Floodplains by Design 2021-2023 Round

Water Work Session

January 21, 2020

River and Flood Programs

- Early warning and flood response
- Comprehensive planning
  - SWIF
  - CFHMP/FLIP
- National Flood Insurance Program
- Technical Assistance

Repair & Maintenance Projects

Flood Hazard Reduction Projects

FLOODPLAINS BY DESIGN

REDUCING RISK, RESTORING RIVERS.

Accomplishments to date*

Projects funded in **15 COUNTIES** across Washington

36 projects on **13** major floodplains

Reducing flood risk

38 PROTECTED communities

9.5 MILES of new, state-of-the-art levees built for flood protection

500 TONS of garbage & hazardous waste removed from Dungeness River

700 residences removed from high-risk floodplain areas

Restoring salmon habitat

Natural riverine processes restored along **25 MILES** of river

2,500 ACRES of floodplain reconnected

with planning under way for 3,000 more

Providing community benefits

Public access & recreational trails built on **8** different rivers

Protecting working lands

500 ACRES protected for long-term agricultural use

Water-quality improvements to **1,220 ACRES** of shellfish beds

Floodplains by Design is an ambitious public-private partnership working to reduce flood risk and restore habitat along Washington's major rivers. By transforming how floodplains are managed on a landscape scale, we can support thriving communities and a healthy environment. Since 2013, the Washington State Legislature has appropriated $115 million to support large-scale, multiple-benefit projects across the state through the Department of Ecology's Floodplains by Design grant program.

www.floodplainsbydesign.org

Accomplishments to date include all projects funded through 2018.

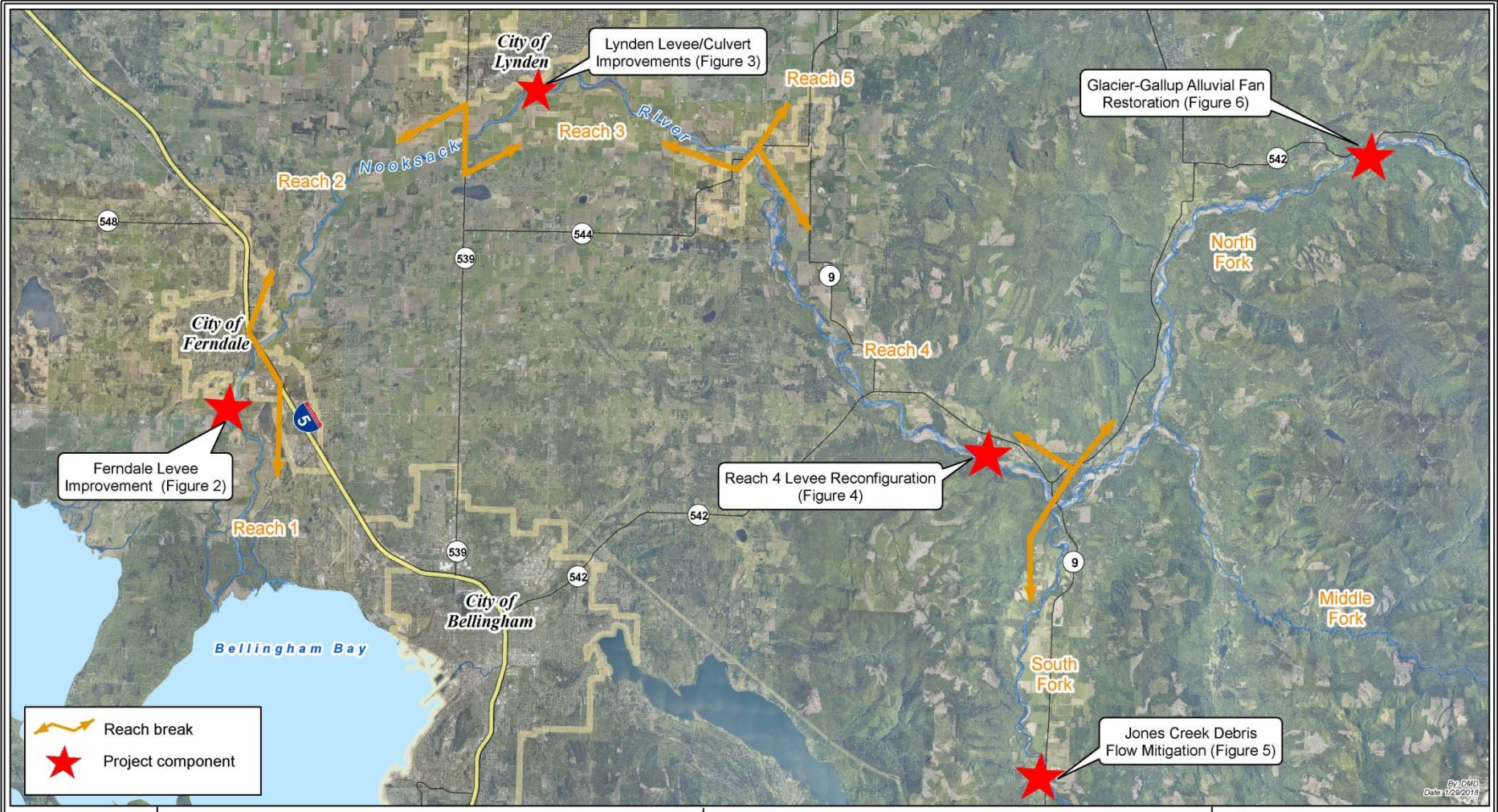
2021–2023 FbD Ranking Criteria

- Collaboration, Participation, Institutional Structures and Level of Integration – 60 points
- Flood Hazard/Risk Reduction – 60 points
- Floodplain Ecosystem Protection/Restoration – 60 points
- Direct Benefits to Agriculture – 30 points
- Other Relevant Benefits – 30 points

  (water quality, open space recreation, economic development)
- Cost Effectiveness and Budget– 10 points
- Readiness to Proceed – 30 points
- Leverage Opportunities – 30 points

2019-2021 Proposal Components

- Ferndale Levee Improvement (60 % design)
- Lynden Levee Improvement Design and Construction (channel relocation component)
- Reach 4 Land Acquisition (or other opportunity)
- Jones Creek Debris Flow Mitigation - acquisition
- Glacier-Gallup Creek (60% design, easements)
- Ag integration (Ag consultant, farmers, videos, early action project)



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Nooksack River: Floodplains that Work

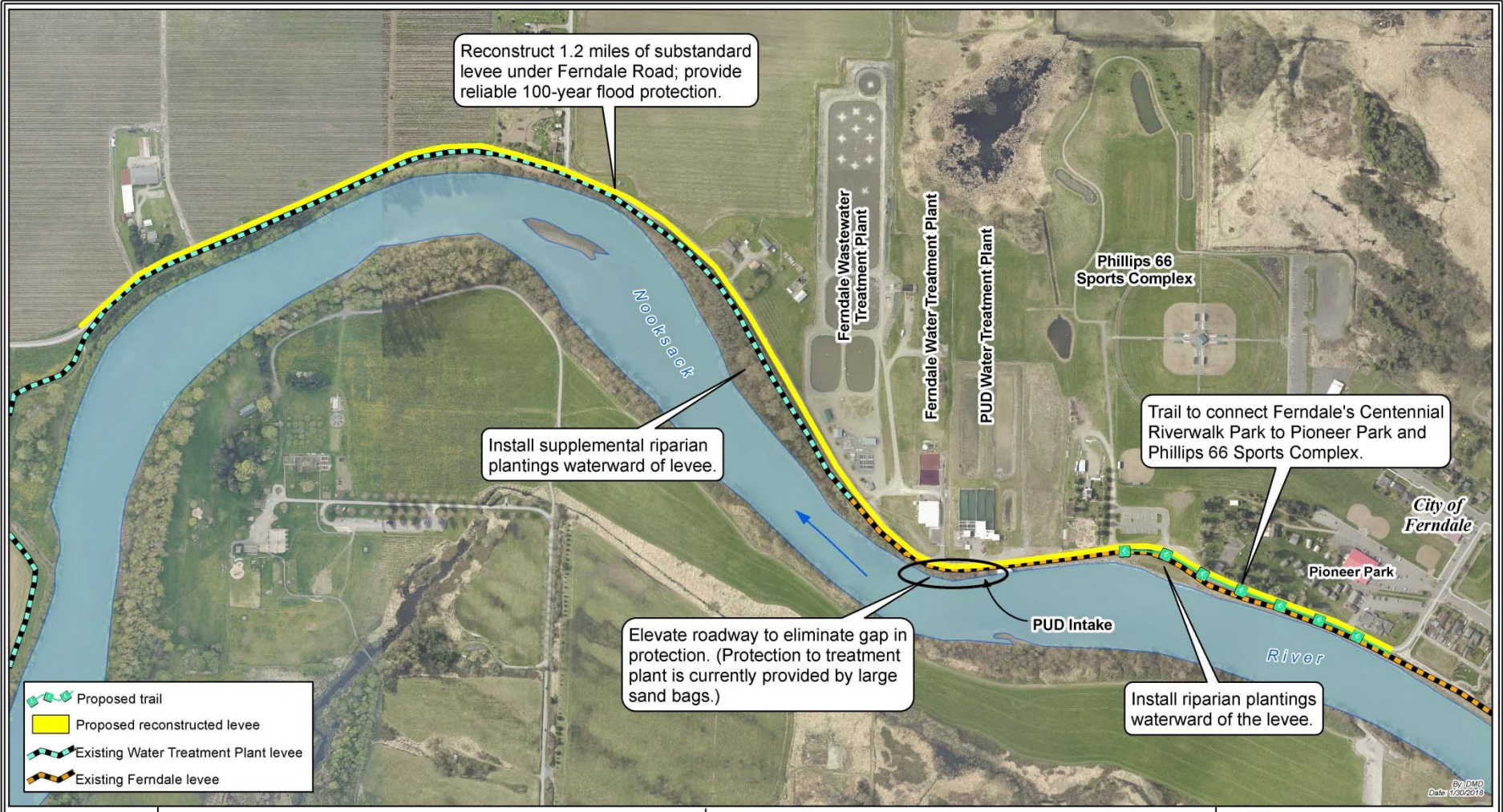
2019 - 2021 Biennium

Figure 1

Project Component Vicinity Map

Public Works Department
River & Flood Division
322 North Commercial, Suite 120
Bellingham, WA 98225-4042
P: (360) 778-6230 F: (360) 778-6231

