Lake Purdy Dam Stability Improvement Project

Community Meeting

November 19, 2024

Agenda

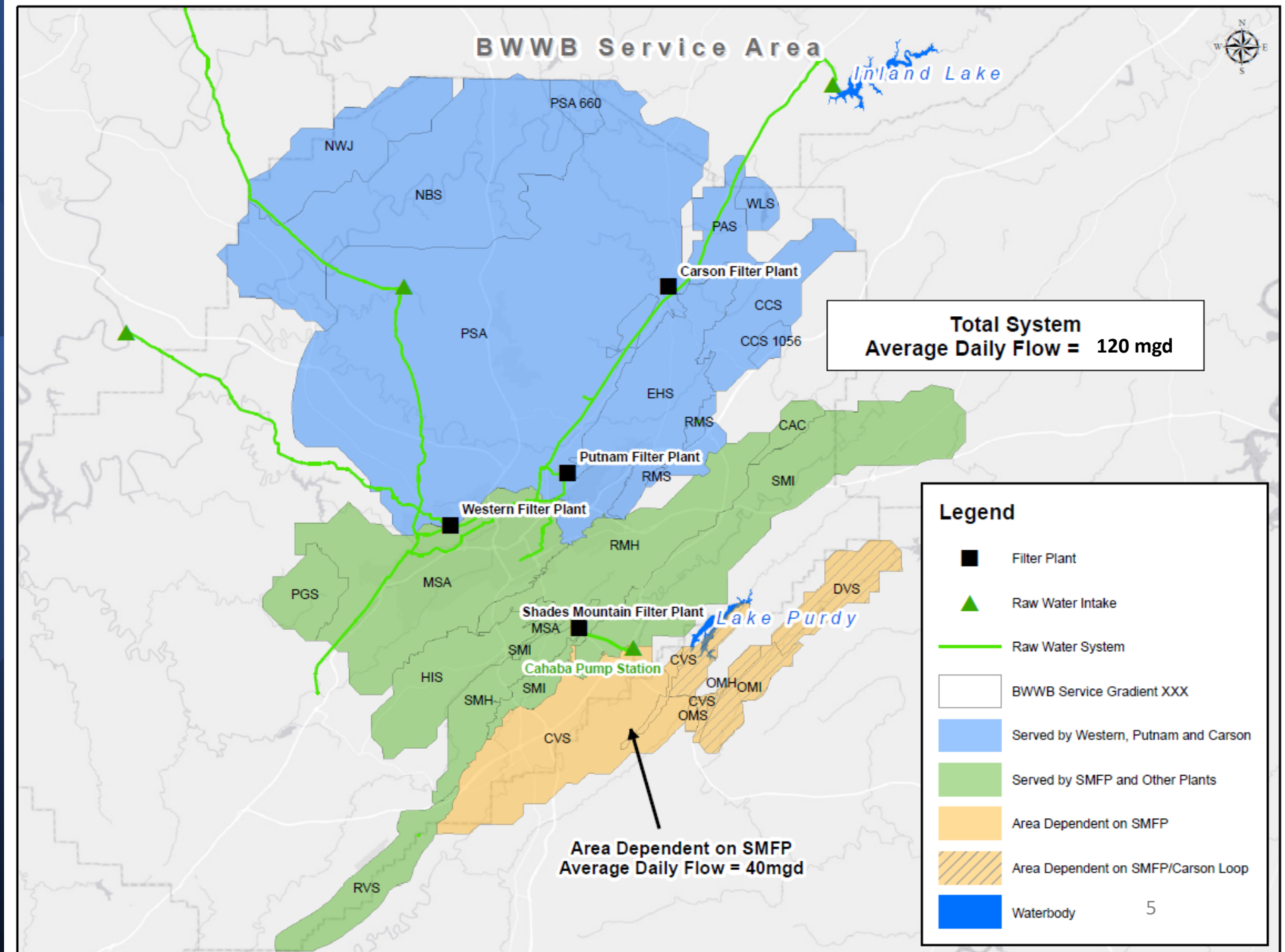
1. System Overview
2. Project Overview
3. Project Approach
4. Road Improvements and Environmental Mitigation

About Lake Purdy Dam

- Constructed between 1906-1910 to create Lake Purdy which is fed by the Little Cahaba River
- Overflow gravity dam constructed of locally mined limestone and dolomite reinforced with Portland Cement
- Dam was raised 20 feet between 1927-1929 and is 445 wide and 73 feet high
- Lake Purdy Reservoir has a surface area of 1,100 acres
- Used as a raw water source for Shades Mountain Filter Plant, the largest filtration plant in the State of Alabama
- Overall Project Costs: $86.3 million

