



## MEMORANDUM

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Project 22138

**TO:** Derrick Crane, P.E. - Natural Resources Conservation Service

**FROM:** Robert Huzjak, P.E. - RJH Consultants, Inc.

**DATE:** March 26, 2024

**RE:** Brush Creek Site 12 Dam Rehabilitation Planning – Second Public Meeting Notes

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This memorandum presents a summary of items discussed during the Second Public Meeting held on March 26, 2024. The Second Public Meeting is a requirement of the Supplemental Watershed Plan and Environmental Document for the Brush Creek Site 12 Dam Rehabilitation Planning (Project). The meeting was hosted by the Natural Resources Conservation Service (NRCS) and was supported by the Sponsoring Local Organizations (Sponsors – including Mercer County Commission, Southern Conservation District, and the West Virginia Conservation Agency), RJH Consultants, Inc. (RJH), and WSP Global, Inc. (WSP).

The meeting began at 6:30 p.m. and was held in-person at the Gardner Center (241 Mercer Springs Road, Princeton, WV 24740) and virtually using Zoom meeting software. The virtual presentation was recorded and is available electronically in the Project file. This memorandum is a summary of the meeting and is not intended to be a verbatim account of what transpired.

The following individuals conducted the presentation:

<b>NRCS</b>	<b>RJH</b>	<b>WSP</b>
Derrick Crane	Robert Huzjak	Ghazoll Motlagh
	Adam Prochaska	

### Purpose

The purposes of this meeting were as follows:

- Review general Project information that was previously presented at the March 7, 2023 Public Scoping Meeting.
- Explain data that was collected to support evaluations.
- Explain existing deficiencies of various dam components.
- Explain the alternatives that were evaluated to address the deficiencies and the estimated construction costs for each. Four alternatives were evaluated:
  1. No Action: Performing no work to address the deficiencies and accepting the risk of dam failure.
  2. Decommissioning: Breaching the dam, purchasing property in the downstream floodplain, and demolishing structures in the floodplain.
  3. Nonstructural: Breaching the dam and constructing downstream channel improvements to prevent flooding of existing structures.
  4. Structural: Constructing a dam rehabilitation.

- Explain the environmental, architectural, and archeological impacts associated with each of the four alternatives.
- Present the Sponsors' preferred alternatives. The following two structural rehabilitation alternatives are preferred:
  1. Replace the existing dam with a new embankment dam and a concrete or RCC spillway chute through the left abutment.
  2. Replace the existing dam with a new RCC gravity dam and overtopping spillway section.
- Either alternative would include a new access road onto the property that crosses the creek downstream of the dam and extends over the left side of the dam.

## **Attendance**

Meeting notification and the link to the Zoom meeting were distributed to interested agencies, nearby landowners, posted in local and regional newspapers, and posted on social media prior to the meetings.

In-person attendance is shown in Attachment 1.

The following participants attended virtually using Zoom:

- Titus Smith (NRCS)
- Debra Croy (local homeowner)
- Will Lawton (college student)
- 304-320-0888
- 304-887-0800

## **Presentation**

A PowerPoint slide deck was used to facilitate the meetings and share pertinent information with meeting attendees. The slides used in the meetings are provided in Attachment 2.

## **Discussion**

In-person attendees concurred with the preferred structural alternatives.

Debra Croy noted that existing water lines would interfere with the new culverts proposed for Alternative 3. RJH explained that the existing water lines may need to be relocated to accommodate the culverts. This would need to be evaluated in more detail if Alternative 3 is advanced.

**Attachments:**

1. In-person Attendance Sheet
2. Meeting Slides

Brush Creek Site 12 Plan-Environmental Document Second Public Meeting Attendance Sheet  
March 26, 2024

Attachment 1

Name	Affiliation	Email	Phone
Bob Huzjak	RJH	rhuzjak@rjh-consultants.com	303-225-4611
Adam Prochaska	RJH	aprochaska@_____	303-225-4611
Ghazali Motlagh	WSP/RJH	Ghazali.Motlagh@wsp.com	215-863-1639
Sigrid Teets	WVCA	steets@wvca.us	681-993-6224
Andy Deichert	NRCS	andy.deichert@usda.gov	304-284-7563
Bill Harris	SCD	bharris8459@gmail.com	304-573-9457
DERRICK CRANE	NRCS	derrick.crane@usda.gov	304-284-7596
Shane Pottery	WVCA	kpottery@wvca.us	204-807-3052
Bill Tucker	Merica Co (commissioner)	commissioner@merica.com	304-407-8310
Jennifer Skaggs	WVCA	jskaggs@wvca.us	304-941-3134
Carla Murphy	SCD	_____	304-467-7048

## Attachment 2

# Brush Creek Site 12 Plan-Environmental Document

## Second Public Meeting

March 26, 2024, 6:30-8:00 PM

Gardner Center  
241 Mercer Springs Road  
Princeton, WV 24740



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## Meeting Agenda

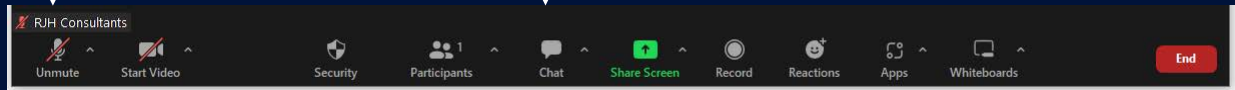
1. Logistics, Introductions, and Objectives
2. Background
3. NRCS Watershed Rehabilitation Program and NEPA Process
4. Purpose and Need
5. Summary of Data Collection
6. Primary Dam Safety Deficiencies
7. Summary of Alternatives to Address Existing Deficiencies
8. Which Alternatives were eliminated vs. developed for Detailed Study
9. Agency, Property Owners, and General Public Discussion
10. Closing

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## Meeting Logistics

- Instructions to **Meeting Attendees**
- Instructions to **Online Attendees**
  - Muted and unable to speak.
  - Chat function is enabled and being monitored.
  - Add name, address, and email/phone number to the meeting chat.



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## Introductions

### Lead Federal Agency

USDA Natural Resources  
Conservation Service (NRCS)



- Derrick Crane, P.E. | *Project Lead*
- Andy Deichert, P.E. | *State Conservation Engineer*

### Consultant Lead

RJH Consultants, Inc.



- Robert Huzjak, P.E. | *Project Manager*
- Adam Prochaska, Ph.D., P.E., P.G. | *Project Engineer*

### Project Sponsors

Southern Conservation District,  
West Virginia Conservation Agency  
and Mercer County, WV



- Gene Buckner, Greg Puckett, and Bill Archer | *Mercer County Commissioners*
- Bill Harris, Randall Patton | *Southern Conservation District*
- Sigrid Teets | *West Virginia Conservation Agency*

### Environmental Consultant

WSP USA



- Ghazoll Motlagh, P.E., CFM | *Project Manager*

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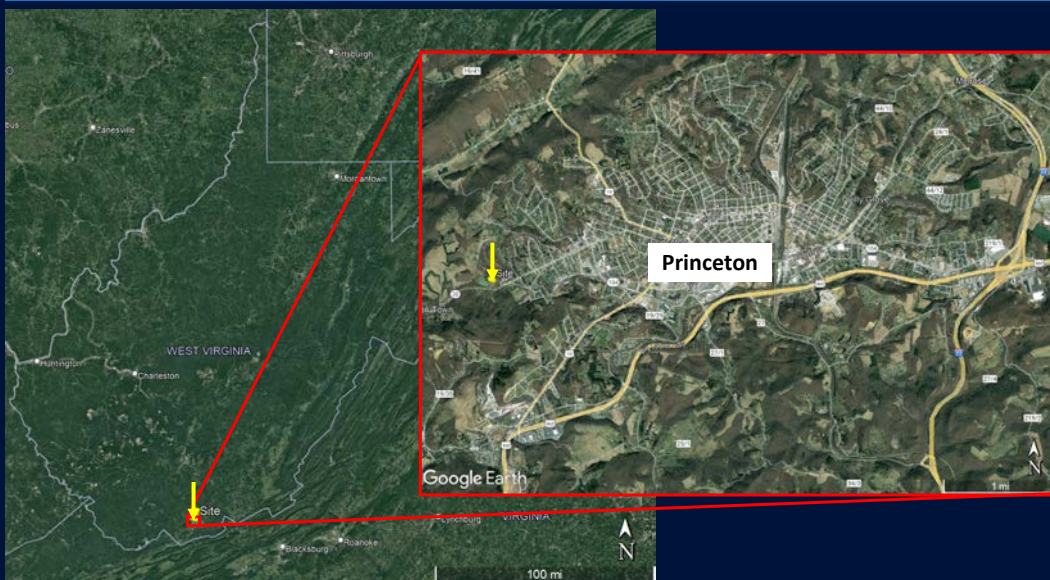
## Meeting Objectives

1. Provide update on progress of work
2. Explain alternatives considered
3. Present Sponsor's preferred alternatives
4. Get public opinion and feedback on preferred alternatives
5. Provide updates on remaining work tasks

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## Project Location



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## Project Location



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## Background

- Designed and built in 1965 as a **high hazard potential** dam for the primary purpose of flood protection.
- 2011 Condition assessment indicated the dam **does not meet** current design standards and the spillway would likely erode leading to a dam breach if activated.

