

# LANDSCAPE INTEGRATION REPORT

THE DOAN BROOK RESTORATION NEAR HORSESHOE LAKE PARK

AUGUST, 2023



Please visit [www.neorsd.org/DoanBrook](http://www.neorsd.org/DoanBrook) for more information.

- Virtual Meeting #1 recording from 08/25/2022
- Virtual Meeting #2 recording from 11/30/2022
- Virtual Meeting #3 recording from 05/15/2023
- Detailed answers to Frequently Asked Questions

# CONTENTS

## Introduction

|                      |    |
|----------------------|----|
| Project Introduction | 4  |
| Design Team          | 6  |
| Watershed Context    | 8  |
| Goals and Objectives | 12 |
| Engagement Overview  | 16 |

## Part I Inventory and Analysis

|                             |    |
|-----------------------------|----|
| Overview                    | 18 |
| Site History                | 20 |
| Connections and Access      | 28 |
| Ecology and Site Assessment | 34 |
| Public Engagement           | 40 |
| Web Survey                  | 42 |

## Part II Exploring Alternatives

|   |    |
|---|----|
| Overview                                | 46 |
| Park Alternatives and Stream Alignments | 48 |
| Public Design Workshop                  | 56 |

## Part III Landscape Integration Plan

|                                 |    |
|---------------------------------|----|
| Overview                        | 60 |
| Iterative Design Process        | 62 |
| Landscape Integration Plan      | 64 |
| Earthwork and Landscape Ecology | 66 |
| Circulation                     | 68 |
| Hydrology                       | 70 |
| Amenities                       | 72 |
| Plant Communities               | 76 |
| Perspective Renderings          | 78 |
| District Scope and Maintenance  | 80 |



SHELBURNE

NORTH PARK BOULEVARD

LEE ROAD

CLEVELAND HEIGHTS  
SHAKER HEIGHTS

PARK DRIVE

SOUTH PARK BOULEVARD

An aerial photograph of a park area. A road is visible at the top left, with the word "ROAD" written in white. A green circular feature, possibly a pond or a landscaped area, is visible in the lower left. The surrounding area is a mix of green and grey, indicating a mix of vegetation and paved areas.

## INTRODUCTION

The purpose of this Landscape Integration Report is to define, evaluate, and summarize the range of planning objectives and program ideas established during the three phases of the Pre-Design process: discovery, alternatives, and refinement of the landscape integration plan. From the beginning, our values and priorities for this project have been to take a collaborative approach to design, cultivate direct experience with the site and stakeholders, and demonstrate responsiveness to the many voices of the community. A community-centered planning process was instrumental in establishing this visionary and grounded park plan. The Pre-Design phase culminated in the development of this stand-alone comprehensive Landscape Integration Report that summarizes a range of landscape planning ideas informed by an inclusive and transparent stakeholder engagement process. These park planning ideas focus on the entire 60-acre study area bounded by Lee Road, North Park Boulevard, Park Drive, and South Park Boulevard, as illustrated on the facing page.

Together with the NEORSD, the Design Team undertook a robust stakeholder engagement process during this year-long project. This report highlights the ecological, cultural, & recreational amenities that surfaced in our conversations with stakeholder groups and public workshops, and illustrates how these have been prioritized

and crafted into a comprehensive framework plan. While the engineering alternatives in NEORSD's Basis of Design report identify elements such as the stream valley shape, channel alignment, confluence location, sediment management, dam removal, and the performance of those elements hydrologically, this Landscape Integration Report strategically composes these elements into a broader vision that shapes the required earthmoving to the surrounding context and integrates landscape ecology, plant communities, site histories, stormwater management, park circulation, and various site amenities.

Part I of the Landscape Integration Report summarizes the Design Team's inventory and analysis of the existing and historical conditions, as well as the various forms of stakeholder engagement that were utilized to secure feedback during the process. Part II focuses on the stream alignment alternatives that were studied as part of the Pre-Design phase of the project. This will summarize the park planning opportunities and constraints that were identified for each alternative, including the results of a public open house design workshop. Part III of this report focuses on the final recommendations of the Landscape Integration Plan, which will be further developed in the Detailed Design phase of the project to commence in Fall 2023.

## DESIGN TEAM

STIMSON assembled a high-powered Design Team to provide excellent design and client services to the NEORS D for the Doan Brook Restoration Near Horseshoe Lake Park project. The Design Team possesses both national expertise and local knowledge and pragmatism —incorporating all the specialties needed to construct landscapes in Northeast Ohio and meet the needs of this unique project.

STIMSON is a nationally recognized landscape architecture firm, led by five principals, sharing an urban and rural landscape architecture studio, a working farm, and a plant nursery. For nearly three decades, STIMSON has built a wide range of projects in the realm of cultural institutions, parks, and performance spaces. Our work is informed by a shared love of land, craft, and invention. STIMSON's designs respond to and reflect each site's unique historical, cultural, environmental, and ecological context. We believe design should emanate from the land, its history, and the cultural influences that have impacted the landscape. We seek to preserve and enhance a site's unique character, as well as incorporate concepts that honor and respect a site's history and its people – both past and present. We strive to create a cohesive and connected whole, while crafting highly functioning and purpose-driven spaces.

The STIMSON team has led civic open space and ecological restoration efforts across the country, including award-winning landscapes like Phil Hardberger Park in

San Antonio, Ferrous Foundry Park in Lawrence, MA, and the Artist's Trail at the Florence Griswold Museum in Old Lyme, Connecticut. Glen Valentine, ASLA, principal-in-charge, brings over twenty years of experience focused on designing innovative and performative landscapes in historic settings. Matt Langan, ASLA and team project manager, has a proven track record of translating complex challenges into clear and rational design solutions, and has led the design of the Nord Family Greenway and Smith Family Gateway landscapes along the Doan Brook in University Circle.

AECOM is a national leader in the field of dam engineering & safety and ranks #1 in Dams and Reservoirs by Engineering News-Record (ENR). AECOM is familiar with the site and several stakeholders through their role in the temporary breach work at Horseshoe Lake Dam, Horseshoe Lake Sediment Characterization Study, and development of engineering plans for the replacement of the Horseshoe Lake dam. In addition, the AECOM team has been engaged in award winning dam removal projects on the Boardman and Kalamazoo Rivers, among other regional projects, AECOM brings an impeccable national reputation to Horseshoe Lake Park. AECOM will lead the dam removal and sediment management design tasks.

GPD Group houses the largest stormwater experienced resource base in the state. Our integrated water, site, public works and transportation teams are experienced with

executing a diverse portfolio of design services, many of which align perfectly with the key design tasks anticipated with the rehabilitation of Horseshoe Lake Park. For a combined 36 years GPD has served the cities of Shaker Hts and Cleveland Hts. They have provided numerous studies and planning efforts along with design and construction services. Their work has involved all facets of municipal infrastructure improvements from roadways and culverts to larger watershed, stormwater, water, and sanitary sewer improvements including the removal of SSOs.

Bluestone Heights Environmental Education is led by Dr. Roy Larick - a passionate researcher, lecturer, and educator that brings archaeological perspectives to the urban environmental issues in Greater Cleveland. Roy works with varied partners to recover buried natural features and regenerate ecological functions - investigating the weave of natural and human forces in building urban landscapes. Roy will be a key advisor and educator to our team, just as he has been for years with the District, Doan Brook Watershed Partnership, and the Central Lake Erie Basin Watershed Collaborative, among others. He will provide his expertise on the Doan Brook ravine evolution, legacy milling landscape, archaeology of Shaker milling, and local forest ecology.

EnviroScience, Inc. is a team of over 100 expert biologists, commercial divers, environmental scientists, and environmental engineers headquartered in Ohio.

EnviroScience's ecological consulting services are nationally recognized and include restoration and environmental compliance assistance on projects of all sizes for freshwater mussels, bats, fisheries, aquatic surveys, and streams and wetlands. EnviroScience has provided expert technical services to help clients achieve their environmental design and regulatory requirements, and has been working with Northeast Ohio Regional Sewer District (District) as a certified small business in both prime contractor or subcontractor capacity for over 10 years. Their diverse level of services has been utilized by the District on many projects throughout their service area. EnviroScience will lead the restoration design of Doan Brook and develop environmental permit applications for the overall project.

River Reach Construction is a specialized construction contracting company with expertise in the repair, remediation, and construction of streams, rivers, wetlands, lakes, and dam removals of varying size. Their management team has expertise in working closely with ecological design teams and project owners to see that their vision becomes reality. As a local Northeast Ohio firm, RiverReach Construction has the local knowledge and contacts to find creative and cost effective avenues for every type of situation that might arise.

## WATERSHED CONTEXT

Doan Brook is a direct tributary to Lake Erie that flows through the cities of Cleveland Heights, Shaker Heights, and Cleveland before draining into the lake at the Cleveland Lakefront Nature Preserve. The movement of water throughout Northeast Ohio has always been a primary force in shaping the landscape and creating place identity. There are three drainage areas in the Doan Brook watershed. The project study area, highlighted in yellow on the facing page, is located in the smallest of the three drainage areas called the Upper Doan Brook watershed. It was here at the confluence of the North and Middle branches of Doan Brook where the Shakers built a dam for a mill operation in 1852, creating what became Horseshoe Lake.

With development pressures throughout the 20th century, Doan Brook became an urban stream that has been culverted underground in various places along its length. At University Circle, Doan Brook flows underground in a series of culverts from Ambler Park before emerging near the Cleveland Museum of Art. It then continues through the cultural gardens along Martin Luther King Blvd before entering another culvert at I-90 and through the Nature Preserve to Lake Erie. The areas along Martin Luther King Blvd and University Circle have experienced repeated flooding over the years due to storm events which overwhelm the existing stormwater infrastructure.



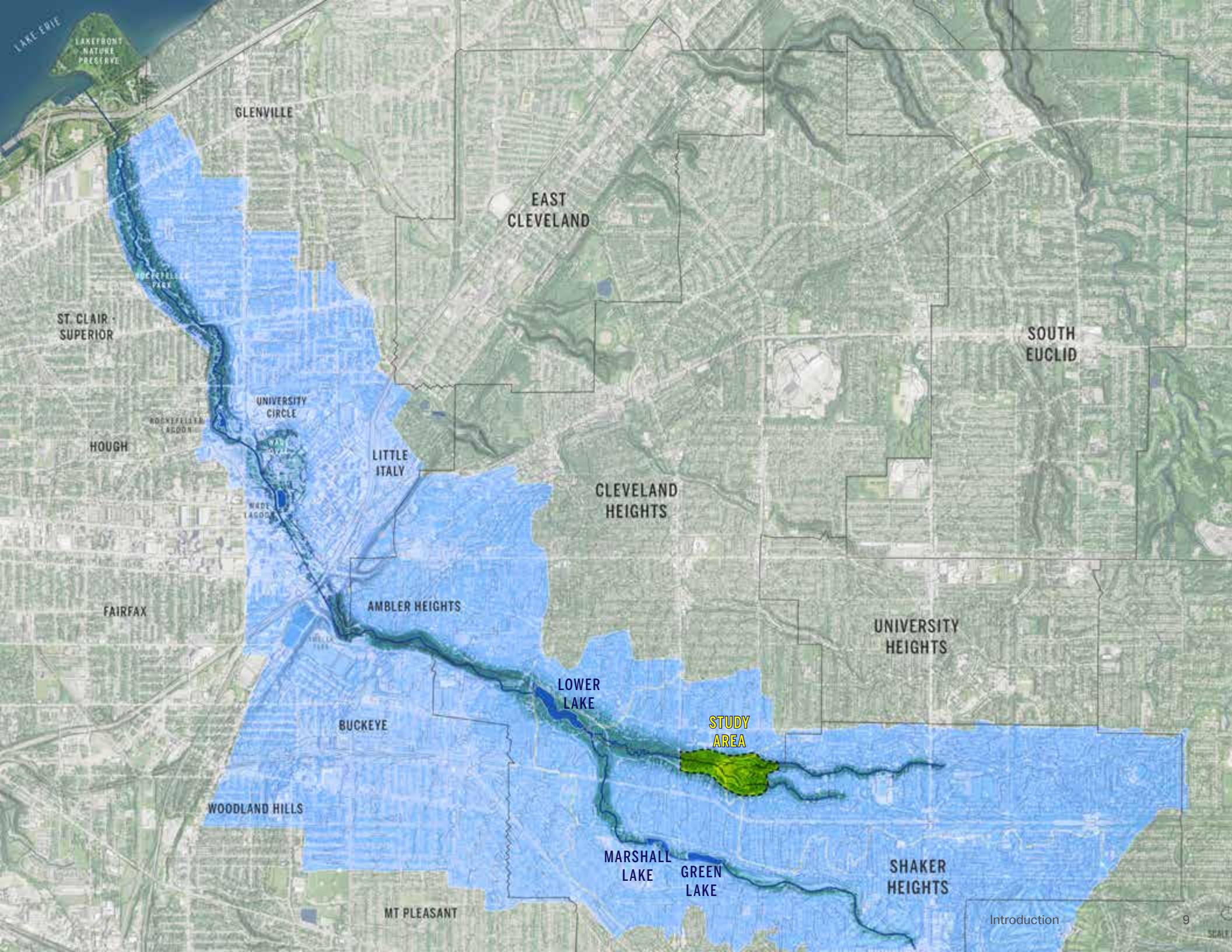
Saw cut and removal of concrete walkway over Horseshoe Lake spillway to investigate detected voids within the dam and spillway structure, July 2021

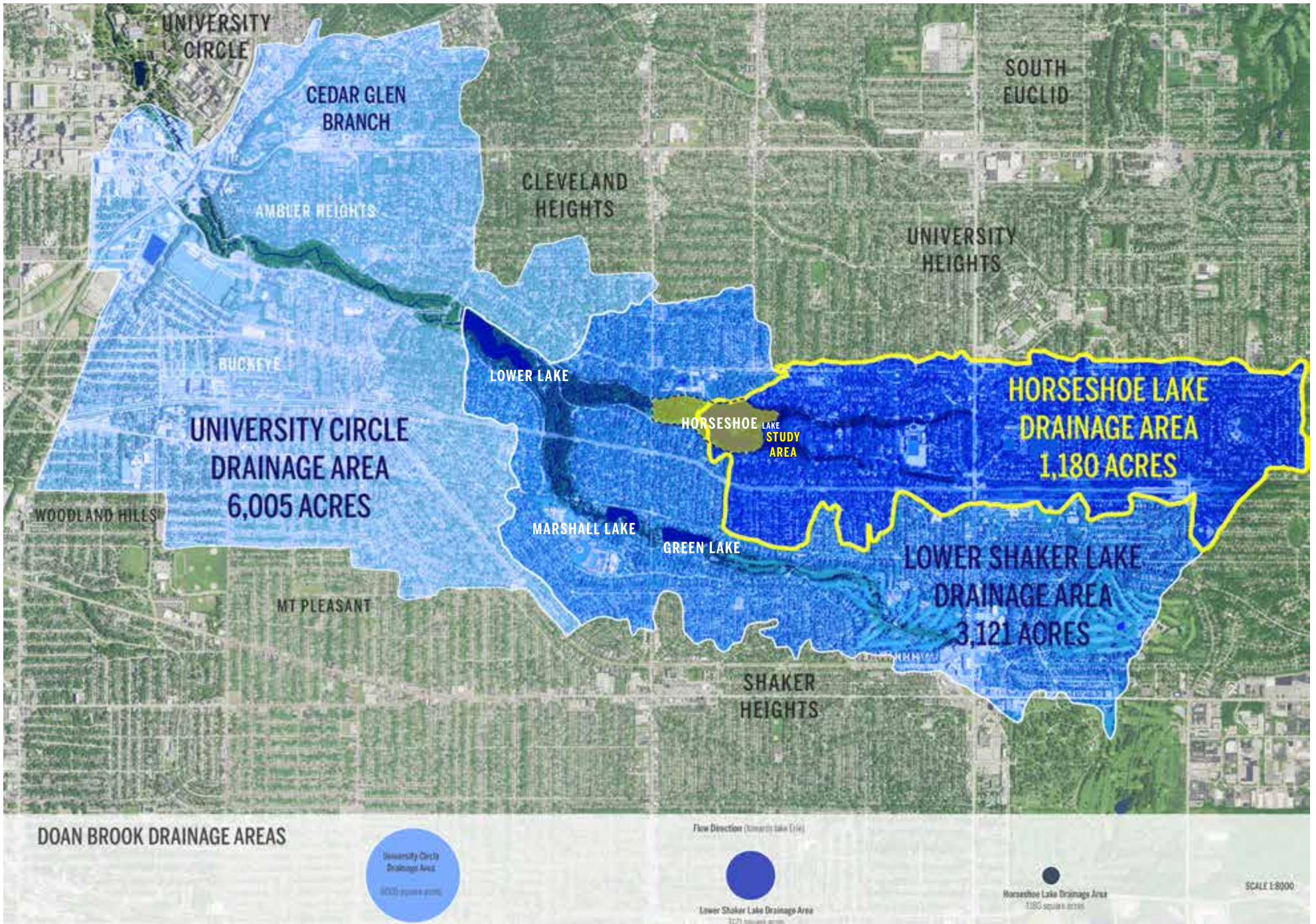
There are two types of flood concerns for Doan Brook articulated in the NEORSD's Regional Stormwater Management Program. The first is the type of flooding occurs during storm events due the significant amount of impervious surface and undersized culverts.

The second type of flooding concern is a dam failure, which would release of a large quantity of water which may result in the loss of life and would cause significant property damage. At Horseshoe Lake, the flood impact would begin immediately downstream of the dam and continue to University Circle.

The 170-year-old Horseshoe Lake Dam is in extremely poor condition and out of compliance with Ohio Dam Safety regulations. During safety inspections, sinkholes were found in the masonry spillway portion of the dam, some of which were 7 feet deep. The presence of these structural failures in the dam led to an order by the Ohio Department of Natural Resources (ODNR) to drain Horseshoe Lake. It is classified by ODNR as a Class 1 High Hazard dam due to

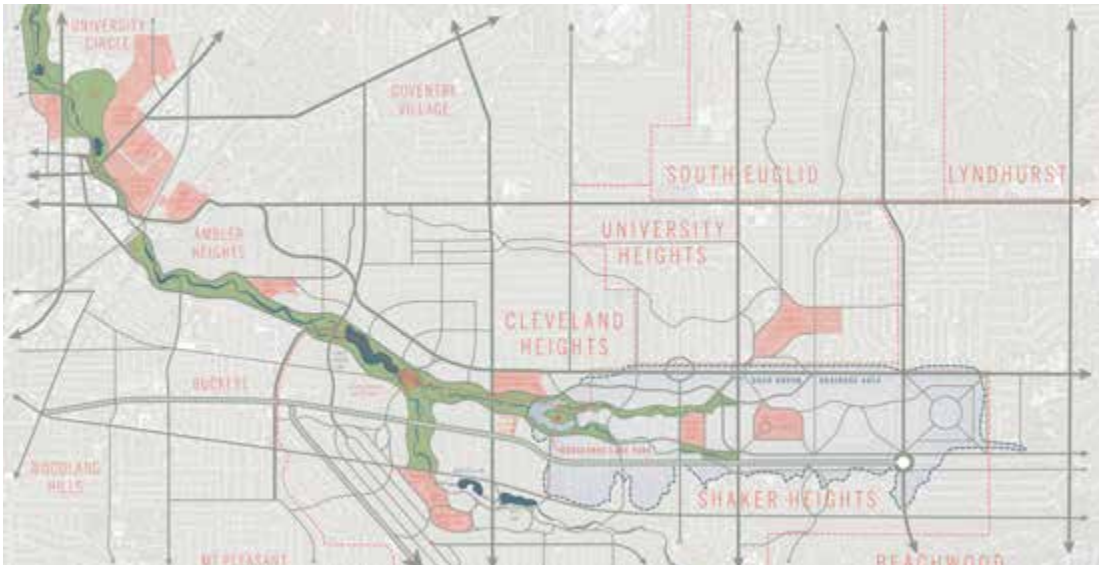








Temporary breach of the Horseshoe Lake Dam.



The Horseshoe Lake drainage area of 1,180 acres in the context of the broader upper watershed and surrounding communities

the potential for loss of life if the dam were to fail. The City of Shaker Heights undertook a project build an emergency breach and auxiliary spillway to lessen the severity of flood impact in the event of a dam failure. Although this measure greatly reduced the risk of an imminent dam failure, a more permanent solution that restores the ecological health of Doan Brook and prioritizes safety of the community involves the complete removal of the dam at Horseshoe Lake.

The restoration of Doan Brook through the study area achieves the goals outlined in the NEORS D’s Regional Stormwater Management Program and addresses non-compliance with the State of Ohio regulatory requirements. Restoring natural stream function through vegetated floodplains will also reduce the extensive maintenance requirements associated with sediment management and dam regulations.

The Upper Doan Brook Watershed—the drainage area upstream of University Circle—is approximately 6,005 acres and home to four artificial lakes. Green and Marshall Lakes are located on the south branch of Doan Brook. Horseshoe Lake, sits at the confluence of the middle and north branches. The two branches confluence just upstream of Lower Lake.

