

U.S. Department of the Interior
National Park Service

Environmental Assessment & Section 106 for the

Lincoln Memorial Reflecting Pool Rehabilitation

Consulting Parties Meeting #4



THE Louis Berger Group, INC.

S A S A K I



Agenda

2:00 – 2:40

Update on Site Design Options

- Pedestrian Circulation and Security Option
- Walkway Materials
- Site Furnishings
- Lighting Fixtures

2:40 – 3:00

Water System Option

- Physical Parameters
- Associated Structures

3:00 – 3:15

Memorandum of Agreement

3:15 – 4:00

Comments from Consulting Parties



Proposed Actions

CIRCULATION, ACCESSIBILITY, SECURITY



Proposed Actions

CIRCULATION, ACCESSIBILITY, SECURITY

- 
- A wide-angle photograph of the Lincoln Memorial in Washington, D.C. The white neoclassical building with its iconic columns is the central focus, situated on a large, tiered stone staircase. In the foreground, a calm reflecting pool is bordered by a light-colored path. The surrounding area is lush with green grass and mature trees. Several people are seen walking on the paths and stairs, providing a sense of scale to the monument.
- New Accessible Paths with walls and bollards
 - New and Resurfaced Walkways
 - Elm Walks
 - Water System



Revised Option

CIRCULATION, ACCESSIBILITY, SECURITY

EA Option A3

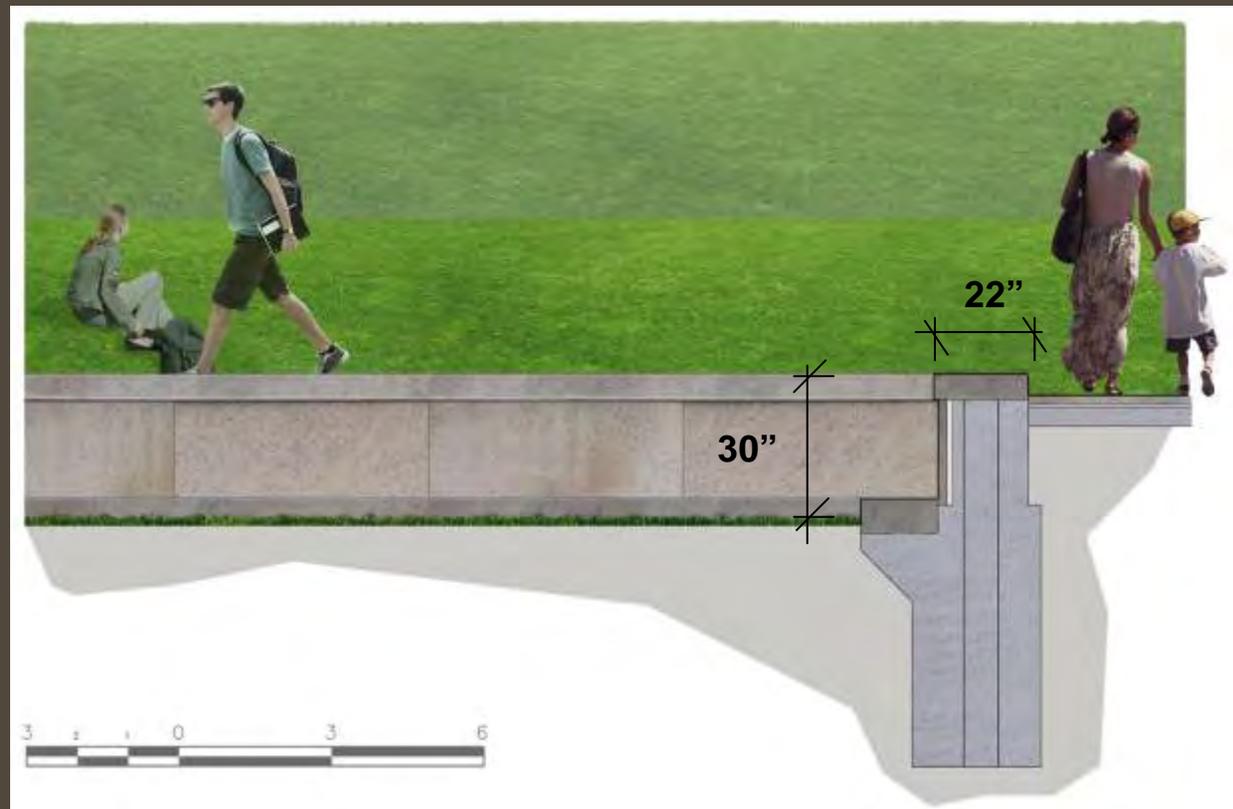


PARAMETERS

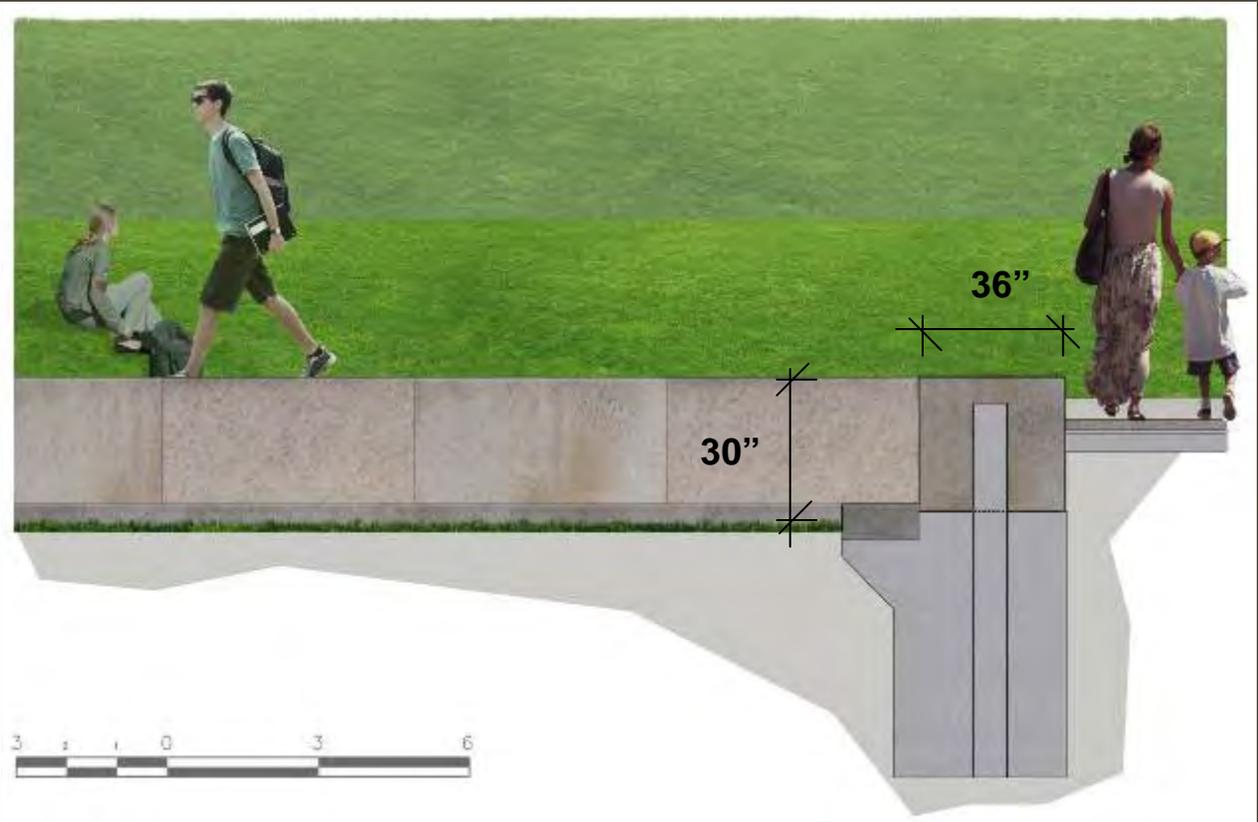
- Accessible curved paths
- Walkways flank Reflecting Pool
- Combination of bollards and walls provide perimeter security
- Regrading reduces visible heights of walls
- Bollards adjacent to pool are aligned east to west



