

WETLAND CONVERSION OF UPPER DURANT LAKE OVERVIEW

Project Background

In 2013, an engineering firm contracted by the City of Raleigh deemed the dam and spillway of the 6-acre Upper Lake to be deficient and in need of major repair. In 2018 and 2019, under contract with the City, North Carolina State University (NCSU) conducted a study to explore alternatives to stabilize the structure and improve the Preserve.

In 2020, City staff recommended, and City Council approved, a wetland conversion alternative to address the dam and spillway repairs, improve water quality in the Perry Creek watershed and the Neuse River Basin, and increase habitat diversity and provide new wildlife viewing opportunities for park patrons.

The *Wetland Conversion of Upper Durant Lake* project is completing Phase 1 of the design process. During this phase, City staff and our design consultant are identifying the type of wetland best suited for the site and determining mobility recommendations to improve the park user experience. Feedback from neighbors and park users during this phase will help tailor design details of how the new wetland connects to the existing trail system.

How will this project affect me?

Design Phase 1 WINTER 2022-FALL 2024 (CURRENT PHASE)

- Project Team will be on trails, surveying, and conducting tests.
- Regular progress updates on the project webpage and engagement opportunities.

Design Phase 2 FALL 2024-FALL 2025

- Additional site investigation is anticipated. Surveying and tests may be conducted as needed.
- Fewer ongoing project updates while construction documents are developed.

Construction EST. SPRING 2026 START DATE

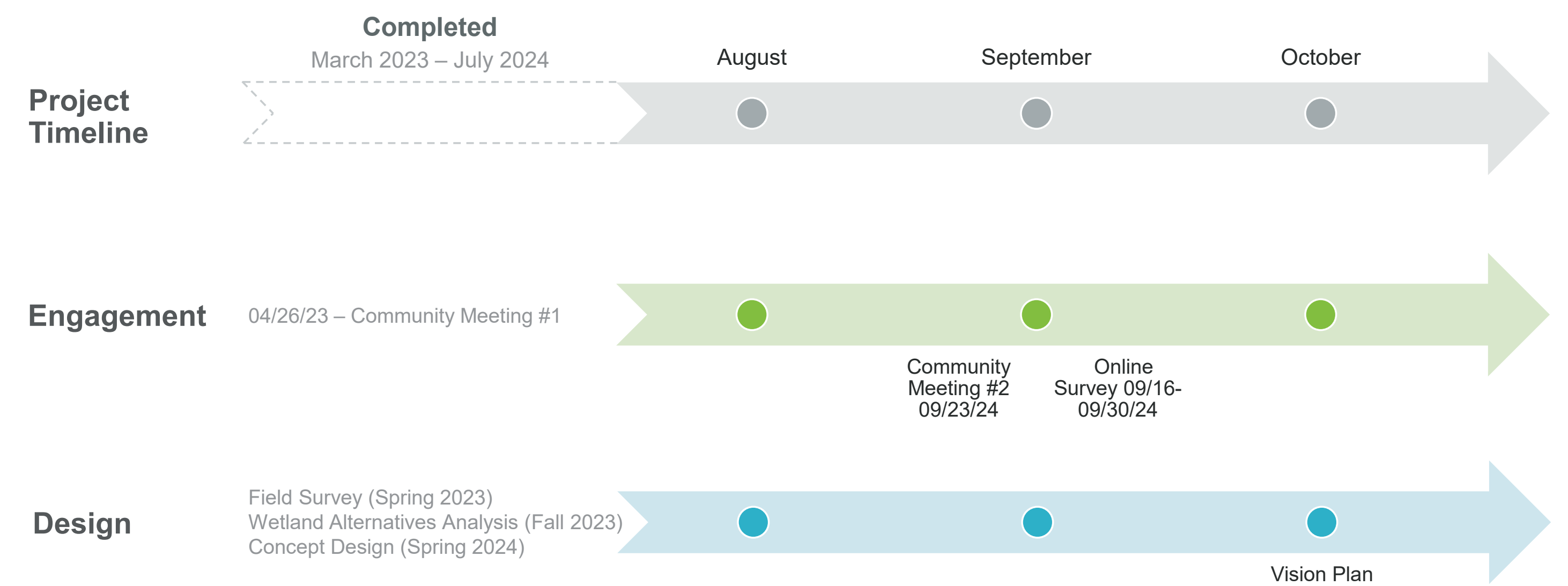
- Environmental protection measures will be installed to protect water quality, sensitive habitats and trees, and to control erosion.
- Construction crews will work and stage materials within designated areas.
- Multiple temporary trail closures around the Upper Lake. Limited closures around the Lower Lake.
- Regular construction updates.

