



**Northeast Ohio
Regional Sewer District**

Lower Shaker Lake Dam Reconstruction

TODAY'S MEETING WILL BEGIN SHORTLY



**Northeast Ohio
Regional Sewer District**

NEORSD Podcast

A bi-weekly chat with the real people who bring our clean water work to life.

neorsd.buzzsprout.com



Clean Water Works



**Northeast Ohio
Regional Sewer District**



Lower Shaker Lake Dam Reconstruction

Today's meeting will
start shortly.

Photo credit: Denis Zaharija



Can you save on your sewer bill?

**Utility Assistance
Resource Fair**

November 4, 2023

(216)881.8247
neorsd.org/save

Lower Shaker Lake Dam Reconstruction

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**Northeast Ohio
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Working for Clean Water



**Northeast Ohio
Regional Sewer District**

[NEORSD.ORG/CAREERS](https://www.neorsd.org/careers)

Lower Shaker Lake Dam Reconstruction



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start shortly.

Photo credit: Denis Zaharija

Lower Shaker Lake Dam Reconstruction

NORTHEAST OHIO REGIONAL SEWER DISTRICT

OCTOBER 5, 2023



**Northeast Ohio
Regional Sewer District**

Housekeeping

- Tonight's meeting
 - Introduce the project
 - Recording available at neorsd.org/LowerLake
 - Use the Q&A function in Zoom or email askus@neorsd.org

Housekeeping

- October 7 at Lower Shaker Lake Spillway
 - 10 a.m. – 2 p.m.
 - Between North Park and South Park Boulevards at Brook Road



Cisco Rivera
Watershed Team Leader
NEORSD



Tonight's Agenda

- About NEORSD & Project
- Meet the Team
- Project Goals & Schedule
- Dams 101
- Public Engagement



About NEORS

NEORSD: At a glance

- **Services:** Sanitary and stormwater management to 57 municipalities, including the City of Cleveland, across 4 counties
(6 additional municipalities sanitary-only)
- **Governance:** Independent political subdivision of the State of Ohio governed by a 7-member Board of Trustees

1,000,000 Customers

Regional Stormwater Management Program

- Addresses problems related to stormwater runoff from hard surfaces.

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- Runoff contributes to regional stream flooding, erosion, and water-quality issues.

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- Runoff contributes to regional stream flooding, erosion, and water-quality issues.
- Improves our ability to further address stormwater problems that cross community boundaries.



Lower Shaker Lake History

A historical map of the Shaker Lake area in Ohio. The map shows Doan Brook flowing from the bottom left towards the center, where it meets Shaker Lake. Several mills are marked, including a 'GRIST MILL' and a 'SAW MILL'. There are also labels for 'APPLE ORCHARD' and 'SHAKER LAKE'. The map is drawn in a simple, hand-drawn style with various lines representing the water bodies and land features.

- North Union Shaker Community (1822-1889)
- Doan Brook dammed for sawmill, gristmill (1836)
- 187-year-old earthen dam not built to modern standards, noncompliant with state regulations





**Northeast
Ohio Regional
Sewer District**

**REGIONAL
STORMWATER
MANAGEMENT**



**SHAKER
HEIGHTS**

Roles and Responsibilities

- **Ohio Department of Natural Resources (ODNR):**
Assess, enforce dam compliance
- **Shaker Heights and Cleveland Heights:**
Compliance with ODNR orders
- **NEORSD:** Regional Stormwater Management Program

Reasons to Reconstruct Dam

- Non-compliance with State regulations:
 - Not built to modern engineering standards
 - Class I dam failure would result in probable loss of life and property damage
 - Cannot pass Probable Maximum Flood

Reasons to Reconstruct Dam

- Non-compliance with State regulations
- NEORSD Chagrin River & Lake Erie Direct Tributaries Stormwater Master Plan findings:
 - Lower Shaker Lake Dam provides downstream flood control benefit

- Lower Shaker Lake Drainage Area
- Doan Brook Subwatershed
- Community Boundaries

Lower Shaker Lake Project Area

CLEVELAND HEIGHTS

Nature Center at Shaker Lakes

Horseshoe Lake

Doan Brook

Marshall Lake

SHAKER HEIGHTS

Green Lake

Doan Brook

Lower Shaker Lake Drainage Area
3,121 Acres



Meet the Team

Northeast Ohio Regional Sewer District



Denis Zaharija, PE
Project Manager



Frank Greenland, PE
Director of
Watershed Programs



Kim Colich, PE
Stormwater
Design Manager



Cisco Rivera
Watershed Team
Leader



Design Team

HDR



Steven Riedy, PE
Project Manager
Dam Safety & Geotechnical



David Moore, PE
Dam Safety &
Hydrology/Hydraulics

SmithGroup



Chad Brintnall,
PLA, ALSA
Landscape Architecture



Michelle Johnson
Stakeholder & Public
Communications

Design Team

Lawhon & Associates

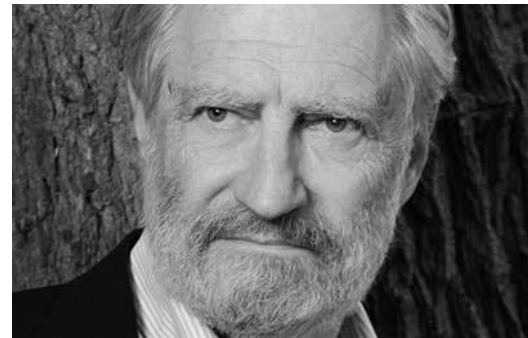


Jason Earley, PWS
Ecological/Permitting



Andy Sewell
Cultural/Historical

Bluestone



Roy Larick, PhD
Cultural/Historical

AECOM



Brian Mastin
Dredging & Sediment
Management



Steven Riedy, PE
Project Manager
Dam Safety & Geotechnical
HDR



Design Team - Roles



Prime
Consultant



Structural Lead,
Geotech Peer Review



Landscape Architecture,
Stakeholder & Community
Engagement



Cultural & Historical
Stakeholder Engagement



Geotechnical
Exploration
& Laboratory Testing



Dredging & Sediment
Management



Permitting Guidance, Geomorphology
& Streambank Stabilization, Tree
Survey



Topographic Survey,
Sediment Sampling



Project Controls

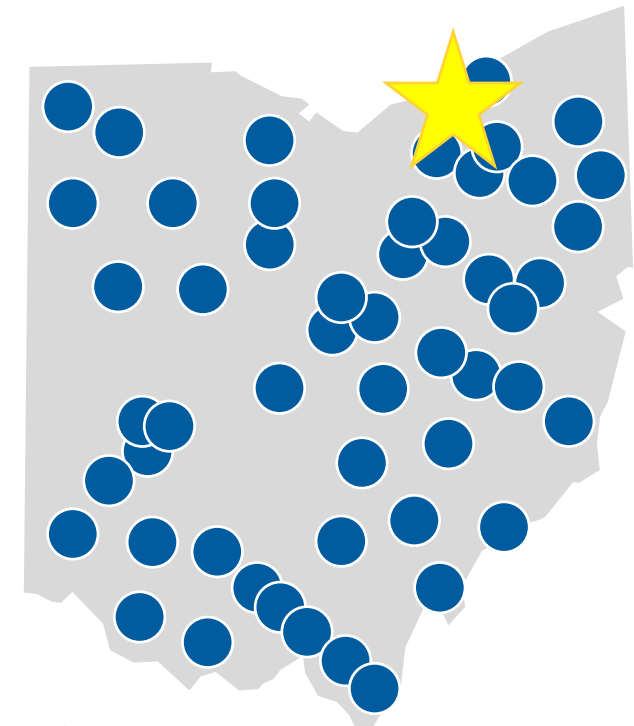
Team Experience

HDR's Core Focus Areas

- Dam Safety
- Civil Design
- Geotechnical Engineering
- Hydrology & Hydraulics

Team Experience in Ohio

- HDR team members have completed safety projects on more than **50 Class I dams**.
- The HDR team has successfully completed more than **\$261MM** of dam safety capital improvements.



- ★ Lower Shaker Lake Dam
- Relevant HDR Team Dam Experience

Core Focus Areas

- HDR holds the Nationwide Dam Safety Mandatory Modification Center Contract with the US Army Corps of Engineers (Huntington District).
- Completed more than **\$16MM** in dam safety designs in 2022.



**Northeast Ohio
Regional Sewer District**

HARGUS LAKE DAM



**Northeast Ohio
Regional Sewer District**

PORTAGE LAKES



**Northeast Ohio
Regional Sewer District**

PORTAGE LAKES

Core Focus Areas:

- Public Engagement
- Landscape Architecture



Team Experience |



Consensus direction through shared dialog

Team Experience |



Mill Creek Park – Dexter, Michigan

Team Experience |



Middlegrounds Metropark – Toledo, Ohio

Project Goals

Project Goals

- **Address dam safety deficiencies** and bring dam into compliance with State of Ohio regulations.

Project Goals

- **Reduce flood risk** downstream of the dam and along Coventry Road and North Park Boulevard.

Project Goals

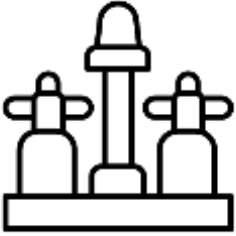
- **Restore and stabilize Doan Brook** immediately downstream of the dam.

Project Goals

- **Integrate dam safety improvements** with consideration to historical and cultural features and park space.

