



FEMA

FEMA Levee Flood Risk Mapping and LAMP – WV Floodplain Management Conference

June 11th, 2019

RiskMAP

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Topics To Be Covered

- Overview of Levee Study Process in the NFIP
- Accreditation
- Non-Accredited Levee Analysis and Mapping Procedure (LAMP)
- Provisional Levee Accreditation (PAL)
- State of the Levees: West Virginia Levee Status

Total # of levee systems:

- FEMA has 21 WV levee systems located in the database.
- These 21 systems will all have coordination with FEMA so that the true risk landward of the levees are reflected on the Flood Insurance Rate Maps.
- Many of the systems are along the Ohio River and Potomac River Branches.



**LEVEE ACCREDITATION STATUS
WEST VIRGINIA - REGION 3
AS OF 5/20/2019**

*ALL EXPIRED PALS (12 TOTAL) ARE SHOWN AS UNDER REVIEW
 SOURCES: FAST, NLD
 WV ORTHOIMAGERY NAIP 2016

Living with Levees – It's a Shared Responsibility

Community Officials

- Understand/communicate risks
- Planning - risk reduction and rapid recovery
- Work with levee owners pursuing certification, adopt O&M Plan

CTPs, States, Engineers, Surveyors

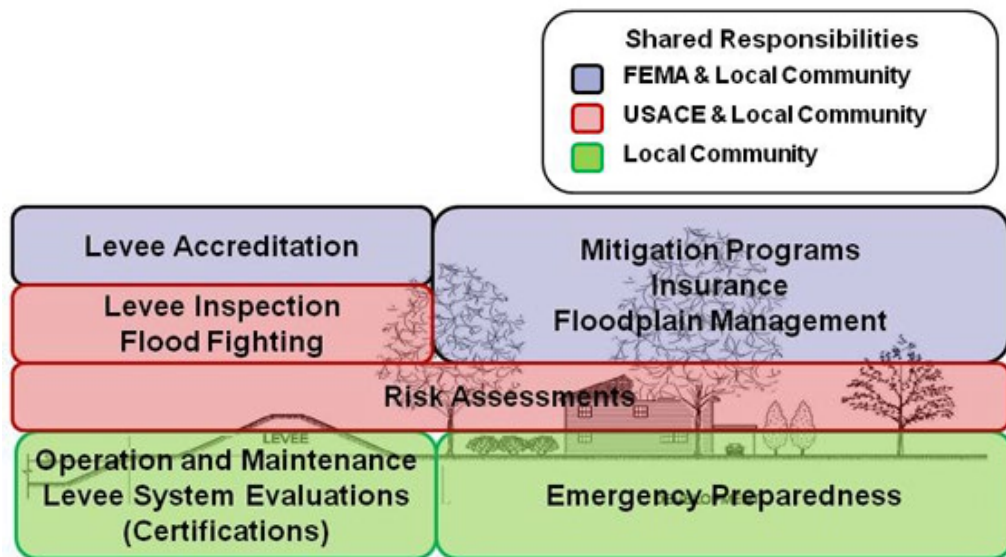
- Understand accreditation issues and levee mapping
- Work with FEMA and USACE to stay informed on levee issues

Others

- Levee owners
- Property owners
- Real Estate & Insurance Professionals
- All stakeholders have a responsibility!

Federal Agencies

- Coordinate efforts, where possible
- Coordinate with States toward development of a National Levee Safety Program
- FEMA determine accreditation per submitted certifications, map risk, etc.
- USACE administer Rehabilitation & Inspection Program (RIP), flood fighting , etc.



Certification/Accreditation

Certified Levee System

- Local community/Federal agency or levee owner has certified and provided all documentation to FEMA to show that the levee system that meets ALL the requirements of outlined by 44 CFR 65.10

Accredited Levee System

- FEMA has reviewed community certification package and has verified that levee system documentation meets ALL the requirements of outlined by 44 CFR 65.10; therefore, is shown on the Flood Insurance Rate Maps (FIRM) as providing protection from the base (one-percent-annual-chance) flood.

Non-Accredited Levee System

- Levee system that does not meet the requirements of 44 CFR 65.10; therefore, the levee system is shown on the FIRM as not providing protection from the one-percent-annual-chance flood.
- Reasons for non-accredited status include inadequate freeboard, lack of maintenance and/or operational plans, documented structural issues within system, or lack of documentation.

Overview of Potential Mapping of Levees on FIRM

- **Accreditation of Certified Levees**

- FIRM shows Zone X (shaded) with accreditation note
- Internal Drainage as Special Flood Hazard Area (SFHA)

- **Non-accredited Levees**

- Now use FEMA's Levee Analysis and Mapping Procedure (LAMP)
- FIRM shows Zone D, SFHA Zone AE, or a combination

- **Interim FIRM Mapping Options**

- FIRM shows levee as accredited for a limited period
- Must eventually move to either accredited or non-accredited levee mapping



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Accredited Levee Systems

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Governing Documents

- **Code of Federal Regulations (CFR)**
 - Title 44, Chapter 1, Section 65.10 (1968)
 - Mapping of Areas Protected by Levee Systems

- **Procedure Memorandum No. 63**
 - Guidance for Reviewing Levee Accreditation Submittals
 - Improves and clarifies the process of review for compliance with 44 CFR 65.10

Completeness Check Approach

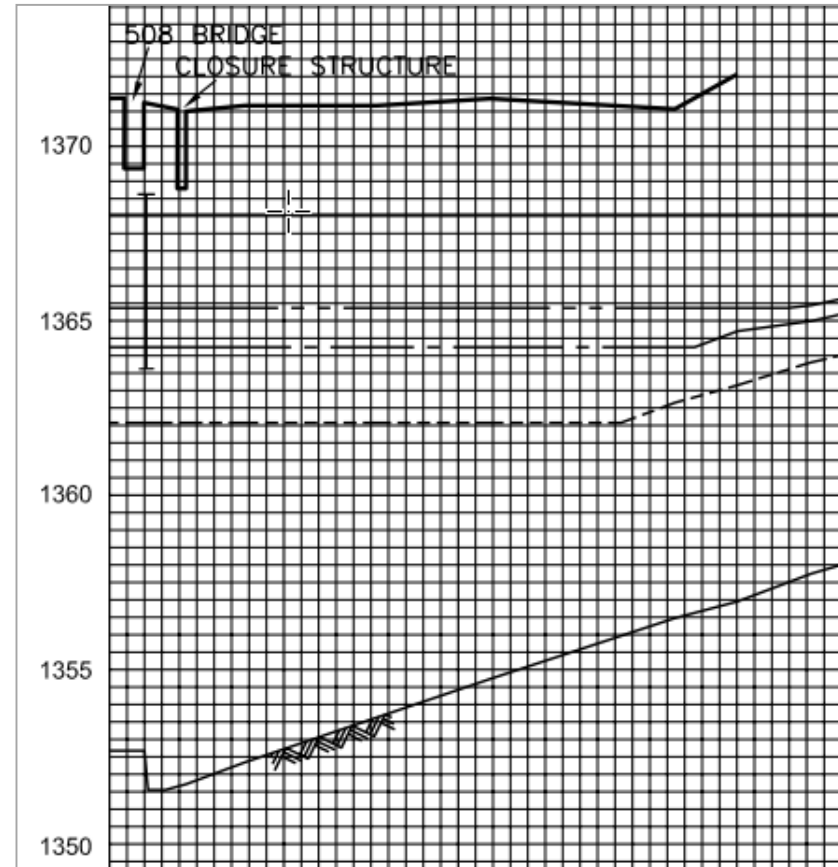
- Performed to ensure that all data demonstrating compliance with 44 CFR Section 65.10 is submitted, so FEMA can delineate the appropriate risk zones on NFIP maps.
- **Completeness Check is NOT:**
 - A technical review
 - An evaluation of design
 - Determination on how a levee will perform during a flood event
- **Submitted data must be certified by a P.E. or by a Federal agency with responsibility for levee design**
 - Back-up data and supporting information for all calculations must be submitted
 - Conflicting data may lead to a request for clarification and/or more in depth review

Step 1: Certification by a registered P.E.