10,000 5,000 0 10,000 Feet



Nooksack River: Floodplains that Work

2019 - 2021 Biennium

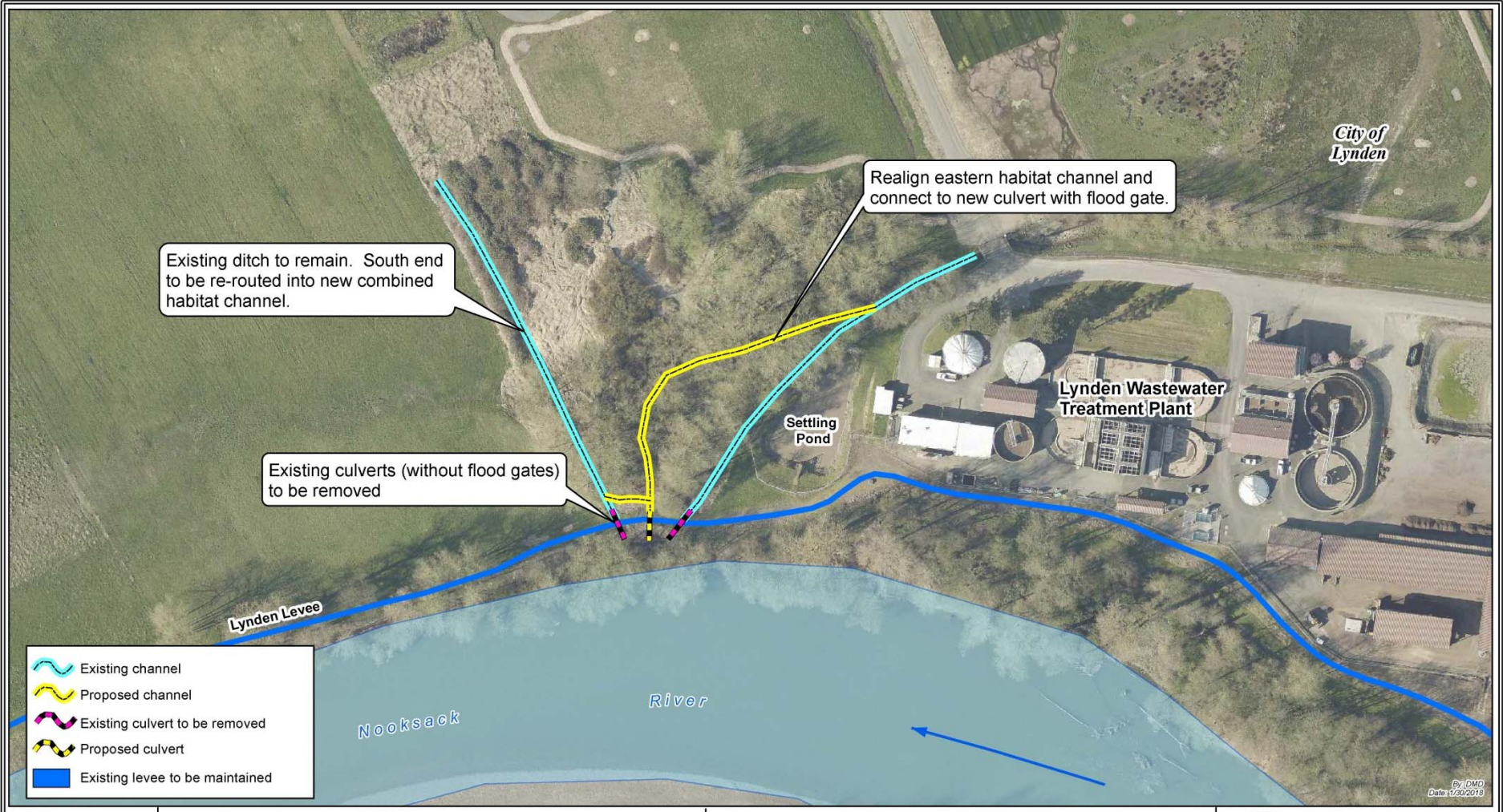
Figure 2

Ferndale Levee Improvement

Public Works Department
River & Flood Division
322 North Commercial, Suite 120
Bellingham, WA 98225-4042
P: (360) 778-6230 F: (360) 778-6231

400 200 0 400 Feet

Ferndale Levee



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Nooksack River: Floodplains that Work

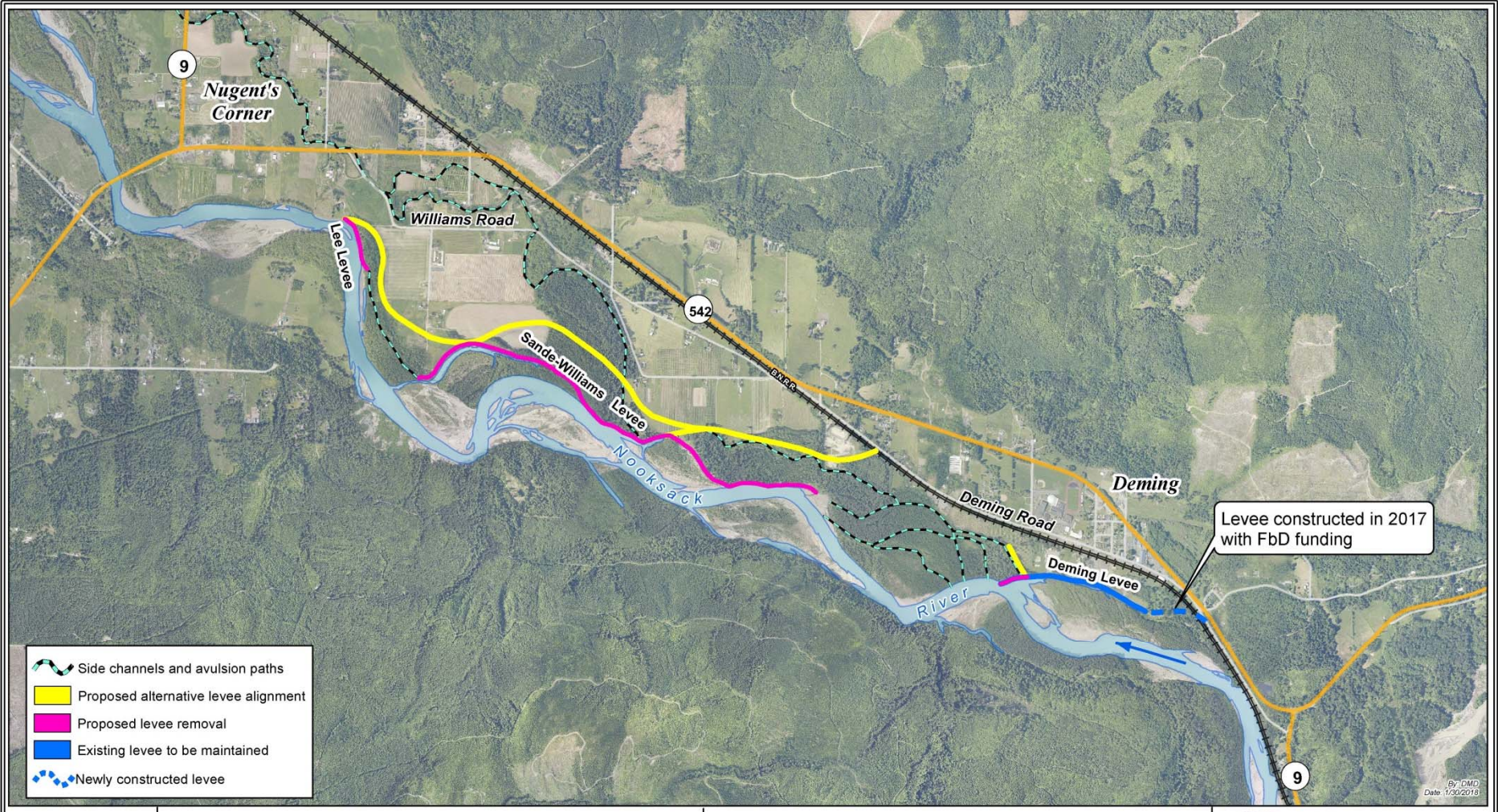
2019 - 2021 Biennium

Figure 3

Lynden Levee/Culvert Improvements

Public Works Department
River & Flood Division
322 North Commercial, Suite 120
Bellingham, WA 98225-4042
P: (360) 778-6230 F: (360) 778-6231

100 50 0 100 Feet



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Nooksack River: Floodplains that Work