Dams 101

Reasons for Dams



Drinking water
& irrigation



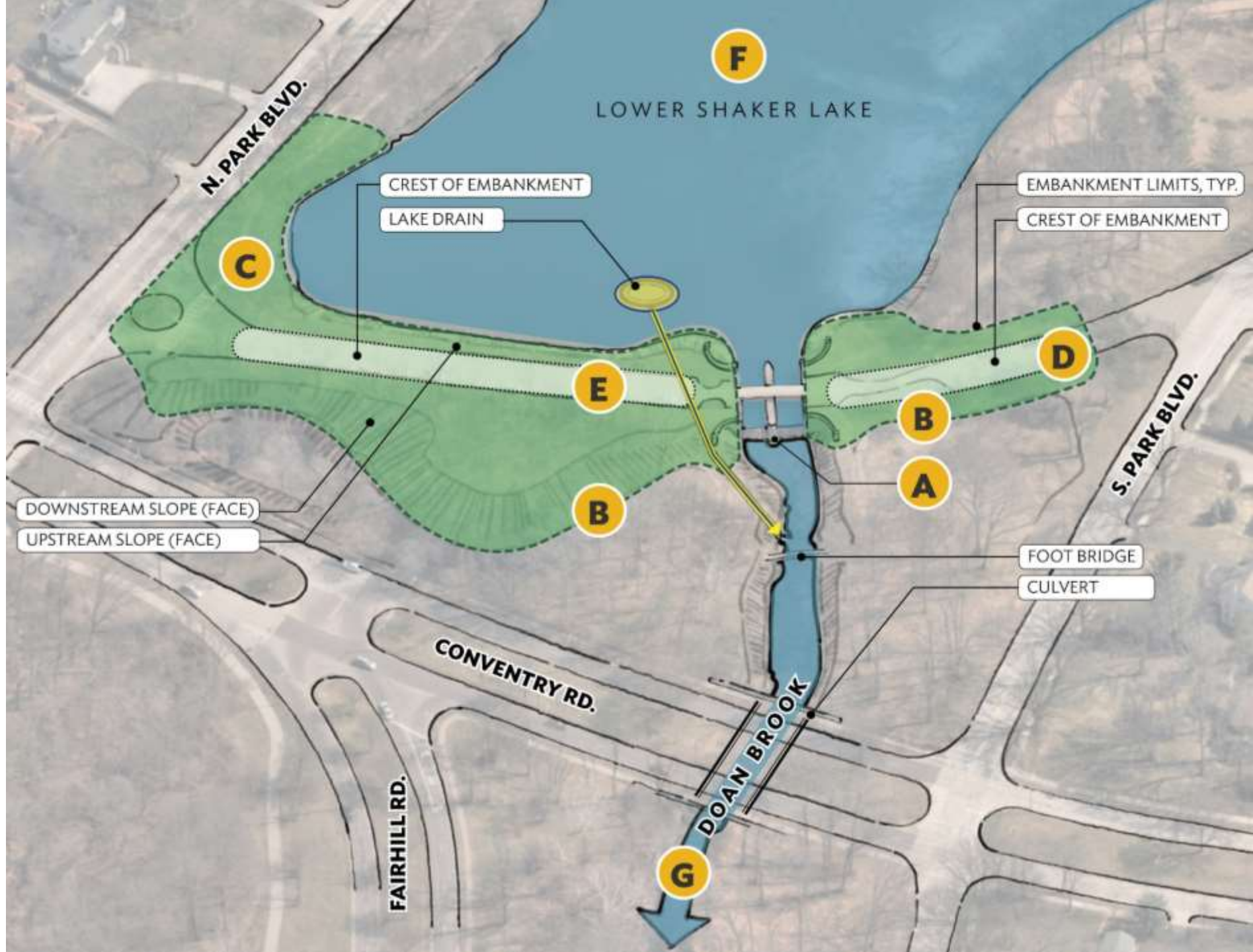
Hydroelectric
power

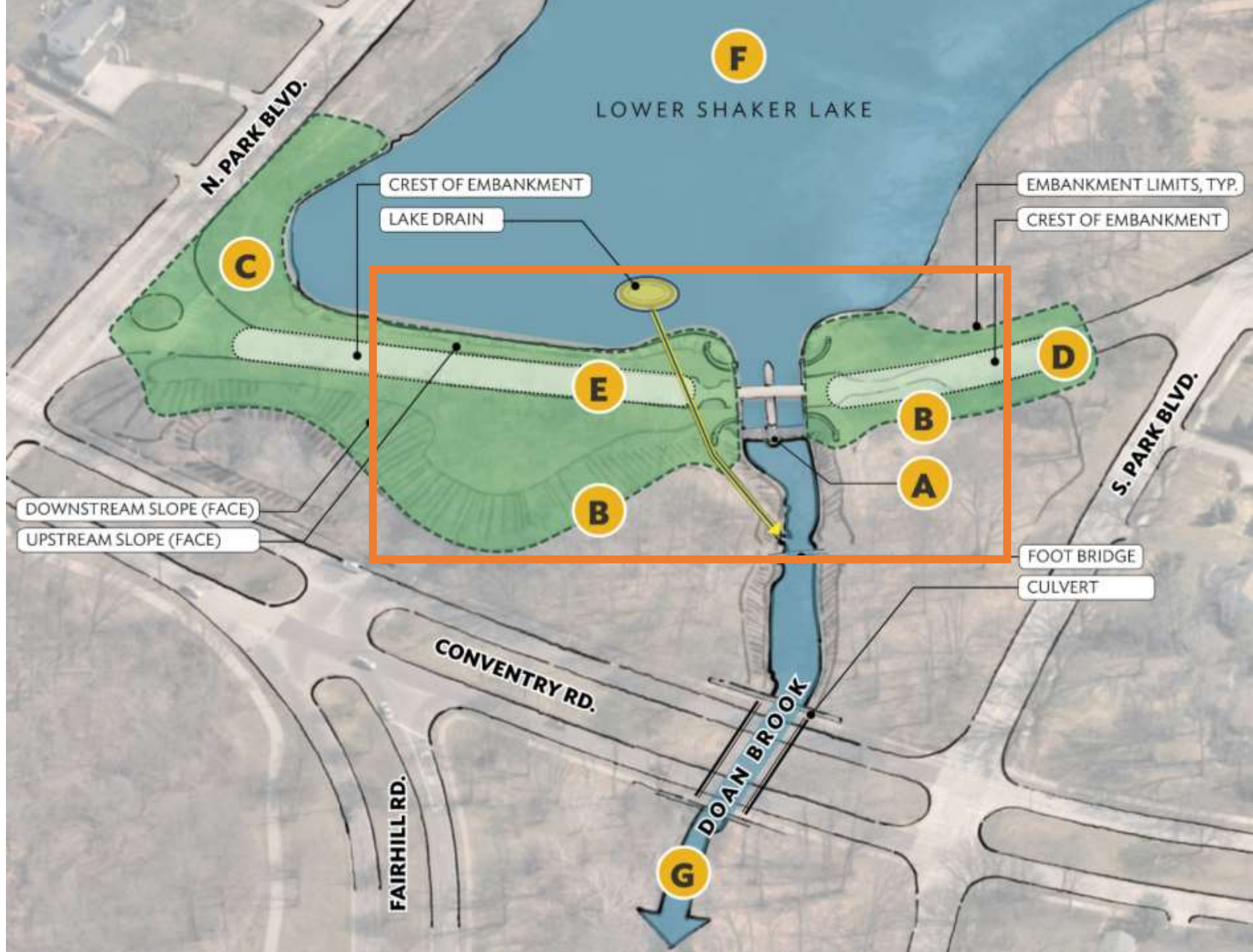


Flood control



Commerce



