

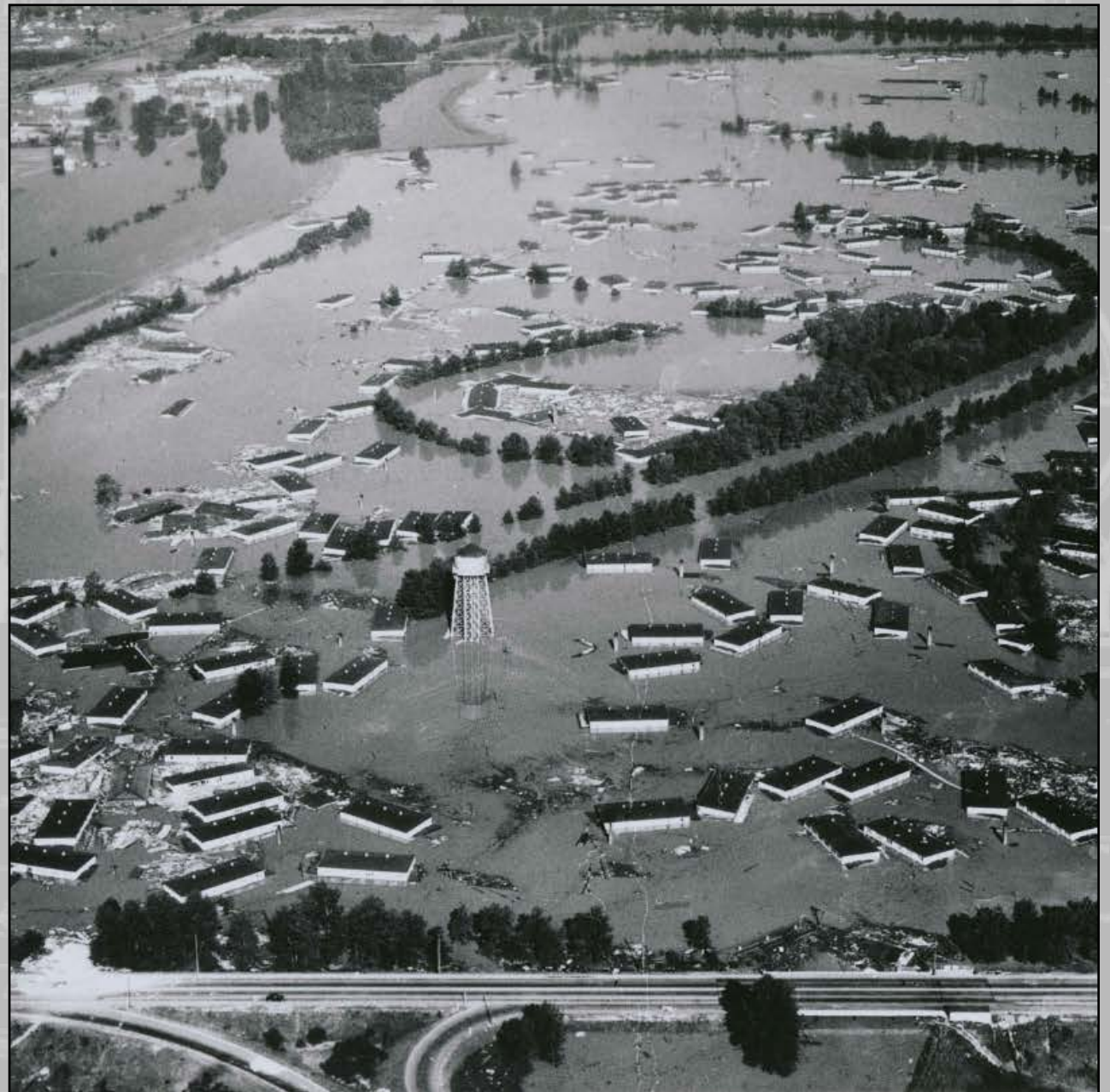
WELCOME

Draft Integrated Feasibility Report and Environmental Assessment Public Informational Meeting

- | | |
|-----------|--|
| 6:00-6:20 | Visit our Breakout Areas |
| 6:20-7:00 | Presentation |
| 7:00-8:00 | Visit our Breakout Areas
Leave Written Comments |



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Portland District



*1948 Vanport flood (Photo courtesy of Oregon Historical Society,
Lot 131_010)*

PURPOSE OF THE STUDY & MEETING



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1913-
1921

- Four drainage Districts were constructed by locals

1936

- Congress authorized Corps to improve system

1950

- Congress authorizes Corps to raise and strengthen system

2018

- Congress authorized Corps to study the system to determine if additional Federal investment is needed

Today

- Seeking input to the study, preparing the system for the next 50 years and beyond

WAYS TO COMMENT



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By email: PMLS-Feasibility@usace.army.mil

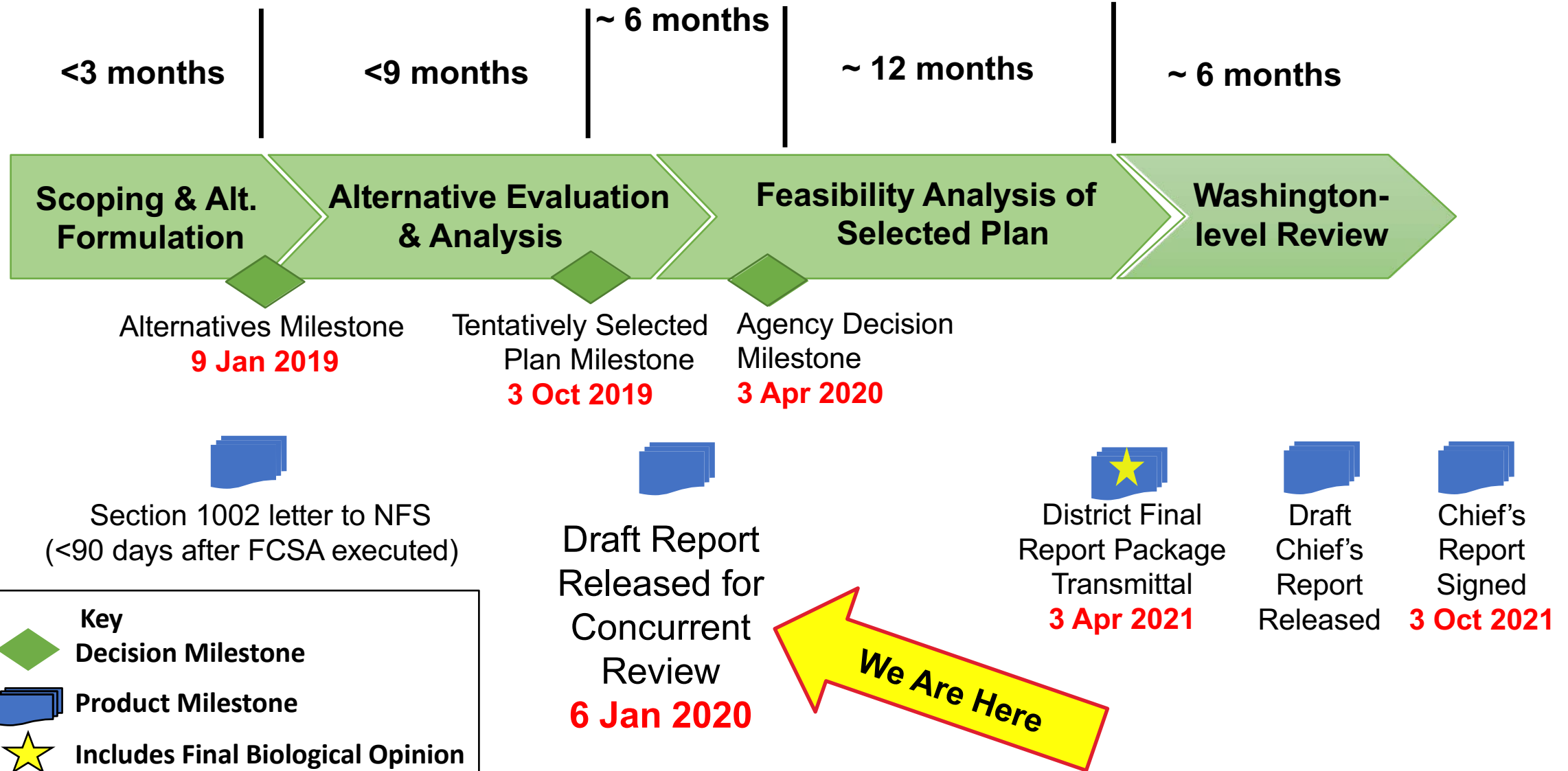
By mail: U.S. Army Corps of Engineers, Portland District
Attn: CENWP-PM, Laura Hicks
P.O. Box 2946
Portland, Oregon 97208-2946

