Bartlet Mall Restoration Project

Presentation to City Council – August 15, 2023

AGENDA

1. Team Introductions
2. Brief History
3. Investigation Summary
4. Project Summary
5. Design changes since CPA approval
6. Design Details
7. Maintenance
8. Questions

Team Introductions

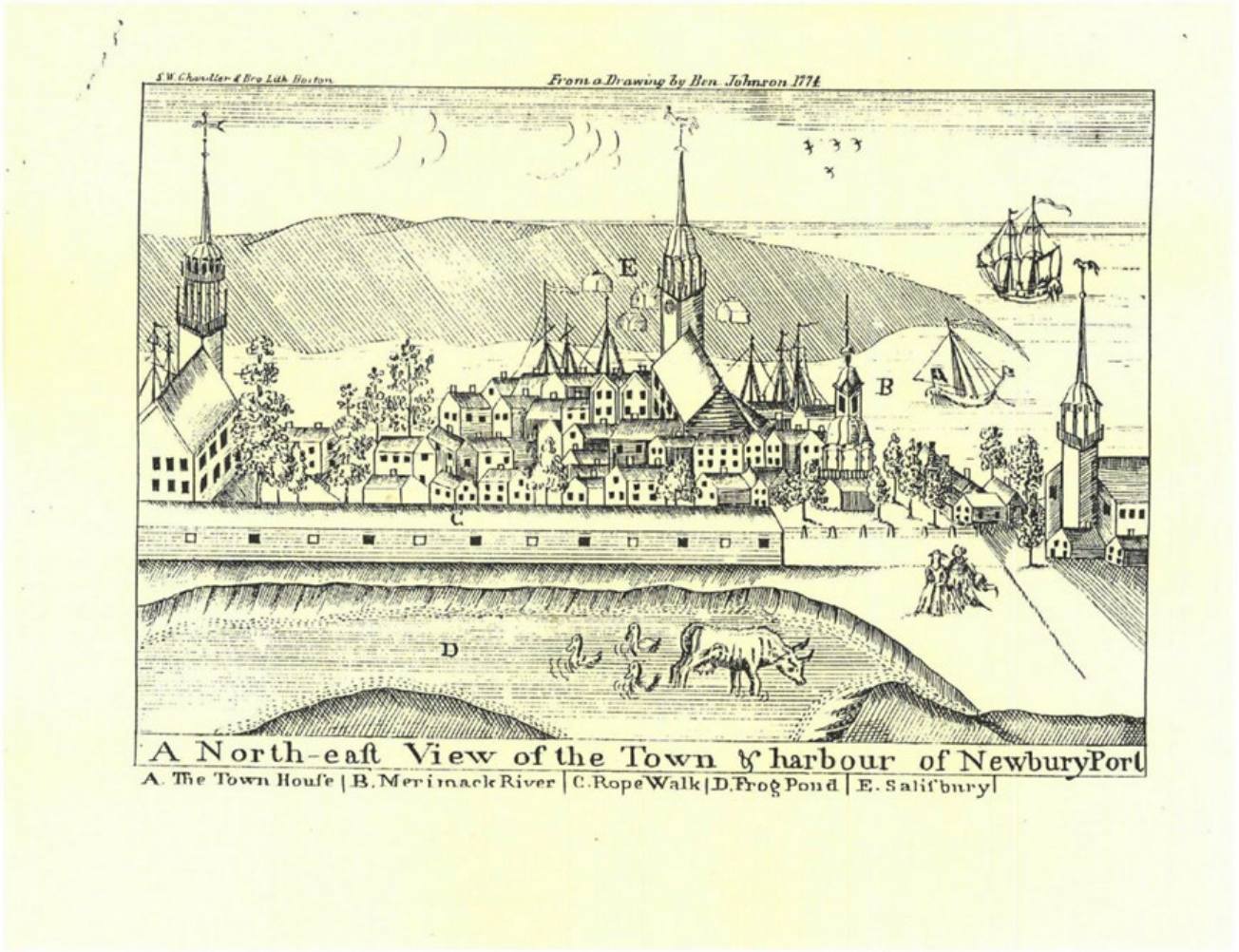
- GEI Consultants: geotechnical, environmental & civil engineers
- Aqueous, LLC: water resource engineers
- Project Manager: landscape architect
- Received approvals from 9 different Federal, State and local agencies
- Collaboration among all agencies, peer reviewers, board and commission members, and local residents

Project Introduction:
A Brief History

Newburyport's Original Town Common

- 1600s-1700s: Livestock, rope making, training for Revolutionary War militia
- 1800: Transformed into a park
- 1805: Federal Courthouse built & water inlet cut off
- 1891: Fountain installed to attempt to clean the water
- 1987: Fountain restored but quickly deteriorated due to lack of clean water

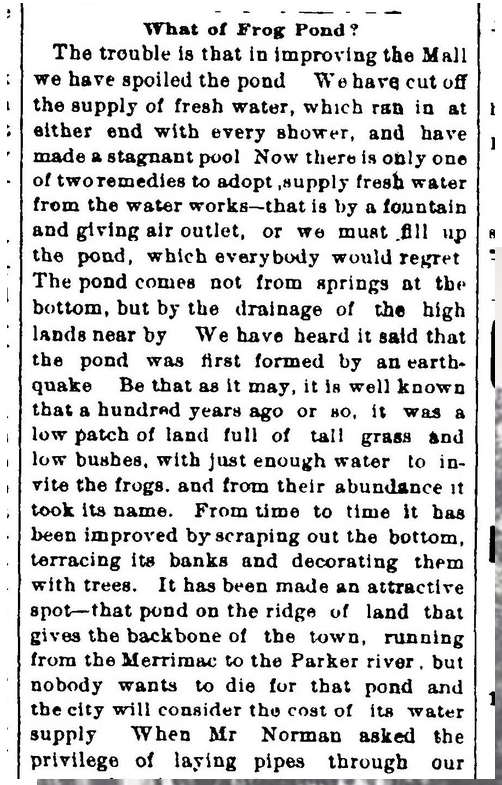
Complaints of odors and water quality issues reported going back to the 1800s



Project Introduction:
A Brief History

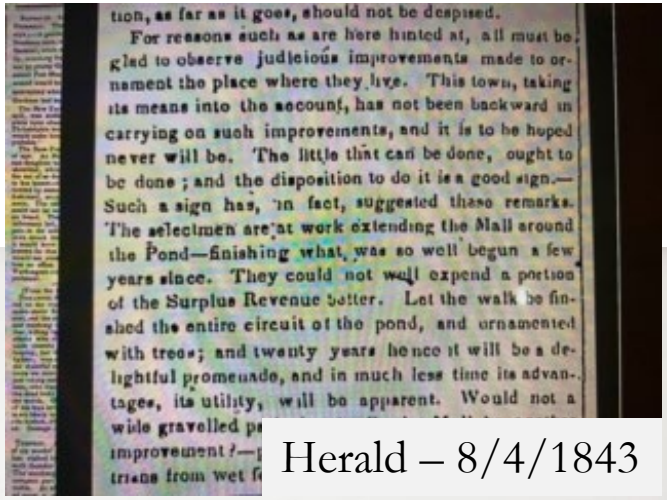
Charles Eliot's vision, early 1900s

- Protective granite edge
- Circulation of water (via fountain)
- Meticulously sloped lawn
- Water and high-branched trees frame the beauty of the space (no flowering plants)
- Complete the northwest corner slope



What of Frog Pond?

The trouble is that in improving the Mall we have spoiled the pond We have cut off the supply of fresh water, which ran in at either end with every shower, and have made a stagnant pool Now there is only one of two remedies to adopt ,supply fresh water from the water works—that is by a fountain and giving air outlet, or we must fill up the pond, which everybody would regret The pond comes not from springs at the bottom, but by the drainage of the high lands near by We have heard it said that the pond was first formed by an earthquake Be that as it may, it is well known that a hundred years ago or so, it was a low patch of land full of tall grass and low bushes, with just enough water to invite the frogs. and from their abundance it took its name. From time to time it has been improved by scraping out the bottom, terracing its banks and decorating them with trees. It has been made an attractive spot—that pond on the ridge of land that gives the backbone of the town, running from the Merrimac to the Parker river, but nobody wants to die for that pond and the city will consider the cost of its water supply When Mr Norman asked the privilege of laying pipes through our



tion, as far as it goes, should not be despised.