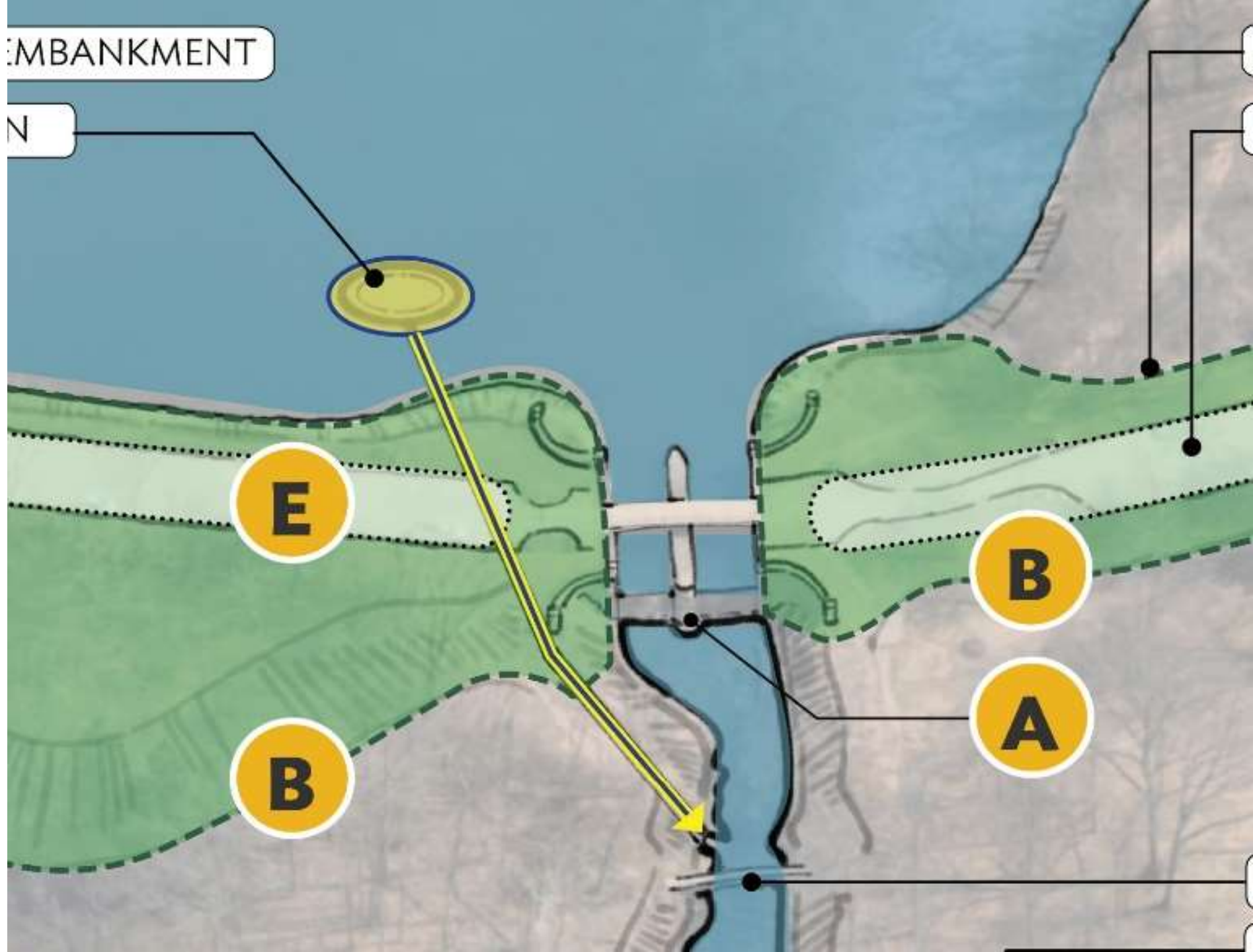


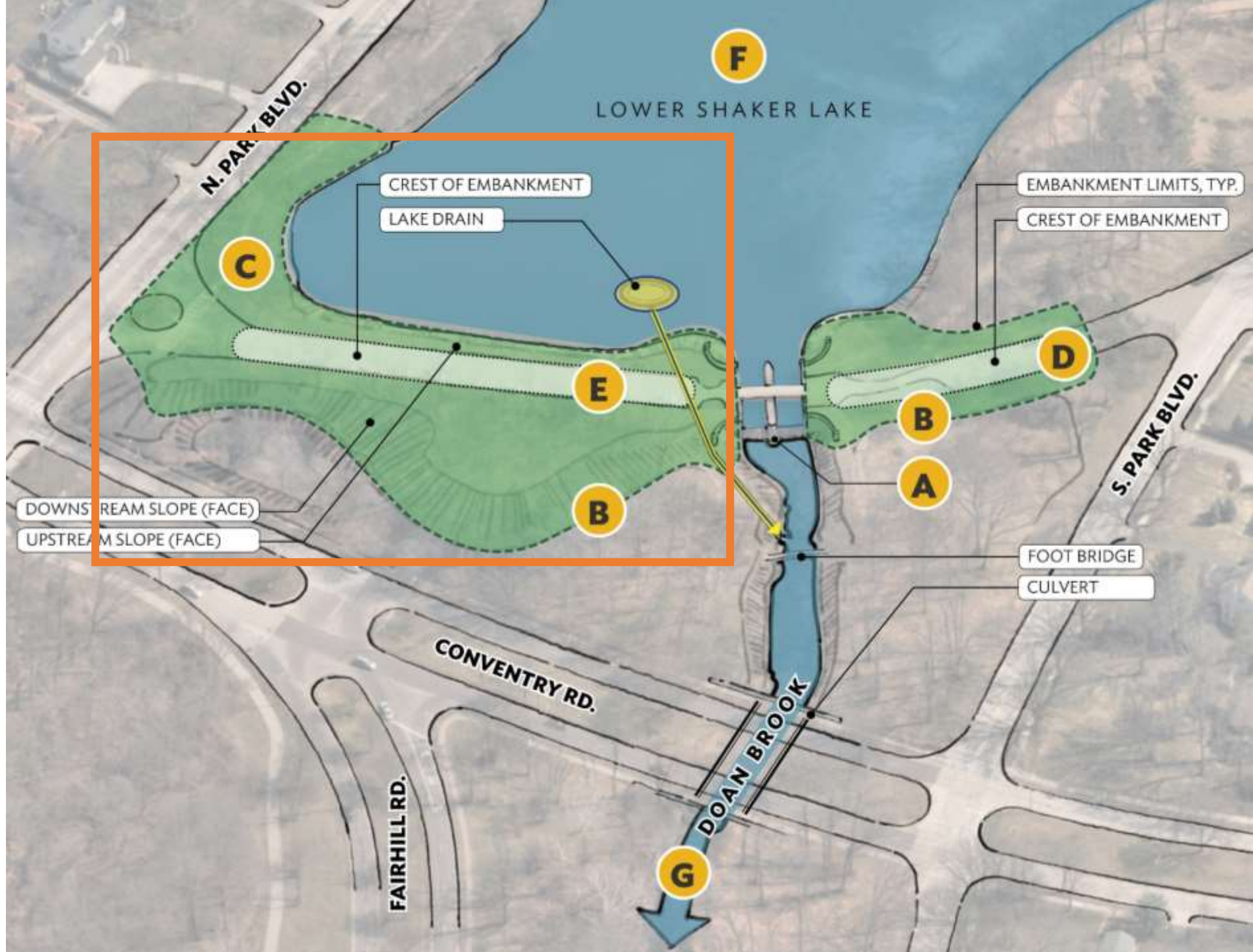
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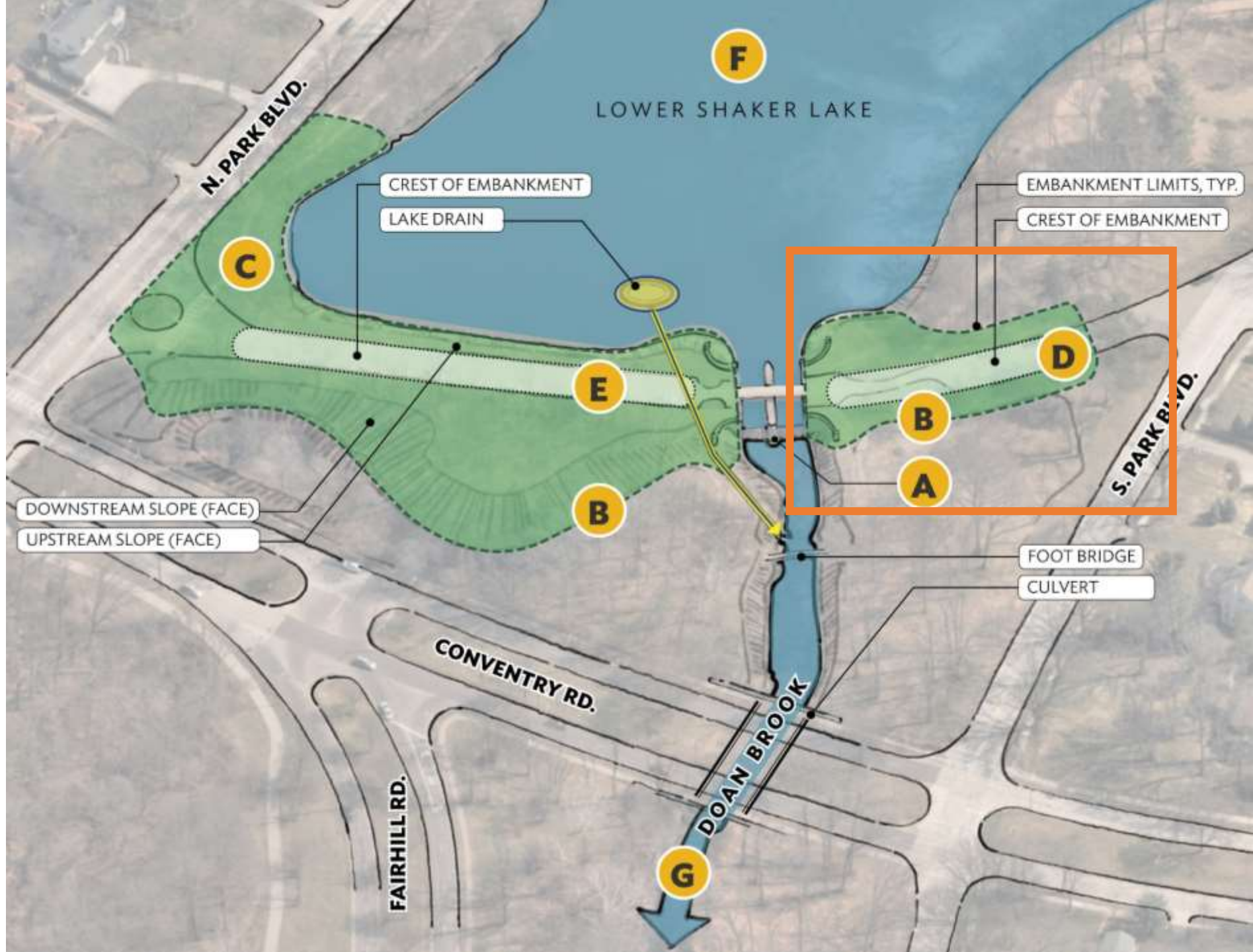
Primary
Spillway

