

City of Raleigh  
Engineering  
Services  
Department



## Stormwater Management

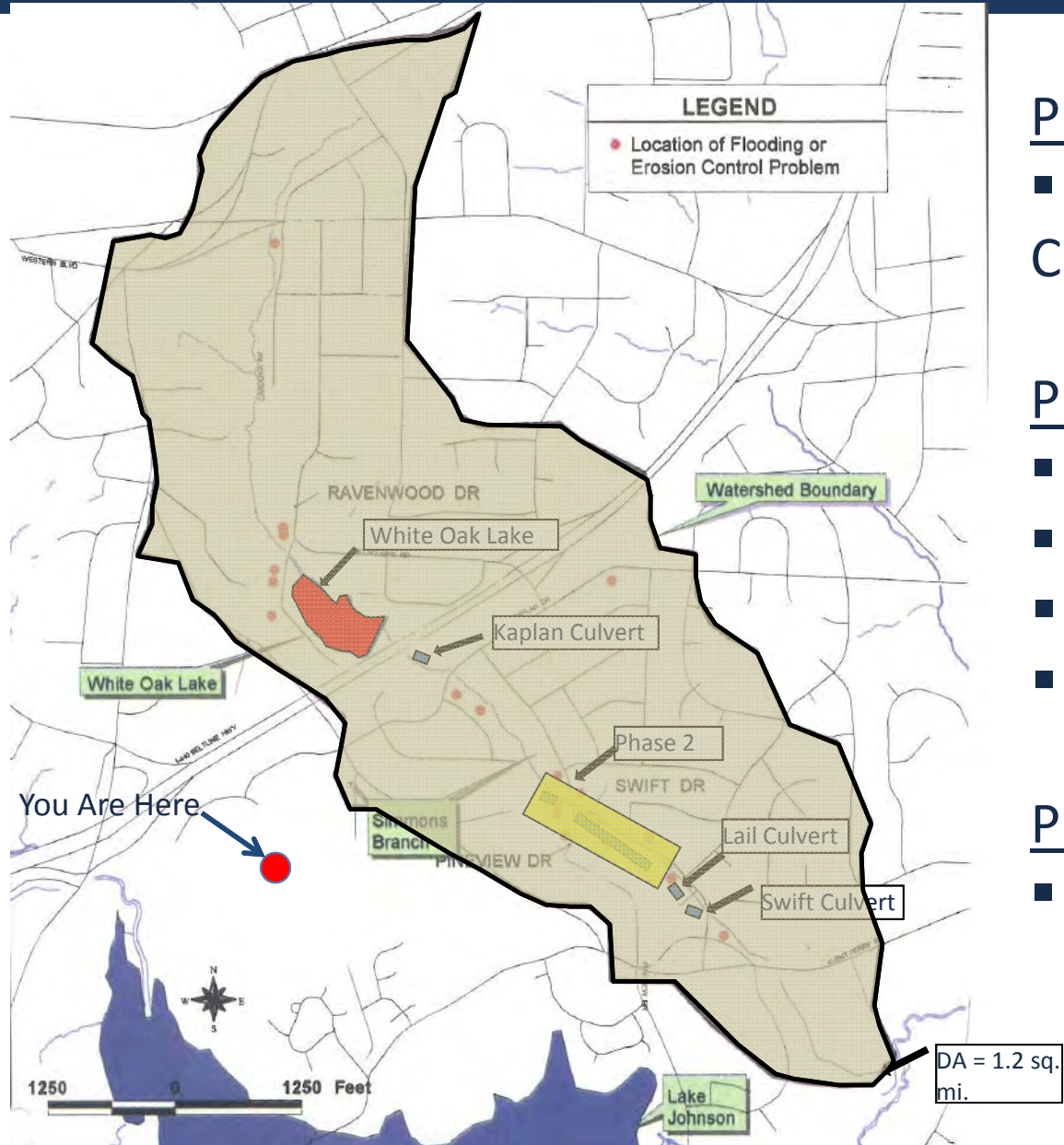


## White Oak Lake Reconstruction Project

October 18, 2017

Public Meeting  
At Thomas Woodland Center

# Phasing and Project Orientation



## Phase 1

- Lail, Kaplan, and Swift Culverts

## Phase 2

- Pineview Drive Culvert
- Swift Drive Culvert
- Driveway Bridge
- Bank Stabilization

