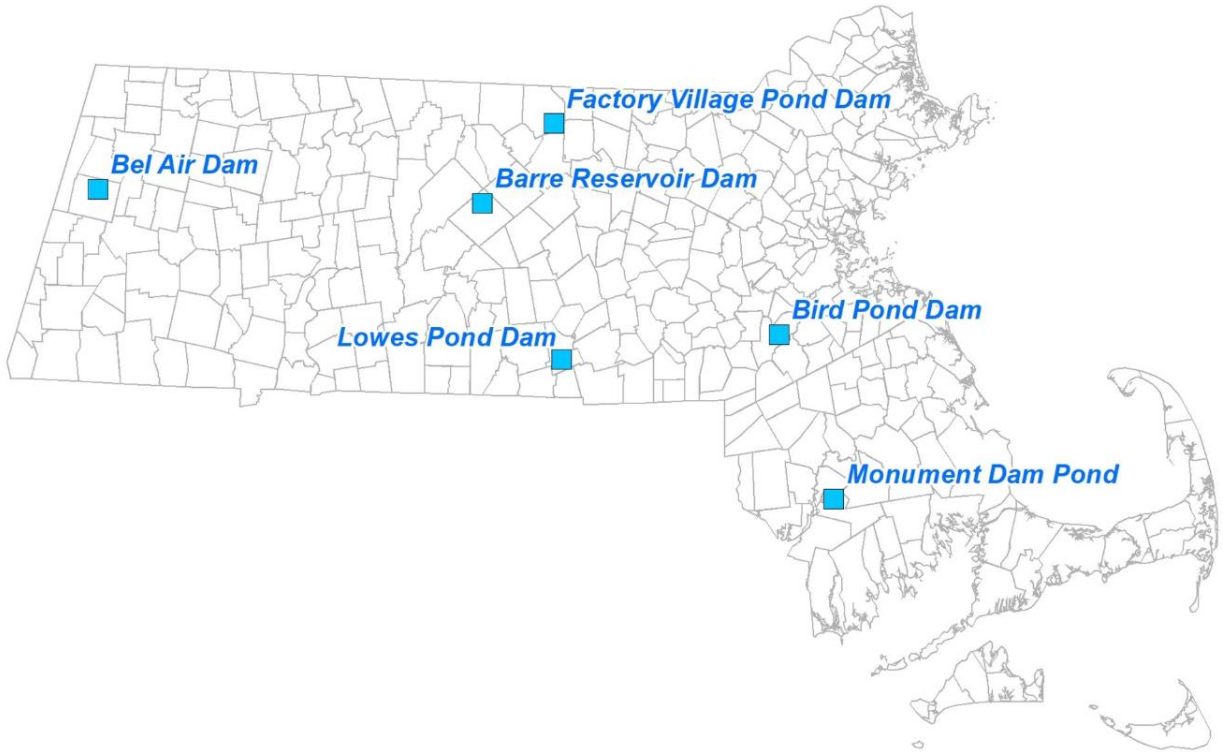
Bird Pond Dam

September 17, 2024

Agenda

- Project Background
- Evaluation Approach
- Phase II Investigation and Alternative Analysis
- Work to Date
- 2022 – 2023 Supplemental Alternatives Analysis and Conclusions
- Future Conditions and Artist Renderings
- Cost Breakdown of Alternatives
- Property Ownership Review
- Permitting
- Conclusions/Next Steps

DCR Abandoned Dams Program



These 6 are some of the many abandoned dams with no active ownership in the state. These were prioritized because they are the highest risk to the public as all are Significant or High Hazard dams in Unsafe to Poor condition. Currently Dam Safety inspects each dam regularly and hires contractors to perform maintenance as needed at Commonwealth's cost. Currently none comply with Dam Safety Regulations.