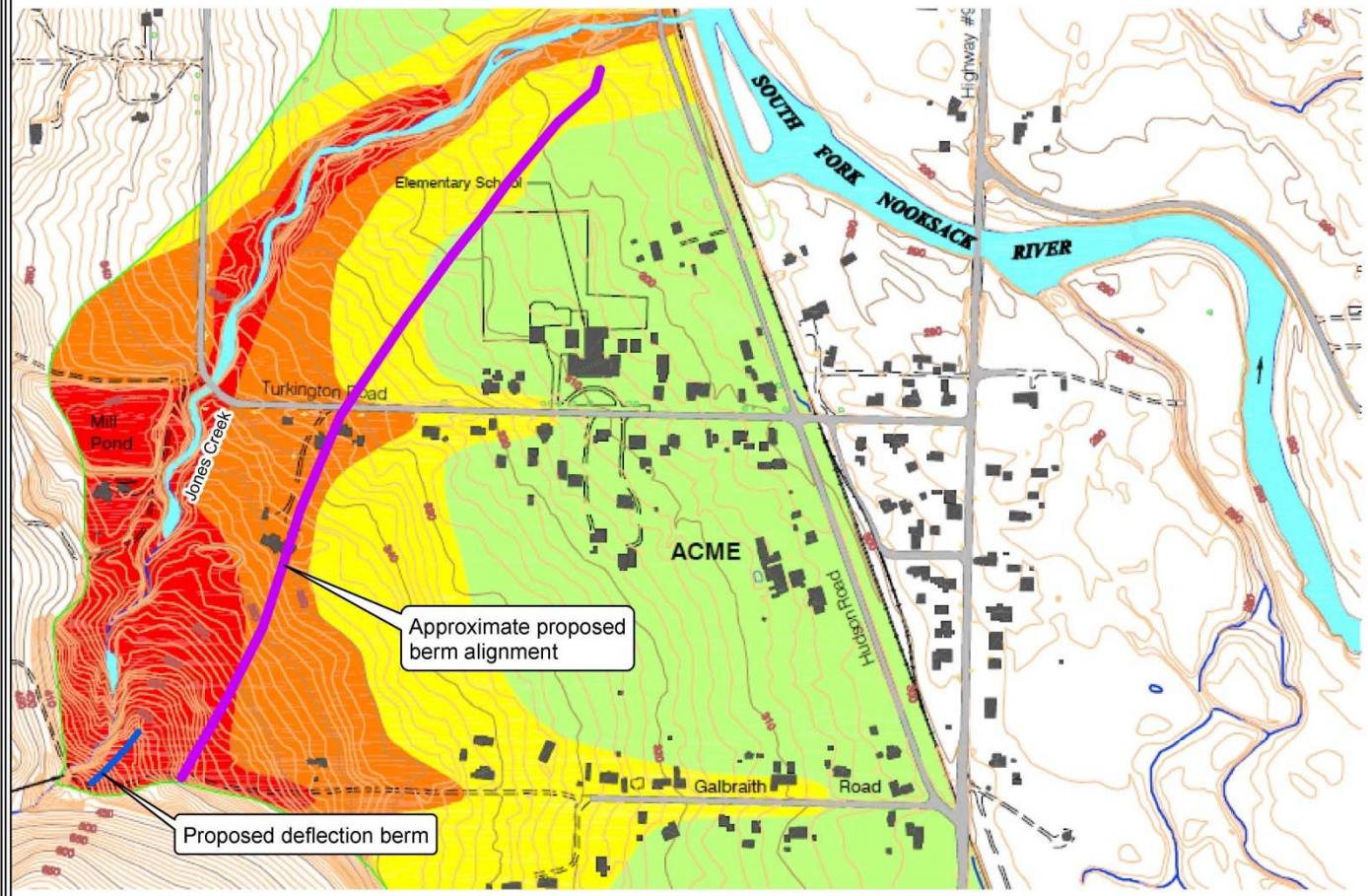
2019 - 2021 Biennium

Figure 4

Reach 4 Levee Reconfiguration
Alternative #2 from SWIF Planning Process

Public Works Department
River & Flood Division
322 North Commercial, Suite 120
Bellingham, WA 98225-4042
P: (360) 778-6230 F: (360) 778-6231

2,000 1,000 0 2,000 Feet



Legend

Railway

Approximate Fan Boundary

DEBRIS FLOW HAZARD ZONES
(500-Year Return Period)

ZONE 1
Area potentially subject to severe debris impact during a debris flow. In the event of a debris flow, there is an increased risk for loss of life and property. Not recommended for land development with our regional off-site flood control works or engineered works designed to mitigate for a flow depth up to 12 ft, a flow velocity up to 24 ft/s, and a boulder diameter up to 3 ft.

ZONE 2
Area potentially subject to direct debris impact during a debris flow. In the event of a debris flow, there is an increased risk for loss of life and property. Not recommended for land development without regional off-site flood control works or engineered works designed to mitigate for a flow depth up to 8 ft, a flow velocity up to 12 ft/s, and a boulder diameter up to 2 ft.

ZONE 3
Area potentially subject to moderate debris flow impact: depth up to 4 ft, a flow velocity up to 6 ft/s, and a sediment diameter up to 1 ft. Land development should be subject to an engineering report with on-site mitigative measures.

ZONE 4
Potentially subject to flooding and deposition during a debris flow to a depth of up to 2 ft, a velocity of up to 3 ft/s, and a sediment diameter up to 0.5 ft. Land development is subject to elevating building above the surrounding ground elevation.

KERR WOOD LEIDAL associates limited
CONSULTING ENGINEERS

By: DMD
Date: 1/30/2018

N W E S

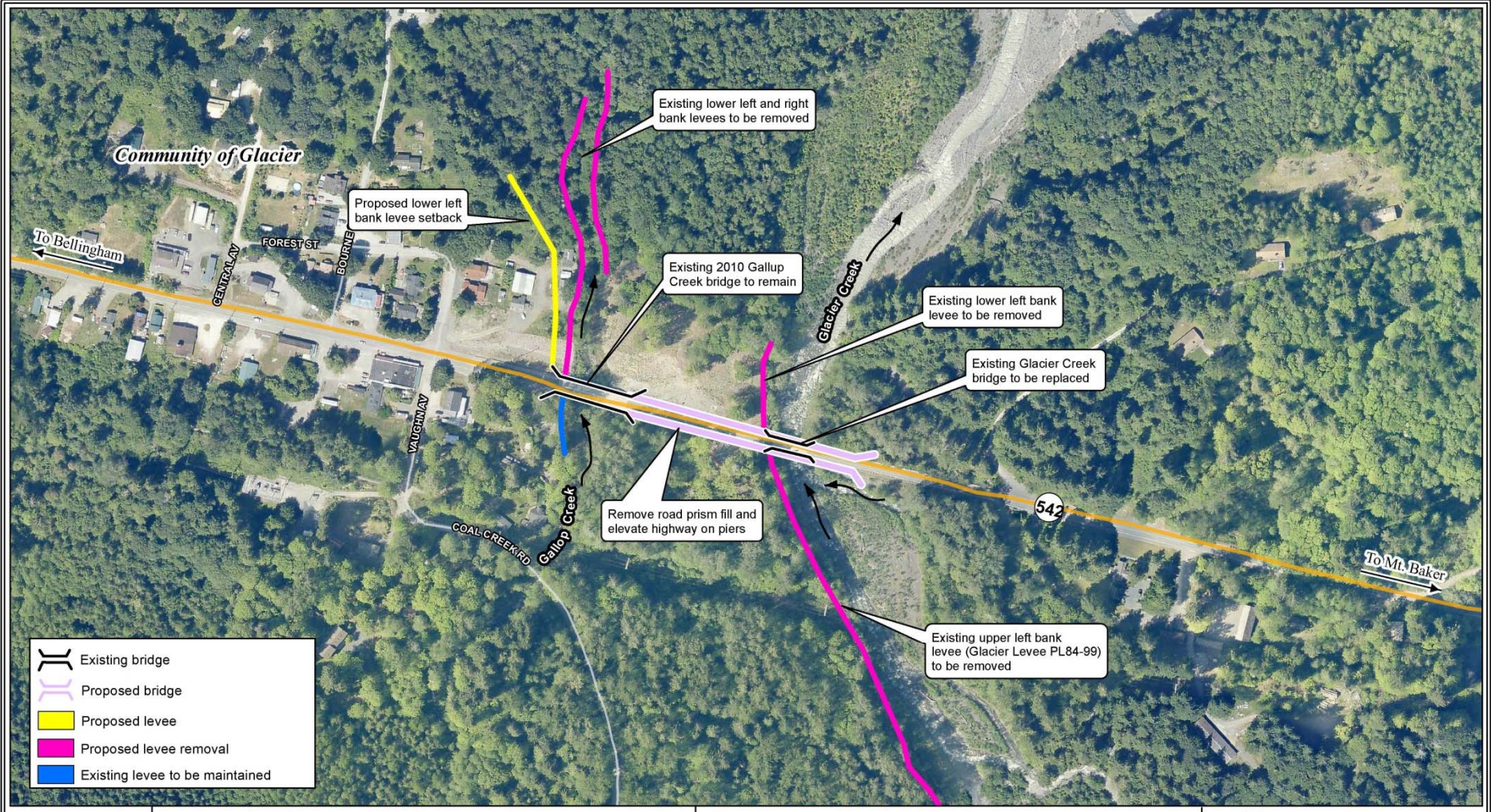
Nooksack River: Floodplains that Work

2019 - 2021 Biennium

Figure 5

Jones Creek Debris Flow Mitigation

Public Works Department
River & Flood Division
322 North Commercial, Suite 120
Bellingham, WA 98225-4042
P: (360) 778-6230 F: (360) 778-6231



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Nooksack River: Floodplains that Work

2019 - 2021 Biennium

Figure 6

Glacier-Gallup Alluvial Fan Restoration
WSDOT SR542 Preferred Alternative (#3)

Public Works Department
River & Flood Division
322 North Commercial, Suite 120
Bellingham, WA 98225-4042
P: (360) 778-6230 F: (360) 778-6231

250 125 0 250 Feet

2021-2023 Proposal Ideas

- Ferndale Levee Improvement (100% design)
- Floodplain Land Acquisition
- Jones Creek Debris Flow Mitigation (construction)
- Glacier-Gallup Creek (100% design)
- Ag integration and tribal capacity building (support for ag reps and tribal staff in FLIP)
- Fish Camp Integrated Fish-Flood Project (design and/or construction for Phase 1/2)
- Early action project on LNR from FLIP Process