## Phase 3

- White Oak Lake



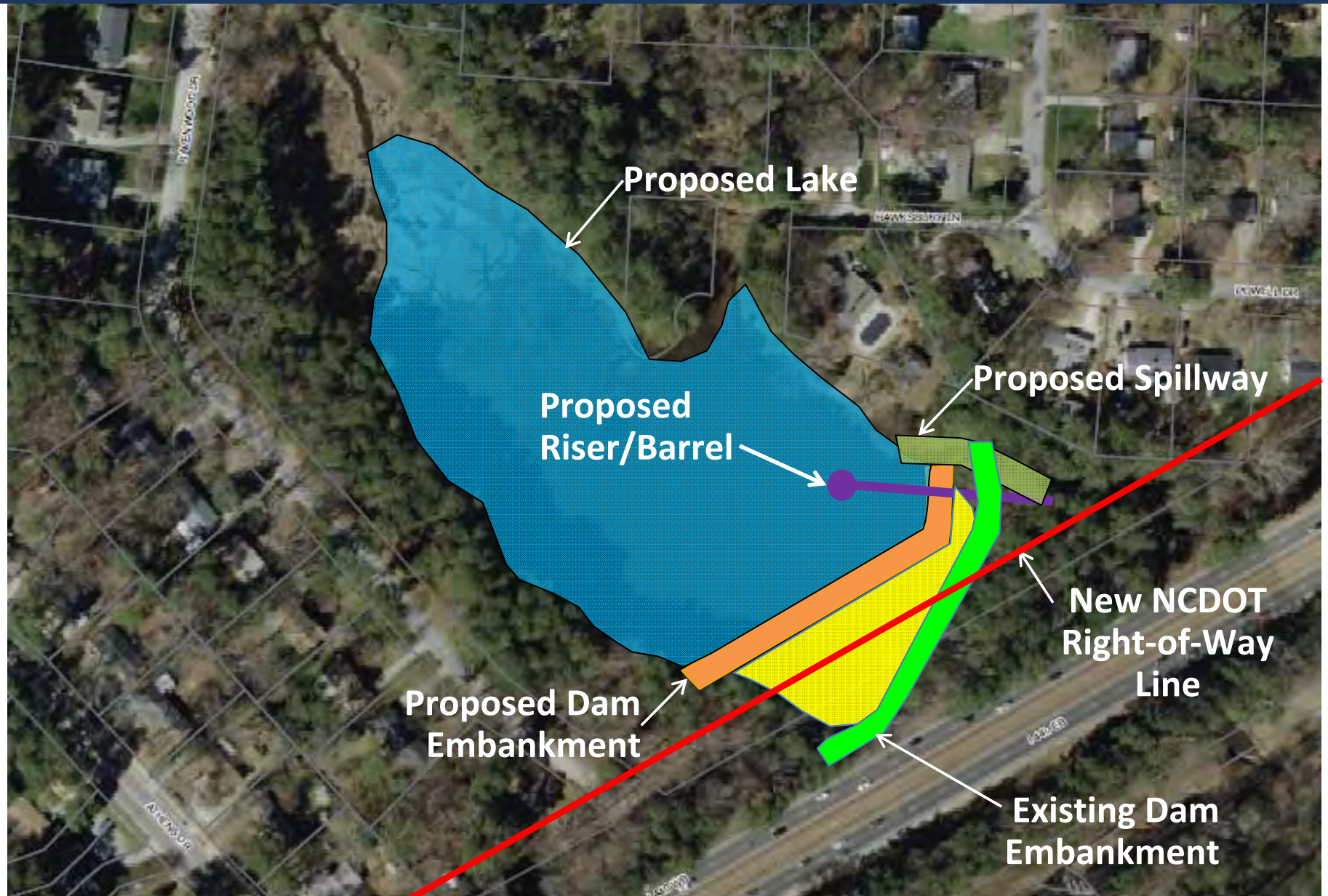
# Project Objectives



1. Improve public safety
2. Reconstruct failing or missing lake controls (embankment, riser, emergency spillway)
3. Move embankment out of future NCDOT I-440 widening project
4. Address future maintenance challenges
5. Reduce downstream flooding
  - Eliminate roadway flooding for a 10-year flood
  - Minimize flooding of homes and yards