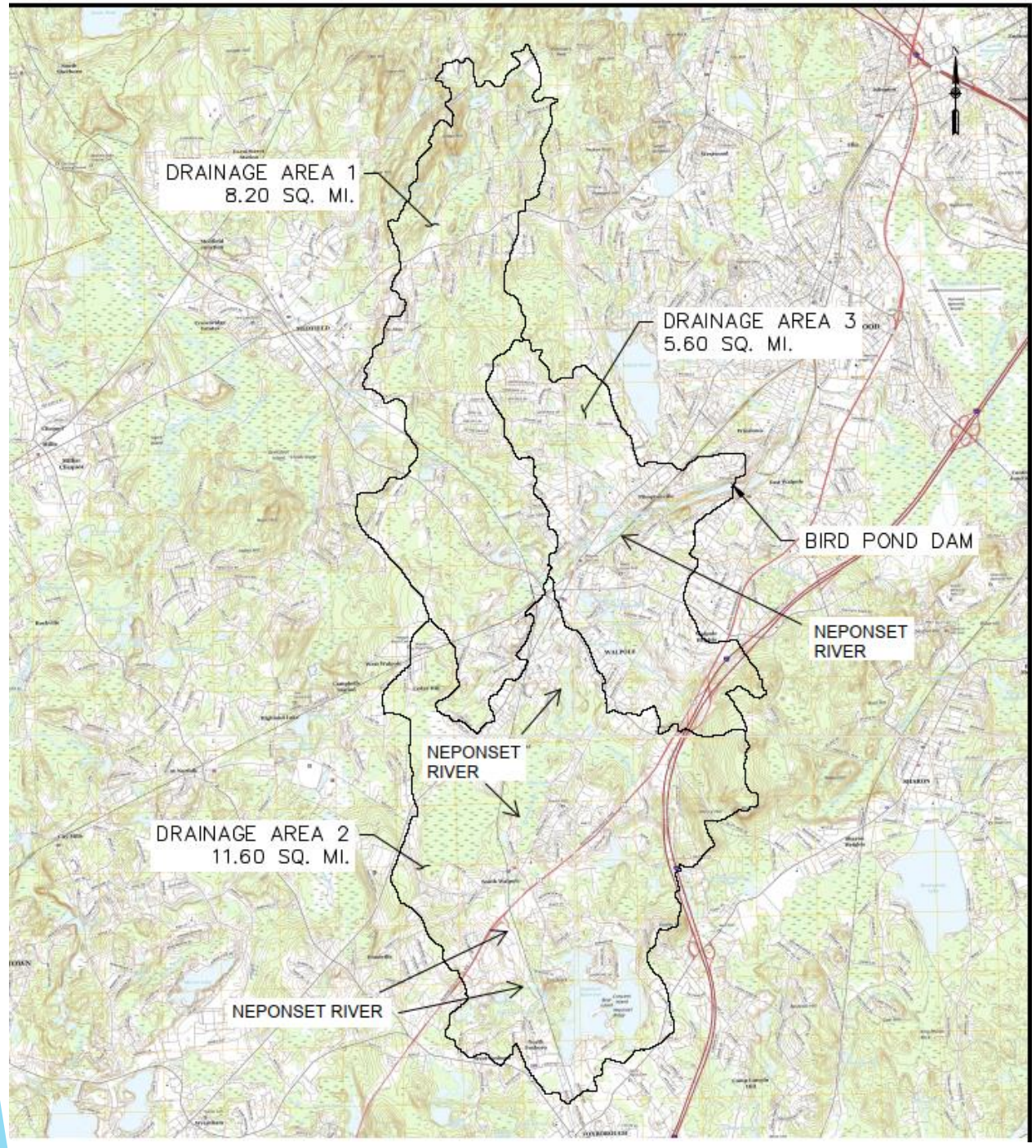
- Lowes Pond Dam, Oxford
- Monument Pond Dam, Freetown
- Factory Village Pond Dam, Ashburnham
- Bird Pond Dam, Walpole
- Bel Air Dam, Pittsfield
- Barre Reservoir Dam, Barre