Into the Future TO BE DETERMINED

- Ribbon cutting and celebration!
- New experiences at Durant!

Project Schedule

The timeline below will be updated regularly as the project progresses.



Stay Involved!



SPREAD THE WORD

Let your neighbors, family, and friends know about the project.



TAKE THE SURVEY

Share your thoughts by taking the survey by September 30. Scan the QR code on the right!



STAY UP TO DATE

Follow along with project updates on our website. Scan the QR code below!



CONNECT

Reach out to the project team with ideas, questions, and concerns. Contact:

Raleigh Stormwater
 Kyle Bucher, Project Manager
 kyle.bucher@raleighnc.gov
 919-996-4068



Visit <https://raleighnc.gov/projects/wetland-conversion-upper-durant-lake> to learn more!

SUMMARY OF ANALYSES AND DESIGN CONSIDERATIONS

Analysis



Design Considerations

Stream and Lake System Assessment

- The project area has two major landform types: the upper floodplain and the lake system.
- Construction of I-540 and land development in the upper watershed have introduced an unusually high volume of sediment into the system and created a large alluvial valley in the upper floodplain. This landscape can support a relatively large wetland system.



The primary design challenge is controlling water entering the system from large storm events, as these have the potential to disrupt the land surface of the wetland habitat.



The dam and spillway will need to be lowered to convert the pond into a wetland in a cost effective manner that limits imported soil.



The system will require controls to manipulate the water level for maintenance. Manual controls are cost effective and require less upkeep. This helps protect native plant communities from invasives.

Sediment Data

- Collected sediment data indicates a relatively stable alluvial stream through the upper floodplain.
- However, because of the dam, sediment cannot move downstream as it naturally would. The structure of the stream and floodplain will change slowly over time and the system will continue to deliver moderate amounts of sediment to the constructed wetlands.
- The sediments in the lake that will be used to form the wetland surface are of poor quality.



The design needs to manage the sediment the watershed delivers to the wetland system. Options include reducing the sediment supply, creating a sediment sink, and accommodating access for sediment removal.



Controlling the energy of flowing water is crucial to maintaining a stable landscape. Constructed landforms, such as berms, should be integrated in to the design to direct and manage the water's energy.



The soils forming the wetland surface will require soil amendments to support wetland vegetation.

Vegetation Assessment

- Plant community data were collected at two locations in the upper floodplain area and at two similar wetland locations at Lake Crabtree and Crabtree Creek.
- The upper floodplain area is mostly covered with prolific invasive species.
- Installation of habitat features presents an opportunity to reduce the dominance of pine monoculture on the north side of the lake.



The City has determined that a variety of wetland habitats be designed for the site. The communities chosen should be informed by the assessment performed at similar sites.



Use a mix of maintenance strategies to manage invasive species including chemical (herbicide applications), mechanical and manual removal, and biological (periodic flooding) controls.



Water level control is a critical tool for controlling invasive plant species. Diverse native vegetation can be introduced in select areas to reduce pine monoculture.

Dam Evaluation

- The Upper Lake dam riser structure (which drains water to maintain the water level of the lake) has trees growing out of it and appears to have failed, and the concrete emergency spillway is serving as the primary outlet for water.
- The structure of the dam itself is compromised. It is necessary to remove large portions where structural integrity is compromised by organic materials and low levels of compaction.



The most important factor for managing water entering the system is correctly configuring the outlet structures of the rehabilitated dam.



The elevation of the spillway impacts water levels, extents of boardwalks, and types of wetland habitats.



Conduct additional geotechnical analysis of the dam as needed to help refine the design during phase 2.

First Public Open House

- Collection of public feedback was part of the design process as we made adjustments to the design based on the feedback received
- People are excited about creation of new habitat to support greater diversity of wildlife.
- People expressed concerns about how construction will impact trail access.



Maintain user access during construction by rerouting trails and creating temporary trails.



Viewing platforms should accommodate educational groups and highlight the Preserve as a demonstration site for ecological processes.



Viewing platforms should support intended uses and activities, and should not be within casting distance of open water.

Mobility and User Experience Assessment

- Wayfinding is inconsistent and insufficient for helping user get oriented and make decisions. There are many informal access points.
- There are few elements that interpret ecology and history.
- The Border Trail has a creek crossing that is a compelling feature but poses a barrier to mobility.



Create a dynamic and engaging environment through creation of a variety of habitat types, trails, and viewing platforms.