In person: Written input can be provided tonight

KEY MILESTONES IN A 3x3 STUDY



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CONSIDERATION OF ENVIRONMENTAL & CULTURAL RESOURCES

Obtain early feedback from stakeholders

- Open houses
- Early coordination and pre-consultation with agencies and federally recognized tribes

Evaluation of alternatives

- Description of affected environment
- Consideration and formulation alternatives
 - Integration of avoidance, minimization, or mitigation measures
- Evaluation of environmental consequences

Agency & Public Review

- Ongoing consultation with agencies and federally recognized tribes
- Draft Integrated Feasibility Report and Environmental Assessment
 - Draft Finding of No Significant Impact (FONSI)



NEPA

Clean Water Act



Endangered Species Act

Fish and Wildlife Coordination Act



Migratory Bird Treaty Act & Eagle Protection Act

National Historic Preservation Act



REPORT TABLE OF CONTENTS



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1. Introduction
2. Need for and Objectives of the Action
3. Plan Formulation
4. Affected Environment and Environmental Consequences
5. Tentatively Selected Plan (TSP)
6. Compliance with Environmental Statutes
7. Summary of Public Involvement, Review Process and Consultation
8. Draft Recommendation
9. List of Preparers
10. References

APPENDICES



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A. Hydrology and Hydraulics

B. Economics

C. Levees

D. Civil Design

E. Pump Station Risk Assessment

F. Hazardous, Toxic, and Radioactive Waste (HTRW)

G. Additional Affected Environment Data

H. Cultural Resources

I. Public Involvement

J. Section 404(b)(1) Evaluation

K. Draft FONSI

STUDY AREA



PROBLEMS

Consequences of flood risk

- **Life Safety:** large population at risk; difficult to evacuate
- **Economic Losses:** critical infrastructure, structures, contents, vehicles, hazardous materials inundation

Weaknesses in existing system

- Overtopping of existing levees
- Weak points (e.g. Railroad embankment)
- Aging infrastructure
- Pump stations lack of adequate pumps

OBJECTIVES & CONSTRAINTS



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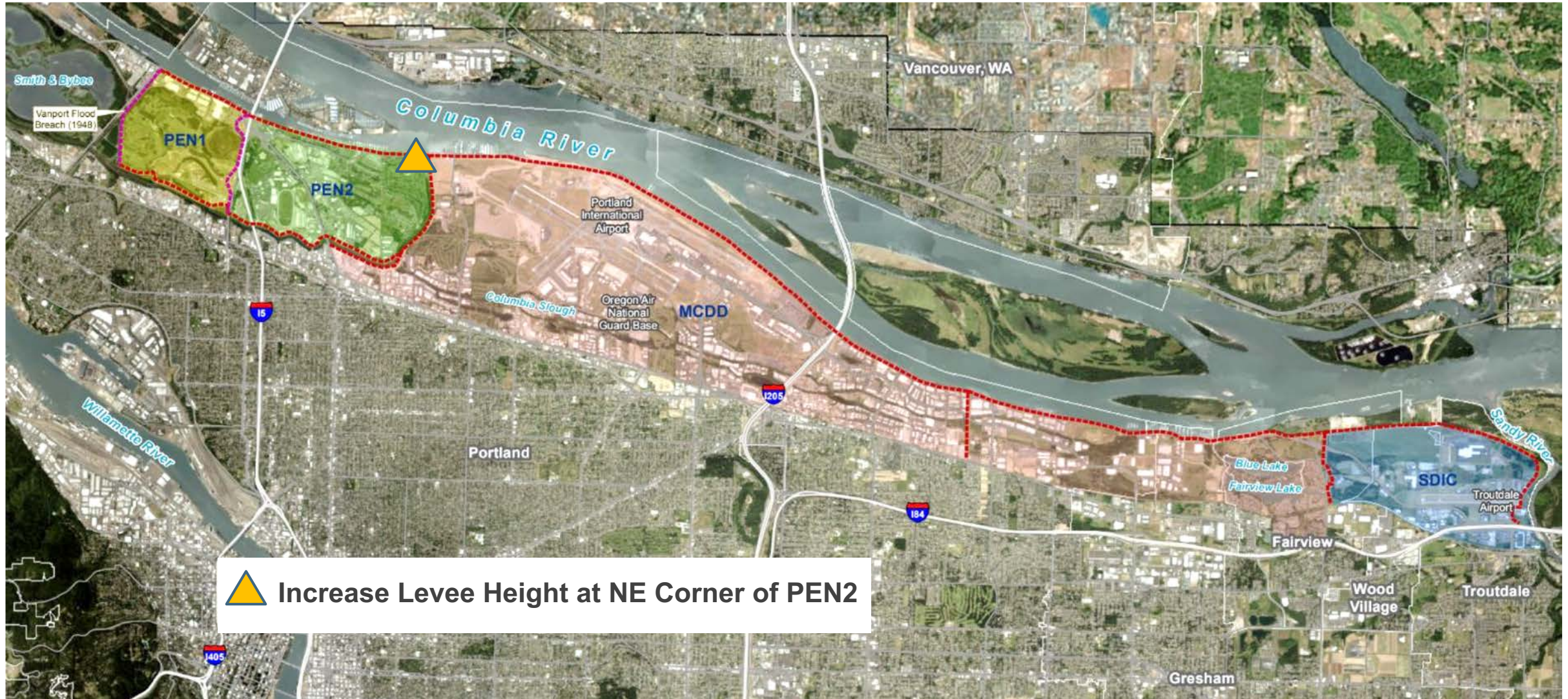
Objectives (within the system, over the period of analysis)

- **Reduce flood risk**, in particular to critical infrastructure
- **Reduce threats to life safety** from flooding, and **increase awareness** of flood risk
- **Increase resiliency** of the flood management system
- **Increase reliability** of the flood management system
- **Improve operability** of the flood management system
- To the extent practicable, provide opportunities for **recreation, natural resources, and cultural resources.**

