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Council Work Session – Lake Planning

September 27, 2023

Note to users: this presentation is a summary of work performed and a guide for discussion during the work session. For details and context, please see the specific technical memorandum.

Agenda

- Master planning introduction
- Conservation buffers, vegetation control, and lawn chemical programming
- Trash and debris control
- North Lake feed channel
- Dredging
- Summary and action items

Master Planning Introduction

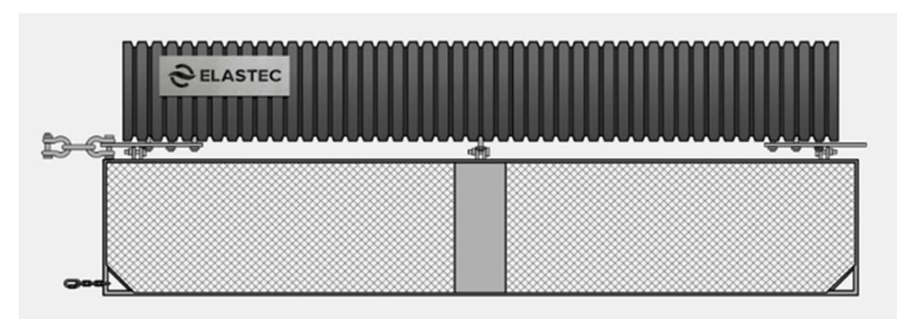
- Task Order No. 23 executed 09/09/22
  - Total fee: $75,000
  - Total amount invoiced through 08/25/23: $54,700
  - Total amount remaining after 08/25/23: $20,300
- Task 2 – Data Collection and Analysis
  - Topographic and bathymetric surveys
  - Water quality sampling and analysis
- Task 3 – Water Quality Improvements
  - Lake system dredging and shoreline shaping
  - North feed to North Lake
  - Conservation buffers, vegetation control, and lawn chemical programming
  - Trash and debris control

Conservation Buffers, Vegetation Control, and Lawn Chemical Programming

- Conservation buffer zone
  - Recommended on both public and private parcels
  - Generally 10’ wide of unmowed vegetated area
  - Education focused on the benefits of buffer zones
  - Consider legislation to enforce buffer zone policies
- Vegetation control
  - Tree management and maintenance program (urban forest management plan)
  - Education focused on how to rake leaves (avoid streets and lakes)
  - Encourage mulching where practicable
- Residential lawns
  - Proper mowing height to absorb rainfall and reduce weeds
  - Education focused on lawn chemicals and their impact on the lakes
  - Consider legislation to minimize lawn chemicals use

Trash and Debris Control – West Tributary to South Lake

- Trash and debris primarily originates from west side of Cleveland Avenue
- Currently settles along feed to South Lake
- Three options for control
  - Routine cleanup
  - Upstream litter capture
  - Downstream litter capture



Trash and Debris Control – West Tributary to South Lake

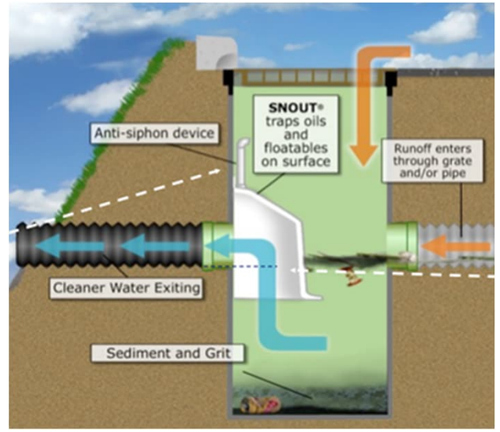
- Alternative scoring and comparison

Criteria	Alternative 1: Routine Cleanup	Alternative 2: Upstream Litter Capture Device	Alternative 3: South Lake Litter Capture Device
Initial Costs	$0	$1,400	$59,000
Regular O&M Frequency	Monthly Cleanup	Weekly Visual Monthly Cleanup	Weekly Visual Monthly Cleanup
O&M Costs per Year [1]	$300 [2]	$1,600 [3]	$1,900 [4]
Lifecycle Costs for 15 Years	$4,500	$25,400	$87,500
Ease of Implementation	No installation, requires labor only	Installation by contractor, device accessible on foot	Installation by contractor, boat required for cleanup
Impact to Public	Potential for debris along entire tributary and into lake	Debris collected upstream of Minerva Lake Road and Lakewood Drive properties	Potential for debris along entire tributary. Debris collected prior to entering lake
Trash Collection Efficiency	Low	Boom provides high capture of floatables, absence of screen provides less retention and potential pass through	Combination of boom with debris screen provides highest capture and longest retention