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## Benefit – No Dam 100-year Flood

Inundation Limits and Depths for 100-year Event

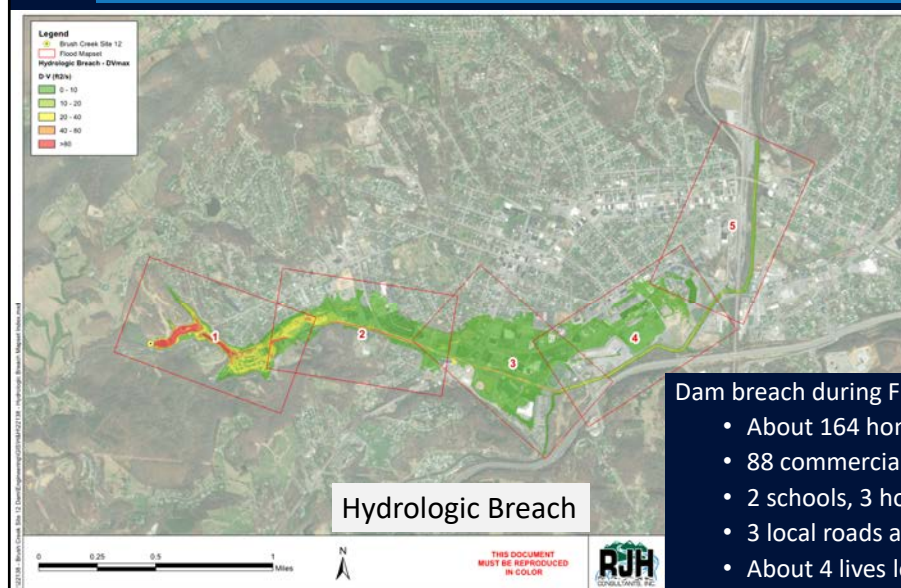


### Protected Structures:

- 1 Commercial
- 1 Church
- 31 Homes

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## Dam Breach Inundation



### Dam breach during FBH would impact:

- About 164 homes and 724 people
- 88 commercial buildings
- 2 schools, 3 hospitals, 3 sports facilities
- 3 local roads and minor highways
- About 4 lives lost

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## Watershed Rehabilitation Process



**This project is currently in the Watershed Planning phase, which involves:**

- Identify the purpose and need.
- Identify and gather data on dam safety concerns.
- Evaluate key resources.
- Evaluate potential solutions.
- **Select the preferred alternative.**
- **Determine if federal funding should be pursued to implement solutions.**

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## Scope of Work

### Project Planning Phases

- **Phase 1:** Goals, Objectives, Purpose and Need
- **Phase 2:** Inventory and Analyze Resources
- **Phase 3:** Alternatives Formulation
- **Phase 4:** Prepare Final Plan-Environmental Document

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## Purpose and Need

### Purpose

- Provide flood damage reduction
- Improve safety and reduce loss of life potential

### Need

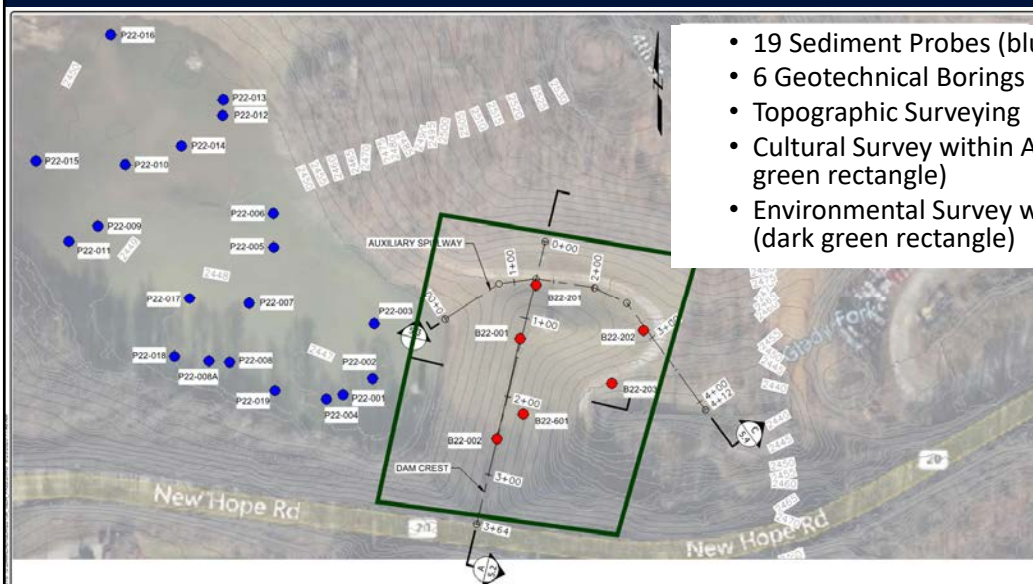
- Address dam safety and performance deficiencies
- Reduce potential loss of life
- Continue to provide flood damage reduction



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## Summary of Data Collection



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## Dam Components

### Embankment

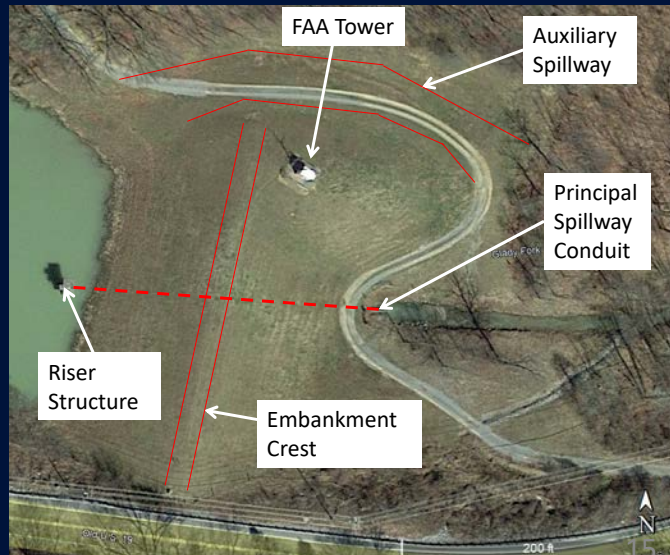
- Inadequate Seepage Protection

### Auxiliary spillway

- Predicted to erode during ASH
- Predicted to breach during FBH

### Principal Spillway

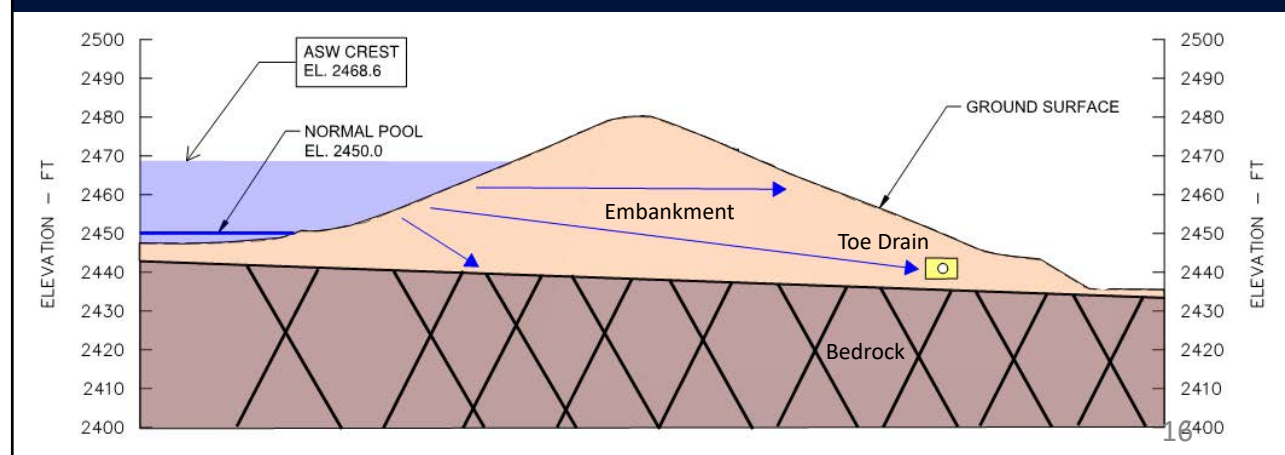
- Inadequate Seepage Protection
- Inadequate Structural Capacity