## GOALS AND OBJECTIVES

### *Develop a landscape plan that integrates ecological, cultural, and recreational amenities*

This study presented an opportunity to guide the future development of Horseshoe Lake Park with a respectful approach to the multifaceted historical, natural, and cultural legacies that have impacted the site's ecology and land use over time. We took advantage of this opportunity to assess the overall conditions of the park to provide a unified landscape framework that organizes the visitor experience with a clear circulation system, a rich and robust landscape, and a set of priorities articulated by the community for expanded or improved amenities. The design team employed a rigorous process of inventory and analysis to establish a thorough understanding of the practical limitations of the site, which generated unique ideas that we presented to the project stakeholders for consideration. This Pre-Design Landscape Integration Plan for Horseshoe Lake Park serves as a decision-making tool that communicates a vision for the future and facilitates practical day-to-day decision-making. Its purpose is to make sure that the individual improvements made in and around Horseshoe Lake Park, including changes to the Doan Brook, the dam, and other critical stormwater infrastructure, will fit within a larger whole and bring consistency and coherence to the public realm. The Landscape Integration Plan also ensures that investments are properly sequenced, are grounded in an achievable management plan, and contribute to a larger long-term collaborative vision.



The Study Area is bound by Lee Road, North Park Boulevard, Park Drive, and South Park Boulevard.



An initial observation of the Design Team was that the 6-acre peninsula park is well used and maintained, but the rest of the study area is maintained to a lesser degree and under-utilized. We challenged ourselves and the project stakeholders to consider the entire 60-acre Study Area as the future park.



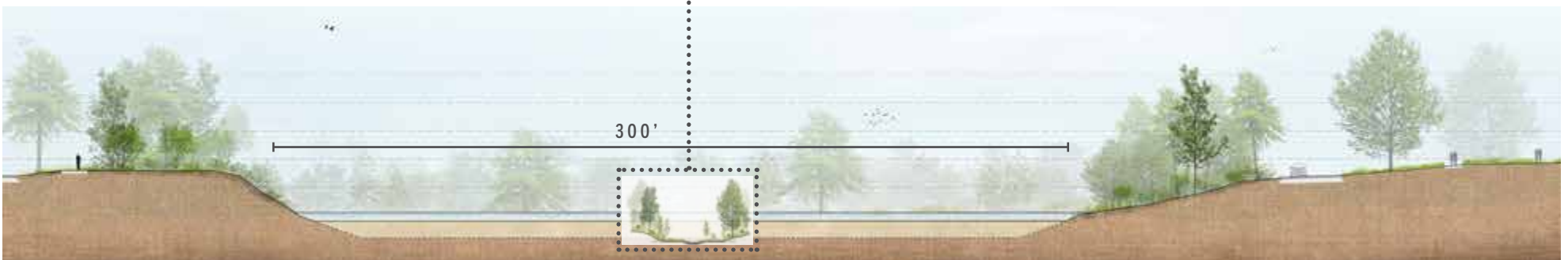
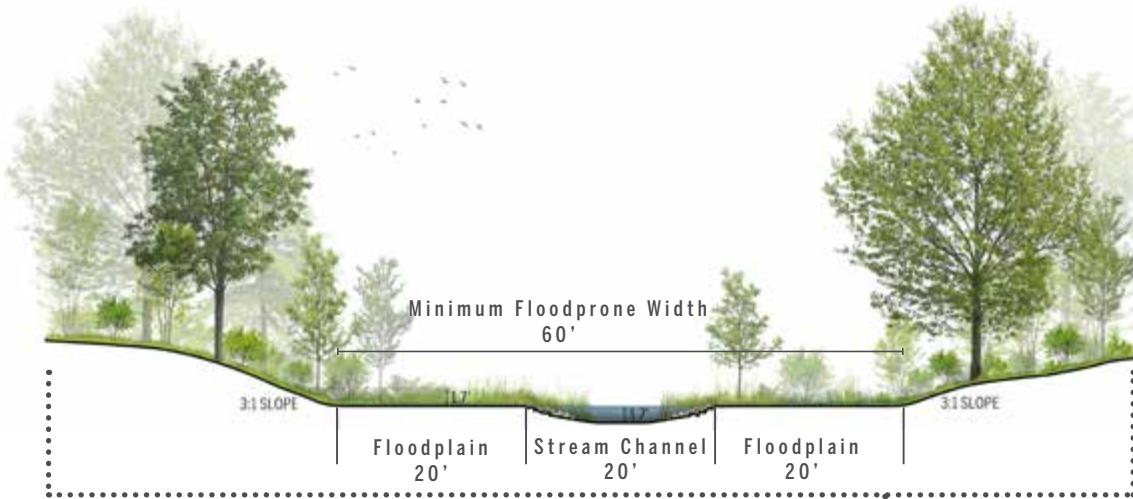
Doan Brook at the Cleveland Museum of Art



Beecher's Brook in Mayfield, Ohio

## ***Restore the stream corridors and enhance ecological sustainability***

A primary driver for this project is to re-naturalize the Doan Brook channels and riparian features through the impoundment area to improve ecological function. This work must be sequenced carefully and be guided by data-driven recommendations to manage storm events, erosion, and flow in an environmentally responsible way. The challenge is that the North and Middle Branches of Doan Brook confluence together within the impoundment area of the former Horseshoe Lake and flow through the spillway and emergency breach in the existing dam. The 1850s-era dam structure created a +/- 25ft deep pond that has filled in with sediment over the last 175 years to approximately 75% of the maximum depth, where the deepest part of the lake prior to draining in 2018 was less than 6ft. Initial data provided, additional investigations, and site visits demonstrated clearly that the sediment is highly fluid and unstable even in a post-drained condition. This enormous volume of sediment and the dam itself need to be moved to accommodate this stream restoration process.



## ***Manage waterway sediment to accommodate the project program in a way that is cost effective***

There is a significant amount of sediment within Horseshoe Lake (~184,000 CY) that will need to be managed as part of the project. This single task item will be the driver for the overall project cost. Thus, out-of-the-box creativity and flexibility are required when evaluating management alternatives for sediments of this volume. The Horseshoe Lake impoundment is nearly full of sediment, complicating removal efficacy and increasing cost. Therefore, sediment management decisions must be data-driven, made carefully, and in the context of the watershed as a whole.

During the Detailed Design process, the Design Team will provide a more detailed cost/benefit analysis for the best ways to reuse, re-purpose, and/or dispose of stream sediment. The site offers many potential benefits for dam removal and ecological restoration as it is part of a well-used and loved park system. However, this presents

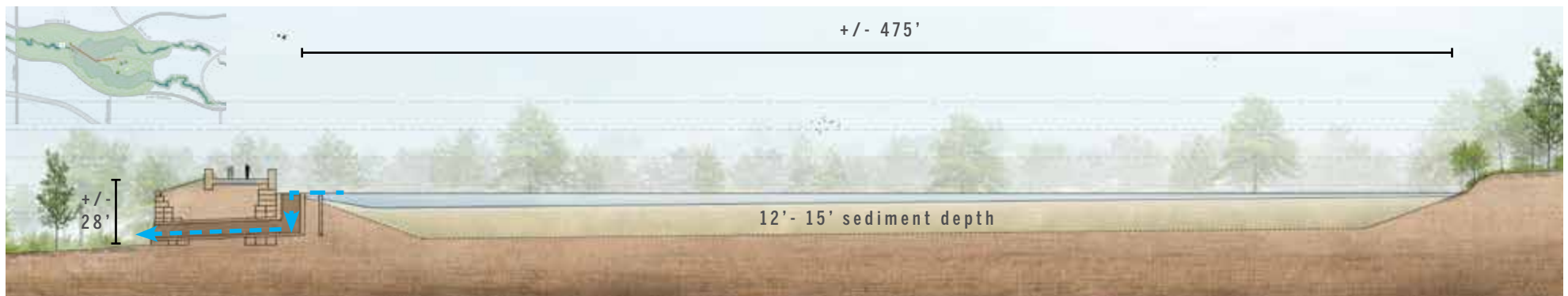
construction challenges such as limited site access (other than through residential neighborhoods and/or city parks) as well as limited adjacent property for stockpiling materials as part of the remedial design.

Our team will evaluate beneficial reuse opportunities for the sediment that cannot be managed on site. Analytical, geotechnical, and treatability tests will be used as guidance to evaluate additional regional opportunities for placement.



Left: Example of complex management of sediment management on site at Ferrous Foundry Park in Lawrence, MA  
STIMSON

Below:  
Section through dam and lake bed showing the depth of accumulated sediment.

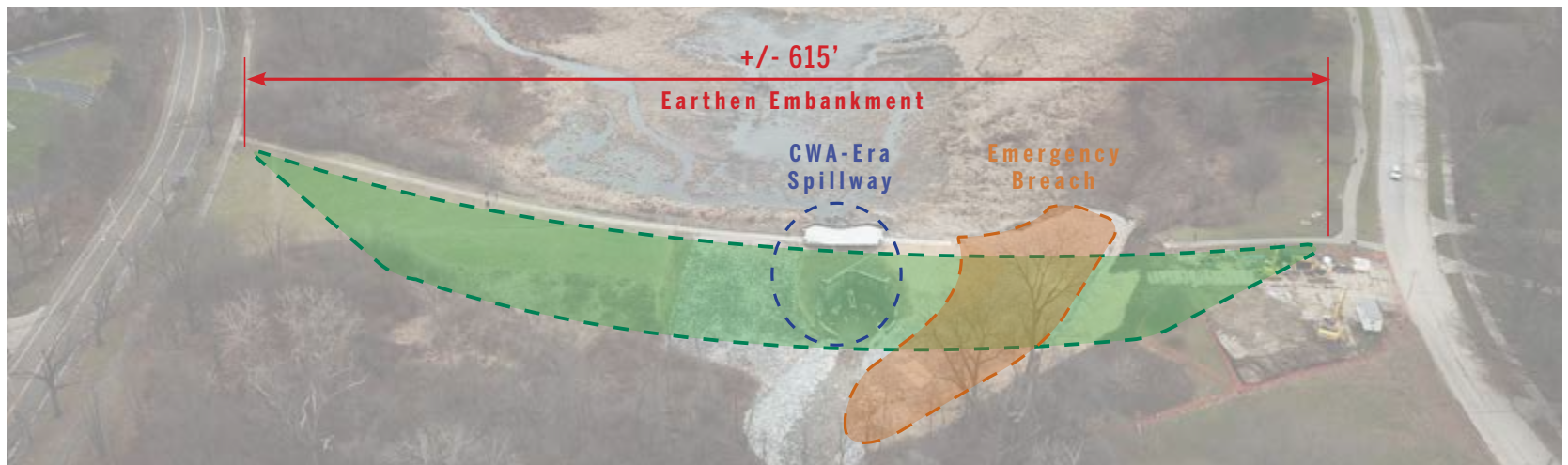


## ***Remove the dam to mitigate risk during and after construction***

Any dam removal restoration must always consider the regulatory, public safety, and environmental challenges associated with dam removal, including the elevation difference (+/- 25ft), sediment deposits (depth, volume, and composition), and the contributing watershed drainage area (1,180 acres) for restoring the stream and valleys post-removal. A strategy for dam removal is the focal point of risk and a primary motivation for the project, so an approach that minimizes safety risks while managing variable stream flows during construction is of utmost importance. The dam removal strategy also has the most direct influence over the sediment management component of the project

due to the sheer volume of deposition behind the dam. Managing flow during a dam removal can be challenging - solutions must be integrated with sediment management and stream restoration strategies. Understanding the variability of the frequency, magnitude and seasonality of storm events is the first step towards designing an approach to managing flow and water levels in the impoundment. Removing the dam structure will require applying principles of hydrology, hydraulics, structural engineering, and geotechnical engineering. Creatively applying these engineering disciplines will ensure the dam is removed safely and in a cost-effective manner.

Dam removal strategies will consider the extent of removal of the earthen embankment, the spillway structure, and the temporary emergency breach that was constructed in 2022.



## PUBLIC ENGAGEMENT PROCESS

For the Horseshoe Lake Park project to have design substance, credibility, and momentum for implementation, it must be championed by the greater Cleveland Heights and Shaker Heights communities. It must engage and carefully balance the needs of diverse stakeholders, including residents of the varied adjacent neighborhoods, professionals, recreational users, transit riders, tourists, nature enthusiasts, and others. We believe that the key to a successful, robust, inclusive, and fun public engagement process is the layered use of approaches to reach the broadest public audience.

The Design Team, led by STIMSON and working in close partnership with NEORS & LAND Studio, designed and deployed innovative, inclusive strategies that directly engaged a broad spectrum of the Shaker Heights and Cleveland Heights communities during the Pre-Design phase. Engagement first focused on understanding the needs and capabilities of NEORS and those of the cities of Shaker Heights and Cleveland Heights. Stakeholder engagement then extended to reach a variety of specific groups and other interested community members. Outreach in the Pre-Design phase of the process aimed to ensure that the final Landscape Integration Plan reflected the collective aspirations of the many diverse voices invested in the park. Engagement focused on

building understanding about the overall vision as well as the developing details of the landscape's character. The Design Team hosted a series of meetings and facilitated discussions with the following stakeholder groups:

### **Senior Leadership**

NEORS

City of Shaker Heights

City of Cleveland Heights

City of Cleveland

### **District Partners**

Doan Brook Watershed Partnership

Nature Center at Shaker Lakes

Shaker Historical Society

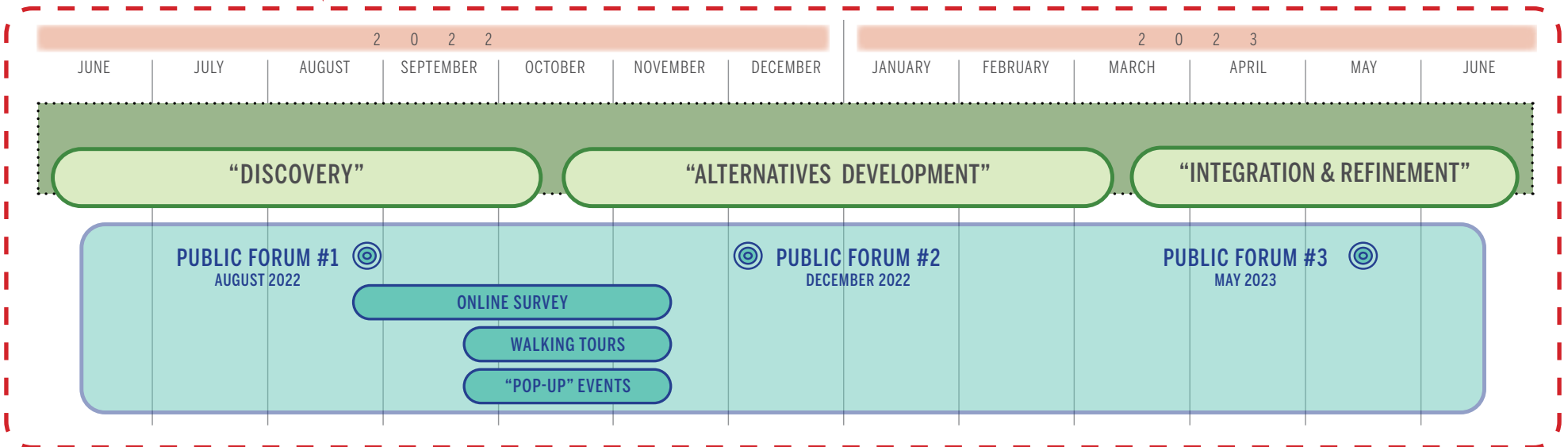
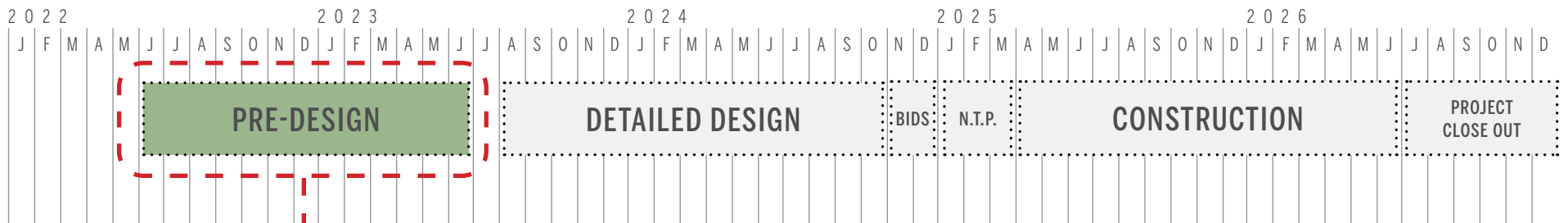
Village Garden Club

Additionally, we worked hard to engage the general public to participate in various open houses, virtual meetings, and other engagement exercises throughout the process. Our efforts with engaging the general public focused on seeking interest in the qualitative character, new or rehabilitated park amenities, and who are likely end-users of the park. Our broad community engagement approach employed a series of formal and informal tactics including virtual meetings, public forum open houses, pop-up events, walking tours, and an online survey. A primary goal of engaging the general public was to capture their knowledge of the project and to increase their ownership of the project by encouraging innovation and inclusion. Creating meaningful stakeholder engagement helped to enhance inclusive decision making, promote equity, and build social capital. The benefits from this broad-based stakeholder group engagement process created opportunities to create a shared vision and shared objectives for the park.



This graphic schedule illustrates the general schedule for the full design and construction process (above) and highlights the details of the Pre-Design phase (below).

Pre-Design was further broken down into 3 distinct tasks: Discovery, Alternatives Development, and Integration & Refinement. Each milestone public forum focused on the findings from each task.







## PART I INVENTORY AND ANALYSIS

The “Discovery” Pre-Design task focused on a robust inventory and analysis of existing conditions. This included a range of sub-tasks that spanned our collective engineering and design expertise. In the summer of 2022, field investigations were performed to yield a better understanding of the existing conditions. Various forms of circulation connections and access were studied, including parking, cycling infrastructure, pedestrian circulation, and public transit access. Existing site ecology and hydrology was also studied and mapped to help piece together the relationships between human interventions, environmental processes, and the conditions observed in the field.

The team reviewed existing hydrologic & hydraulic modeling data, Stormwater Master Plan data and Standard, Stormwater Inspection and Maintenance reports, existing flow level logger and rainfall monitoring data, and available NEORSD GIS datasets. For landscape and design analysis, the design team also researched available record drawings from previous projects, reviewed the as-built drawings from the recent emergency breach, and studied aerial photographs and impervious area delineations. Finally, the team read existing plans and reports including Ecological Assessment Reports, available community planning data (i.e., regulations, policies, etc. and previous park concepts and associated meeting minutes by the Cities of Shaker

Heights, Cleveland Heights, and Cleveland.

The “Discovery” phase, which ran from June to October 2022, culminated with a series of public engagements. The Open House in Horseshoe Lake Park in August allowed the design team to present their analysis to the public, and gather feedback from the community about the way they use the park and their vision for an expanded Horseshoe Lake Park.

Part I of this report synthesizes the research and analysis conducted by the design team that was presented at the Public Forum in August. It also provides a summary of the engagement events and web survey results, all of which heavily informed the design team’s work during the Alternatives Development task.

## SITE HISTORY

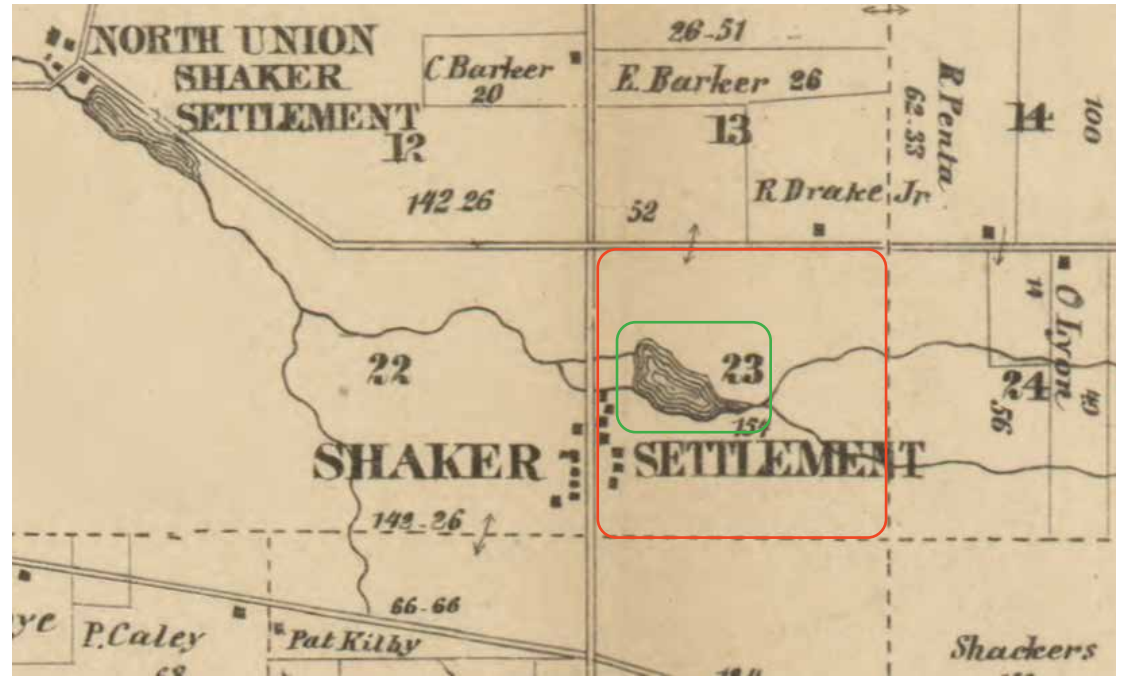
The Horseshoe Lake project area has four primary historical landscape features located on or below the legacy earthen dam:

- 1775 sf of masonry spillway lying just below dam crown and just south of midpoint dam length
- 545 lf of dam earthen crown (walkable promontory)\* with 270 lf of masonry facing on the lake side
- 570 lf of mill headrace (earthen channel and outside berm contour) excavated into the ravine south wall
- 645 lf of parkway crossover graded into the ravine north wall

The masonry spillway, dam crown and headrace were built in ~1852 as part of the Shaker Center family woolen mill operation. The woolen mill, located on the south side of



Woolen Mill & blacksmith shop c. 1895



Elijah Russell sawmill millpond, 1820s (Hopkins 1858)

Doan Brook just upstream from Lee Rd, functioned until ~1870 (fewer than 20 years). Maintenance of all woolen milling infrastructure ceased at this time. The brick woolen mill was dismantled by 1905; no trace remains.