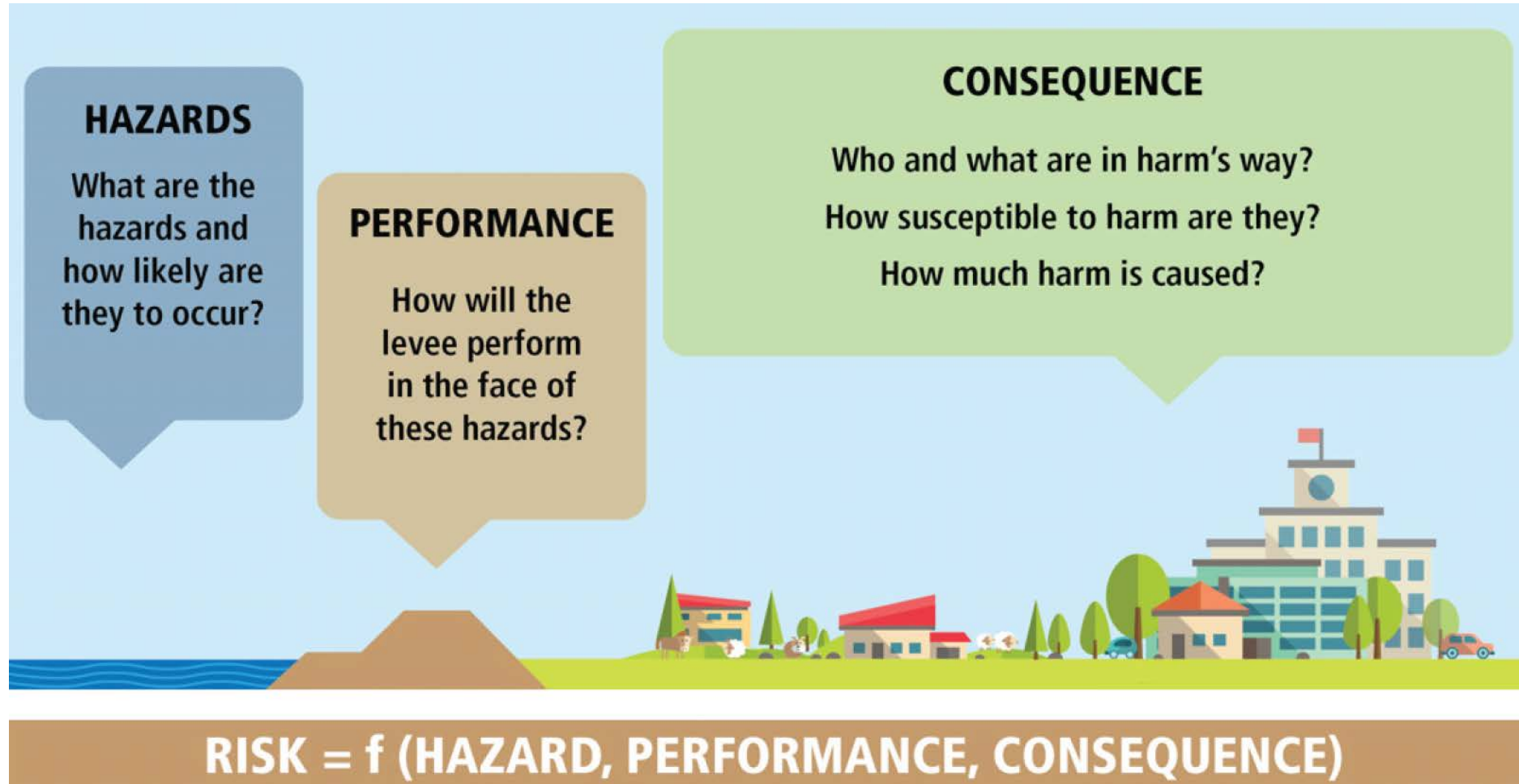
Constraints

- Cross-levees must stay in place
- Railroad embankment will not be considered a levee in the same alignment.
- Existing road infrastructure remains unchanged.

FUTURE WITHOUT PROJECT CONDITION

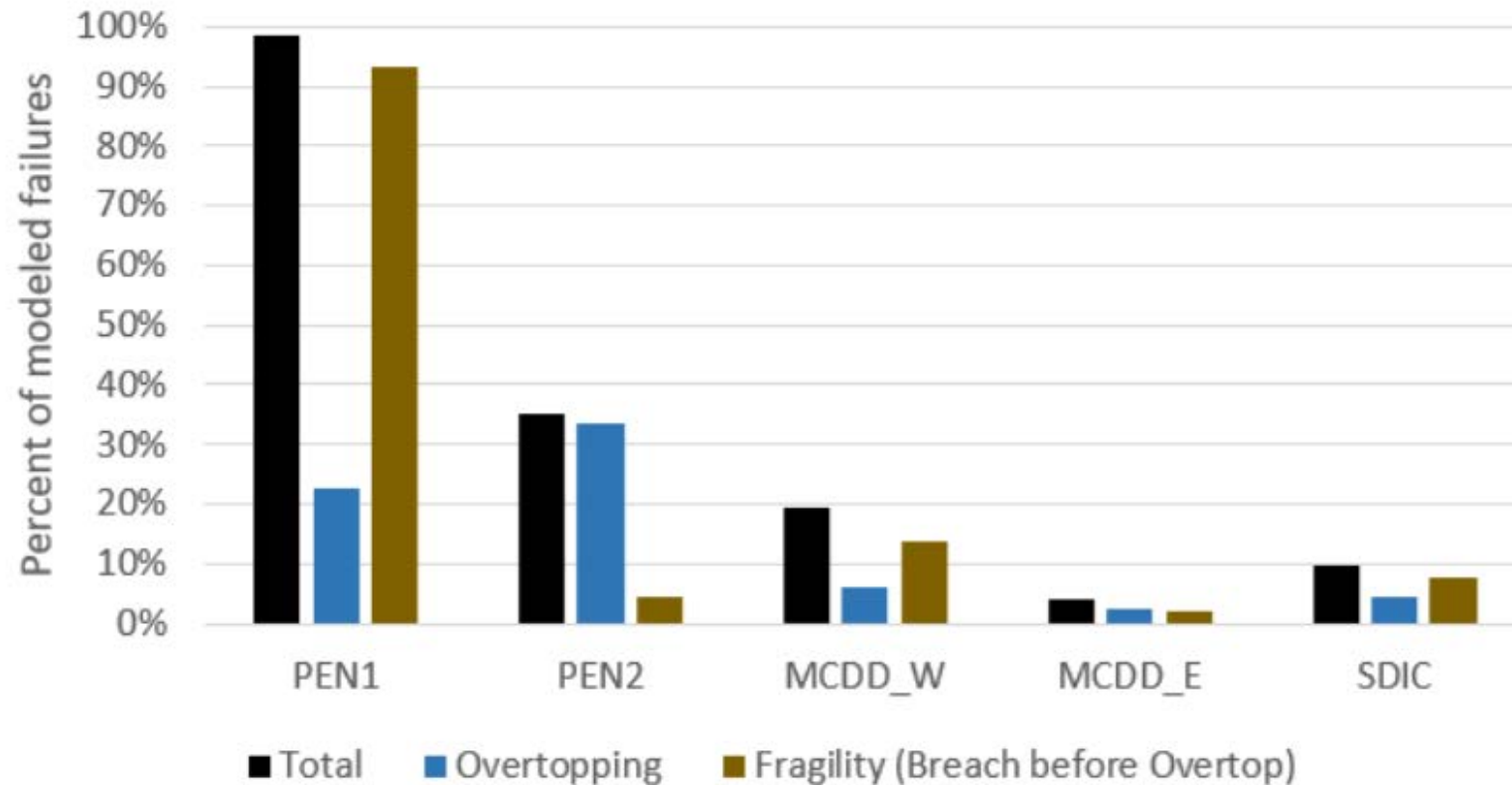


WHAT IS FLOOD RISK?