- **The primary certifying engineer must state in writing that the levee meets all requirements of 44CFR 65.10.**
 - Individual components each need to be certified and this certification may come from different engineers (ex: geotech report, interior drainage)
- **No restriction on age of supporting documents**
 - Certifying engineer responsible to ensure it's still valid
 - Leverage existing documentation, including as-builts
- **Federal Agency (usually the USACE) may also certify a levee**

Step 2: Freeboard Check

- **Levee crest must be at least 3 feet above the 1% annual chance flood elevation**
 - Additional 1.0 foot within 100 feet in either side of structures (such as bridges) and flow constrictions.
 - Additional 0.5 foot at the upstream end of the levee
- **In certain circumstances, exceptions may be approved by FEMA when a minimum of 2-foot freeboard exits**
 - Uncertainty analysis required
 - Coordinate with FEMA prior to submittal of request
 - USACE risk based approach
- **Profile must be submitted**
- **Temporary structures or measures (i.e., sand bags) typically not used to meet freeboard, except:**
 - Sandbags may be used at closures if the invert is above the BFE



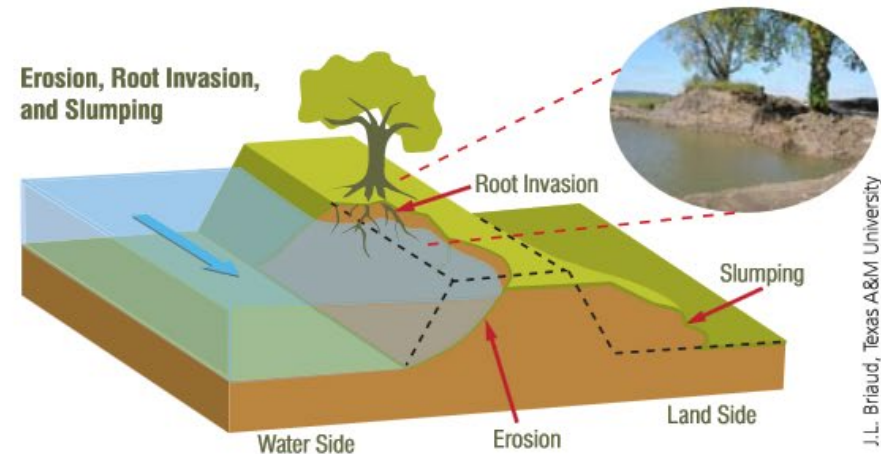
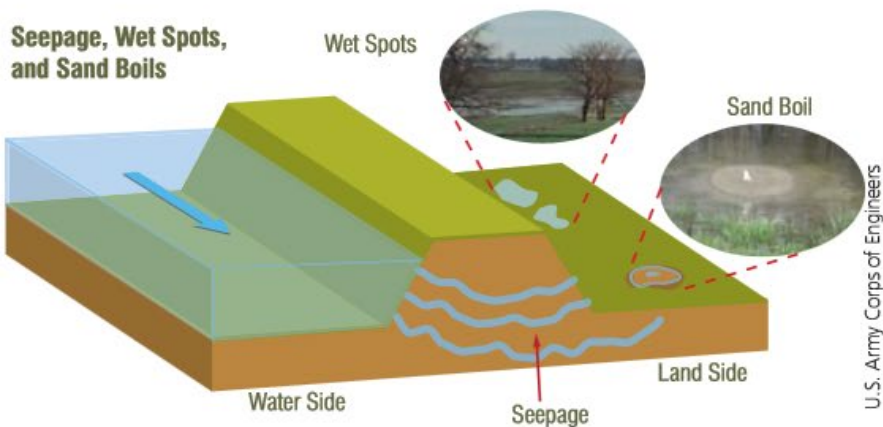
Step 3: Regulations

- **Submittal must address all applicable Federal, State, and local laws, regulations and requirements**
 - Local floodplain management ordinances
 - Environmental laws
 - Permit requirements

- **Can be verified through communication with requestor**

Step 4: Operations and Maintenance (O&M) Plan

- Plan must be officially adopted
- Plan must be specific
 - What → Inspections, testing, trainings
 - Mechanical systems (pumps, gates, etc.)
 - Vegetation control, signs of erosion or seepage, sedimentation – maintain conveyance
 - Flood warning System
 - When → Frequency should conform to risk
 - Who → Names or titles of responsible individuals