Security Walls CAP AND CURB



Security Walls CURB, NO CAP



Security Walls VIEW AT HA HA



Curved Paths

WALLS AND BOLLARDS



Curved Paths WALLS



Curved Paths WALLS



Curved Paths

WALLS AND BOLLARDS



Revised Option

WALL AND BOLLARDS



Proposed Actions

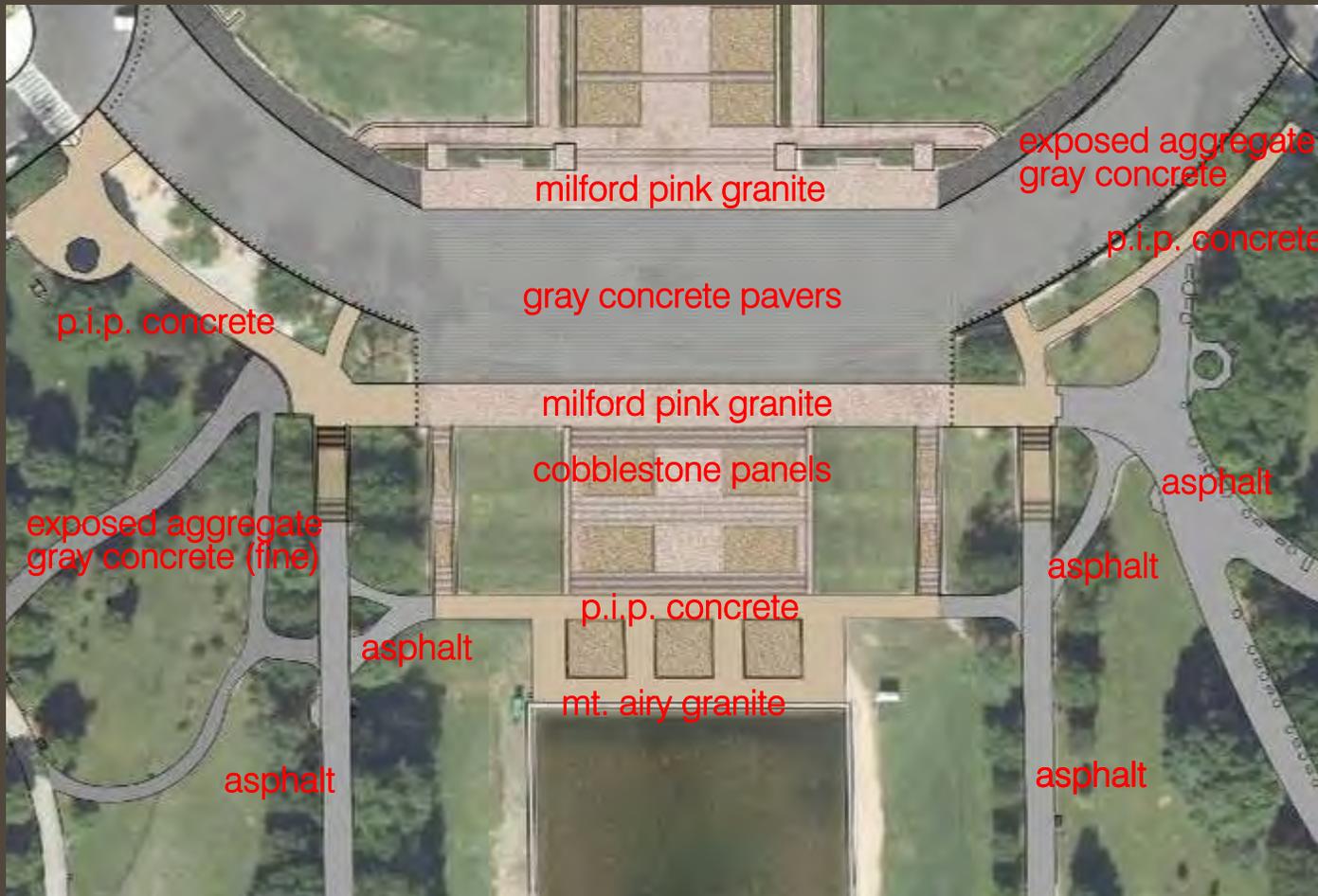
CIRCULATION, ACCESSIBILITY, SECURITY



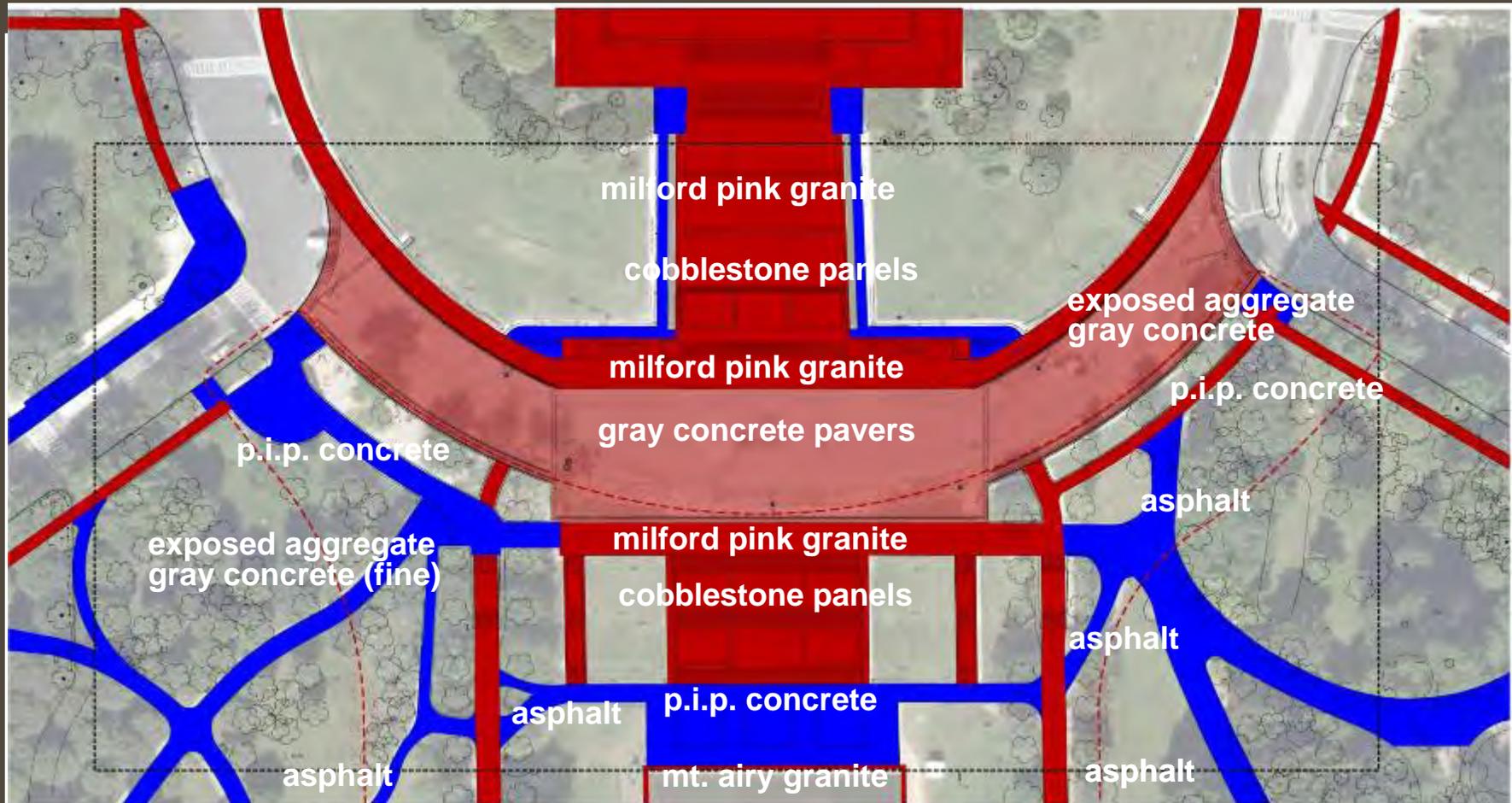
- New Accessible Paths with walls and bollards
- New and Resurfaced Walkways
 - Elm Walks
 - Water System



Site Materials EXISTING PALETTE



Site Materials HISTORIC SIGNIFICANCE



Historical Significance - Cultural Landscape Report (1999)
Contributing Features

HARDSCAPE FEATURES OF NON-HISTORIC SIGNIFICANCE (POST 1933): ■
 HARDSCAPE FEATURES FROM THE PERIOD OF HISTORICAL SIGNIFICANCE (1914-1933): ■
 PEDESTRIAN PLAZA OF HISTORICAL SIGNIFICANCE (RENOVATED IN 2008): ■