System Overview

System Overview- Pressure Gradients



System Overview – Water Plants & Intakes

Treatment Plant	Source Water	Description	Approved Capacity (MGD)	Average Daily Flow (MGD)
Shades Mountain Filter Plant	Cahaba River and Lake Purdy	The Shades Mountain Filter Plant can only be supplied with raw water from the Cahaba River system.	80	55
Western Filter Plant	Sipsey and Mulberry Forks	The Mulberry and Sipsey intakes and associated transmission systems provide water to the Western Filter Plant. During drought conditions, production can be shifted from the Shades Mountain Filter Plant to the Western Filter Plant and the H.Y. Carson Filter Plant.	60	30
Putnam Filter Plant	Inland Lake, Sipsey Fork, and Mulberry Fork	Inland Lake and the associated transmission system provide water to the Putnam Filter Plant. The Sipsey system is considered a secondary water supply for the Putnam Filter Plant and raw water customers.	24	15
H.Y. Carson Filter Plant	Inland lake	The H.Y. Carson Filter Plant and most of the raw water customers are supplied from Inland Lake. During an emergency, BWWB can deliver up to approximately 20 MGD from the Sipsey or Mulberry systems to the H.Y. Carson Filter Plant, in addition to the feed to the Western and Putnam Filter Plants and the industrial raw water customers. During drought conditions, production can be shifted from the Shades Mountain Filter Plant to the Western Filter Plant and the H.Y. Carson Filter Plant.	25	15

System Overview: Current Assets

OUR GOAL IS TO MAINTAIN EXISTING ASSETS IN ORDER TO PRODUCE THE NATION'S HIGHEST QUALITY WATER

4 Treatment Plants

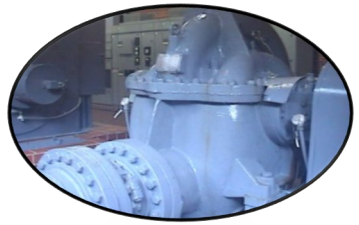
4 Raw Water Plants

2 Sludge Facilities

FY23(4,123) – FY24(4,137) Miles of Water Main

Note: 229 Miles > 100 yrs. old

1,000 Miles of Service Lines



51 Distribution Pump Stations

41 Pressure Reducing Valves (PRV)

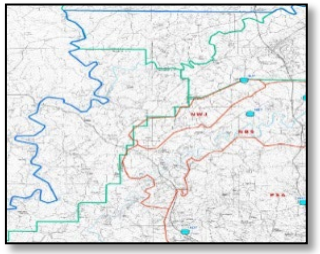
73 Potable and Raw Water Tanks

56,000 valves

15,000 hydrants

154 Buildings

6 Impoundments (Dams)



20 Pressure Gradients

Over 220,000 Meters/Connections

System Overview

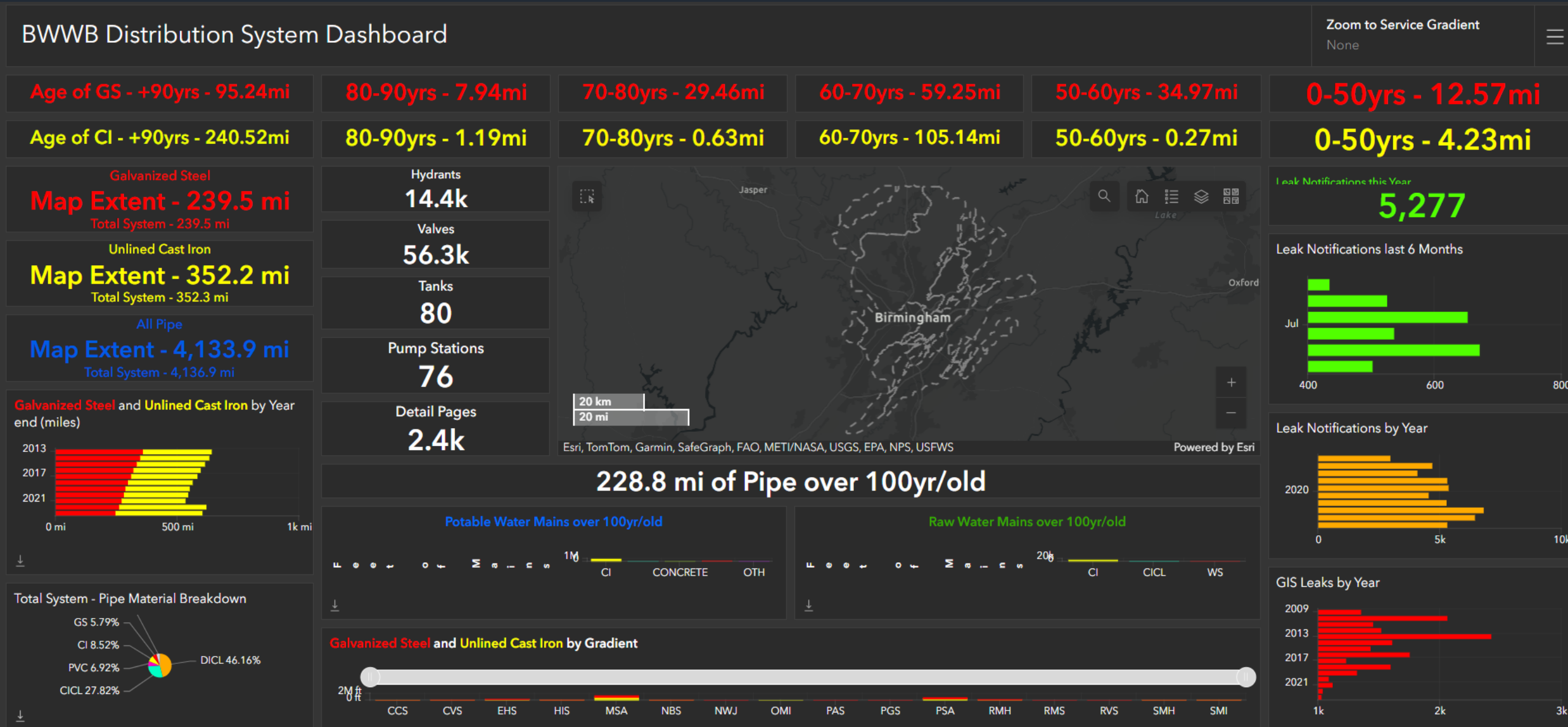
Driver: Leakage is driven by Galvanized Steel and Un-Lined Cast Iron Pipes