Step 5: “With Levee” and “Without Levee” Analysis

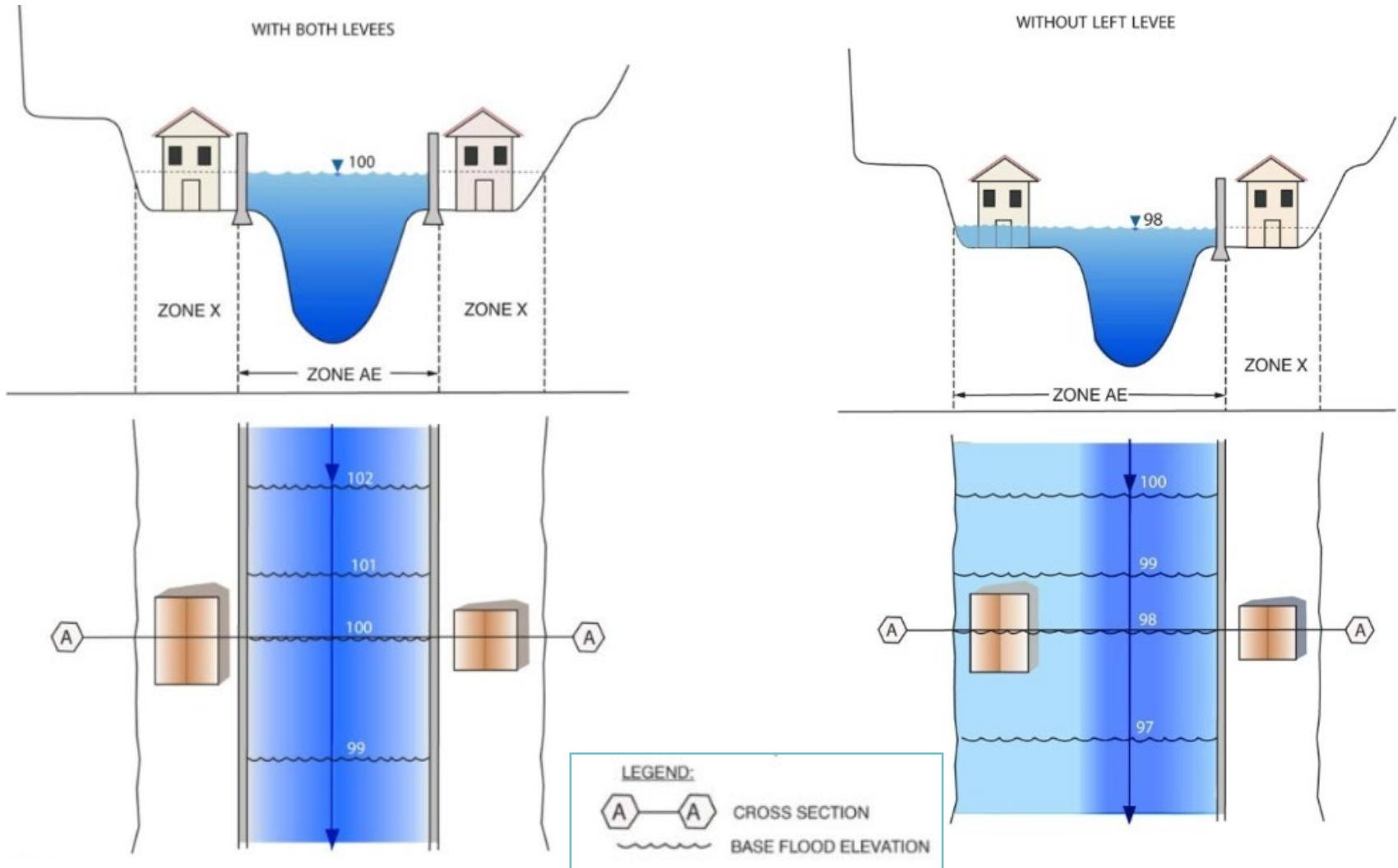
- **With Levee Analysis**

- Used to determine BFEs on the riverward side of the levee

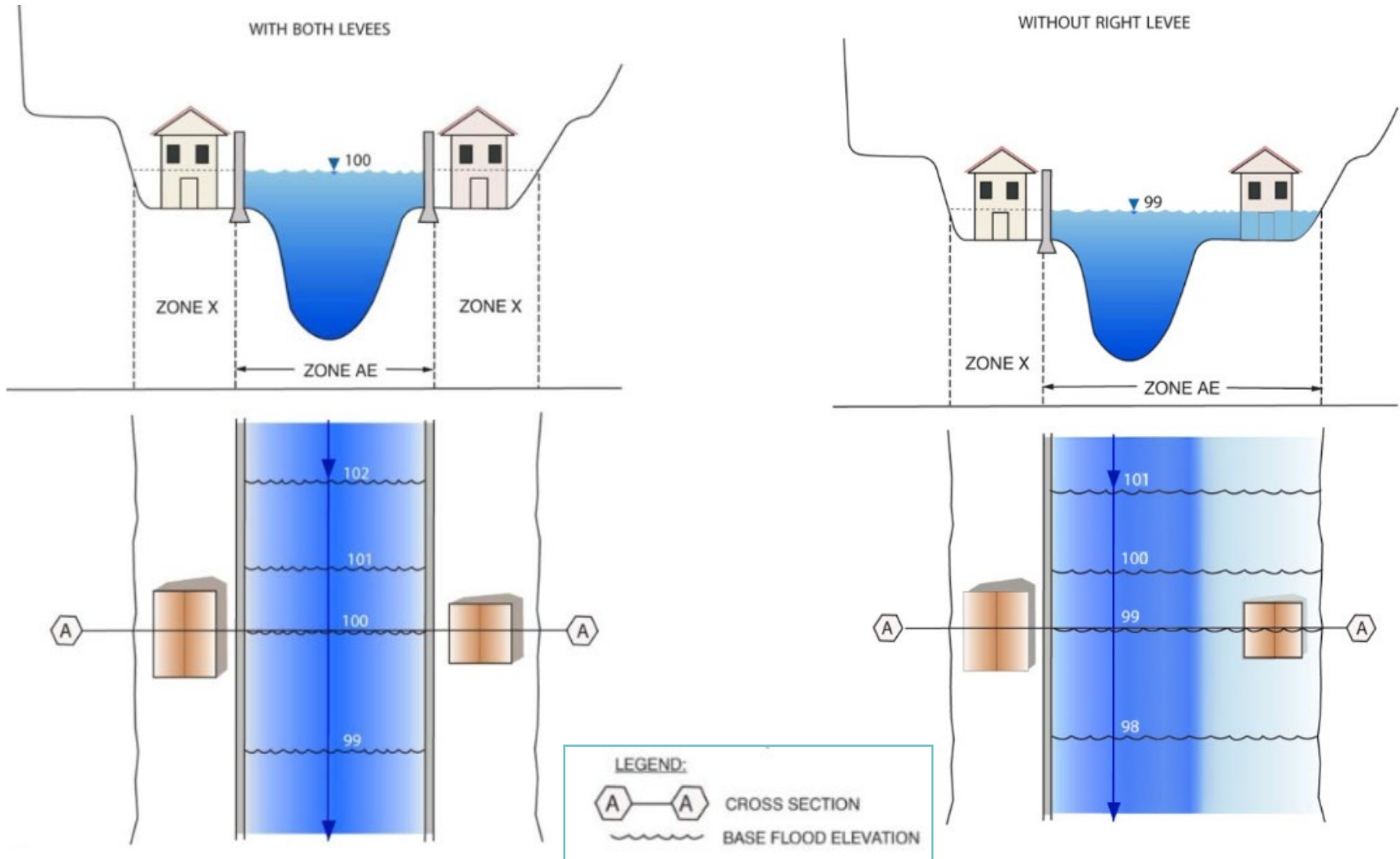
- **Without Levee Analysis**

- Used to determine the flood zone delineation behind the levee, in combination with interior drainage