[1] Maintenance hourly wage rate assumed to be $25/hour
[2] Assumed one hour of labor per monthly cleanup
[3] Assumed one hour of labor per weekly inspection and monthly cleanup
[4] Assumed one hour of labor per weekly inspection and two hours of labor per monthly cleanup

Trash and Debris Control – Remaining Locations

- Three additional known discharges to lakes
  - North feed channel to North Lake
  - North Bay Drive channel
  - East Shore Drive outlet



Trash and Debris Control – Cleaning Frequency

Cleanup Location	Recommended Frequency
Right-of-way along east side of Cleveland Avenue	Monthly
West tributary to South Lake (box culvert outlet)	Monthly, before and after large storm events
West tributary to South Lake (stream outlet)	Monthly, before and after large storm events
North feed to North Lake (storm sewer outlets)	Monthly, before and after large storm events
North Bay Drive channel (storm sewer outlet)	Monthly
East Shore Drive outlet	Monthly
Perimeter of the north and south lakes	Quarterly

Trash and Debris Control – Additional Programs

- Litter prevention
  - Education focused on the financial and physical impacts of litter
- Curbside leaf pickup
  - Reminding residents to not rake leaves into the street
- Street cleaning program
  - Once or twice each year
  - Ohio EPA recognizes street sweeping as a pollution prevention practice

North Lake Feed Channel – Existing Conditions

- Backwater from North Lake backs up into channel
- Bank stabilization (logs and garden ties) is deteriorating
- Landscaping stone blocks are tipping and heaving






North Lake Feed Channel – Improvement Options

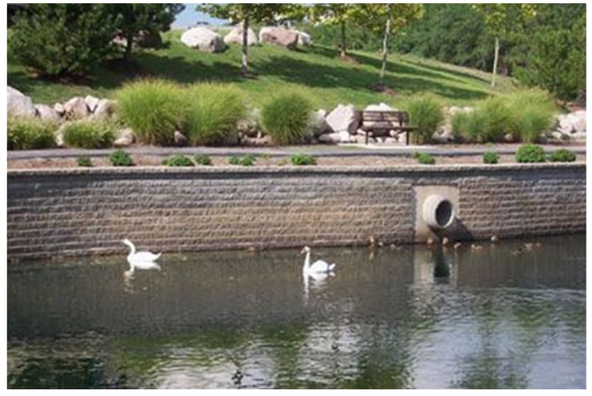
- Rolled erosion control products / turf reinforcement mats

- Rock-lined or riprap stabilization

North Lake Feed – Improvement Options

- Bioengineering (brush mattresses or layering)

- Stone retaining wall



North Lake Feed – Improvement Options

- Bulkhead or seawall (wood)

- Bulkhead or seawall (vinyl)

North Lake Feed – Improvement Considerations

- Initial capital cost, annual maintenance, useful life
- How do improvements tie into dredging considerations
- How do improvements affect mobility and connectivity planning