Site Materials LOWER APPROACHWAY



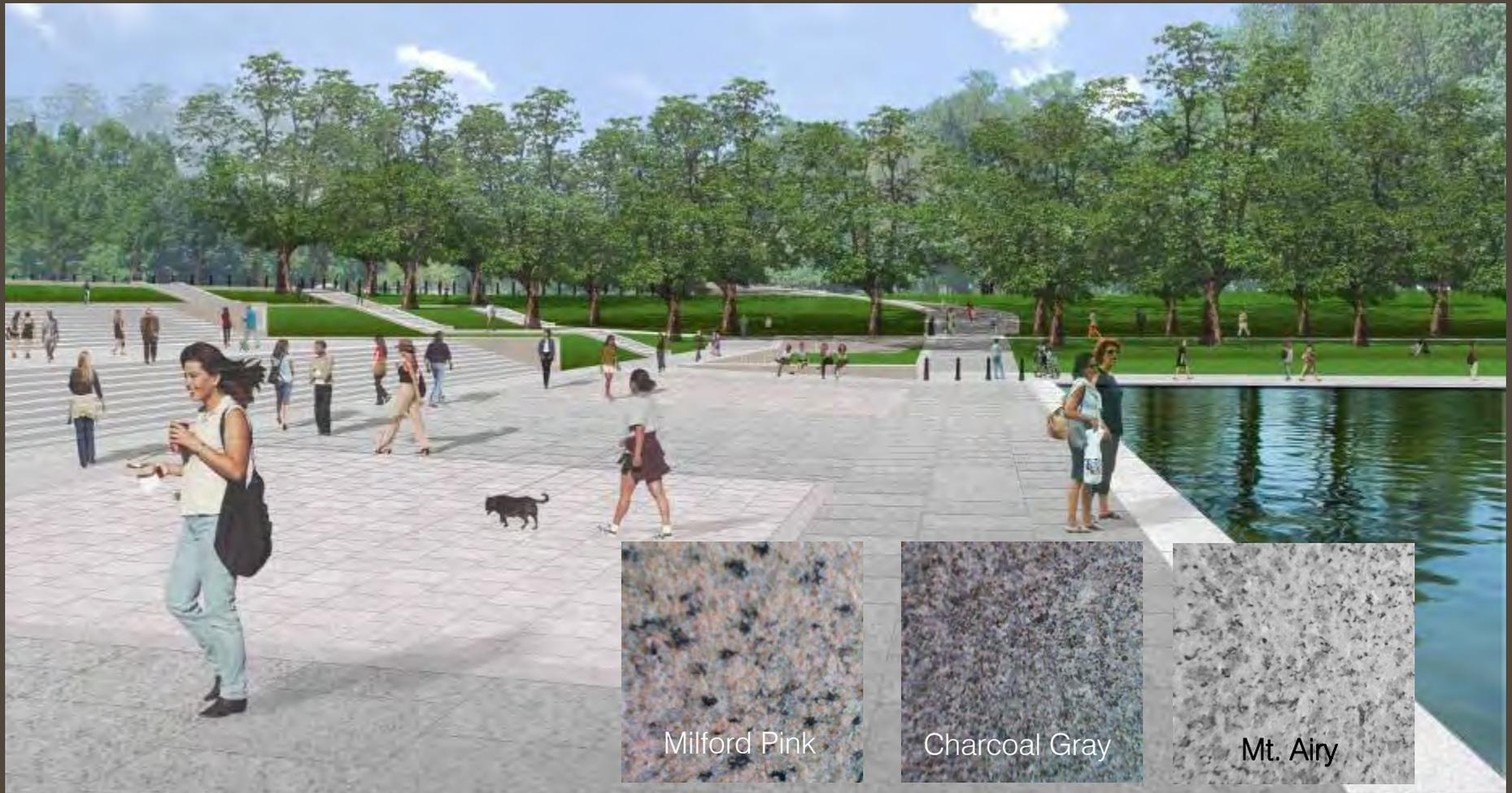
Charcoal Gray



Mt. Airy



Site Materials LOWER APPROACHWAY



Milford Pink



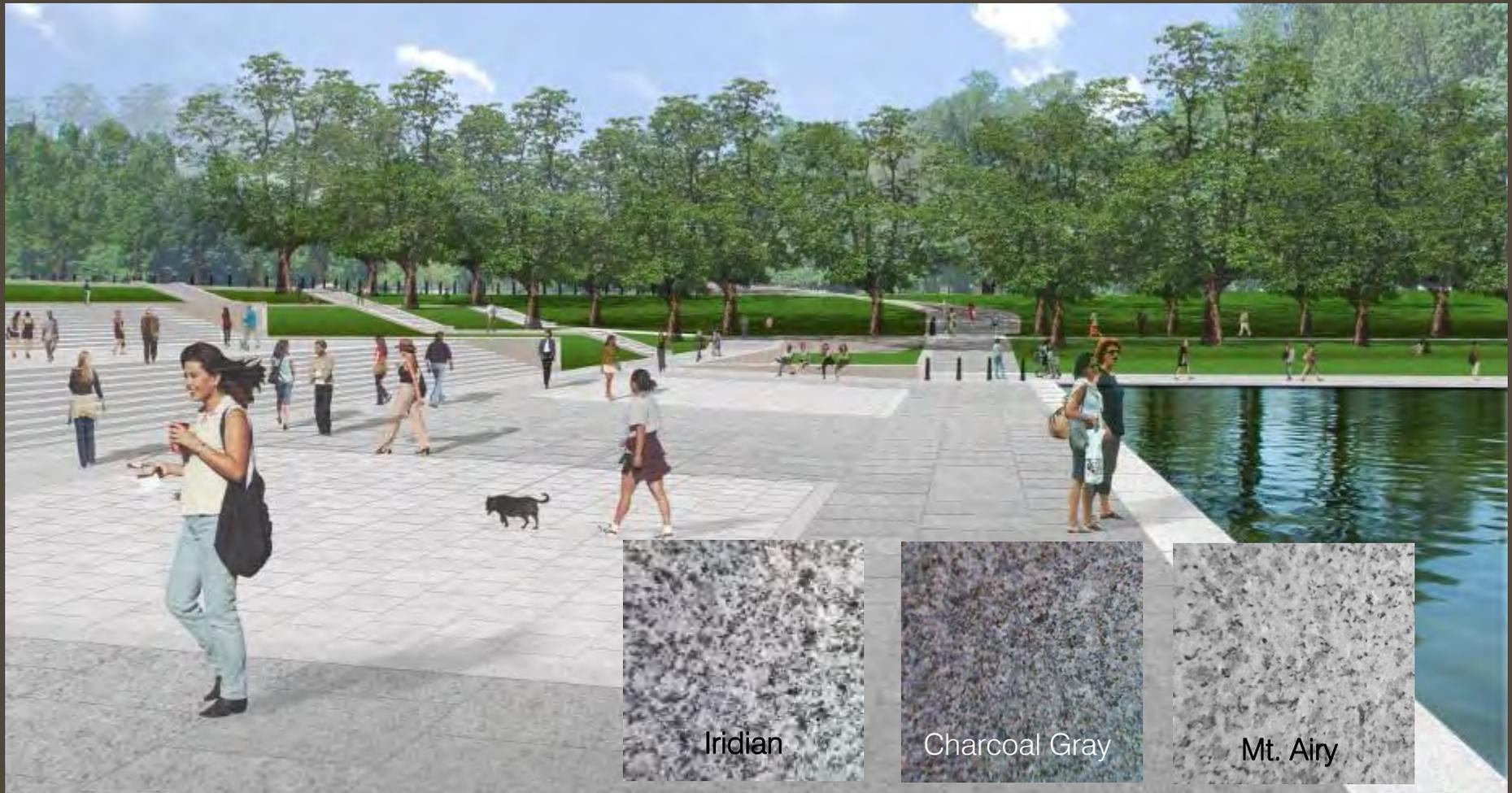
Charcoal Gray



Mt. Airy



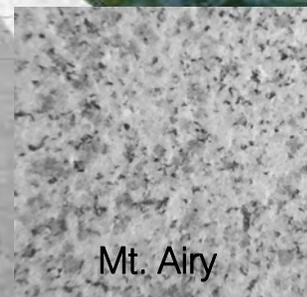
Site Materials LOWER APPROACHWAY



Iridian



Charcoal Gray



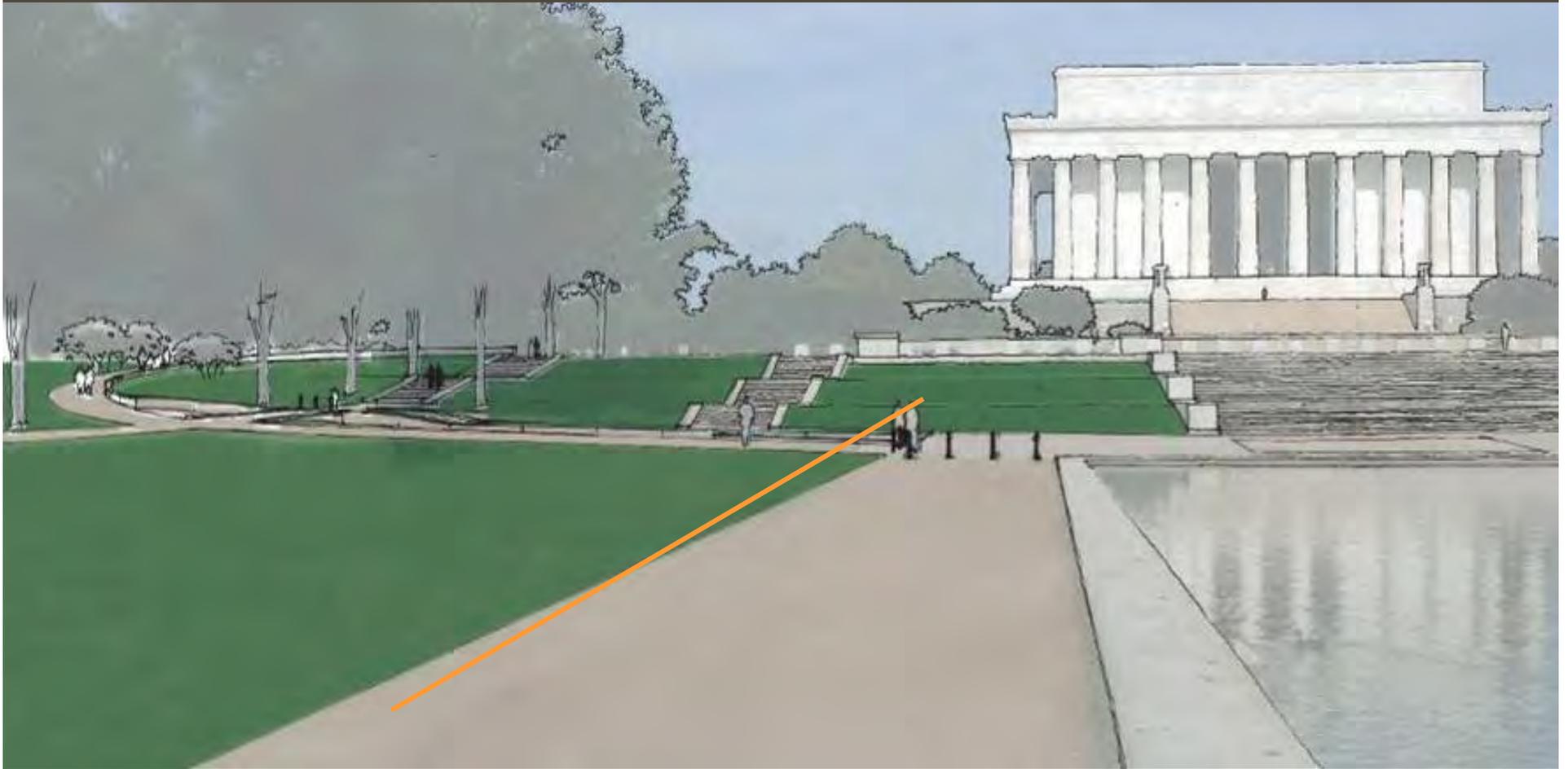
Mt. Airy



Site Materials LOWER APPROACHWAY



New Walkways



New Walkways



Stone dust



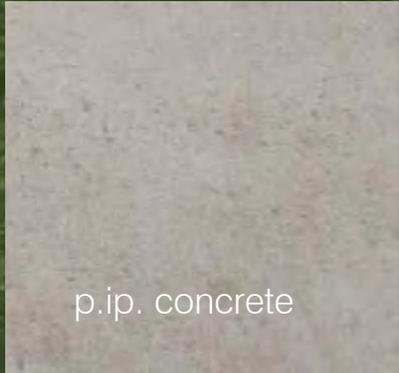
New Walkways



Gray exposed aggregate (fine)



New Walkways



p.ip. concrete



Site Materials

EXISTING MATERIALS



EXISTING CONDITIONS

- Asphalt Elm Walks
- Poured in place (PIP) concrete at WWII
- Worn Dirt Paths



Site Materials

EXISTING MATERIALS



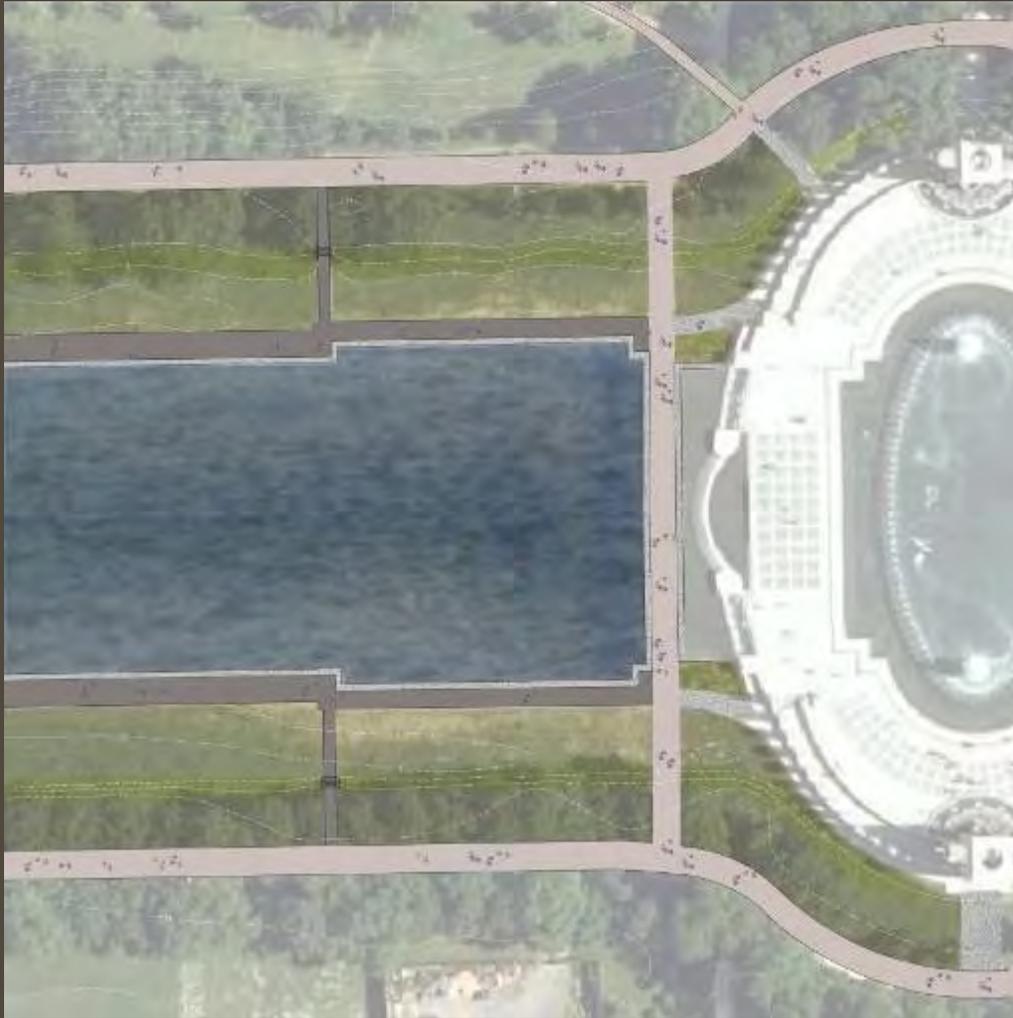
OPTION

- Gray exposed aggregate (fine)
- Continue PIP from WWII along elm walks



Site Materials

EXISTING MATERIALS



OPTION

- Replace PIP concrete around east end of pool with gray exposed aggregate (fine)