Since 1870, the dam crown, spillway and headrace have been degraded by regular over-cresting and breaching. All earthen structures have thus been significantly remodeled; almost all masonry has been replaced. The masonry of the spillway and dam crown facing are of 1920s vintage or later. The most recent remodeling involves stabilizing the masonry spillway (2019) with concrete and cutting an emergency spillway through the dam (2021). The latter work has divided the walkable promontory into two sections: 415 lf on the north and 130 lf on the south.



Upper Lake spillway outfall c. 1900

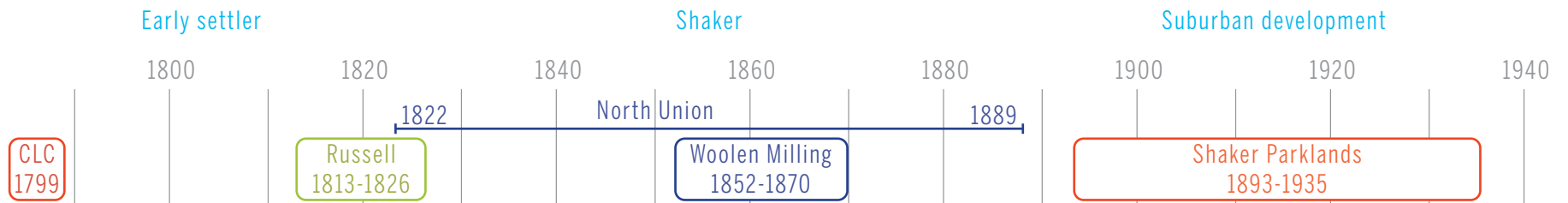


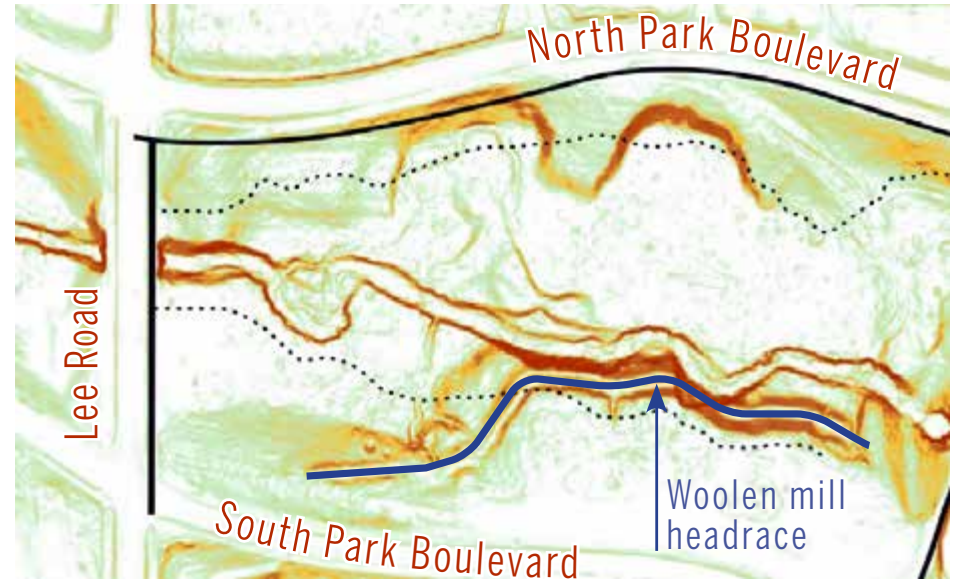
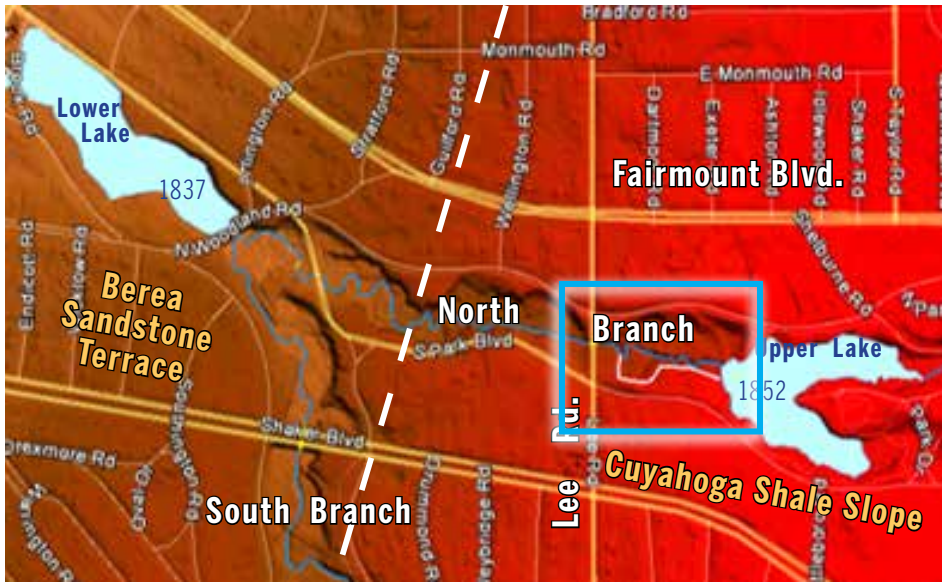
Civil Works Administration (CWA) masonry, 1934

The earthen headrace has long been truncated at proximal (dam) and distal (mill) ends. The remaining structure remains largely as built except for a ~50 ft section that is collapsing as Doan Brook undercuts the headrace embankment in this area.

By 1905, the parkway crossing was graded into the Doan Brook ravine just below the dam. The crossing was U-shaped in plan with north and south legs meeting just below the dam. The south leg (descending from South Park Blvd) was washed out by 1950. The north leg (descending from North Park Blvd) remains.

## HISTORICAL RESOURCES TIMELINE

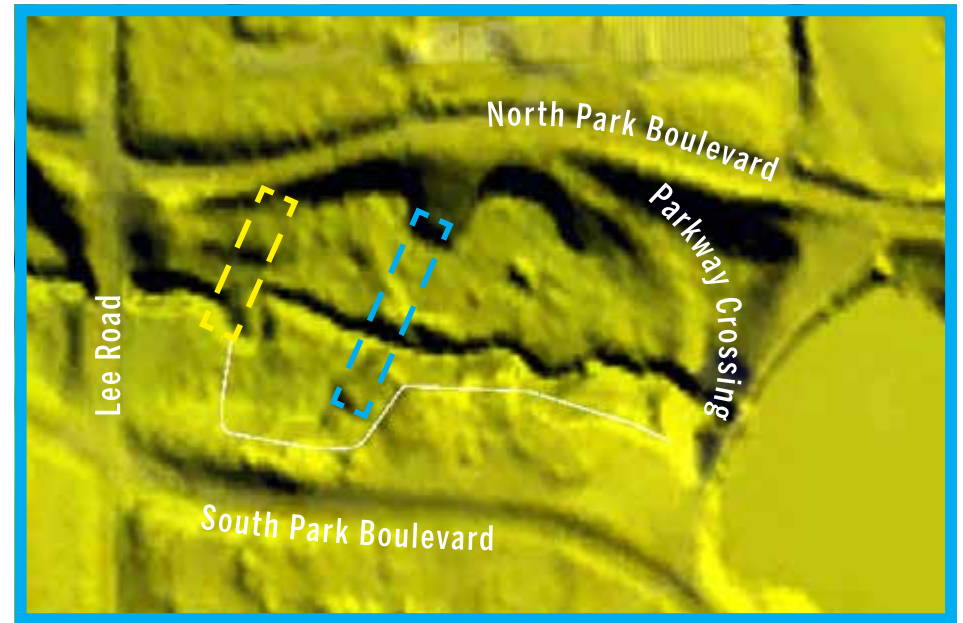




Surface Bedrock



Bowditch & Pratt - 1894



Current Topography (LIDAR)

## LANDSCAPE TRANSFORMATIONS



Pre 1790s  
Limited Human Occupation

- Dense vegetation and narrow stream channel support biodiversity



1830s  
Shaker Settlement

- Fragmentation of forest greatly reduces habitat for wildlife.
- Significant deforestation from Shaker agricultural practices
- Destabilized soils lead to erosion and increased sedimentation of stream



1860  
Commercial Land Uses

- Lake collects pollutants from urban runoff and industrial land uses, decimating aquatic biodiversity
- Impoundment area lake reduces habitat variation



Present  
Doan Brook near Horseshoe Lake Park

- Mature trees are mostly less than 100 years old
- Invasive grasses and reeds dominate the former lake impoundment area
- Volunteer plants along riparian edge are prevalent
- Significant amounts of sediment exist in the former Horseshoe Lake

## 1894 - BOWDITCH & PRATT PLAN

The Bowditch & Pratt plan of 1894 for the parks and parkways on the East Side of Cleveland was a comprehensive planning effort for the entire length of the Doan Brook, from the Heights all the way out to Lake Erie. The plan illustrated the alignment and character of the boulevards and open spaces that were to run uninterrupted, parallel to the Doan Brook. While most of this plan appears to have been implemented, some of the ideas were either lost to time or were never implemented.



A snapshot of the Bowditch & Pratt Plan, illustrating the character of the Shaker Lakes, including a parkway crossing just downstream of the Horseshoe Lake dam, which connected North and South Park Boulevards.



The existing condition of the entrance drive to Horseshoe Lake Park



This diagram highlights the Horseshoe Lake Park entrance drive, providing access to a "Summer Hotel" and canoe landing that preceded what is now known as "the Beach."



## 1932 - PITKIN & MOTT PLAN

The Pitkin & Mott Plan of 1932 was a speculative plan that clearly defined specific plant collections to be considered for implementation and stewardship by various garden clubs and organizations in the area, such as flowering tree collections, orchards, meadows, coniferous evergreen groves, and bog plantings. The proposed locations for these elements were surely driven by the site's topography and hydrology. Some of these ideas are visible today, such as the conifer collection on the park peninsula and the flowering tree collection, which is stewarded by the Village Garden Club still today.



Pitkin & Mott's 1932 Plan, illustrating the specific plant collections, views and vistas, and trails around what was referred to at the time as Hampton Lake Park, now Horseshoe Lake Park.



This diagram of the Pitkin & Mott plan illustrates a walking trail across the dam's earthen embankment, and also identifies specific views and vistas to be developed for what was then called Hampton Lake Park. Overlooks and clearings were identified to take advantage of long views.

## VILLAGE GARDEN CLUB PLANS

The Village Garden Club (VGC) has stewarded a flowering tree grove along South Park Boulevard for over 90 years, and the group remains committed to long-term stewardship of the grove. Over the years, the VGC has commissioned planting plans for replacement and expansion of the grove. The VGC has been one of the District's key partners during the Pre-Design process and has been kept up-to-date on the development of the project, including another possible expansion of the VGC Grove.



This is an illustration highlighting the extents of a 1980 planting plan for the VGC Grove by landscape designer Alexander Apanius.



## 1940 - SHAKER LAKES PARK DEVELOPMENT PLAN PROCTOR NOYES

The Shaker Lakes Park Development Plan by Proctor Noyes in 1940 illustrates a robust network of trail typologies around the Shaker Lakes. This plan also shows the promenade to the apex “splash pad” at the tip of the peninsula, as well as the stone walkway and stairs down to the beach. These elements are still intact today and provide great prospect over the former lake impoundment, but are in need of rehabilitation. The parkway crossing and low-lying bridge across Doan Brook just downstream of the dam is still part of the circulation network in the Noyes plan, but is understood to have washed away in a storm sometime in the 1950s.



An illustration of the 1940 Proctor Noyes plan, which shows separated walking and bridle paths that cross various bridges over Doan Brook as they wind around the park.



Apex “splash pad” overlook



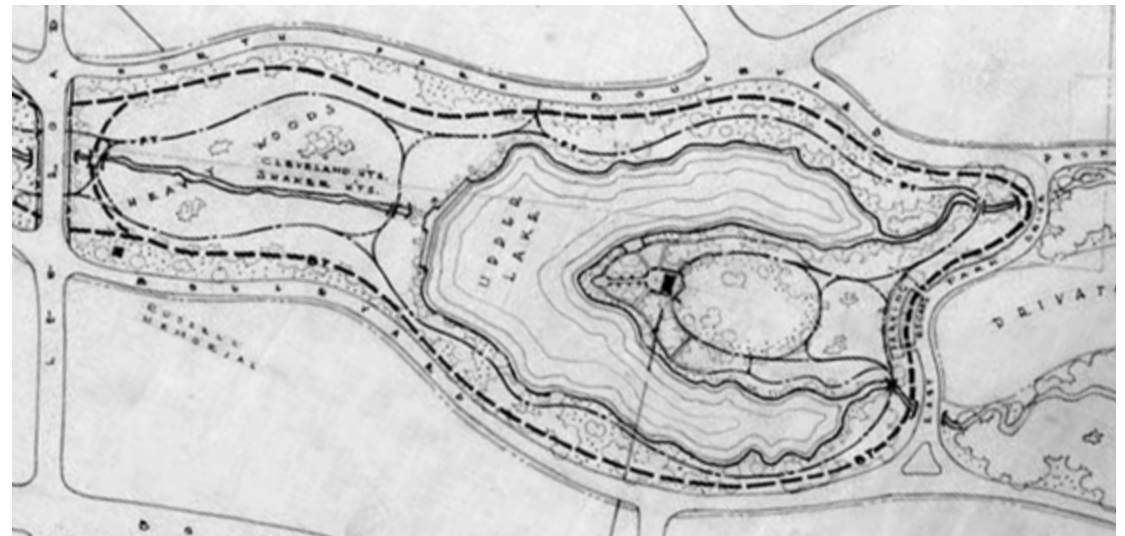
Stone walkway from apex “splash pad” overlook



The Beach



Stone stairway to the Beach



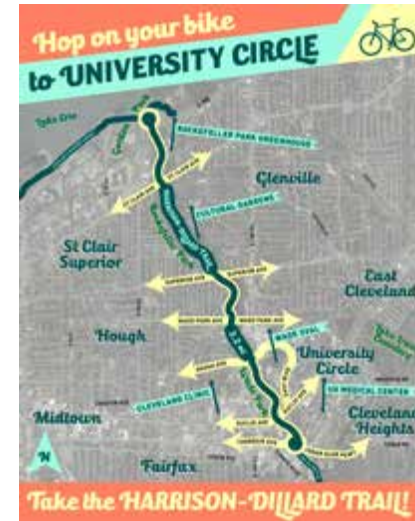
The 1940 Shaker Lakes Park Development Plan by Proctor Noyes

## CONNECTIONS AND ACCESS

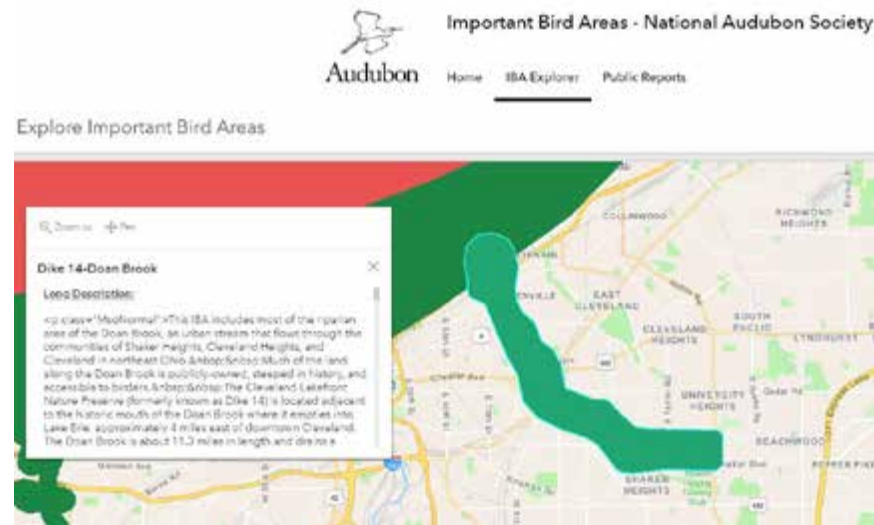
The Doan Brook corridor is a remarkably intact riparian corridor that spans from its headwaters in Shaker Heights all the way out to the Lakefront Nature Preserve and Lake Erie, beyond. This corridor has been nearly “loved to death” by the many communities that are fortunate enough to be framed or bisected by Doan Brook. It is home to many beloved cultural and educational institutions, as well as a myriad of memorials, civic sculptures, and public artworks. Beyond that, the corridor is a vital, albeit over-taxed, piece of urban infrastructure that is under constant scrutiny and pressures of development, utilities, recreation, and maintenance. Importantly though, the Doan Brook is a largely uninterrupted corridor that spans nearly 12 miles inland from Lake Erie, a regional greenway that effectively supports the transport of water, sediment, flora, fauna, insects, and people everyday. It is a precious artery for all living things that call Northeast Ohio home. The Landscape Integration Plan is an opportunity to encourage connections, remove barriers to access, and to promote restoration and rehabilitation of the critical hydrological, ecological, cultural, and recreational functions it performs for all users of the corridor. While the corridor is braced by the Shaker Lanes Nature Center and the Cleveland Lakefront Nature Preserve, the entire corridor is worthy of the “nature preserve” recognition and is ripe with opportunities for continued stewardship to keep its heart beating for the benefit of all.



Lake-to-Lakes Trail Map shows how the trail follows Doan Brook from beginning to end



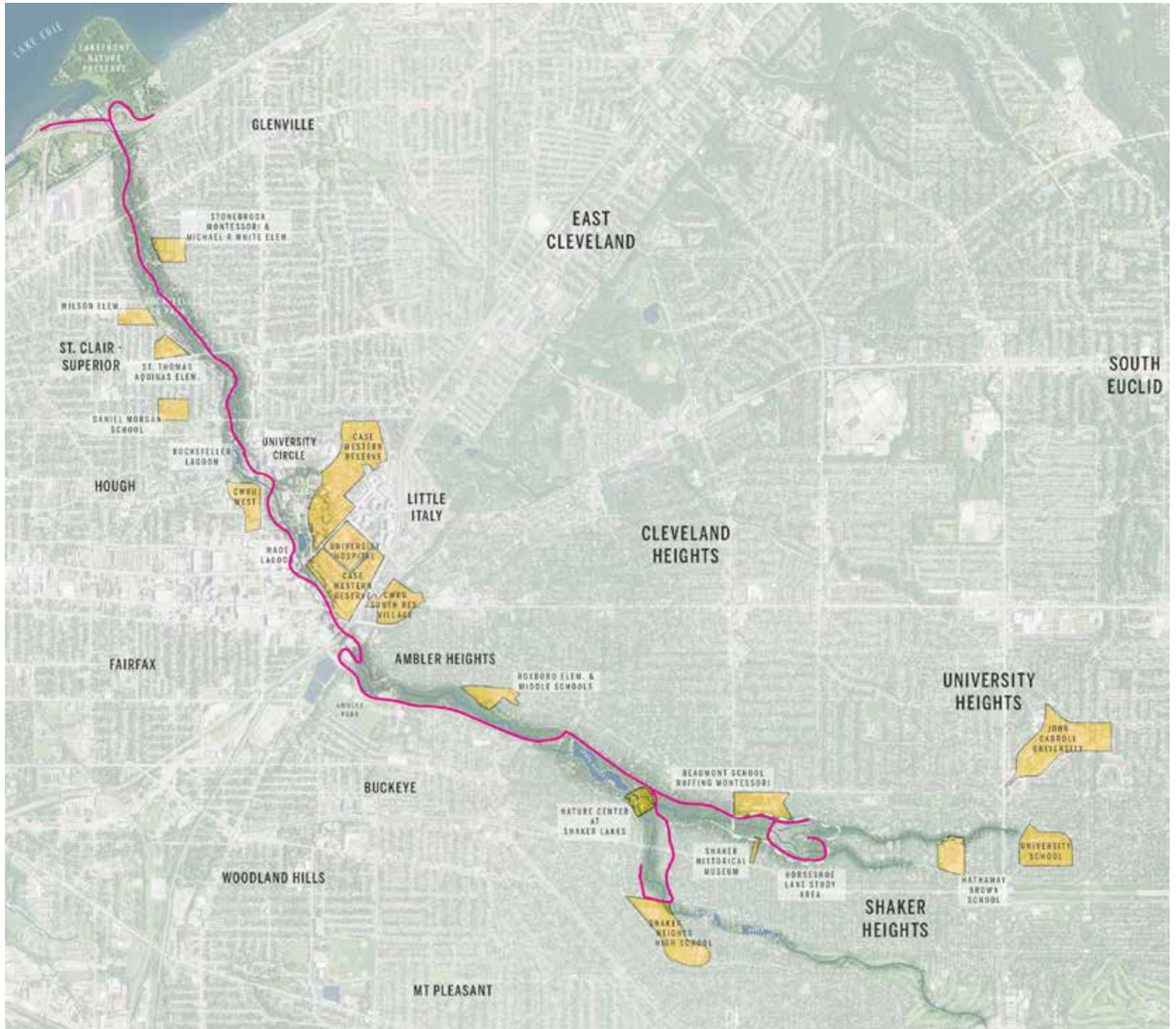
The Lake-to-Lakes Trail takes advantage of the existing Harrison-Dillard Trail to complete the linkage to Lake Erie



The National Audubon Society identifies the Doan Brook corridor as one of 68 Important Bird Areas (IBA) in Ohio, due to the rich & documented history of bird study in the corridor

### Cultural Corridor

The Lake-to-Lakes Trail (shown in pink) along Doan Brook connects many schools and cultural institutions to one another. Along Doan Brook, schools were historically built in floodprone areas where land was developed later than the surrounding parcels.