Evaluation Approach

- Initial Municipal Outreach
- Phase II Investigation/Condition Assessment
- Develop Alternative Concepts / Costs to Achieve Dam Safety Compliance
  - Repair
  - Partial Removal to Achieve Non-Jurisdictional Dam
  - Full Removal
- Engage Community to Gain Consensus on Selected Alternative
- Repair Alternative
  - Requires Municipal Commitment to Achieve Property Ownership
  - DCR Implements Repairs Prior to Turnover
- Given no Municipal Interest, Full or Partial Removal is Preferred

Phase II Investigation and Alternatives Analysis Components

- Condition Assessment
- Topographic / Bathymetric Surveys
- Subsurface Investigation
- Spillway Adequacy Evaluation
- Seepage and Stability Evaluation
- Sediment Sampling and Management Plan
- Develop Alternative Concepts / Costs (Repair, Partial Removal, Full Removal)



NEPONSET RIVER WATERSHED UPSTREAM OF BIRD POND DAM IS 25.4 SQUARE MILES

Bird Pond Dam Condition

- Combined earthen embankment, stone masonry, and concrete structure dam
- Height of 18.5’, 430’ length with an impoundment capacity of 298 acre-feet
- Intermediate size, high hazard dam classification.
- Unsafe condition
- Issues with seepage and trespassers
- Businesses immediately downstream impacted by condition of dam
- **Spillway channel below buildings limits options to repair/remove due to limited capacity of 100-year storm**