Minimize site disturbance by ensuring trails avoid environmentally sensitive areas and by using in-situ materials as much as possible for construction.



Identify new creek crossing location with a bridge for the Border Trail.



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WETLAND SCHEMATIC DESIGN

Design Intent

The primary goal of the wetland concept is to establish a durable system of habitats that contribute to water quality while sustaining the storm flows delivered by the stream. This system would establish several different plant communities that blend together across varying water depths established across the site. Structures made out of local materials will be used to dissipate and absorb energy from storm flows while also providing habitat features.

Design Elements



Engineered Log Jam

A series of logs that are intentionally and precisely arranged to control the flow and energy of water moving through the system. Intended to stabilize and restore riverine system functions.



Sediment Forebay

An excavated area at the transition point between the upper floodplain and constructed wetland. Slows incoming water and captures sediment, keeping it from entering the wetland.



Rock Cascades

These park amenities direct water flowing into and out of the wetland system. They serve as visual and auditory points of interest while simultaneously providing vital habitat and structural functions. There is a rock cascade at the sediment forebay and at the primary outlet.

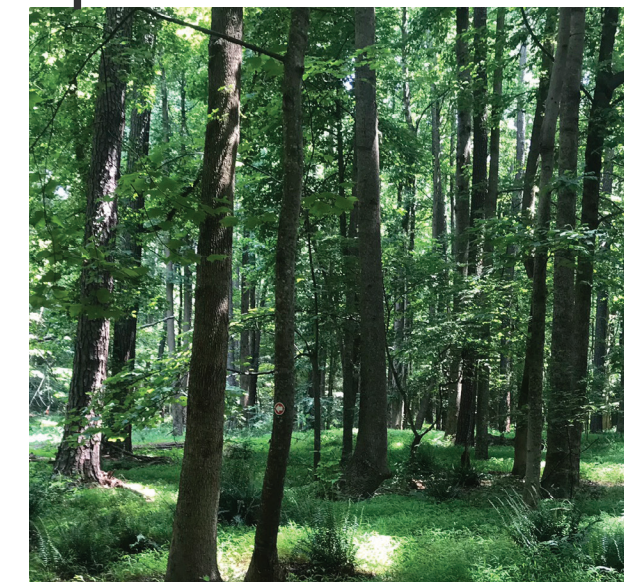


Proposed Berm

These earthen mounds absorb and redirect energy of water moving through the system. They also provide maintenance access and increase habitat diversity.