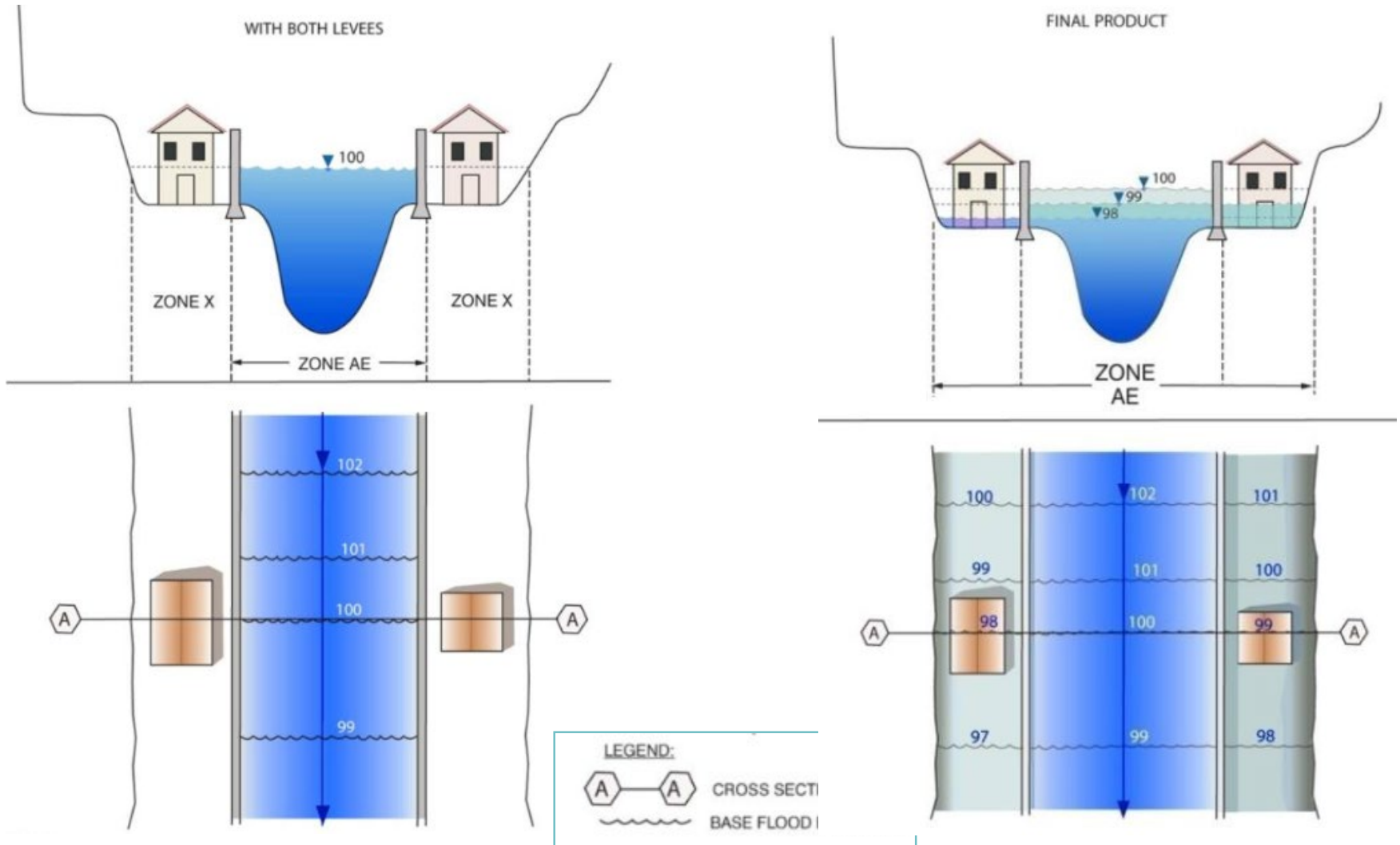
Step 5: “With Levee” and “Without Levee” Analysis



Step 5: “With Levee” and “Without Levee” Analysis



Step 5: “With Levee” and “Without Levee” Analysis



Step 6: Levee System and Cross Reference Check

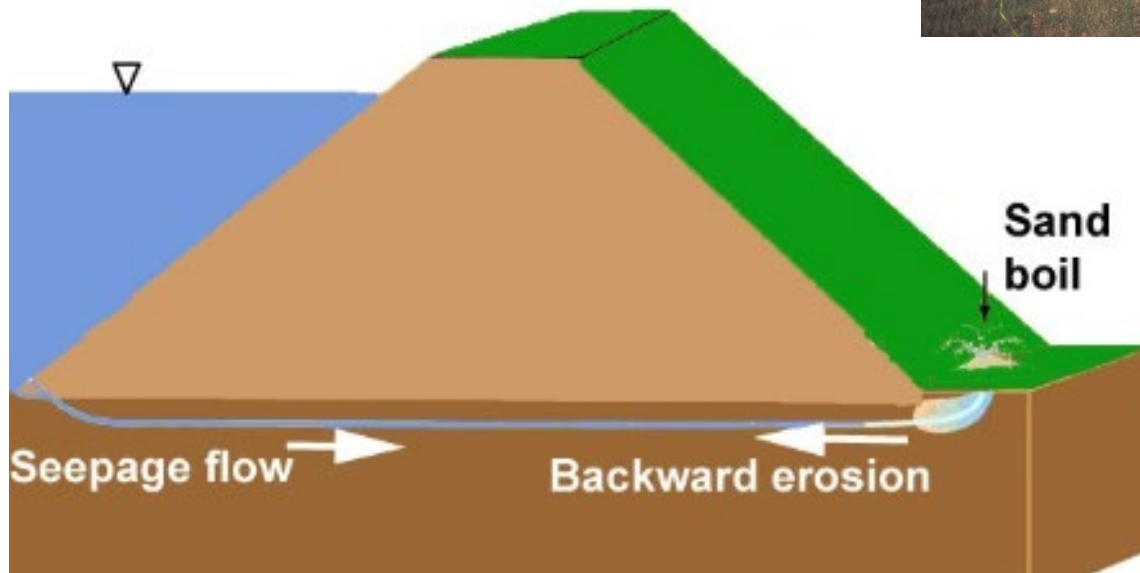
- **Certification must cover a complete system**
 - Tie-in to natural high ground on both ends
 - Adjacent levees must also be accredited or hydraulically independent
 - May not rely on non-levee embankments (ex: roads) unless they are part of the structure being certified

Step 7: Interior Drainage Analysis

- Hydrologic and hydraulic analysis
- Identify extents of flooding greater than 1.0 foot in depth
 - Delineate areas on a topographic map
- Documentation for capacity of storage and pumping systems
- Consider joint probability of interior and exterior flooding
- Interior drainage system should be included in operation and maintenance plans

Step 8: Structural Design Requirements

1. Closure Structure Data
2. Embankment Protection
3. Stability
4. Settlement



Step 9: Inspection Reports

- **Inspections performed at least once per year**
 - Should examine impact of any previous flood events
- **Include most recent report with submittal**
- **Documentation that any issued have been resolved**

Levee Accreditation

- Responsibility does not end with accreditation
- Not a guarantee of levee performance during a flood

Levees in U.S. Army Corps of Engineers (USACE) Programs

- USACE inspections are not equivalent to full 65.10 certification for FEMA accreditation
- USACE data may be leveraged as part of a 65.10 package
- Where USACE is the levee owner, USACE and FEMA have Federal agency procedures to facilitate accreditation review



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Non-Accredited Levee Systems

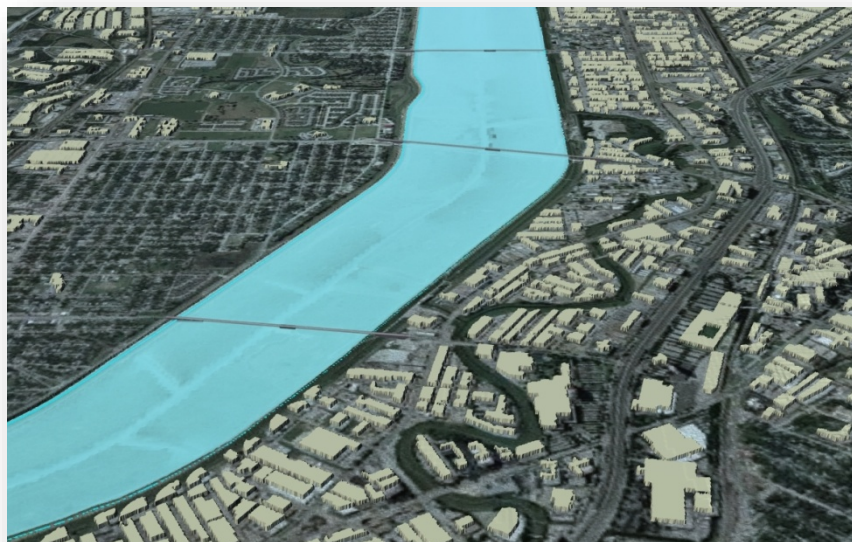
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Former Approach

