March 2004
- Combined Photogrammetric data with LiDAR data
- Developed new 2-foot contour mapping for over 50 miles of river corridor
- Base maps produced at 1” = 500 foot scale



Hydrologic Analysis

- Used available USGS gage data at study boundaries including upstream Snoqualmie River, Skykomish River, Tolt River, Sultan River, and Raging River
- Infilled data by gage transposition or hydrologic modeling
- Focused on 1965 – 2003 period
- Adjusted discharges to account for:
  - SF Tolt Reservoir
  - Spada Lake
  - Snoqualmie 205 Project

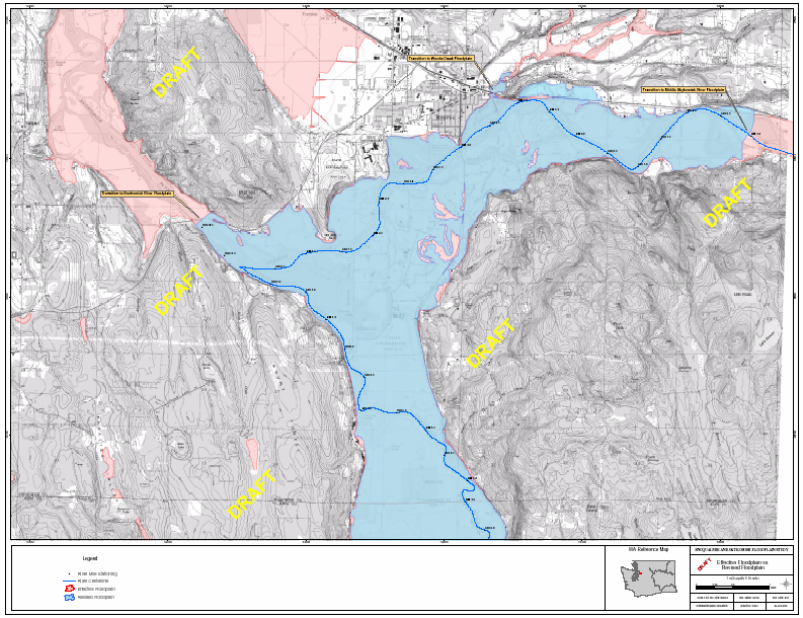


Hydraulic Modeling and Analysis

- Used other Study Products as Input (e.g. cross sections, topography, hydrology)
- Unsteady Flow Modeling using U.S. Army Corps of Engineers HEC-RAS Model
- No certified levees in Study area
- Calibration to 5 historic flood events
- Simulation of 11 additional historic flood events
- Development of 10-, 50-, 100-, and 500-year models
- Used 100-year model to develop floodway

Flood Inundation Mapping

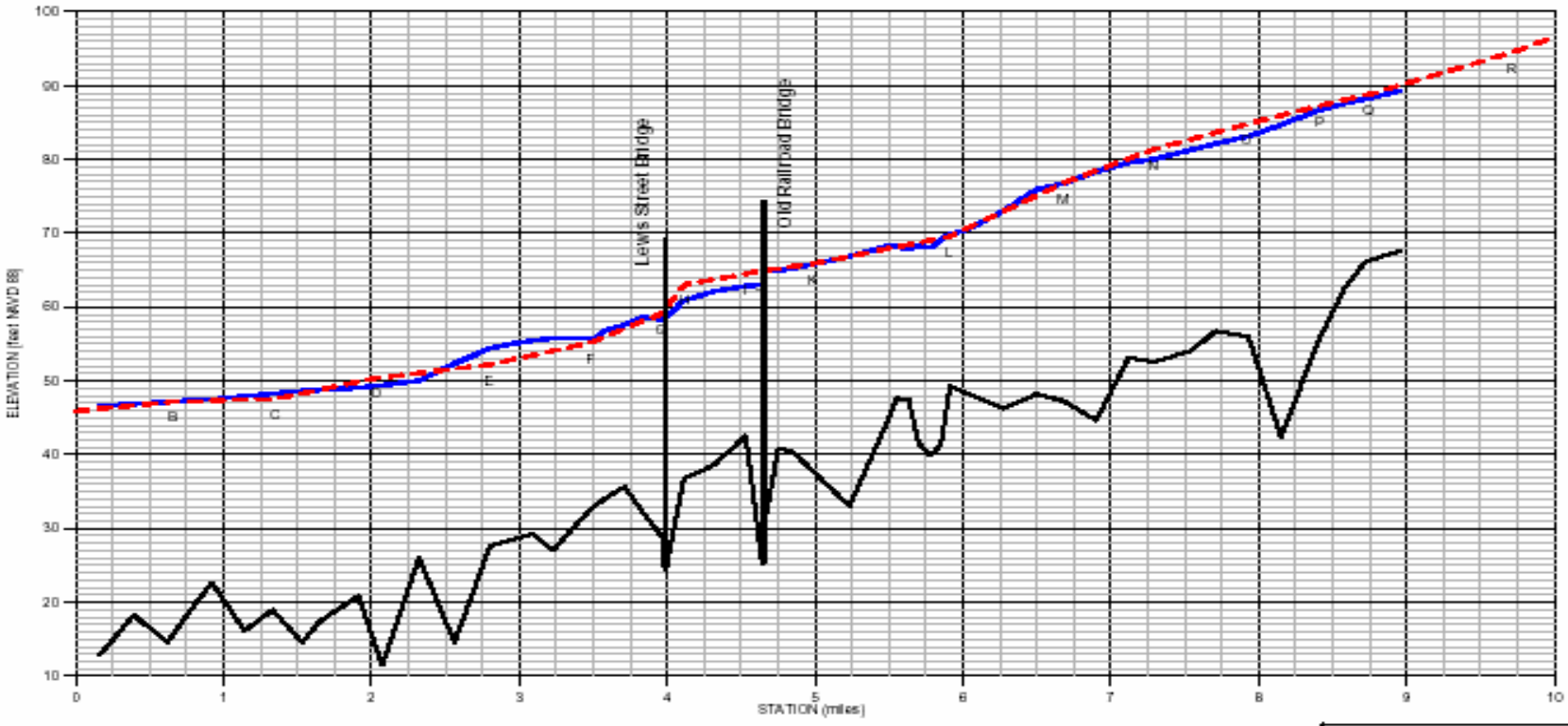
- Transferred data from hydraulic model to topo map
- Developed Base Flood Elevations (BFEs)
- Mapped 100-year and 500-year inundation limits
- Plotted flood profiles for 10-, 50-, 100-, and 500-year events
- Mapped new floodway
- Note: FEMA will blend data at all study limits with previous studies



Study Documentation

- Reviews Completed by FEMA's Regional Map Coordinator
  - Topographic Mapping
  - Hydrologic and Hydraulic Modeling Approach
  - Hydrologic Analysis
  - Hydraulic Model
  - Inundation Mapping
- Study documentation submitted during early 2006
- FEMA reviews completed in July 2006
- Study results incorporated into draft DFIRM by FEMA
- nhc reviewed draft DFIRM and provided comments to FEMA