B

Embankment
Limits

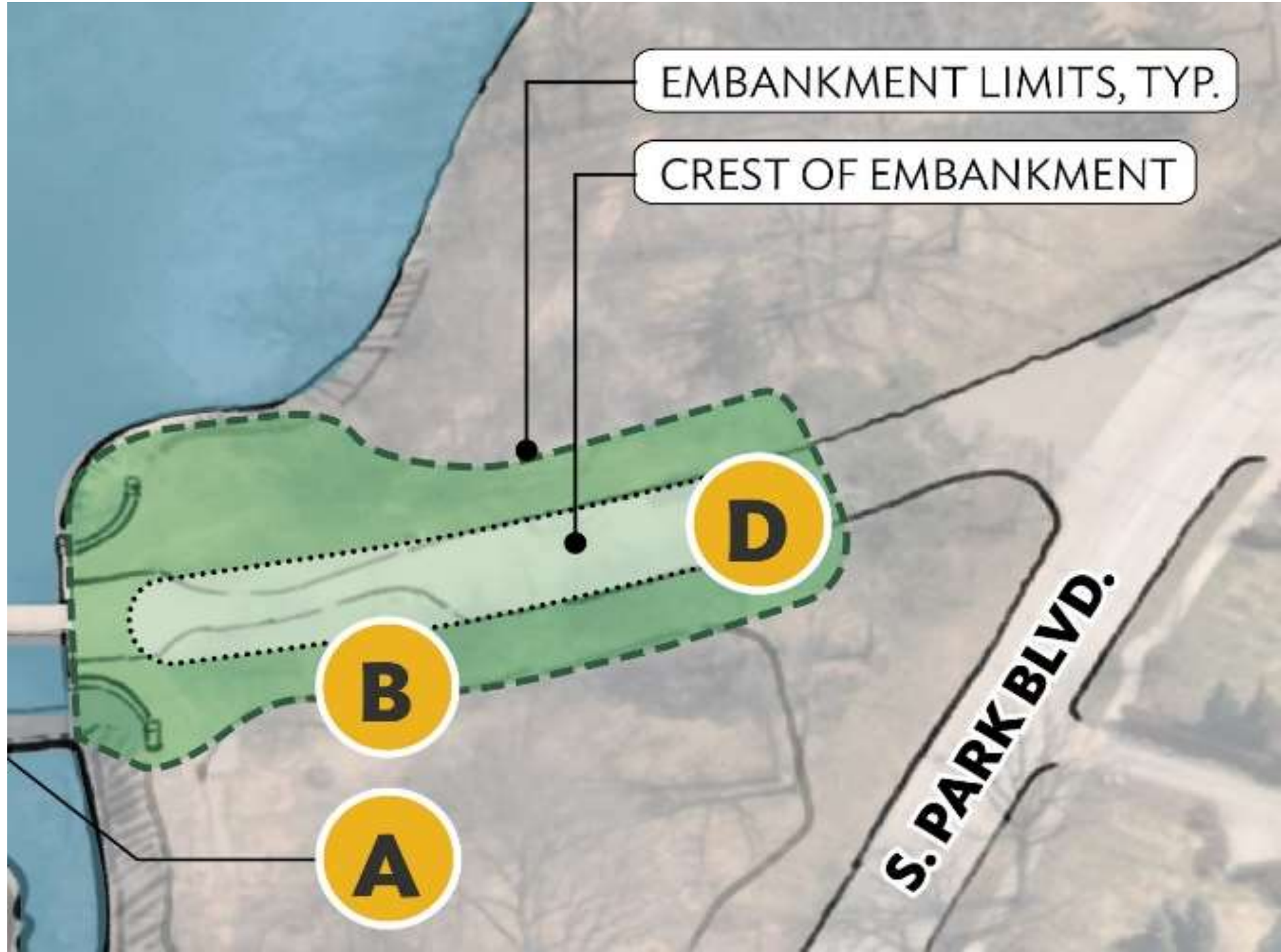


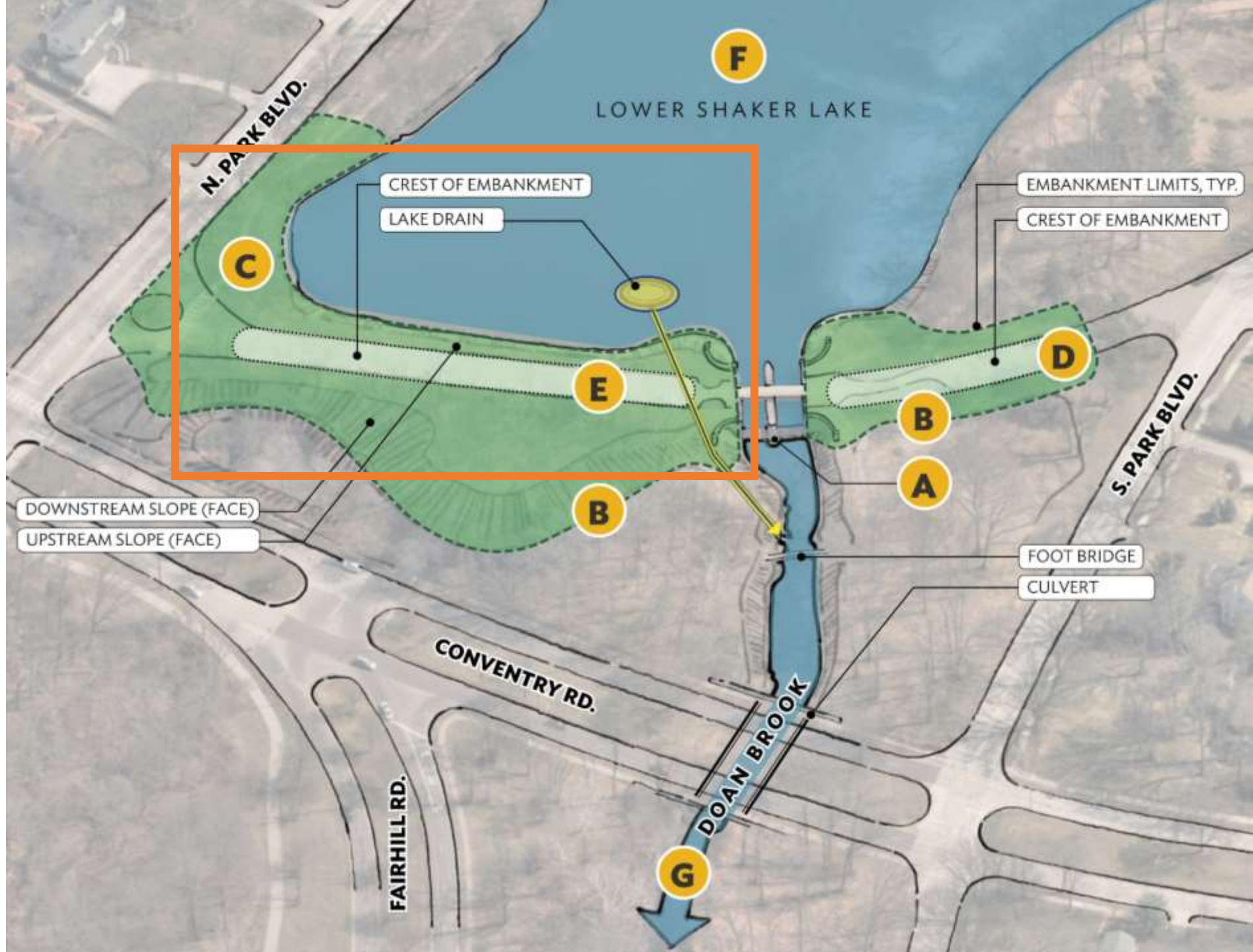


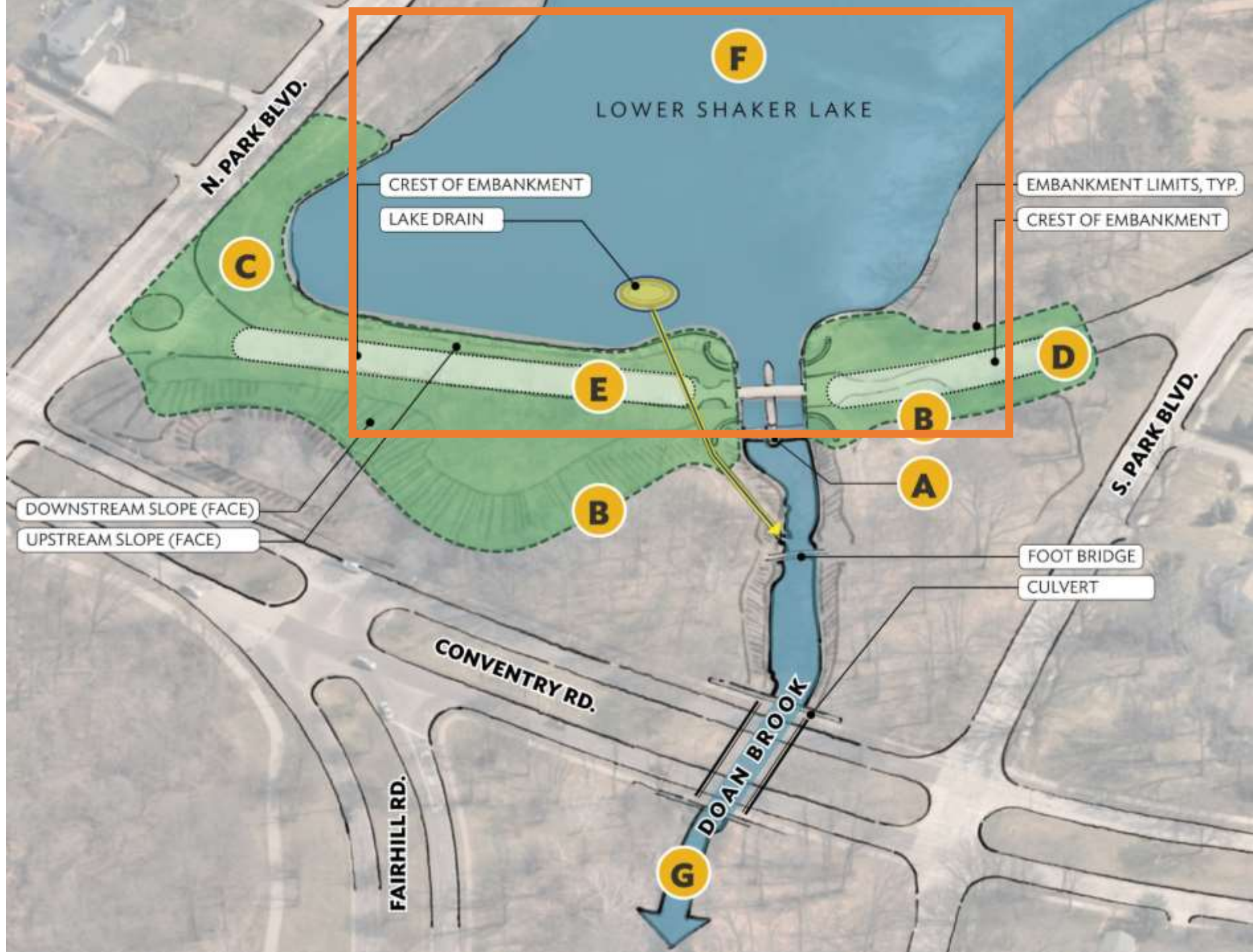


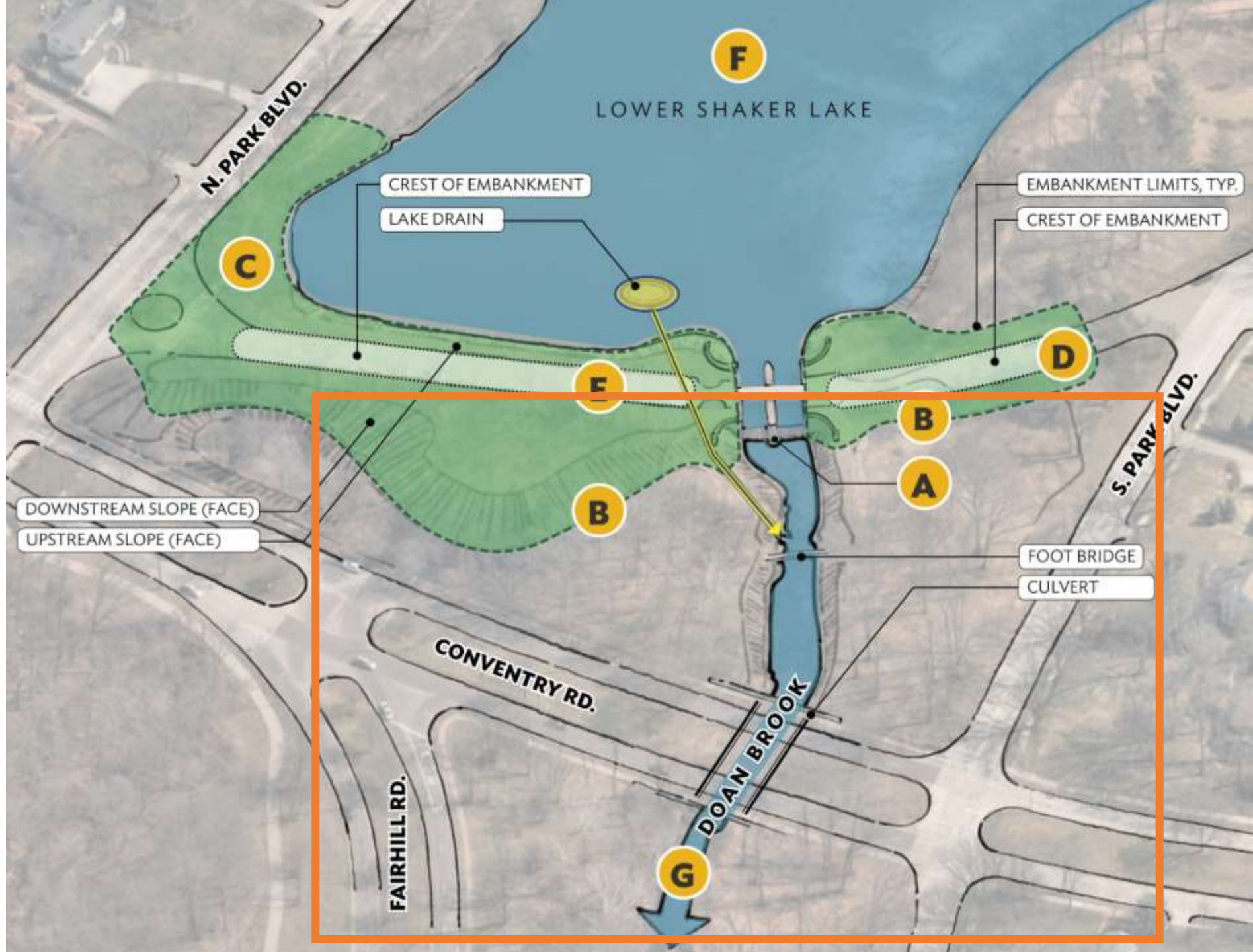
D

Left
Embankment



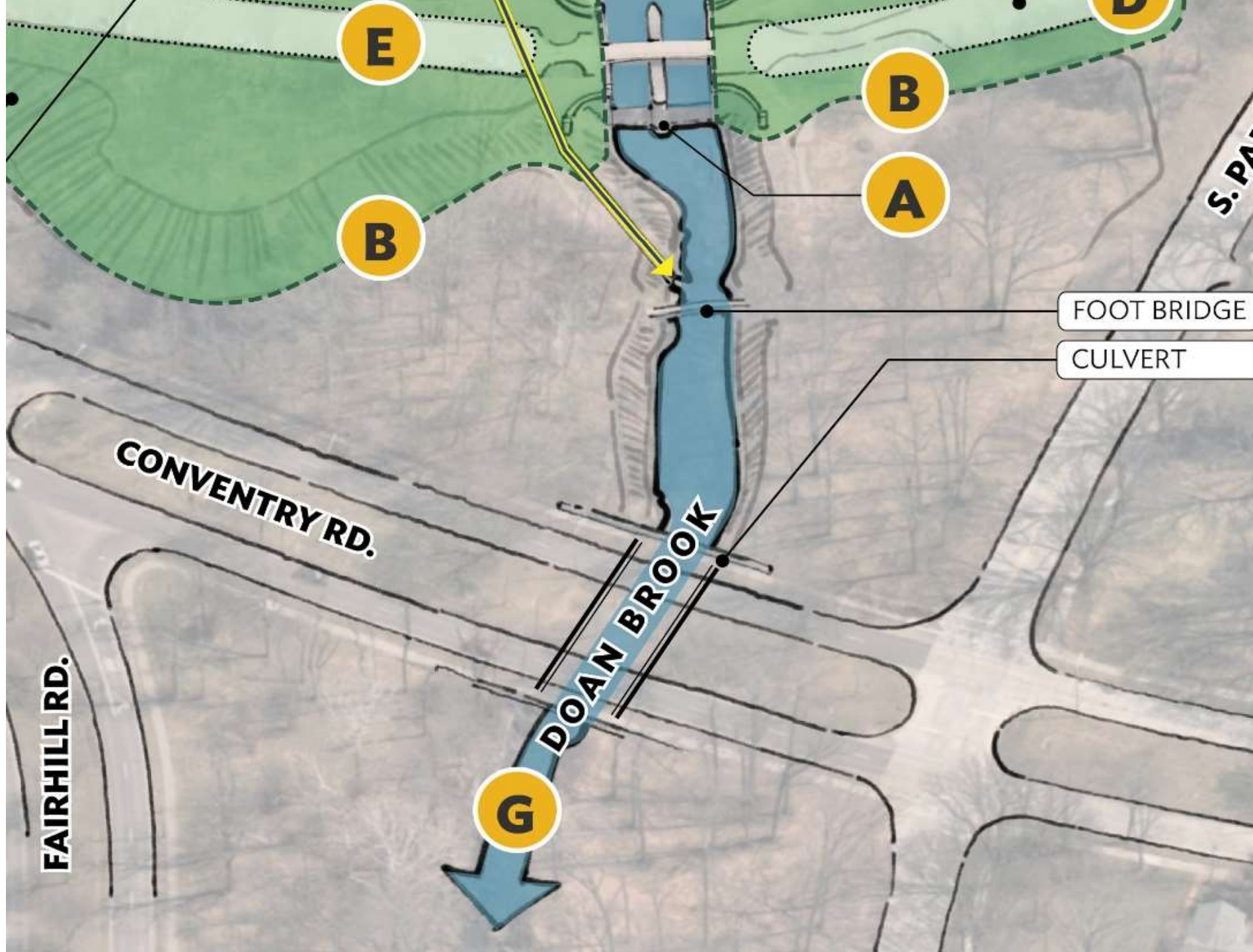


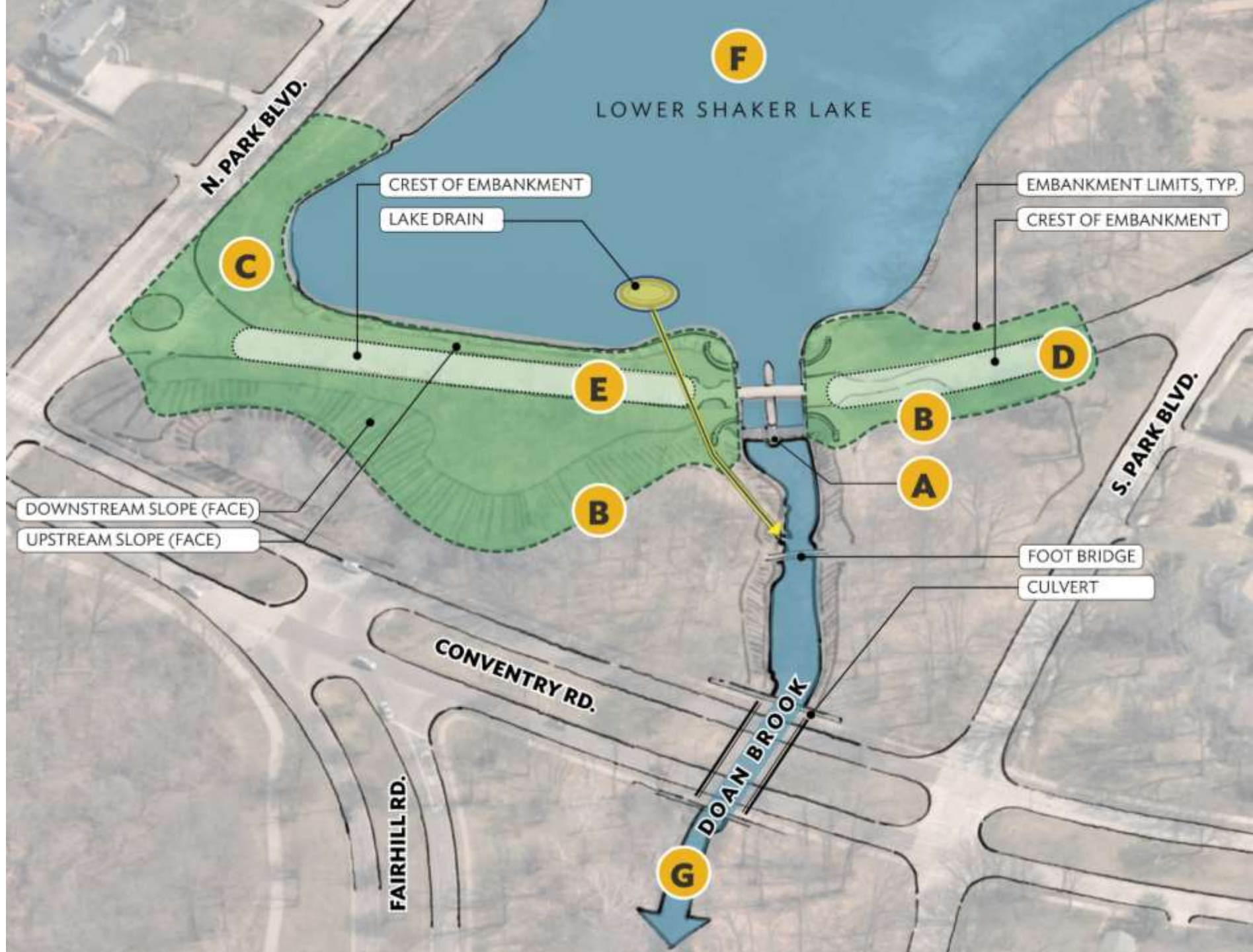




G

Outlet
Channel
(Doan Brook)





Dam Regulation and Classification

- In Ohio, dams are regulated by ODNR's Division of Water Resources - Ohio Dam Safety Program