Site Materials

EXISTING MATERIALS



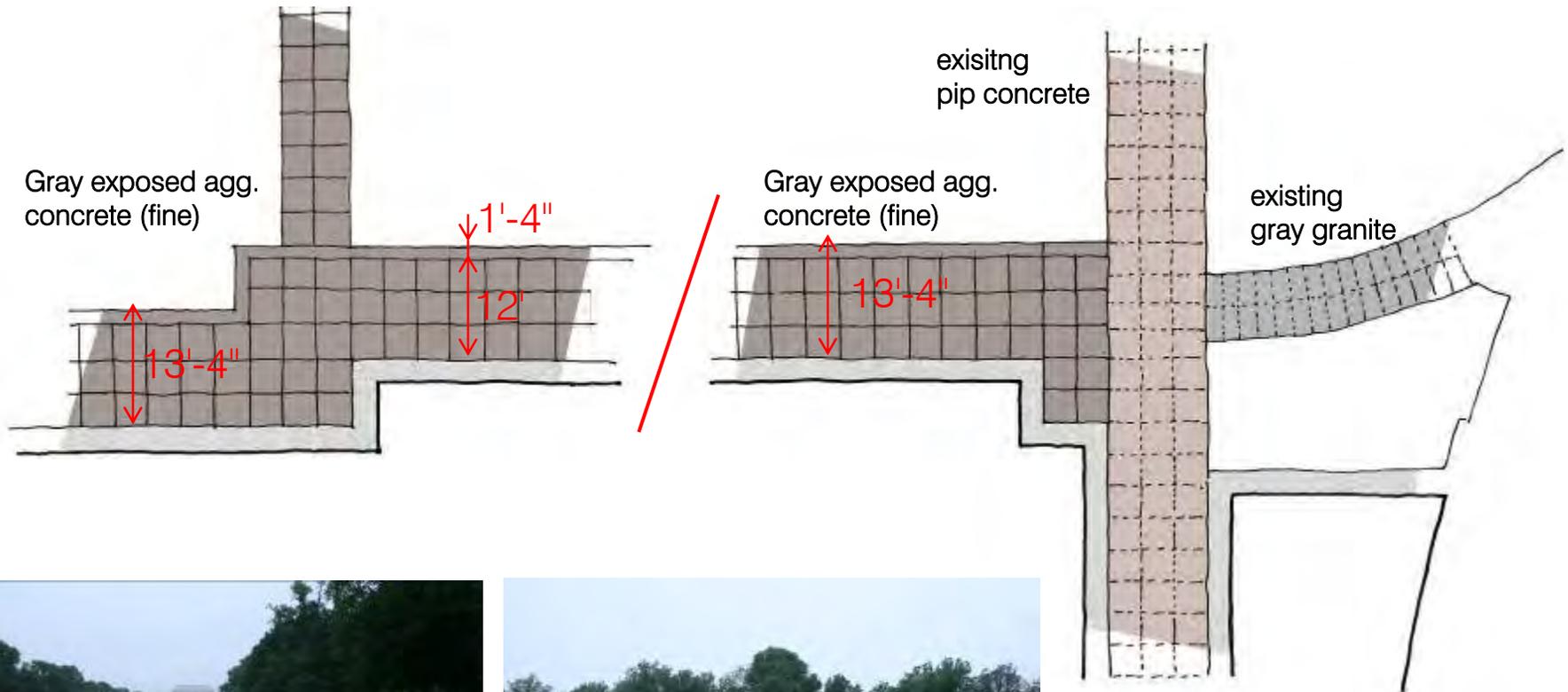
OPTION

- Elm walks and new walkways PIP concrete



Pool Walks

DETAIL PLAN



Proposed Actions

CIRCULATION, ACCESSIBILITY, SECURITY

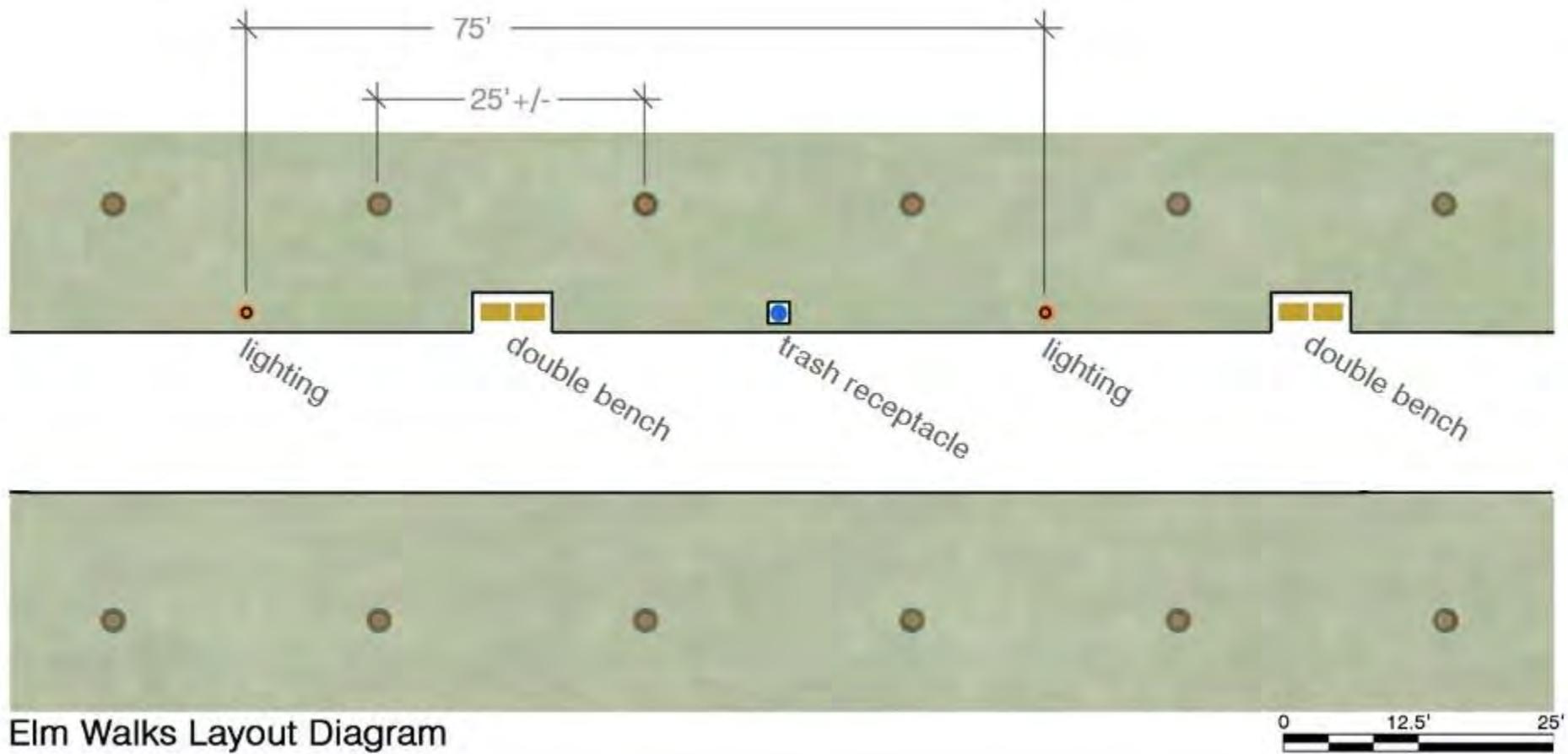


Elm Walks

SITE FURNISHINGS



Elm Walks SITE FURNISHINGS



Elm Walks Layout Diagram



Elm Walks

EXISTING CONDITIONS



Elm Walks ASPHALT W/ SITE FURNISHINGS



Elm Walks

ASPHALT W/ GRANITE EDGE



Elm Walks

ASPHALT W/ STONE DUST RUNNING PATH



Elm Walks

ASPHALT W/ POST AND CHAIN



Elm Walks CONCRETE



Elm Walks

LED LIGHT FIXTURE – LUMEC 1