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## Primary Dam Safety Deficiencies

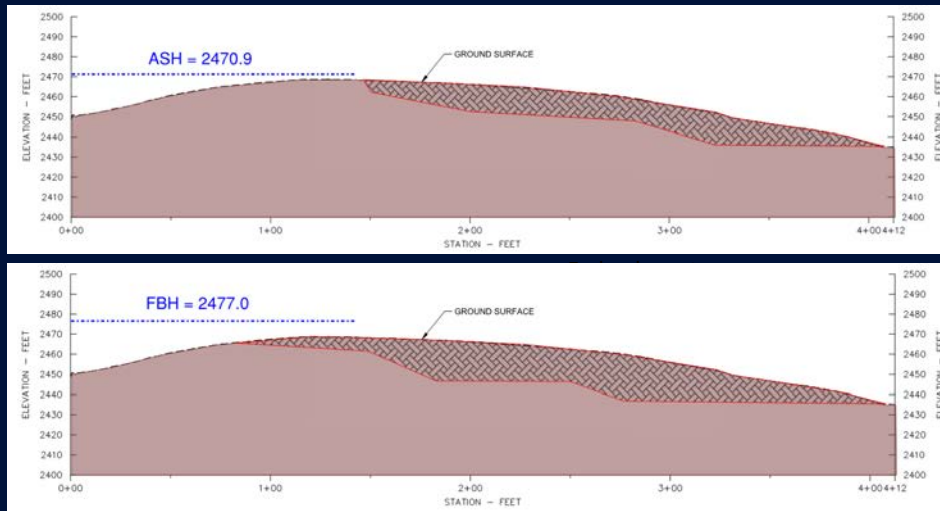
### Embankment: Inadequate Seepage Protection



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# Primary Dam Safety Deficiencies

## Auxiliary Spillway: Erosion during ASH and breach during FBH



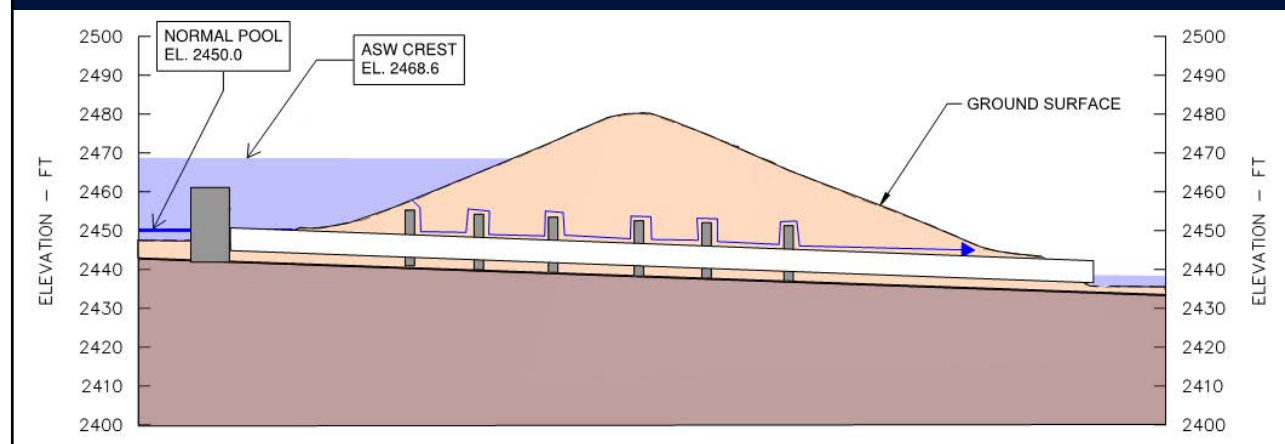
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# Primary Dam Safety Deficiencies

## Principal Spillway:

Inadequate Seepage Protection, Inadequate Structural Capacity, Downstream Submergence



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## Initial Array of Alternatives to Address Deficiencies

- Alternative 1 (No Action/Future Without Project (FWOP))
  - Continue to operate dam in its current condition and accept the risk of failure
- Alternative 2 (Decommissioning)
  - Breach the dam, purchase and demolish structures in downstream inundation limits
- Alternative 3 (Nonstructural)
  - Breach the dam, construct downstream improvements to protect existing structures
- Alternative 4 (Structural)
  - Rehabilitate the dam to address deficiencies and meet current standards

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## Alternative 1

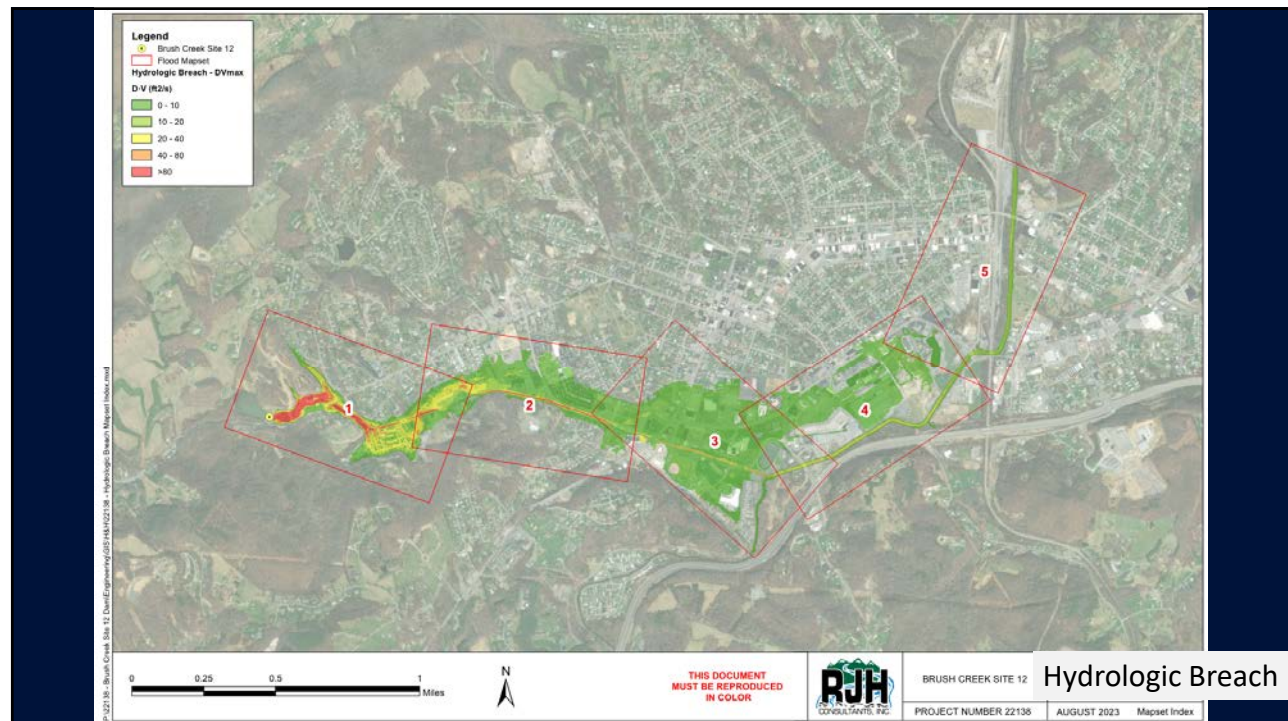
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## Alternative 1 (No Action/FWOP)