For reasons such as are here hinted at, all must be glad to observe judicious improvements made to ornament the place where they live. This town, taking its means into the account, has not been backward in carrying on such improvements, and it is to be hoped never will be. The little that can be done, ought to be done; and the disposition to do it is a good sign.—Such a sign has, in fact, suggested these remarks. The selectmen are at work extending the Mall around the Pond—finishing what was so well begun a few years since. They could not well expend a portion of the Surplus Revenue better. Let the walk be finished the entire circuit of the pond, and ornamented with trees; and twenty years hence it will be a delightful promenade, and in much less time its advantages, its utility, will be apparent. Would not a wide gravelled p

improvement?—

trians from wet f

Herald – 8/4/1843

Project Introduction:
A Critical Moment

Complex project with many pieces that must be carefully orchestrated

- Water quality problem demands a unique solution
- Funding for the project via CPA bond: **condition of the bond order that final design approved by Council**
- Political and public support for the project
- Water quality is at a critically dangerous ecological point (HAB, stagnant, toxic)

Investigation Summary

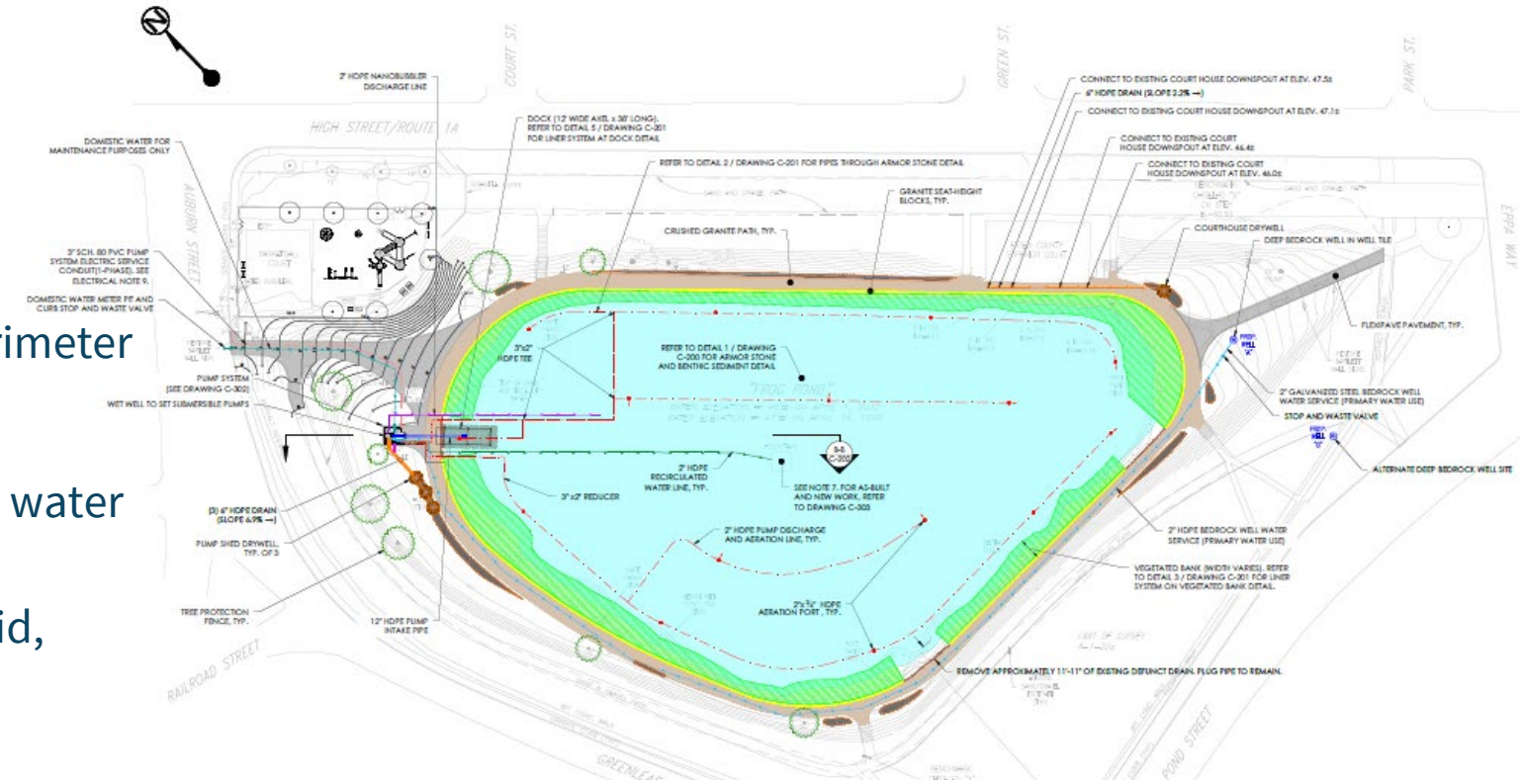
- Reviewed previous investigations & data
- Performed additional investigations in 2021 to close data gaps:
  - Pond Investigations: sediment investigation, in situ shear vane testing, bathymetric survey, in-situ surface water quality assessment, and surface water sampling.
  - Upland Investigations: subsurface investigation, monitoring well installation and survey, in-situ groundwater quality assessment, and hydraulic conductivity testing.

Findings

- Urban contaminants are present in shallow sediments
- Shallow sediment is not suitable for disposal at a Massachusetts lined landfill
- Phosphorus present up to 12 feet below bottom of pond
- No hydraulic connection to groundwater - groundwater is ~ 30 feet below the bottom of the pond
- Surface water in the pond is contained by low-permeability sediment

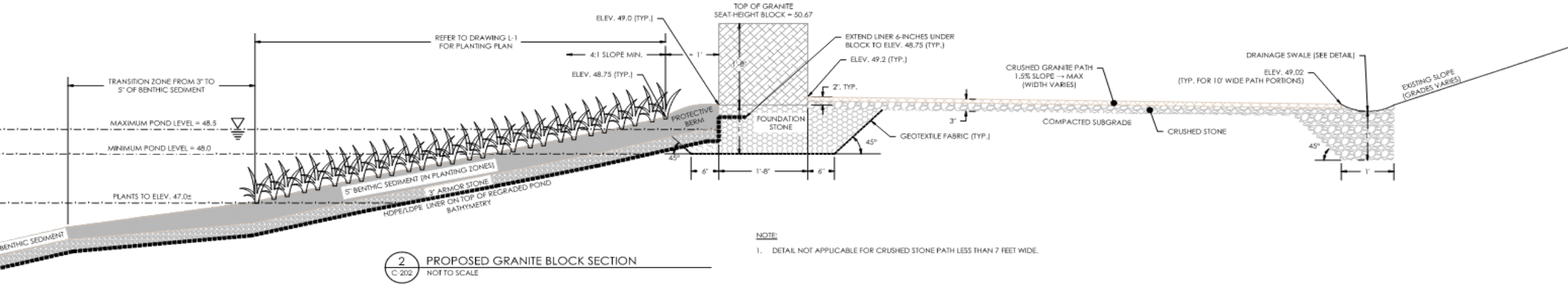
Project Summary

- Park Restoration:
  - New universally-accessible playground
  - Park access walkways
  - Granite seat-height blocks around pond perimeter
- Pond Restoration:
  - Dewater, treat, and discharge existing pond water under NPDES DRGP
  - Install liner system: methane system, geogrid, HDPE, armor stone, benthic sediment, and vegetated perimeter
  - Install water quality system: bedrock water supply, filtration, aeration, re-circulation, and outflow
  - Remove, rehabilitate, and reinstall fountain