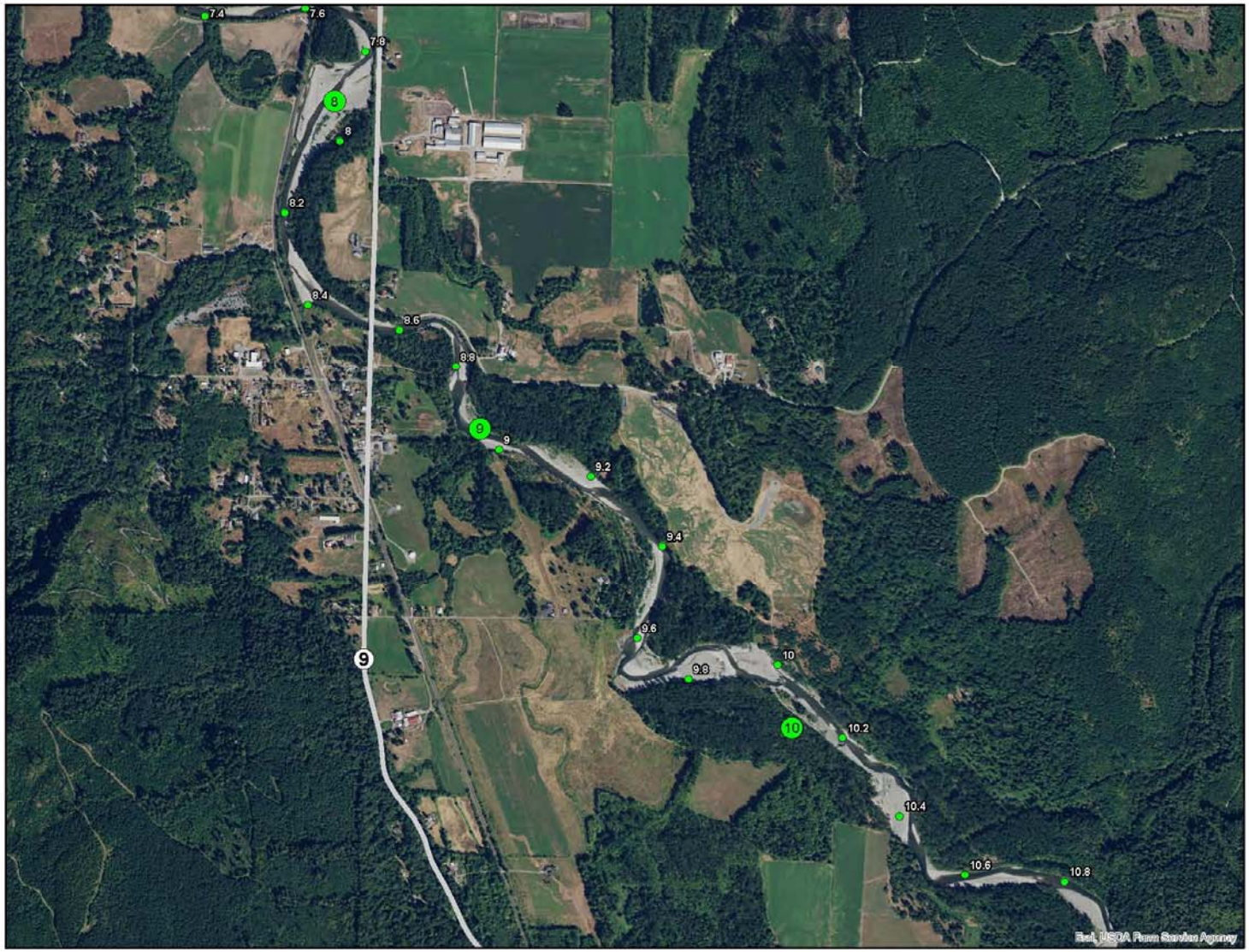


Figure 1.
South Fork Nooksack
RM8 to RM10

Legend

- USGS River Miles
- Approx. 0.2 Miles
- SR-9

N

0 550 1,100 2,200 Feet

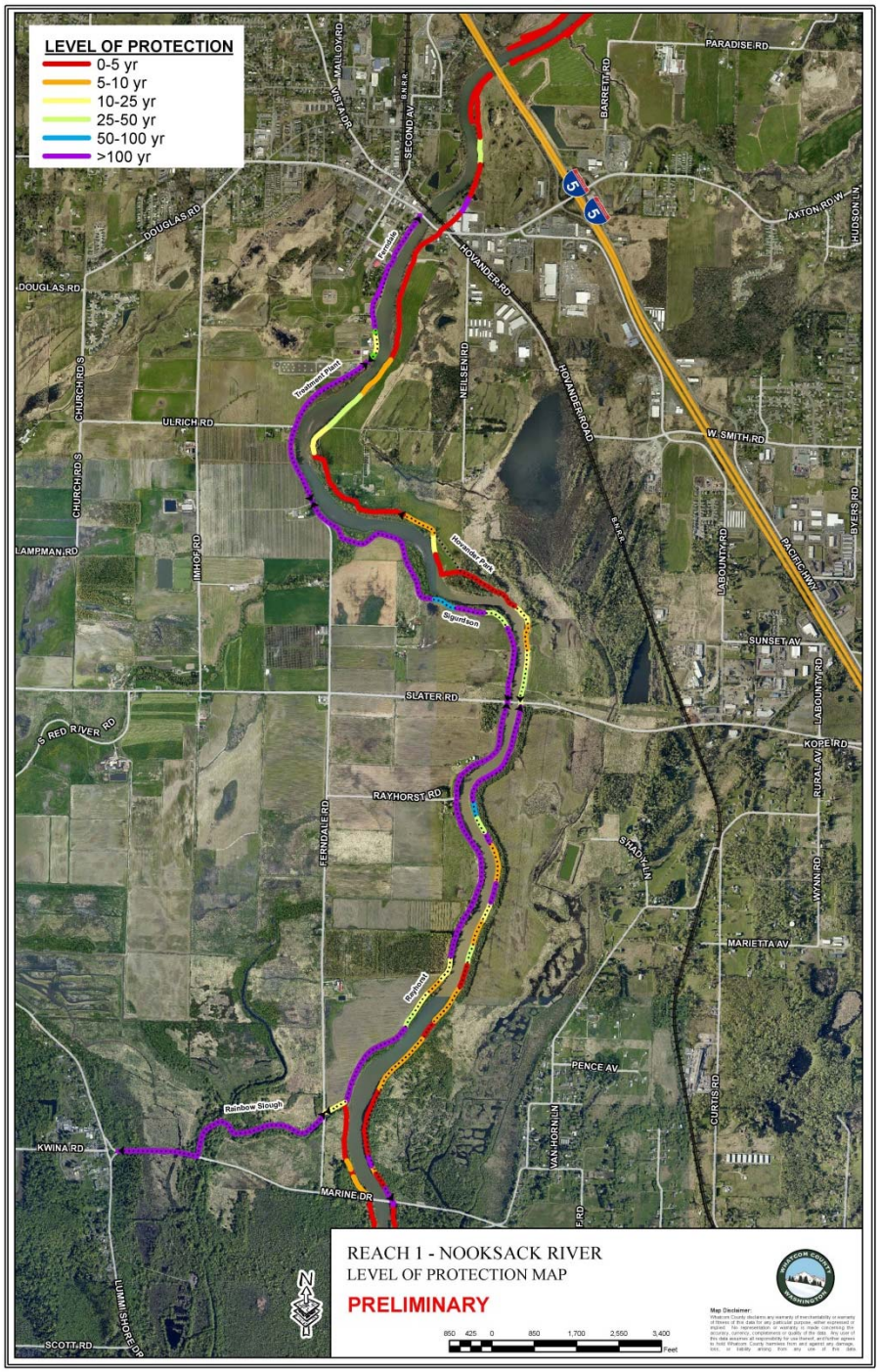
HERRERA

Whatcom County Aerial, 2016

Flood Capital Program

	Reach	Local Sponsor	Project Name	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026		2020 Scope
	NF	Roads	Rutsatz Road Emergency Stabilization	X												
	1	NA	Marietta Demolition	X			X									C
	Swift	SNE Subzone	Swift Creek bank/channel work	X		X	X	Taken on by Road program								
	NF	Roads	Truck Road Emergency Stabilization			X										
	High	NA	High Creek Sediment Traps			X										
↑	1	WDFW	Marine Drive Levee Repair			X										
Non-SWIF	Jones	AVZ Subzone	Jones Creek Deflection Berm													D
SWIF	4	DD#2	Deming Levee Improvement		X											
↓	1	Ferndale /DD#1	Ferndale Levee Improvement													D
	3	LE Subzone	Lynden Levee Improvement													D
	3	LE Subzone	Upper Hampton Levee Improvements													
	1	DD#1	Rayhorst Levee Widen/Backslope				X									
	2	DD#3	Appel Levee Culvert Replacement		X											
	2	DD#4	Bertrand Creek RB Stabilization													
	3	LE Subzone	Abbott Levee Upstream Tie-in													D
	4	SNE Subzone	Twin View Widen/Backslope													D/C
	2	DD#4	Bertrand Creek LB Stabilization													
	1	DD#1	Red River Levee Stabilization					X								C
	4	DD#2	Sande-Williams Riprap Repair	X			X									
	2	DD#3	Neevel Levee Bank Stabilization													
	2	DD#3	Devries Levee Widen/Backslope													
	2	DD#4	River Road Levee Repair													
New projects	Glacier		Glacier-Gallup Alluvial Fan Restoration													D
↓	3	LE Subzone	Hannegan Levee Rehabilitation				X									
	4	SNE Subzone	Twin View Levee Rehabilitation				X									
	1	Ferndale	Ferndale Levee Rehabilitation				X									

	Original schedule contained in final SWIF
	Schedule for projects developed outside of SWIF
X	Year constructed
	Revised from original schedule
	Funding included in FbD grant
	Construction complete
	Start/end year may vary depending on material availability