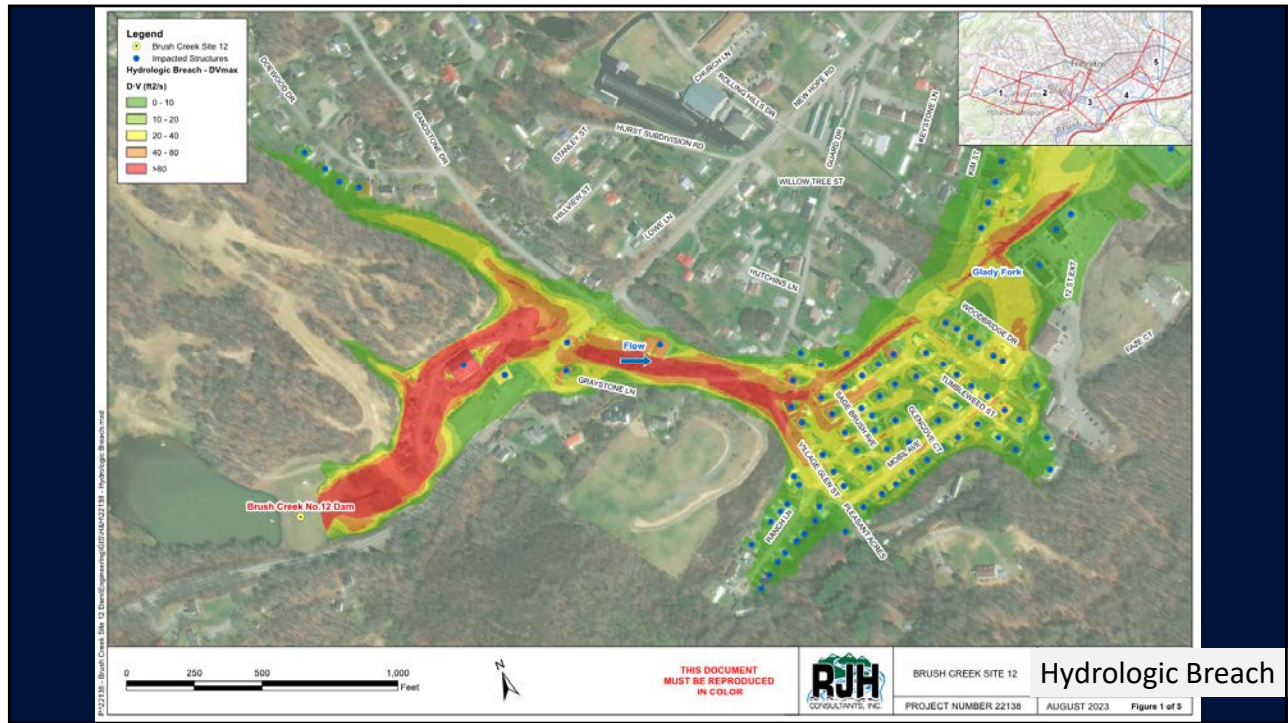
- Downstream consequences will depend on hydraulic load at time of failure

		Hydrologic Breach	Static Breach	Seismic Breach
Load		Peak of FBH	ASW Crest	Normal Pool
Peak Discharge (cfs)		32,200	17,892	1,950
Inundated Structures	Mobile Homes	13	1	0
	Homes	149	108	29
	Apartments	2	1	0
	Commercial Buildings	6	2	0
	Commercial Small	82	48	0
	Schools (not in use)	2	1	0
	Hospitals	3	1	0
	Sport Facility	3	0	0
	Main Local Roads and Minor State Highways	3	3	0
Population at risk (PAR)		724	517	0
Estimated lives lost (LL)		3.7	2.7	0

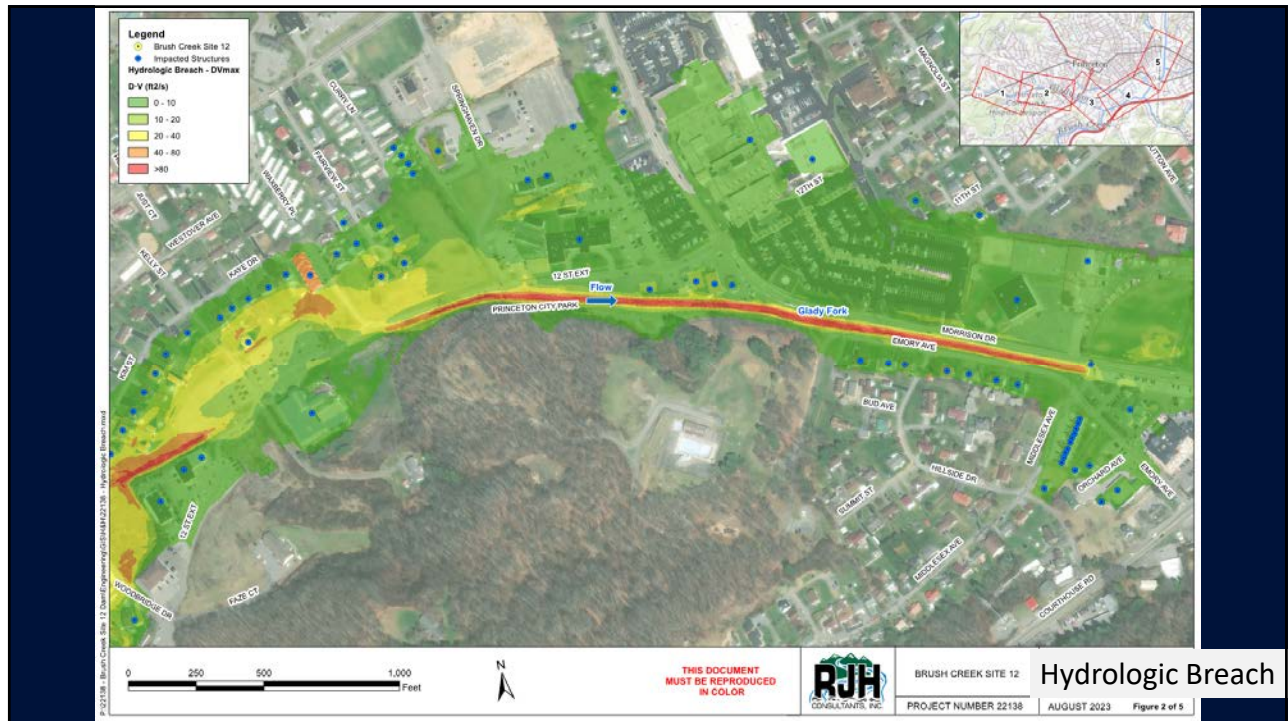
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## Alternative 2

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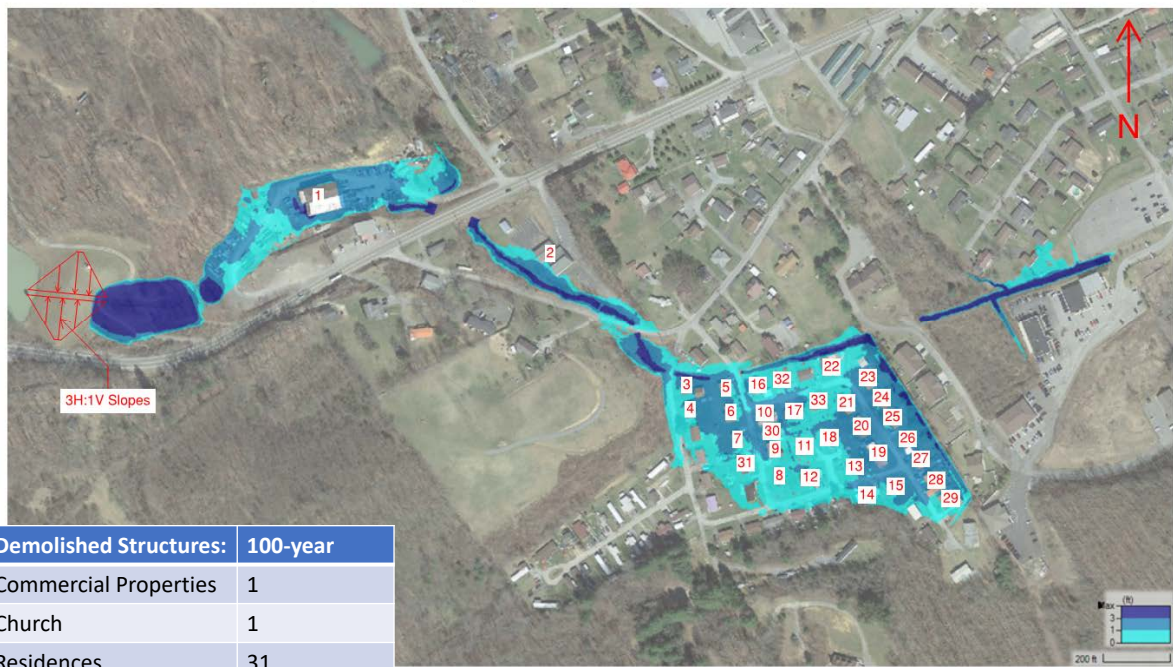
## Alternative 2 (Decommissioning)

- Breach dam and stockpile material onsite
- Demolish principal spillway and dispose of offsite
- Reclaim reservoir area to stabilize sediment
- Purchase downstream properties and demolish structures in 100-yr or 500-yr inundation area