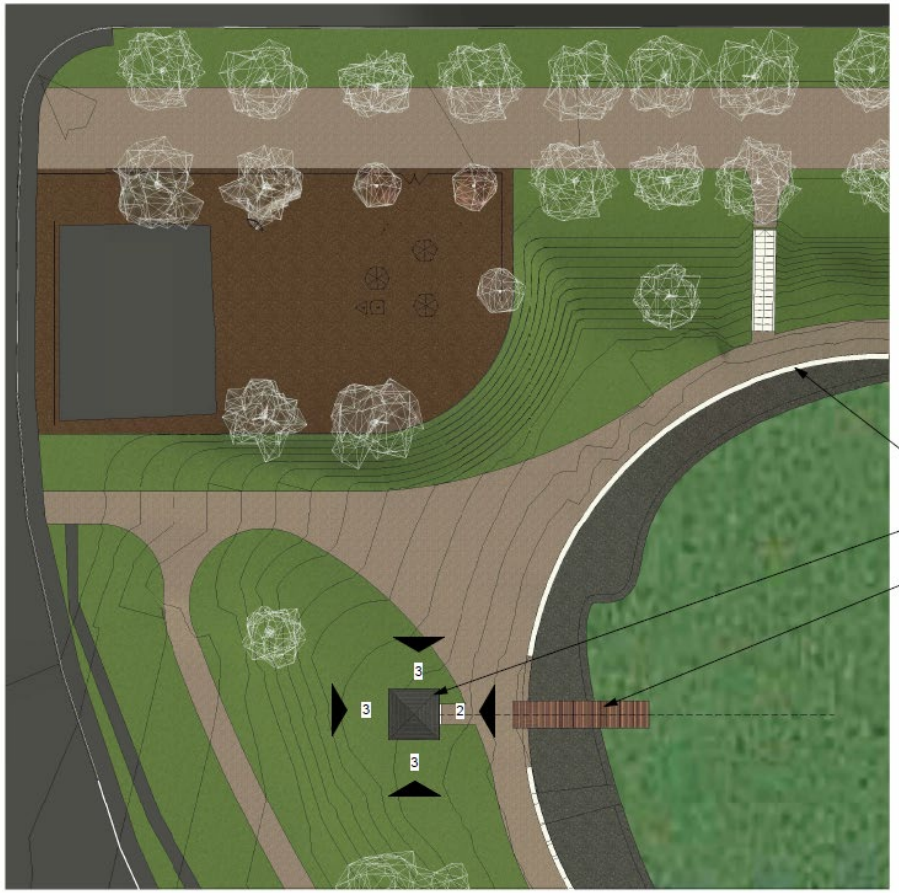
Design changes since CPA approval: No Dredging & Removal

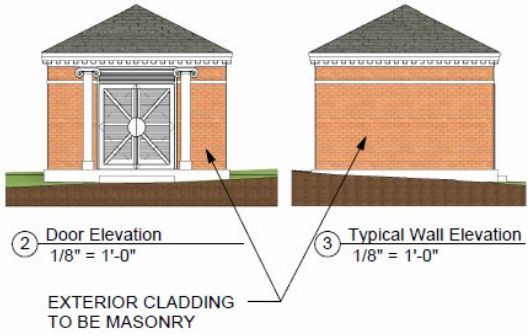
- Increase surrounding grade instead of dredging and removing sediments:
  - Elevating perimeter walkway by 6” to maintain depth of pond
  - Eliminates costs associated with dredging & off-site disposal:
    - Mob/Demob of dredging equipment and costs for dredging effort
    - On-site dewatering and amendment of sediments
    - Transportation & disposal costs
  - Was discussed as potential option during CPC application



Design changes since CPA approval: Free Standing Pump House

- Free-standing pump house instead of burying utility shed in grade:
  - Reduce visible prominence of the vault at the nose of the NW slope
  - Avoid construction sequencing issues with install of playground
  - Improve climate control and avoid moisture-rich environment that would corrode equipment
  - Reduce structural design, support of excavation, material disposal, grading and retaining wall costs
  - Avoid need for licenses to operate in enclosed spaces with engulfment risk



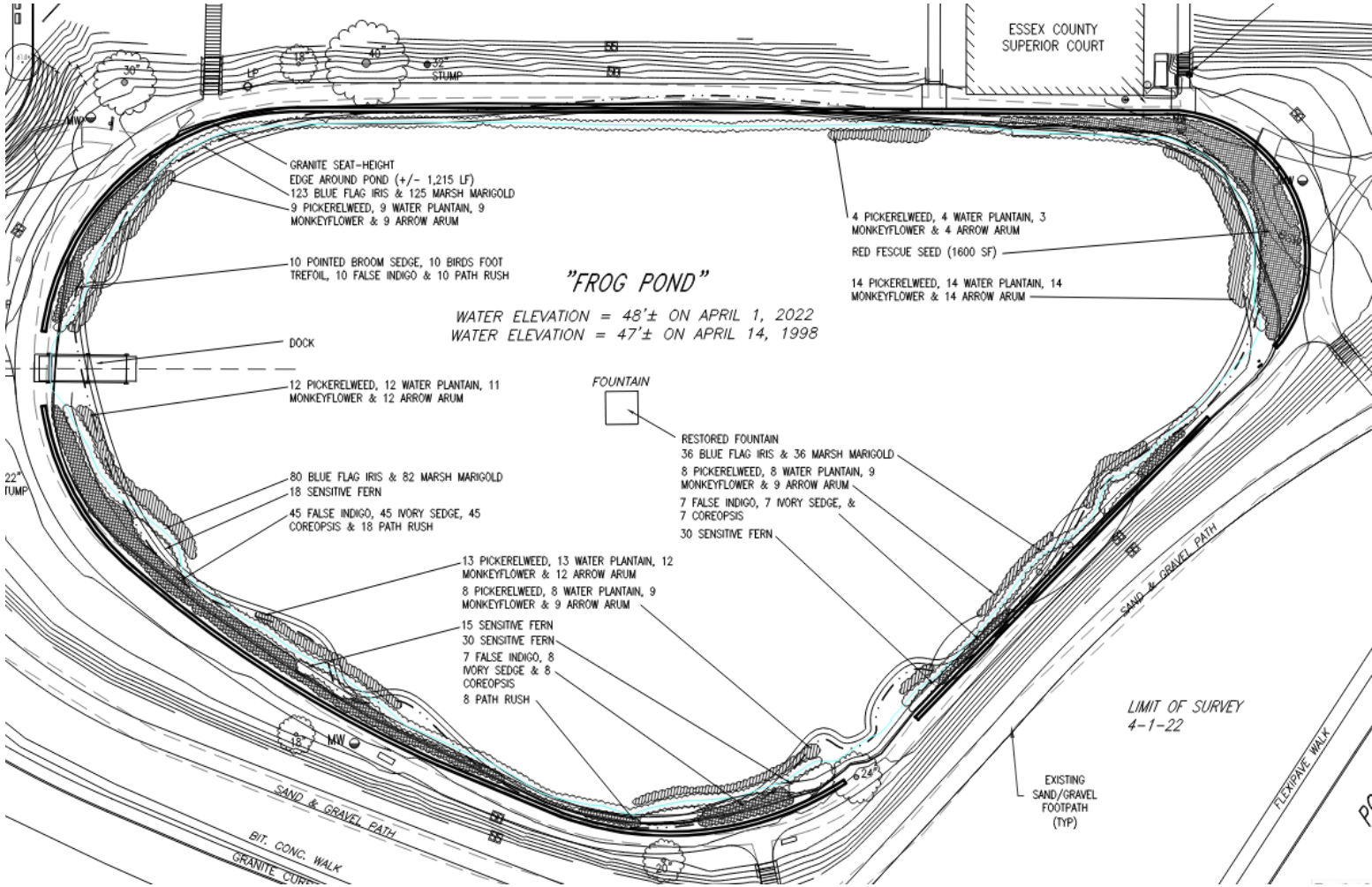


Design changes since CPA approval: Habitat Improvement – Vegetated Ring

- Vegetated Perimeter
  - Improves habitat and helps to stabilize banks
  - Consist of native, low growing, plants approved by Parks Commission