## PARKING



Our initial site assessment revealed that there is adequate parking available near Horseshoe Lake Park. The following street parking is available:

- 105 street parking spaces on South Park Boulevard
- 105 street parking spaces on North Park Boulevard
- 48 street parking spaces along Park Drive

In addition to the street parking, there are 3 ADA accessible at the end of the cul-de-sac in Horseshoe Lake Park. This turnaround also provides space for park visitors to pick-up or drop-off near the existing park facilities including the restrooms, rental pavilions, and playground.

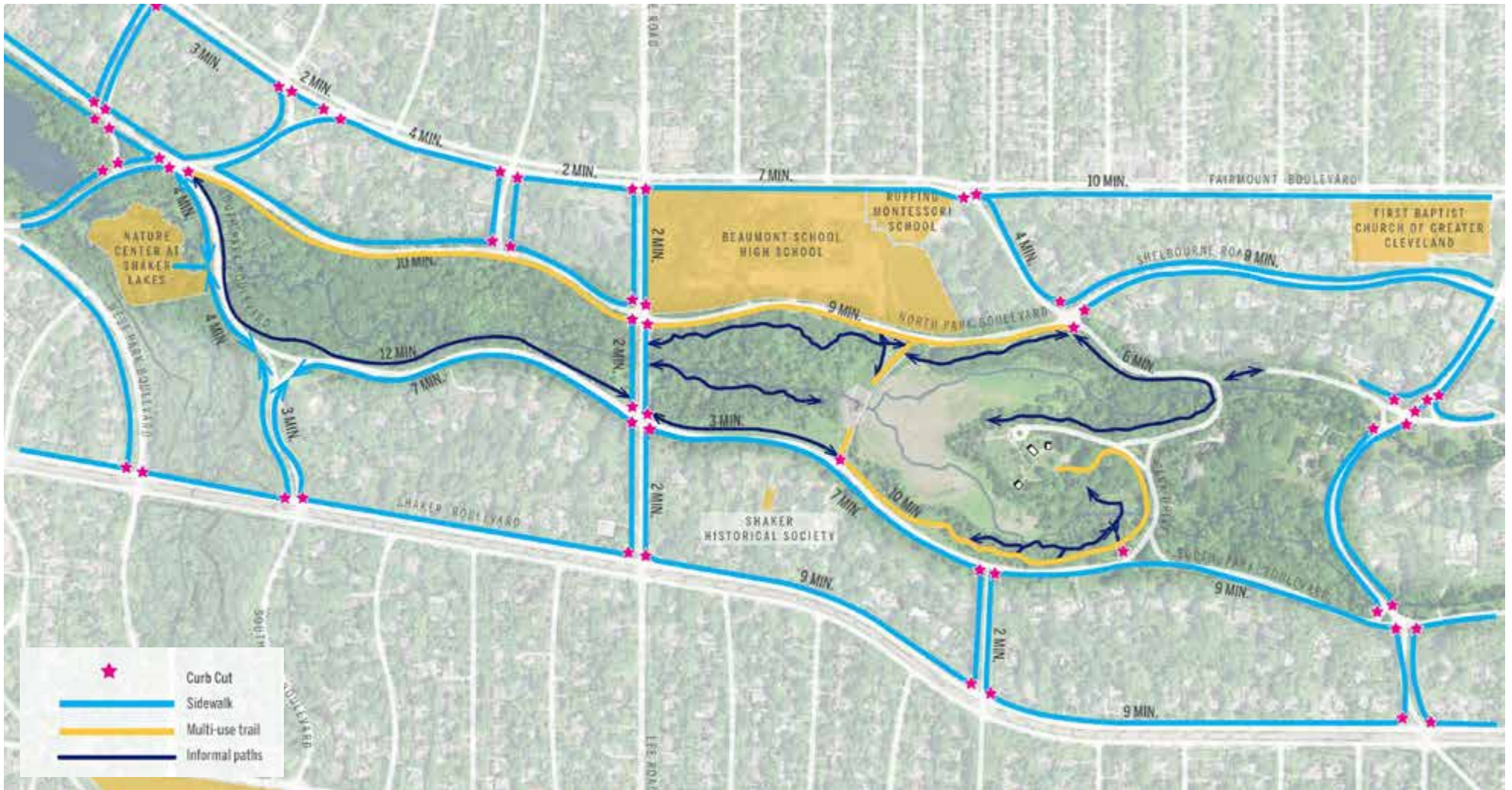
## CYCLING INFRASTRUCTURE



The existing and planned cycling infrastructure is promising, though remains incomplete. Horseshoe Lake Park is connected to other parks along Doan Brook, University Circle, and Lake Erie by the Lake to Lakes trail, a xx-mile multi-use trail. In the project area, this trail ends at the intersection of North Park Boulevard, Shelburne Road, and Park Drive, where the street cycling becomes

dangerous due to blind curves. Our team fully supports the planned additions to cycling routes (shown above in navy), which will be critical to expanding cycling connectivity in the city and improving safety for bikers and pedestrians.

## PEDESTRIAN CIRCULATION



Pedestrian access into the park from the surrounding communities is fragmented. Some access points such as the crosswalks and curb cuts at Lee Road and South Park Boulevard are not complete with sidewalks or trails into the park. At Attleboro and Shelburne, two main roads that lead to the park, there are no accessible entries into the park. Within the study area, desire lines--informal trails worn

through use (shown in navy)--show where pedestrian networks are incomplete. Our team views these informal trails as physical indications of where pedestrian infrastructure networks can be augmented and improved.



## TRANSIT ACCESS



Transit access to Horseshoe Lake Park is excellent. The walk between the Attleboro Station of the Shaker Heights Rapid Transit and the south side of the study area under 10 minutes. Additionally, there are several bus stops at Lee Road, though lack of curb cuts and sidewalks impede access to the park.

## ECOLOGY & HYDROLOGY

The study area is home to a collection of plant communities, each with unique qualities that make the Horseshoe Lake Park rich with different landscape experiences. Currently, the park has a very large area of lawn that is mowed weekly--in Horseshoe Lake Park, and a perimeter along South Park Boulevard, North Park Boulevard, and Lee Road. The upland forest communities are characteristic of Northeast Ohio upland forests, with oaks and beeches. In the floodplain areas of the site, the forest is dominated by maples, cottonwoods, ash, sycamore, and hickory. The sedimented lake bed has been colonized by invasive monocultures of phragmites and cattail.

EnviroScience led a survey to establish a baseline understanding of the extent of invasive species on site. The team determined that there is extensive presence of woody, ornamental, and herbaceous invasive plants in the study area. The lower diagram to the right shows the approximate coverages of each invasive species.



PLANT COMMUNITIES

■ floodplain forest 
 ■ upland forest 
 ■ invasive wetland



INVASIVE PLANT SPECIES

■ monoculture honeysuckle 
 ■ moderate cattail-phragmites 
 ■ light cattail-phragmites 
 ■ wintercreeper  
■ monoculture cattail-phragmites 
 ■ ivy 
 ■ porcelain berry 
 ■ knotweed 
 ■ ornamental groundcover  
■ privet 
 ■ heavy woody plants 
 ■ moderate woody plants 
 ■ light woody plants



Oak grove



Eastern Cottonwood



Shagbark Hickory



Northern Red Oak



Black Locust



Sycamore



Tulip Tree

**LANDSCAPE CHARACTER ZONES**

This diagram shows different existing landscape character areas on site. These zones result from different maintenance regimes, historical interventions, and natural processes. Though these zones have many different plant communities (as shown on page 32) there are four typological landscapes that characterize the site--lawn and tree, forest edge, herbaceous wetland, and wooded wetland..



Lawn in the foreground with forest edge beyond.



Informal trails have been cut through forest edge.



Wooded wetland



### LANDSCAPE CHARACTER ZONES

- |   |   |   |  |
|---|---|---|--|
| 1 | Lawn & Tree   mowed weekly  | 5 | Invasives Wetland   typha and phragmites |
| 2 | Hardwood Forest Edge   oak and beech                                  | 6 | Wet Meadow   mowed weekly                |
| 3 | Volunteer Pioneer Forest Edge   black cherry, black locust, white ash | 7 | Open Mud Flat                            |
| 4 | Wooded Wetland   black willow and silver maple                        |   |  |

SCALE 1:1000

## PUBLIC FORUM OPEN HOUSE

The first public forum during the Pre-Design phase included a virtual meeting on the evening of Thursday, August 25, 2022, with an open house hosted in Horseshoe Lake Park on Saturday, August 27 2022 . The open house style event was organized by a series of themed stations distributed around the study area that were staffed by Design Team members, District staff, and other expert volunteers. Visitors were welcomed to walk around from station to station and participate in activities and discussions based on the theme of each station identified below:

1. Envisioning the Future Park #1 (Stimson)
2. Watershed Ecology (NEORS staff, Laura Gooch - volunteer Ornithologist)
3. Stream Morphology and Hydrology (EnviroScience)
4. Landform and Sediment (Stimson, AECOM)
5. Envisioning the Future Park #2 (Stimson, GPD Group)
6. Dam Removal (AECOM, RiverReach)
7. History and Geology (Roy Larick)

These public forum events were very well-attended, with 283 participants in virtual meeting, and over 275 participants attending the open house in the park. The Design Team received lots of great feedback in the form of notes from discussions, drawings, & participation in various activities at the open house stations. three primary themes emerged, which are summarized on the next page.



Opposite, above: Visitors expressed their approval with green stickers and disapproval with red stickers.

Above: Map of engagement stations at the project site for the Open House event.

Left, middle: Examples of traced comments and ideas by participants.



Left, below: Principal Glen Valentine draws ideas with members of the public at the August 28th Open House in Horseshoe Lake Park.

Opposite, below: Participants and team members at the open house



## LANDSCAPE CHARACTER & PARK AMENITIES

- Miss the walk across the dam
- Celebrate water in some way
- Places to approach/play/overlook/interact with the streams
- More space for quiet contemplation and exploration
- Places for birdwatching and opportunities to observe wildlife
- Preserving and/or reusing historic masonry throughout the park
- Protect the existing large trees
- Desire for Nature play

## ACCESS & CIRCULATION

- Improving and expanding existing pedestrian circulation
- Making walks and trails safer and more accessible
- Desire for a variety of trail types
- Expressed concerns about bike/ped safety
- North/South connectivity is of critical importance
- Better connections to the park on all levels
- Dog friendly

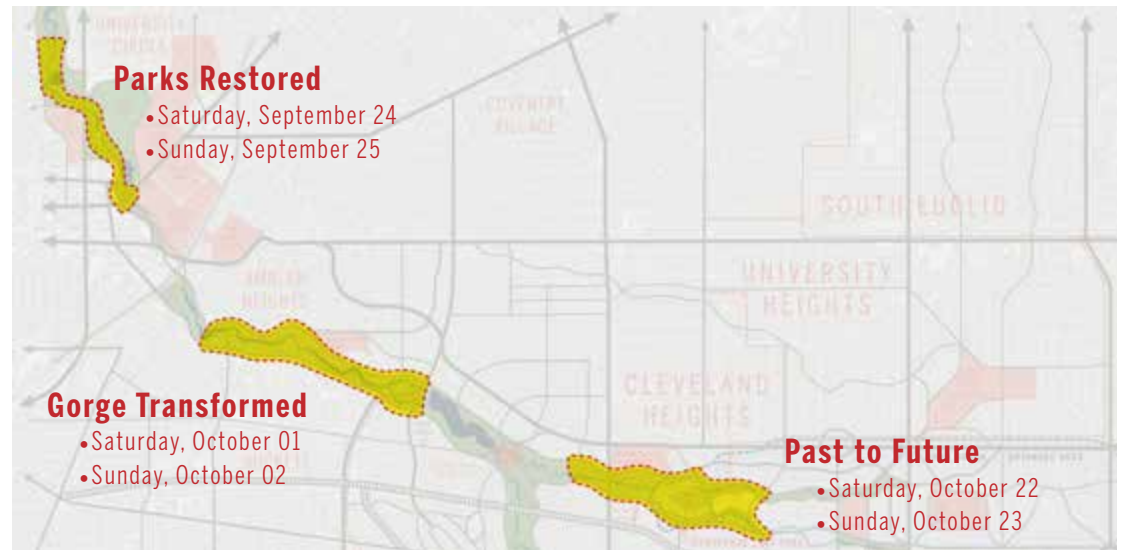
## MAINTENANCE & SUSTAINABILITY

- More native plants and naturalized landscapes
- Consideration of trees that will adapt to climate change
- Many noted that invasive species are a concern
- What are the future maintenance responsibilities



## WALKING TOURS

The walking tours included Design Team member led tours that provided participants an opportunity to see first-hand the issues and opportunities of the project study area, including explanations of the natural and cultural history of the study area. Tours featured multiple Design Team leaders (no less than 2) and focused on their topical specialties. These themed walking tours were welcoming, inclusive, and informal events that encouraged participants to share ideas. Each themed walking tour had a duration of roughly 2 hours, depending on the size of the group. The goal was to attract community members who are interested in seeing the study area first-hand or other relevant projects that will illustrate the potential character of the transformation within the project study area.



### Walking Tour #1: **Parks Restored**

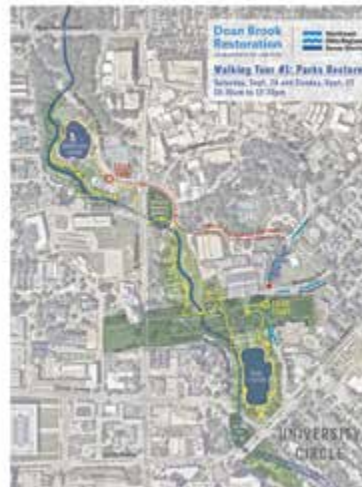
- Location: University Circle
- Participants: 38

### Walking Tour #2: **Gorge Transformed**

- Location: Doan Brook gorge
- Participants: 30

### Walking Tour #3: **Past to Future**

- Location: Project Study Area
- Participants: 30



Walking Tour #1 Map



Walking Tour #3 Map





A “very ambitious” sketch of some park ideas generated by young visitors at the pop-up event at the Nature Center at Shaker Lakes (photos, above)



Glen Valentine and Roy Larick sketching park ideas with visitors to the pop-up event in Cleveland Heights

## POP-UP EVENTS

The pop-up events included a table with various materials and displays that provided citizens an opportunity to gather and share impromptu, intimate, and important conversations. The Design Team constructed the pop-ups as welcoming, eye-catching spaces that invited people to stop and share ideas. The pop-up events were each 3-4 hours, depending on the event or venue. The goal for these events was to catch community members who are unlikely or unable to attend the public forums or other engagement events.

### Pop-up Event #1

- Location: Shaker Heights Public Library
- Participants: 10 (est.)

### Pop-up Event #2

- Location: Nature Center @ Shaker Lakes
- Participants: 30 (est.)

### Pop-up Event #3

- Location: Lee Road near Cedar Lee Theater
- Participants: 20 (est.)

## WEB SURVEY

### BACKGROUND

LAND studio (LAND), a nonprofit organization committed to the design and activation of public spaces in Cleveland, was engaged by the District to develop, manage, compile, and share survey data related to the Doan Brook Restoration project near Horseshoe Lake Park, an area that occupies land in both the Cities of Shaker Heights and Cleveland Heights. LAND worked the Design Team to develop survey questions that addressed who visits the park, how they arrive, what they enjoy doing at the park, and what their visions are for the space once the necessary stream bank restoration project is completed. The survey was open on SurveyMonkey from August 25 – October 31, 2022. It received responses from 846 people, who spent an average of nine minutes responding to survey questions.

### DEMOGRAPHICS

56% of survey respondents identified as female, 39% as male, 3% chose not to identify, and 1% identified as non-binary, third gendered, or chose to self-describe. 2% of respondents were under 25 years and younger, 21% were 26-39, 21% were 40-49, 19% were 50-59, 22% were 60-69, 12% were 70-79, and 3% were over 80 years. 85% of respondents identified as white/Caucasian, 3% as Black, Afro-Caribbean, or African American, 1% as East Asian, 1% Hispanic or Latin American, 3% chose to self-describe, and

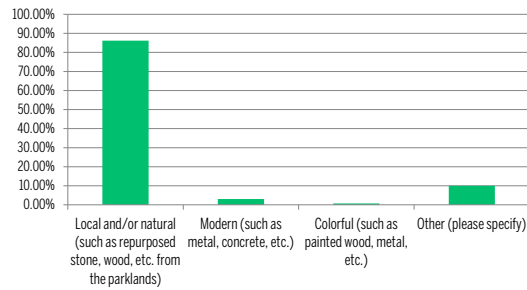
8% chose not to answer. 32% of respondents lived in the zip code 44120, 30% in 44118, 24% in 44122, 7% in 44106, 3% in 44121, and a total of 10 respondents from 44124, 44112, and 44102 combined.

### MODE OF TRANSPORTATION

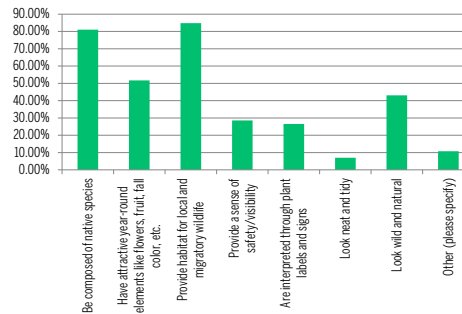
To learn how people accessed the park, LAND asked multiple choice questions and allowed respondents to select more than one answer when applicable. Most respondents use multiple modes of transportation to arrive at the parklands, with 68% of respondents drive to Horseshoe Lake Park, 65% walking, 44% riding bikes, and less than 2% accessing the parklands via public transportation. For people arriving by car, 57% parallel park on Park Drive, 26% parallel park on South Park Blvd., 14% parallel park on North Park Blvd., and 3% use a handicap accessible spot in the parking lot. 22% of respondents answered that they do not drive to the park. When arriving on foot or by assistive mobility device, 28% of respondents access the park at the corner of South Park and Park Drive, 25% access at North Park and Shelburne Road, 22% by crossing South Park by Attleboro Road, 21% at the corner of North Park and Lee Road, and 20% at the corner of South Park and Lee Road. 21% said they do not arrive by foot or assistive mobility device, and 5% answered "other."

LAND also asked a series of questions targeted at understanding the look, feel, and use of the park space around the Doan Brook. Overwhelmingly, people expressed their interest in a park space that provides natural amenities, peacefulness, and respite, along with opportunities for exercise, education, wellness, and play.

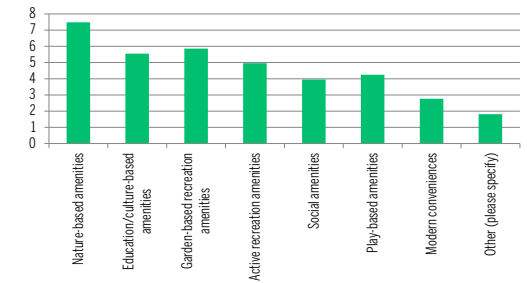
Generally, I think new park amenities should be built out of materials that are:



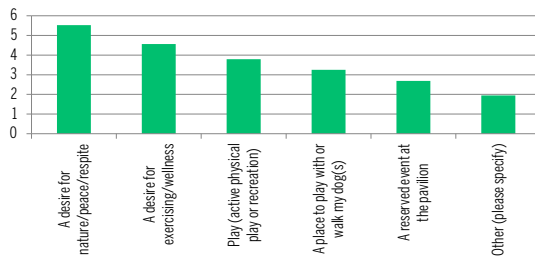
To me, it is important that the landscape plantings: (select all that apply)



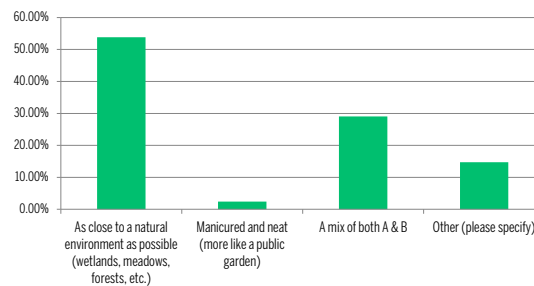
The types of park amenities that are most appealing to me include: (please rank the choices below, with 1 being "most appealing" and 9 being "least appealing")



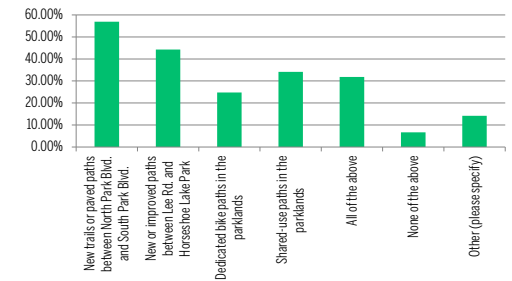
I am most drawn to the park by (Rank your top choice, second choice, etc.):



I'd like the park landscape to look:



I would like to see greater access to and through the park by improving and enhancing the following connections: (select all that apply)



### OPEN-ENDED QUESTIONS

In response to the question, ***“With regard to this project, I am most excited about \_\_\_\_\_,”*** the answers received ranged across a number of themes. These included:

1. Ecological Restoration (38% of respondents)

This category included respondents whose answers included things such as stream restoration, the creation of wetland, invasive species removal, use of native plants, habitat restoration, and dam removal.