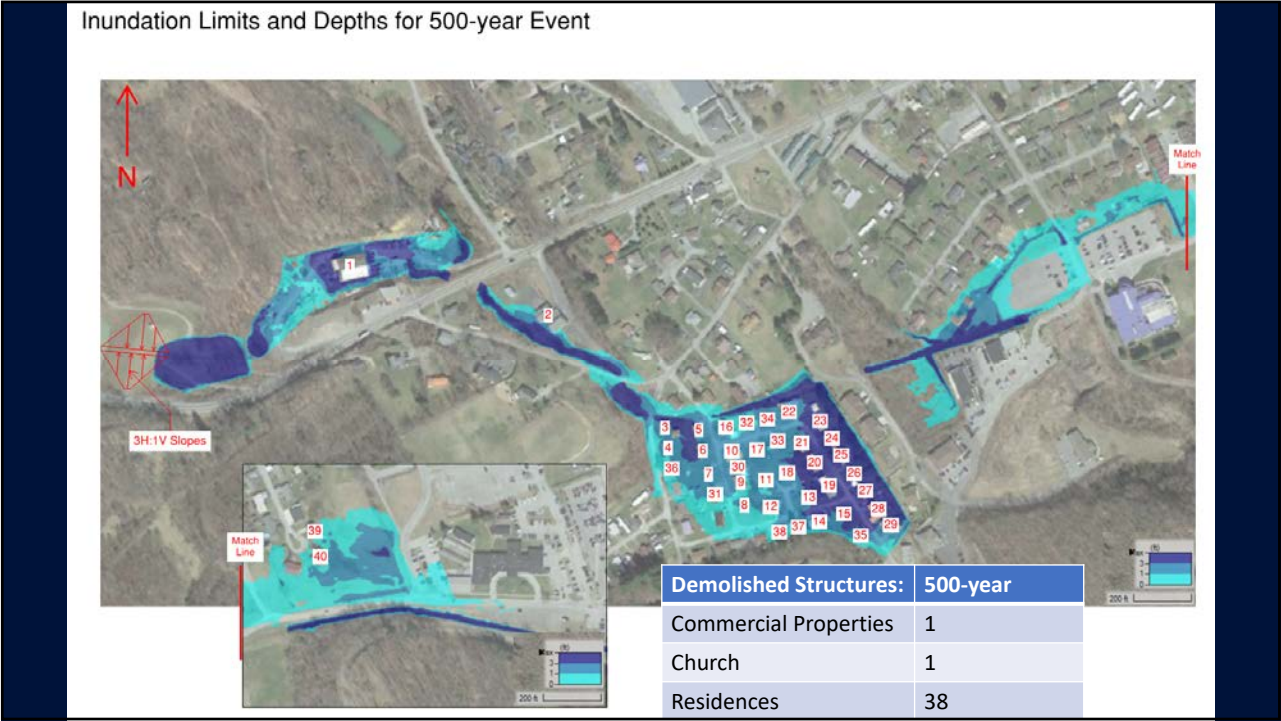


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Inundation Limits and Depths for 100-year Event



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Alternative 3

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## Alternative 3 (Nonstructural)

- Breach dam and stockpile material onsite
- Demolish principal spillway and dispose of offsite
- Reclaim reservoir area to stabilize sediment
- Construct downstream improvements to flood proof structures for 100-year or 500-year event



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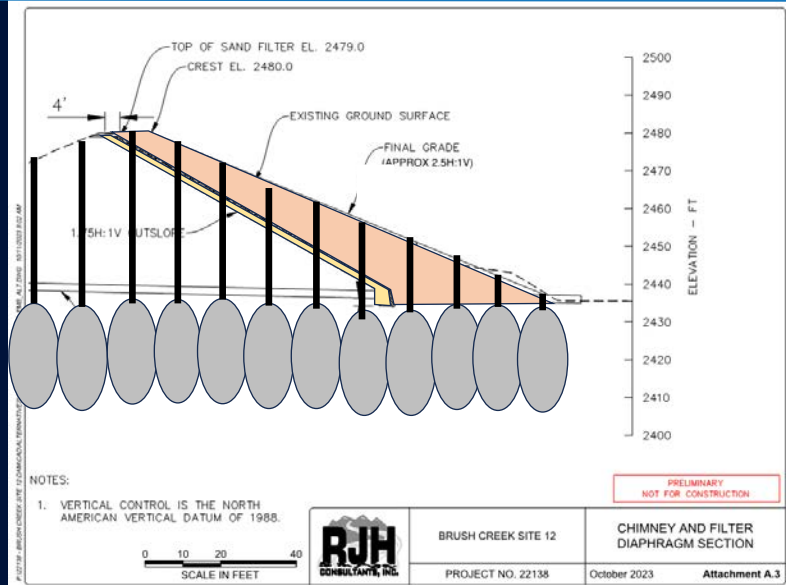


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# Alternative 4

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## Mitigate Embankment Seepage Deficiencies: Foundation Grouting and New Filter



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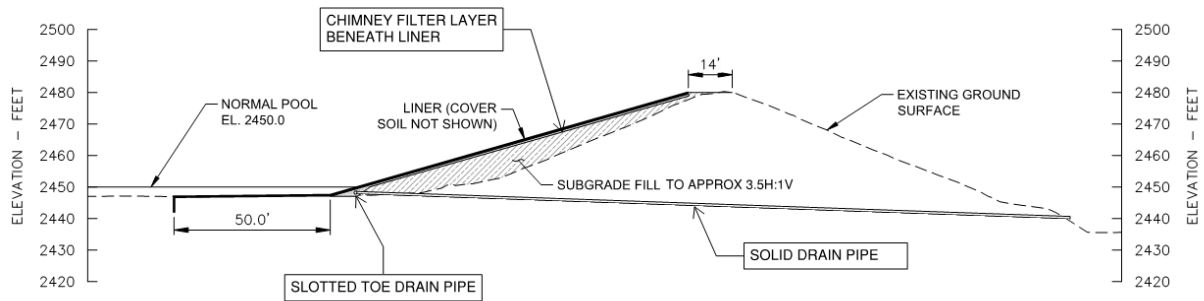
## Mitigate Embankment Seepage Deficiencies: Upstream Liner



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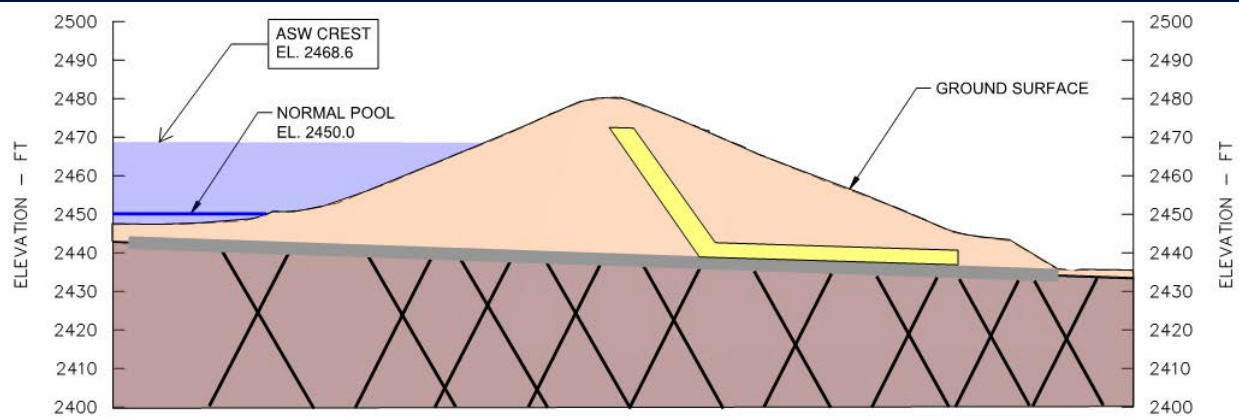
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## Mitigate Embankment Seepage Deficiencies: Upstream Liner



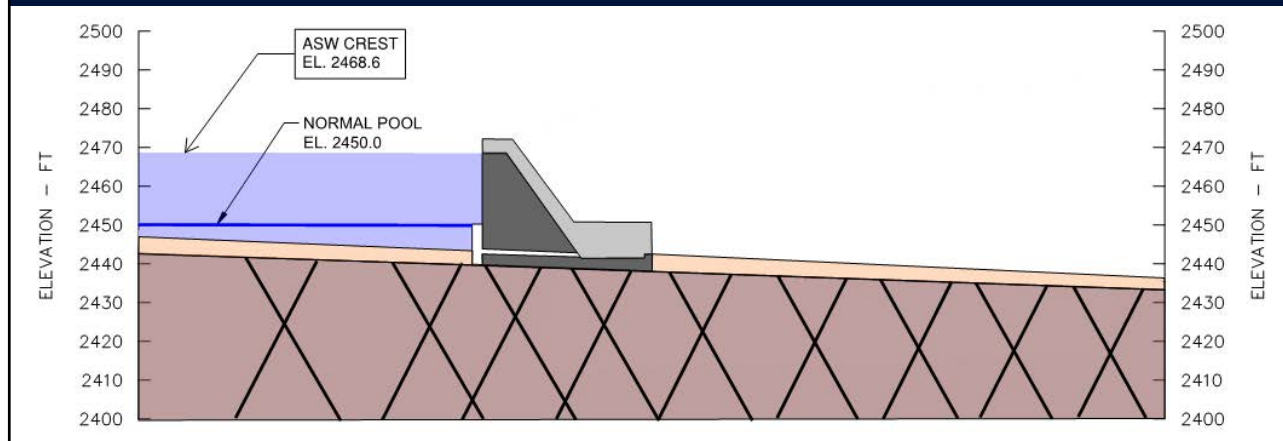
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## Mitigate Embankment Seepage Deficiencies: Reconstruct New Embankment with Slush Grouted Foundation and Filter Protection