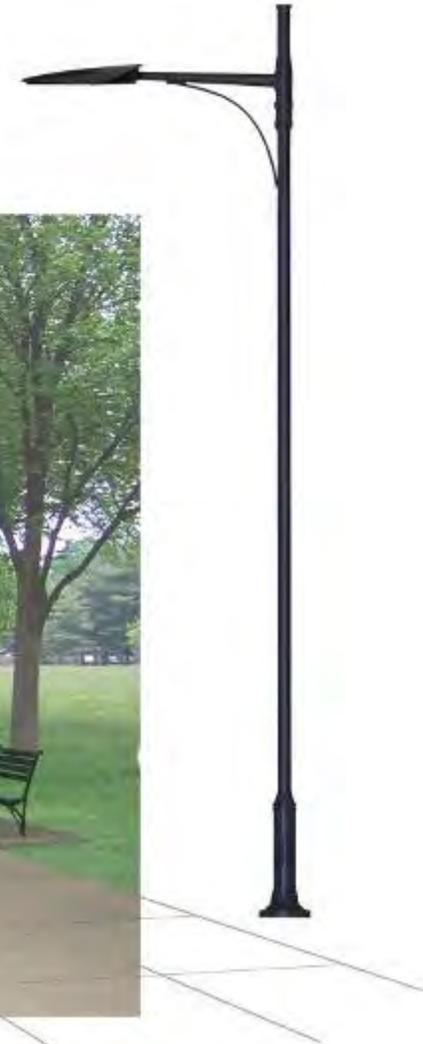
Elm Walks

LED LIGHT FIXTURE – LUMEC 2



Elm Walks

LED LIGHT FIXTURE – PHILIPS 1

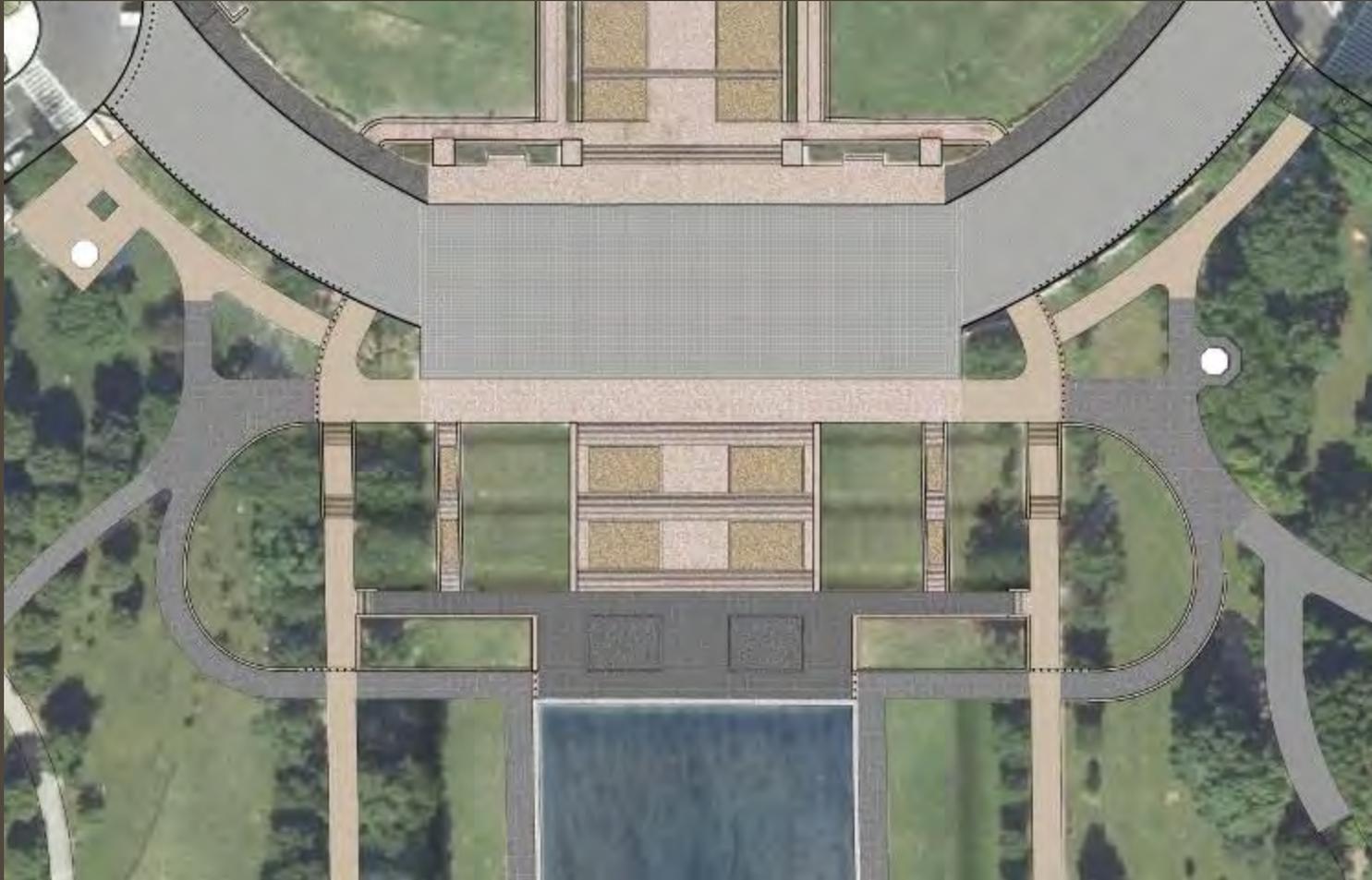


Elm Walks

NON DARK SKY COMPLIANT – LUMEC 3



Materials SUMMARY OPTION 1



Option 1

Enlargement

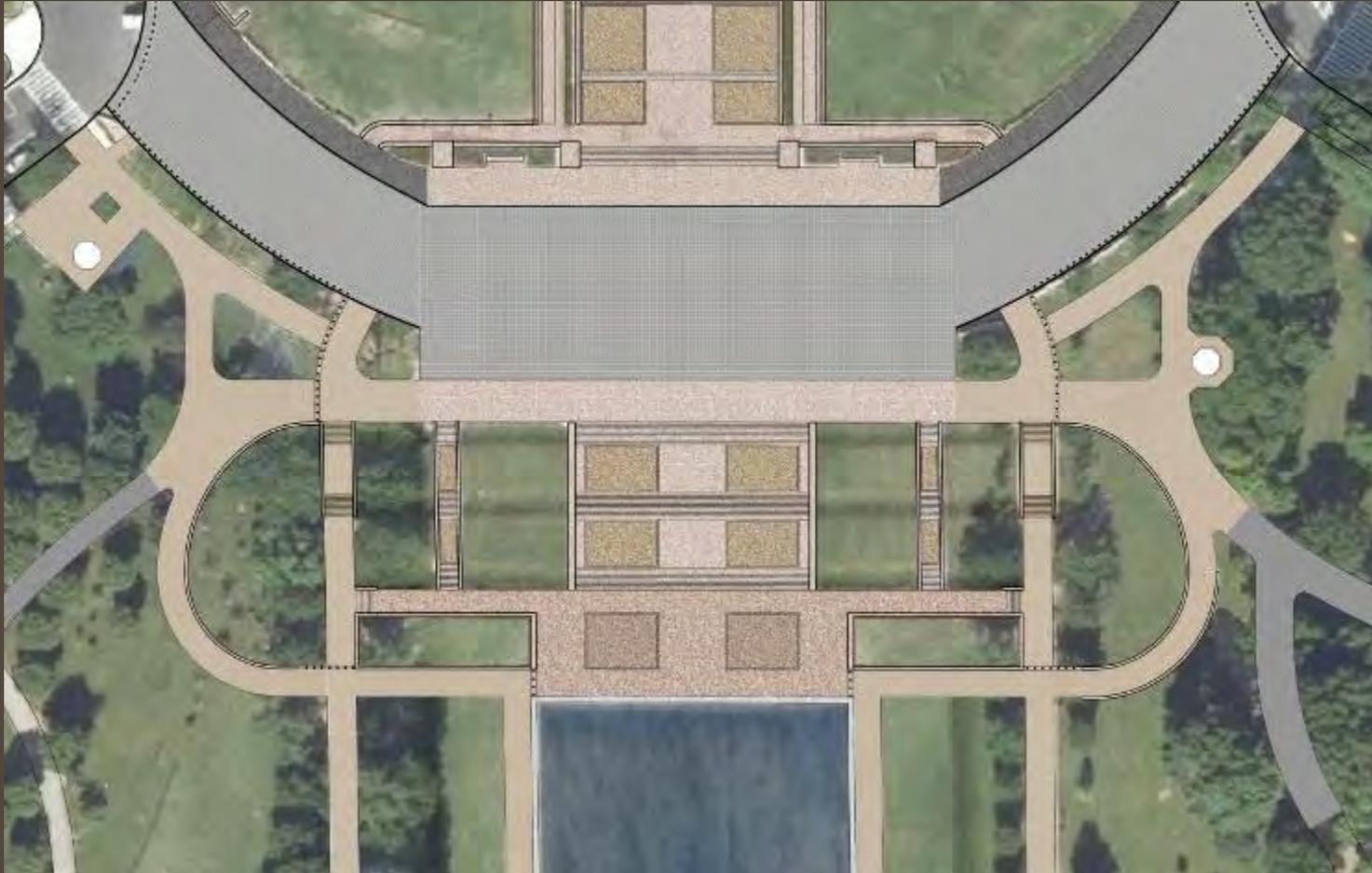
West R. Pool Plaza:
Gray granite

Pool Walks:
Dark Gray Exposed
Agg.

Elm Walks:
PIP Concrete
w/historic scoring



Materials SUMMARY OPTION 2

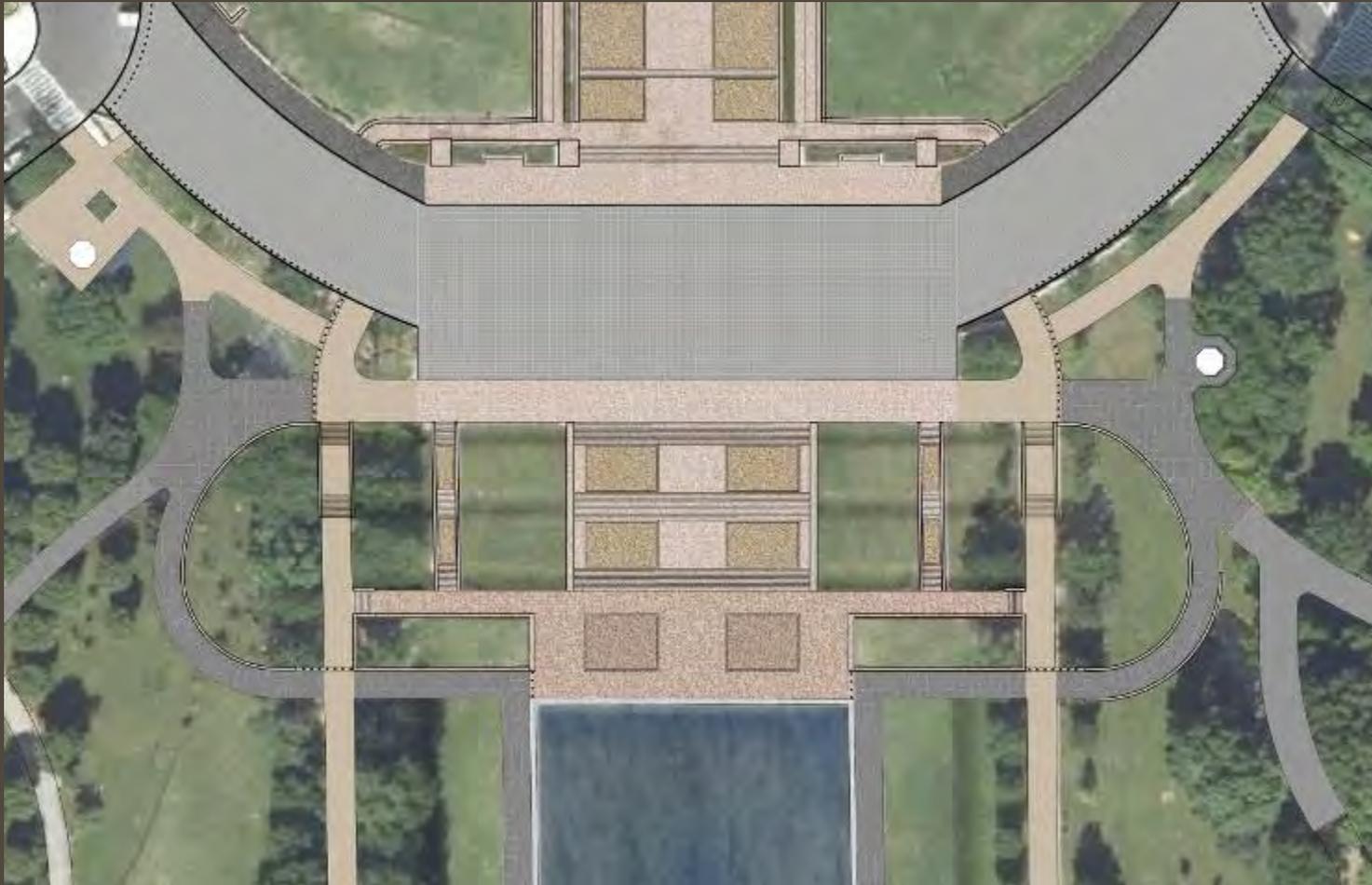


Option 2
Enlargement
West R. Pool Plaza:
Milford Pink Granite

Pool Walks:
PIP Concrete
w/historic scoring
Elm Walks:
PIP Concrete
w/historic scoring