# I-440 Right-of-Way Line

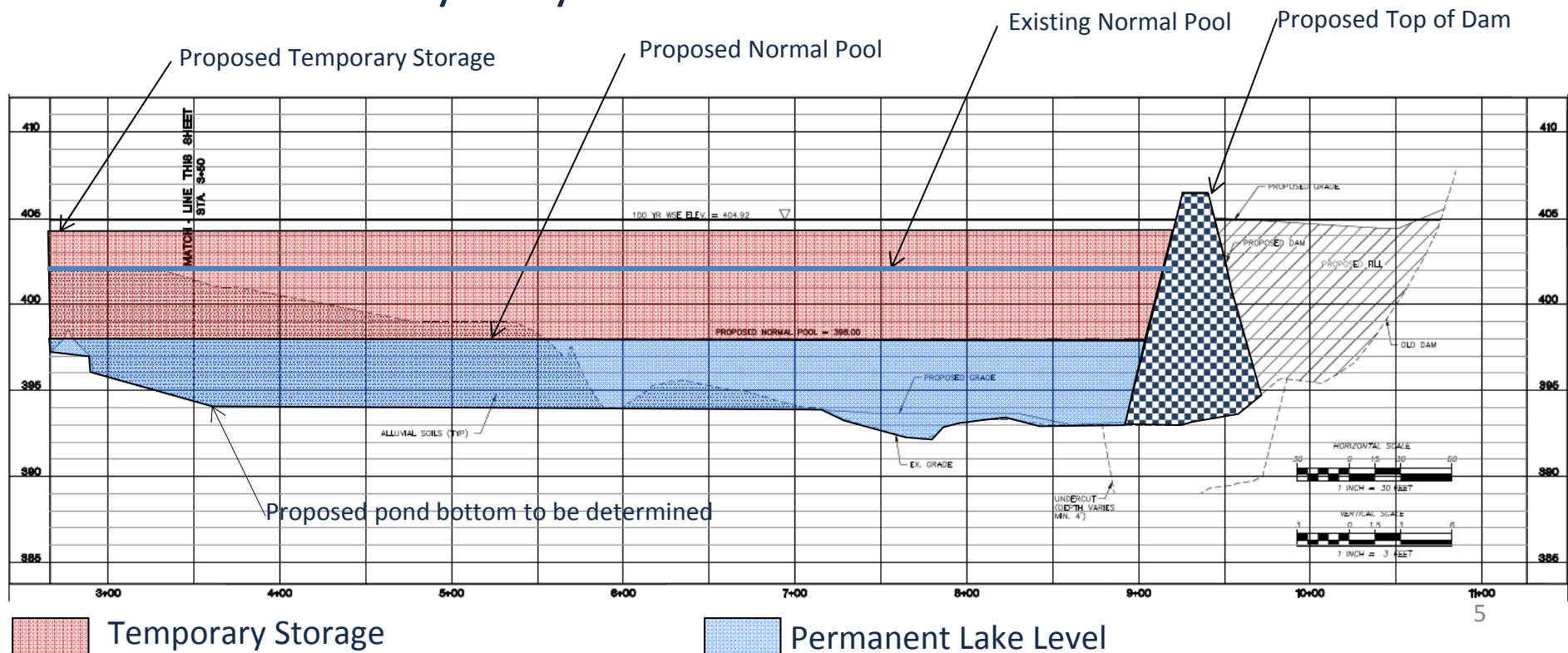




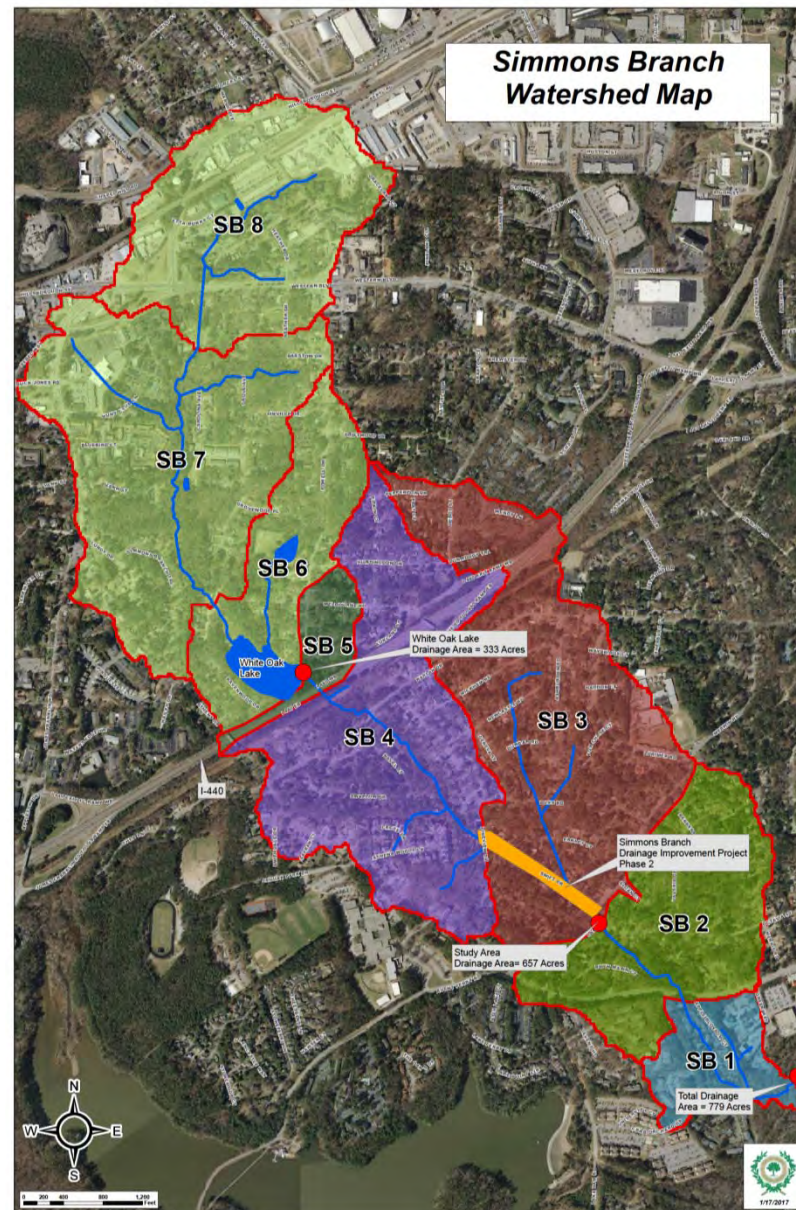
# Flood Reduction



- Lower normal pool from 401.8' to 397.0'
- Raise emergency spillway from 402' to 404.25'
- Install new riser with 96" dia. Barrel
- Take temporary storage from 0 cf. to more than 1,500,000 cf.
- Peak flow is delayed by almost one hour



# Flood Reduction





# Current Lake





# Failed Primary Spillway





# Failed Primary Spillway





# Failed Emergency Spillway





# Failed Emergency Spillway





# Tree Lined Dam Embankment





# Lake Filling in With Sediment



# Design Objectives



Maintain lake footprint (if possible)