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- All regulated (non-exempt) dams must meet all ODNR standards
- Classification of regulated dams in Ohio is governed by Ohio Administrative Code (OAC) 1501:21

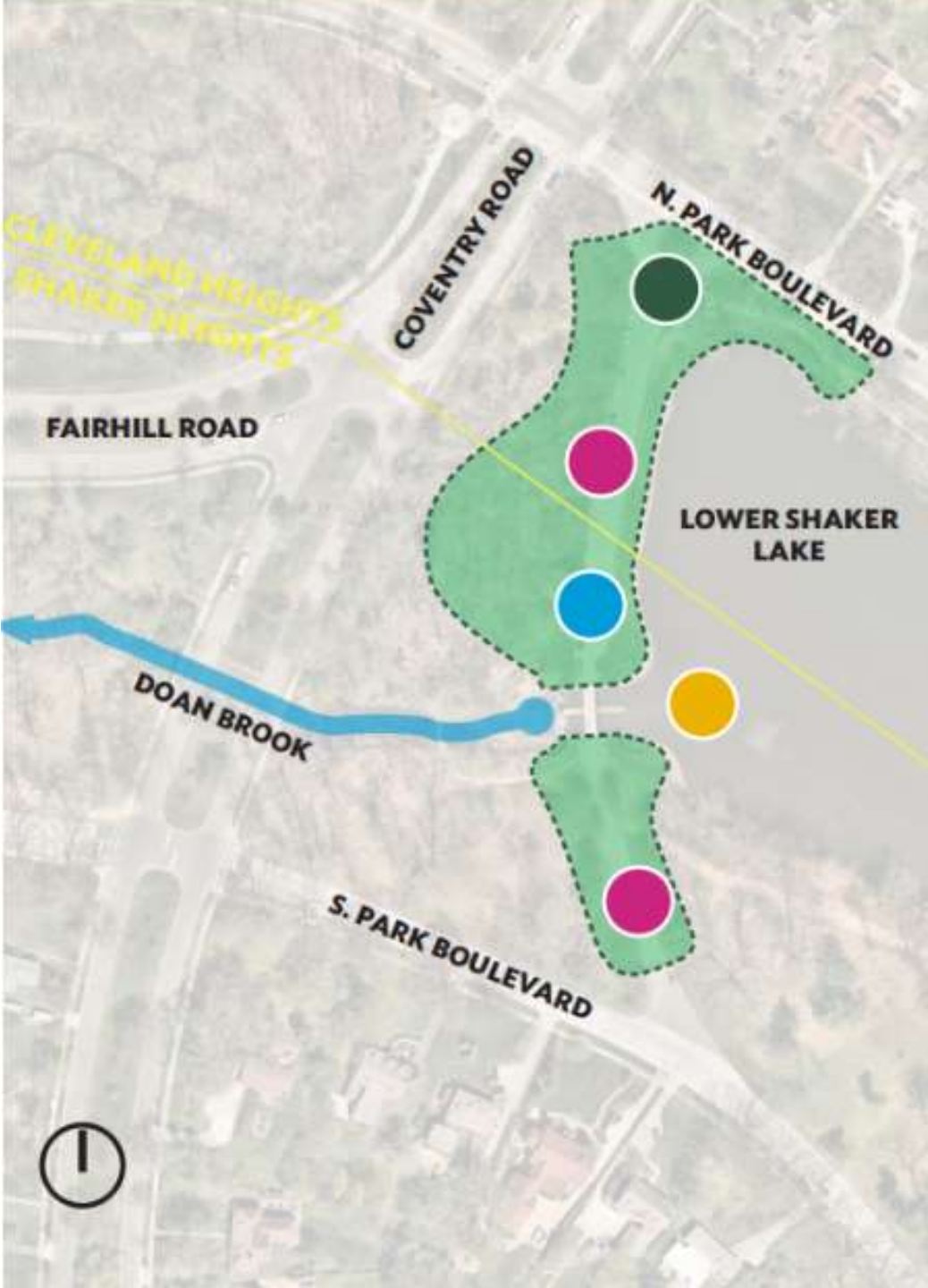


Dam Safety Challenges

OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER RESOURCES – OHIO DAM SAFETY PROGRAM