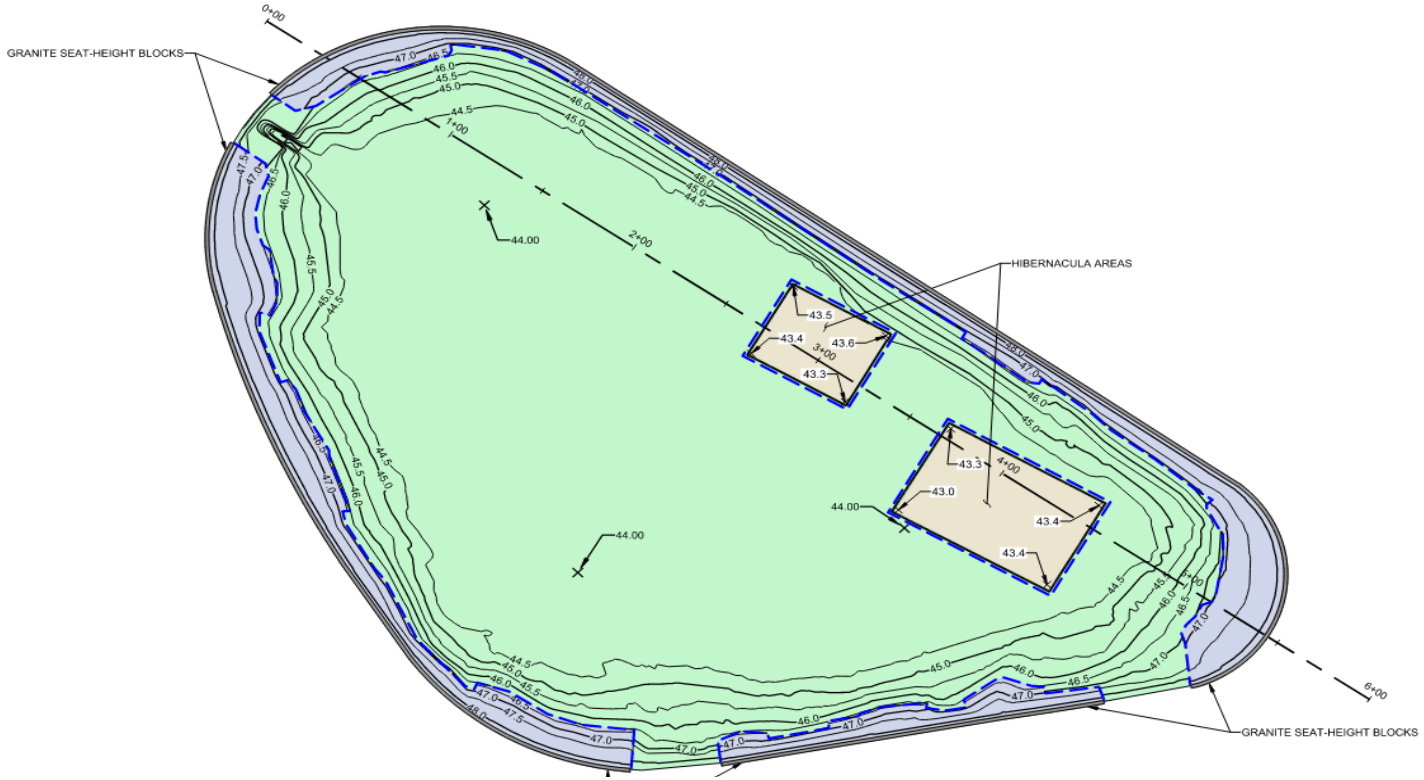
Bartlet Mall Frog Pond Restoration Plant List

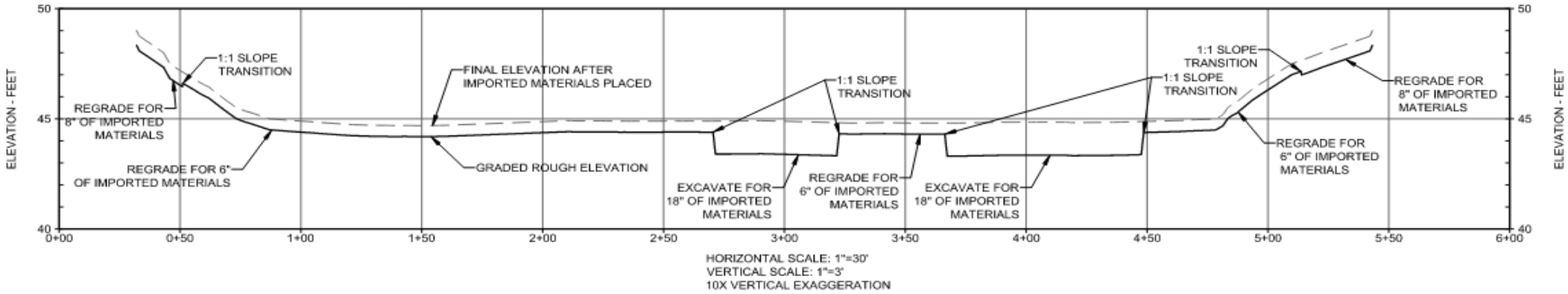
Qty.	Scientific Name	Common Name
68	Alisma subcordatum	Water Plantain
69	Amorpha nana	Fragrant False Indigo
243	Caltha palustris	Marsh Marigold
60	Carex eburnea	Ivory Sedge
10	Carex scoparia	Pointed Broom Sedge
60	Coreopsis lanceolata	Coreopsis
239	Iris versicolor	Blue Flag Iris
36	Juncus tenuis	Path Rush
10	Lotus corniculatus	Birds Foot Trefoil
67	Mimulus ringens	Monkeyflower
93	Oncclea sensibilis	Sensitive Fern
69	Peltandra virginica	Arrow Arum
68	Pontederia cordata	Pickerelweed
Seed		
1600 sf	Festuca rubra	Red Fescue



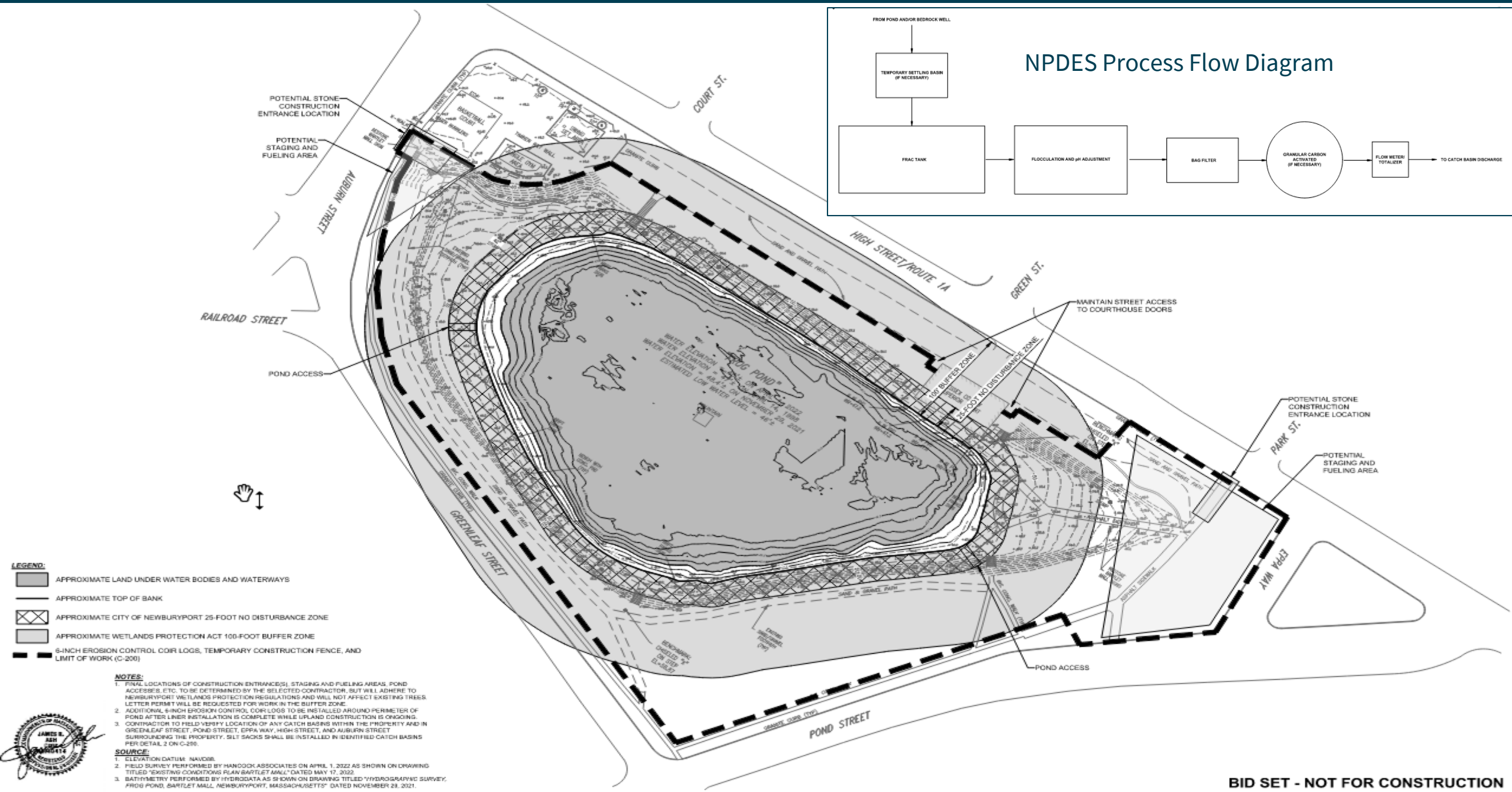
Design changes since CPA approval: Habitat Improvement

- Hibernacula:
  - Areas to allow turtles to burrow during winter





Mobilization, Staging, Erosion Control, & Dewatering



NPDES Process Flow Diagram

LEGEND:

- APPROXIMATE LAND UNDER WATER BODIES AND WATERWAYS
- APPROXIMATE TOP OF BANK
- APPROXIMATE CITY OF NEWBURYPORT 25-FOOT NO DISTURBANCE ZONE
- APPROXIMATE WETLANDS PROTECTION ACT 100-FOOT BUFFER ZONE
- 8-INCH EROSION CONTROL COIR LOGS, TEMPORARY CONSTRUCTION FENCE, AND LIMIT OF WORK (C-200)