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## Mitigate Embankment Seepage Deficiencies: Reconstruct New RCC Dam



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## Options for Addressing Internal Erosion of Embankment

- **Options Considered but Eliminated from Detailed Study:**
  - Foundation blanket grouting: Technically Risky
  - Upstream Liner: Questionable whether it satisfies intent of NRCS design criteria
- **Potential Options:**
  - New Embankment Dam
  - New RCC Dam

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## Options for Addressing Spillway Erodibility

- **Dismissed options that are ineffective/inefficient**
  - Widen the existing spillway channel
  - Lower the spillway crest
  - Overtopping embankment spillway
  - Armor existing spillway channel with ACB or soil-cement
- **Potential options**
  - New spillway chute (RCC or concrete) in the left abutment
  - New RCC dam with overtopping spillway

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## Options for Addressing PSW and Ancillary Deficiencies

- PSW structural capacity: CIPP liner or new concrete-encased conduit
- PSW submergence: obtain variance or install new conduit profile
- Narrow crest: will be widened as part of embankment rehabilitation
- Install instrumentation and fence to keep livestock off embankment
- Lack of filter protection: chimney and filter diaphragm will be added
- Drain pipe material: new toe drain will be installed
- Site access: new driveway along north side of auxiliary spillway. New bridge or larger culvert at Culvert 1

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## Final Array of Alternatives

- Alternative 1 (No Action)
- Alternative 2 (Decommissioning)
- Alternative 3 (Nonstructural)
- Alternative 4 (Structural)

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## Wetlands and Endangered Species

### Wetlands

- 7.3-acre open water impoundment
- 0.2-acre adjacent fringe scrub-shrub wetland

### Endangered Species

- Potential limited foraging habitat for listed bats
- Limited roosting habitat for Indiana bat, northern long-eared bat, and tri-colored bat.
- Limited habitat for Monarch butterfly



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## Environmental Impacts – Alternative 1 - FWOP

If *no action* is taken, there is potential for **dam failure**.

- ❖ In the event of dam failure, there could be both short- and long-term impacts to natural resources within the breach inundation area.

### Short-term Impacts

- High flows could damage natural resources within the breach inundation area, including suitable bat roosting habitat
- Flooding and sediment could adversely impact stream habitats and water quality

- ❖ In the absence of a dam breach, no impacts to natural resources would occur and current conditions would persist.

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## Environmental Impacts – Alternative 2 - Decommission

Short-term Impacts	Long-term Impacts
<ul style="list-style-type: none"> <li>• Potential water quality impacts during construction*</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of approximately 7-acre pond that provides aquatic habitat</li> <li>• More frequent flooding downstream within the 500-year inundation area</li> <li>• More natural stream flows</li> <li>• Re-establishment of approximately 1,120 linear feet of stream habitat</li> <li>• If tree clearing was required, potential impacts to listed bats could occur**</li> </ul>
<p>*Best Management Practices (BMPs) would be used to limit adverse impacts.  **Adverse impacts could be avoided by adhering to seasonal clearing restrictions.</p>	

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## Environmental Impacts – Alternative 3 – Non-Structural

Short-term Impacts	Long-term Impacts
<ul style="list-style-type: none"> <li>Potential water quality impacts during construction*</li> </ul>	<ul style="list-style-type: none"> <li>Loss of approximately 7-acre pond that provides aquatic habitat</li> <li>More frequent flooding downstream within the 500-year inundation area</li> <li>More natural stream flows</li> <li>Re-establishment of approximately 1,120 linear feet of stream habitat</li> <li>Enlargement of approximately 600 feet of stream channel</li> <li>If tree clearing was required, potential impacts to listed bats could occur**</li> </ul>
<p>*Best Management Practices (BMPs) would be used to limit adverse impacts.  **Adverse impacts could be avoided by adhering to seasonal clearing restrictions.</p>	

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## Environmental Impacts – Alternative 4 - Structural

Short-term Impacts	Long-term Impacts
<ul style="list-style-type: none"> <li>Temporary land disturbance and potential water quality impacts during construction*</li> <li>Temporary loss of aquatic habitat during construction if pool were partially drained</li> </ul>	<ul style="list-style-type: none"> <li>If tree clearing was required, potential impacts to listed bats could occur**</li> </ul>
<p>*Best Management Practices (BMPs) would be used to limit adverse impacts.  **Adverse impacts could be avoided by adhering to seasonal clearing restrictions.</p>	

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## Environmental Impacts – Summary

Potential Effects of Proposed Alternatives				
Resource Concern	Alternative 1*	Alternative 2	Alternative 3	Alternative 4
Threatened & Endangered Species	✓	✱	✱	✱
Wetlands	✓	X	X	✱
Hydrology	✓	✓	✓	X
Pond Habitat	✓	✓	✓	✓
Stream Habitat	✓	⤴	⤴	X
Flooding	✓	✓	✓	X
Water Quality	✓	✱	✱	✱
<p>*Impacts associated with Alternative 1 assume dam breach occurs</p> <p>✓ Impact</p> <p>X No Impact</p> <p>✱ Adverse impacts could be avoided by adhering to seasonal clearing restrictions and use of Best Management Practices (BMPs)</p> <p>⤴ Re-establishment of habitat</p>				

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## Architectural Impacts – Alternative 1 - FWOP

If *no action* is taken, there is potential for **dam failure**.

- ❖ In the event of dam failure, there could be both short- and long-term impacts to historic resources within the breach inundation area.

Historic Resources* within the Hydrologic Breach Inundation Area	
<ul style="list-style-type: none"> <li>The historic earthen dam embankment**</li> <li>Five commercial buildings</li> <li>One education-related building</li> </ul>	<ul style="list-style-type: none"> <li>One bridge</li> <li>72 residential buildings</li> </ul>
<p>*None of the historic buildings or structures appear eligible for listing in the National Register of Historic Places (NRHP). All appear to be common types found throughout the region and country, although an assessment of each resource is necessary to determine eligibility requirements.</p> <p>**The dam embankment was previously surveyed by WSP in November 2022 and recommended as not eligible for listing in the NRHP.</p>	

- ❖ In the absence of a dam breach, no impacts to historic resources would occur and current conditions would persist.

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## Architectural Impacts – Alternative 2 - Decommission

### Historic Resources\* within Alternative 2's LOD and 500-year Flood Inundation Area

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• The historic earthen dam embankment**</li> <li>• One commercial building</li> </ul> | <ul style="list-style-type: none"> <li>• One bridge</li> <li>• 38 residential buildings</li> </ul> |
|--|--|

\*None of the historic buildings or structures appear eligible for listing in the National Register of Historic Places (NRHP). All appear to be common types found throughout the region and country, although an assessment of each resource is necessary to determine eligibility requirements.

\*\*The dam embankment was previously surveyed by WSP in November 2022 and recommended as not eligible for listing in the NRHP.

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## Architectural Impacts – Alternative 3 – Non-Structural

### Historic Resources\* within Alternative 3's LOD

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• One commercial building</li> <li>• One bridge</li> </ul> | <ul style="list-style-type: none"> <li>• Seven residential buildings</li> </ul> |
|---|---|

\*None of the historic buildings or structures appear eligible for listing in the National Register of Historic Places (NRHP). All appear to be common types found throughout the region and country, although an assessment of each resource is necessary to determine eligibility requirements.

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## Architectural Impacts – Alternative 4 -Structural

### Historic Resources\* within Alternative 4's LOD

- The historic earthen dam embankment\*\*

\*None of the historic buildings or structures appear eligible for listing in the National Register of Historic Places (NRHP). All appear to be common types found throughout the region and country, although an assessment of each resource is necessary to determine eligibility requirements.

\*\*The dam embankment was previously surveyed by WSP in November 2022 and recommended as not eligible for listing in the NRHP.