Study Results - Profiles



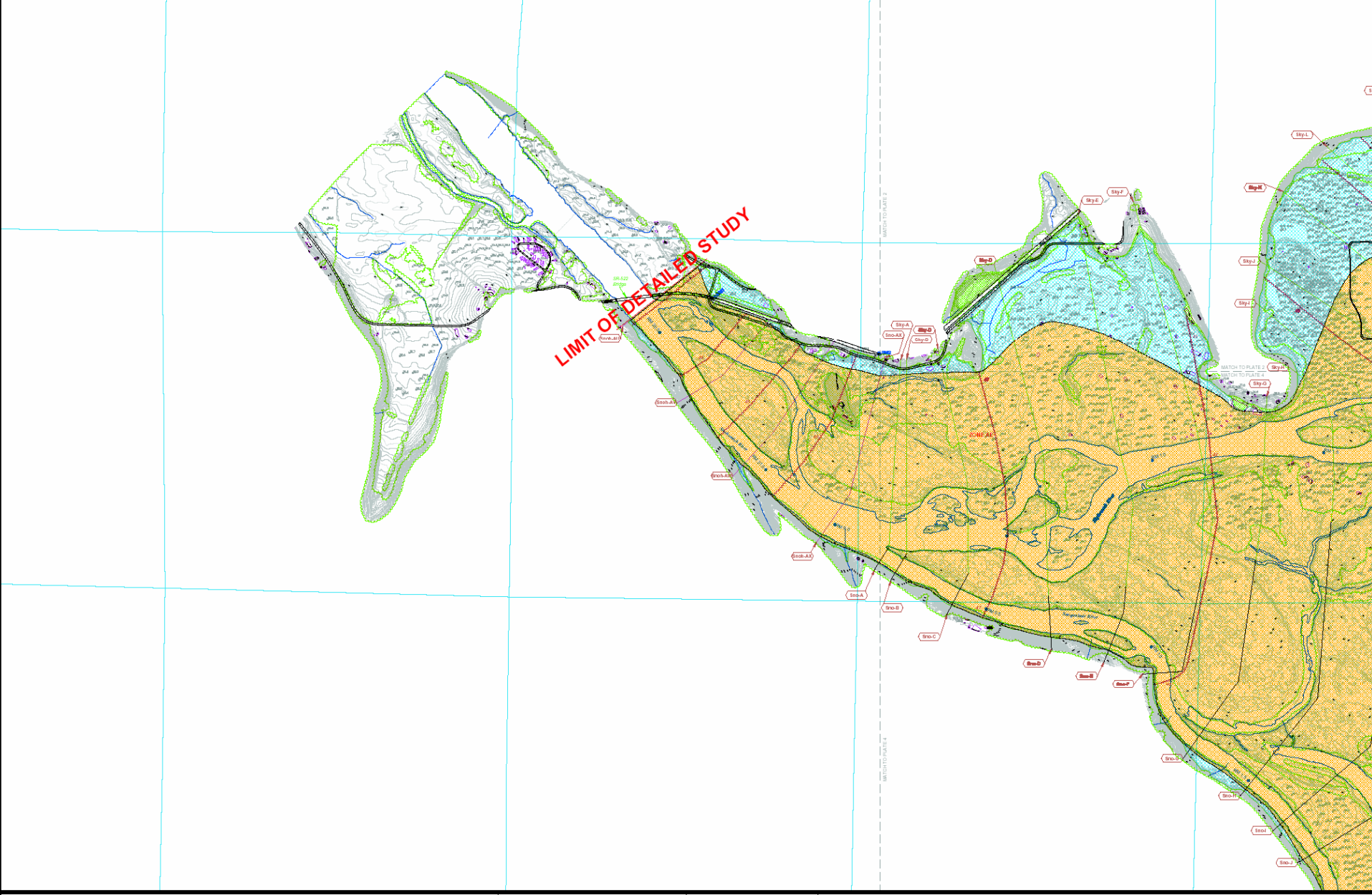
NOTE:
1. River station based on RM 0 at the confluence of the Snoqualmie and Skykomish Rivers.

Revised 100-year Profile
Effective 100-year Profile
Current Thalweg

SNOQUALMIE AND SKYKOMISH RIVERS FLOODPLAIN STUDY

SKYKOMISH RIVER EFFECTIVE vs. REVISED 100-YEAR PROFILE

northwest hydraulic consultants



Legend

- Major Contours - 10 foot
- Minor Contours - 2 foot
- 33.1 Spot Elevations
- Vegetation Lines
- Ground Not Visible
- Corporate Boundary
- RM 3.5 River Mile Marker and Number
- Railroad
- PLSS Grid
- BM 57 Elevation Reference Mark and Number
- Structures
- Edge of Water
- Matchlines
- 100-year Floodplain Boundary
- 500-year Floodplain Boundary
- Floodway Boundary
- Base Flood Elevation
- Sno-A Cross-Section (color varies by river reach)

Elevation Reference Mark Information

Name	Elevation	Description
BM1	66.65	CP-WSDOT-3241
BM2	71.98	CP-WSDOT-3242

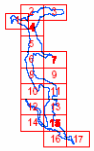
This map has been photogrammetrically compiled from 1"=750' scale, 152.882 mm C.F.L. aerial photos to meet National Standard for Spatial Data Accuracy (NSSDA) at a map scale of 1"=200' or 1:2400. Publication or use at any larger scale will void any implied or stipulated accuracy standards. This map has not been verified by field checks. Note: Field verification of map accuracy should occur prior to design level tasks that are dependant upon this map. Areas within dense vegetation are indicted by dashed contour lines, accuracy within these areas may vary in accordance with NSSDA standards.

Topography created by 3DI West of Eugene, Oregon
Topography based upon March 2004 Aerial Photographs (Bergman Photogrammetric Services), Ground and Bathymetric Surveys (Minister-Glaeser Surveying), AGPS control (Orion GPS), and LIDAR data (Puget Sound LIDAR Consortium, King County Dept of Transportation, Snohomish County Dept. of Public Works).

Contour Interval: 2 ft (contours generated from photogrammetry in King Co. and LIDAR and photogrammetry in Snohomish County)

Vertical Datum: NAVD 88, Horizontal Datum: HPGN (NAD 1983/1991)
Coordinate System: State Plane Washington North - feet
Datum Conversion Equation: NGVD29 = NAVD88 - 3.49'

Sheet Index



N

Scale: 1" = 500'

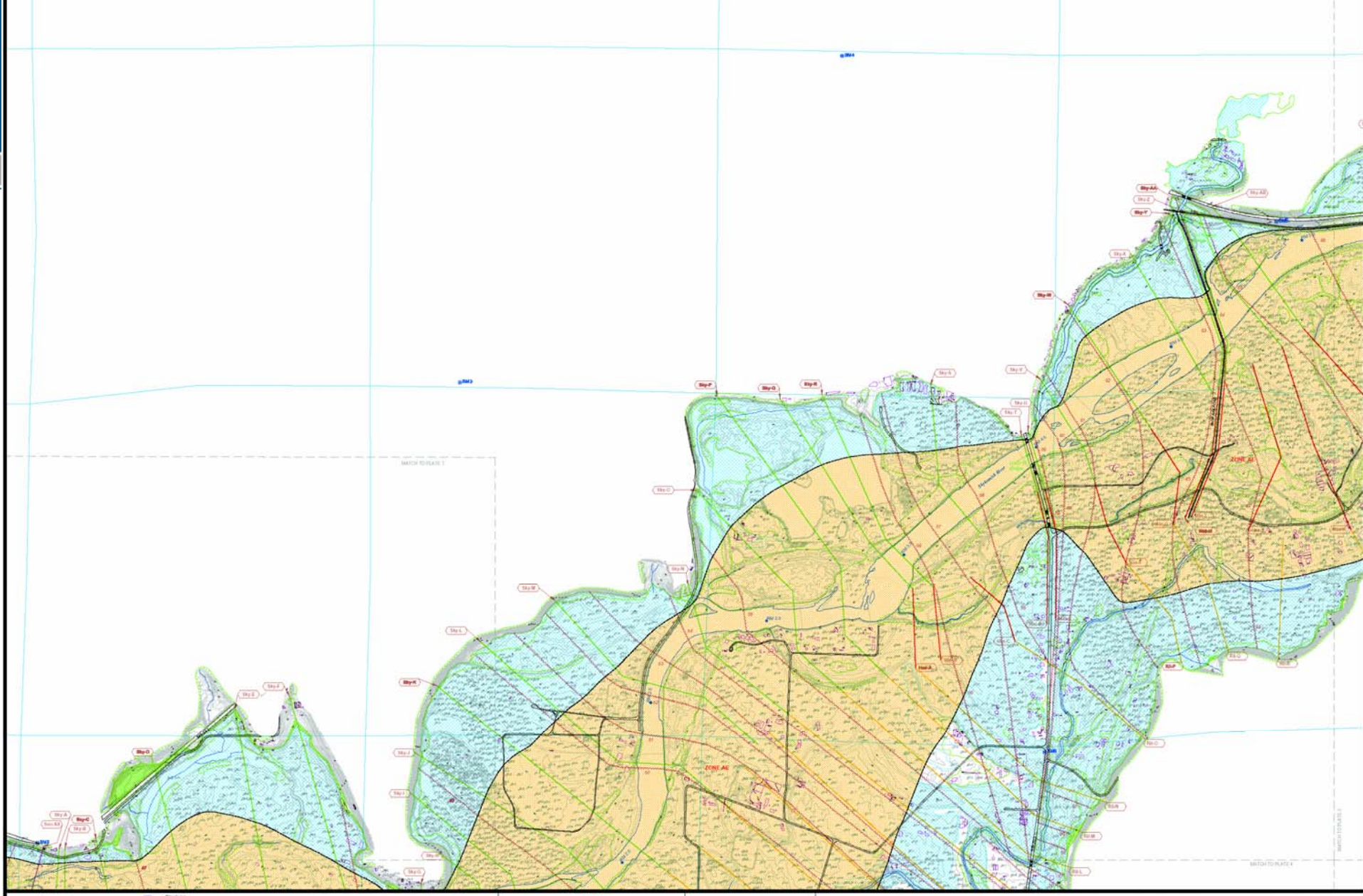
Lower Snoqualmie & Skykomish Rivers Work Map
King & Snohomish Counties, Washington

northwest hydraulic consultants inc.
16300 Christensen Road, Suite 350
Seattle, WA 98188
206-241-6000

Prepared for King County Department of Natural Resources and Parks, and Snohomish County Department of Public Works

Date: 3/23/2006

Plate 12.1



Legend

- Major Contours - 10 foot
- Minor Contours - 2 foot
- Spot Elevations
- Vegetation Lines
- Ground Not Visible
- Corporate Boundary
- River Mile Marker and Number
- Railroad
- PLSS Grid
- Elevation Reference Mark and Number
- Structures
- Edge of Water
- Matchlines
- 100 year Floodplain Boundary
- 500 year Floodplain Boundary
- Floodway Boundary
- Base Flood Elevation
- Cross-Section (color varies by river reach)