NOTES:

1. FINAL LOCATIONS OF CONSTRUCTION ENTRANCE(S), STAGING AND FUELING AREAS, POND ACCESSES, ETC. TO BE DETERMINED BY THE SELECTED CONTRACTOR, BUT WILL ADHERE TO NEWBURYPORT WETLANDS PROTECTION REGULATIONS AND WILL NOT AFFECT EXISTING TREES. LETTER PERMIT WILL BE REQUESTED FOR WORK IN THE BUFFER ZONE.
2. ADDITIONAL 8-INCH EROSION CONTROL COIR LOGS TO BE INSTALLED AROUND PERIMETER OF POND AFTER LINER INSTALLATION IS COMPLETE WHILE UPLAND CONSTRUCTION IS ONGOING.
3. CONTRACTOR TO FIELD VERIFY LOCATION OF ANY CATCH BASINS WITHIN THE PROPERTY AND IN GREENLEAF STREET, POND STREET, EPPA WAY, HIGH STREET, AND AUBURN STREET SURROUNDING THE PROPERTY. SILT SACKS SHALL BE INSTALLED IN IDENTIFIED CATCH BASINS PER DETAIL 2 ON C-200.

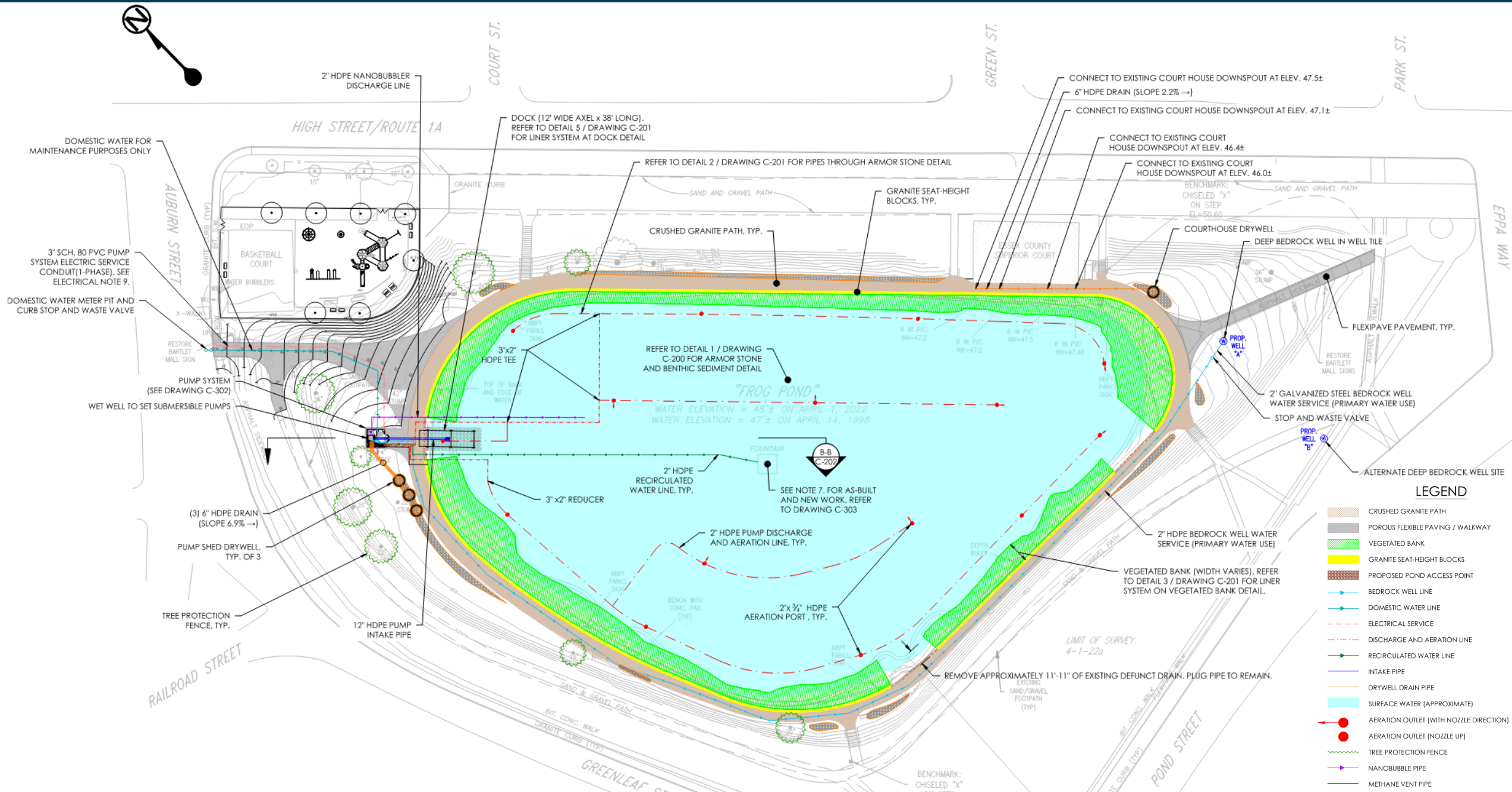
SOURCE:

1. ELEVATION DATUM: NAVD88.
2. FIELD SURVEY PERFORMED BY HANCOCK ASSOCIATES ON APRIL 1, 2022 AS SHOWN ON DRAWING TITLED *"EXISTING CONDITIONS PLAN BARTLET MALL"* DATED MAY 17, 2022.
3. BATHYMETRY PERFORMED BY HYDRODATA AS SHOWN ON DRAWING TITLED *"HYDROGRAPHIC SURVEY, FROG POND, BARTLET MALL, NEWBURYPORT, MASSACHUSETTS"* DATED NOVEMBER 29, 2021.

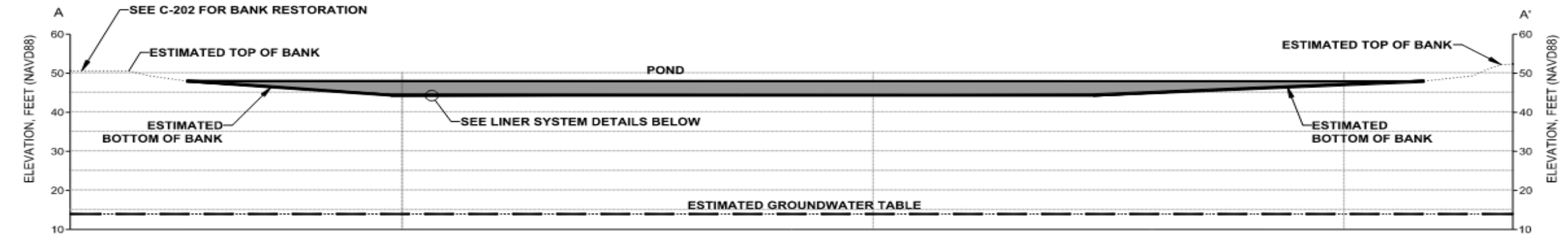
JAMES S. ASH 49174 REGISTERED PROFESSIONAL ENGINEER

BID SET - NOT FOR CONSTRUCTION

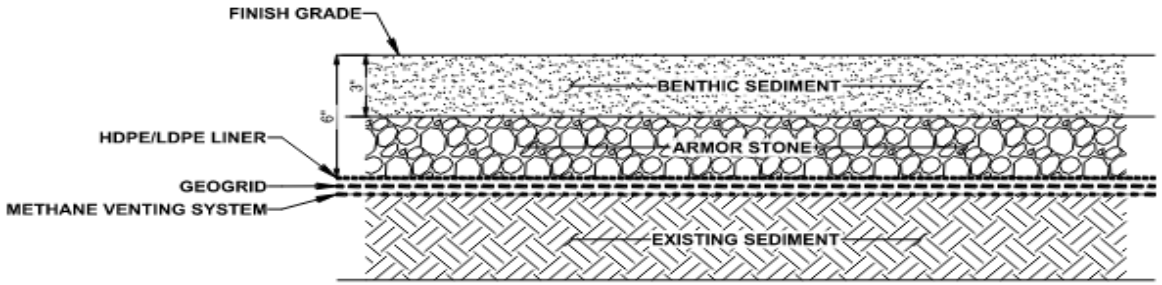
Proposed Liner Installation & Water Quality System Overview



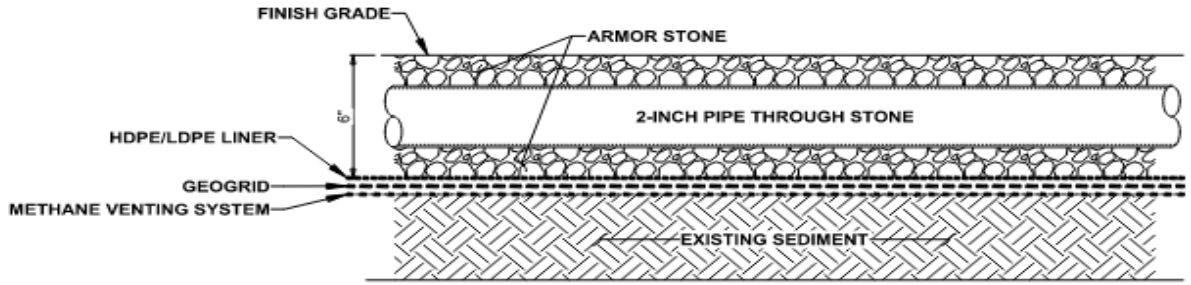
Proposed Liner Installation Details



NAVD88 = NORTH AMERICAN VERTICAL DATUM OF 1988.