Plant Communities

Upland Forest



Natural Succession



Forested Wetland



Scrub-Shrub Wetland



Palustrine Emergent Wetland



Vernal Pools



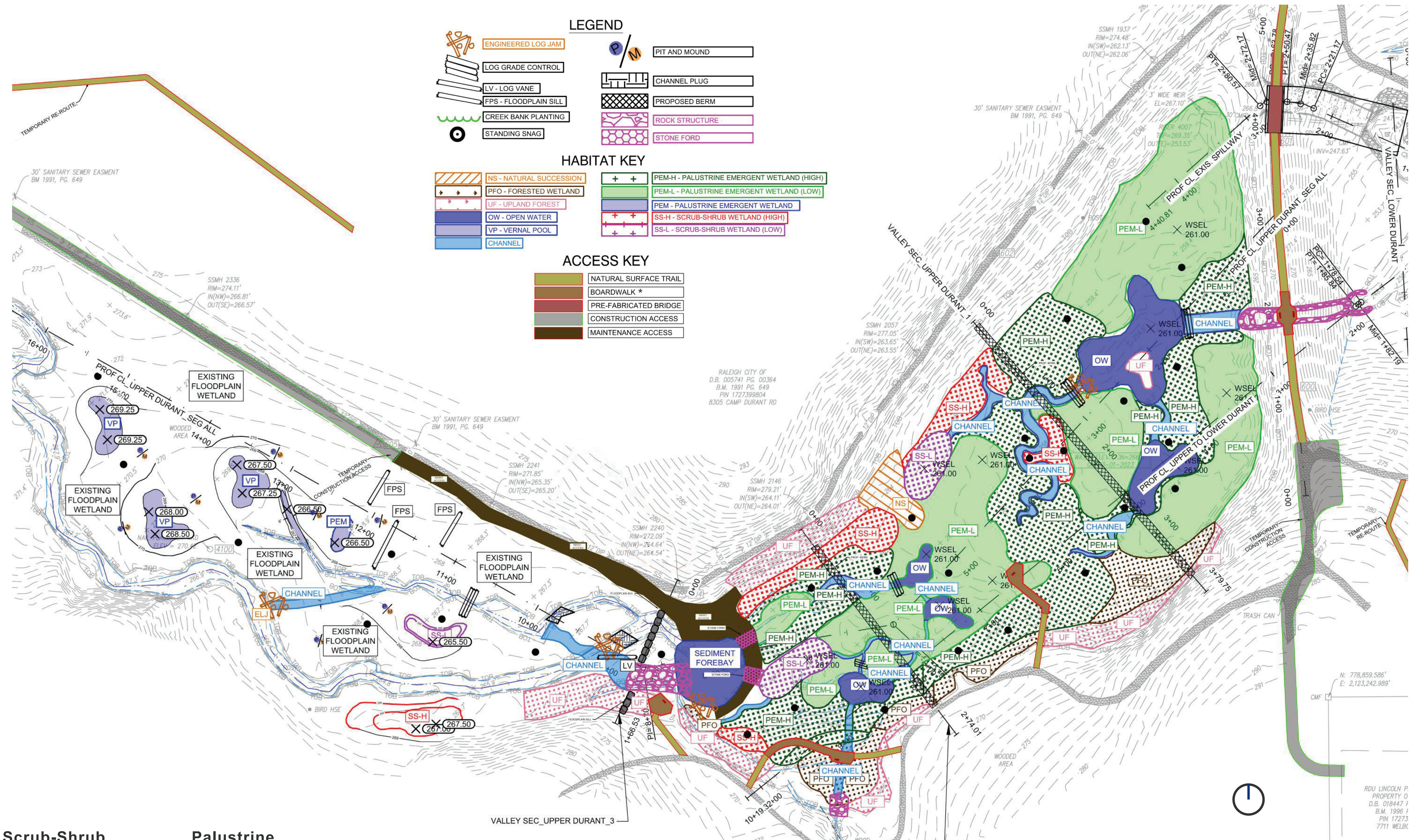
Open Water



Channels



Note: Number of boardwalk features is for representative purposes only. Final quantity, size, shape, and location of boardwalk features to be determined in design stage.



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MOBILITY RECOMMENDATIONS

Goals and Intent

The mobility recommendations presented here create a legible and comprehensive trail system in and around the project area. The accompanying map shows the recommended changes, which accomplish the following:

Ensure user access during construction:

- Temporary trail re-routes on the Border Trail and the Lakeside Trail enable users to make easy connections while sections of the trail are closed.

Establish an interconnected trail system:

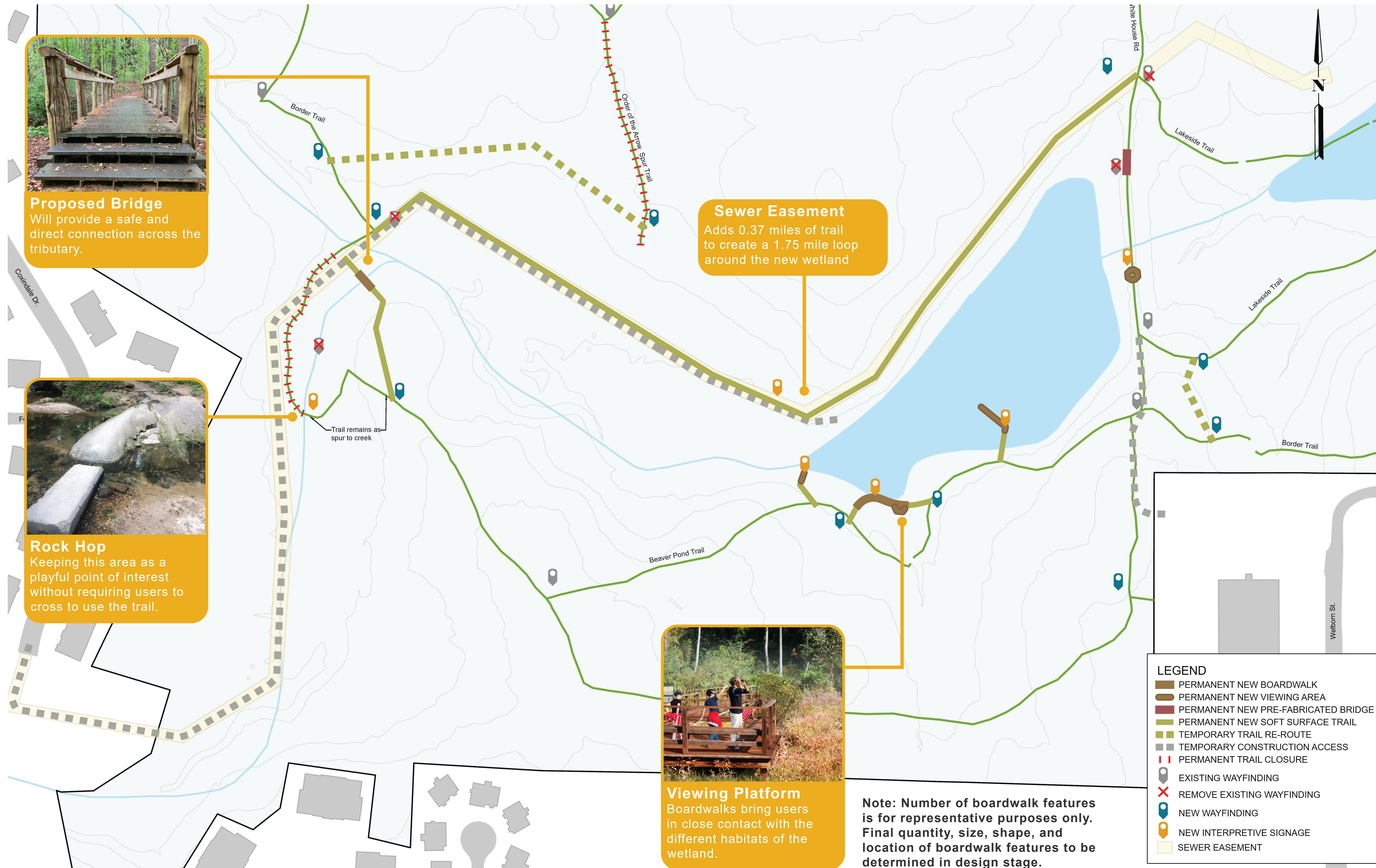
- Opening up the sewer easement between the Border Trail and White House Rd for patron use provides access to the northern side of the wetland area and creates opportunities for a variety of different trail loops.