Unlined Cast Iron Pipe	Galvanized Steel Pipe	Other Distribution Mains	Total Pipe in DS
352.3 miles	239.5 miles	3,545.1 miles	4,136.9 miles

- ✓ ***Galvanized Steel and Unlined CI account for only 14.3% of the system***
- ✓ ***<u>Galvanized Steel Pipe and Unlined CI Pipe Accounts for 67% of our Maintenance Activity</u>***

BIRMINGHAM WATER WORKS

System Overview – GIS Pipeline Dashboard



FY2024 Capital Budget

General Capital, Technology, and Distribution Projects

$28,100,000

Maintenance and Repair Projects

$18,469,100

Distribution Main Replacement Program (1D and 1E)

$25,000,000

Capitalized O&M

$12,142,440

Total 2024 Capital Budget

$83,711,540

Project Overview

State of Lake Purdy Dam

- High Hazard Classification (per US Army Corps of Engineers)
- Alabama adopted *Dam Safety Program* in December 2023
- Improvements needed to renew the life of the Dam to meet current standard of care for Dam Safety in the United States.

Project Overview and Outcomes

1. The project is **essential to maintaining the public health** in Birmingham by ensuring a reliable supply of clean water to support overall community.

2. Rehabilitating the Lake Purdy Dam will **strengthen the structure and increase resiliency** against extreme climate events.

3. This **project supports and stimulates Birmingham's economy** by ensuring a consistent water supply, vital for the businesses in the city, especially those in the downtown area.

Lake Purdy Dam Design and Project Team

BWWB Representatives:

- Chief Engineer and Engineering Manager – Hattye D. McCarroll, PE
- Principal Engineer / Project Manager – Wanda Ervin, PE
- Assistant Project Manager – Matt Rocksvold, EI

Design Engineer:

- Arcadis
- Schnabel Engineering
- AG Gaston Engineering and Construction
- CE Associates

BWWB Independent Support Services:

- Field Services & Material Testing Firm: Bhate
- Environmental Compliance Oversite: TTL, Inc & Sidney May PE, LLC

Contractor:

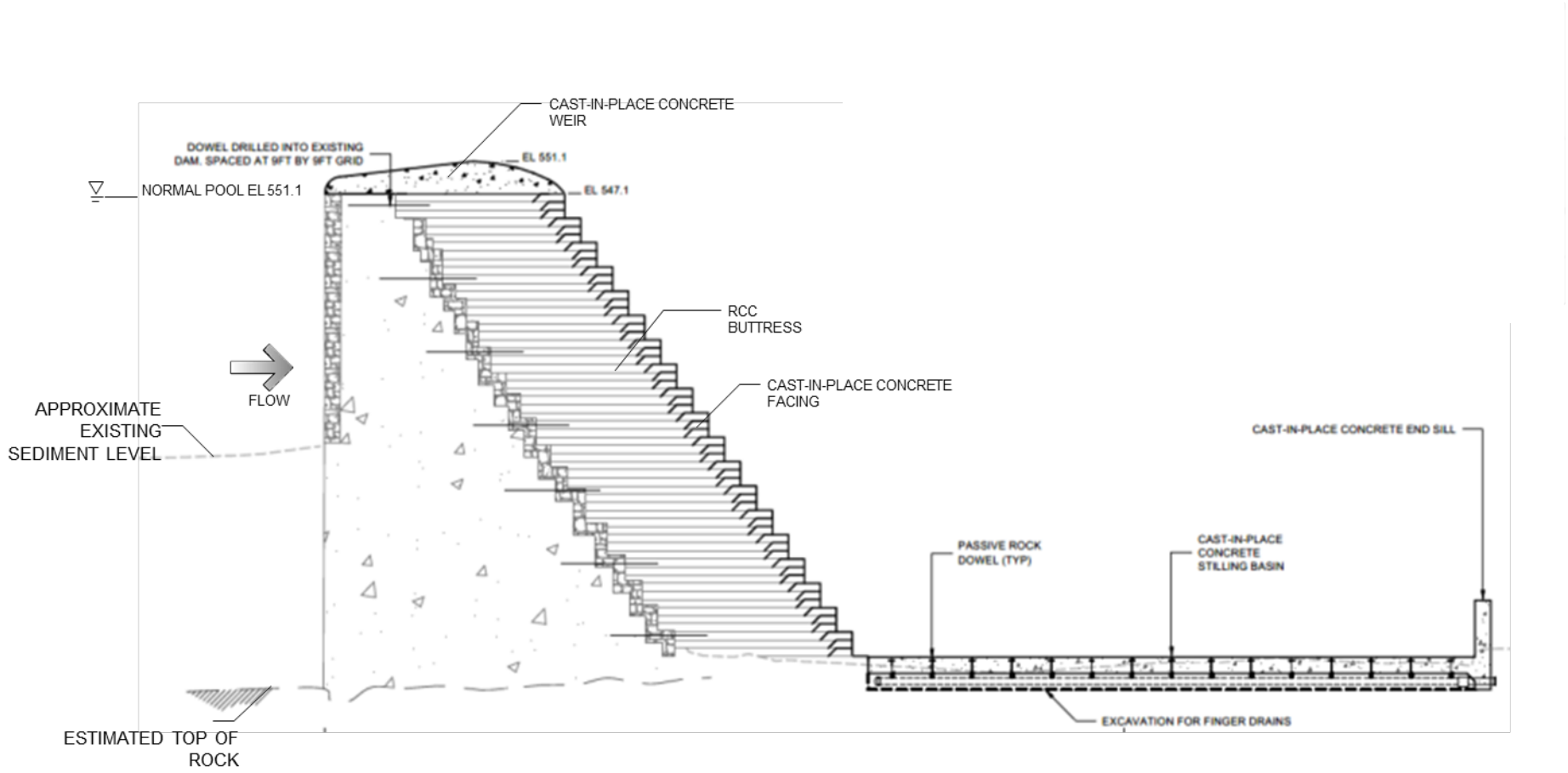
- Thalle Construction Company

Project Approach

Project Objectives

- Improve Structural Stability to Meet Full Range of Loading Conditions
- Mitigate Seepage Visible at Foundation and Abutments through Foundation Grouting
- Improve Spillway Capacity
- Raise Non-Overflow Section of the Walls to Train Flow to the Spillway
- Rehabilitate the Valve House and replace valves.