LEVEL OF PROTECTION
0-5 yr
5-10 yr
10-25 yr
25-50 yr
50-100 yr
>100 yr
PARADISE RD
BARRETT RD
MALLOY RD
SECOND AV
AXTON RD W
HUDSON LN
DOUGLAS RD
HOVANDER RD
NEILSEN RD
HOVANDER ROAD
ULRICH RD
W. SMITH RD
CHURCH RD S
LAMPMAN RD
IMHOF RD
LABOUNTY RD
PACIFIC HWY
BYERS RD
SUNSET AV
SLATER RD
S RED RIVER RD
KOPE RD
RURAL AV
RAYHORST RD
FERNDALE RD
STADY LN
WYNN RD
MARIETTA AV
PENCE AV
CURTIS RD
VAN HORN LN
KWINA RD
MARINE DR
ILLMMI SHORE DR
SCOTT RD
Rainbow Slough
Bigrivlan
N
REACH 1 - NOOKSACK RIVER
LEVEL OF PROTECTION MAP
PRELIMINARY
850 425 0 850 1,700 2,550 3,400
Feet
Map Disclaimer:
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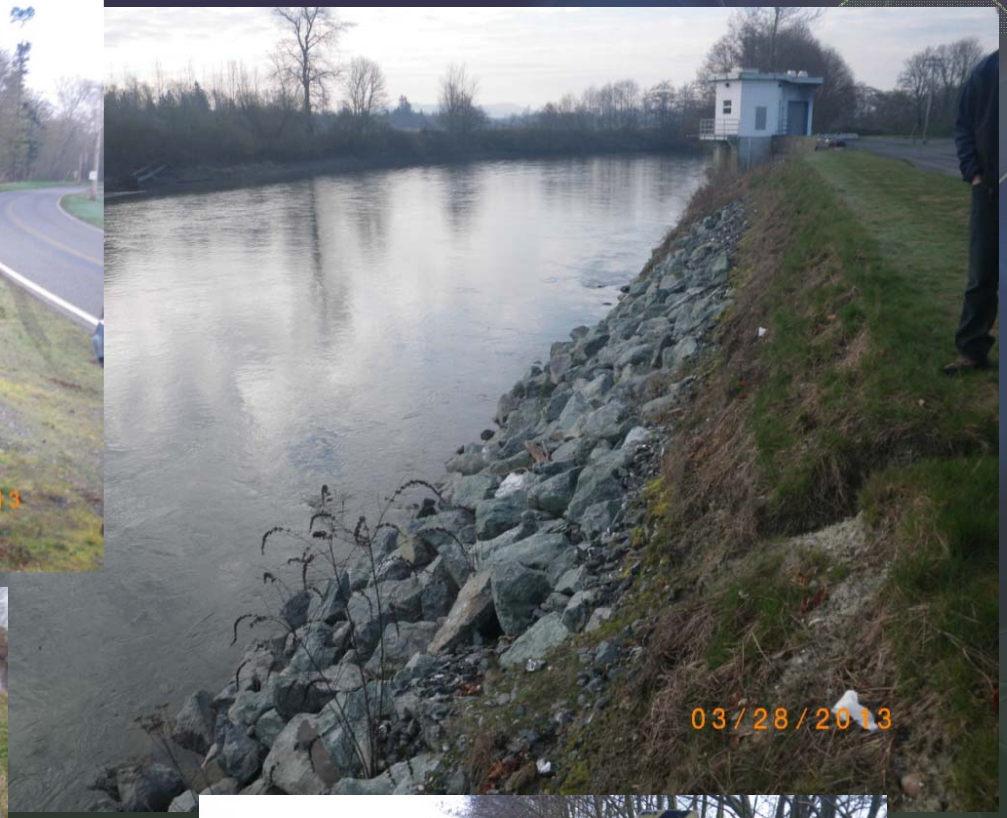
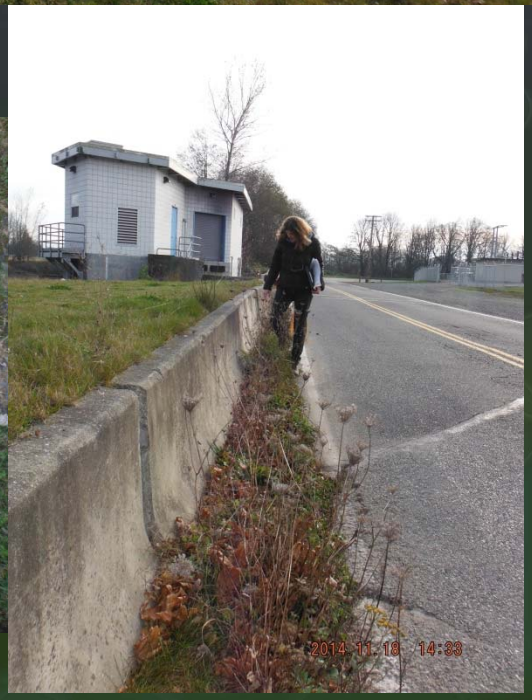
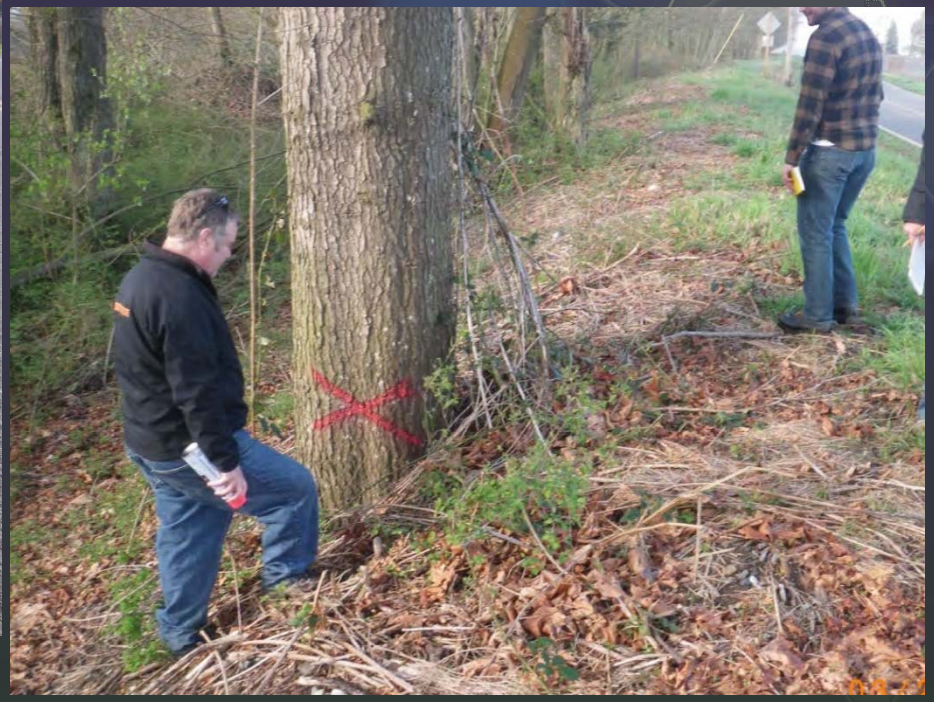