Dredging – Technology Options

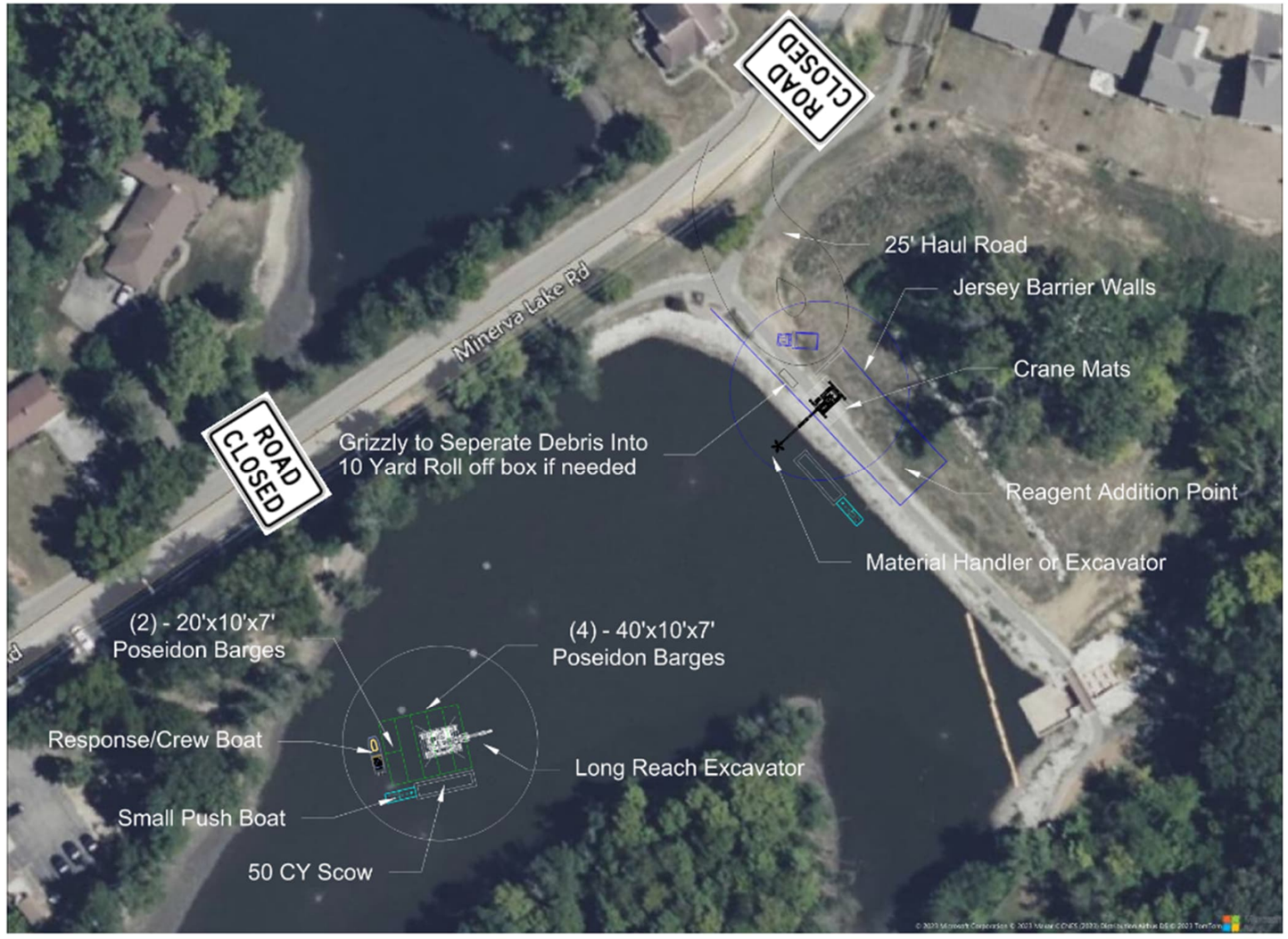
- Hydraulic dredging and sediment dewatering w/geotextile tubes

Dredging – Technology Options

- Mechanical dredging with scows

- Recommended technology due to limited nearby vacant land, limited work hours, and relatively high cost of mobilizing and setting up other technology

Dredging – Conceptual Layout



Dredging – Disposal Options

- Solid Waste Authority of Central Ohio (SWACO)
  - With further investigation, would consider accepting dredged material for free
- Ohio Soil Recycling, LLC
  - At $15.00/ton this was the basis for cost estimating
- Frank Road Recycling Solutions
  - Currently not accepting additional material
- Price Farms Organics, Ltd.
  - Current price is $50.00/ton, but could reduce price with further investigation

Dredging – Alternative No. 1

- Provide average water depth of 5’ in both lakes

Description	Value
Total quantity of material to be removed from site	21,500 CY
Estimated length of contractor being on-site	5.75 months
Estimated construction cost	$3,800,000
Estimated design cost and overall project management cost	$260,000
Estimated construction oversight cost	$240,000
Estimated total project cost	$4,300,000

Dredging – Alternative No. 2

- Providing sloping bottoms in both lakes
  - North Lake: Provide a 0.50% slope from the northern-most point for approximately 400 feet to a bottom elevation of EL 846.00, which is the existing grade of the lake bottom in that area.
  - South Lake: Provide a 0.25% slope from the western-most point for approximately 775 feet to a bottom elevation of EL 844.20, which is 5 feet of depth.

Description	Value
Total quantity of material to be removed from site	15,500 CY
Estimated length of contractor being on-site	2.50 months
Estimated construction cost	$2,670,000
Estimated design cost and overall project management cost	$225,000
Estimated construction oversight cost	$105,000
Estimated total project cost	$3,000,000

Dredging – Alternative No. 3

- Perform dredging only in South Lake

Description	Value
Total quantity of material to be removed from site	13,000 CY
Estimated length of contractor being on-site	2.00 months
Estimated construction cost	$2,300,000
Estimated design cost and overall project management cost	$192,000
Estimated construction oversight cost	$83,000
Estimated total project cost	$2,575,000

Dredging – Alternative No. 4

- Convert North Lake to green space

Summary and Action Items

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Important

Council Work Session – Lake Planning

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