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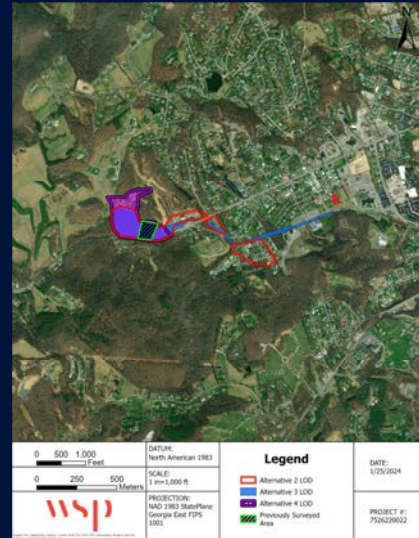
## Archaeological Impacts – Alternative 1 - FWOP

- In November 2022, WSP completed a Phase 1 archaeological survey of approximately 2.5 acres
  - 10 Shovel Tests were excavated in testable areas
  - No archaeological sites or isolated finds were found within the surveyed area
  - Background research revealed that no previously recorded sites were located within a one-mile buffer of each proposed LOD
- Alternative 1 does not require ground disturbance and no archaeological survey will be required

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## Archaeological Impacts – Alternative 2 - Decommission

- Includes proposed ground disturbance
- Soils suggest a relatively stable landform that, while not necessarily containing potential for deeply buried deposits, could contain intact soils containing archaeological materials in the upper soils.



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## Archaeological Impacts – Alternative 3 – Non-Structural

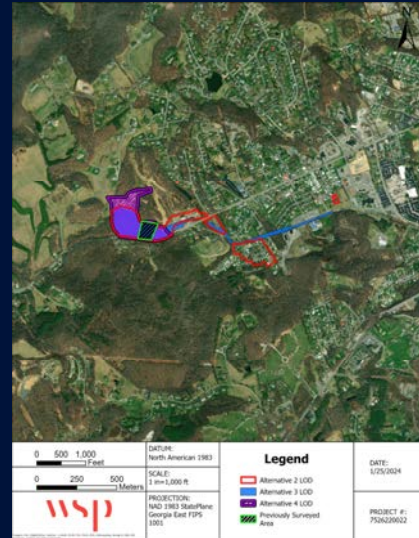
- Includes proposed ground disturbance
- Soils suggest a relatively stable landform that, while not necessarily containing potential for deeply buried deposits, could contain intact soils containing archaeological materials in the upper soils.



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## Archaeological Impacts – Alternative 4 - Structural

- Includes proposed ground disturbance
- Soils suggest a relatively stable landform that, while not necessarily containing potential for deeply buried deposits, could contain intact soils containing archaeological materials in the upper soils.



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## Summary of Environmental and Cultural Impacts

Relative Impacts			
Alternative	Environmental	Architectural	Archaeological <sup>†</sup>
1 – Future without Project*	High	High	Neutral
2 – Decommissioning	Medium	Medium	Neutral
3 – Non-Structural	Medium	Low	Neutral
4a – Structural: New Embankment Dam	Low	Neutral	Neutral
4b – Structural: New RCC Dam	Low	Neutral	Neutral

\*Impacts associated with Alternative 1 assume dam breach occurs  
<sup>†</sup> Neutral impacts reflect desktop analysis with no findings but may require field verification for the preferred alternative

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## Summary of Construction Costs

Alternative	Approx Construction Cost (\$ millions)
1 (No Action)	\$ 0.0
2 (Decommissioning)	\$ 8.6 for 100-year \$ 9.9 for 500-year
3 (Nonstructural)	\$ 5.5 for 100-year \$ 9.0 for 500-year
4A (Structural): New embankment dam	\$ 4.0
4B (Structural): New RCC dam	\$ 6.6

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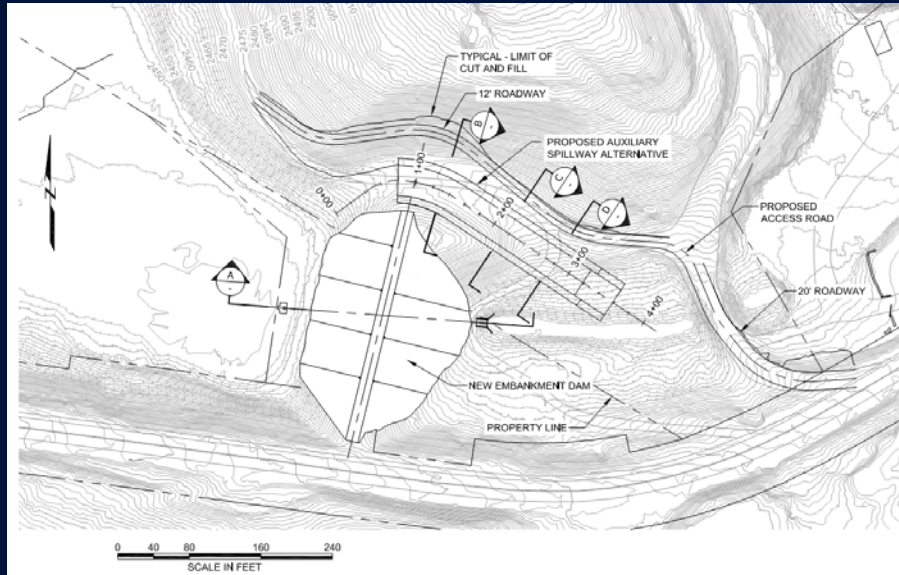
## Sponsor's Selection of Preferred Alternative

- **Alternative 1 (No Action) is not preferred because it does not address existing deficiencies**
- **Alternative 2 (Decommissioning) is not preferred.**
  - Flood control benefits of the dam would be lost
  - Residents from 30+ homes would need to be relocated.
- **Alternative 3 (Nonstructural) is not preferred.**
  - Flood control benefits of the dam would be lost.
  - Downstream flooding would be increased for rainfall events that fall either upstream or downstream of the dam.
- **Alternative 4 (Structural) is preferred.**
  - 4A: New embankment dam with new RCC or concrete chute spillway in left abutment
  - 4B: New RCC dam with overtopping spillway

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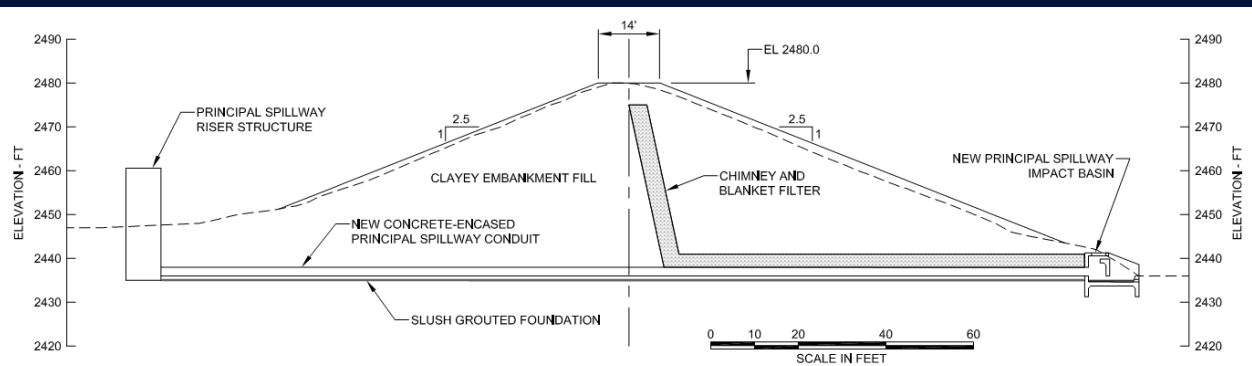
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## New Embankment Dam: Site Plan