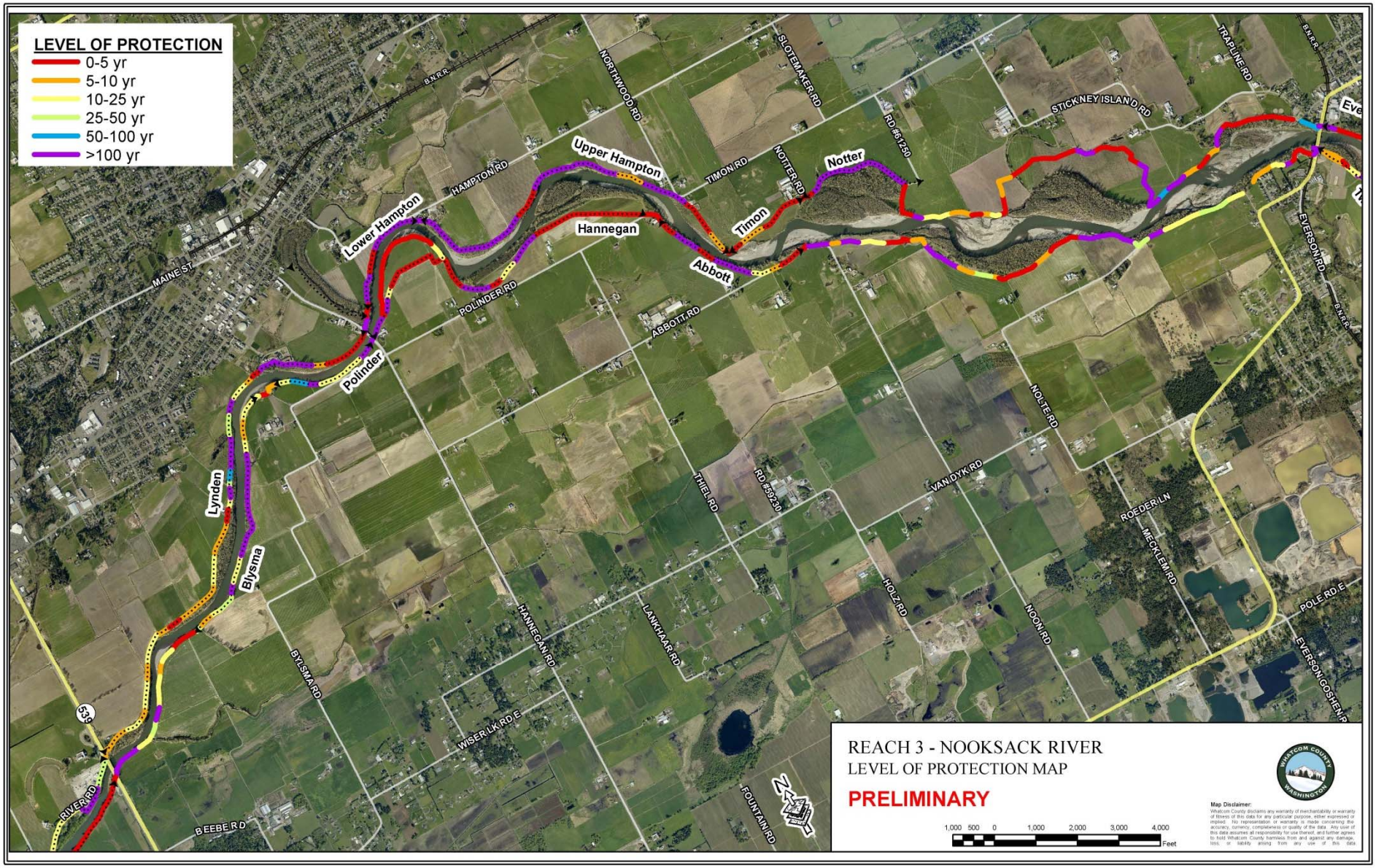
Ferndale Levee



Ferndale Levee



Ferndale Treatment Plant Levee


LEVEL OF PROTECTION
0-5 yr
5-10 yr
10-25 yr
25-50 yr
50-100 yr
>100 yr
Upper Hampton
Lower Hampton
Hannegan
Timon
Notter
Abbott
Polinder
Lynden
Blysma
B.N.R.R.
NORTHWOOD RD
SLOTEMAKER RD
TRAPLINE RD
STICKNEY ISLAND RD
RD #6 1250
HAMPTON RD
TIMON RD
NOTTER RD
MAINE ST
POLINDER RD
ABBOTT RD
EVERSON RD
NOLTE RD
THIEL RD
RD #59 230
VAN DYK RD
ROEDER LN
MECKLEM RD
HOLZ RD
NOON RD
POLE RD E
EVERSON GOSHEN RD
HANNEGAN RD
LANKHAAR RD
BYLSMA RD
WISER LK RD E
FOUNTAIN RD
BEEBE RD
RIVER RD
539
REACH 3 - NOOKSACK RIVER
LEVEL OF PROTECTION MAP
PRELIMINARY
1,000 500 0 1,000 2,000 3,000 4,000
Feet
WHATCOM COUNTY WASHINGTON
Map Disclaimer:
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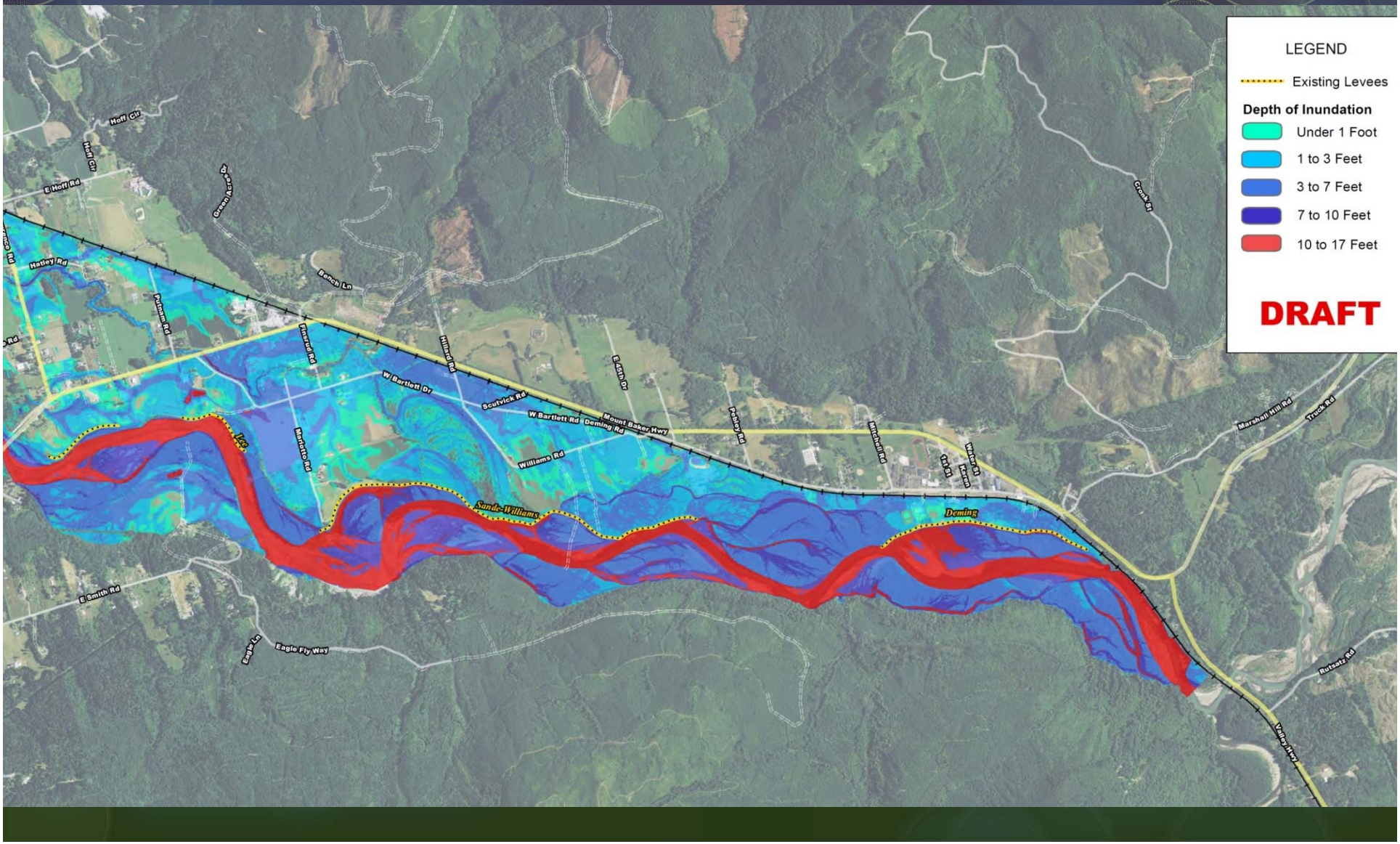
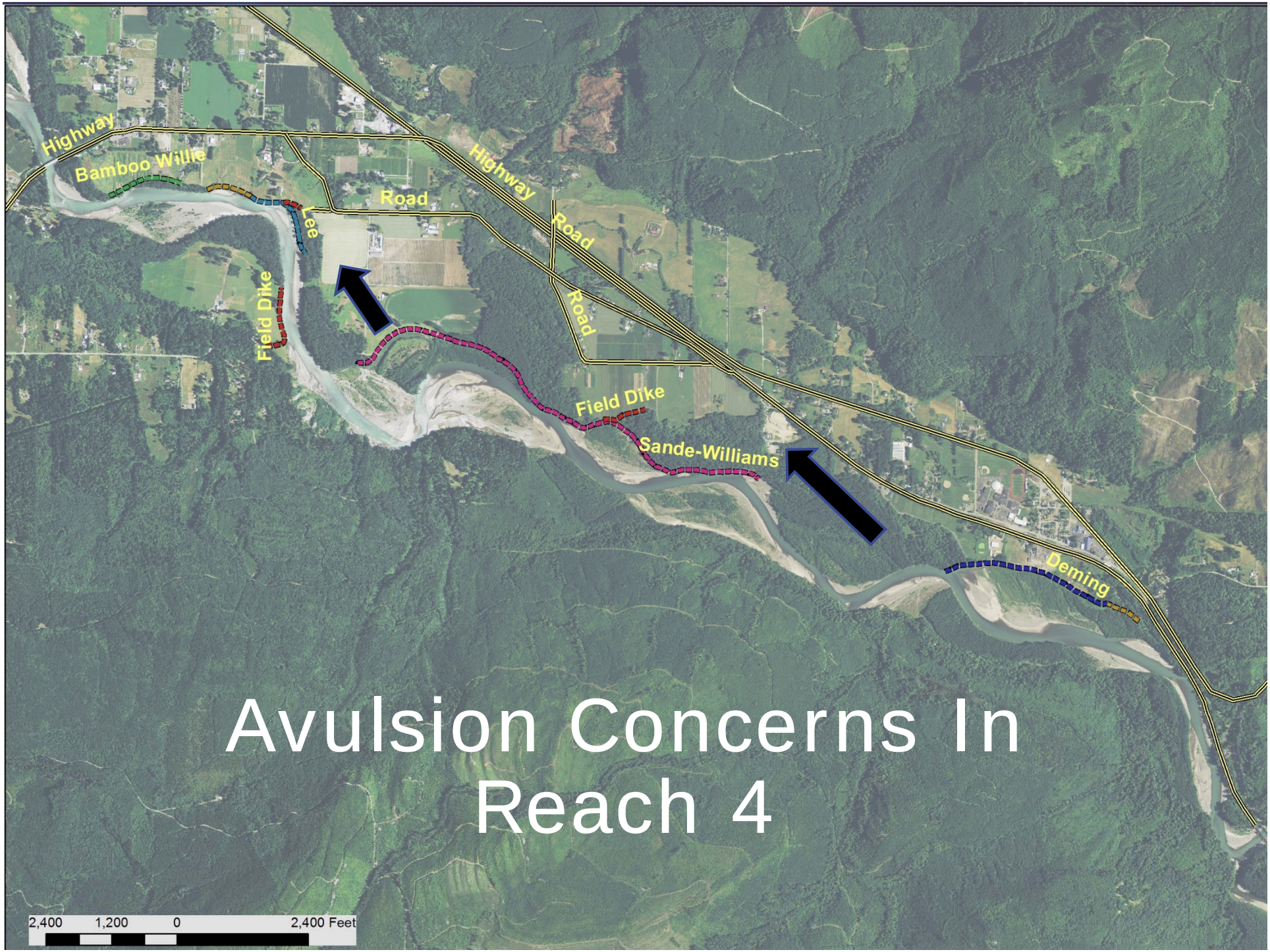
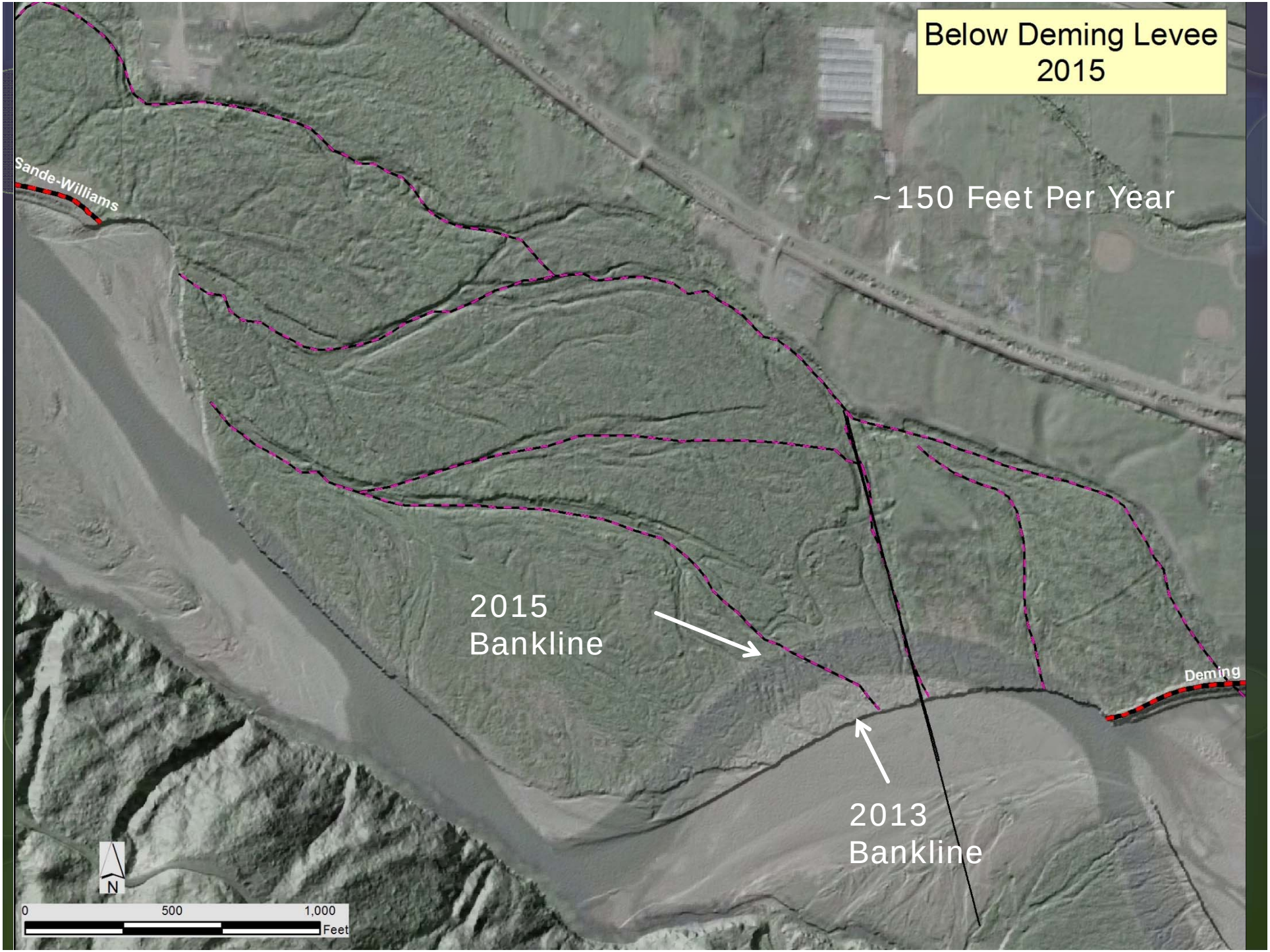
Lynden Culverts