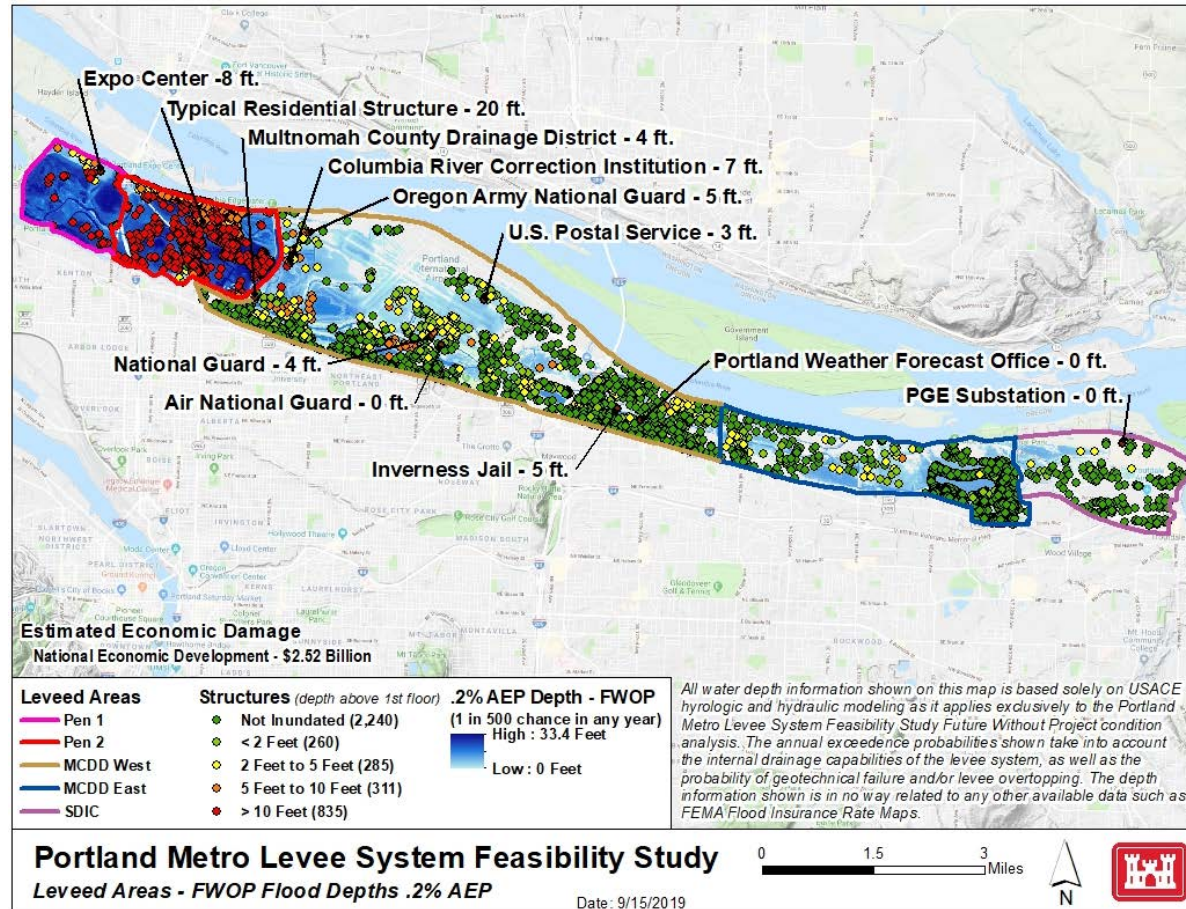
MODEL RESULTS: FUTURE WITHOUT PROJECT

Levee Failures by Flooding Mode

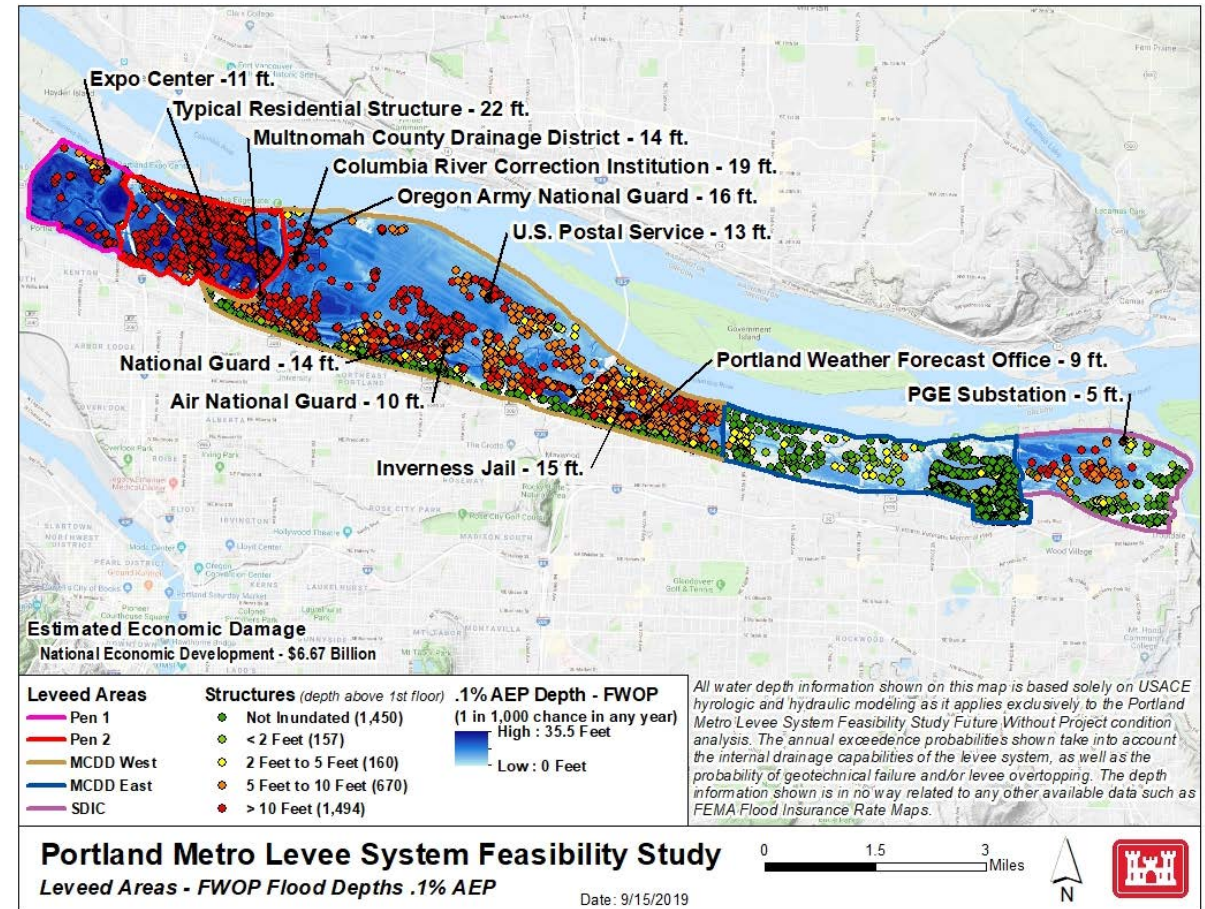


FUTURE WITHOUT PROJECT

0.2% Annual Exceedance Probability
1 in 500 chance of occurring, or being exceeded, in any year



0.1% Annual Exceedance Probability
1 in 1,000 chance of occurring, or being exceeded, in any year



INITIAL MEASURES



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1. Elevate structures
2. Flood proof buildings
3. Buy outs
4. Relocation of residences/ businesses/ critical infrastructure
5. **Widen levees (improve levee performance)**
6. **Flood warning system**
7. **Increase levee heights (this includes cross levees, mainstem, slough)**
8. Maximize/increase flood storage capacity in the Willamette Basin Projects
9. Bigger facility
10. **Add pump capacity**
11. Add gates
12. Add ring levees
13. Riprap (Bank Protection)
14. **Improve Flood Fight: access roads, mobility of flood fighters, remove restrictions for equipment**
15. **Automate operations in the systems**
16. Improve permeability
17. Increase wetlands/retention ponds
18. Complete Seismic retrofits
19. Install Portable pumps similar to Brazil
20. **Add redundancy for pump system**
21. Install Submersible pump stations
22. **Improve/Increase debris control**
23. Relocate MCDD Headquarters out of floodplain
24. Reroute water/floodwater
25. Construct levee next to railway/ highway to act as drainage seep
26. Aquatic invasive plants control/eradication
27. Recreation trails on top of levees
28. Install/Operate tide gates
29. Improve/Increase seepage berms
30. **Build additional levees/floodwalls**
31. Remove existing levee (specific to Pen 1)
32. **Rehab or replace mechanical/structural features**
33. Adjust/ensure levee slopes meet current standards
34. Relocate transportation corridors
35. Utilize setback levees
36. **Education on flood risk**
37. **Install/Improve Signs for evacuation**
38. Removal of Levee Vegetation
39. Address existing erosion/control future erosion on levees
40. Reduce Area of Protection
41. **Establish "safe zones" for evacuation life/safety**
42. Stem wall
43. Add relief or overflow areas
44. Zoning
45. Secure floating homes

ALTERNATIVE STRATEGIES



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1. Without Project
2. ~~Non-structural~~
3. Prioritize Public Health and Safety
4. Maximize Resilience and Reliability
5. Give the System a More Uniform Annual Exceedance Probability (AEP)

FOCUSED ARRAY OF ALTERNATIVES – MEASURES MATRIX



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No.	Measure	Alt 3	Alt 4	Alt 5
5	Improve Levee Performance and Reliability	●	●	●
7	Increase Levee Heights	●	●	●
30	Build Additional Levee/Floodwall		●	●
10	Add Pump Capacity		●	●
20A	Add Redundant power source		●	●
20B	Replace SDIC Pump Station	●	●	●
32	Rehab/Replace Mechanical Structures (gates, etc.)		●	
6	Flood Warning in Residential/PAR areas	●	●	●
14	Improve Flood Fight		●	●
15	Automate Systems		●	
22	Debris Removal (trash in water and trees/limbs)		●	●
36	Education	●	●	●
37	Signage for Evacuation	●	●	●
41	Safe Zones	●	●	●



Alternative 3

Measures	
No.	Name
5	Improve levee performance and reliability
6	Flood Warning
7	Increase levee heights
20A	Redundant power source
20B	Replace SDIC Sandy pump station
36	Education on flood risk
37	Signage for evacuation
41	Safe Zones

Costs
\$50 M
\$1.9 M/yr.