- Data/documentation submittal shows compliance with 44CFR65.10
- Mapped as contained within levee system



- Data/documentation to show compliance with 44CFR65.10 *not received* or *incomplete*
- Mapped as if no flood hazard reduction capability provided by levee system



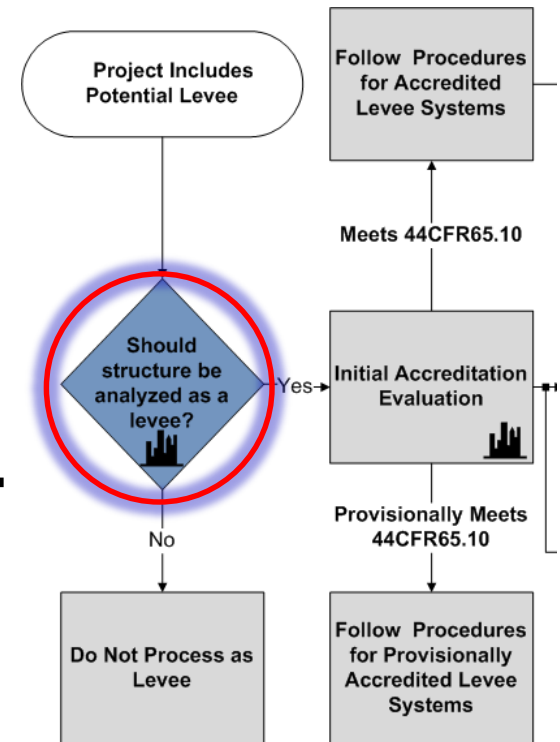
Hallmarks of New Approach – LAMP (Levee Analysis and Mapping Procedures)

- Increase Coordination/Engagement with Stakeholders
- Establish Local Levee Partnership Team
- Acknowledge Uncertainty with Zone D
- Subdivide Systems into Levee Reaches
- Model and Map Levee Reaches with Suite of Technical Procedures

LAMP Applicability

The new process only applies to a structure that meets the following conditions:

- It was designed as a levee.
- An owner has been identified for it.
- It is operated and maintained as a levee.
- It is hydraulically significant.

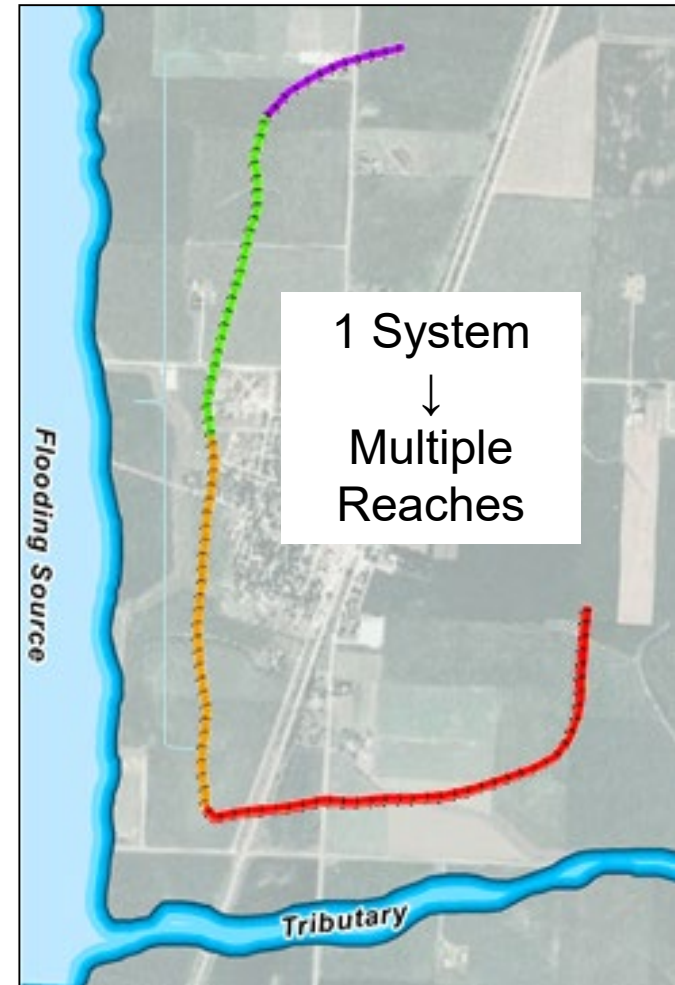


Overview of LAMP Approach

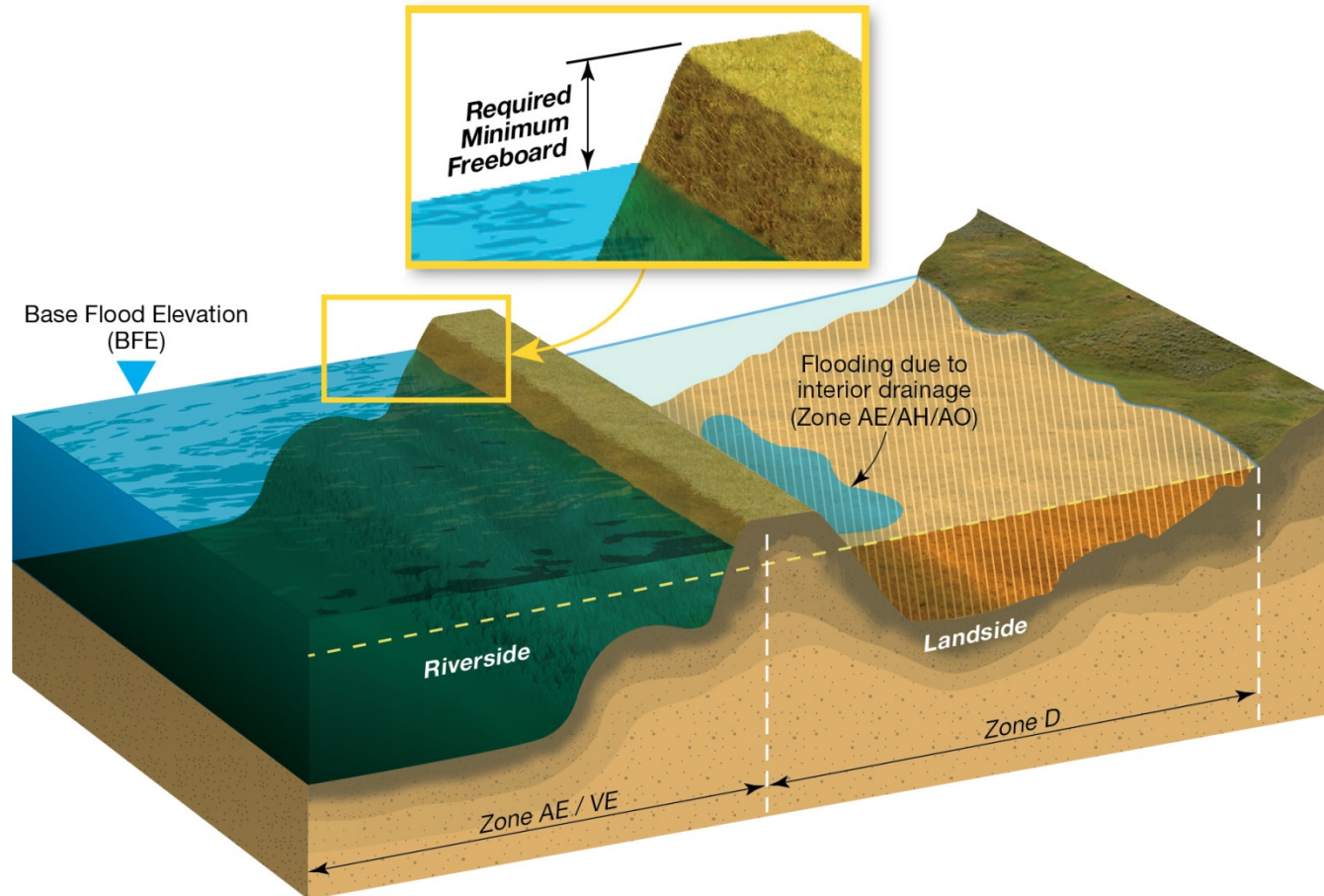
There are five procedures detailed in the LAMP Final Approach Document.