Structural Stability – RCC Buttress at Spillway



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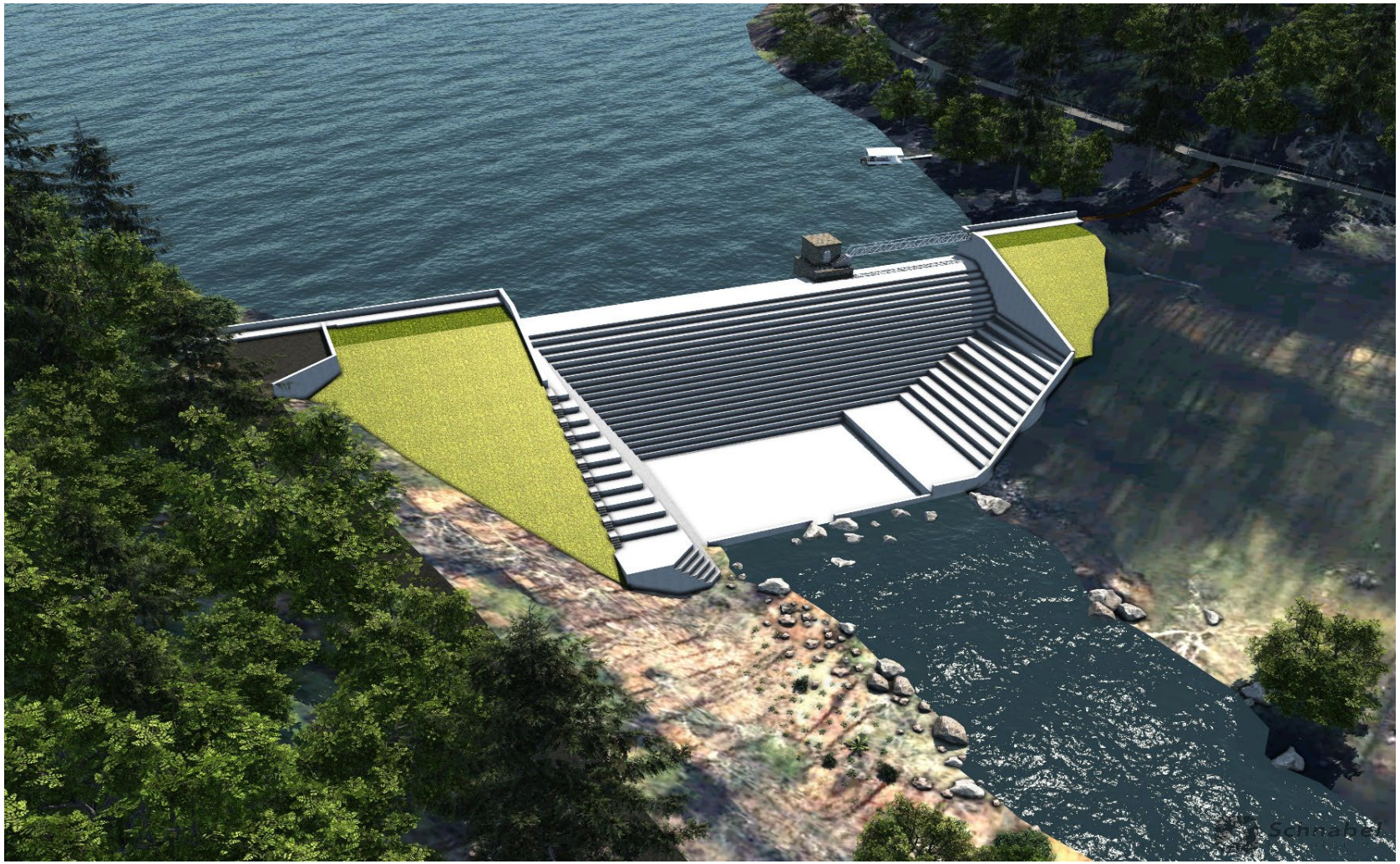
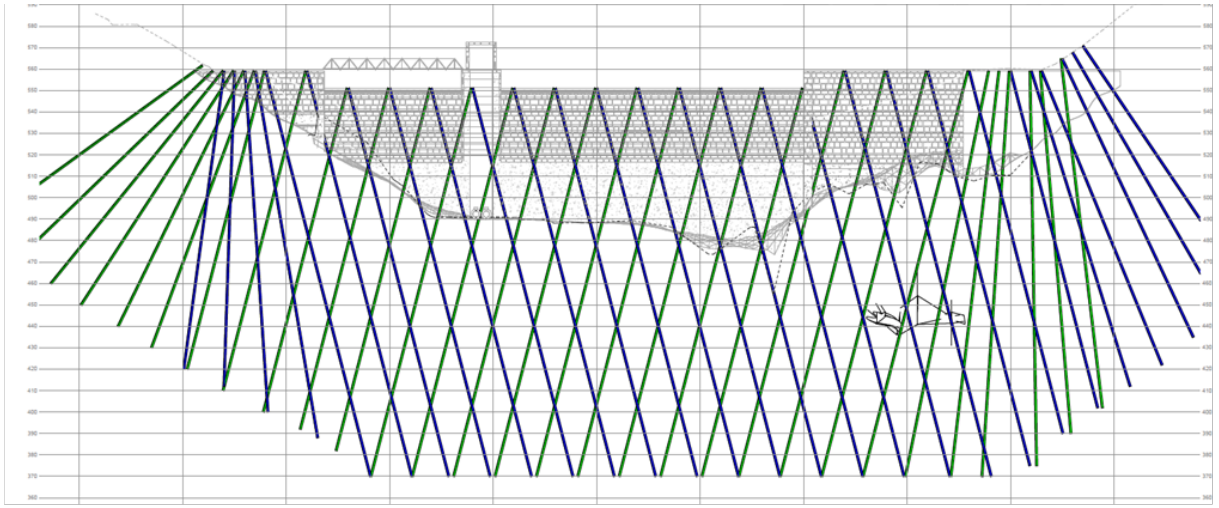
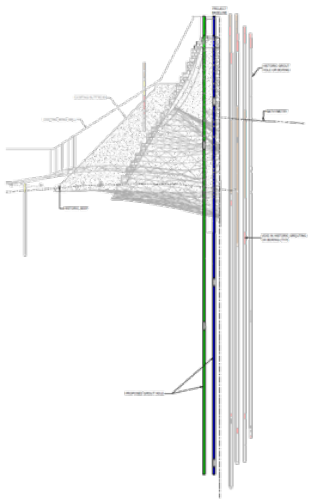
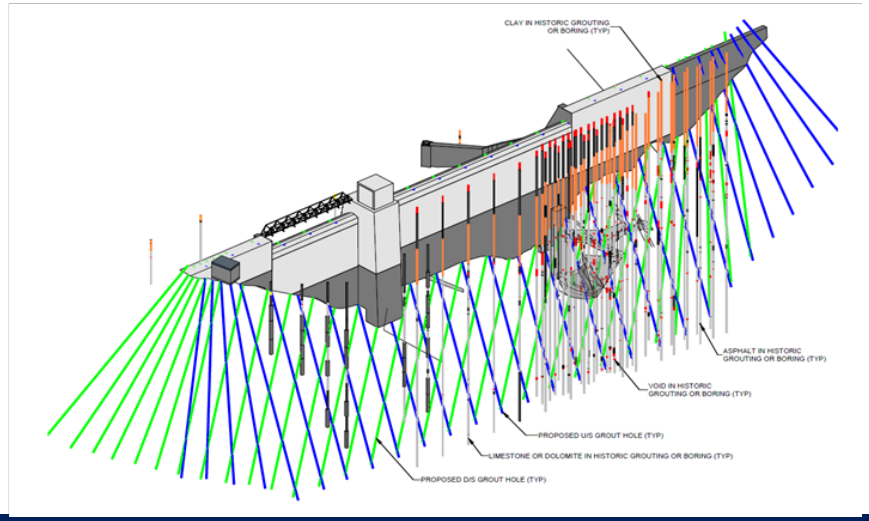