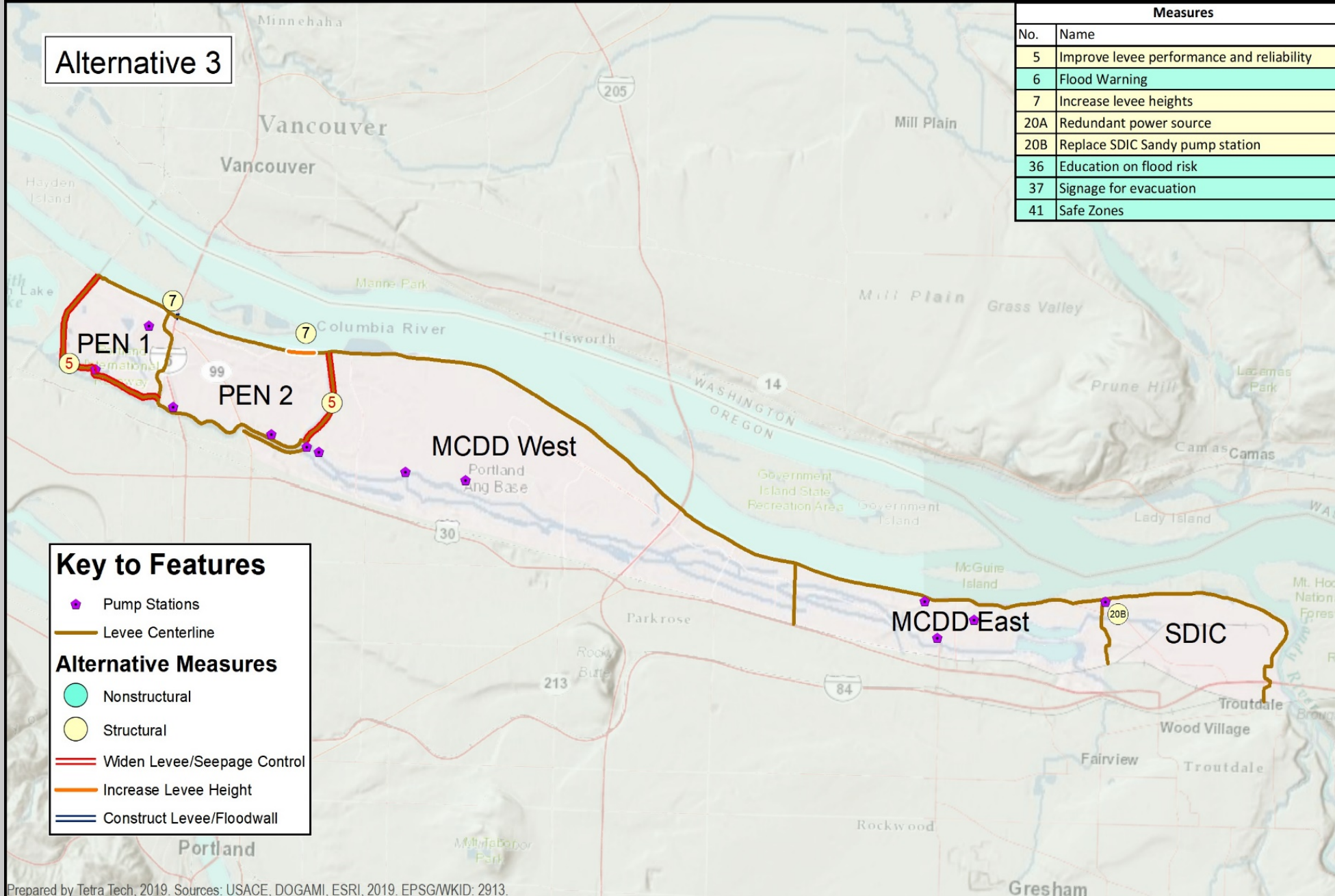
Benefits
\$6.0 M/yr.

Key to Features

-  Pump Stations
-  Levee Centerline

Alternative Measures

-  Nonstructural
-  Structural
-  Widen Levee/Seepage Control
-  Increase Levee Height
-  Construct Levee/Floodwall



Prepared by Tetra Tech, 2019. Sources: USACE, DOGAMI, ESRI, 2019. EPSG/WKID: 2913.



PORTLAND METRO LEVEE SYSTEM



Alternative 4

Measures	
No.	Name
5	Improve levee performance and reliability
6	Flood Warning in Residential/PAR Areas
7	Increase levee heights
10	Add pump capacity
14	Improve flood fight
15	Automate systems
20A	Redundant power source
20B	Replace SDIC Sandy pump station
22	Debris removal
30	Build additional levee/floodwall
32	Rehab or replace mechanical structures
36	Education on flood risk
37	Signage for evacuation
41	Safe Zones

Costs








\$77 M

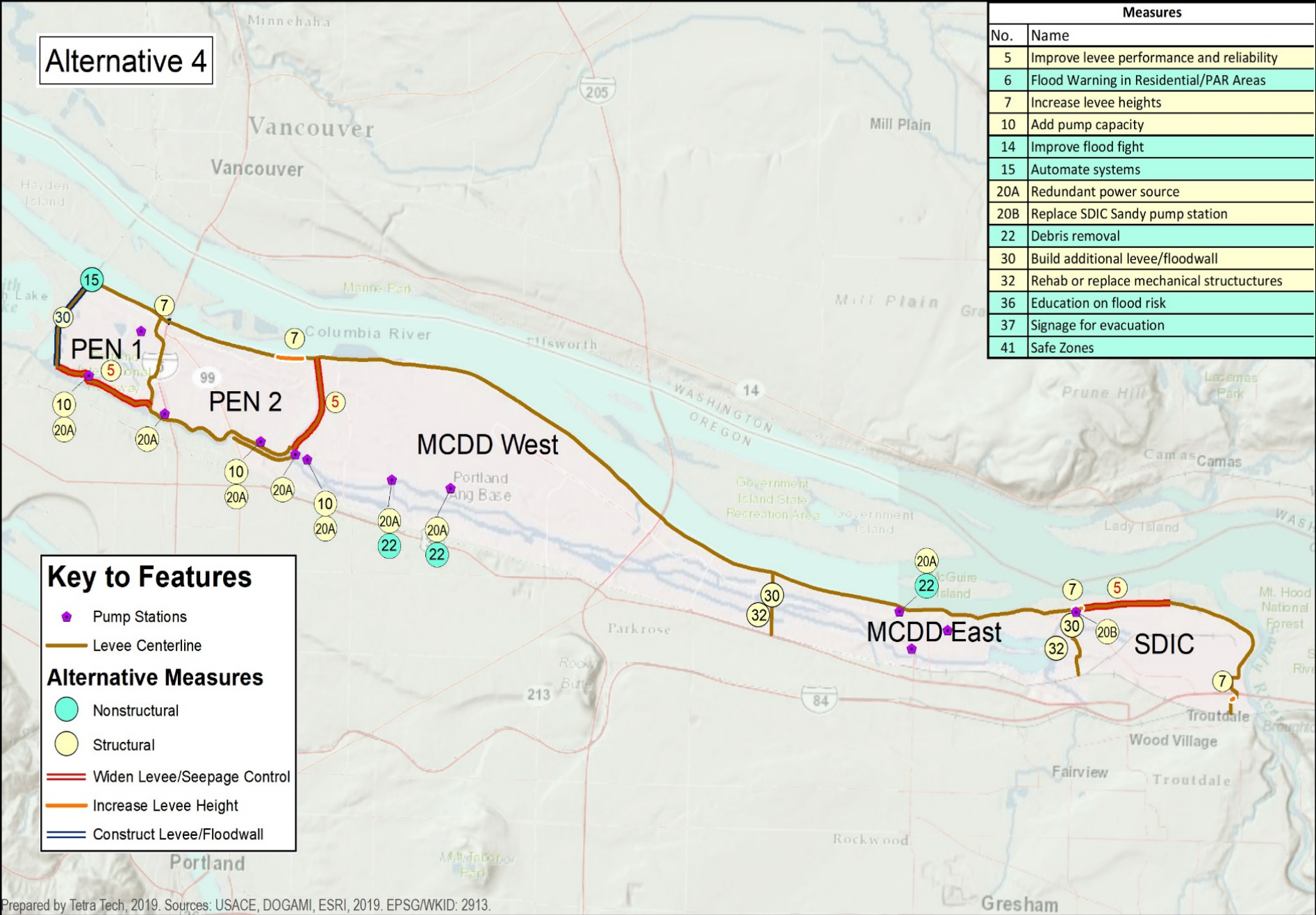
\$2.9 M/yr.

Benefits

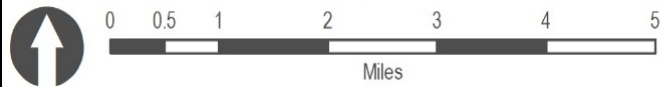
\$8.5 M/yr.

Key to Features

-  Pump Stations
-  Levee Centerline
- Alternative Measures**
-  Nonstructural
-  Structural
-  Widen Levee/Seepage Control
-  Increase Levee Height
-  Construct Levee/Floodwall



Prepared by Tetra Tech, 2019. Sources: USACE, DOGAMI, ESRI, 2019. EPSG/WKID: 2913.



PORTLAND METRO LEVEE SYSTEM



Alternative 5

Measures	
No.	Name
5	Improve levee performance and reliability
6	Flood Warning in Residential/PAR Areas
7	Increase levee heights
10	Add pump capacity
14	Improve flood fight
20A	Redundant power source
20B	Replace SDIC Sandy pump station
22	Debris removal
30	Build additional levee/floodwall
36	Education on flood risk
37	Signage for evacuation
41	Safe Zones

Costs
\$165 M
\$6.2 M/yr.