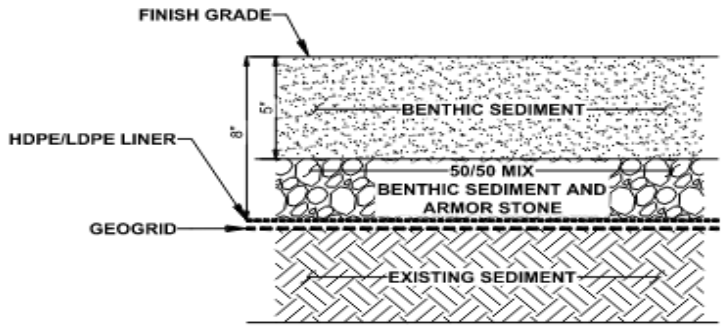
1 C-106 TYPICAL DETAIL
LINER SYSTEM
NO SCALE



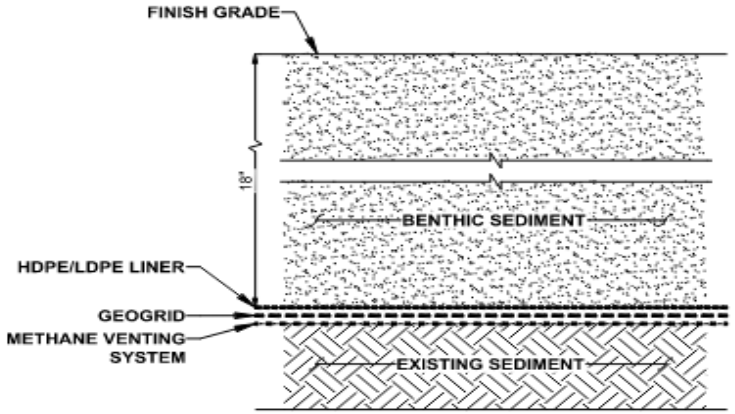
2 C-106 TYPICAL DETAIL
LINER SYSTEM AROUND WATER QUALITY PIPES
NO SCALE

NOTE:

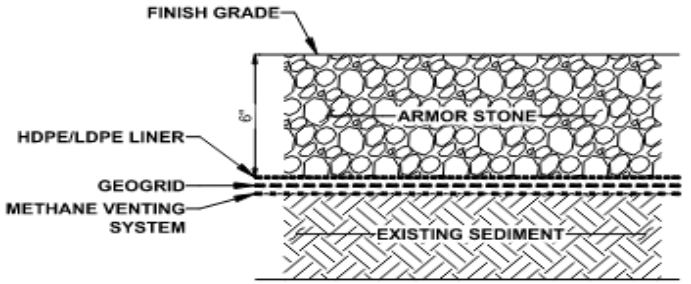
1. ARMOR STONE TRENCH FOR PIPING TO BE 2 FEET WIDE.