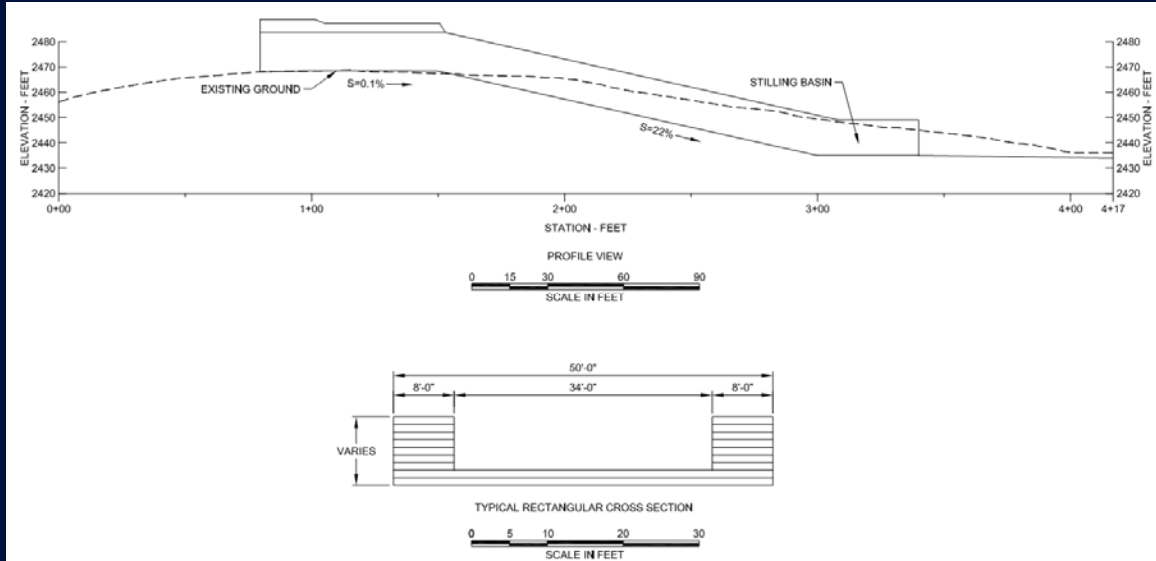
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## New Embankment Dam: Typical Embankment Section



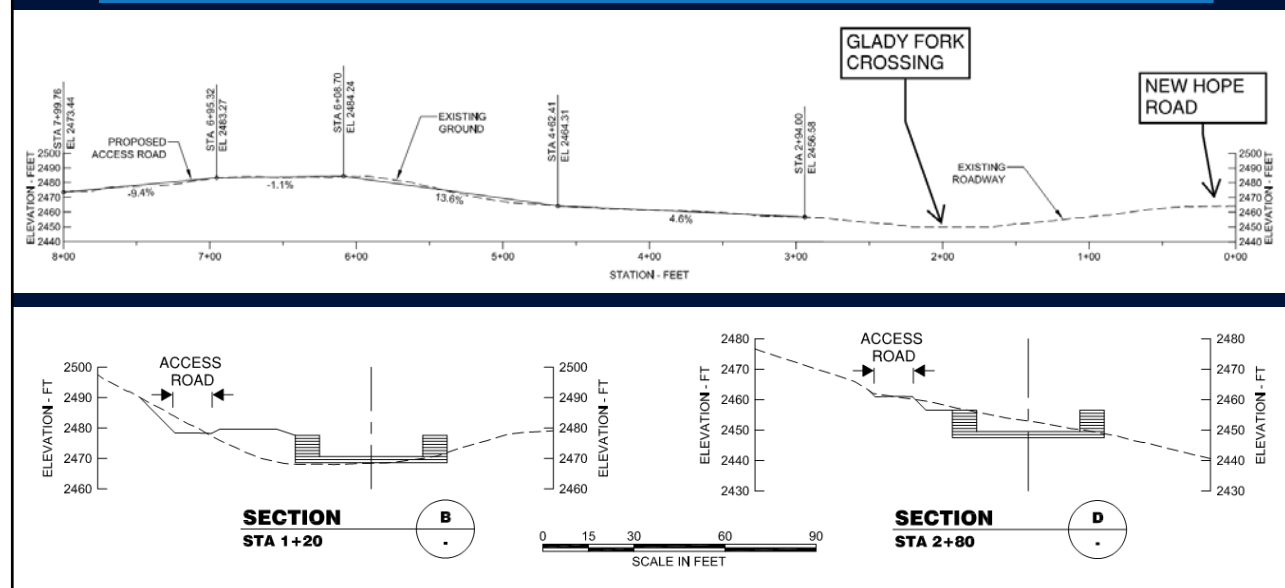
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## New Embankment Dam: Spillway Chute Profile and Typical Section



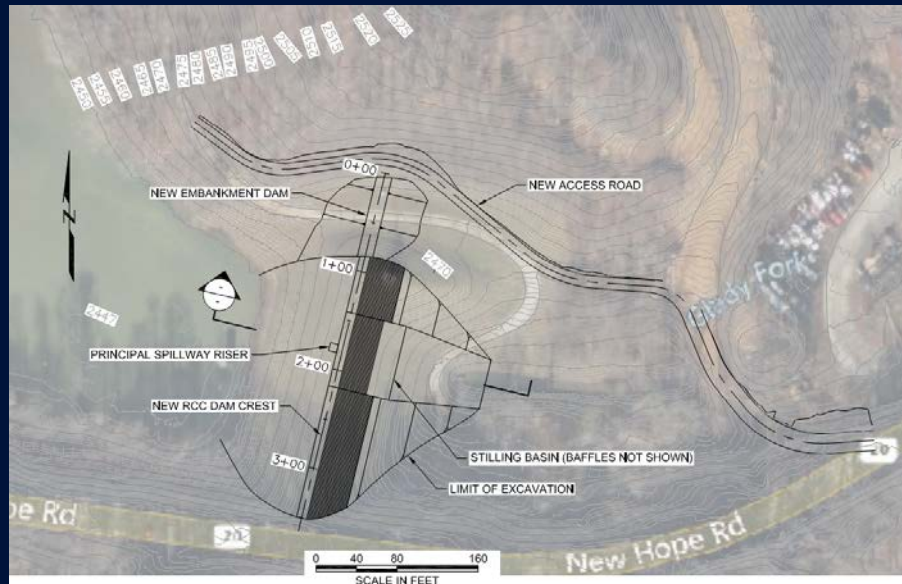
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## Access Road Profile and Typical Sections



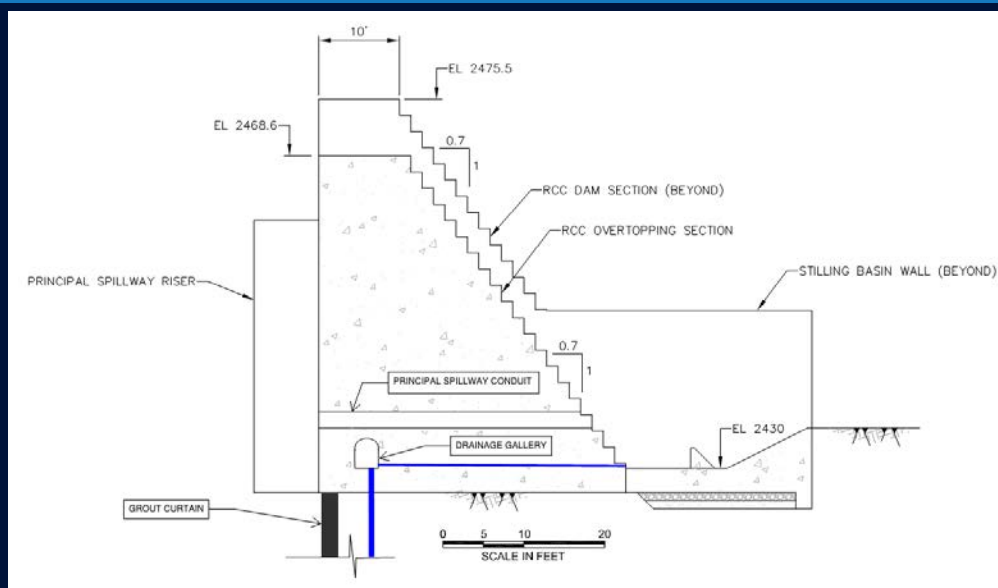
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## New RCC Dam: Site Plan



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## New RCC Dam: Typical Dam Section



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## Open Discussion/Questions



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## Public Input

- Three scheduled opportunities for public and agency input:
  - **Initial Public/Agency Scoping Meeting – Spring 2023**
    - Provided: Project introduction
    - Requested: Input on objectives, alternatives, and prioritization
  - **Alternatives Meeting - Today**
    - Provided: Report on how input was incorporated and presentation of alternatives
    - Requested: Input on selected alternative
  - **Plan-Environmental Document Review Meeting**
    - Provided: Review of the Plan-Environmental Document
    - Requested: Comments on the Plan-Environmental Document

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## Schedule

Alternatives Meeting	March 26, 2024
Public review of draft documents.	Winter 2024/25
Public review of final documents.	Winter 2024/25
Planning Completion	Spring 2025

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## Closing Comments

### Final Thoughts

- Planning phase of a bigger project.
- Schedules and timelines are targets, not rigid.
- The participation of public and agencies is voluntary **BUT CRITICAL TO A SUCCESSFUL PROJECT.**
- The project is intended to reflect the values and opinions of the local agencies and community whenever possible.
- Project webpage: <https://www.nrcs.usda.gov/conservation-basics/conservation-by-state/west-virginia/brush-creek-site-12>

Contact Derrick Crane with the NRCS:

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- **Phone:** (304) 943-9557

Comments/Questions are due to Derrick Crane by: **Friday April 26, 2024**

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