Materials SUMMARY OPTION 3



Option 3
West R. Pool Plaza:
Milford Pink Granite

Pool Walks:
Dark Gray Exposed
Agg.
Elm Walks:
PIP Concrete
w/historic scoring



Proposed Actions

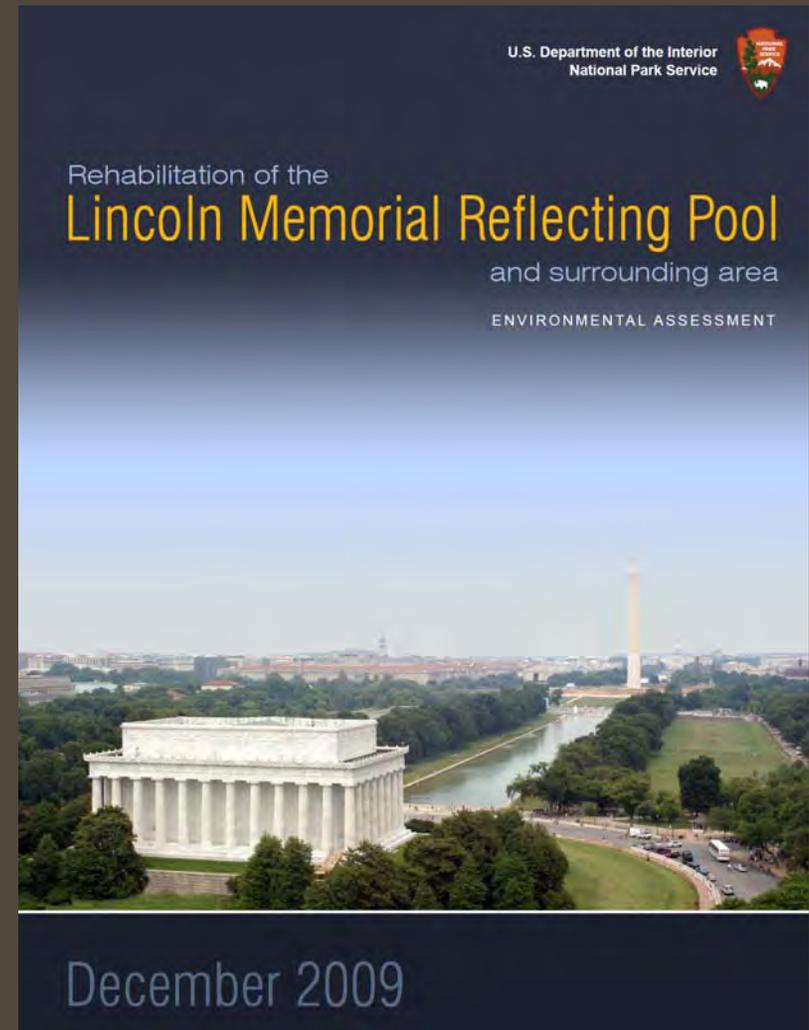
- 
- A wide-angle photograph of the Lincoln Memorial in Washington, D.C. The white neoclassical building with its iconic columns is the central focus, situated on a grassy rise. In the foreground, a large reflecting pool is visible, with a paved walkway along its edge. Numerous people are seen walking on the steps and paths around the memorial. The sky is overcast, and trees frame the scene on both sides.
- New Accessible Paths with walls and bollards
 - New and Resurfaced Walkways
 - Elm Walks
 - Water System



Water System ALTERNATIVES

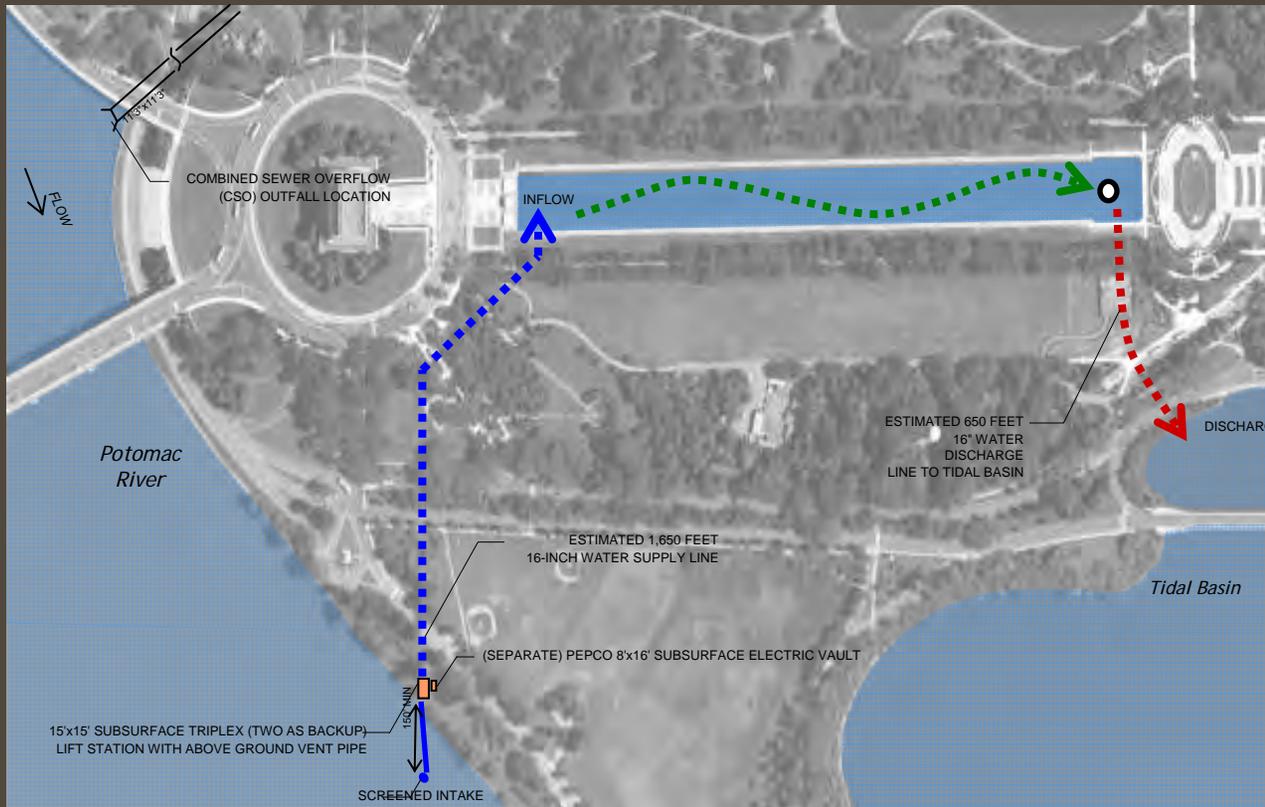
Options Analyzed in EA

- I. No Action Alternative
- II. Action Alternative
 - C1. Potomac Intake, Tidal Discharge, continuous flow
 - C2. City Water with Recirculation & Treatment
 - C3. Tidal Intake, Potomac Discharge, continuous flow



Water System

PREFERRED EA OPTION



PHYSICAL PARAMETERS

- Potomac Intake
- Tidal Basin Discharge
- Continuous Flow (2,500 gpm)
- Intake downstream outfalls

ADVANTAGES

- Eliminates primary reliance on city water

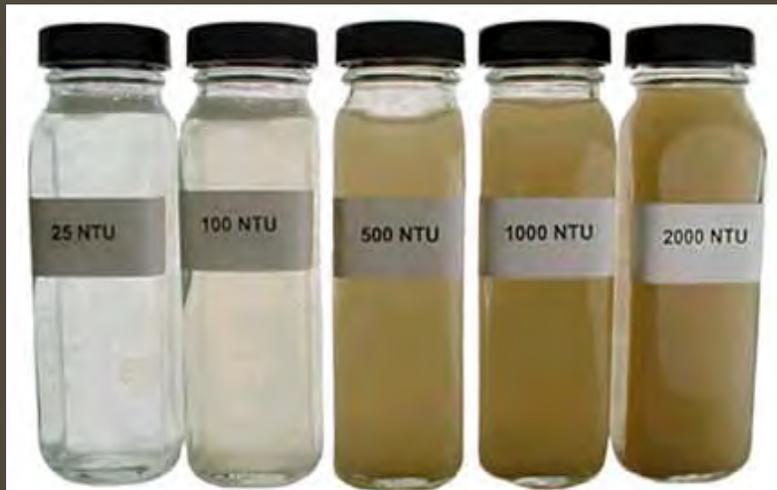
DISADVANTAGES

- Poor Water Quality at Source and Discharge
- Potential risks to human health
- Intake 2,500 ft from Easby CSO
- Impacts from CSO events
- Constant pumping was not energy efficient



Water System POTOMAC WATER QUALITY ISSUES

Suspended Solids



Assume:
Influent TSS concentration of 400 mg/l and 50% settles out in the Reflecting Pool due to low velocities.

Result:
At 2,500 gpm, approximately **3 tons** of material will be deposited in the pool every day.

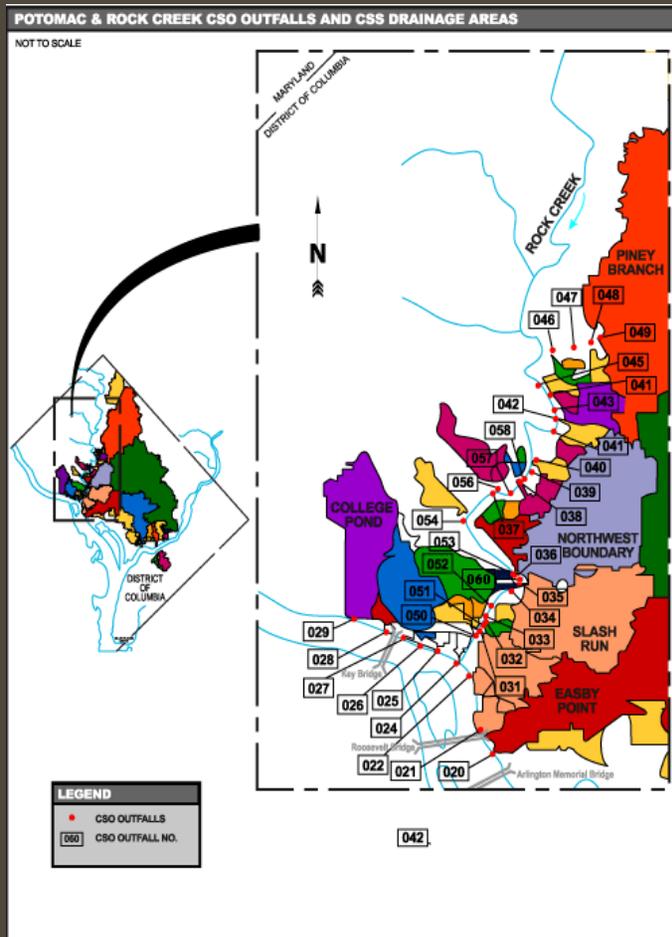
Fecal Coliform

Class	Definition	Standard (MPN/100ml)
A	Primary contact recreation	200
B	Secondary contact recreation and aesthetic enjoyment	1,000

Source:
The District of Columbia Water Quality Standards (WQS), Title 21 of the District of Columbia Municipal Regulations (DCMR) Chapter 11 (Effective, January 24, 2003).



Water System POTOMAC WATER QUALITY ISSUES



CSO Event Mean Concentrations

Parameter	Potomac CSOs	Storm Water Only
Fecal Coliform (MPN/100 ml)	939,270	28,265
E. Coli (MPN/100 ml)	686,429	16,238
Dissolved Oxygen (mg/l)	6	6

Source: *Decision Rationale Total Maximum Daily Loads Potomac River Watershed for Fecal Coliform Bacteria*. USEPA, February, 2005.

There are **NINE** combined sewer overflows along the Potomac River alone that are upstream of the Lincoln Memorial. The nearest is the Easby Point CSO (~2,500 feet upstream).

In an average year, it is estimated that the Easby Point CSO will overflow **25 times** with a total overflow volume of **89.58 million gallons**.