- Natural Valley
- Sound Reach
- Freeboard Deficient
- Overtopping
- Structural-Based Inundation

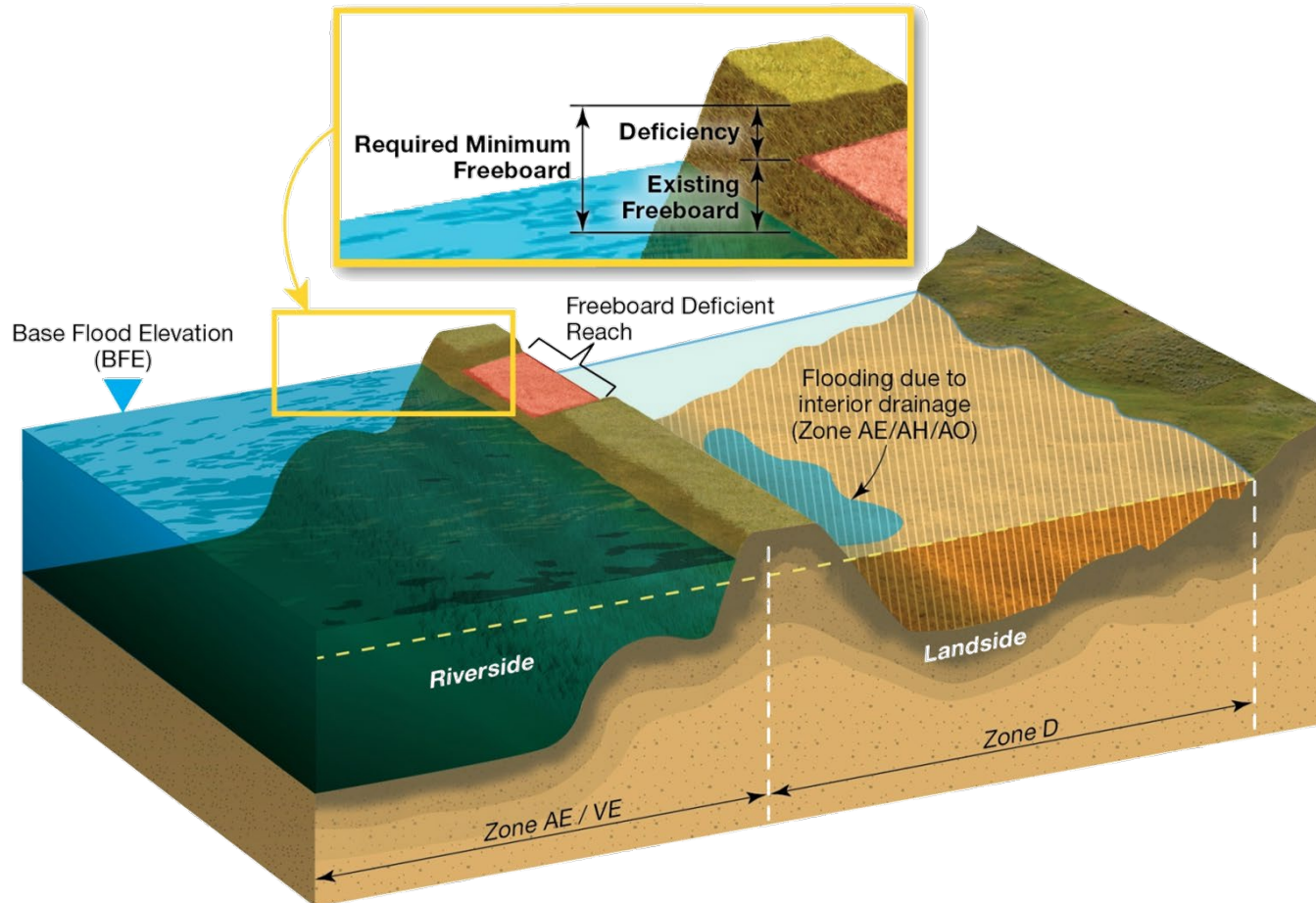
A levee system can be broken up into multiple reaches in order to analyze the flood risk in its vicinity.