Seepage - Grouting

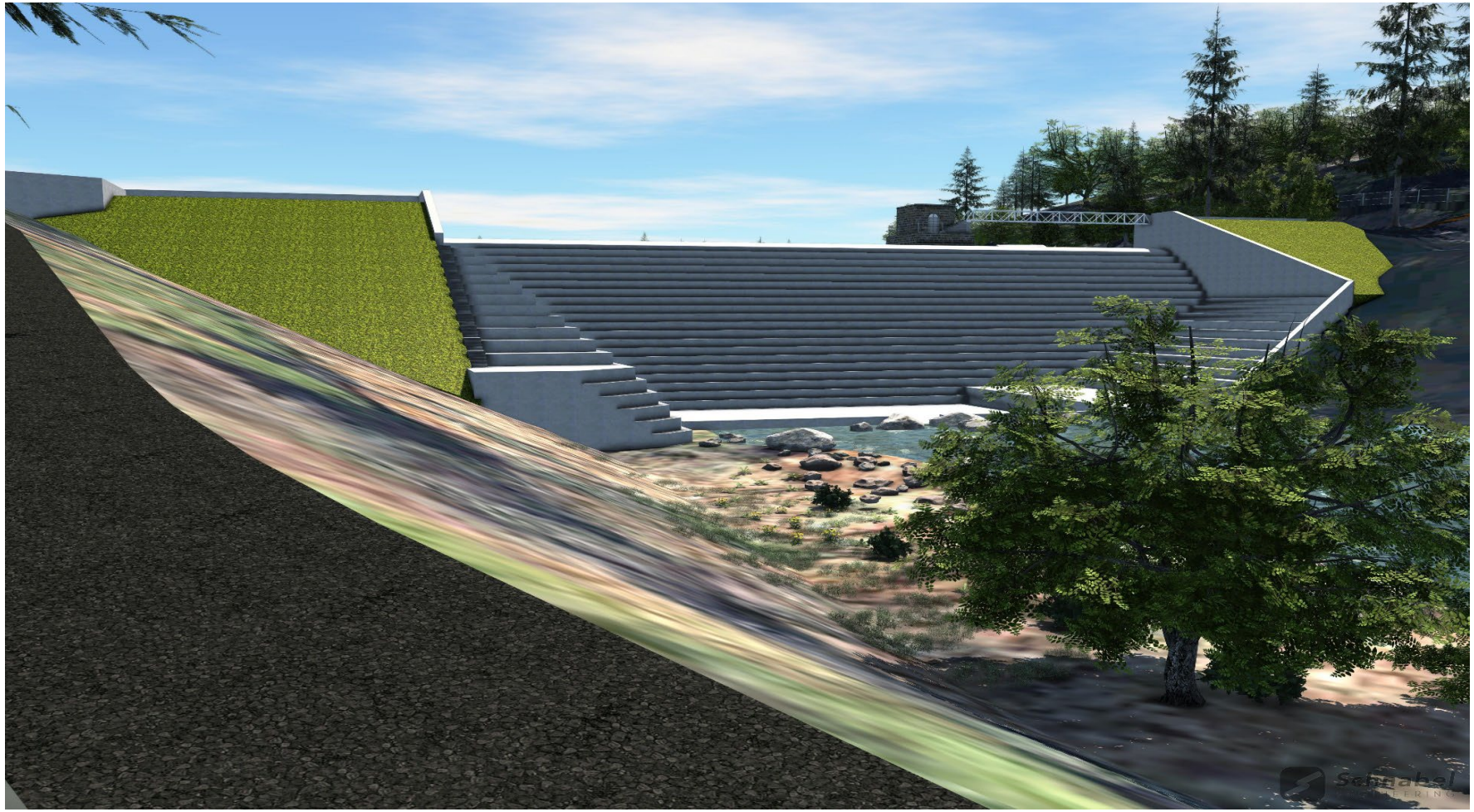




- Buttress constructed (to top of existing dam) and pre-treat upper section prior to grouting.