Elevation Reference Mark Information

Name	Elevation	Description
BM2	71.98	CP-WSDOT-3242
BM3	71.10	CP-WSDOT-3244
BM4	89.67	CP-WSDOT-1169
BM5	114.38	CP-WSDOT-2424
BM6	56.58	CP-WSDOT-3212

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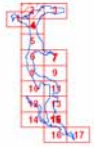
Contour Interval: 2 ft (contours generated from photogrammetry in King Co. and LIDAR and photogrammetry in Snohomish County)

Vertical Datum: NAVD 88, Horizontal Datum: HPGN (NAD 1983/1991)
Coordinate System: State Plane Washington North - feet
Datum Conversion Equation: NGVD29 = NAVD88 - 3.67

Sheet Index



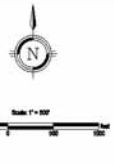


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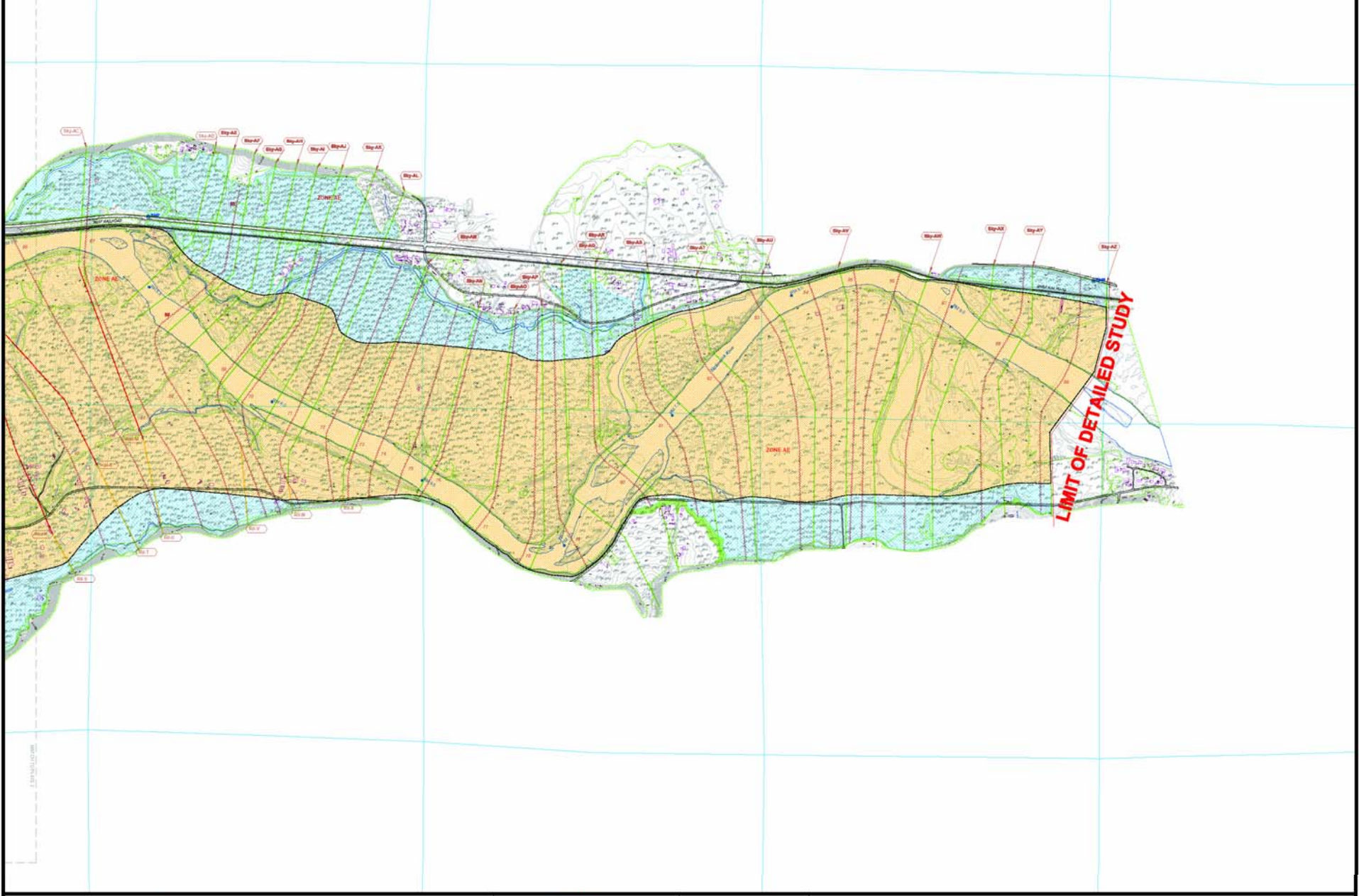
Plate 12.2



Legend

- Major Contours - 10 foot
- Minor Contours - 2 foot
- Spot Elevations
- Vegetation Lines
- Ground Not Visible
- Corporate Boundary
- River Mile Marker and Number
- Railroad
- PLSS Grid
- Elevation Reference Mark and Number
- Structures
- Edge of Water
- Matchlines
- 100-year Floodplain Boundary
- 500-year Floodplain Boundary
- Floodway Boundary
- Base Flood Elevation
- Cross-Section (color varies by river reach)

Elevation Reference Mark Information:

Name	Elevation	Description
BM7	71.06	CP-WSDOT-2426
BM8	92.94	CP-WSDOT-3212

This map has been photogrammetrically compiled from 1"=700' scale, 152/852 mm C.F.L. aerial photos to meet National Standard for Spatial Data Accuracy (NSSDA) at a map scale of 1"=200' or 1:2400. Publication or use at any larger scale will void any implied or stipulated accuracy standards. This map has not been verified by field checks. Note: Field verification of map accuracy should occur prior to design level tasks that are dependent upon this map. Areas within dense vegetation are indicted by dashed contour lines, accuracy within these areas may vary in accordance with NSSDA standards.

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Coordinate System: State Plane Washington North - feet
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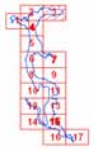
Sheet Index



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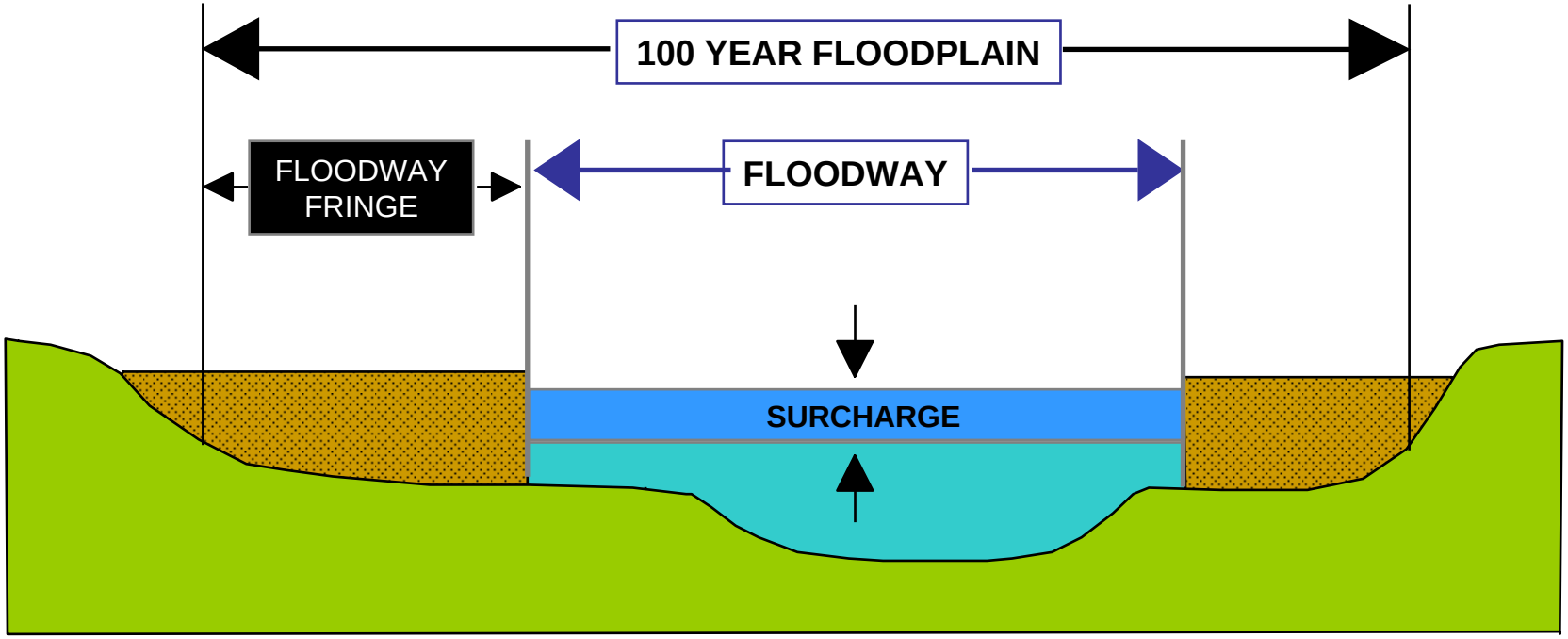
Date: 3/23/2006