Target a normal pool depth of 3.0 ‘

Reduce downstream flows

Convey 500-yr flood with 1.0’ of  
freeboard on top of dam

No flooding of FFE in 500-yr flood

No garage flooding in the 100-yr  
flood





# Stormwater Modeling



NRCS 24-Hour Type II synthetic  
rainfall event

Soils

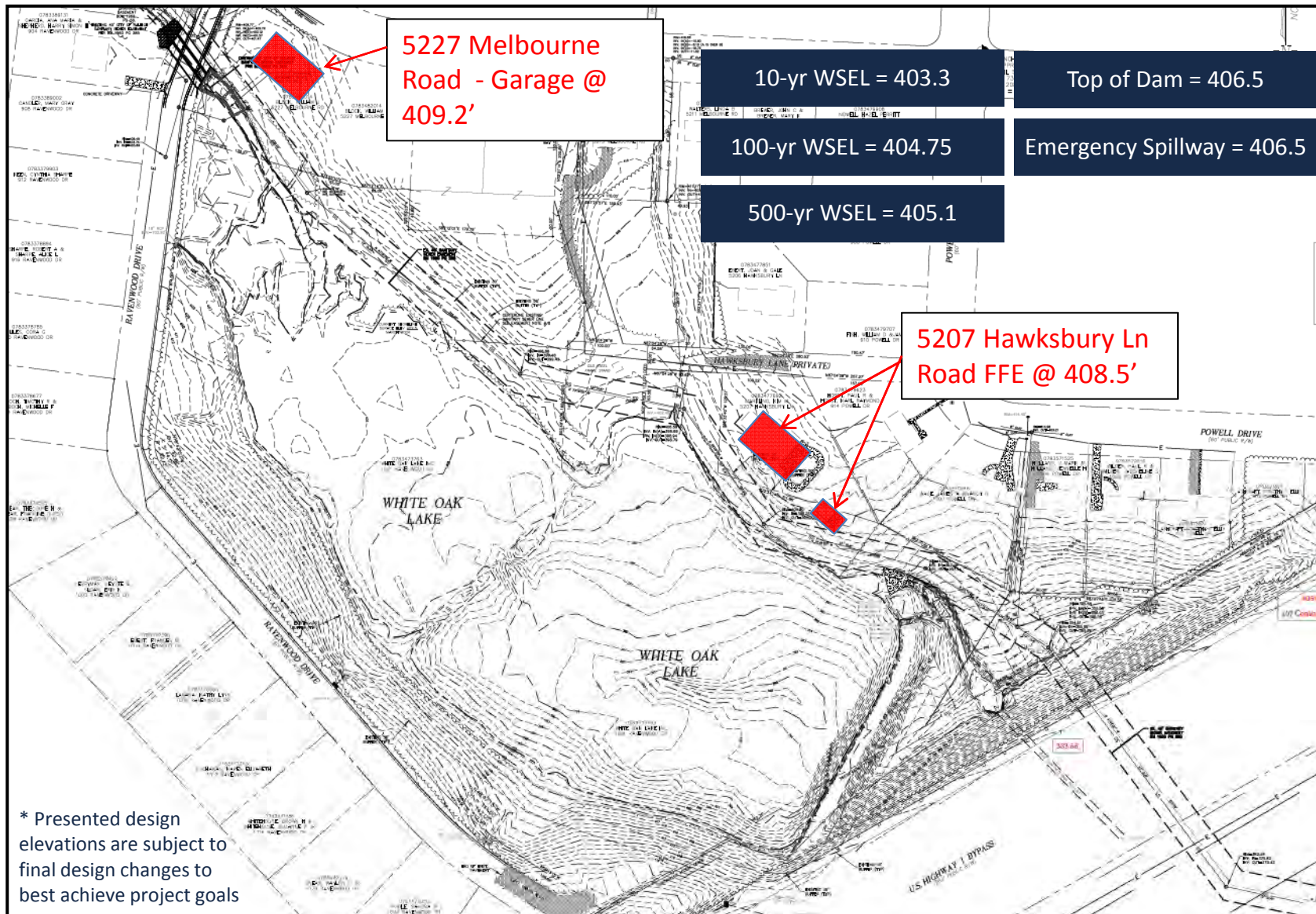
Land

Slope of the land

Drainage area



# Summary of Proposed WSELs





# Summary of Flows Changes



## Existing Conditions

10-Yr = 553 cfs

100-Yr = 1112 cfs

500-Yr = 1317 cfs

## Proposed Conditions

10-Yr = 305 cfs

100-Yr = 749 cfs

500-Yr = 882 cfs

\* Presented design flows are subject to final design changes to best achieve project goals