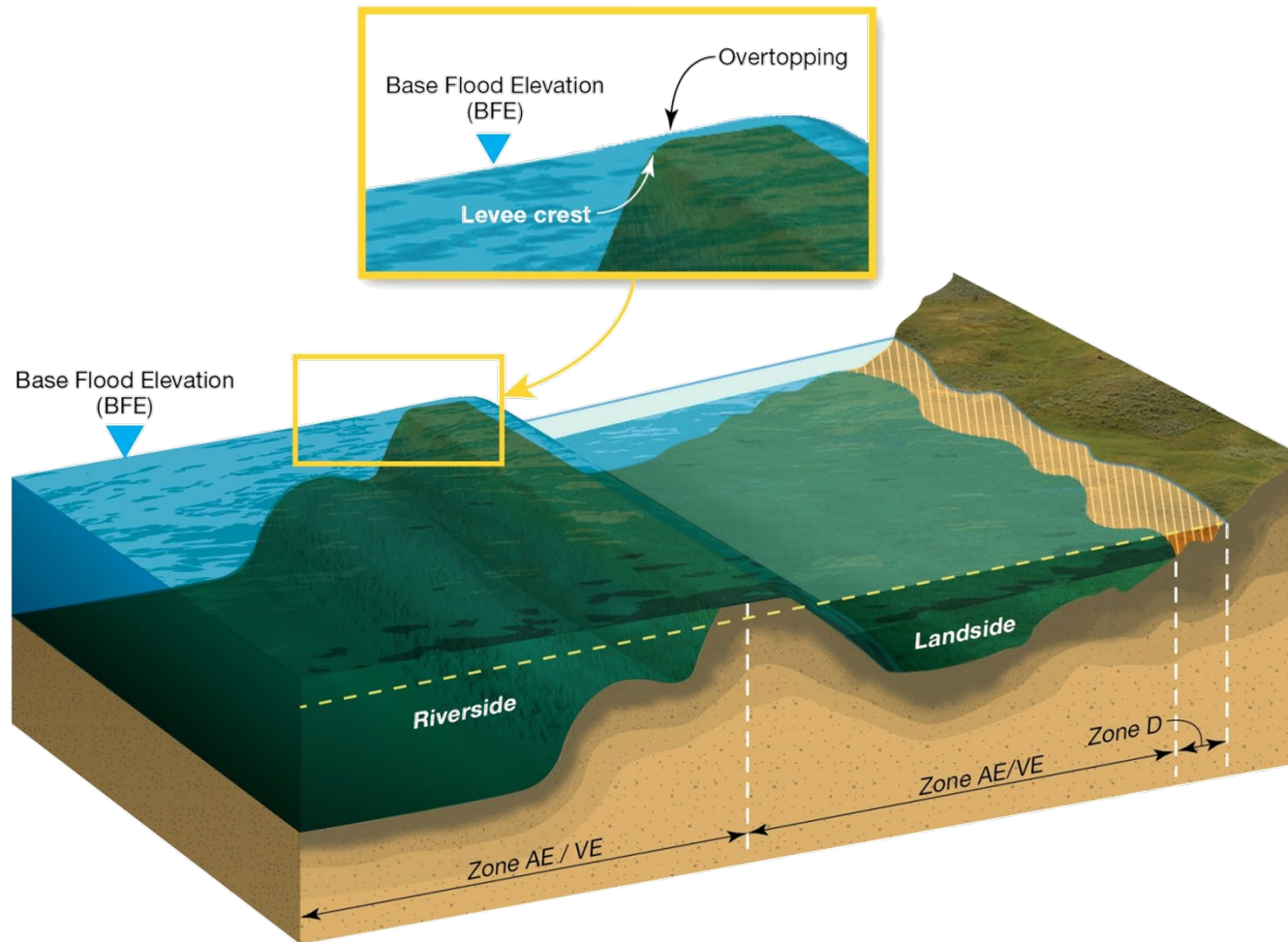
Sound Reach Procedure



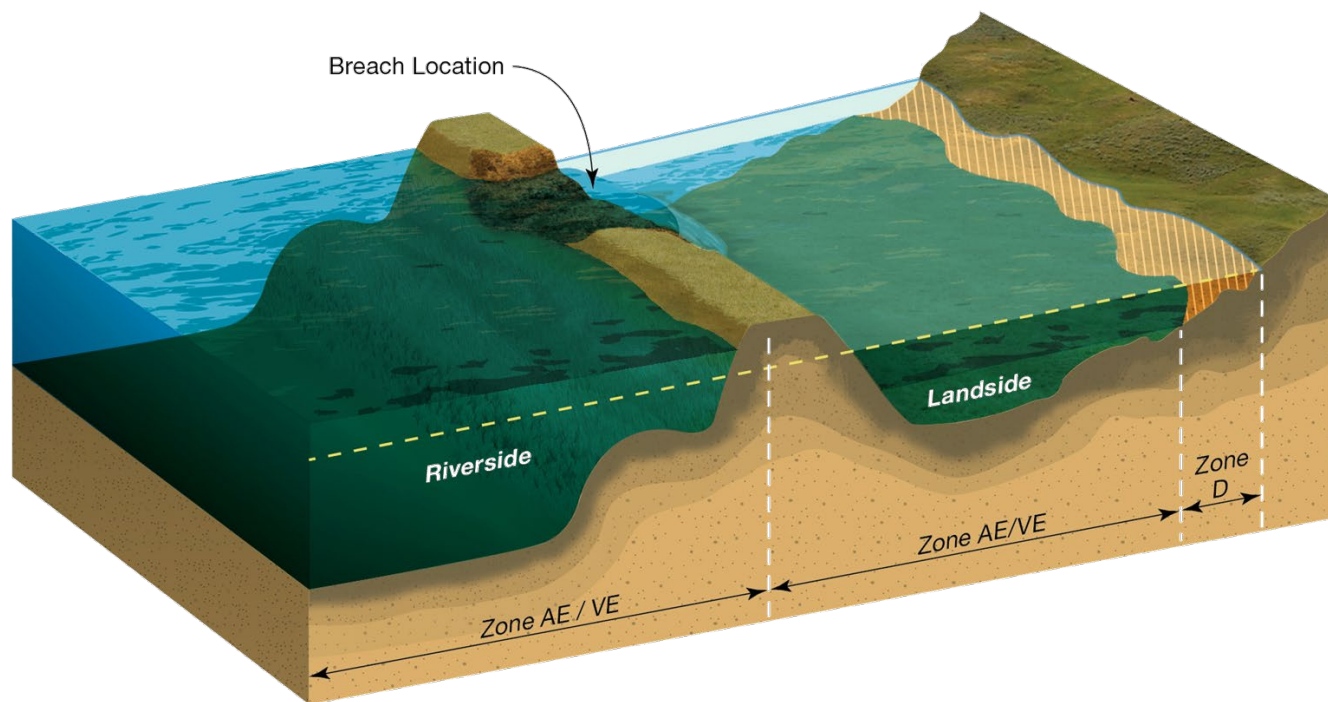
Freeboard Deficient Procedure



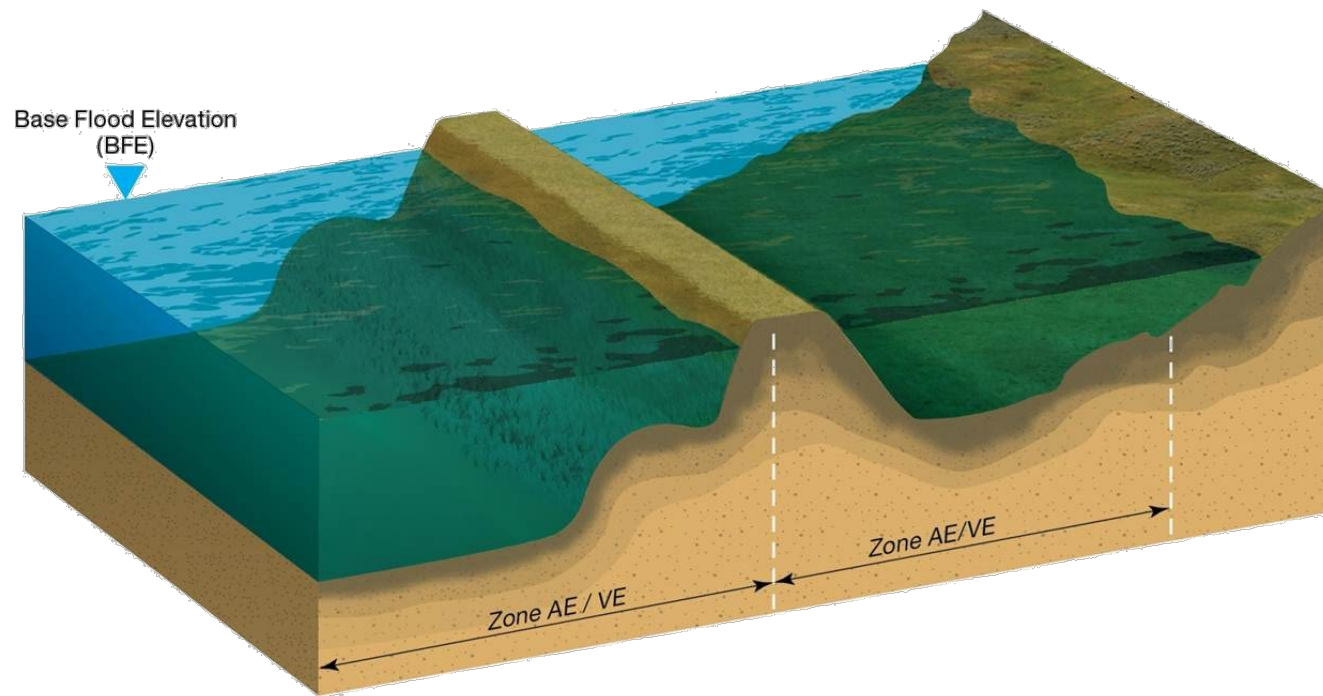
Overtopping Procedure



Structural-Based Inundation Procedure

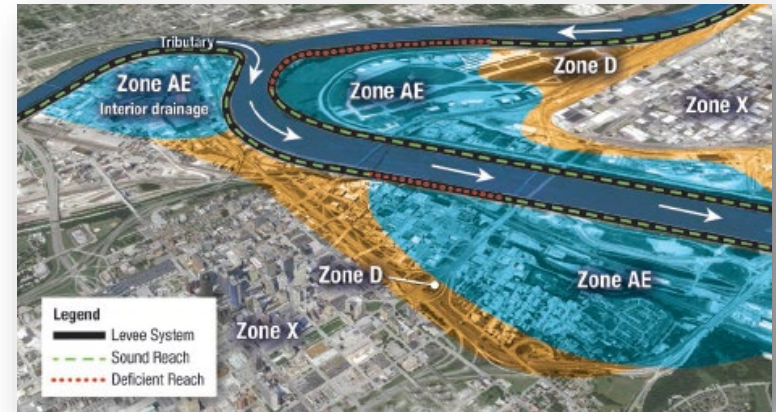


Natural Valley Procedure



Zone D

- Zone D identifies an area of uncertain flood risk
- All levees have residual risk
- Zone D is not classified as a Special Flood Hazard Area (SFHA)
 - No mandatory Flood Insurance purchase requirement
 - No minimum development criteria or requirements are implied
- FEMA recommends property owners purchase flood insurance to cover structures in Zone D (cost commensurate with risk uncertainty)



* WYO Bulletins W-14053 and W-14055 available at NFIPiService.com

Local Considerations for Zone D

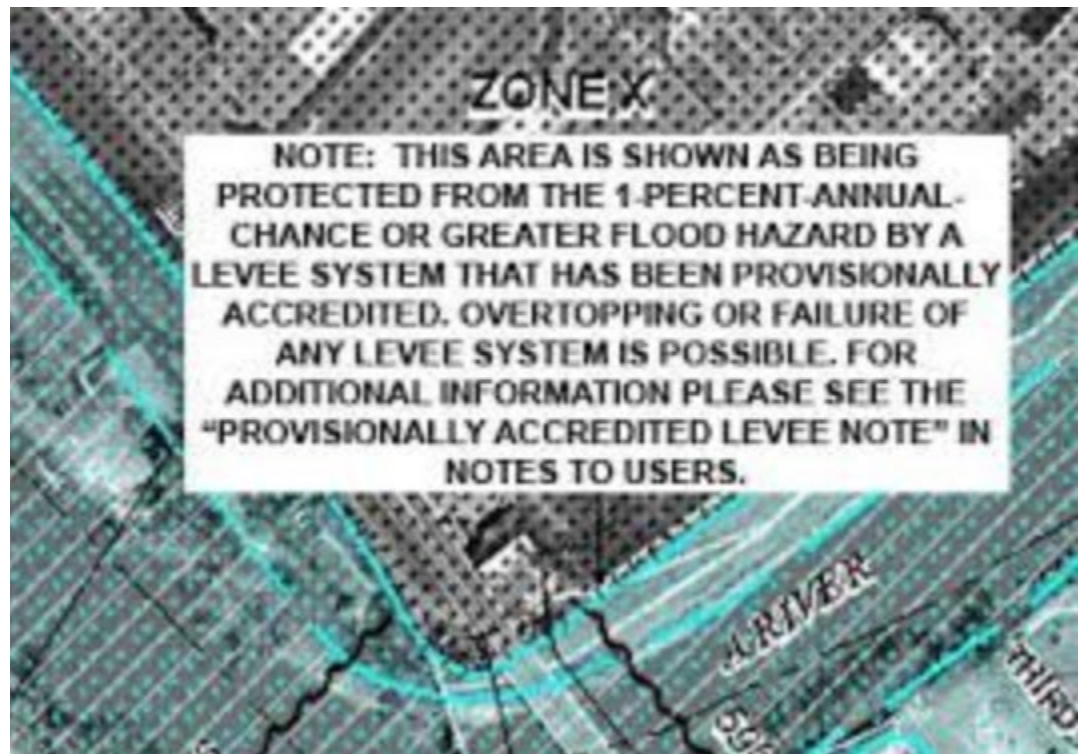
- Local regulations may be more stringent than the Federal minimum standard.
- FEMA encourages communities consider adoption of higher standards in Zone D areas.
 - Adopt minimum floodplain management standard for all Zones
 - Restrict or prohibit new development
 - Adopt freeboard of 1-3 feet
 - Adopt floodproofing requirements
- To support more robust floodplain management regulations in Zone D, FEMA is providing flood risk products:
 - Water Surface Elevation Grid(s)
 - Flood Depth Grid(s)

Provisionally Accredited Levees (PALs) Mapping

- Process to allow time for levee owner to provide levee certification documentation – but not repairs or upgrades.
 - 24-month period
 - May involve additional 1-yr rehabilitation period