Design Flood Containment – Flood Walls



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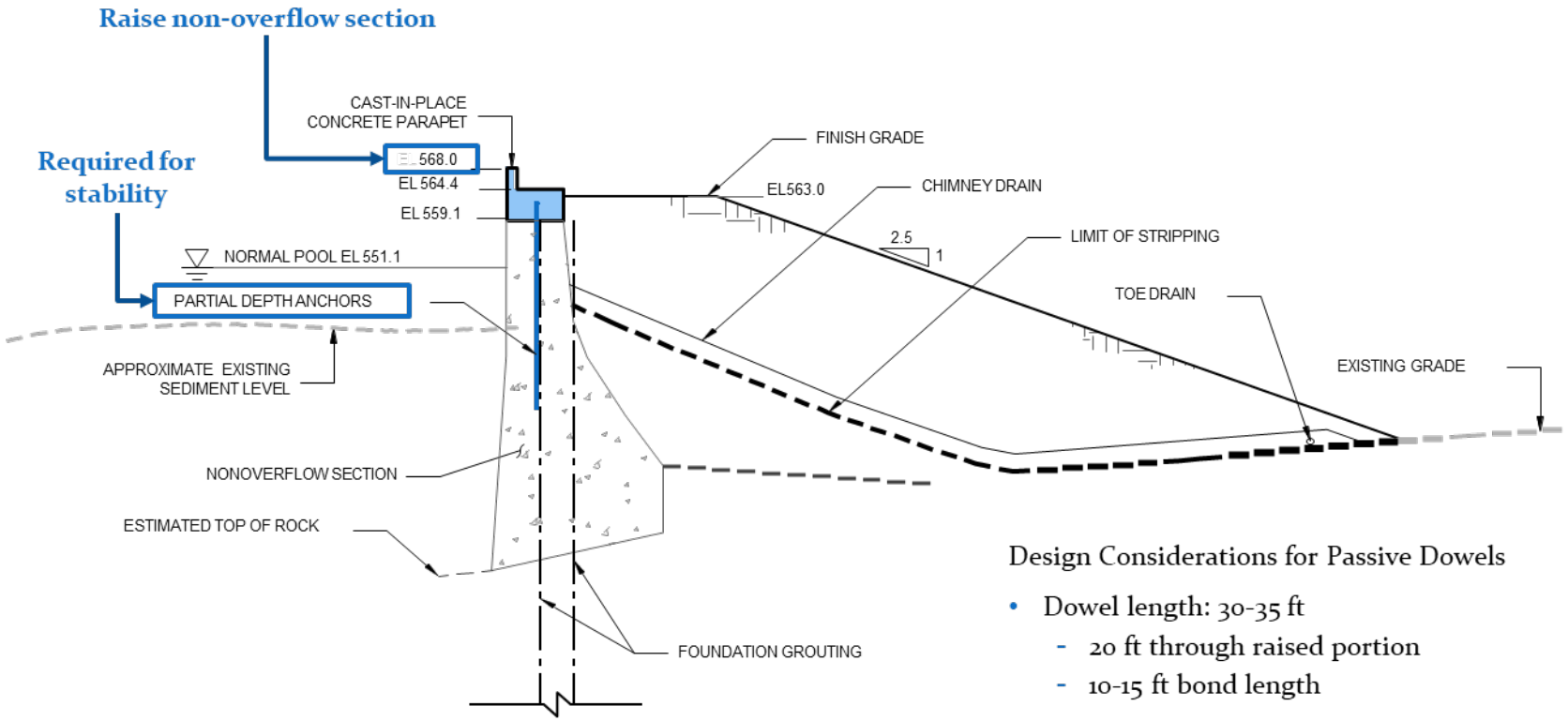


Design Considerations for Passive Dowels

- Dowel length: 30-35 ft
  - 20 ft through raised portion
  - 10-15 ft bond length
- Ultimate grout/concrete bond strength: 150 psi
  - Conservative estimate based on concrete and dolomite
  - Bond strength FS ≈ 5