2. Greenspace Improvements (18% of respondents)

This category included answers from respondents wanting to take advantage of under-utilized space, more/better spaces for children to play, having more activities within the space, and creating a larger greenspace overall.

3. Enhanced Trails & Access (17% of respondents)

This category included respondents whose answers related to more trails, trail improvements, accessibility of trails, and connectivity within and across the park as well as to the surrounding neighborhoods. Respondents were interested in walking, hiking, biking, and having spaces that were safe and accessible to children, the elderly, and people who use wheelchairs.

4. Possibility of Restoring the Lake (16% of respondents)

This category was comprised of respondents whose answers suggested they were in support of saving the lake and rebuilding the dam. It also included people whose answers said things such as “nothing” and derogatory language targeted at either NEORSD or the project.

5. Other (11% of respondents)

The final category of responses to this question included answers that made up less than 2% of the responses, but were made more than once, such as sharing history, educational opportunities, sediment removal, being dog-friendly, and the STIMSON team in general.

In response to the questions, ***“With regards to this project, I’m most concerned about \_\_\_\_\_,”*** the answers also ranged across a number of themes, including:

1. Losing Horseshoe Lake (25%)

Respondents who expressed this being their largest concern also noted an interest in rebuilding the dam, building a smaller lake, and other answers that indicated their remorse over the stream restoration.

2. The Project Not Being Natural Enough (23%)

These respondents were concerned about invasive species taking over, native plantings not being used, not including enough trees, not rebuilding habitat, and over development of the greenspace. Several respondents specifically said they were not interested in a space such as the stream restoration at the Cleveland Museum of Art or spaces like the Nature Center at Shaker Lakes.

3. Neighbors Will Stop or Delay the Project (17%)

These respondents noted concern over “well-resourced” opposition, “NIMBYs,” “a small but vocal minority,” and other notes related to the efforts of the Friends of Horseshoe Lake. These respondents supported a more naturalized space and the removal of the Horseshoe Lake Dam.

4. Getting the Project Right (15%)

Respondents in this category wanted the project—whatever it is—to be completed, and done well. They want to ensure it is properly maintained, adequately budgeted, and doesn’t cause long-term disruption during construction.

5. Other (20%)

There were a number of answers that came up within this category, each one less than 3% of the total answers, but given by multiple people. These included not having enough parking, general safety, flooding, having too many dogs/a dog park, too many people/overuse, too much nature in a suburban area (such as coyotes and deer), and the division this project is creating within the community.



LAND asked people to use one word to describe Horseshoe Lake Park today and above is a graphic demonstrating the words shared, with larger size meaning increased frequency. LAND also asked how they would like to see this space in the future and below is a graphic demonstrating the words shared, again with larger words indicating increased frequency.



LAND asked people to share their fondest memories of Horseshoe Lake Park and the Doan Brook Parklands. Respondents' answers were counted more than once and the number of times we saw the following responses are below:

1. Trail Walking/Hiking (135)
2. Time with Children/Play (130)
3. Picnics/Birthday Parties/Gatherings (121)
4. Observing Nature/Wildlife (96)
5. Views of the Lake (65)
6. Daily Interactions (41)
7. Dog Walking (29)
8. Regattas/Being on the Lake (24)
9. First Dates/Proposals/Big Life Moments (22)

#### WEB SURVEY CONCLUSION

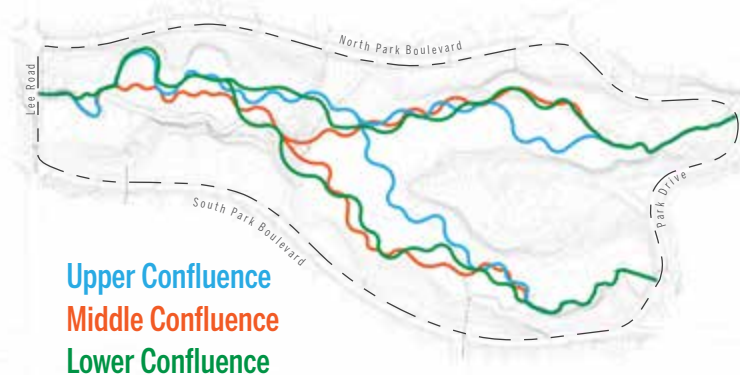
In summary, a highly engaged community provided detailed, thoughtful, nuanced responses to a variety of questions. LAND's opinion is that there is a significant amount of common ground to be found in the use of natural and reclaimed materials and in honoring the deep connections that people have to this special place.



## PART II EXPLORING ALTERNATIVES

The Design Team developed and evaluated a series of engineering and design alternatives that considered the following: stream gradient & pattern, sediment removal & reuse, preservation of site and historic elements, removal & reuse of dam materials, pedestrian connectivity, and park amenities. The Design Team developed and evaluated these alternatives in the context of the impoundment area, as well as the upstream conditions to Park Drive and downstream conditions to Lee Road. The alternatives incorporated valley shape, stream channel alignment & confluence location, and barrier location(s) in the context of overall park planning program elements and concepts. The following components were evaluated for each Alternative and were revised and refined for the selected Upper Confluence alternative, which has become the backbone of the Landscape Implementation Plan.

### STREAM PROFILE & ALIGNMENT ALTERNATIVES

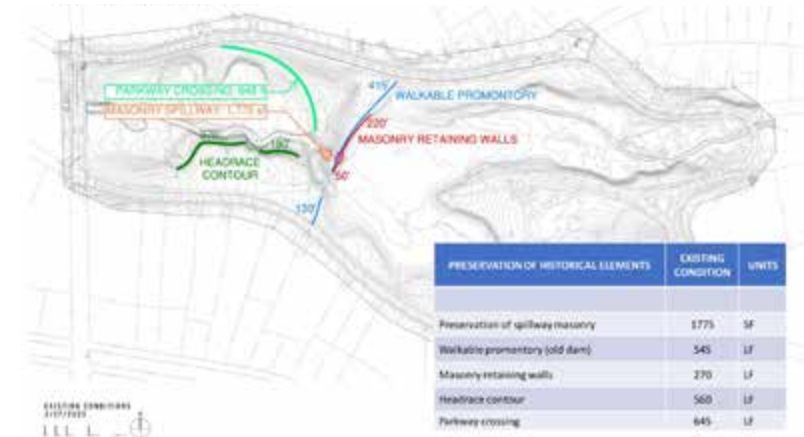


### PRIMARY EVALUATION CRITERIA

- Average stream and floodplain velocity (FT/sec.)
- Average stream and floodplain shear stress (PSF)
- Active floodplain - floodprone storage (acres)
- Stream length (linear footage)
- Preservation of existing mature trees (acres)
- Extent of new natural areas (acres)
- Floodplain wetlands & seasonal inundated areas (ac.)
- Habitat complexity
- Designed stormwater management features (acres)
- Historic preservation
- Sediment analysis
- Constructibility
- Conceptual Construction Costs

Refer to the Pre-Design Basis of Design Report for more engineering details on the alternatives evaluations.

### EXISTING HISTORIC ELEMENTS



## UPPER CONFLUENCE

With this diversity of water bodies the natural planting approach would be to maximize and strengthen the diversity of natural habitats considerations Removal of invasives in flood plain Reforestation of site, upland and floodplain woodlands extended to create more complete woodland corridor Unique wetland planting for maximum habitat diversity such as blueberry, button bush marshes, vernal pools and bogs

## PARK OPPORTUNITIES

Preserve most of the earthen embankment and associated masonry. Conserve the mill race and consider an interpretive trail to highlight the Shaker Legacy and extend the trail to meet earthen embankment. Expand sediment spoils areas along South Park Boulevard will provide landscaped terraces and accessibility down into the floodplain. The 6-acre park peninsula is preserved and complimented with a variety of aquatic & wildlife habitats in the stream valley. Maximize habitat diversity by creating a series of unique wetland habitats. All outfalls captured by stormwater cleansing features. Trails will be designed to provide access to numerous wetland features throughout park. Multi-use trail highlights new habitats.

## PARK CONCEPT



## PARK HYDROLOGY







Stormwater wetlands



Marshes with islands

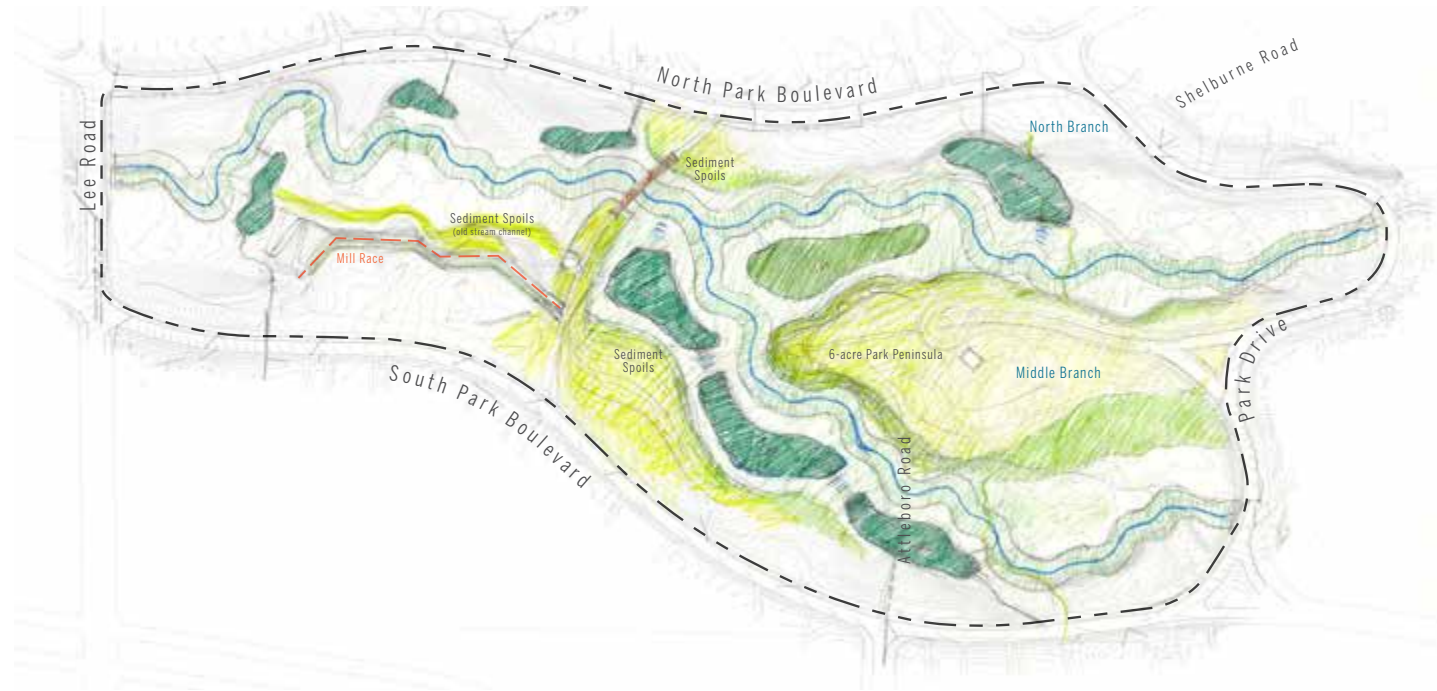


Reuse of masonry

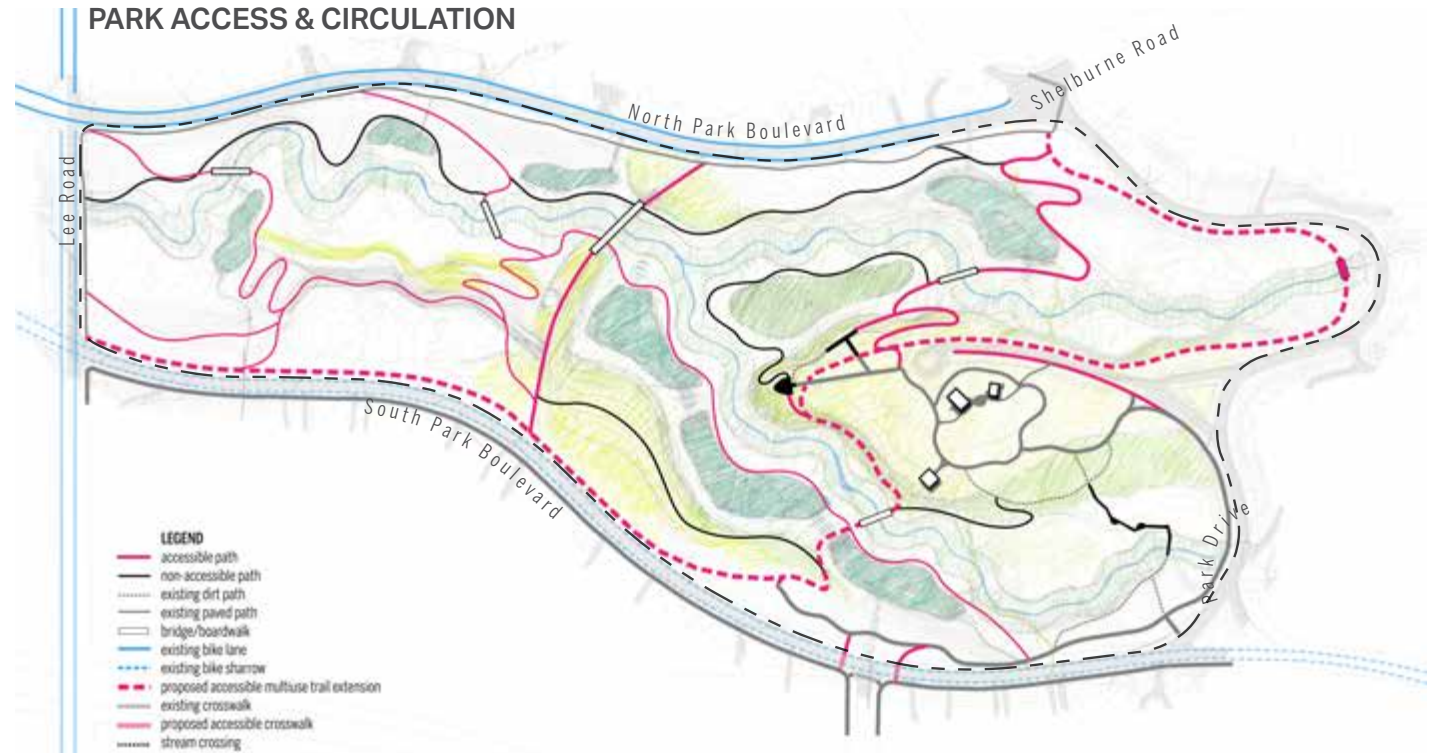


Wooded stream corridor

## PARK FRAMEWORK



## PARK ACCESS & CIRCULATION



## MIDDLE CONFLUENCE

The Middle Confluence Alternative highlights the historic ornamental plantings, and celebrates Shaker heritage by replanting orchards. It is inspired by the Pitkin + Mott plant that envisions a series of garden entries into the park. The central wet meadow will be planted for dynamic seasonal display and flooding after storm events.

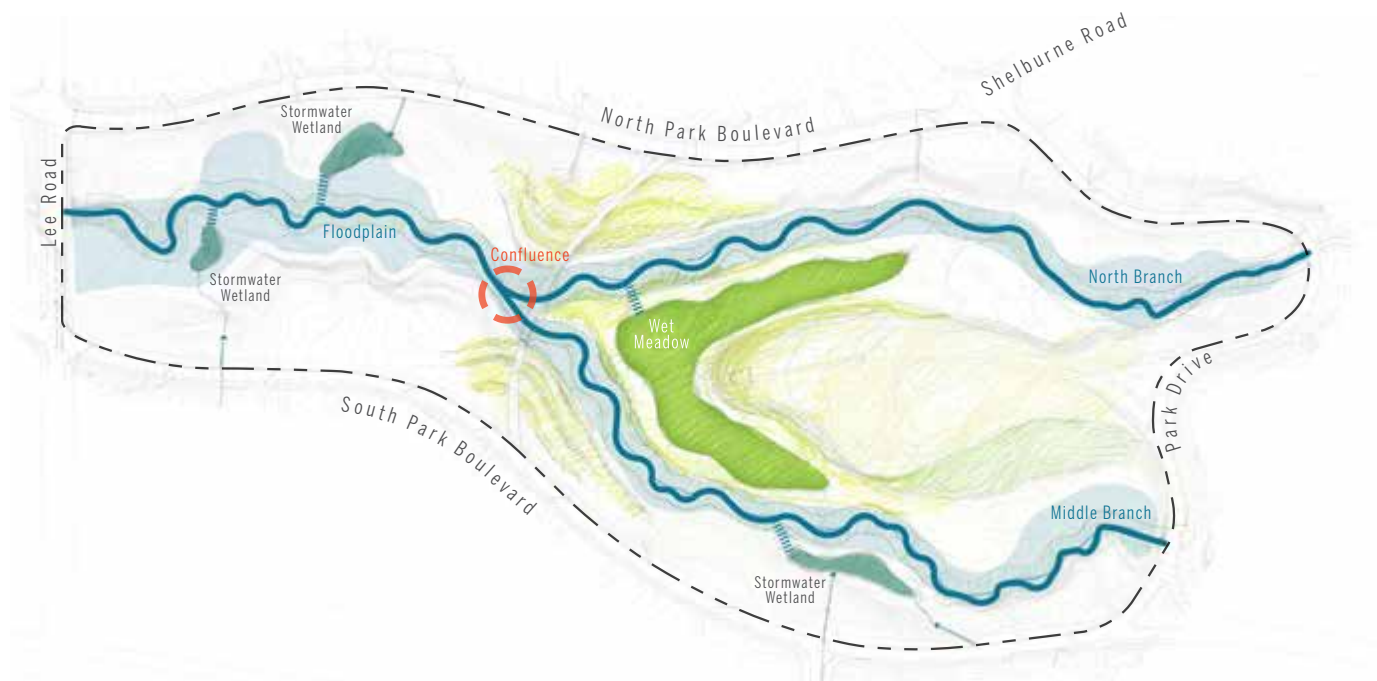
## PARK OPPORTUNITIES

A pedestrian bridge would span the stream confluence at this crossing point, providing long views upstream and downstream. Sediment spoils areas along the boulevards will provide landscaped terraces and accessibility down into the floodplain. The central wet meadow provides seasonal display and is visible to all areas; it creates extensive habitat areas and a central ephemeral water feature after storm events