Plate 12.3

FLOODWAY SCHEMATIC



FLOODWAY + FLOODWAY FRINGE = 100 YEAR FLOODPLAIN
SURCHARGE NOT TO EXCEED 1.0 FEET

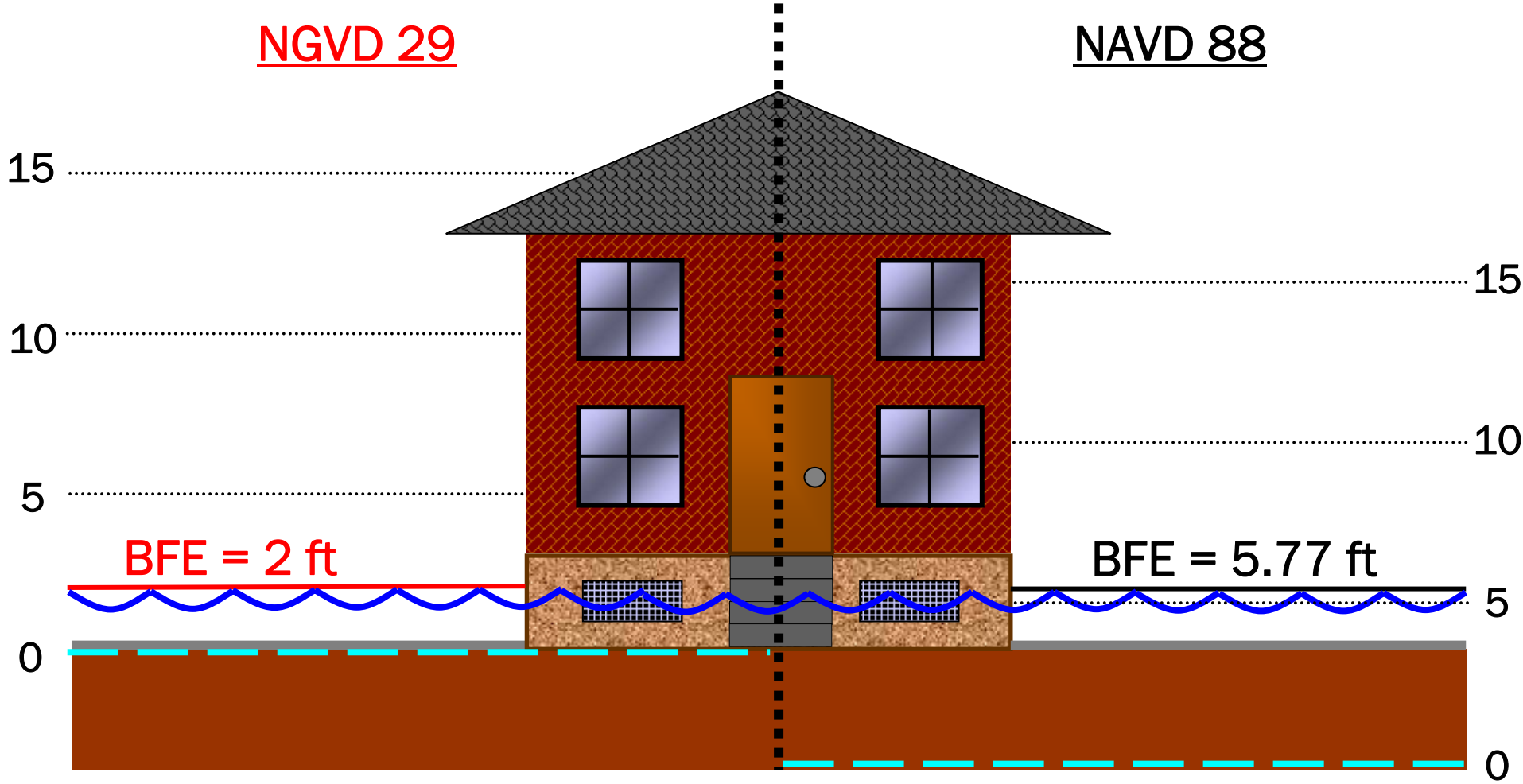
What's new

Vertical Datum Change

- **NGVD 29**
  - **Based on a mean sea level from 21 tidal stations in the US & 5 stations in Canada**
- **NAVD 88**
  - **Based on the density of the Earth instead of varying values of sea heights**
  - **More accurate**
- **Conversion in Pierce County Varies**
  - **NGVD + (vertical adjustment') = NAVD**
  - **See page 59 of Preliminary FIS**

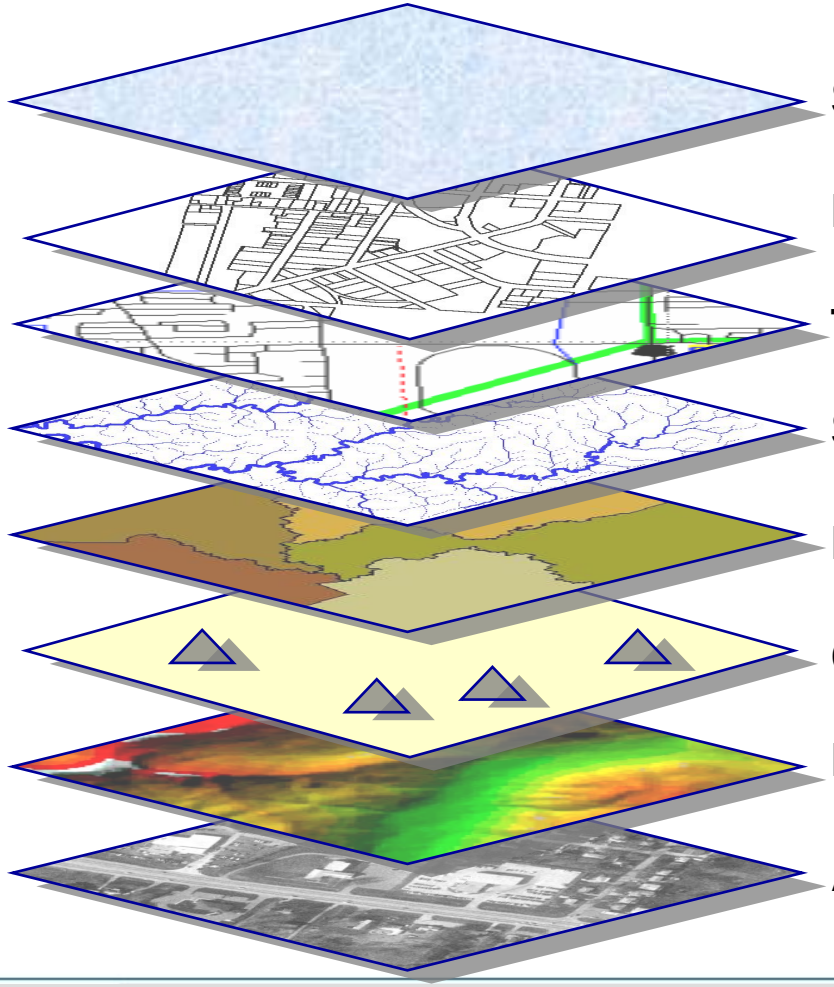
Digital Flood Insurance Rate Maps

Vertical Datum and FIRMs (ex uses 3.77' conversion)