Provide a variety of opportunities to experience the wetland:

- One or more viewing platforms are envisioned to bring users close to different wetland habitats. Locations shown on the map will be refined in future design phases.
- These platforms would be sized to accommodate tours and educational groups and will include educational signage.

Create a legible and navigable trail system:

- New wayfinding signs at all new and existing decision points ensure that users can confidently make decisions about their journey.
- Interpretive signs at key locations throughout the project area give users a greater understanding of their experience and surroundings.



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SHARE YOUR THOUGHTS

The City of Raleigh is interested in hearing your feedback on the following topics to help complete the vision for the new wetland. Use your marker to add your choices to the poster board!

INTERPRETIVE SIGNAGE

Interpretive signage is planned to enhance user experience and provide more information about the site.

Which topics should be addressed with interpretive signage?

- Ecosystem services (e.g., water quality, carbon sequestration)
- Cultural history of the site
- Plant communities
- Wildlife

Other:

BOARDWALKS

One or more boardwalks with viewing platforms are envisioned. Indicate your preference by marking like(check)/dislike(X) for all of the following photos.



Curvilinear boardwalk

✓ ✗



Angular boardwalk

✓ ✗



Boardwalk with wood railing

✓ ✗



Boardwalk with wood and metal railing

✓ ✗

SEATING

The design is investigating potential for seating at resting and viewing areas along the trail. Indicate your preference by marking like(check)/dislike(X) for the following photos.



Simple backless wooden bench

✓ ✗



Wooden bench with back

✓ ✗



Curvy backless wooden bench

✓ ✗



L-shaped wooden bench with back

✓ ✗



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BIRD BLINDS



The wetland will attract more birds of different species. A bird blind is a structure used to conceal a person while they watch or photograph birds. It allows you to observe natural bird behavior more easily.

How long would you like to use a bird blind?

- Not going to use it
- Less than 10 min
- 10 - 30 min
- Greater than 30 min

PHOTO POINTS



This is a dynamic landscape that will change over time. Photo points include a support for phones that allows you to take pictures of the same location over time.

What kind of scene do you want to photograph over time?

- Large view of the wetland
- Animals
- Water features
- Me & my friends in the landscape

Other:

TRAIL RE-ROUTE SIGNAGE

Trail re-route signage will be provided while trails are temporarily affected by construction.

What kind of information is needed on trail re-route signs?

- Trail names and distances
- Maps
- Level of difficulty

Other:

Where do you want to see re-route information?

- Online
- At every decision point
- Trailhead kiosk
- Informal neighborhood access points