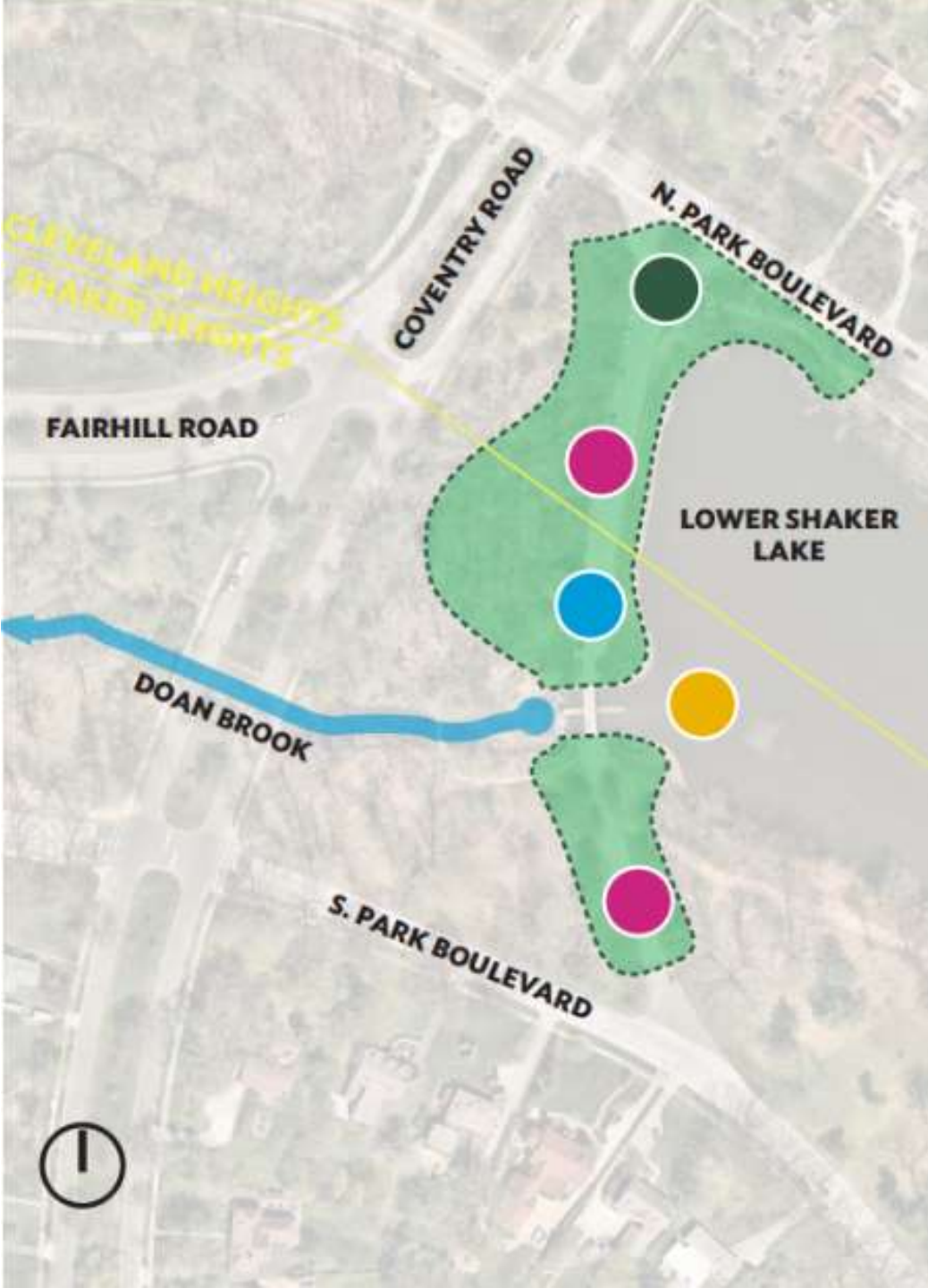
Dam Safety Deficiencies

- Severe deficiency in capacity of spillway discharge



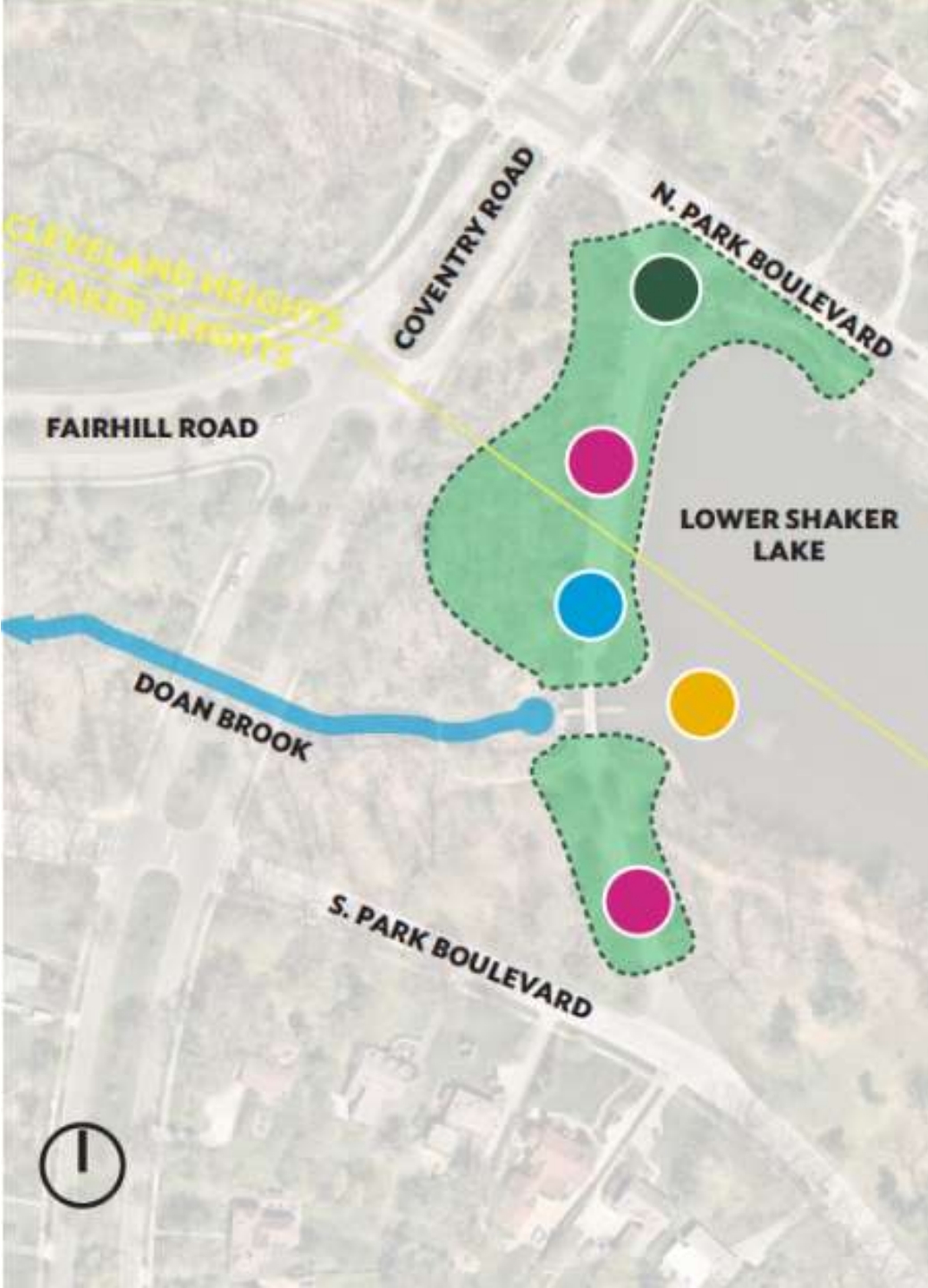
Dam Safety Deficiencies

- Frequent overtopping along North Park Boulevard due to low right abutment



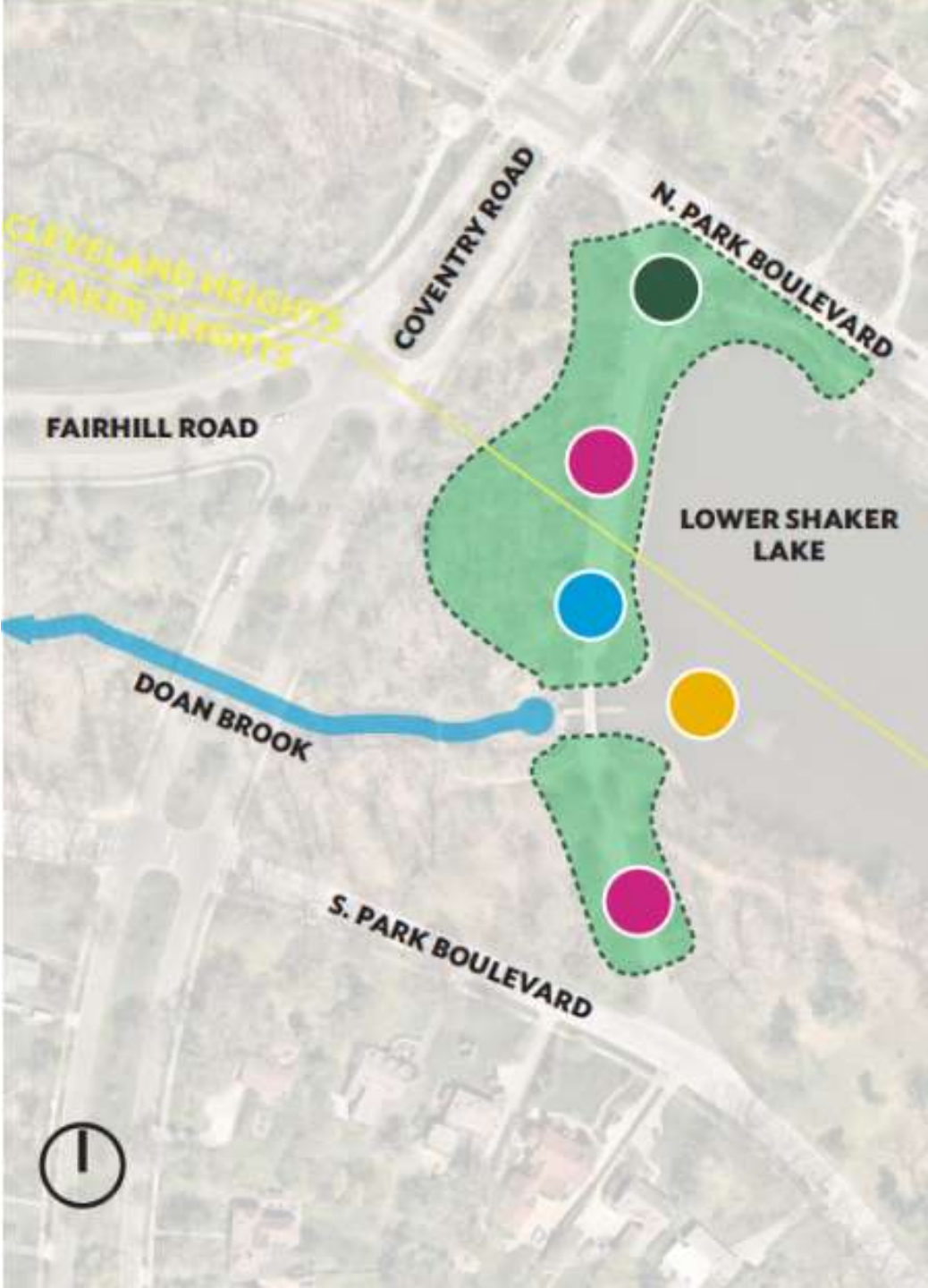
Dam Safety Deficiencies

 Irregular crest elevation



Dam Safety Deficiencies

- Overtopping and stability of main embankment



What Does It Mean To Be A Class I Dam?