# Proposed Riser/Barrel

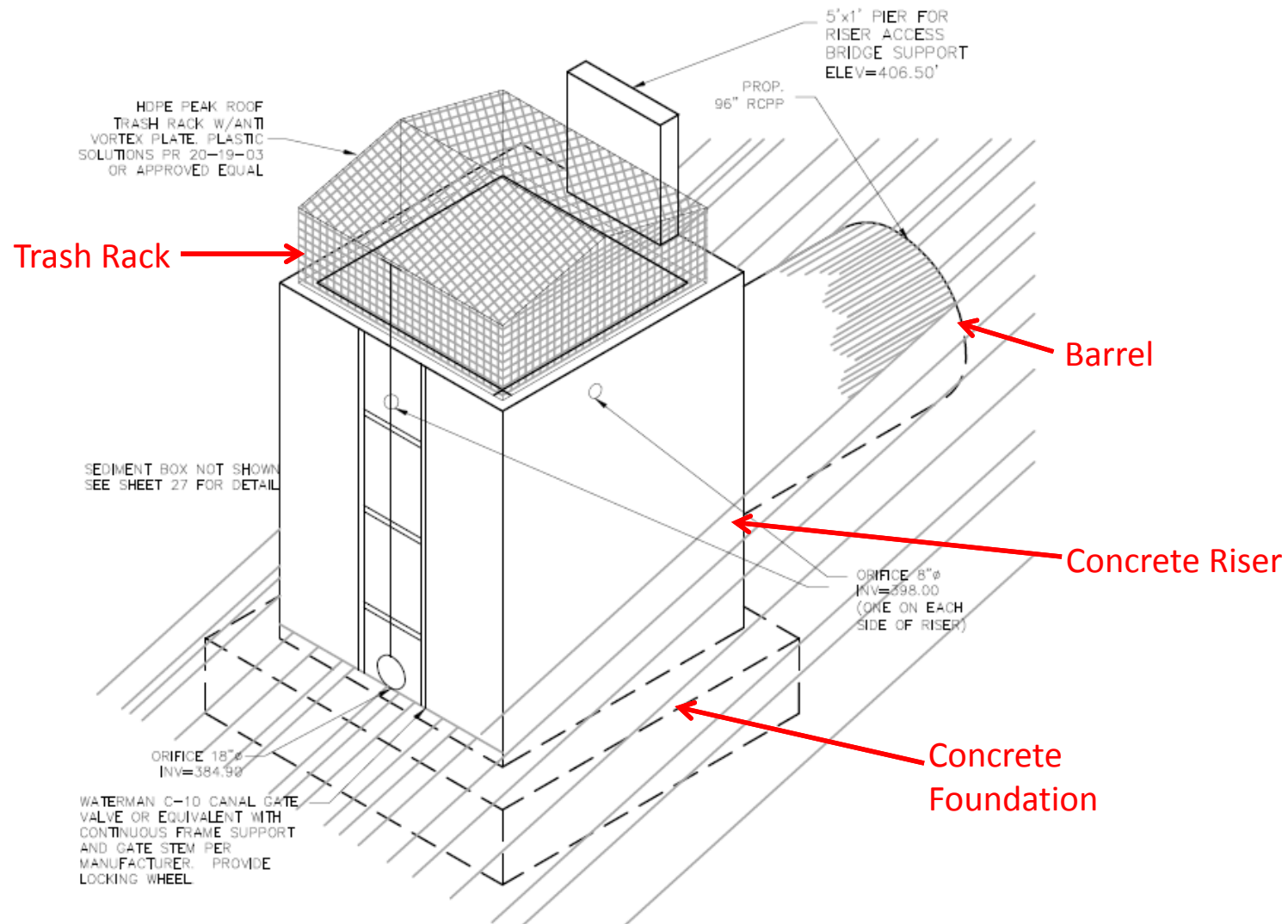


- 10'x10' concrete riser (vault)
- 96" dia. barrel (110 LF)
- Steel trash rack
- Anti-vortex plate