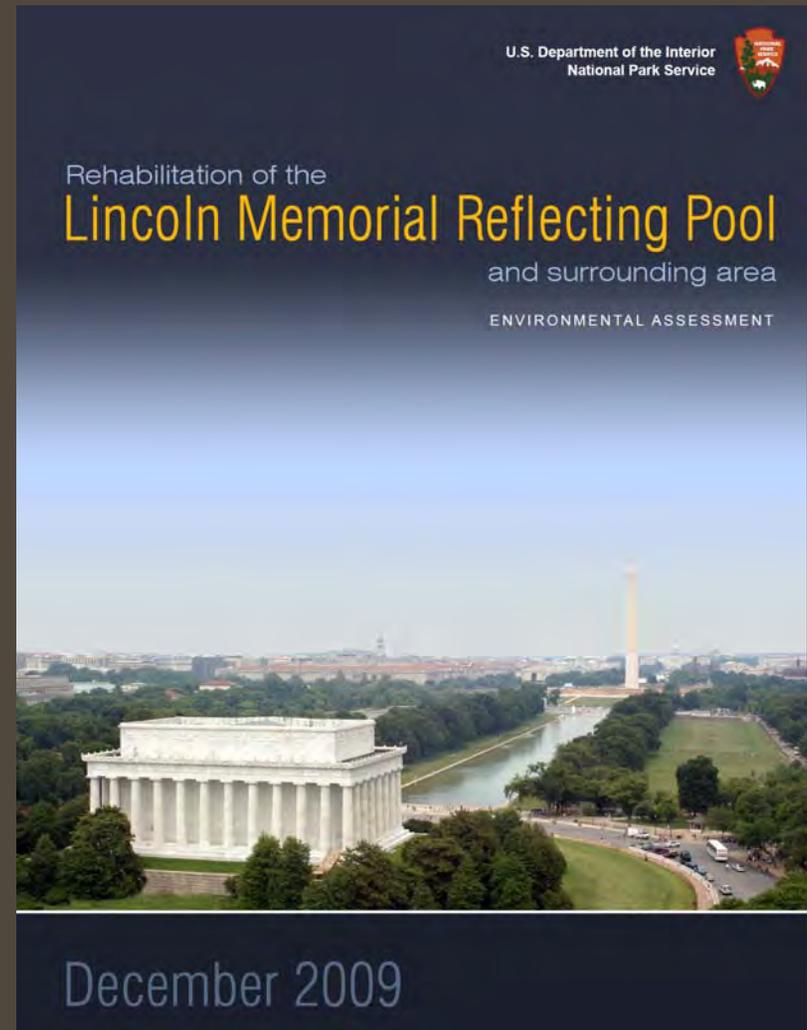
The minimum precipitation event to cause an overflow at the Easby Point CSO is **0.5 inches**.



Water System ALTERNATIVES RE-EVALUATION

Options Analyzed in EA

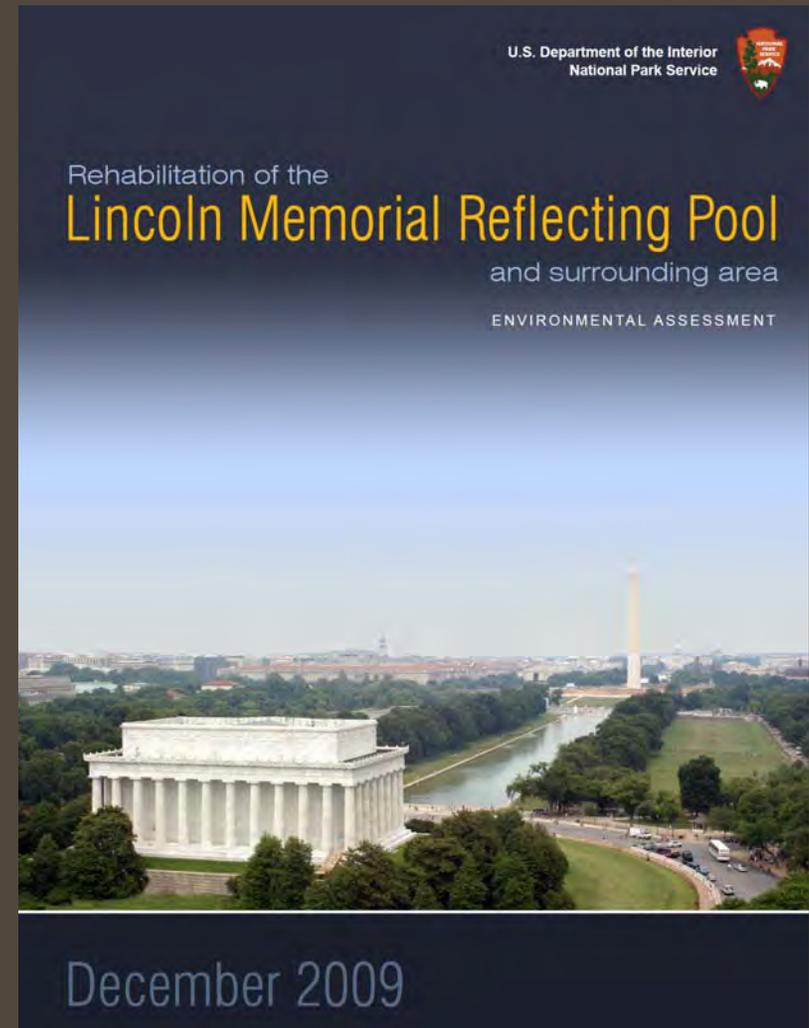
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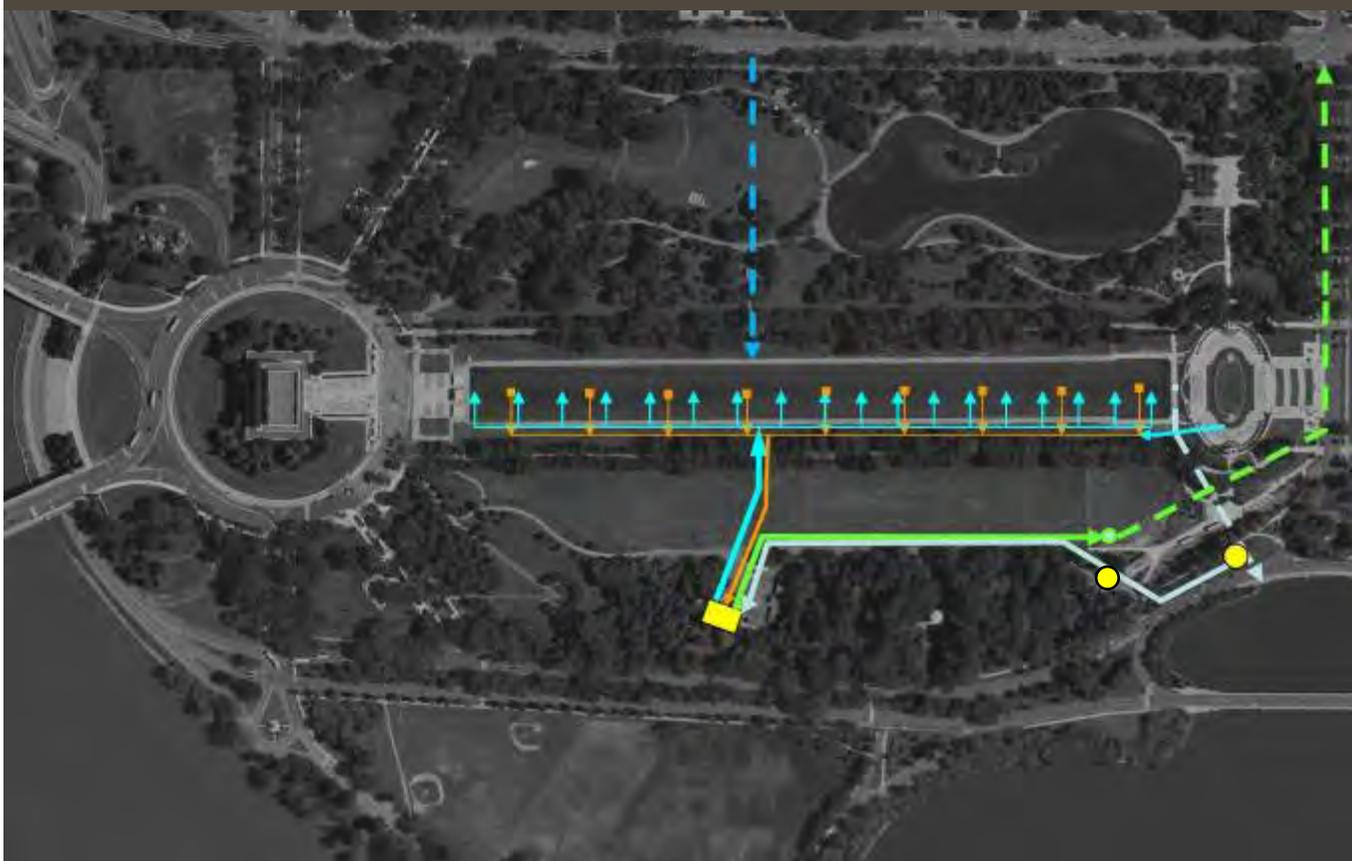
Water System ALTERNATIVES RE-EVALUATION

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 - C3. Tidal Intake, Potomac Discharge, continuous flow



Water System REVISED PREFERRED OPTION



PHYSICAL PARAMETERS

- Tidal Basin Intake
- Municipal Supply for Supplemental/Back Up
- Treated Groundwater from WWII Memorial for Makeup
- Recirculation of pool water

ADVANTAGES

- Sustainable system
- Non-chemical filtration
- Skimming System
- Reuse groundwater
- Reuse existing Tidal Basin infrastructure pipes
- Provides excellent water quality

DISADVANTAGES

- Requires 40x60' filtration structure

- Water Supply (proposed)
- Water Supply (existing)
- Tidal Intake (proposed)
- Tidal Discharge (existing)

- Sanitary Sewer Discharge (existing)
- Sanitary Sewer connection (proposed)
- Return Line (proposed)
- Water Supply pumping station(proposed)
- Water Treatment Facility (proposed)



Water System

ASSOCIATED STRUCTURES



WATER SUPPLY PUMPING STATION

- Below ground 20' x 30' vault
- Two possible locations
- Access hatch is only visible feature on the ground surface

FILTRATION STRUCTURE

- Above ground 40' x 60' single-story structure
- Proposed to be co-located with the US Park Police Stables and Maintenance Facility