3 C-106 TYPICAL DETAIL
LINER SYSTEM ON VEGETATED BANK
NO SCALE



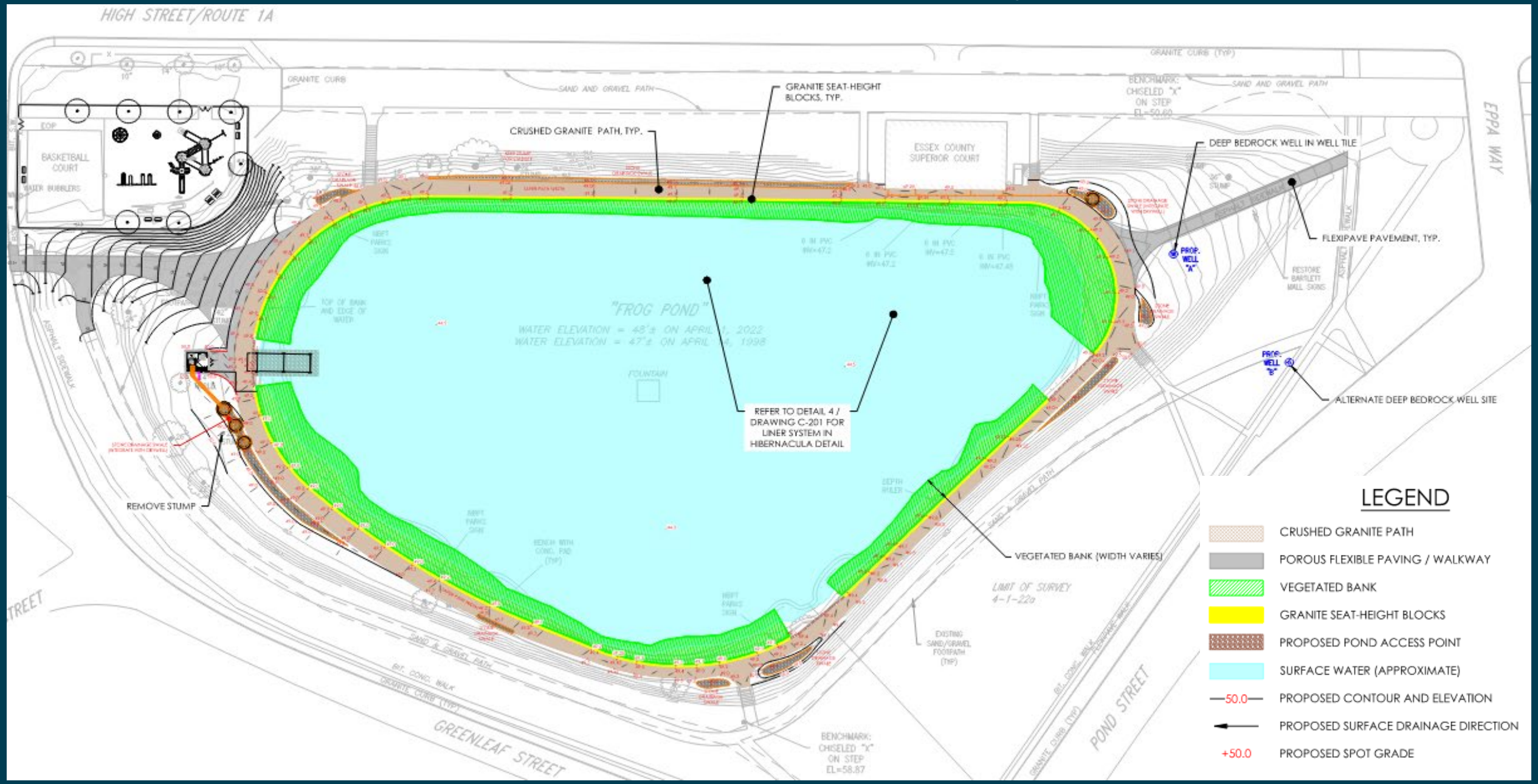
4 C-106 TYPICAL DETAIL
LINER SYSTEM IN HIBERNACULA
NO SCALE



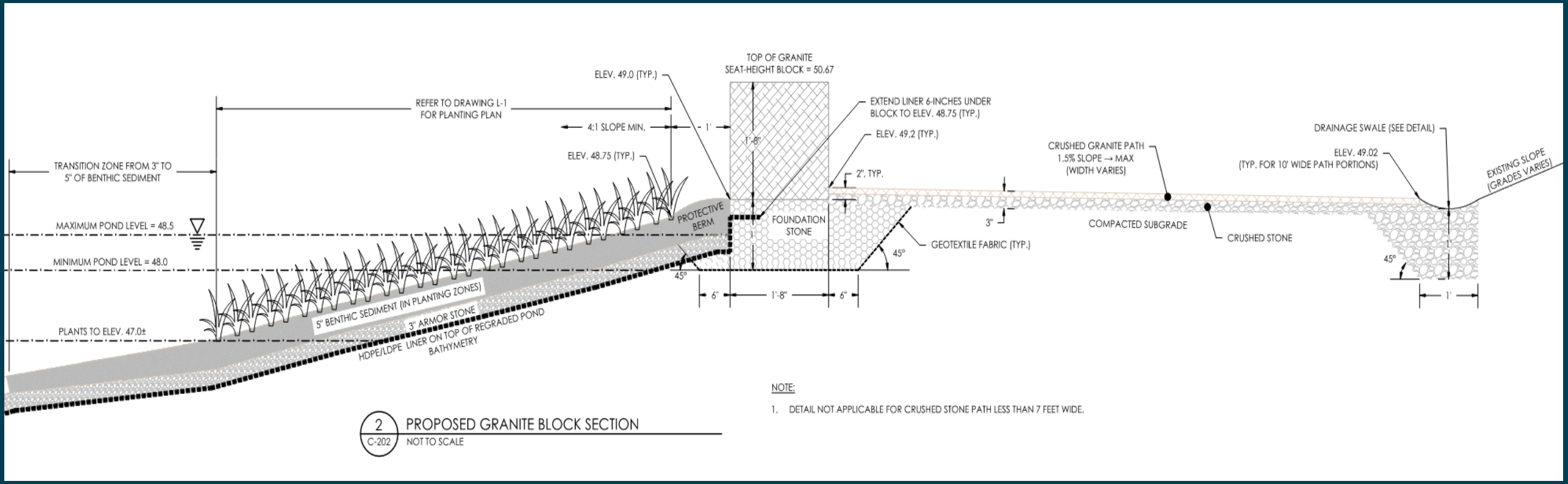
5 C-106 TYPICAL DETAIL
LINER SYSTEM AT DOCK
NO SCALE

BID SET - NOT FOR CONSTRUCTION

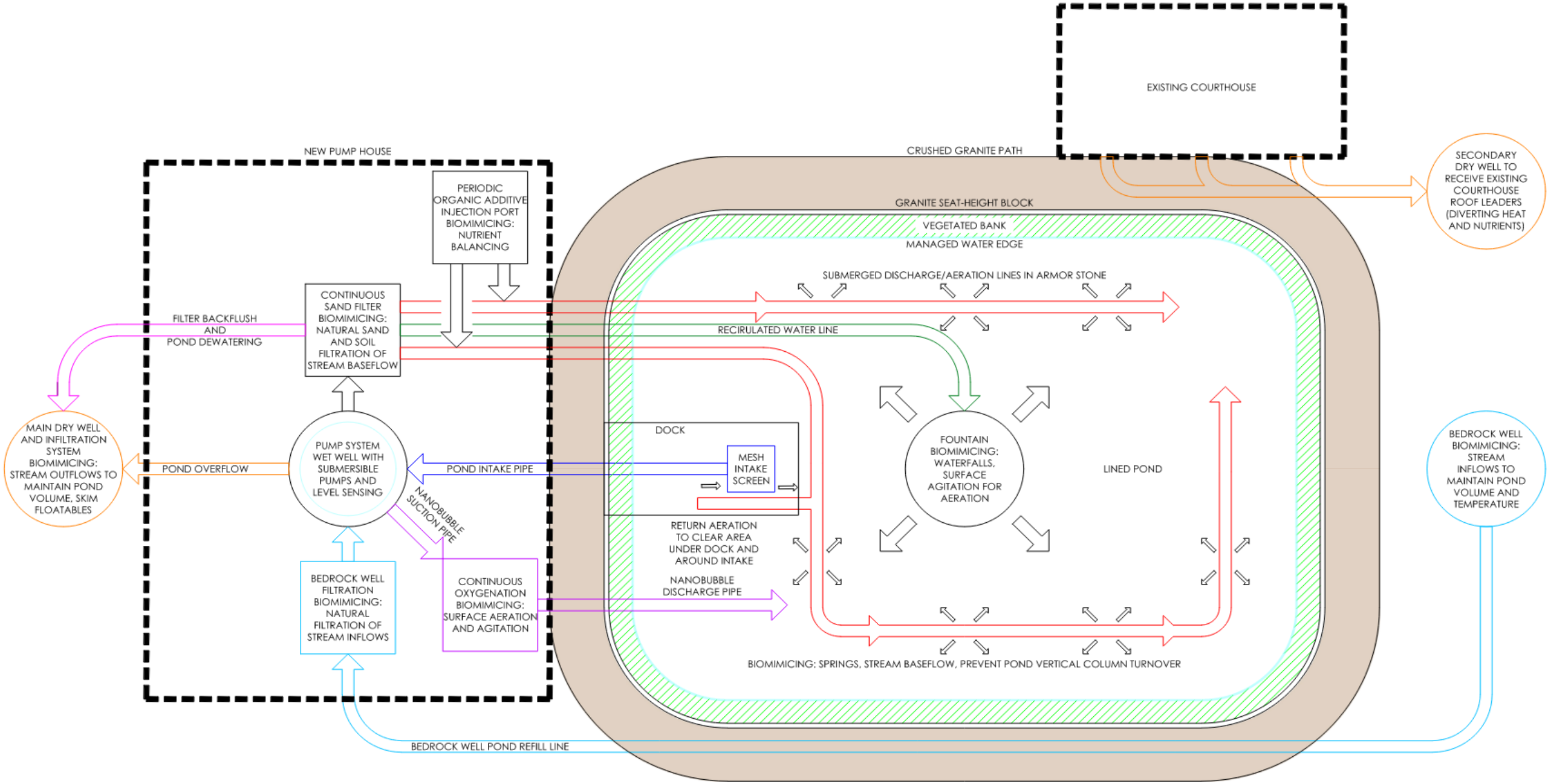
Proposed Bank, Granite, and Pathway Overview



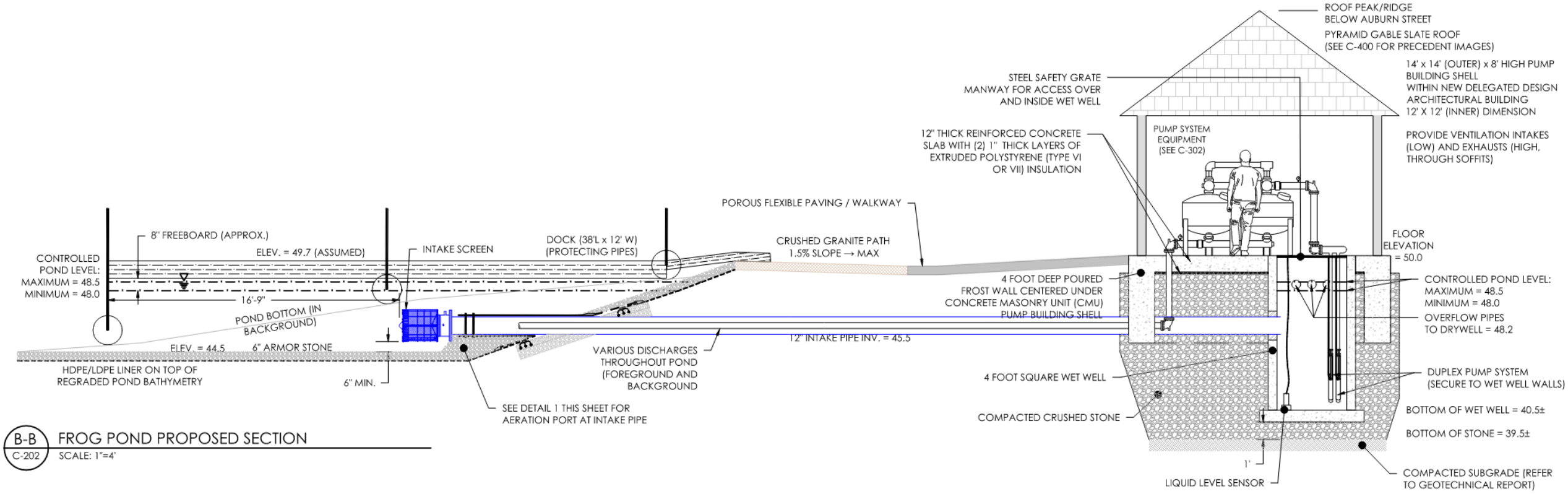
Proposed Bank, Granite, and Pathway Details