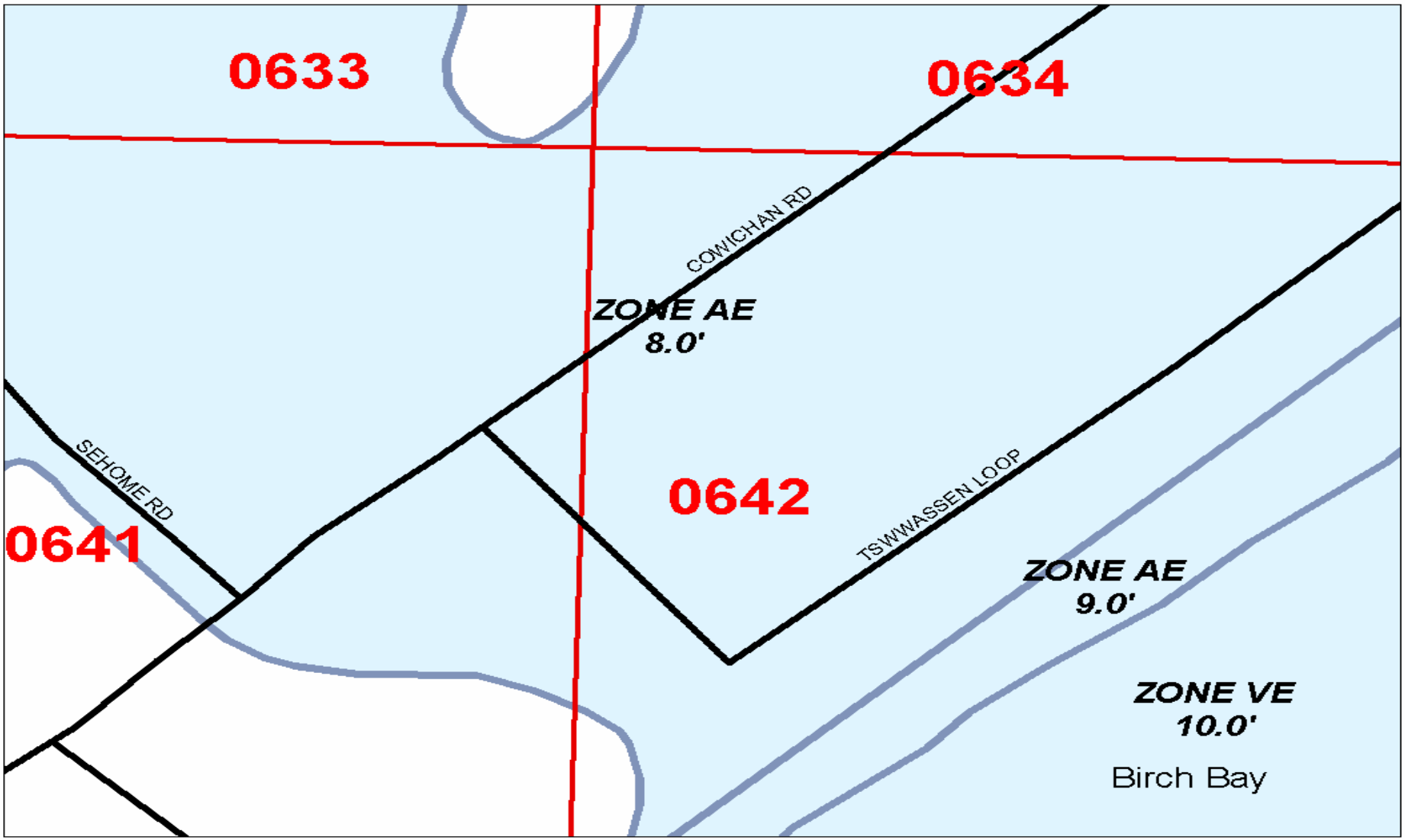
Digital Flood Insurance Rate Maps

Digital Format



Digital Flood Insurance Rate Maps

Digital Floodplain Data

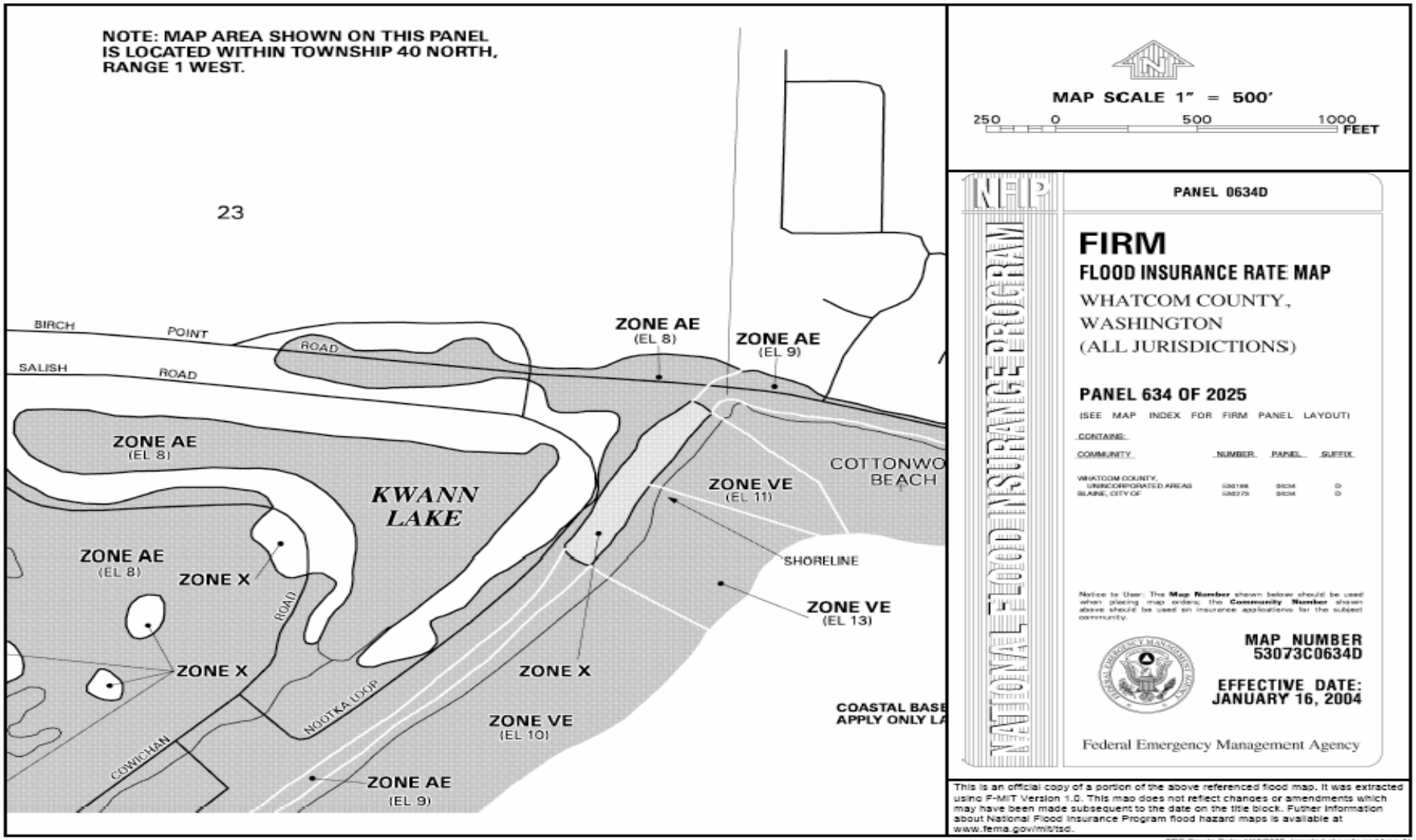


Digital Flood Insurance Rate Maps

Apply local parcel and topo layers…

Digital Flood Insurance Rate Maps

Paper Maps: "FIRMette" tool



Development

Means <u>any</u> man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, *filling,* grading, paving, excavation or drilling operations or storage of equipment or materials.

** Permits are required for all "development" in the floodplain.*

Substantial Damage

Substantial Damage: means damage <u>of any origin</u> sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

* Insured buildings that are SD may be eligible for an additional $30k in coverage to elevate, relocate, demolish, or floodproof (or any combination thereof)

Substantial Improvement

"Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the *market value* of the structure before the 'start of construction' of the improvement"

- ***RCW 86.16 prohibits SI in floodway***
- ***Full definition, see 44CFR59.1 or WA Model Ordinance Section 2.0***

Flood Insurance Ramifications

Unincorporated King County Facts

CRS Class 2 = 40% discount (as of October 2007)

- Participating in the regular phase of the NFIP since 9/29/1978
- 1965 policies with an average premium of $546 / year
  WA Average: $606 / year (avg savings in FP: $404)
- 628 historic claims paid or $11,733,464 policy payouts
- $433.6 million in insurance coverage
- 82 Repetitive loss buildings
- 8 Severe rep loss sites (insured building with 4+ losses)

Carnation Facts

- Participating in the regular phase of the NFIP since 3/4/1980
- 100 policies (includes UGA) with an average premium of $591 year
  WA Average: $606 year
- 15 historic claims paid
- $25.5 million in insurance coverage
- 2 Repetitive loss buildings
- 0 Severe rep loss sites (insured building with 4+ losses)

Duvall Facts

- Participating in the regular phase of the NFIP since 6/4/1980
- 5 policies with an average premium of $892 / year
  WA Average: $606 / year
- 2 historic claims paid totaling $11,719 in policy payouts
- $1.3 million in insurance coverage
- 0 Repetitive loss buildings
- 0 Severe rep loss sites (insured building with 4+ losses)

Issaquah Facts

- CRS Class 5 - 25% discount
- Participating in the regular phase of the NFIP since 5/1/1980
- 225 policies with an average premium of $625 / year
  WA Average: $606 / year
- 95 historic claims paid with $2,206,278 in policy payouts
- $48.5 million in insurance coverage
- 22 Repetitive loss buildings
- 1 Severe rep loss sites (insured building with 4+ losses)

North Bend Facts

- CRS Class 6 – 20% discount
- Participating in the regular phase of the NFIP since 8/1/1984
- 531 policies with an average premium of $ 674 / year
  WA Average: $606 / year
- 45 historic claim paid with $707,627 in policy payouts
- $ 115.5 million in insurance coverage
- 1 Repetitive loss building
- 0 Severe rep loss sites (insured building with 4+ losses)