Lower Shaker Lake Dam is classified as a Class I (High Hazard Potential) dam structure due to the population at risk downstream. Currently, the dam is not in compliance with ODNR dam safety standards.

Ohio's Dam Classification Criteria

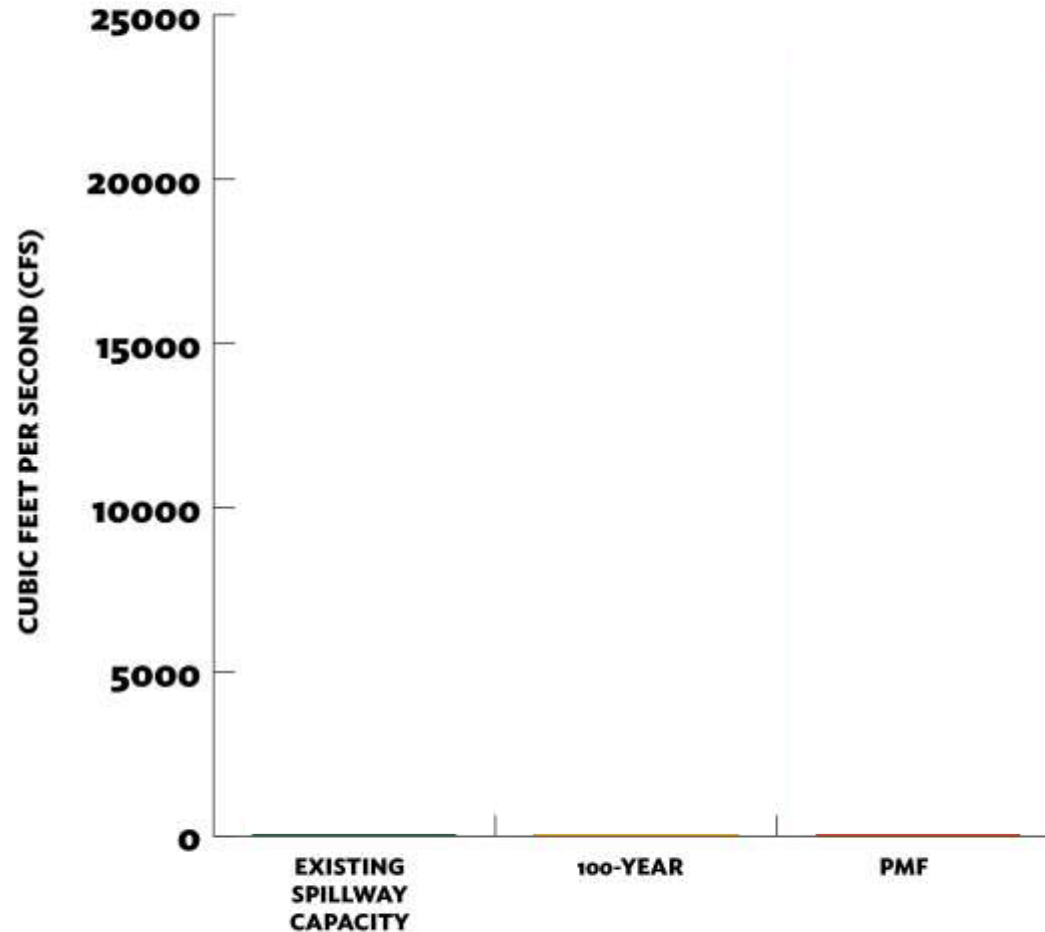
Hazard Potential	Height (FT)	Storage (AC FT)	Downstream Hazard Potential
I High	>60	>5,000	Probable Loss of Human Life
II Significant	>40	>500	Loss or Damage of High-value Infrastructure of Assets
III Low	>25	>50	Damage of Local Roads or Not Otherwise High Valued Assets
IV Exempt	<25	<50	Dam or Agriculture/Rural Land

Lower Shaker Lake Dam Class

Height (FT)	Storage (AC FT)	D/S Hazard
		X
	178	
17.3		

Available Flood Storage is filled with small storm events leaving little to no available storage for larger storm events.

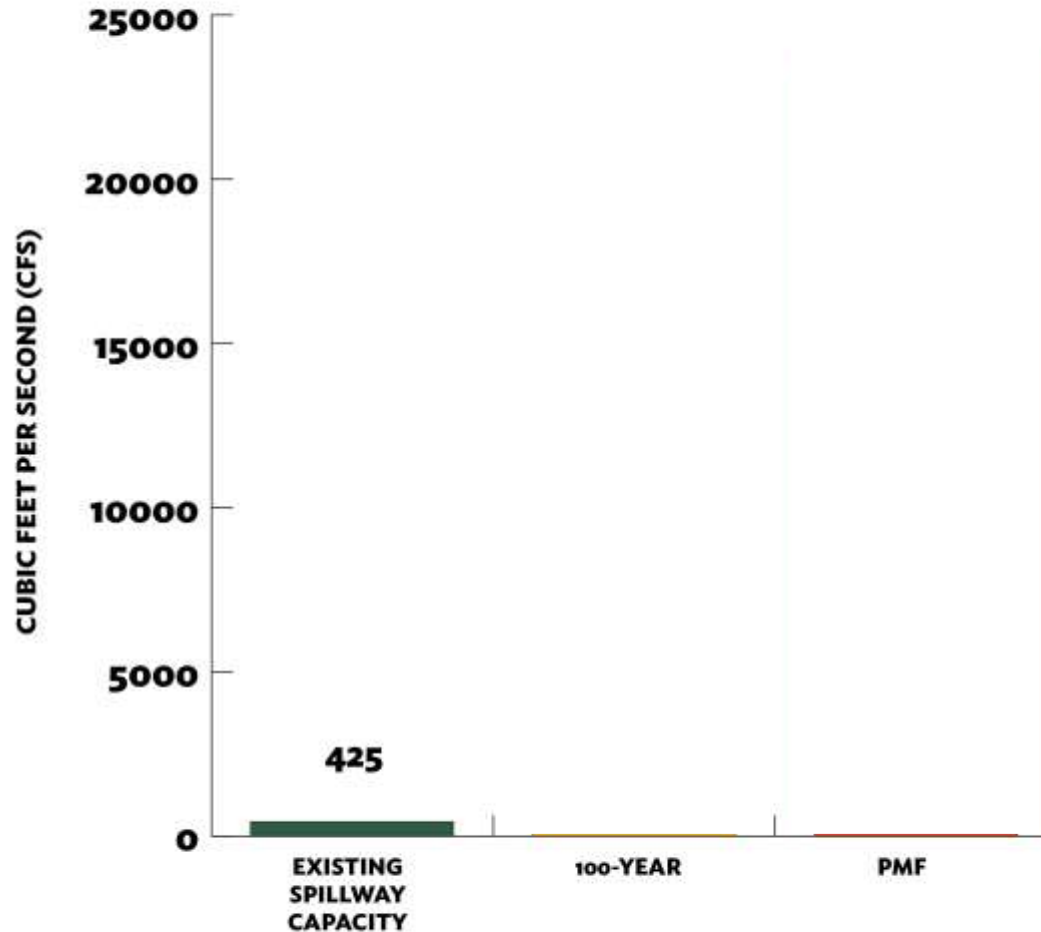
Maximum Inflow Compared to Existing Spillway Capacity



Existing spillway capacity from ODNR Dam Safety Inspection Report.