Road Improvements and Mitigation

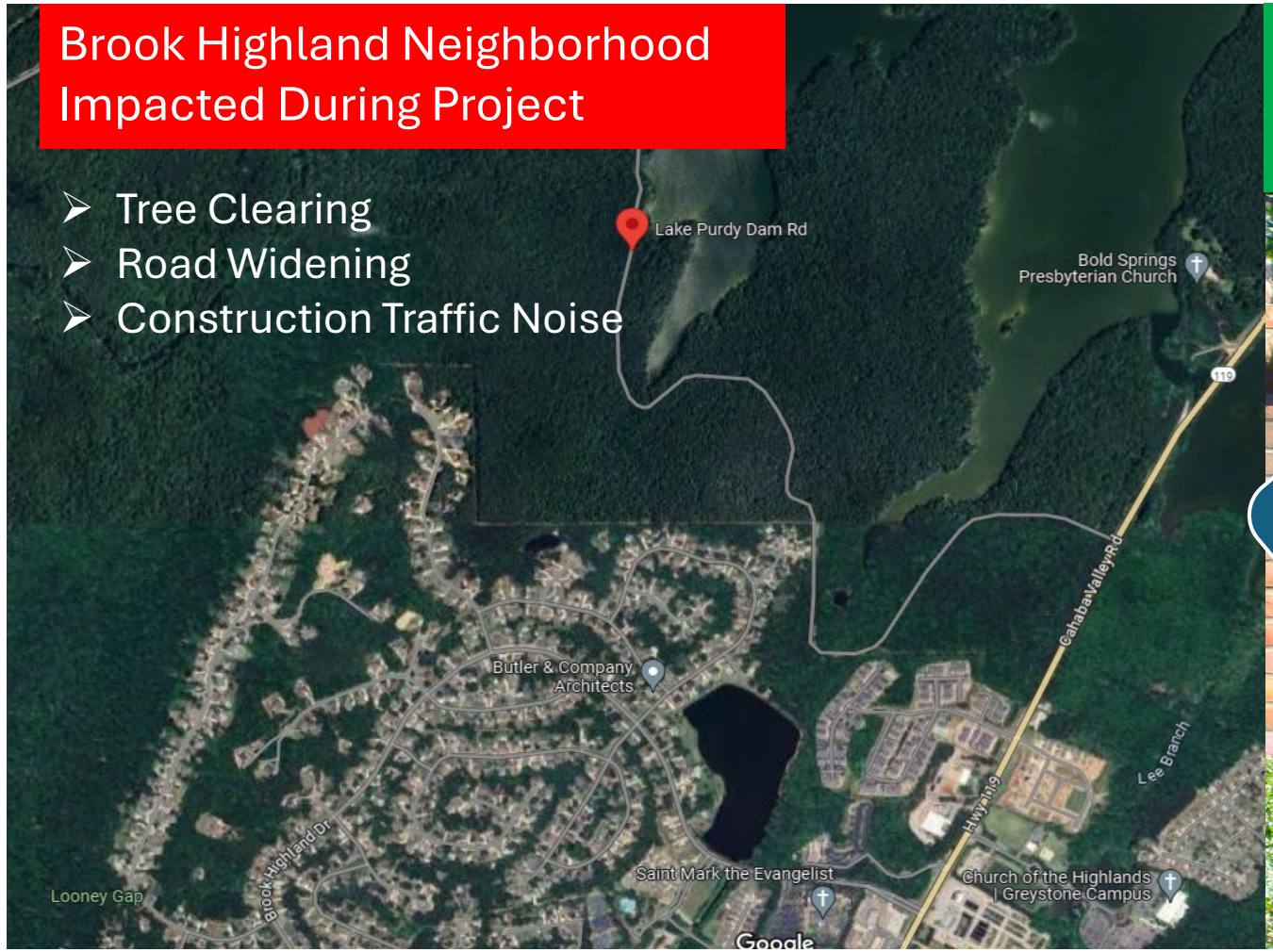
Road Improvements

- Existing access routes to the Dam not adequate to support the construction traffic
- Need two-mile road improvements from Hwy 119 to the Dam site to support construction traffic
- Improvements include
- Tree removal
- Widening existing roadway
- Increasing minimum turning radius to support truck traffic

Potential Community Impact

Brook Highland Neighborhood Impacted During Project

- Tree Clearing
- Road Widening
- Construction Traffic Noise



Measures to Address Community Impact

Environmental Impacts and Mitigation

Environmental Impact and Mitigation

- Federally Listed Threatened and Endangered Species of Potential Occurrence within the Project Area Based on US Fish and Wildlife Service IPAC Review
  - Gray Bat
  - Northern Long-eared Bat
  - Indiana Bat
  - Tricolored Bat
  - Freshwater Mussel Species & Critical Habitat

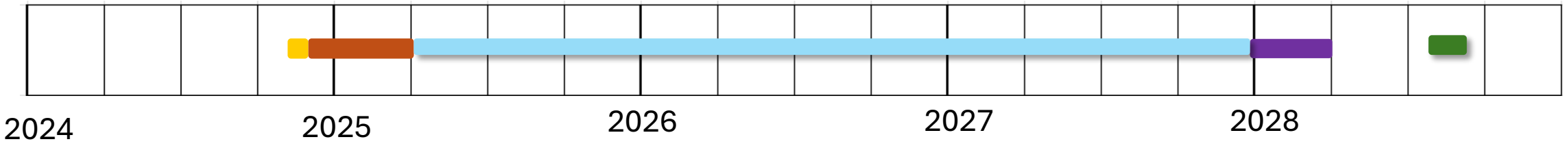
Construction Schedule and Next Steps

Project Timeline

Notice to Proceed
November 2024

Dam Rehabilitation Work
(April 2025 – December 2027)

Project Completion
August 2028



Tree Removal/ Road Widening (November 2024 – March 2025)

Valve House Rehabilitation (January 2028 – March 2028)

Seasonal Constraints to Maintain Operations

TABLE 01 14 16 -B SCHEDULE OF SEASONAL RESTRICTIONS			
Sr. No	**Activity**	**Description**	**Allowable Timeframe**
1	Tree Clearing	Clearing of trees within staging area or areas of proposed work	November 15 through March 31
2	Lowering of Lake Level	Lowering normal pool elevation by 5 feet during construction of spillway weir on top of RCC	September 1 through December 31
3	Gate house Related Work	Gate house Inspection, Repair and Replacement Work in the Gate house	January through March

Questions and Answers