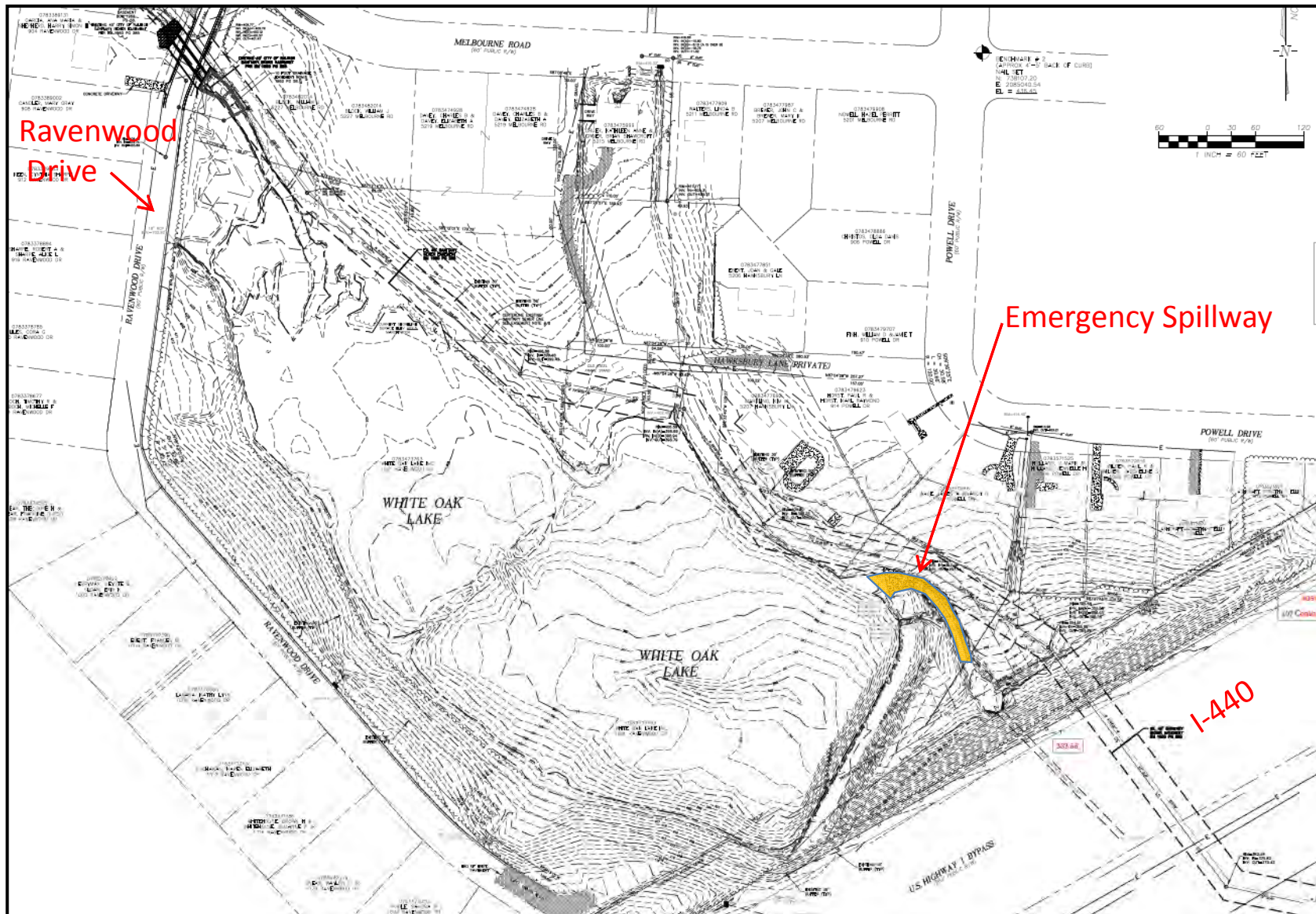


# Proposed Riser/Barrel





# Proposed Emergency Spillway

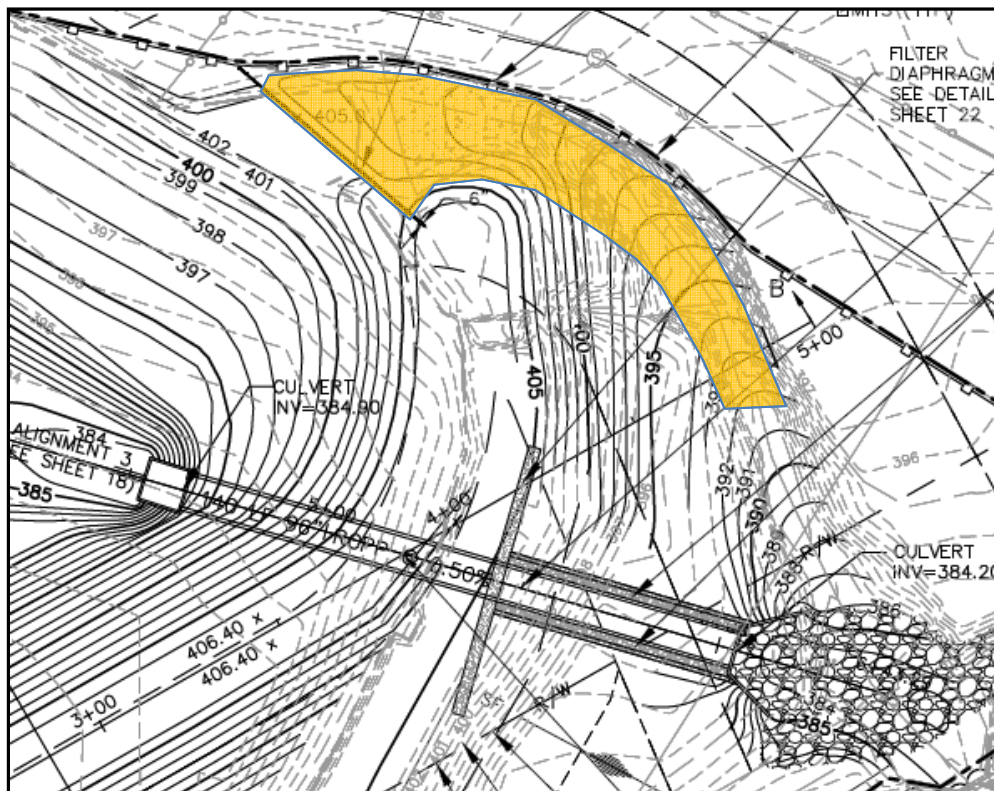




# Proposed Emergency Spillway



- 35' wide concrete lined spillway
- Crest elevation = 404.25' NAVD '88
- Top of dam elevation is 406.5' NAVD '88



\* Presented design elevations are subject to final design changes to best achieve project goals