## PARK CONCEPT



## PARK HYDROLOGY





Terraced orchard



Stormwater wetlands

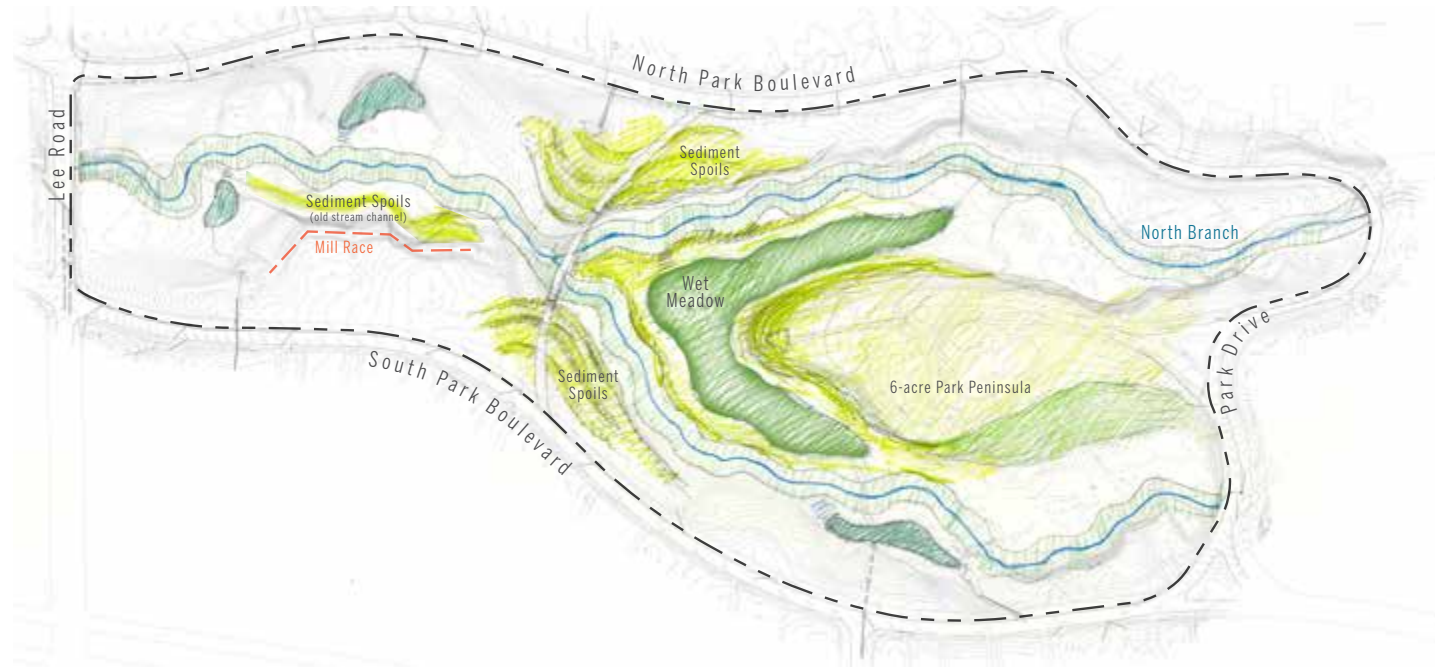


Open stream corridor

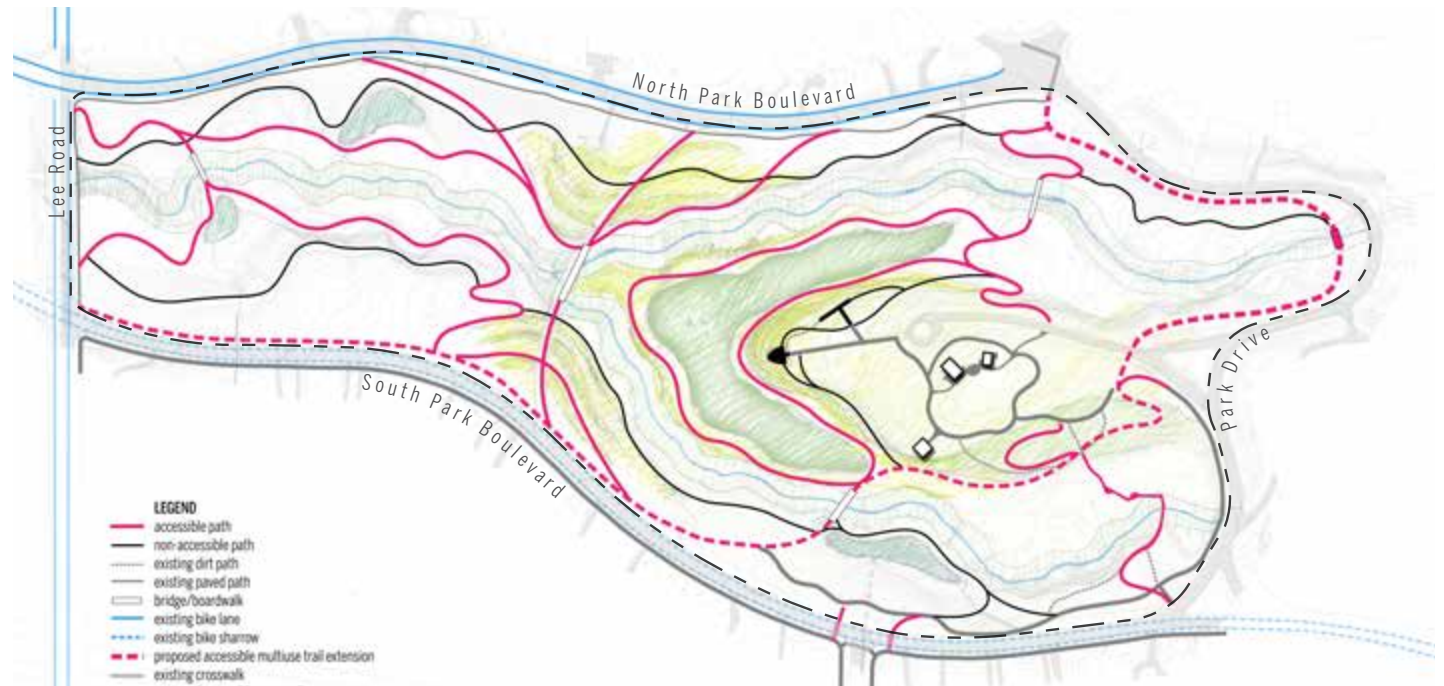


Soft-planted edges

## PARK FRAMEWORK



## PARK ACCESS & CIRCULATION



## LOWER CONFLUENCE "A"

The Lower Confluence "A" Alternative highlights Native flowering trees to provide seasonal interest. Groves of trees are used to frame views into the park and guide the eye of the users, inspired by the Bowditch & Pratt Plan of 1894. The approach creates an unfolding experience as one moves through the park, revealing new spaces and vistas.

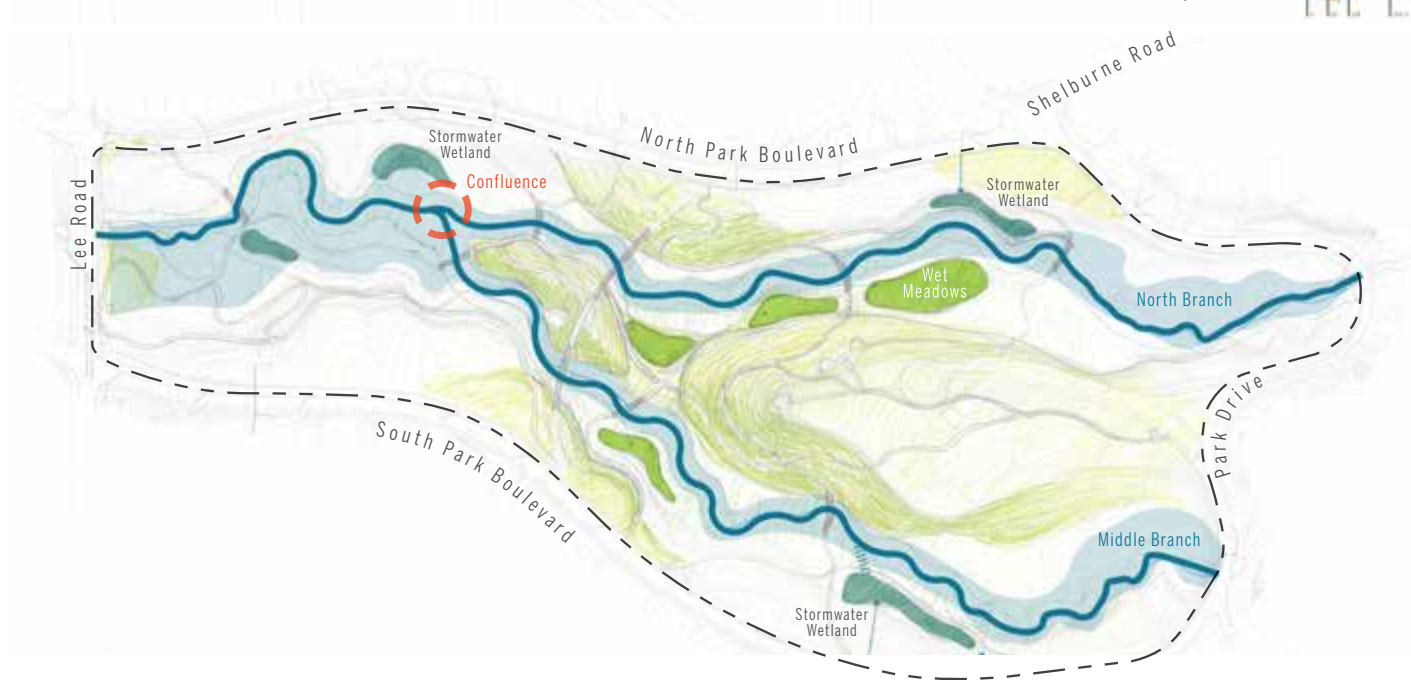
## PARK OPPORTUNITIES

Preserve most of the earthen embankment and spillway "island" and connect to the boulevards with bridges. Conserve the mill race and consider an interpretive trail to highlight the Shaker Legacy. Envision the peninsula park as a trail head for the regional trail system. Extend the park peninsula towards Lee Road with sediment spoils for expanded park and accessibility down into the floodplain. The extension of existing park and creation of new "island" doubles existing park open space. The new landforms link east and west sides of the park and creates possibility for a central spine through the middle of the park. New bridges span the streams and link the two communities to the new central green space.

## PARK CONCEPT



## PARK HYDROLOGY



## Bridges



Serpentine accessible park trail



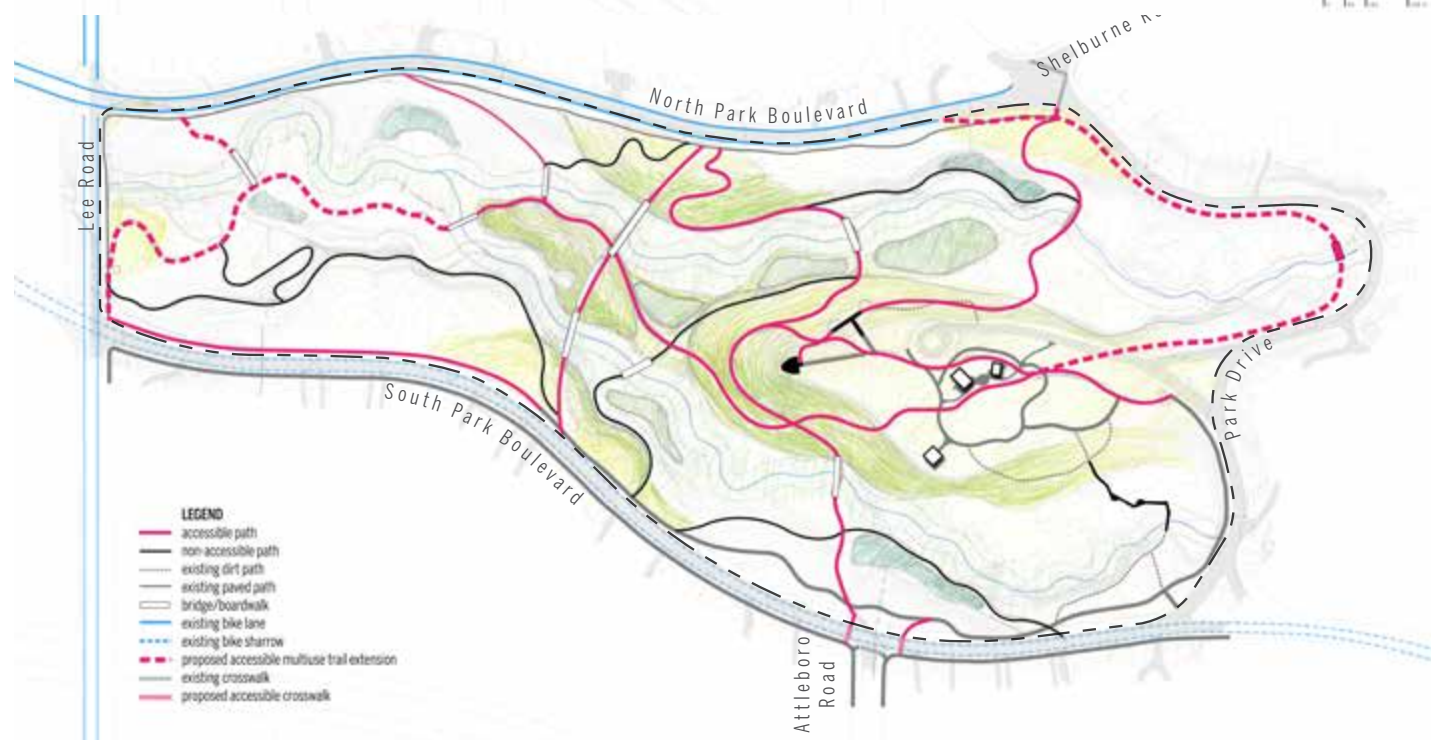
Wet meadows



## PARK FRAMEWORK



## PARK ACCESS & CIRCULATION



## LOWER CONFLUENCE "B"

The Lower Confluence "B" Alternative highlights each island as a unique space framed by groves of trees. Distinctive tree and shrub species of the park might be highlighted on individual islands such as hickory, sycamore, catalpa, or paw paw. The marsh "fingers" throughout the park would be planted to create unique habitats and to create strong seasonal display. The floodplain becomes central planting feature.

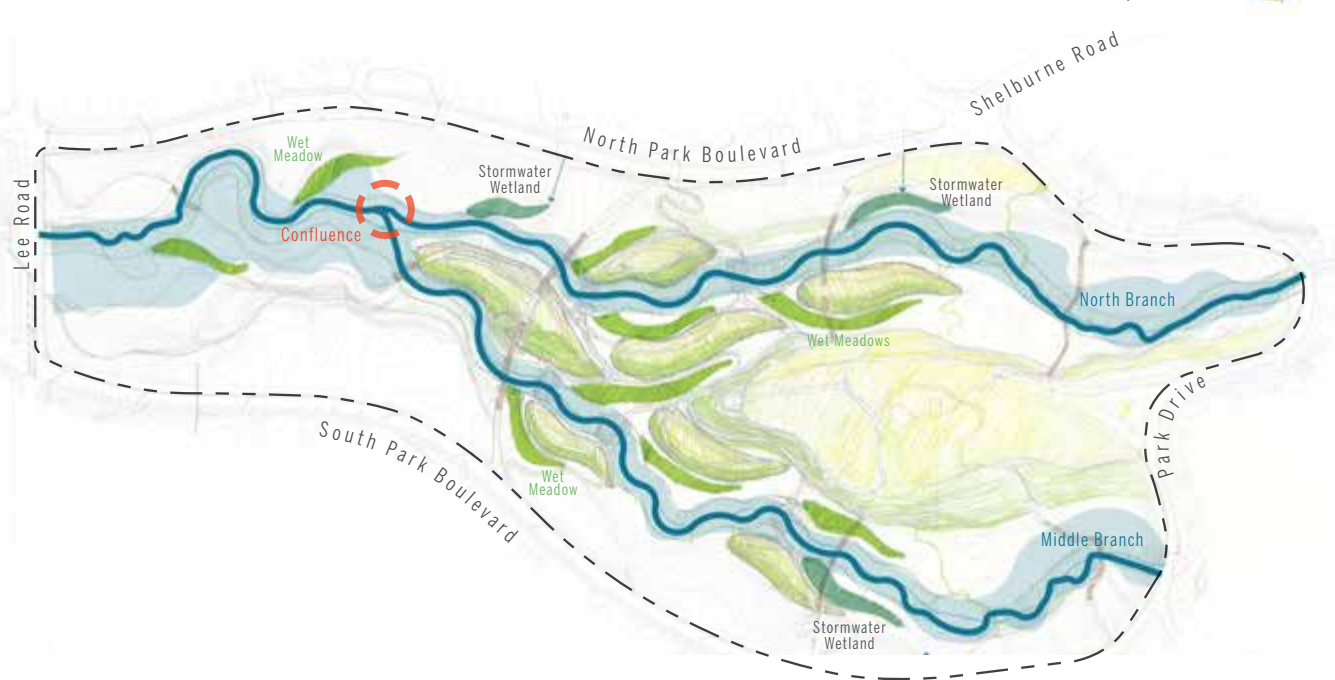
## PARK OPPORTUNITIES

Preserve most of the earthen embankment & spillway "island" and connect to the boulevards with bridges. Conserve the mill race and consider an interpretive trail to highlight the Shaker Legacy. Distribute sediment spoils "islands" throughout the corridor to diversify ecology and park experiences and reduce cost of removal. Celebrate natural dynamic systems of the brook. The wet meadow between is designed as a system that would flood with each storm event, completely transforming the character of the park. Islands are 200' to 350' long; each one creates the opportunity for unique habitat and experience.

## PARK CONCEPT



## PARK HYDROLOGY





Stream crossings



Wet meadows



Bridges

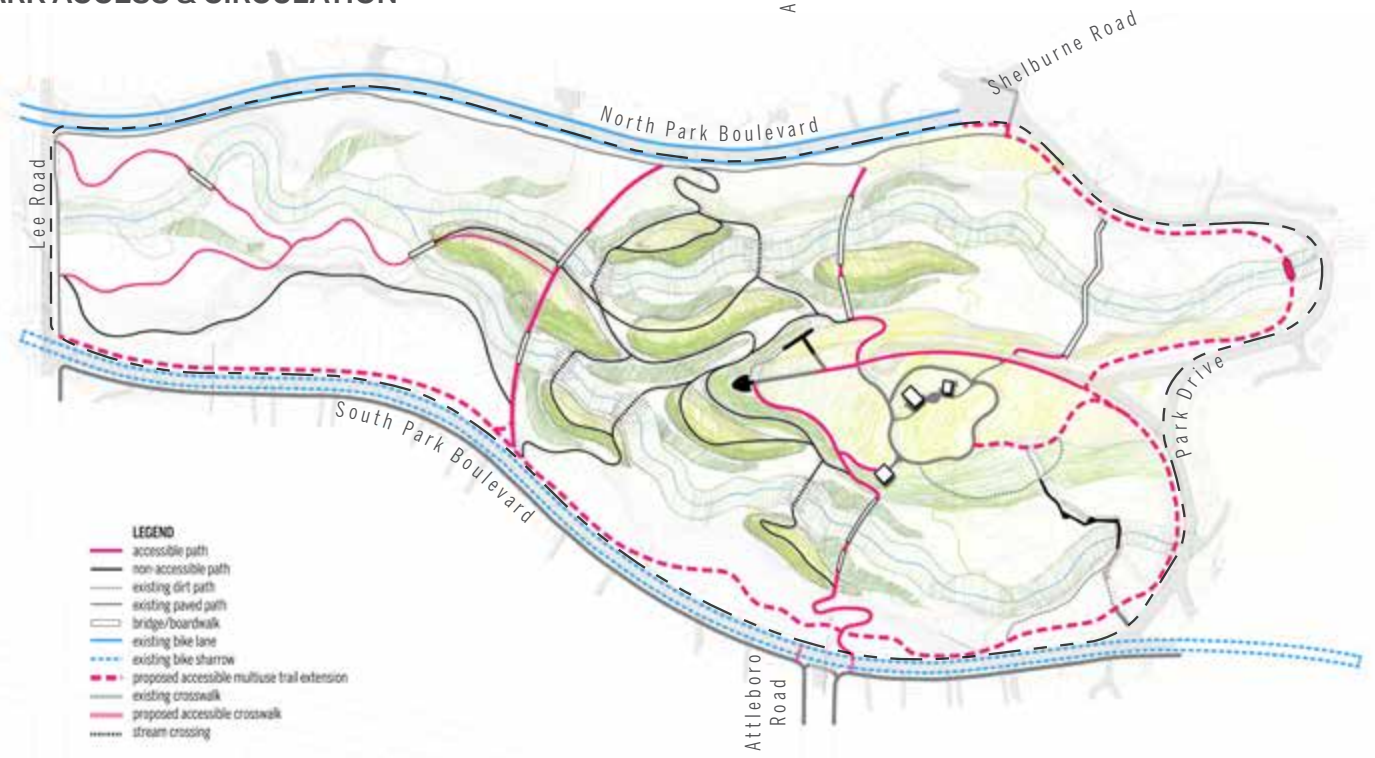


Sculptural landforms

## PARK FRAMEWORK



## PARK ACCESS & CIRCULATION



## PUBLIC DESIGN WORKSHOP

A public design workshop was hosted at the Shaker Heights Public Library on Saturday and Sunday, December 03-04, 2022. A problem-solving activity was developed to illustrate the complexities of the design problem for the participants. The activity was devised as a 5-step process that participants were to take to make careful and measured design decisions with a series of rules about where certain items could be placed and how much money could be spent on amenities. The process is identified below:

- Step 1: Stream alignment - Explanation of 3 stream alternatives being studied by the Design Team
- Step 2: Sediment management - Explore opportunities to re-distribute 180,000 cubic yards of sediment
- Step 3: Ecological improvement - Consider habitat and water quality with stormwater ponds & wetlands
- Step 4: Park amenities - Imagine and prioritize potential park amenities to enhance the park experience
- Step 5: Park access & circulation - Connect your park & community with stream crossings, walks, & trails



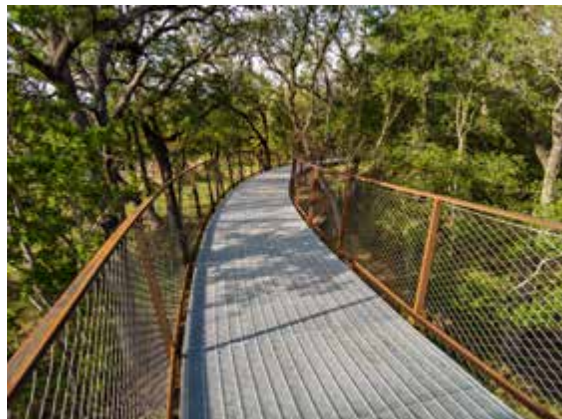
Participants drawing in proposed circulation to connect their layout of park elements.



Left: Participants revisit their design decisions before finalizing their park design.