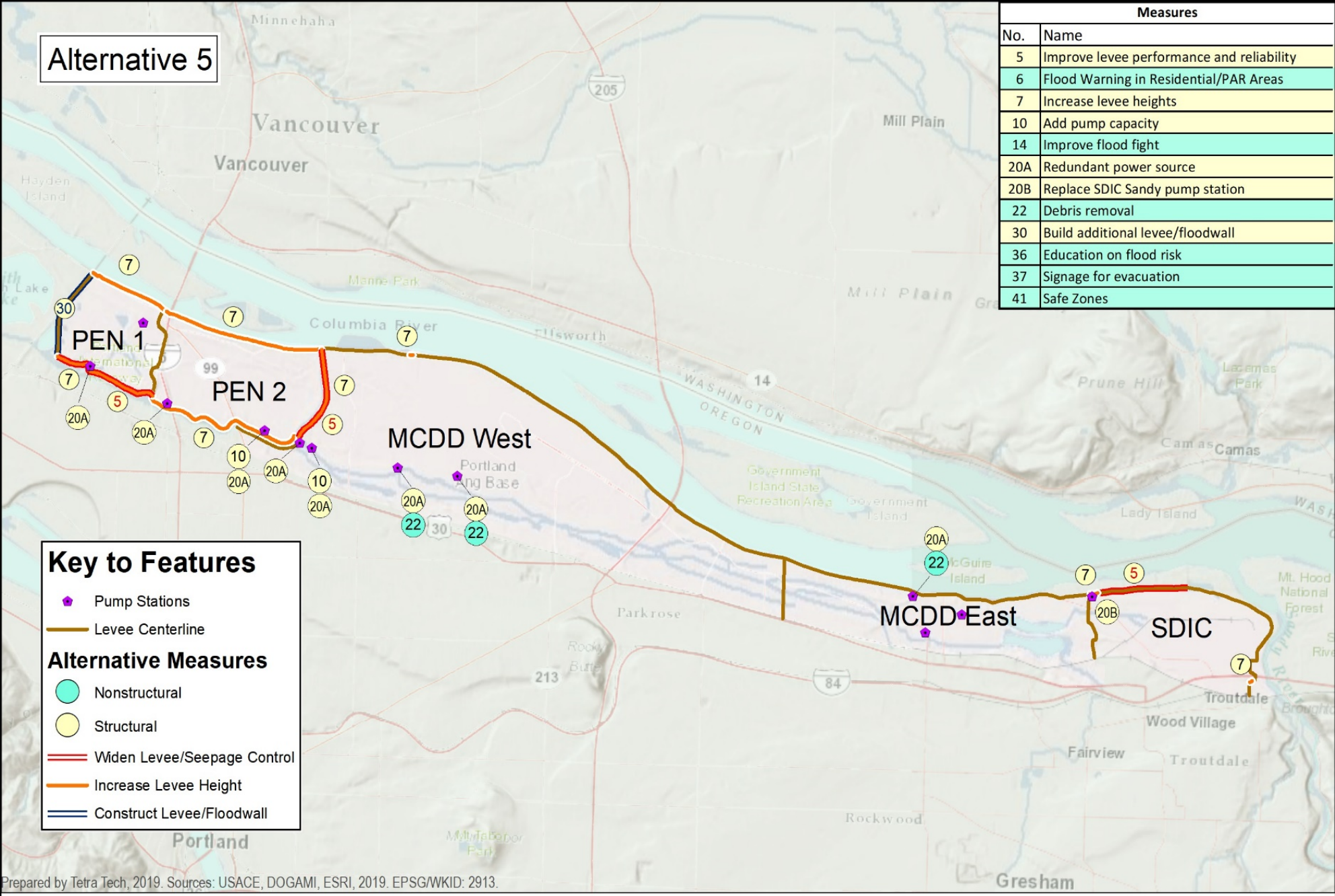
Benefits
\$13.8 M/yr.

Key to Features

- Pump Stations
- Levee Centerline

Alternative Measures

- Nonstructural
- Structural
- Widen Levee/Seepage Control
- Increase Levee Height
- Construct Levee/Floodwall



Prepared by Tetra Tech, 2019. Sources: USACE, DOGAMI, ESRI, 2019. EPSG/WKID: 2913.



PORTLAND METRO LEVEE SYSTEM



CRITERIA FOR TENTATIVELY SELECTED PLAN (TSP)



- Alternatives are evaluated against the planning objectives
- The Principles & Guidelines
 - **Completeness**—The extent that the plan provides and accounts for all necessary investments or other actions to ensure the realization of the planned effects.
 - **Effectiveness**—The extent that the plan meets the objectives.
 - **Efficiency**—The extent that the plan is the most cost-effective means of alleviating risk to the public.
 - **Acceptability**—The workability and viability of the plan with respect to acceptance by Federal and non-Federal entities and the public, and compatibility with existing laws, regulations, and public policies.
 - **Life Safety**—Reduction in life loss risk compared to Future Without-Project
 - **Impacts to Natural Resources**—Area of potential impacts to natural resources
 - **Relative Risk**—Implementation risk, real estate risks
 - **Uncertainty**—Discuss technical uncertainties, Modeling, etc.
- Summary of Alternatives Comparison using the 4 Accounts: National Economic Development, Regional Economic Development, Other Social Effects and Environmental Quality
- Maximizes Net Annual Federal Benefits

ANNUAL COSTS AND BENEFITS (\$1,000)

FY 2020 PRICE LEVELS AND 2.75 DISCOUNT RATE



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Item Description	Alternative 3	Alternative 4	Alternative 5
Construction Costs	\$21,636	\$35,172	\$75,562
Preconstruction Engineering/Design	\$2,597	\$4,221	\$9,068
Construction Management	\$2,164	\$3,518	\$7,557
Contingency	\$13,265	\$21,693	\$46,352
Real Estate (LERRDs)	\$8,904	\$9,513	\$19,018
Total Alternative Cost	\$48,566	\$74,117	\$157,557
Interest During Construction ¹	\$1,285	\$3,012	\$7,536
Total Investment Cost	\$49,851	\$77,129	\$165,093
Annualized Investment Cost ²	\$1,847	\$2,857	\$6,115
Annual O&M ³	\$19	\$26	\$34
Total Annualized Investment Cost	\$1,866	\$2,883	\$6,149
Annual Benefits	\$6,038	\$8,448	\$13,777
Annual Net Benefits	\$4,169	\$5,455	\$7,628
Benefit-Cost Ratio	3.24	2.93	2.24

1) Assumes equal annual outlays for construction periods of 24, 36, and 42 months for Alternatives 3, 4, and 5, respectively.

2) Annualized using the FY2020 Federal Discount Rate of 2.75% and 50-year period of analysis

3) Additional routine work above the without-project conditions expected to occur each year over the life cycle of the project.