Water System PUMPING STATION

Proposed Locations Street Views

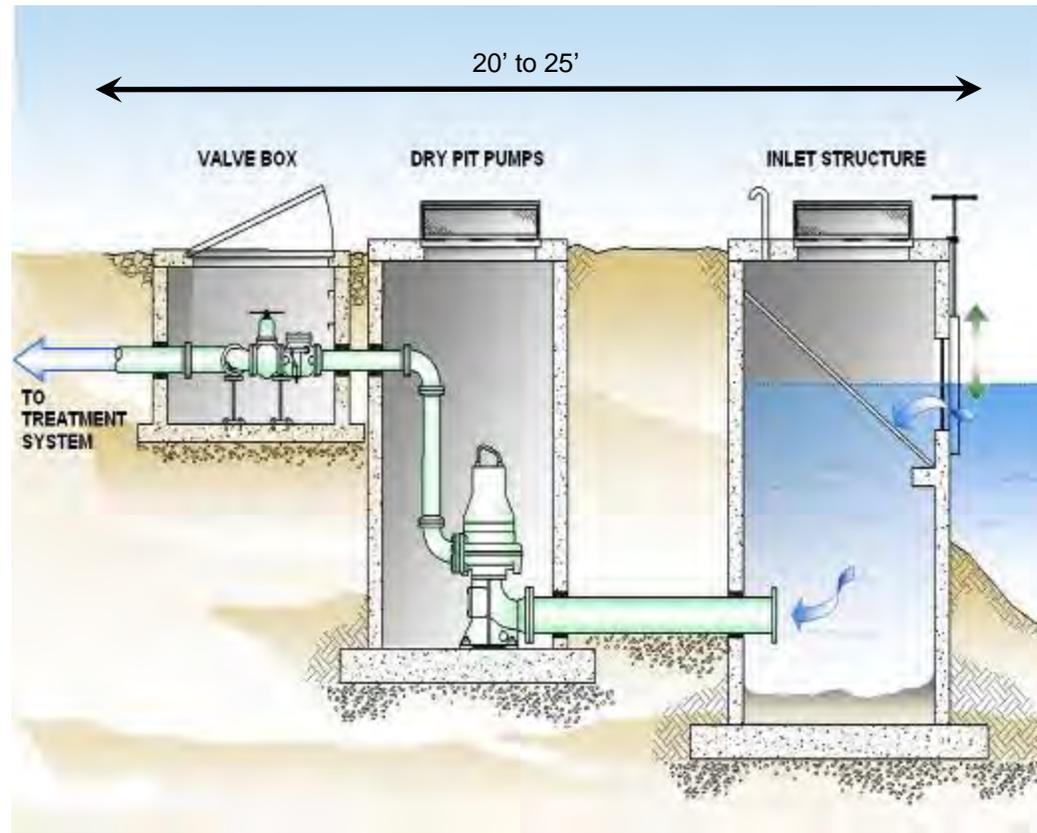
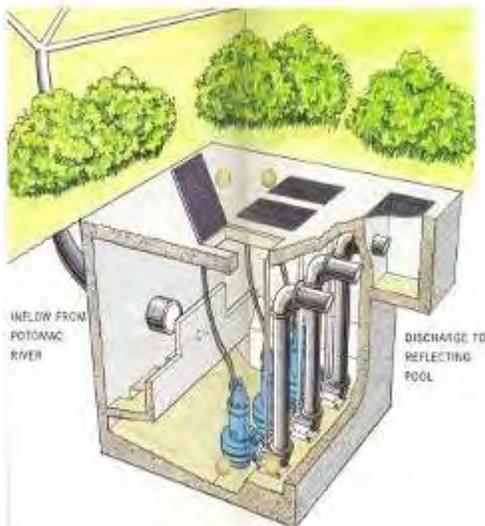


Looking east toward Tidal Basin from Independence Avenue



Water System INTAKE STRUCTURE

Conceptual Design



Water System WATER TREATMENT STRUCTURE

Proposed Location View from top of WAMO



ADVANTAGES

- Proximate to Reflecting Pool
- Outside prominent viewsheds
- Not proximate to heavily visited areas
- Area is already developed with primary access (Ash Rd)
- Heavily obscured from Independence Avenue

DISADVANTAGES

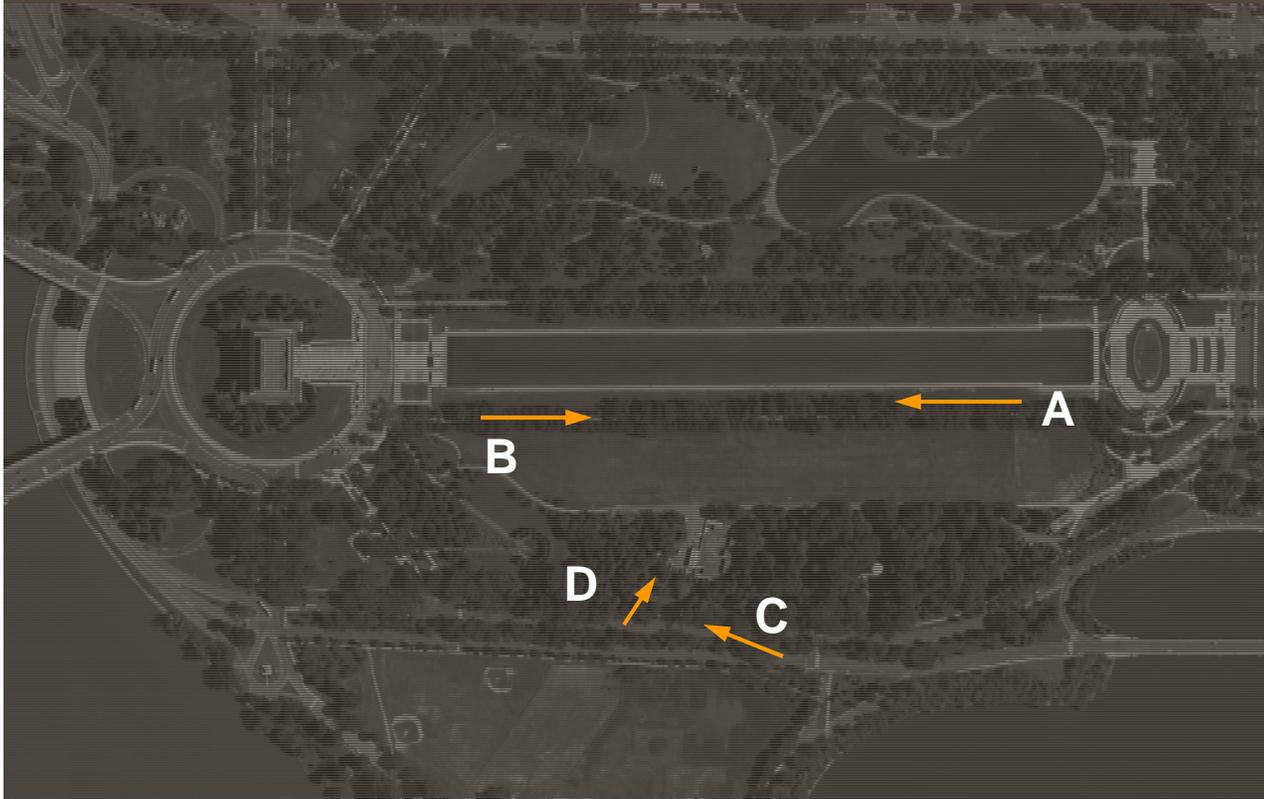
- Might conflict with National Mall Plan proposed use for the area



Water System

WATER TREATMENT STRUCTURE

Viewsheds



- A. South Elm Walk looking west
- B. South Elm Walk looking east
- C. Independence Ave looking west
- D. Independence Avenue looking north



Water System WATER TREATMENT STRUCTURE

View at south elm walk looking west – MAY 2009



Water System WATER TREATMENT STRUCTURE

View at south elm walk looking west – AUG 2009



Water System

WATER TREATMENT STRUCTURE

View at south elm walk looking west – JAN 2010



Water System WATER TREATMENT STRUCTURE

View at south elm walk looking east – JAN 2010



Water System

WATER TREATMENT STRUCTURE

View from Independence Ave SW looking west – GOOGLE EARTH



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Water System

WATER TREATMENT STRUCTURE

View from Independence Ave SW looking west – JAN 2010



Water System

WATER TREATMENT STRUCTURE

View from Independence Ave SW looking north – JAN 2010



Water System

WATER TREATMENT STRUCTURE

Visual Character of the Maintenance Area



Water System WATER TREATMENT STRUCTURE

Existing USPP buildings



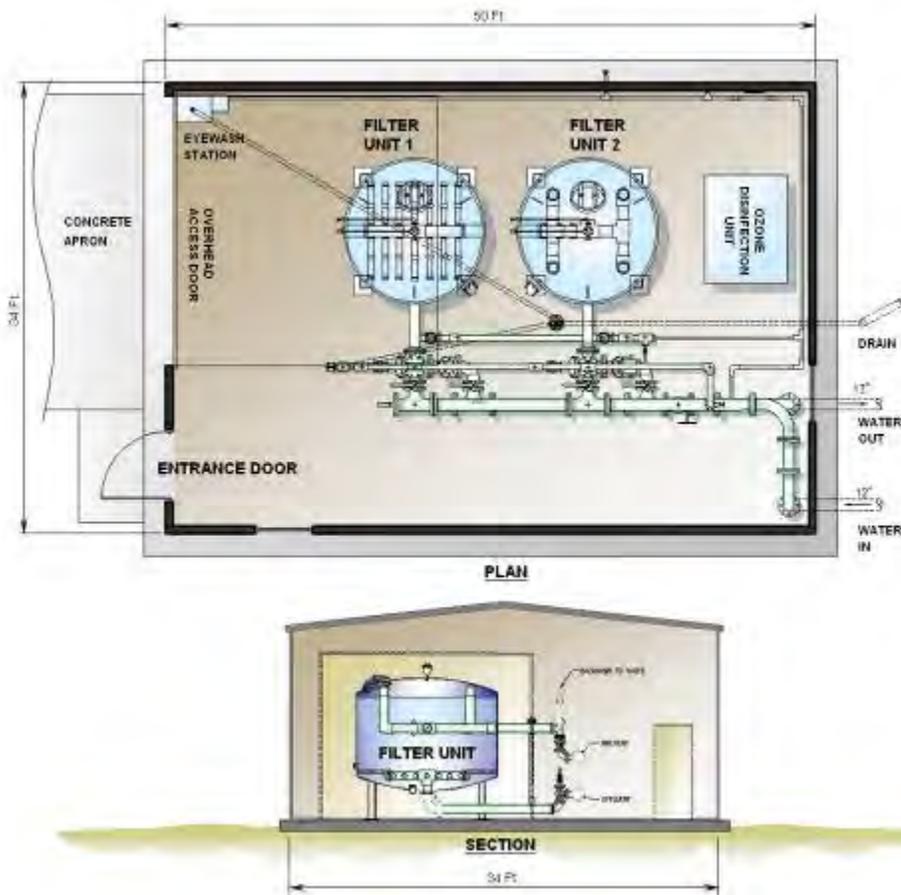
Water System WATER TREATMENT STRUCTURE

Existing stables



Water System WATER TREATMENT STRUCTURE

Conceptual Design



- ➔ Filter area 75 sq. ft. (min)
- ➔ 10 ft. dia. vertical filters, 10 ft. high
- ➔ Ozone disinfection/color removal



Vertical Filter Unit



Ozone Generator



Water System

WATER TREATMENT STRUCTURE

Existing Aerial View



Water System

WATER TREATMENT STRUCTURE



Water System

WATER TREATMENT STRUCTURE



Water System ADVANTAGES

Disadvantages of the previously preferred option:

- Potomac offered poor water quality and restrictions on intake timing with CSOs
- No disinfection or odor control
- High operation and maintenance cost associated with:
 - constant pumping of river flow through
 - Frequent cleaning due to levels of total suspended solids in Potomac

Advantages of revised option:

- Best water quality appearance and algae control
- Least risk to visitors from contact with pool water
- Re-use of WWII Memorial groundwater as make-up water
- Water treatment facility is only 10% larger than what would be required for a potable water system
- Water treatment facility is located in a remote, visually obscure area, close to the Reflecting Pool