Right: Precedent images of proposed park amenities were shared with the activity participants so they could envision the scale and character of these elements during their decision-making process





## PUBLIC DESIGN WORKSHOP

This open house was an overwhelming success, with over 125 visitors during the open house and more than 80 participants helping to develop and complete 46 park designs. The primary motivator for this activity was to have the communities prioritize the park elements that were most important to them, without any guidance from the Design Team or any other subject matter experts. Most importantly, the rules about where elements could and could not be placed, and how much money could be spent on other elements forced the participants to work together with their friends and neighbors to make tough decisions about which elements were most appropriate for their future park. The activity base map below illustrates some of the parameters. The light blue areas were identified as floodplains, where elements were prohibited. The light green areas represented existing mature trees, which would require tree removal if certain park elements were placed in those areas.





An example of a completed Lower Confluence park design



An example of a completed Lower Confluence park design



An example of a completed Middle Confluence park design

The ultimate result of this process is the prioritized list below, which identifies the most popular park amenities based on the total amount of times each amenity was used on a park design, as well as the overall percentage of time the amenity was selected for a park design. This prioritized list was extremely helpful in explaining to the cities of Shaker Heights and Cleveland Heights what their residents believe to be the most desired and most appropriate elements to be considered for the Landscape Integration Plan.

|     | Park Amenities                  | Total Quantity | % Selected |
|-----|---------------------------------|----------------|------------|
| 1   | Nature Play                     | 33             | 72%        |
| 2   | Pollinator Garden               | 28             | 61%        |
| 3   | Canopy Walk / Wetland Boardwalk | 23             | 50%        |
| 4   | Stream Overlook                 | 22             | 48%        |
| 5   | Water's Edge Observation Deck   | 21             | 46%        |
| 6   | Forest Amphitheater             | 20             | 43%        |
| 7   | Allee / Promenade               | 16             | 35%        |
| 8T  | Lounge Swings                   | 15             | 33%        |
| 8T  | Sledding Hill                   | 15             | 33%        |
| 8T  | Sensory Garden                  | 15             | 33%        |
| 11  | Overlook Deck                   | 13             | 28%        |
| 12  | Fruit/Nut Orchard               | 12             | 26%        |
| 13T | Hammock Grove                   | 11             | 24%        |
| 13T | Bird Blind                      | 11             | 24%        |
| 15  | Outdoor Classroom               | 10             | 22%        |
| 16  | Bocce Courts / Horseshoe Pits   | 8              | 17%        |
| 17T | Slide Embankment                | 7              | 15%        |
| 17T | Large Trellis                   | 7              | 15%        |
| 19  | Small Trellis                   | 6              | 13%        |



LEE ROAD

SOUTH PARK BLVD

PARK RESTROOMS

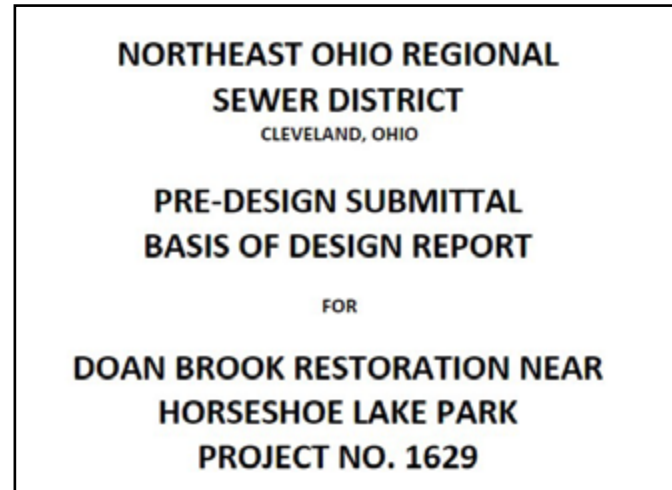


## PART III LANDSCAPE INTEGRATION PLAN

This Landscape Integration Plan is the culmination of over a year of analysis, engagement, and planning. This plan reflects what the Design Team understands to be the priorities of the community, as evidenced by the extensive feedback we received throughout the Pre-Design process, for which we are extremely grateful.

The Landscape Integration Plan makes evident the planning objectives, prioritizes the site amenities developed during the stakeholder engagement process, and suggests an overall park character that is appropriate for Northeast Ohio. Most importantly, we hope you'll agree that the Landscape Integration Plan reflects the values of the Shaker Heights and Cleveland Heights communities. The plan illustrates various ecological, cultural, & recreational amenities crafted into a comprehensive plan. We anticipate a phased implementation of park amenities to include an assemblage of meaningful gestures, relics, and moments that reference the distinct history of Horseshoe Lake and the collective memory of its inhabitants and visitors, grounding this riparian corridor within its natural, cultural, and historical context.

The backbone of this plan is the Upper Confluence stream alignment alternative, which performed the best hydrologically in a series of rigorous engineering studies and simulations. For more information on these engineering studies, please refer to the Pre-Design Basis of Design Report.



The Landscape Integration Plan strategically composes these elements into a broader vision developed together with enthusiastic participation from the project stakeholders and communities that will be the guide for implementation.

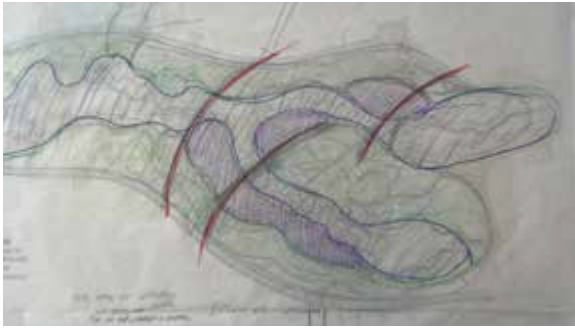
## ITERATIVE DESIGN PROCESS

Once the upper confluence had been identified as the most advantageous for the health and function of Doan Brook and after all of the information from the public engagement process had been gathered and assimilated, the Design Team began a design process that involved numerous iterations of the plan in multiple media to integrate all of this information into a basic concept plan. Through explorations in hand drawings and study models coupled with computer generated hydrological and topographic models the team refined concepts for the final plan.

This plan was then put through a rigorous process of internal reviews, presentations, and critiques, resulting multiple rounds of weeding out the nonessential ideas and forms. Throughout the process, the Design Team called on all of our technical consultants including hydrology experts, geotechnical experts, historians, contractors, and the entities responsible for long term maintenance to test and review the evolving plan. The final plan takes into account all of these various experts approaches and opinions to ensure that the plan is efficient in terms of construction approach and realistic in terms of budget and maintenance.



The combination of cad generated forms and the intuitive process of working by hand in clay models, pencil and pen, a rigorous process of design review and critique, and continuous feedback from all of the consultants on the team led to the set of elegant landforms, circulation hierarchies, and planting strategies that became and framework for the final plan.



## LANDSCAPE INTEGRATION PLAN

The Landscape Integration Plan will transform Horseshoe Lake Park from a 6-acre park into a 60-acre park. The plan takes spoils from the decommissioned Horseshoe Lake dam and combines it with amended sediment from the impoundment area (the former lake bed) to augment existing scalloped promontories originally created by the stream's historical meandering throughout its floodplain. Constructed wetlands will intercept and filter urban stormwater from existing outfalls. These wetlands will fill with water after storms, creating a park experience that is dynamic and dramatically different with every visit.

The plan illustrates a dynamic floodplain park that fully integrates the site and its context, capitalizing on existing natural and built features and creating intuitive and accessible pathways that connect distinct, purpose-driven outdoor spaces for reflection, education, interpretation, retreat, and recreation. Through a robust community conversation, we have developed a plan to repair and enhance the connections through the site, creating comfortable and safe paths that will enable the flow of life in all directions – an opportunity for visitors to connect to the Doan Brook and the dynamic effects of urban hydrology and ecology. This will be a 21st Century nature park where the forces of urban hydrology and ecology are celebrated and amplified, rather than restrained.







K BOULEVARD

HILLSIDE SEATING

ORCHARD

SHELburne GATEWAY

BOARDWALK

BROOK OVERLOOK

PEDESTRIAN BRIDGE

BOULDER CROSSINGS

SENSORY GARDEN

BOARDWALK

BIRD BLIND

POLLINATOR GARDEN

NATURE PLAY

OBSERVATION DECK

BOARDWALK

HILLSIDE SEATING

PROMONTORIES

CONSTRUCTED WETLANDS

VGC GROVE

BIRD BLIND

HILLSIDE MEADOW

PEDESTRIAN BRIDGE

PARK DRIVE

ATTLEBORO GATEWAY

SHARED-USE PATH

SOUTH PARK BOULEVARD



## EARTHWORK STRATEGY

As indicated in the Inventory and Analysis section of this report, the earthwork requirements for this project will be a primary driver for cost. The Design Team has developed a simple strategy to manage the substantial amount of earthmoving to minimize the amount of times the material needs to be pushed, hauled, amended, and compacted into place.

The first step in the strategy was inspired by the site itself, where the existing promontories (dark green areas) sit high above the stream valley along North and South Park Boulevards. These areas are the remnant promontory landforms of the erosion process caused by the stream's cutting across the land and creating its valley over the last few thousand years. The Design Team acknowledged the appropriateness of this inspiration in the context of our stream restoration efforts and proposes to harvest the material in the earthen embankment that needs to be excavated to enable the stream to be cut through the dam for new and expanded promontories (medium green areas). This is likely what the edges of the stream valley would have looked like before the land was deforested and manipulated to create the dam and lake. It is possible in fact that the earth will be put back in place where it was harvested from to create the dam in the first place. Additional berms (medium-light green areas) will then be established to control the active floodplain of the restored stream corridors. These will serve as barriers between the active floodplain and sediment spoils areas (light green areas) that will serve as new constructed wetlands filters for the Brook.



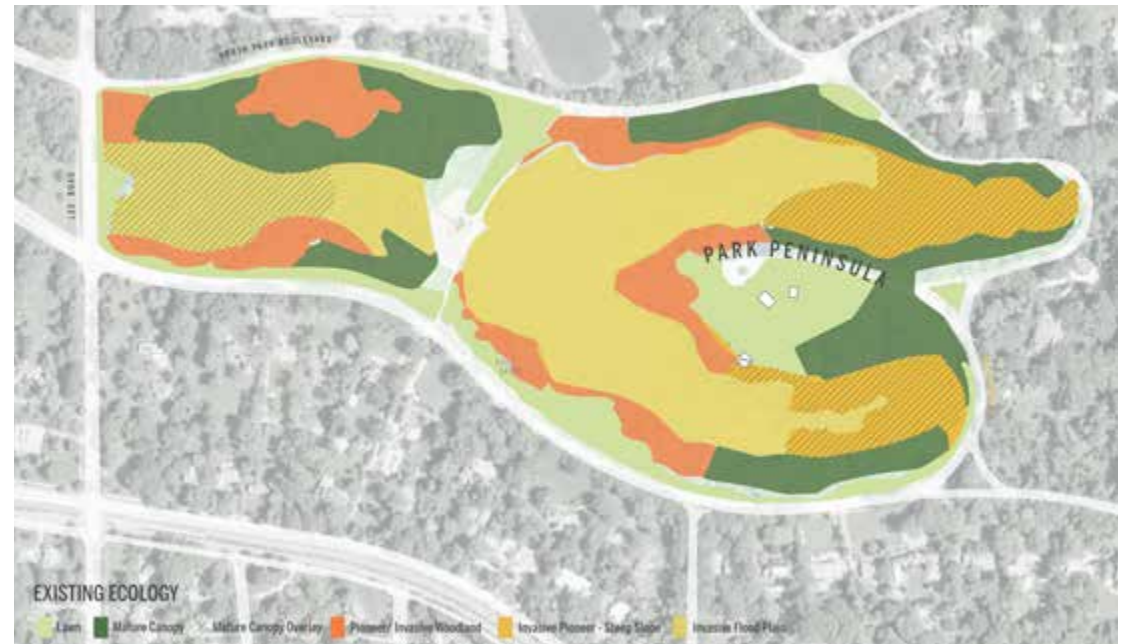
## LANDSCAPE ECOLOGY

The goal of the Landscape Integration Plan is the creation of a diverse landscape that celebrates native plants, creates a rich experience for visitors and ecological uplift for the entire area. The existing upland forests have a diversity of native trees and areas of well established canopy but the narrow remnant forest edges are dominated by invasives such as Norway Maple and Black Locust. The understory is dominated by European Privet and Buckthorn. This monoculture of invasive plants has drastically reduced the ecological diversity of the forest throughout the site. The floodplain has a canopy of Black Willow, Silver Maple and Sycamore but its ground plane is dominated by European Cattail and Phragmites creating a lack of diversity along most of the stream as well.

The newly constructed floodplain and a series of terraced wetland will create rich habitat and display some of the most distinctive native plants of this region of Ohio, including Buttonbush and Highbush Blueberry.

The upland forest will be cleared of invasive understory shrubs over time and replaced with the native understory plants of the region such as Paw Paw, Shad, Redbud, and Witch hazel along with a native ground plane plants.

A new meadow habitat zone will also be created on the hillsides connecting the upland forest with the new flood plane. These meadows will be providing pollinator habitat and strong seasonal displays. Large sections of lawn along South Park Drive will also be converted to meadow.



The substantial earthwork needed for the realignment of the Doan Brook will provide the opportunity to remove many of the floodplain invasives and establish new ecological niches throughout the site.



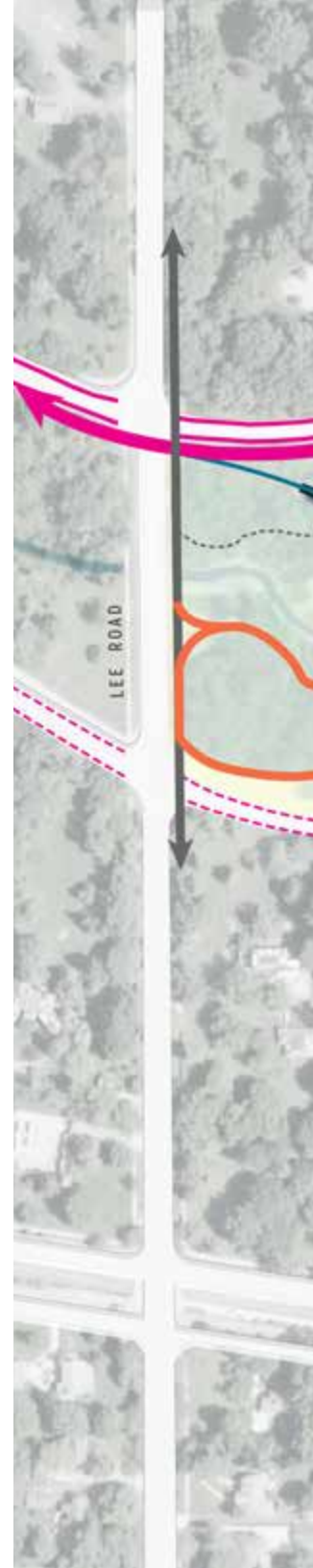
## CIRCULATION

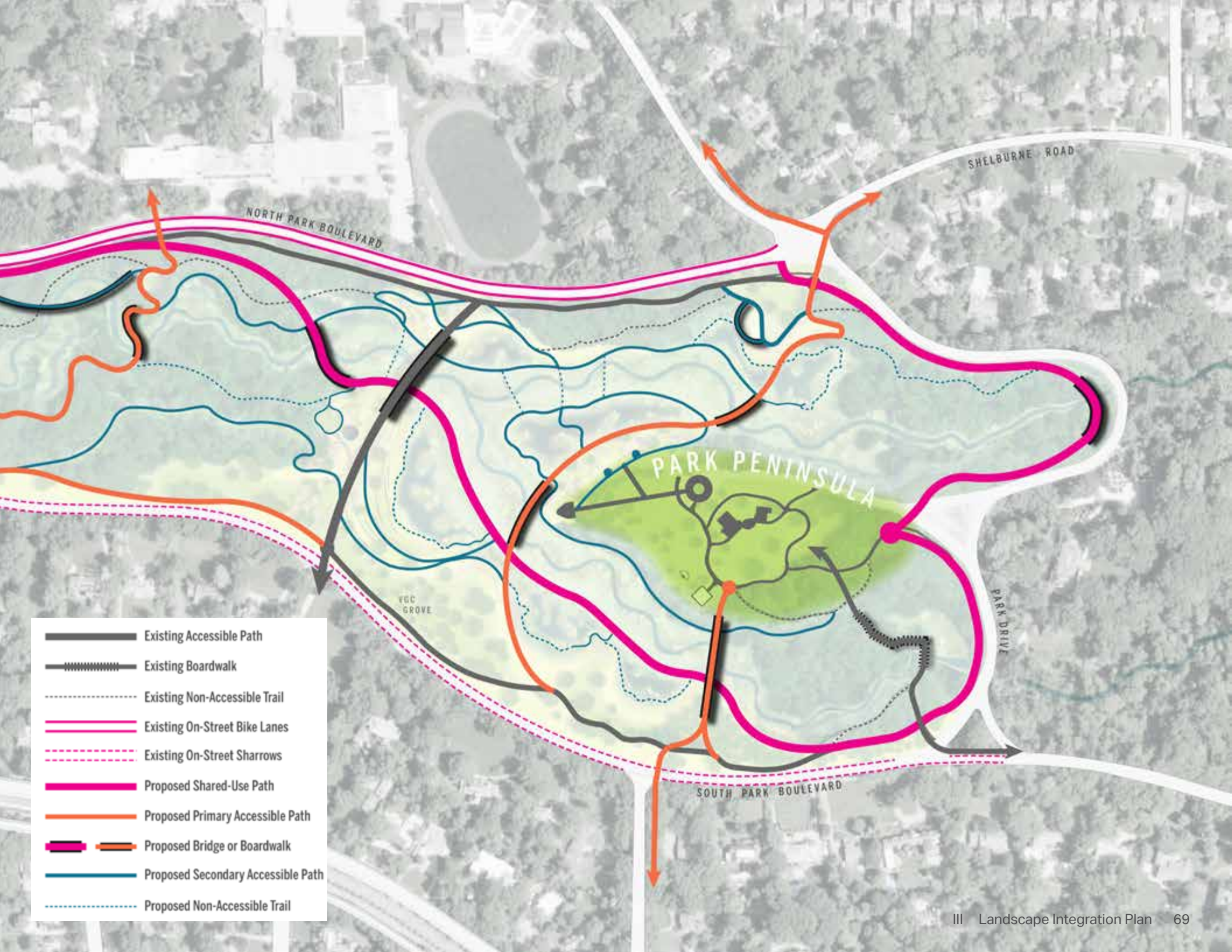
The proposed park circulation takes strategic advantage of existing pedestrian and bicycle infrastructure. All existing walks within the study area will remain, while the bicycle lanes on North Park will terminate in a transition at Shelburne Road to a new shared-use path that will run parallel to Park Drive and provide a safe route to the park peninsula. Additionally, a much more prominent start to the regional Lake-to-Lakes Trail will begin at the park peninsula and turn south to South Park, where it will then turn in toward the center of the park and gently transition down into the stream valley to run diagonally through the park, parallel to the Middle Branch of Doan Brook. It will pass under the new pedestrian bridge spanning high above Doan Brook at the location of the old dam and will turn north to cross Doan Brook itself over a low wetland boardwalk before shifting back to the west to climb up the remnant parkway crossing back up to North Park and toward Lee Road.

In addition to the restored pedestrian connection across the location of the old dam, multiple north-south community connections will be made through the park, including a sinuous trail that connects a new Lee Road Gateway park entrance into the stream valley, across Doan Brook, and up to a proposed mid-block crossing of North Park at the Beaumont School. Another north-south crossing will begin at the Shelburne Gateway park entrance and slide southward down the forested hillside into the

stream valley crossing the North Branch and taking a long sweeping course around the base of the park peninsula before crossing both the Middle Branch and new Lake-to-Lakes Trail before climbing back up the promontory along South Park. A 3rd new north-south path connects the Attleboro Gateway park entrance directly into the park peninsula via a pedestrian suspension bridge that will span the Middle Branch valley, providing direct and intuitive access to the heart of the park from public transit along Shaker Boulevard.

Beyond these primary regional and community connections, there will be a variety of internal trail typologies throughout the park, ranging from paved paths, mown lawn paths through meadows, as well as primitive dirt trails through the forest. Reasonable efforts will be made to make these paths accessible and barrier free. Note that some secondary and tertiary path systems will be impacted by flood events, and may not be passable for short periods after major rain events. Some park amenities are built-in to the circulation network, such as the canopy walk near the intersection of Lee Road & North Park and the Brook overlook near the intersection of North Park & Park Drive. These are strategically located independent of the primary circulation routes, as they are likely to be realized only when funding sources are secured, and are therefore not critical to the circulation hierarchy.