Redmond Facts

- Participating in the regular phase of the NFIP since 2/1/1979
- 562 policies with an average premium of $393 / year
  WA Average: $606 / year
- 4 historic claims paid totaling $21,524 in policy payouts
- $134.5 million in insurance coverage
- 0 Repetitive loss buildings
- 0 Severe rep loss sites (insured building with 4+ losses)

Sammamish Facts

- Participating in the regular phase of the NFIP since 5/25/2000
- 9 policies with an average premium of $644 / year
  WA Average: $606 / year
- 0 historic claims paid
- $2.9 million in insurance coverage
- 0 Repetitive loss buildings
- 0 Severe rep loss sites (insured building with 4+ losses)

Skykomish Facts

- Participating in the regular phase of the NFIP since 7/2/1981
- 36 policies with an average premium of $833 / year
  WA Average: $606 / year
- 16 historic claims paid totaling $299,849 policy payouts
- $5.6 million in insurance coverage
- 1 Repetitive loss building
- 0 Severe rep loss sites (insured building with 4+ losses)

Snoqualmie Facts

CRS Class 5 – 25% discount

- Participating in the regular phase of the NFIP since 7/5/1984
- 541 policies with an average premium of $764 / year
  WA Average: $606 / year
- 565 historic claims paid totaling $9,011,423 in policy payouts
- $102 million in insurance coverage
- 68 Repetitive loss buildings
- 1 Severe rep loss sites (insured building with 4+ losses)

Bank & Lender Responsibility

Flood insurance is required for all mortgage properties which fall under one of the following three criteria:

1. Federally-backed loan
2. Federally-regulated lending institution (FDIC)
3. Sold on secondary market through GSE

* Rates and mandatory purchase requirements are linked only to the "effective" maps, not the preliminary maps

Flood Insurance Rates

2007 Post FIRM Residential Rates ($100k)

3 ft above BFE = $196

2 ft above BFE = $261

1 ft above BFE = $411

0 ft at BFE = $741

-1 ft below BFE = $2,296

-2 ft below BFE = $2,535

-3 ft below BFE = $2,825

-5 ft below BFE = $5,500

Flood Insurance and Preliminary Maps

- Flood insurance policies for new structures in Zone A that are rated using preliminary BFE data from a will often qualify for significantly lower insurance rates than policies that are rated without a BFE.

- *Conversely*…New structures built to a proposed BFE that is <u>lower than the</u> <u>effective</u> BFE may result in a significantly higher flood insurance rate and should not be permitted.

Flood Insurance and Preliminary Maps

- Policies are rated based on the maps in effect at the start of construction
- If a community uses preliminary BFEs, the flood insurance rate is still based on the FIRM in <u>effect on the date of construction</u>.
  - However…If the new maps indicate a more favorable rate, the policy holder will benefit from the lesser rate when the maps become effective.

Flood Insurance

Grandfathering Rate Require Documentation

- To recognize policy holders who have built in compliance and have maintained a continuous and current flood insurance policy, FEMA will allow the policy holder to continue to benefit from the original rating of that building.
- Policies are transferable from one owner to another (e.g. due sale of property)
- Owner has the option of using the updated maps as the rating criteria for that property or continuing to use the rate established based on the original (old) maps.

Or…

Flood Insurance

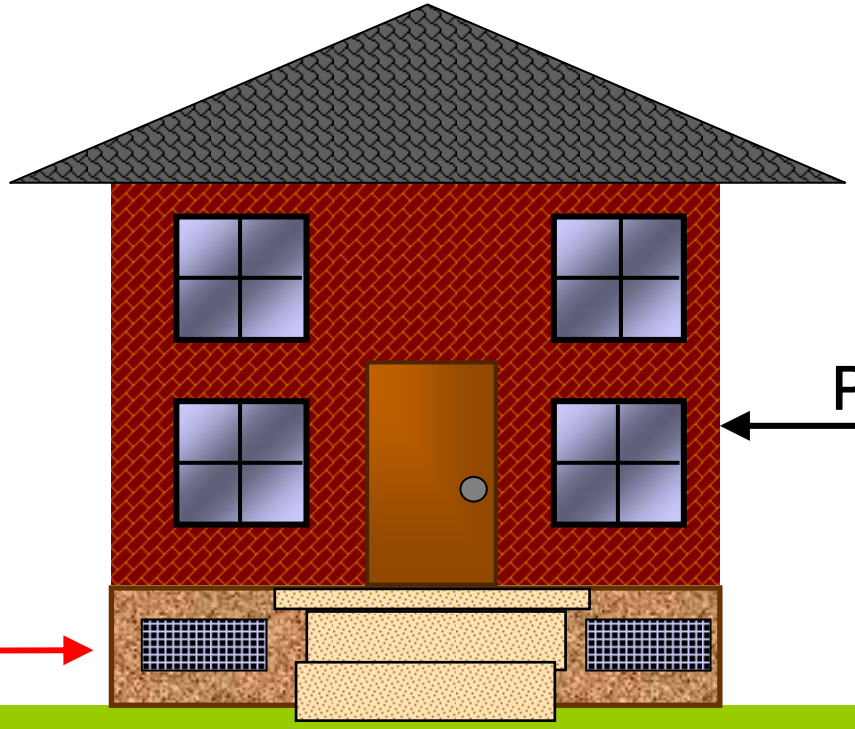
Grandfathering Rate Require Documentation

A policy holder can provide sufficient documentation

- The date of the FIRM in effect when building was constructed
- The flood zone from that FIRM in which the property is located
- The Base Flood Elevation (BFE) for that zone (if applicable)
- A copy of the map panel showing the location of the building
- The rating element that is to be grandfathered (rate or zone).
  - Evidence supporting the rating element includes documents such as Elevation Certificates.
  - A letter from the community official verifying this information also is acceptable, as long as the above information is provided.

Grandfathering

2007 – Existing, Compliant, Post-FIRM Structure



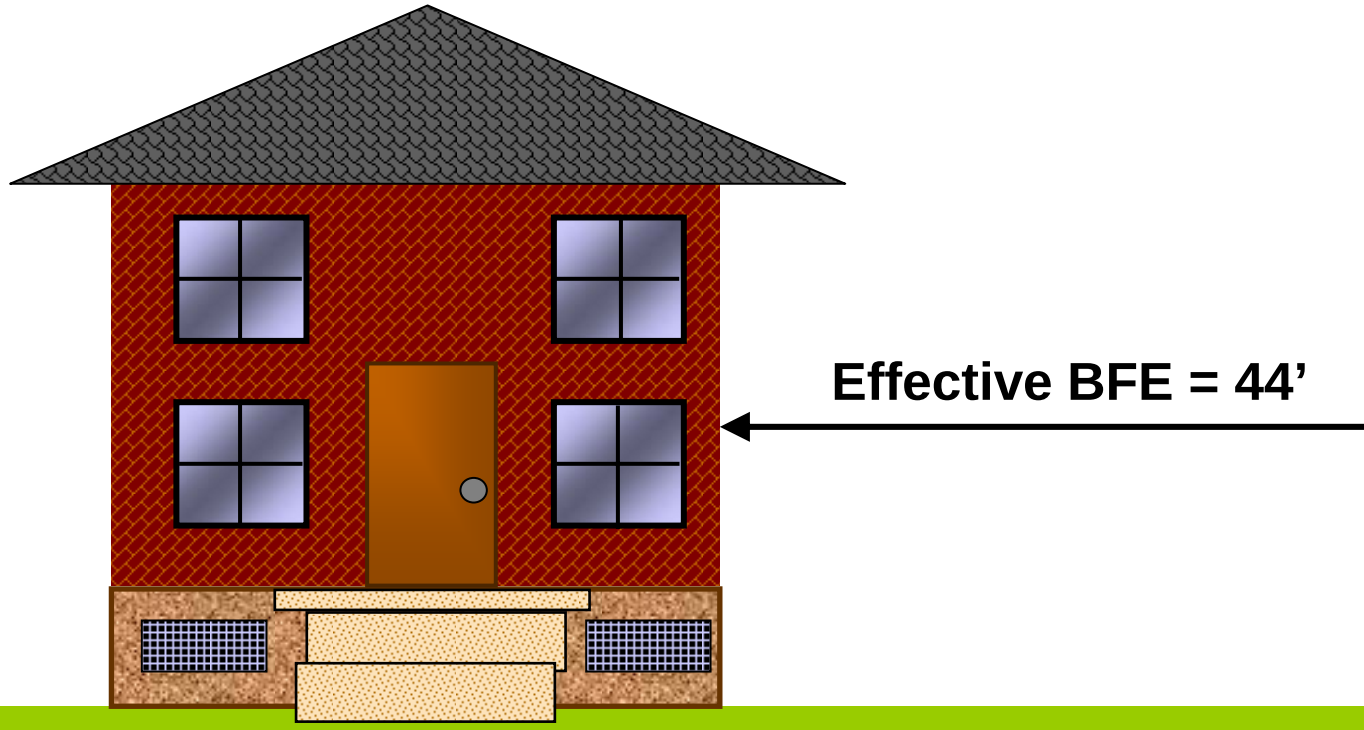
Prelim BFE = 44’