 - Temporarily mapped as accredited during reasonable amount of time for providing certification
 - Cannot have an unacceptable rating from U.S. Army Corps of Engineers (USACE)
 - Current effective FIRMs are used for flood insurance rating purposes.
- Requires concurrence of impacted communities

PAL Mapping

- PAL Mapping is an interim measure
- Can proceed to accreditation or LAMP



Levees Under Accreditation Review

Name of Levee System	County
North Petersburg	Grant County
South Petersburg	Grant County
Huntington, WV, LPP - Guyandotte	Cabell County
Huntington, WV, LPP (Ohio River Floodwall)	Cabell & Wayne Counties

Totals: 4 levee systems; 2 levee projects

Accredited Levees

Name of Levee System	County
Ceredo-Kenova, WV LPP	Wayne County
Matewan, WV, LPP	Mingo County
West Williamson, WV, LPP	Mingo County
Williamson, WV, LPP	Mingo County
Elkins, WV	Randolph County

Total: 5 levee systems

Non-Accredited Levees

Name of Levee System	County
North Moorefield	Hardy County
South Moorefield	Hardy County
Blackwater River Levee (Right Bank)	Tucker County
Blackwater River Levee (Left Bank)	Tucker County
East Bayard	Grant County
West Bayard	Grant County
Ridgeley	Mineral County, Allegany County
Blaine	Garrett County, Mineral County
PARKERSBURG, WV, LPP	Wood County
POINT PLEASANT, WV, LPP	Mason County
Magnolia Ringwall, WV	Mingo County
Benwood -Left Bank Ohio River	Marshall County

Total: 12 levee systems



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WV ORTHOIMAGERY NAIP 2016

Questions about WV levees?

- Let me know:
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