- Existing Accessible Path
- Existing Boardwalk
- Existing Non-Accessible Trail
- Existing On-Street Bike Lanes
- Existing On-Street Sharrows
- Proposed Shared-Use Path
- Proposed Primary Accessible Path
- Proposed Bridge or Boardwalk
- Proposed Secondary Accessible Path
- Proposed Non-Accessible Trail

## HYDROLOGY

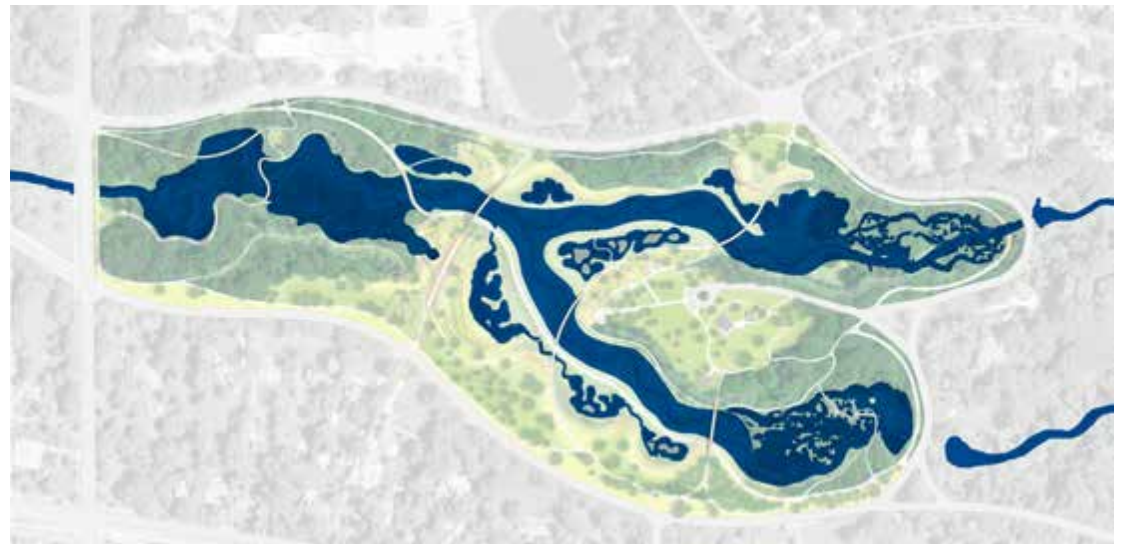
### SMALL STORM EVENT (<1" in a 24-hr period)

The Doan Brook watershed above Horseshoe Lake Park is relatively small, thus base flows through the north and middle branches low. This diagram shows hydrologic conditions in the park after a typical, frequent rain event in Northeast Ohio. The stream does not over-top its banks, though all constructed wetlands receive enough water from outfalls to fill. However, a storm event of this size does not produce enough rain to backfill the off-line wetland terrace near the park peninsula.



### 6-MONTH STORM EVENT (1.65" in a 24-hr period)

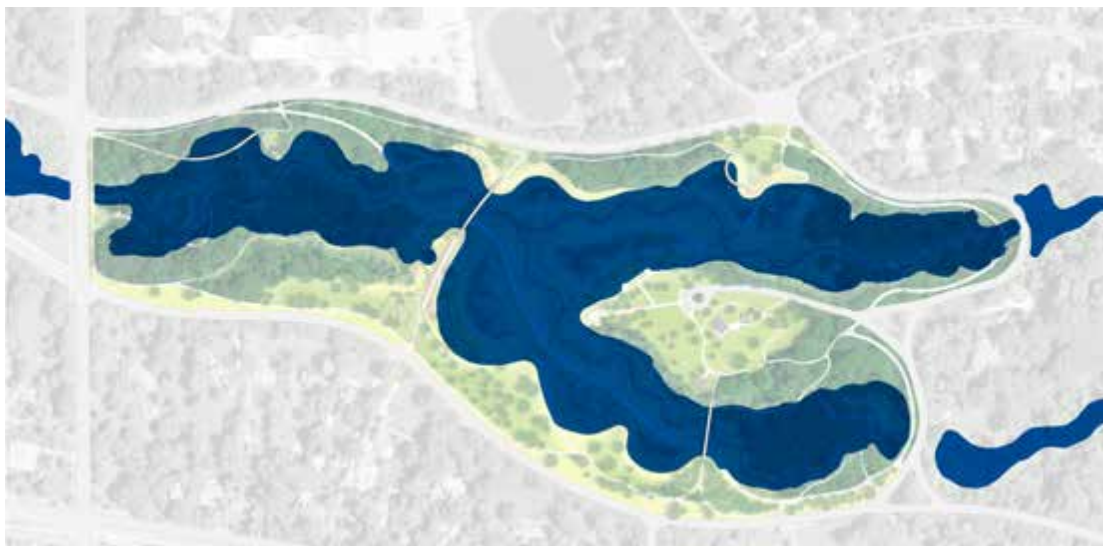
During a 6-month event, Doan Brook will over-top its banks to access the constructed floodplain. Here, one can see that the boardwalk crossings and main trails are not inundated. Notably, the new alignment and profile of Doan Brook downstream of the former earthen embankment allows the stream to access the floodplain, slowing the velocity through the culvert at Lee Road.





2-YEAR STORM EVENT (2.38" in a 24-hr period)

A 2-year event begins to transform the park landscape more dramatically. The main multi-use trail, bridges, and boardwalks remain above the flood elevations, allowing full access to the site. This diagram demonstrates the capacity of the park to function as a fully accessible public park, activated by the dynamic quality of the wetland landscape. Park features like nature play, multi-use trail, and the promontories will allow the public to engage with water.



100-YEAR STORM EVENT (5.38" in a 24-hr period)

During a 100-year event, the park is radically transformed, with water from Doan Brook filling a large percentage of the park's area. This diagram demonstrates the full extent of Doan Brook's floodplain access. The park is accessible by the upland paths and bridges, but all boardwalks and lower elevation paths are inundated in this scenario.

## PARK AMENITIES

An exhaustive list of potential park amenities was developed by the Design Team and was presented to the District, the cities of Shaker Heights and Cleveland Heights, and the project's partnering stakeholders. Feedback was collected from each of these meetings and the list was refined to only those elements that there was general agreement that they were appropriate for this park, able to be maintained effectively, and were realistically possible to fund their construction through a phased implementation process. The resulting short list of amenities (right) was organized into themed groups, and more detailed questions were asked about these types of amenities during the engagement process with the general public. Questions were posed in the web survey, feedback was sought in open houses, and discussions were had during other engagement events. Ultimately, it was this community feedback that determined how park amenities were prioritized

The Landscape Implementation Plan and park amenities diagram on the facing page illustrate those park amenities that ranked the highest from the community. Each has been strategically placed to take the best advantage of either existing or proposed site conditions, and careful attention was paid to ensure that the placement of amenities will not have a negative impact on stream hydrology. Precedent images were used to confirm the appropriateness of the style and character of the amenities.

### NATURE-BASED AMENITIES

- Stormwater wetlands, marshes & wet meadows
- Sediment management landforms, slopes, & hills
- Bird blinds
- Canopy walk
- Wetland boardwalks
- Stream Valley overlook
- Water's edge observation deck
- Wetland education/interpretation deck

### ACTIVE RECREATION AMENITIES

- Sledding hill
- Bocce courts
- Horseshoe pits
- Embankment slide & rock scramble
- Nature play equipment

### GARDEN-BASED AMENITIES

- Orchards
- Allee promenade
- Pollinator / Butterfly garden
- Sensory garden
- Reading garden

### SOCIAL AMENITIES

- Outdoor classroom
- Forest amphitheater
- Small sheltered seating areas / gathering spaces (not for rental)
- Garden swings
- Picnic grove







OUTDOOR CLASSROOM

SENSORY GARDEN

FLOODPLAIN BOARDWALK

HILLSIDE SEATING AREA

PEDESTRIAN BRIDGE

POLLINATOR GARDEN

NATURE PLAY

BROOK OVERLOOK

POLLINATOR GARDEN

SHELBURNE ROAD

NORTH PARK BOULEVARD

FLOODPLAIN BOARDWALK

FLOODPLAIN BOARDWALK

FLOODPLAIN BOARDWALK (SHARED-USE PATH)

BIRD BLIND

LOUNGE SWINGS

SHAKER INTERPRETIVE TRAIL

VCC GROVE

HAMMOCK GROVE

EXISTING FLOODPLAIN BOARDWALK

PARK DRIVE

FLOWERING ORCHARD

POLLINATOR GARDEN

OVERLOOK TERRACE

BIRD BLIND

WATER'S EDGE OBSERVATION DECK

HILLSIDE SEATING AREA

SOUTH PARK BOULEVARD

PEDESTRIAN BRIDGE

POLLINATOR GARDEN

FRUIT / NUT ORCHARD

## OUTDOOR CLASSROOM

With so many schools nearby, an outdoor classroom is a great amenity for the park. Below are examples of “council ring” style outdoor classrooms constructed of logs and stone.



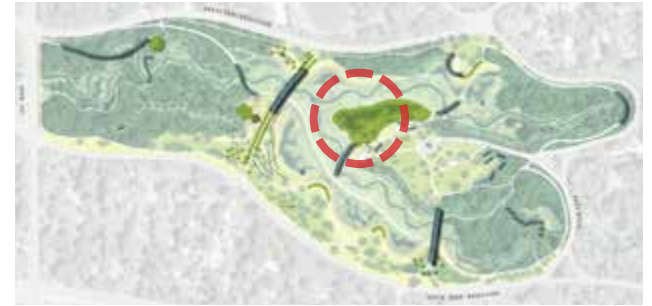
## SENSORY GARDEN

A sensory garden is an immersive experience that can provide opportunities for people with special needs to engage with the park. Our proposal suggests re-purposing the stilling pool as a place for a sensory garden.



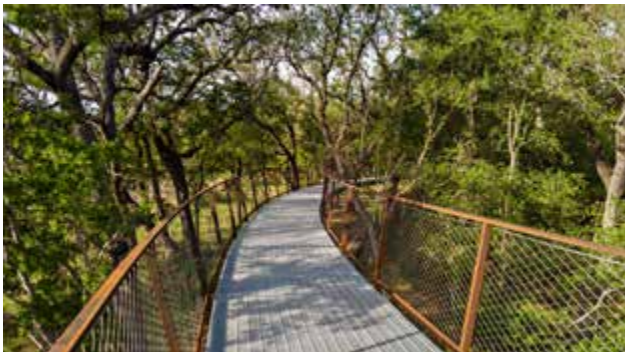
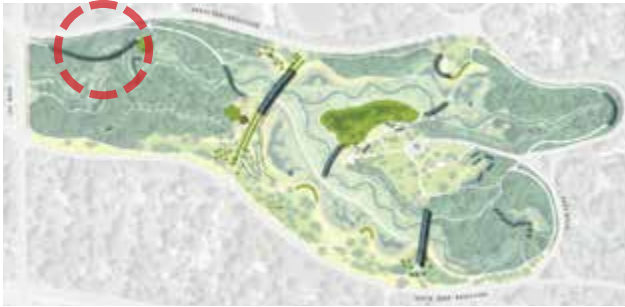
## NATURE PLAY

The recommended landscape plan places a large nature play area against the park peninsula. This location gives the park greater connection to Doan Brook, and allows families to access the parks other existing amenities.



## CANOPY WALK

We suggest a canopy walk near Lee Road and North Park Boulevard because of the steep hillside and exceptionally tall forest canopy in this area of the site.



## PEDESTRIAN BRIDGE

A connection between Attleboro and the park peninsula was critical for improving park access. This pedestrian bridge would pass high above Doan Brook, keeping a N-S connection even during flood events.



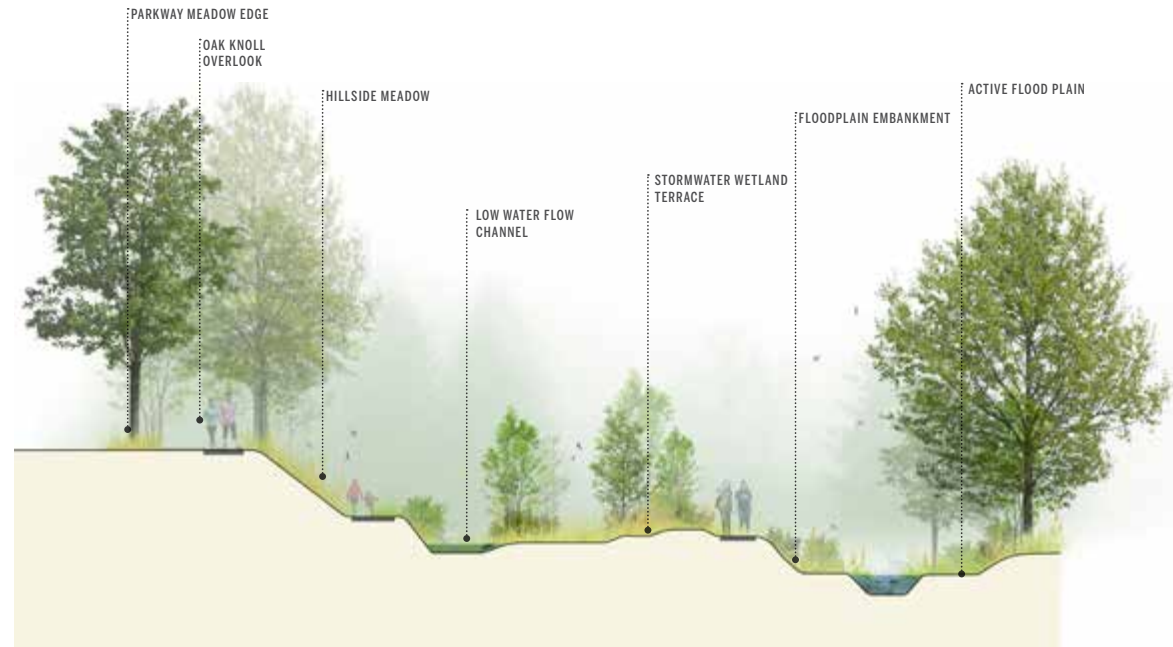
## BROOK OVERLOOK

The brook overlook augments the promontory at the Shelburne Gateway and gives a long view down the stream corridor.



## PLANT COMMUNITIES

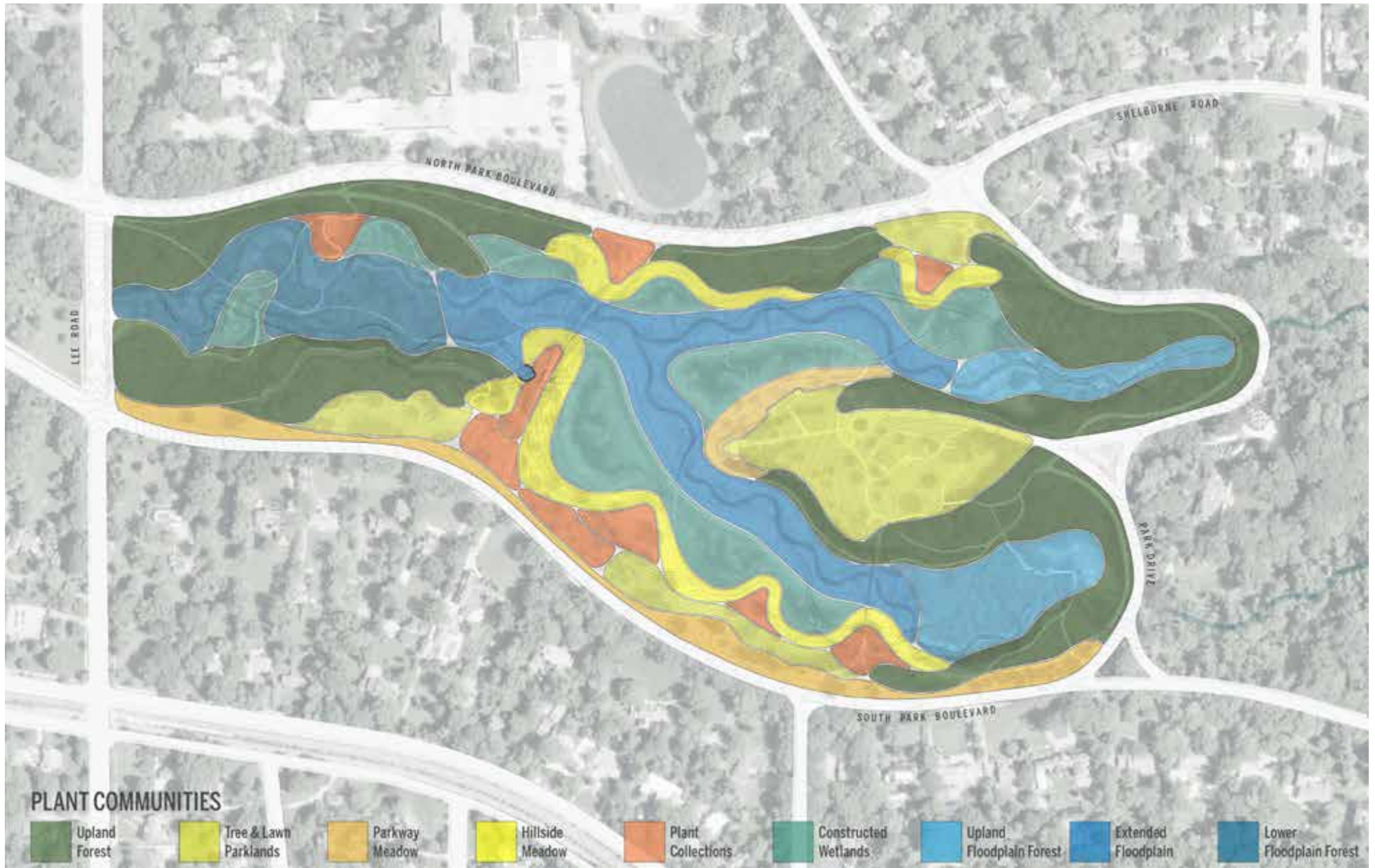
The proposed plant communities within the study area will be inspired by those that would be naturally found in Northeast Ohio. The floodplain is on a vertical gradient from east to west, dropping approximately 46 ft from Park Drive to Lee Road. The upper and lower reaches of the floodplain are predominately existing forested wetlands that will remain, but in the case of the lower floodplain, the stream alignment will be relocated further to the north in an historic alignment that will allow the stream to access the vast floodplain that it is currently detached from. Between these reaches will be an entirely new section of floodplain through the impoundment area and earthen embankment, planted with a variety of grasses, forbs, shrubs, and trees to bridge the gap between the more mature floodplain sections upstream and downstream. A few feet above the floodplain are the constructed wetlands, which will intercept stormwater from existing outfalls that drain stormwater from the streets of the surrounding communities. These wetlands will serve as filters for these outfalls, cleansing the stormwater before returning it to Doan Brook. The hillside meadows will negotiate the grade change between the floodplain and the upland areas along the edges of the study area. The upland areas will reinforce and expand the mature forest, tree & lawn parklands, and other plant collections of cultural value. Attention will be paid to reducing maintained lawn areas to only those that are actively used by the community, transitioning other areas into meadows, woodlands, and other plant collections of ecological value.



This section diagram illustrates how the topography (vertically exaggerated for clarity) of the park will create various dynamic plant communities that relate strongly to elevation and will control flood events and present a variety of park experiences that showcase urban hydrology processes



Various precedent images illustrate the types of plant communities within the Landscape Integration Plan



The proposed plant communities delineation diagram shows a variety of plant communities, building on the framework of existing conditions

**VIEW OF STREAM CONFLUENCE, LOOKING EAST TOWARD PARK DRIVE**

This perspective view illustrates a bird's eye view looking upstream toward the new pedestrian bridge across the old dam location and to the restored North and Middle Branches of Doan Brook and park peninsula beyond. The sensory garden can be seen in the foreground to the right, with the historic stilling pool masonry framing an acoustical garden room within the sensory garden.



**VIEW OF MIDDLE BRANCH, LOOKING WEST FROM ATTLEBORO BRIDGE**

This perspective view illustrates the prospect over the Middle Branch of Doan Brook, looking downstream from the middle of the proposed Attleboro bridge. Just beyond the sinuous Lake-to-Lakes shared-use path are a series of terraced wetlands filters that intercept the existing stormwater outfalls to cleanse the stormwater before it is deposited into Doan Brook



## LANDSCAPE INTEGRATION PLAN | DISTRICT SCOPE

The District scope boundary identified on the facing page reflects the approximate extent of major earthwork operations that are necessary to remove the dam and manage sediment to enable stream restoration throughout the study area. This footprint represents roughly 27 acres of the 60-acre study area and includes all of the major earthmoving, construction of the streams and wetlands, and systematic re-vegetation of all disturbed areas to maximize the site's ecological uplift potential. This will include a variety of appropriate floodplain, wetland, forest, meadow, and upland plant communities that are native or adapted to Northeast Ohio. The management of invasive species within the study area will likely commence prior to the start of this construction effort and will be sustained by the District within the 100-year floodplain (see "Approximate District maintenance corridor" diagram).

To provide construction and maintenance access, the District has committed to the construction of the central asphalt shared-use path that runs diagonally through the site, connecting North Park and South Park Boulevards. Additionally, the District has committed to restoring the north-south connection across the earthen embankment with a new 215ft long pedestrian bridge that will provide great views of the stream restoration efforts upstream and downstream. These will be the only completed new

circulation routes that can be funded by the District, but there are various other pathways (identified by the white dashed lines) where the District's project can help to set subgrade elevations and/or provide aggregate base for future finish paving materials (by others), where appropriate.

In addition to what is illustrated on these diagrams, there will be 3-5 acres of additional restoration work that the District will fund for construction staging, such as in the lawn areas along South Park Boulevard. While this scope of work represents only about half of the full Landscape Integration Plan, the result of this first phase of work will appear finished. Subsequent phases of implementation to be funded through the cities of Shaker Heights and Cleveland Heights will also be designed and constructed as stand-alone projects, using this Landscape Integration Plan as a guide toward the complete vision developed with the feedback and support of the communities.



Approximate District maintenance corridor