Current Effective
BFE = 39’

Annual premium: ~$411 (BFE +1’ rate)
for $100,000 insurance

Grandfathering

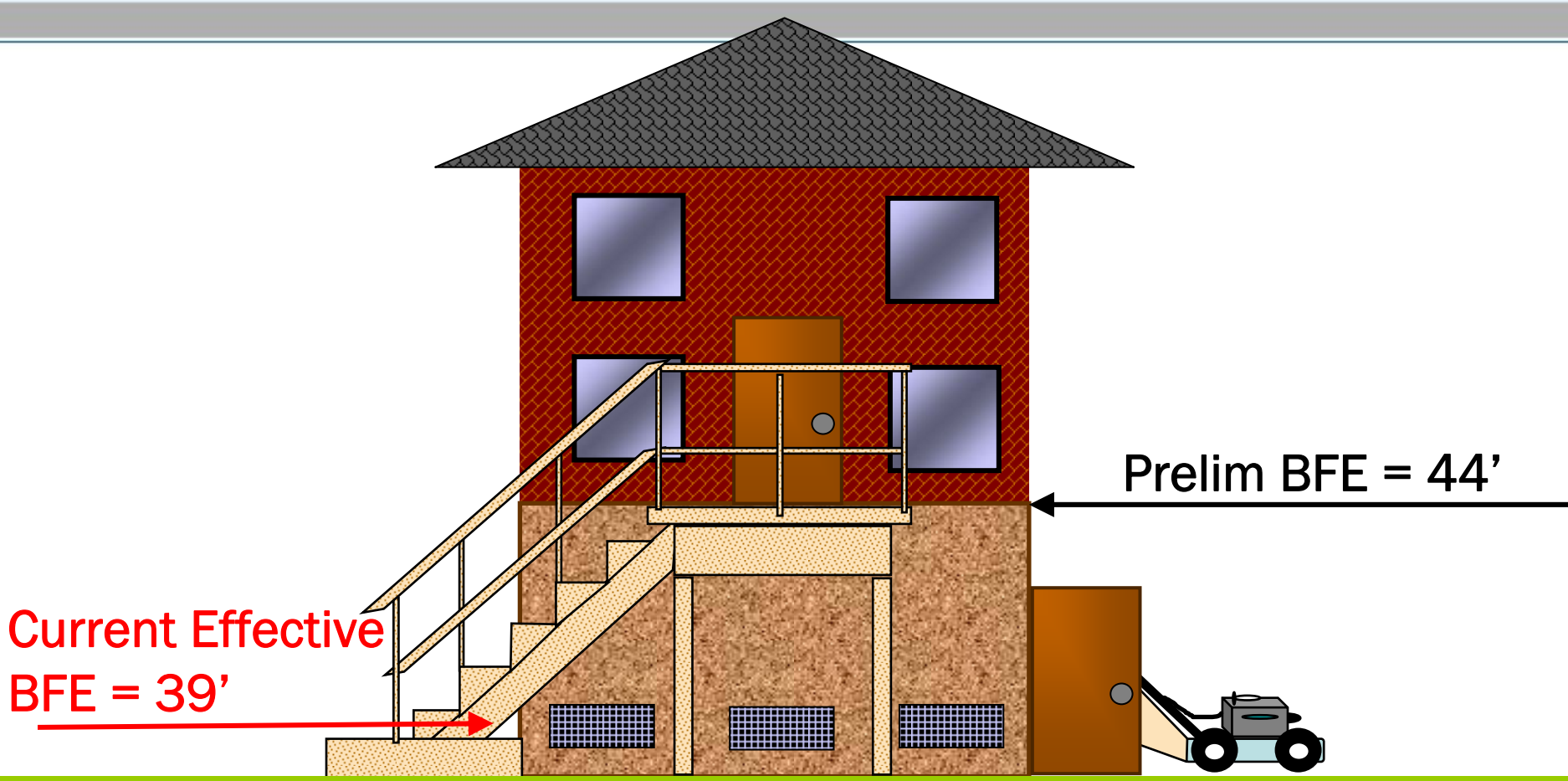
2007 – Existing, Compliant, Post-FIRM Structure: no changes



Grandfathered annual premium: ~$411 (retains BFE +1’ rate) for $100,000 insurance (unless substantially improved)

Grandfathering

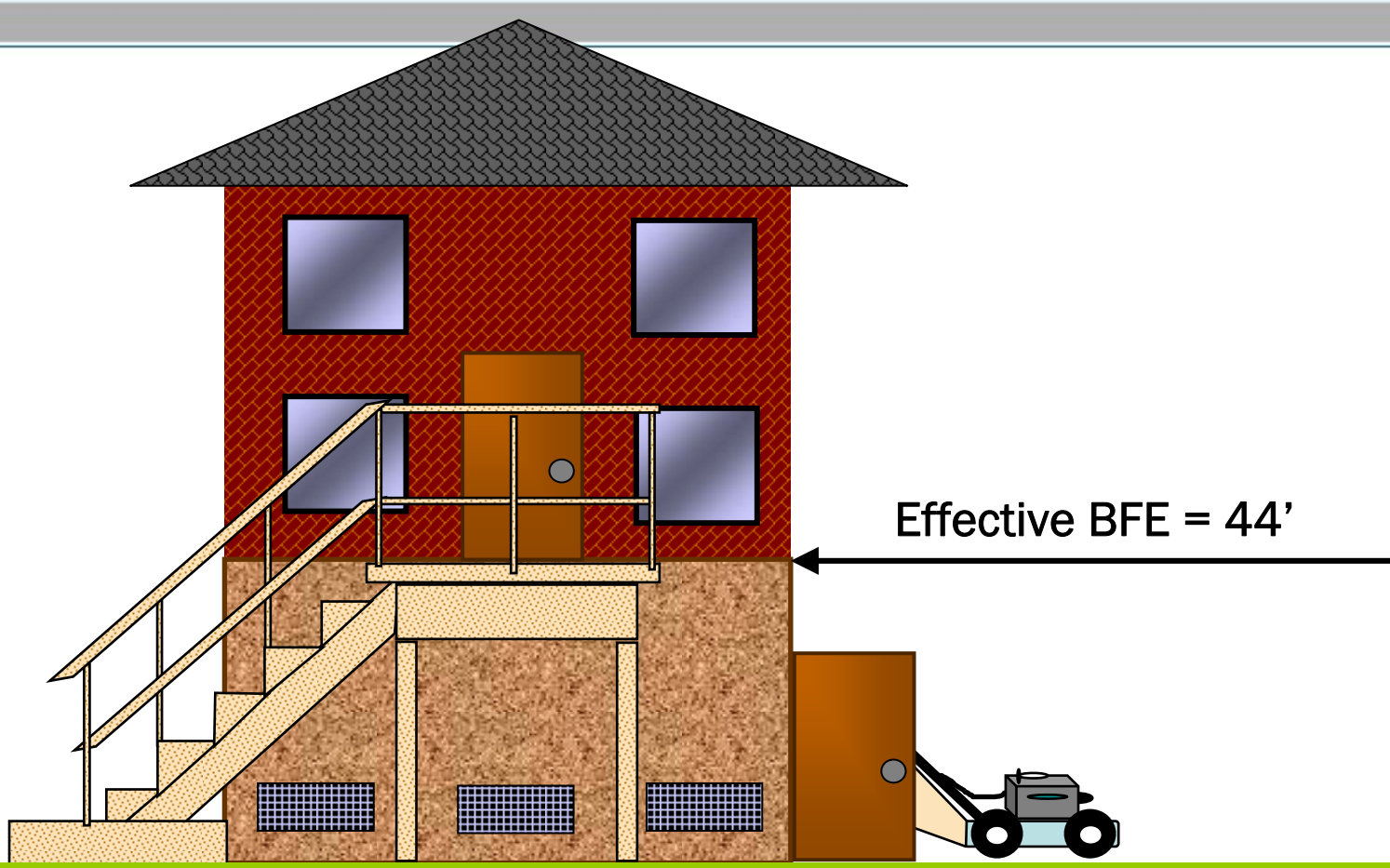
2007 – New construction or substantial improvement