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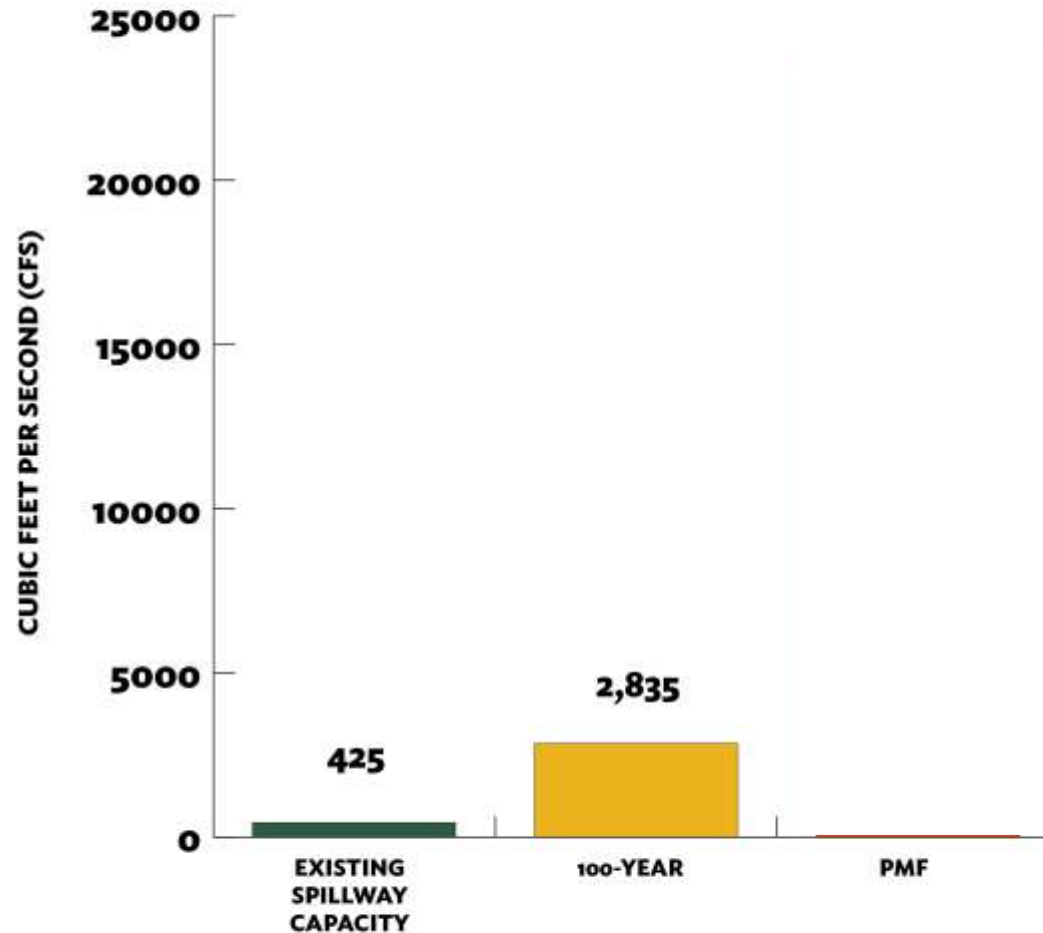
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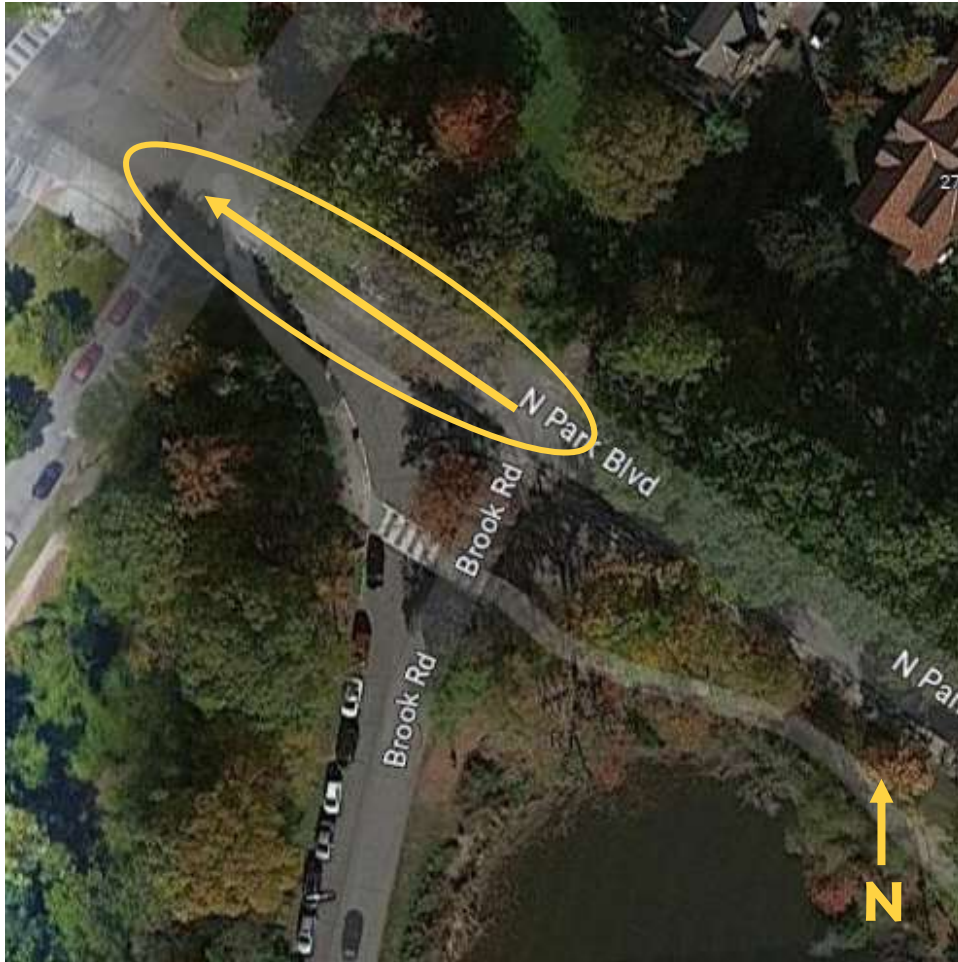
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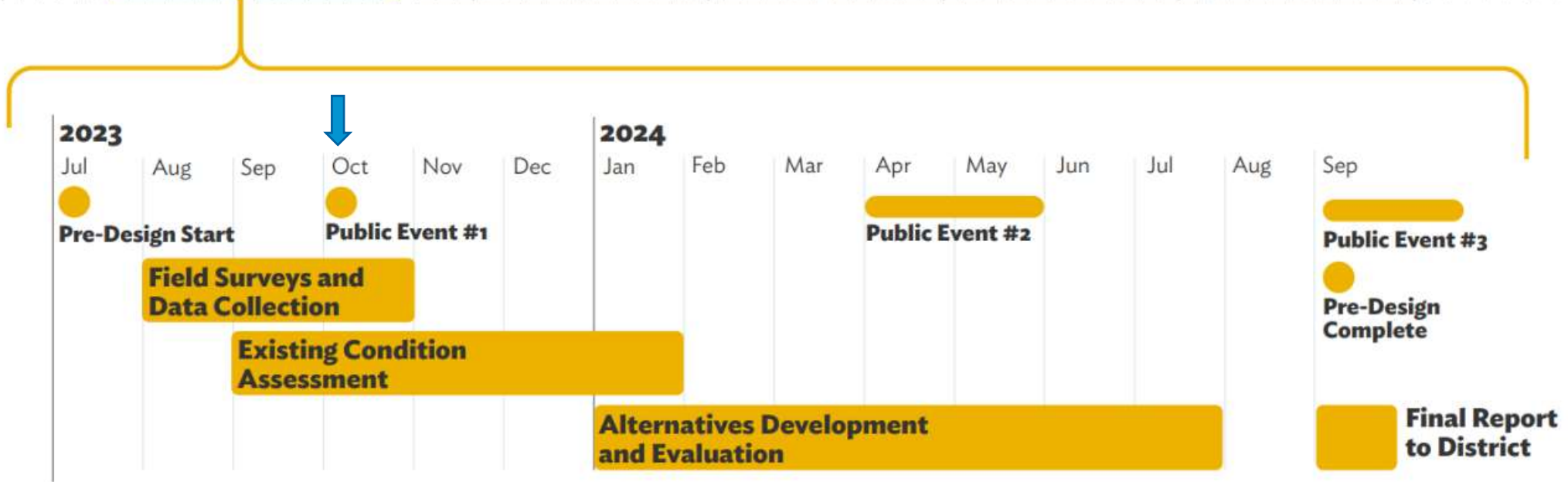
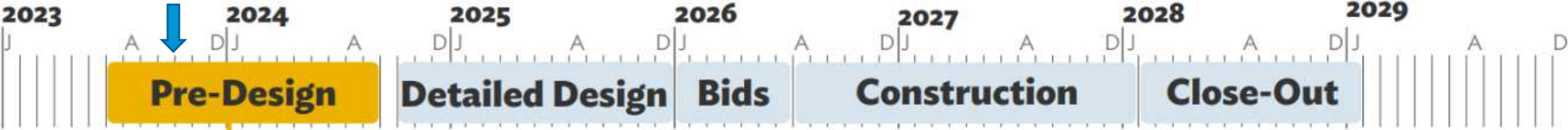
North Park Overtops July 17, 2021



Schedule

Pre-Design Phase

Timeline



Activity to Date

Pre-Design Field Surveys and Inspections

- Topographic survey
- Structural inspection
- Geotechnical exploration
- Tree survey
- Fish relocation
- Sediment sampling



Fish Relocation

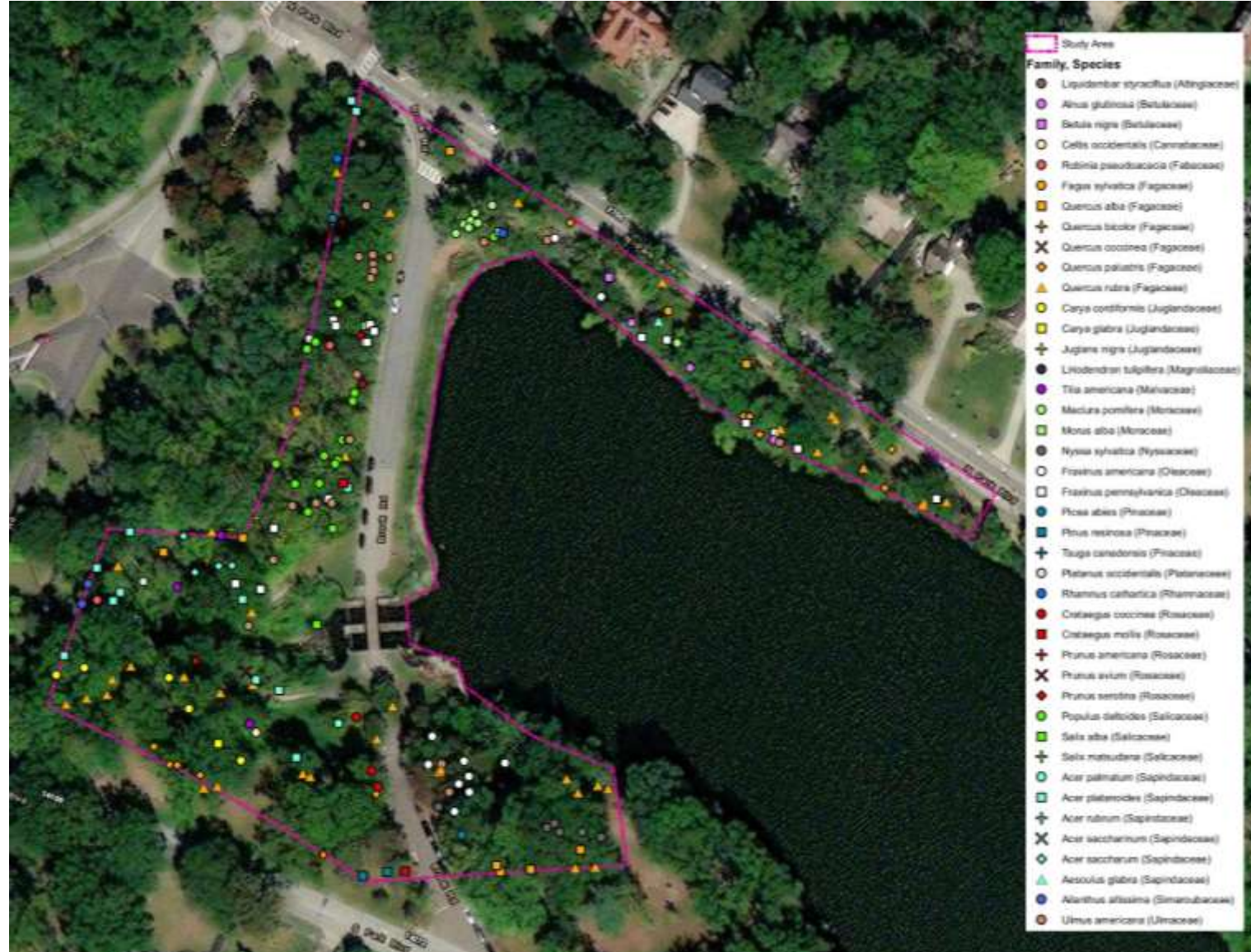


Geotechnical Explorations



Tree Inventory Survey

- Diameter (size)
- Species
- General Health
- Native or Invasive



Public Engagement

OCTOBER 7, 2023
LOWER SHAKER LAKE SPILLWAY

Public Engagement

- Doan Brook Watershed Partnership *Take to the Lake*
- Shaker Heights Historical Society *AppleFest*
- Nature Center at Shaker Lakes *AutumnFest*
- And more...

Public Engagement

- Lower Shaker Lake Spillway
 - Between North Park and South Park Boulevards,
near Brook Road
- Saturday, October 7, 10A-2P
- Rain location:
St. Paul's Episcopal Church, 2747 Fairmount Blvd.



Public Engagement

- Meet the team
- Ask questions
- Tell us about you
- Visit our partners:
 - Friends of Lower Lake, Doan Brook Watershed Partnership, Nature Center at Shaker Lakes



Learn More

NEORS.D.ORG/LOWERLAKE

Q&A

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