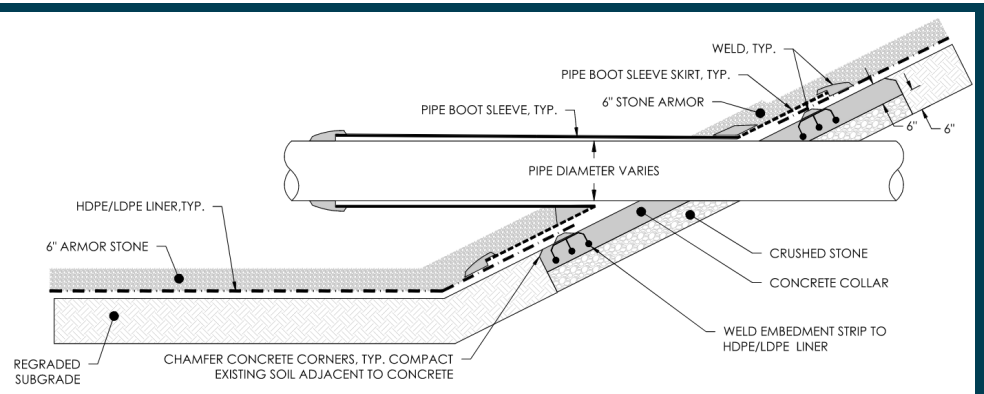
Proposed Water Quality System – Overview & Flow Diagram



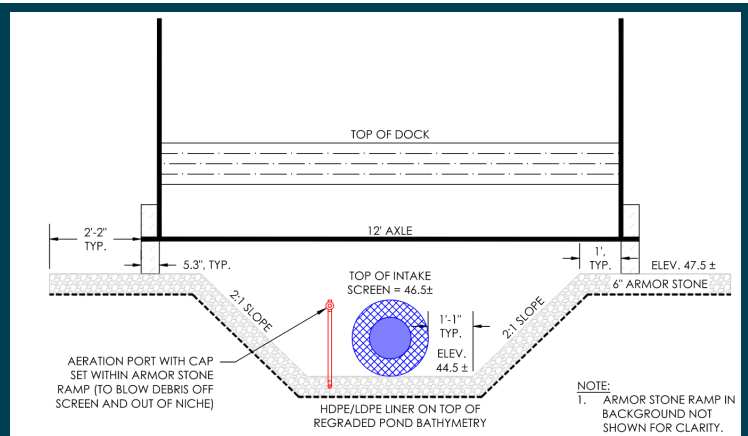
Proposed Pump House Details



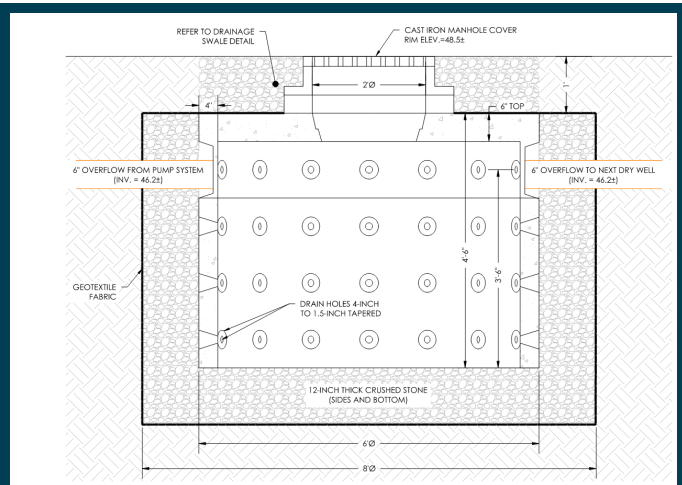
B-B / C-202 FROG POND PROPOSED SECTION
SCALE: 1"=4'



3 / C-202 TYPICAL PIPE PENETRATION THROUGH LINER SYSTEM
NOT TO SCALE



1 / C-202 DOCK CROSS SECTION AT INTAKE SCREEN
NOT TO SCALE



19 / C-205 PUMP SHED DRYWELL
NOT TO SCALE

Maintenance

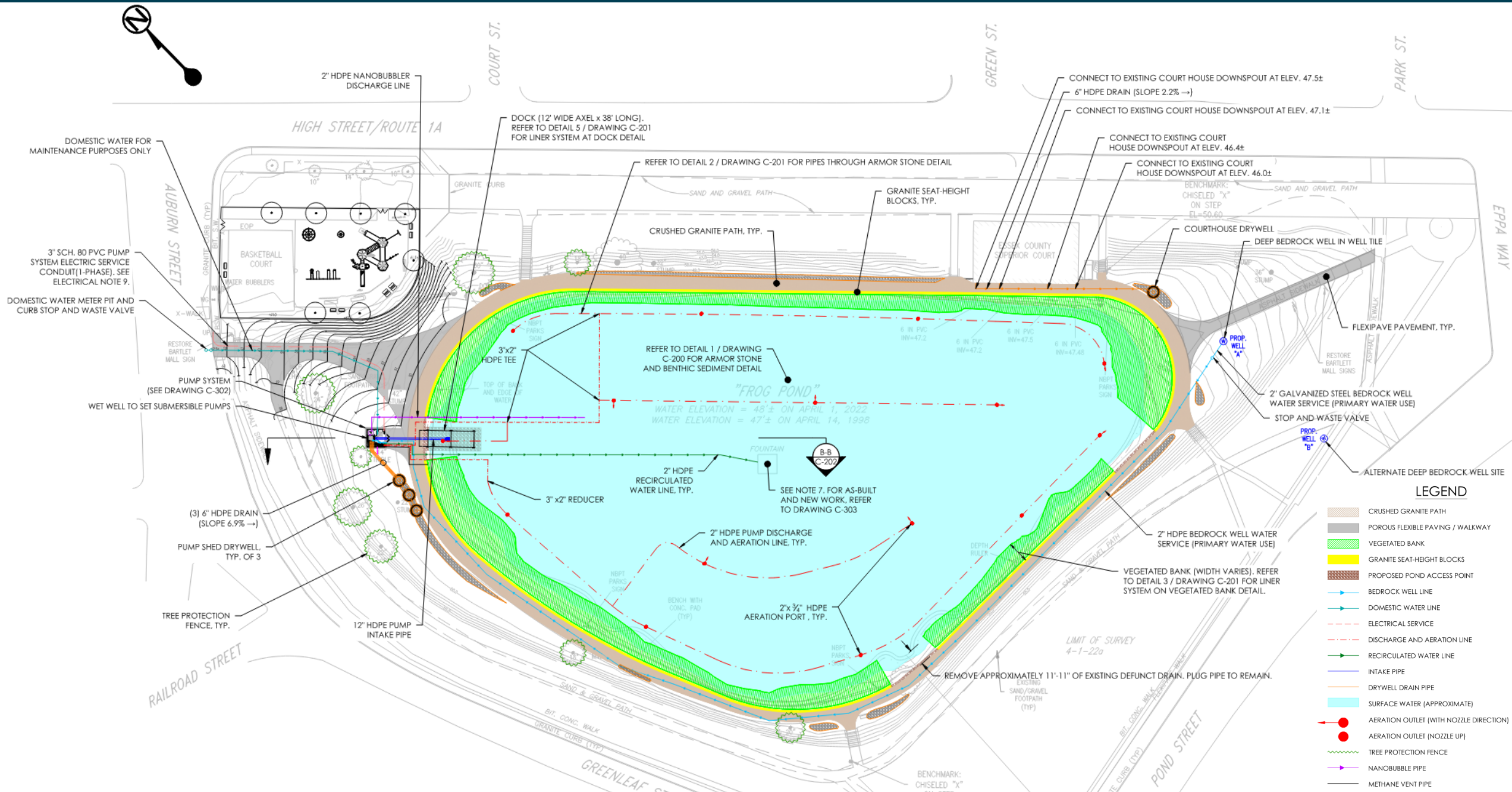
- Contractor will own first year of maintenance:
  - Replacement parts
  - Labor
  - Train City staff on how to operate
- Fully automated
- 150-man hours per year
  - 460 for Inn St
  - 245 for Atkinson Lily Pond
- $10-15K in utility costs annually
  - Boating program to offset costs
- Leaves will not plug intake and are desired to integrate into benthic environment

SIMILAR EQUIPMENT AND SHED AT ATKINSON COMMON (PRECEDENCE)

EASIER AND LESS DANGEROUS TO MAINTAIN THAN INN STREET (U.G. POWER & CHEMICALS)

Aqueous

Proposed Restoration Final Conditions



Questions

GEI Consultants

Aqueous