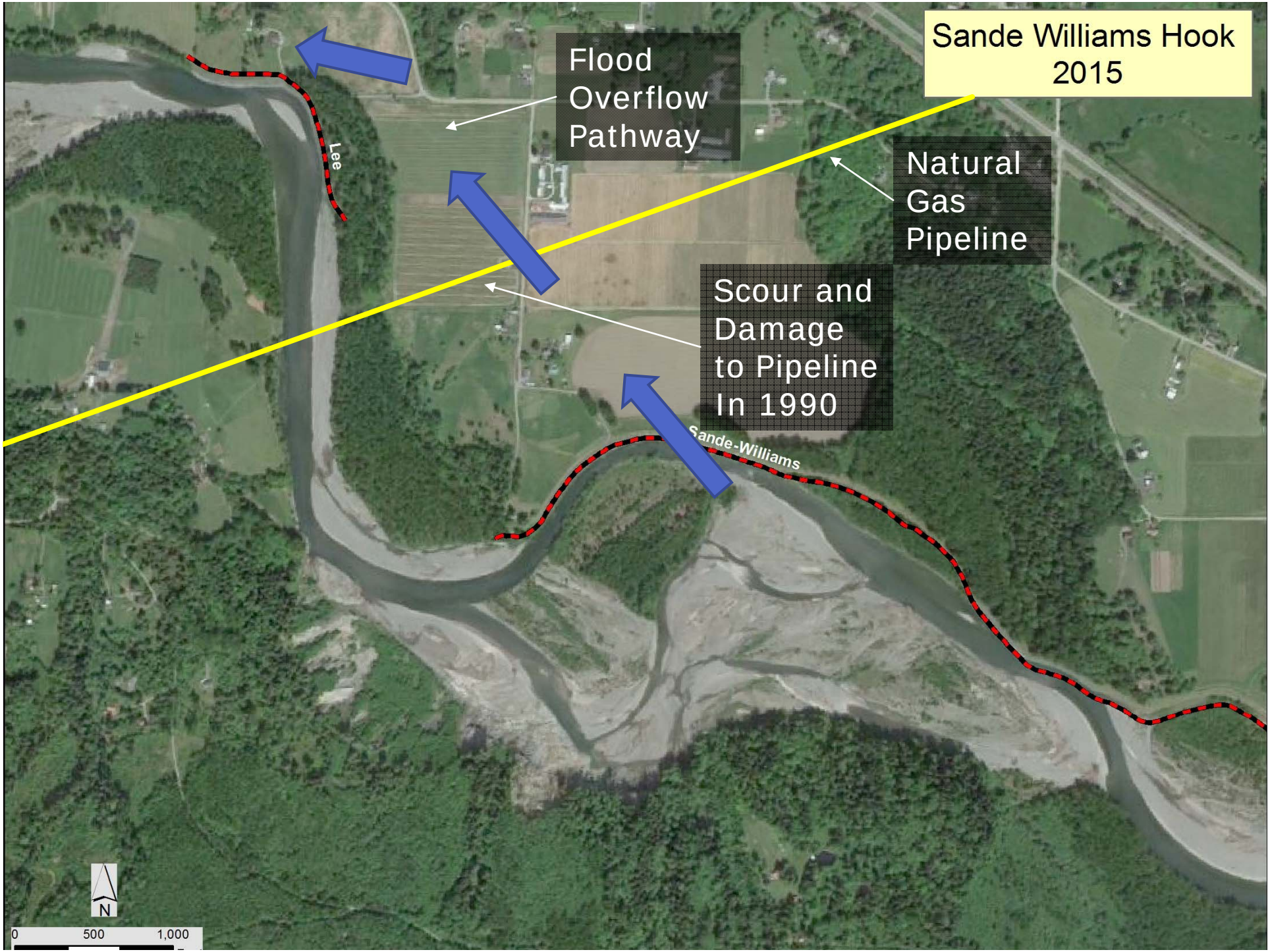
Existing Conditions 100-Yr Flood

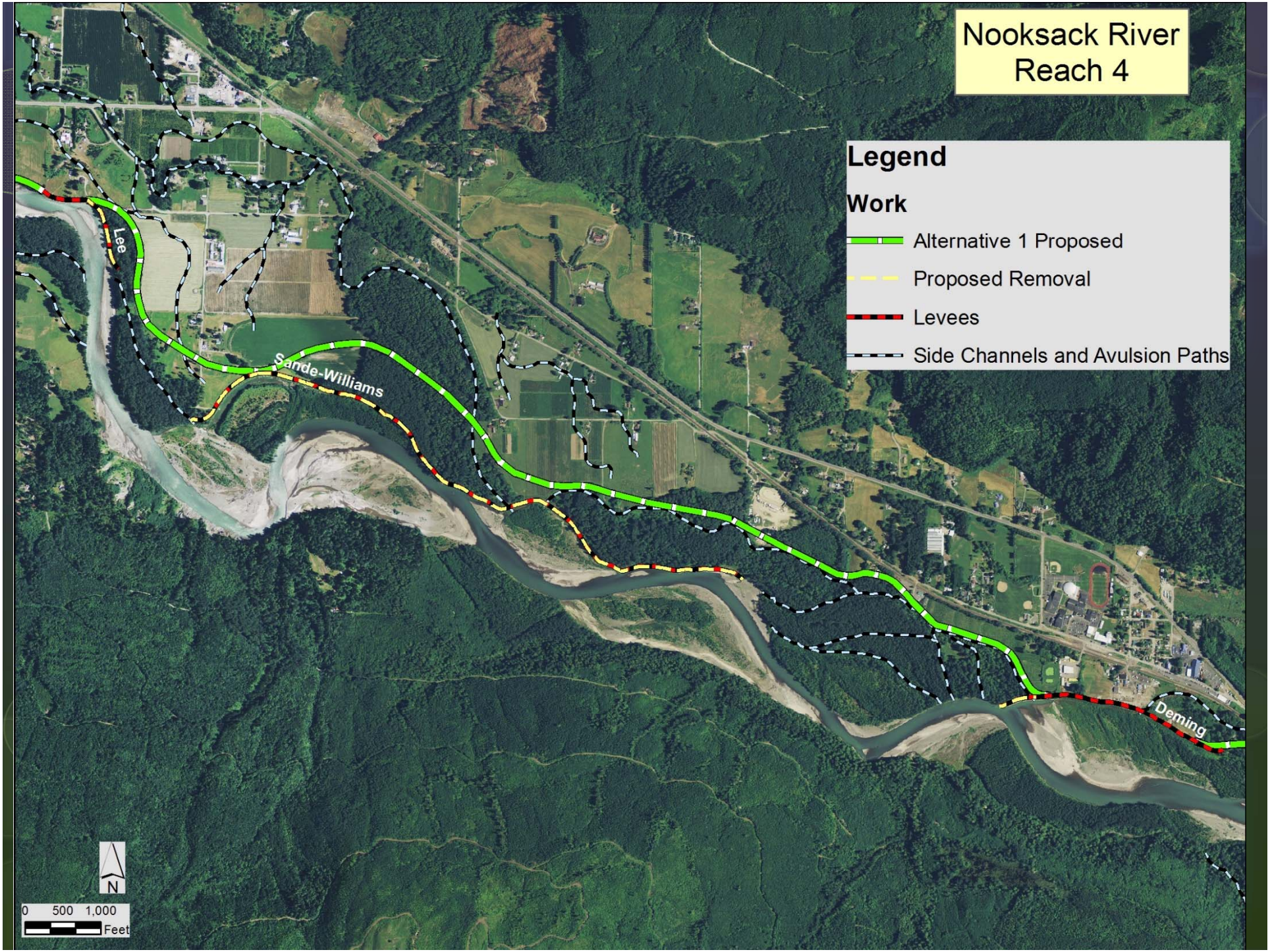


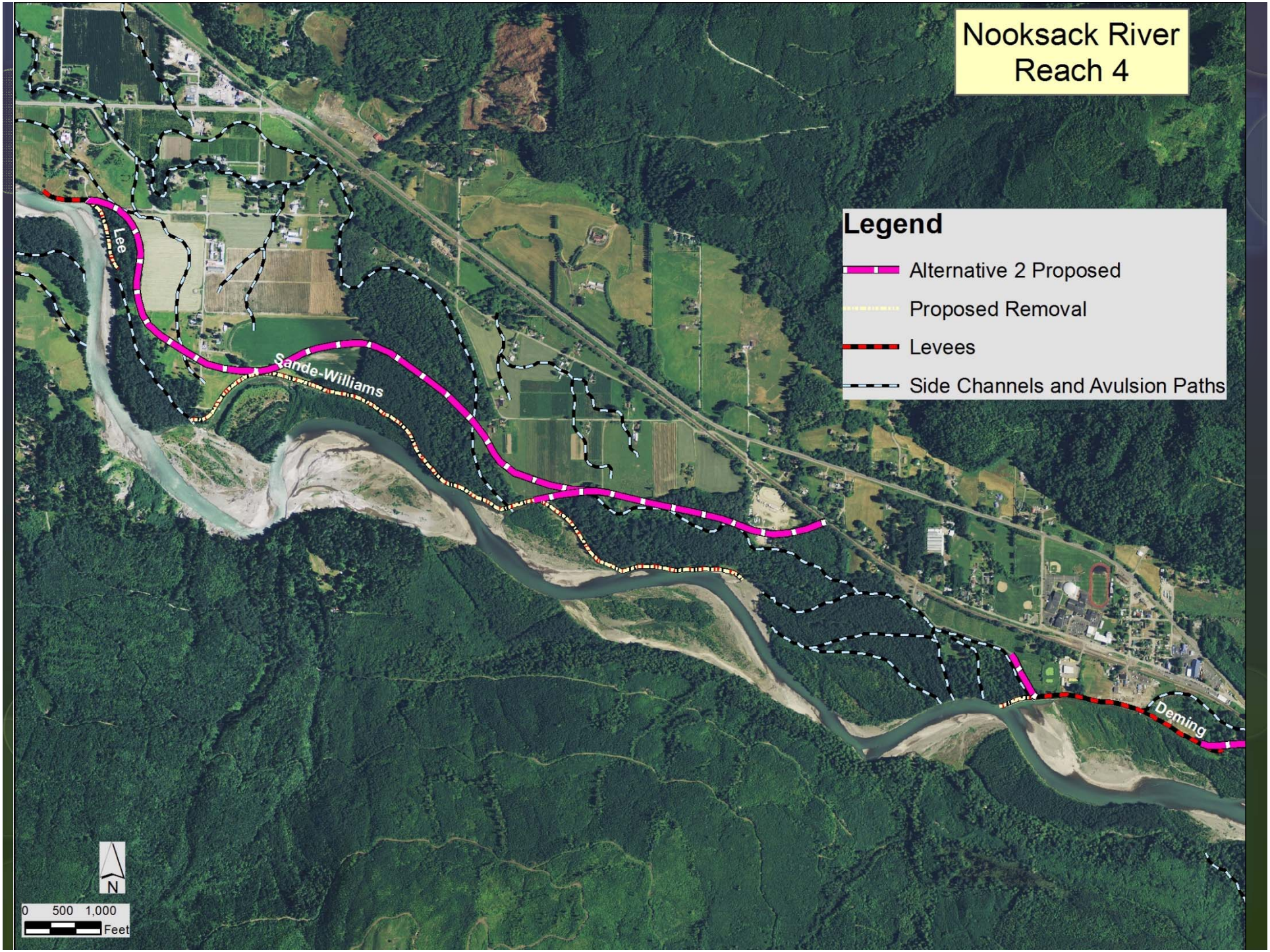


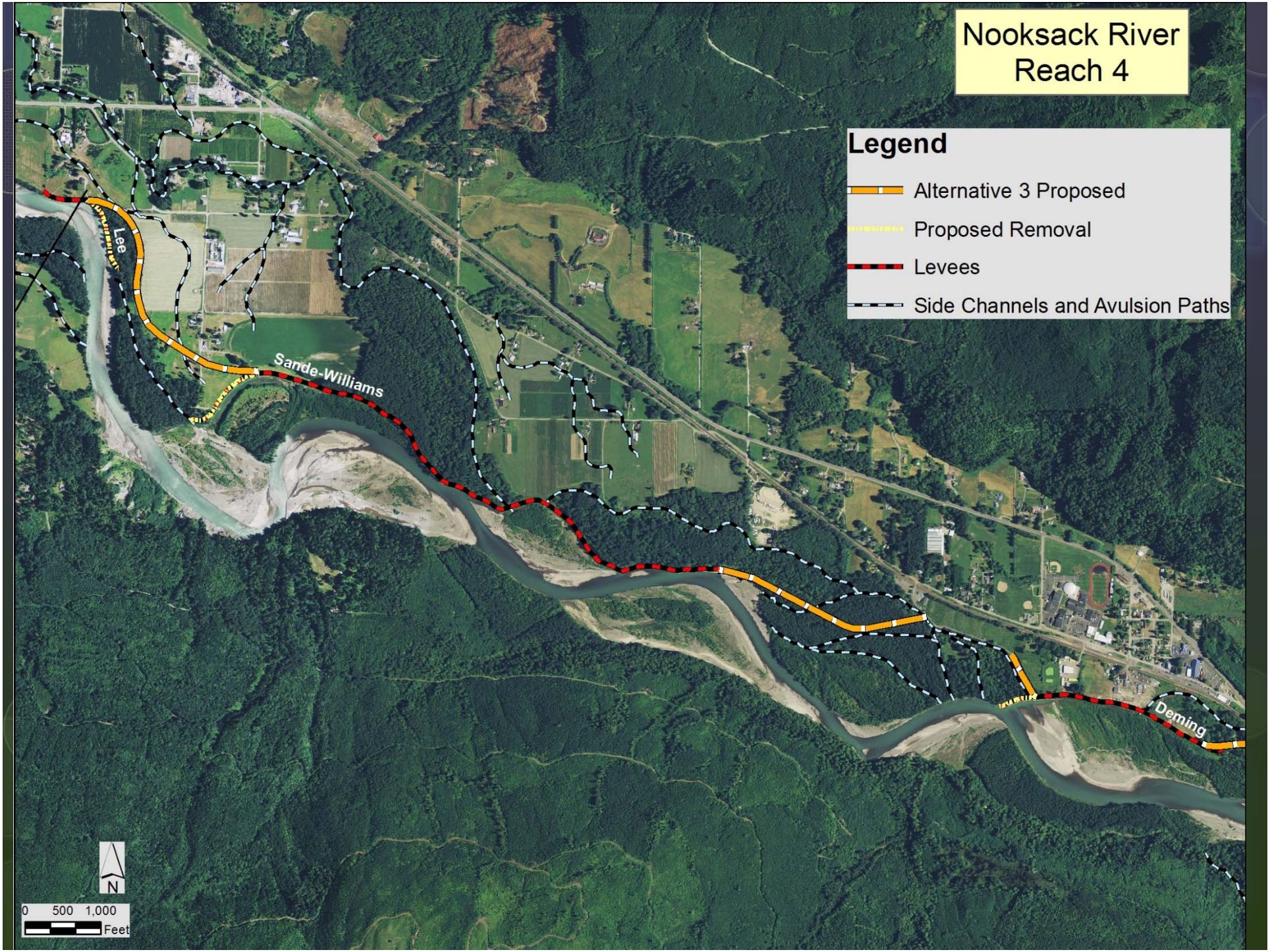
Avulsion Concerns In Reach 4


Below Deming Levee
2015
~150 Feet Per Year
Sande-Williams
2015
Bankline
2013
Bankline
Deming
N
0
500
1,000
Feet


Sande Williams Hook
2015
Flood
Overflow
Pathway
Natural
Gas
Pipeline
Scour and
Damage
to Pipeline
In 1990
Lee
Sande-Williams
N
0
500
1,000


Nooksack River
Reach 4
Legend
Work
Alternative 1 Proposed
Proposed Removal
Levees
Side Channels and Avulsion Paths
Lee
Sande-Williams
Deming
N
0 500 1,000
Feet


Nooksack River
Reach 4
Legend
Alternative 2 Proposed
Proposed Removal
Levees
Side Channels and Avulsion Paths
Lee
Sande-Williams
Deming
N
0 500 1,000
Feet


Nooksack River
Reach 4
Legend
Alternative 3 Proposed
Proposed Removal
Levees
Side Channels and Avulsion Paths
Lee
Sande-Williams
Deming
N
0 500 1,000
Feet

Reach 4 – Alternatives Summary

	Existing	Alternative 1	Alternative 2	Alternative 3
Project Cost (2014 $)	--	$58M	$48M	$34M
Average Annual Maintenance	$440,000	$330,000	$270,000	$300,000
Floodplain Connectivity Area	~0 acres	~142 acres	~142 acres	~10 acres