Annual premium: $196 (BFE + 5’ rate)
for $100,000 insurance

Grandfathering

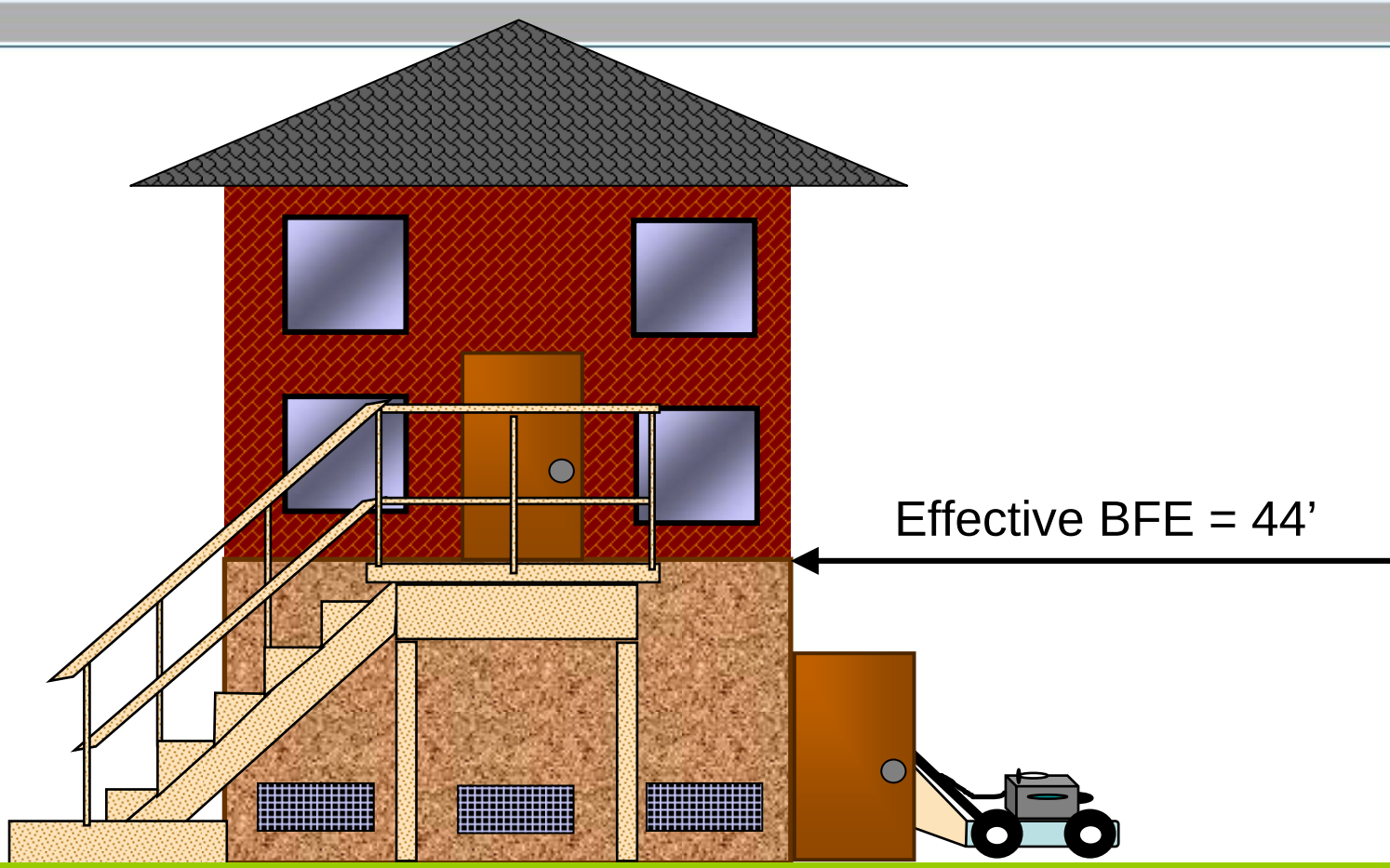
Future new construction or substantial improvement



Annual premium: $196 (retain BFE + 5’ rate)
for $100,000 insurance

Grandfathering

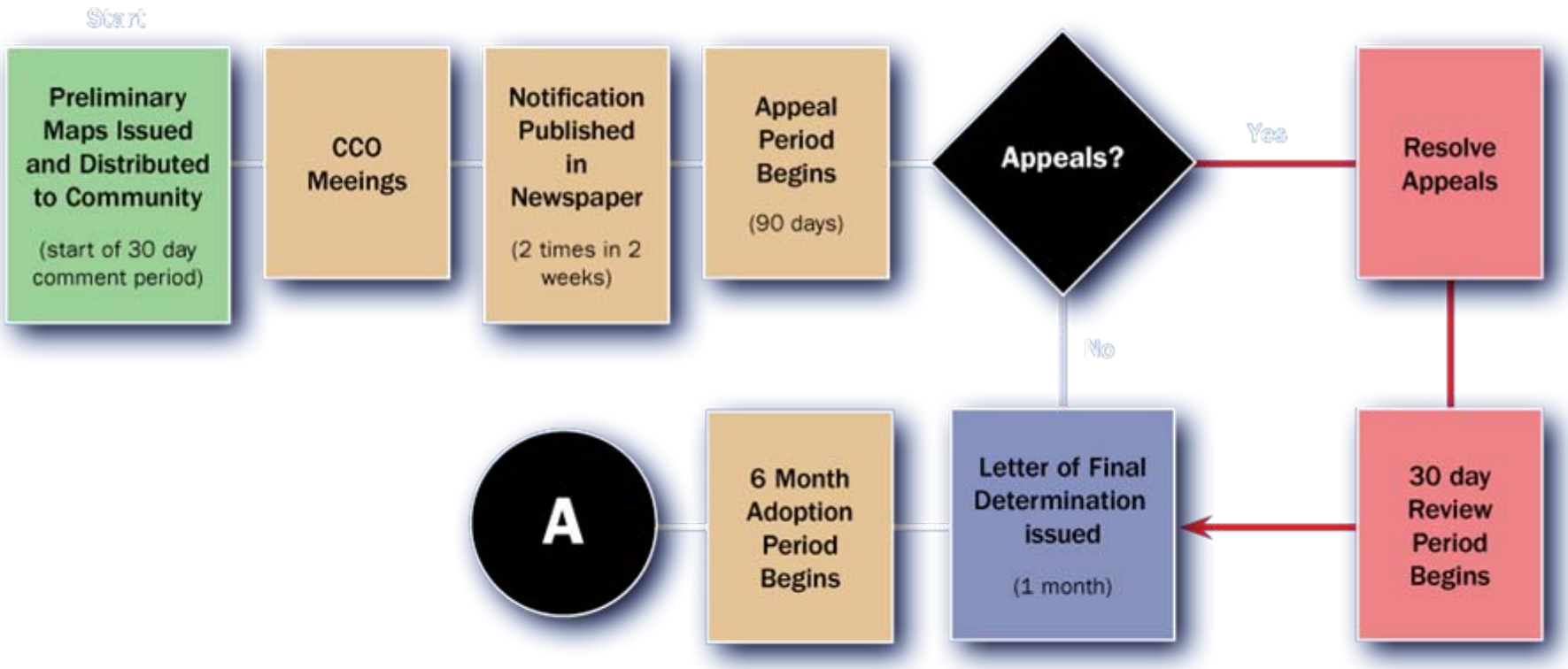
Future New construction or substantial improvement



No grandfathering annual premium: ~$741 (at BFE)
for $100,000 insurance

King County
Adoption Process

Adoption Process



Restudy Process

Timeline of events

- Preliminary maps issued – September 28, 2007
- Hold Final CCO meeting – Oct/Nov 2007
- 90 day appeal period begins after 2nd public notice in local newspaper – est. November 30, 2007
- 90-day appeal period ends – est. February 28, 2008
  - FEMA reviews submitted technical appeals and modifies or maintains maps as appropriate
- FEMA issues "Letter of Final Determination (LFD)" to communities and publishes the BFEs in the Federal Register – est. March 2008
  - Communities have 6 months to adopt the study before the data becomes "effective". *Failure to adopt results in suspension from NFIP*
- Effective date – est. September 2008

90 day Appeal Period

Appeals

- *"requests for changes to proposed BFEs"*
- *Must be based on scientific evidence demonstrating error*
- *<u>FEMA will not accept anecdotal information as the basis of a BFE change on a single lot</u>*

Protests

- *"requests that do not involve BFEs"*
- *hydrology*
- *floodplain boundaries*
- *corporate limits*
- *road locations*
- *road names*
- *etc.*

Letters of Map Change (LOMC) (ways to appeal at any time)

- **LOMA -** for property owners who believe a property was incorrectly included in a SFHA. An elevation certificate supports a LOMA, but by itself, does not remove the insurance requirement.
- **LOMR –** removes land that has been graded or filled (physical changes) since the date of the map. A LOMR can waive flood insurance requirements.

- **(LOMA) Hotline - 1-877-FEMA-MAP**

Next Steps

- Submit your appeal or protest to your community, or…

- Regional Management Center
  Attn: Debi Heiden
  710 Second Ave., Suite 1160
  Seattle, WA 98104

- **Send additional data requests to:**
  RMC10@mapmodteam.com

Questions & Comments

FEMA Region X **- Ryan Ike, CFM (425) 487-4767**
Ecology, NWRO – **Chuck Steele (425) 649-7139**
NFIP Insurance Questions - **Leslie Melville (425) 482-0316**

King County Flood Topics: www.metrokc.gov/dnrp/wlr/flood/dfirm

Flood Insurance Information:
www.floodsmart.gov

FAQs for Preliminary FIS usage:
www.fema.gov/plan/prevent/floodplain/fis_data.shtm#4

FAQs for residents living behind levees:
www.fema.gov/plan/prevent/fhm