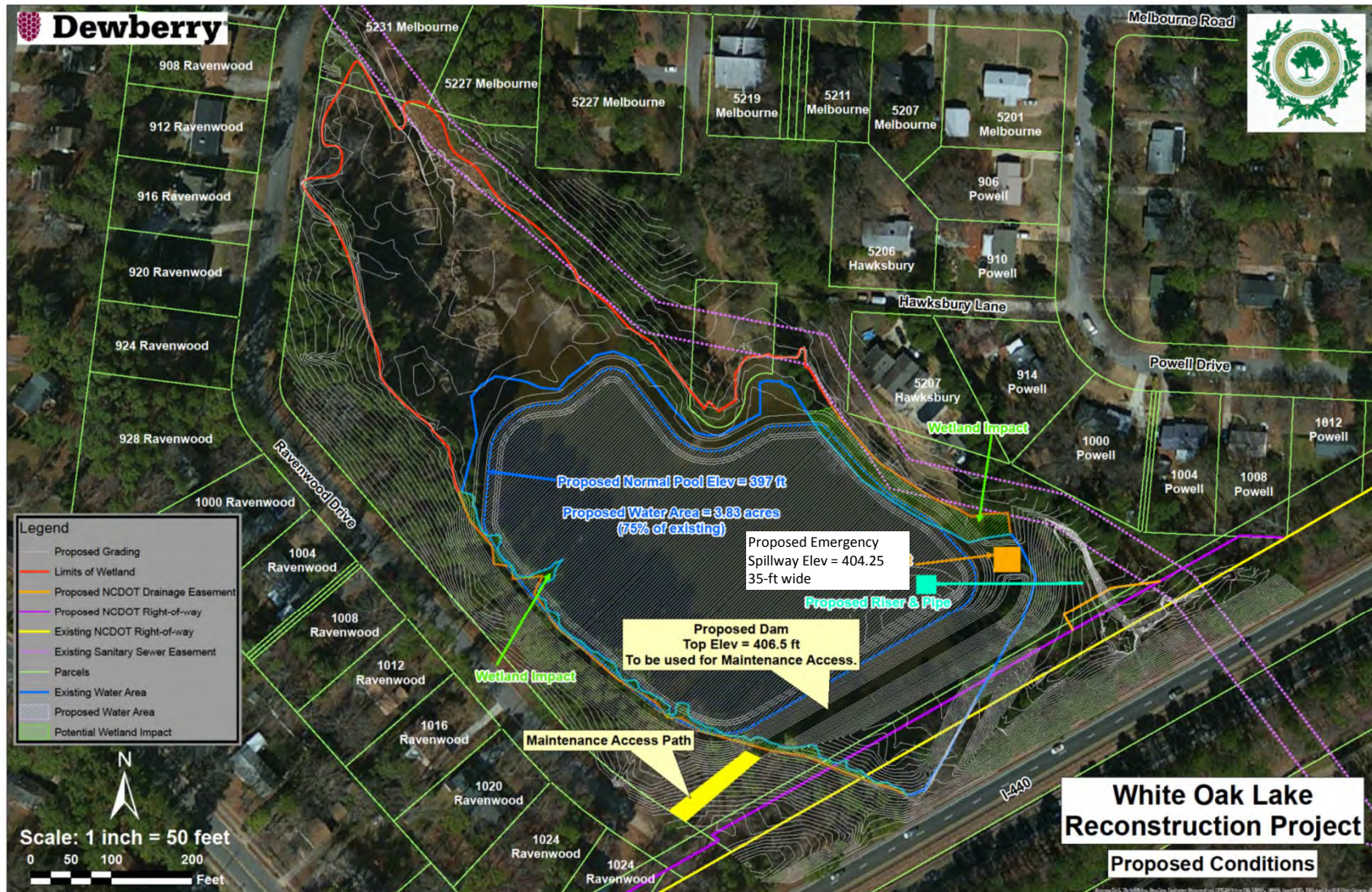


# Existing Conditions Mapping





# Proposed Conditions Mapping





# Dam Classification



Size = Small (total storage of 68 acre feet and height = 17 feet)

Hazard Classification = High



Regulated by NC Dam Safety



Emergency Operation Plan

Submittal for Dam Safety Permit

# Permitting



- **NC Dam Safety**
- **US Army Corps:**
  - < ½ wetland impacts (PCN submittal – Nationwide Permit)
  - Lowering lake level (working through)
- **NCDENR Erosion Control Permit**



# Project Schedule – White Oak Lake



October 2017: 25% design complete

October 2017: Public meeting

October - January 2018: Private utility relocation,  
obtain permits, easement acquisition; finalized  
construction plan

February - April 2018: Project bid

May – June 2018: Project award

July – August: Project construction begins

May 2019: Project completed

# Questions?



[GraniteGrok.com](http://GraniteGrok.com)



# City Website and Project Updates



## **City of Raleigh Stormwater Management Division**

Raleighnc.gov (Search "White Oak Lake")

RaleighStormwater@raleighnc.gov

919-996-4074