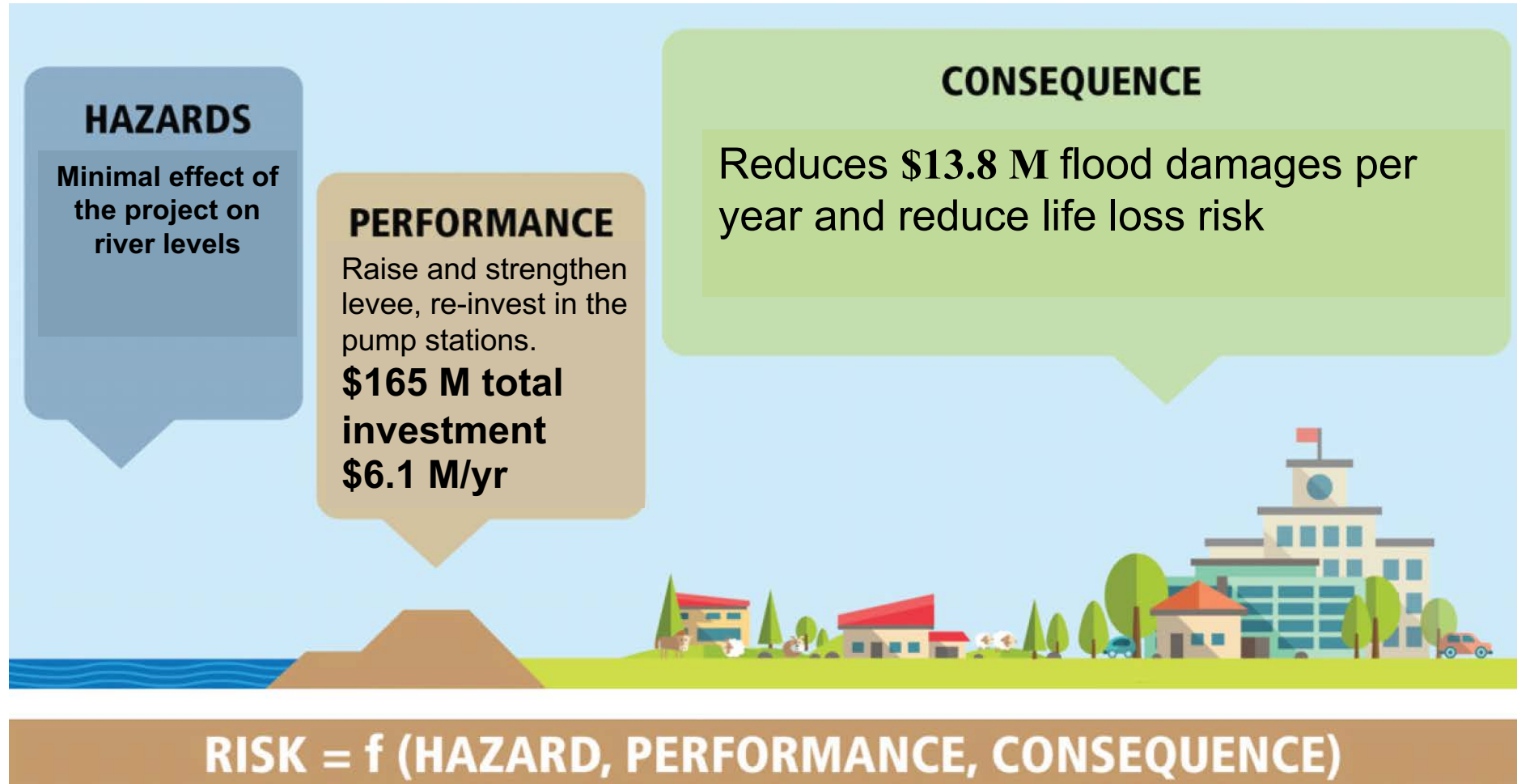
TENTATIVELY SELECTED PLAN (TSP)



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ALTERNATIVE 5



ALTERNATIVE #5 - PEN 1



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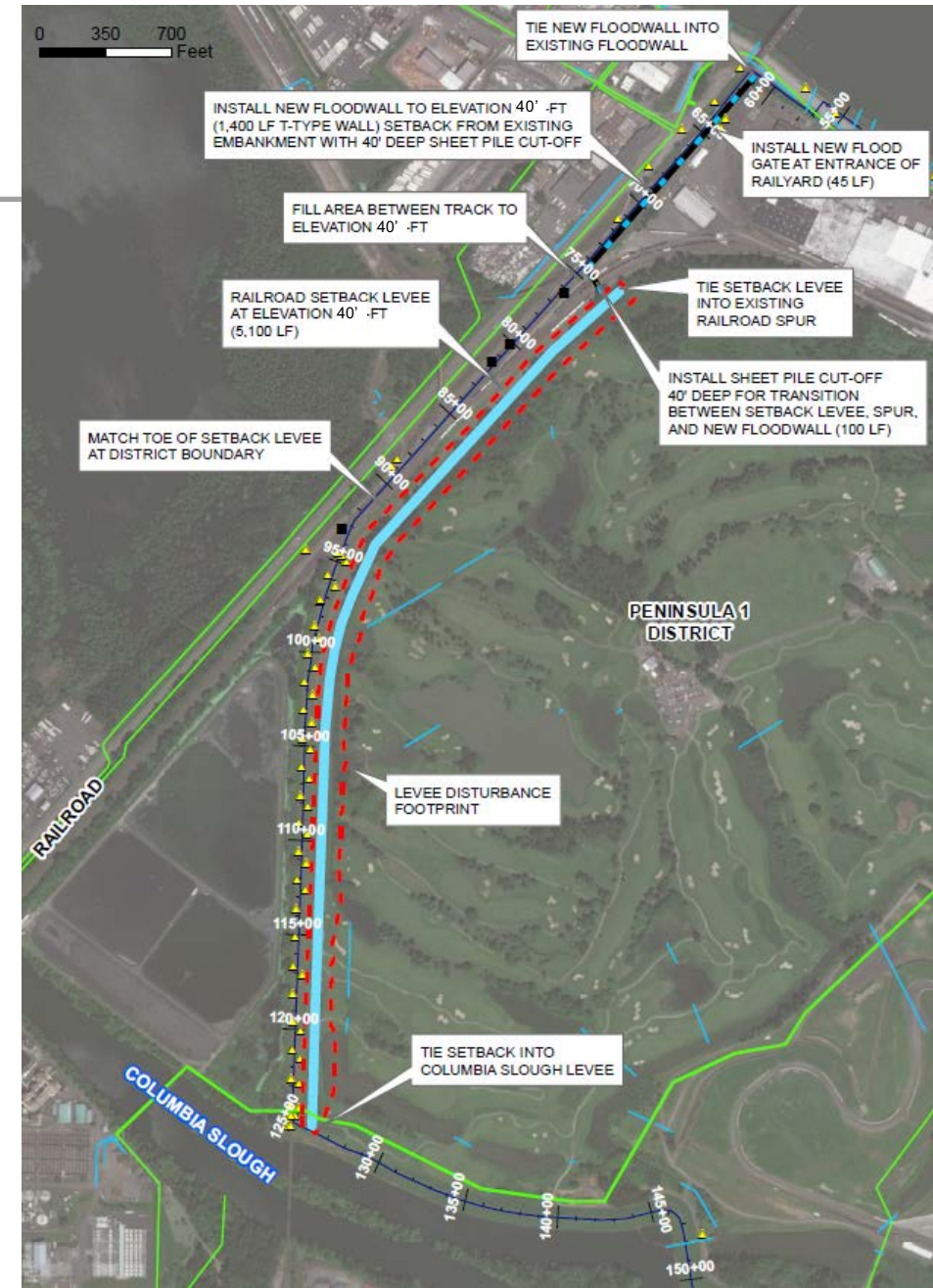
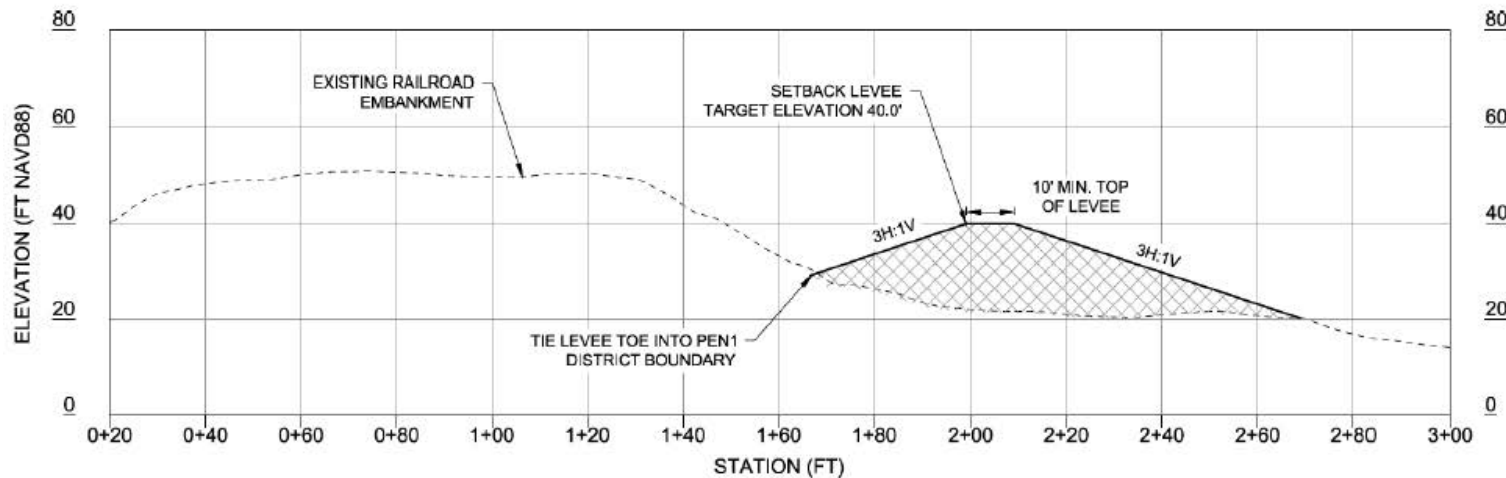


CCDD
Columbia Corridor Drainage Districts

RAILROAD SEGMENT

- Site of levee breach during 1948 flood
- Unknown condition currently
- Currently assuming no cooperation is possible with railroad, though discussions continue

TYPICAL SECTION - PEN1 RAILROAD EMBANKMENT
(PEN1 STA 89+62)



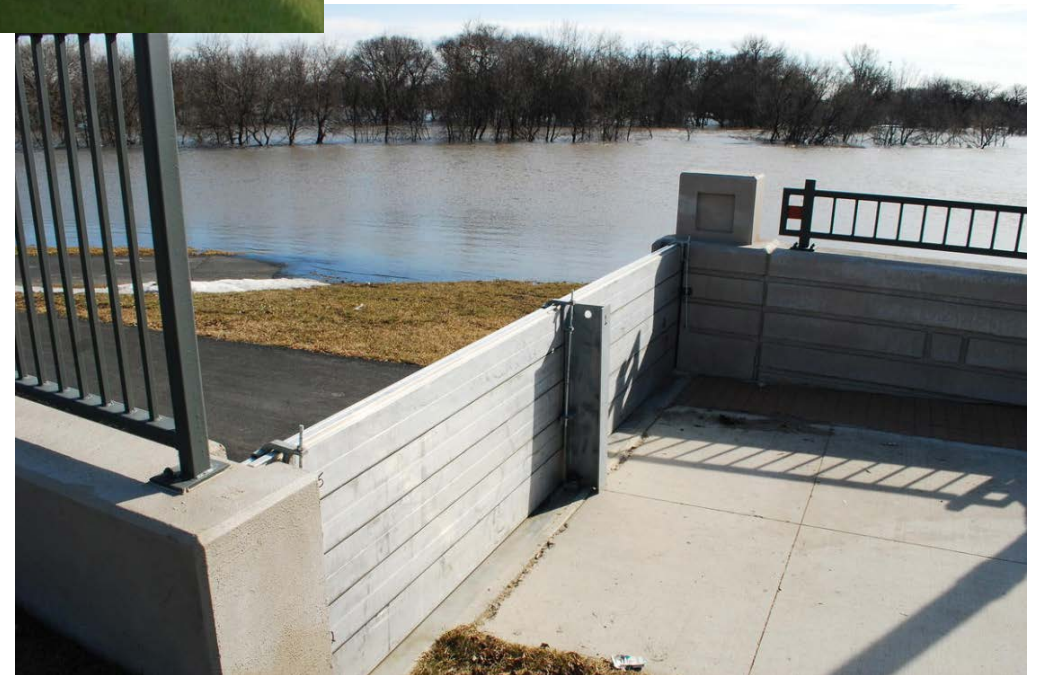
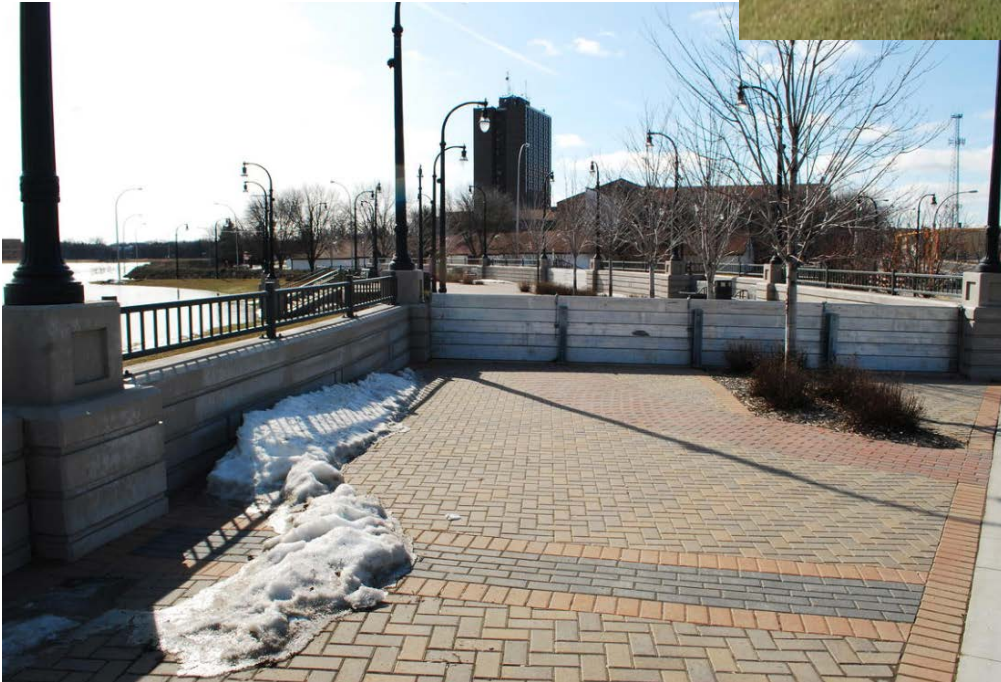
ALTERNATIVE #5 - PEN 2



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Concepts for Flood Wall Protection



Concepts for Flood Wall Protection



ALTERNATIVE #5 – MCDD West



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CCDD
Columbia Corridor Drainage Districts

ALTERNATIVE #5 – MCDD East



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ALTERNATIVE #5 – SDIC



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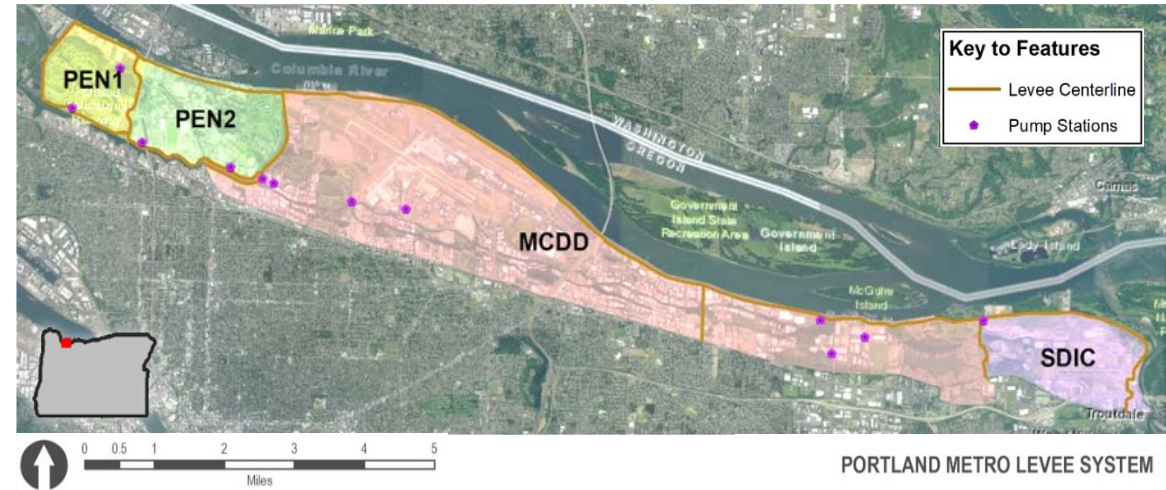


CCDD
Columbia Corridor Drainage Districts

REAL ESTATE MATTERS

Total Project footprint

- **108 acres**
- **135 parcels; 48 owners**



Requires private and publicly owned lands

- Private residential/commercial landowners
- Three Railroads
- City of Portland
- BPA
- Metro
- Port of Portland

RECAP OF PROJECT



- **Reduces the chance of a catastrophic flood, with associated loss of life and economic damages**
- **Prepares the system for changing future climate conditions**
- **Addresses long-standing system deficiencies, such as the railroad embankment**
- **Increases reliability of pump stations**
- **Increases awareness of the flood threat**
- **May add opportunities for recreation, natural/cultural resources**
- **Avoided and minimized impacts to environmental/cultural resources**
- **Consultation with resource agencies and tribes is ongoing**

MILESTONE SCHEDULE



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- ✓ FCSA Executed: 3 Oct 2018
- ✓ Alternatives Milestone: 9 Jan 2019
- ✓ TSP: 3 Oct 2019

- ✓ **Draft Report Public Review: 6 Jan 2020 – 14 Feb 2020**

- Agency Decision Milestone: 3 Apr 2020
- District Final Report Transmittal: 2 Apr 2021
- Chief's Report Signed: 3 Oct 2021

THANK YOU FOR YOUR TIME AND INPUT



The Final Draft Feasibility Study Report is available online at
<https://www.nwp.usace.army.mil/levees/pmls/>

Provide your Input

By email: PMLS-Feasibility@usace.army.mil

By mail: U.S. Army Corps of Engineers, Portland District
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