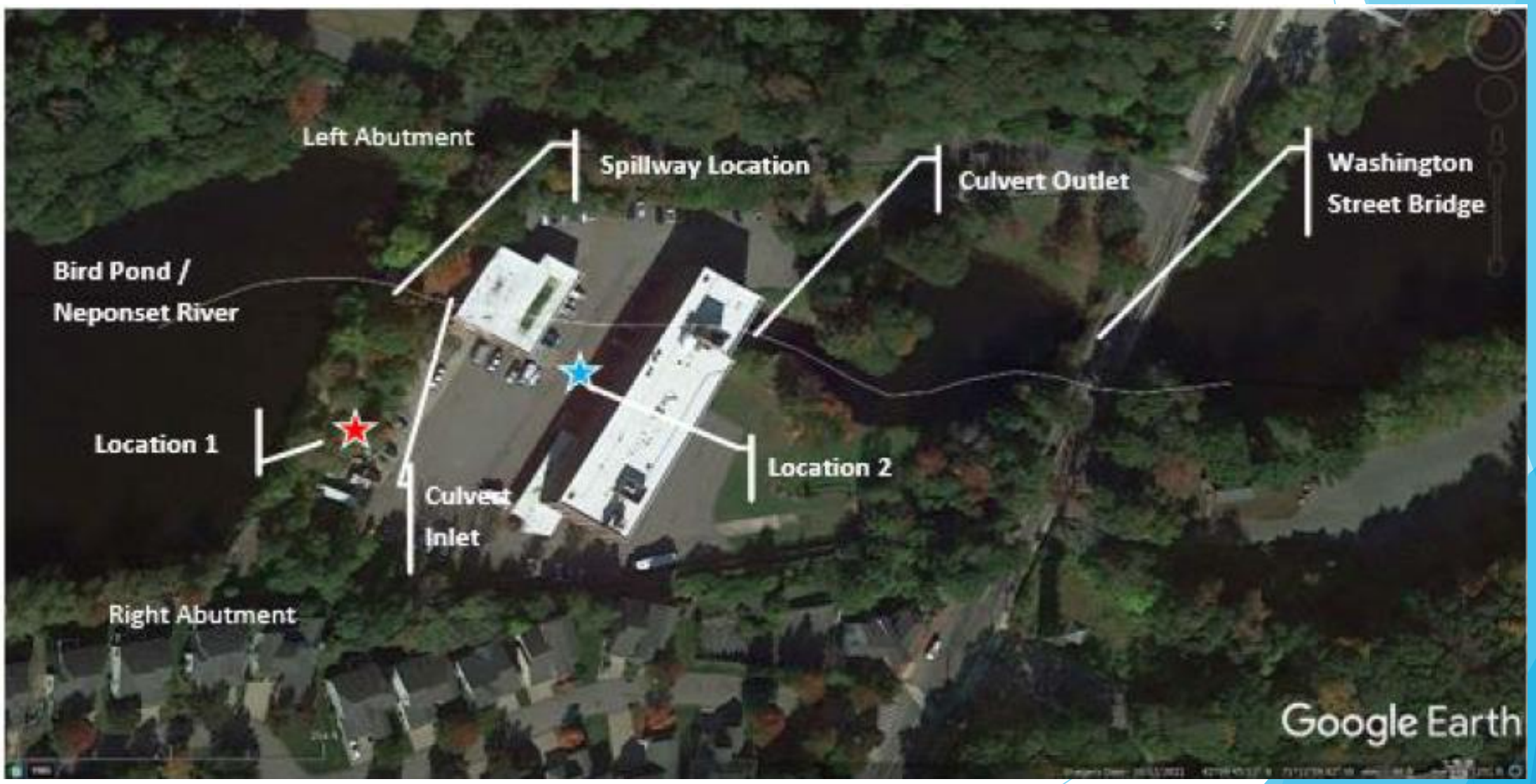
Bird Pond Dam Work to Date

- 2019 - 2020 Phase II Investigation and Alternatives Analysis Report
  - Dam repair recommended
- 2020 Seepage concerns after large December rain event
- 2020 Public safety concerns due to spring trespassing - fence installed
- 2021 30% Preliminary Design Report
  - Rehabilitate spillway and armor dam for overtopping during Spillway Design Flood (SDF)
  - Address seepage via either impervious blanket or secant pile system
- 2022 additional sediment characterization to refine repair costs
- 2023 Supplemental Alternatives Analysis
  - Dam removal downstream flooding impacts
  - Permanent spillway lowering of 1, 2 or 3 feet
  - Spillway removal

Sediment Sampling Results

- In May 2022, sediment samples were collected from 15 locations upstream of the dam, and one downstream location
- Overall absence of substantial exceedance of MassDEP's Massachusetts Contingency Plan (MCP) reportable concentrations (RCs)
- 4 samples exceeded RCS-1 standards for lead
- Alterations to dam would result in sediment being exposed and need to consider MCP notification
- Likely that sediments could remain in place in upstream impoundment

Bird Pond Dam Downstream Infrastructure



Supplemental Alternatives Analysis

- Multiple Scenarios Evaluated
  - Existing conditions
  - Dam breach
  - Spillway removal
  - Spillway and dam lowering scenarios
  - Spillway Design Flood (SDF) overtops under existing conditions and all scenarios
- US Bureau of Reclamation Technical Memorandum "Identification of Hazards" Methodology Applied
  - Flooding Depth and Velocity
  - Pedestrian Flood Level Relationships considered
  - Low-danger, High-danger and Judgement Zones

Summary of Scenarios Evaluated

Scenario	Dam/Embankment Overtopping Depth (Feet)				Downstream Parking Lot Conditions Depth (Feet)			
	10-Year Flood	50-Year Flood	100-Year Flood	500-Year Flood	10-Year Flood	50-Year Flood	100-Year Flood	500-Year Flood
Existing Conditions	0	0	0	1.3	0.2	1.2	1.9	4.0
Dam Breach*	0.4*	1*	1.4*	2.6*	0.6	2.6	3.0	4.0
Spillway Removal**	0	0	0	0	0.2	1.2	1.9	3.8

Judgement Zone

High Danger Zone

*Water depth over the breach elevation of elevation 90 over 120 feet, with 10% side slopes

**Dam embankment remains at current elevation 102; Spillway removed to elevation 86

Hydraulic Limitations

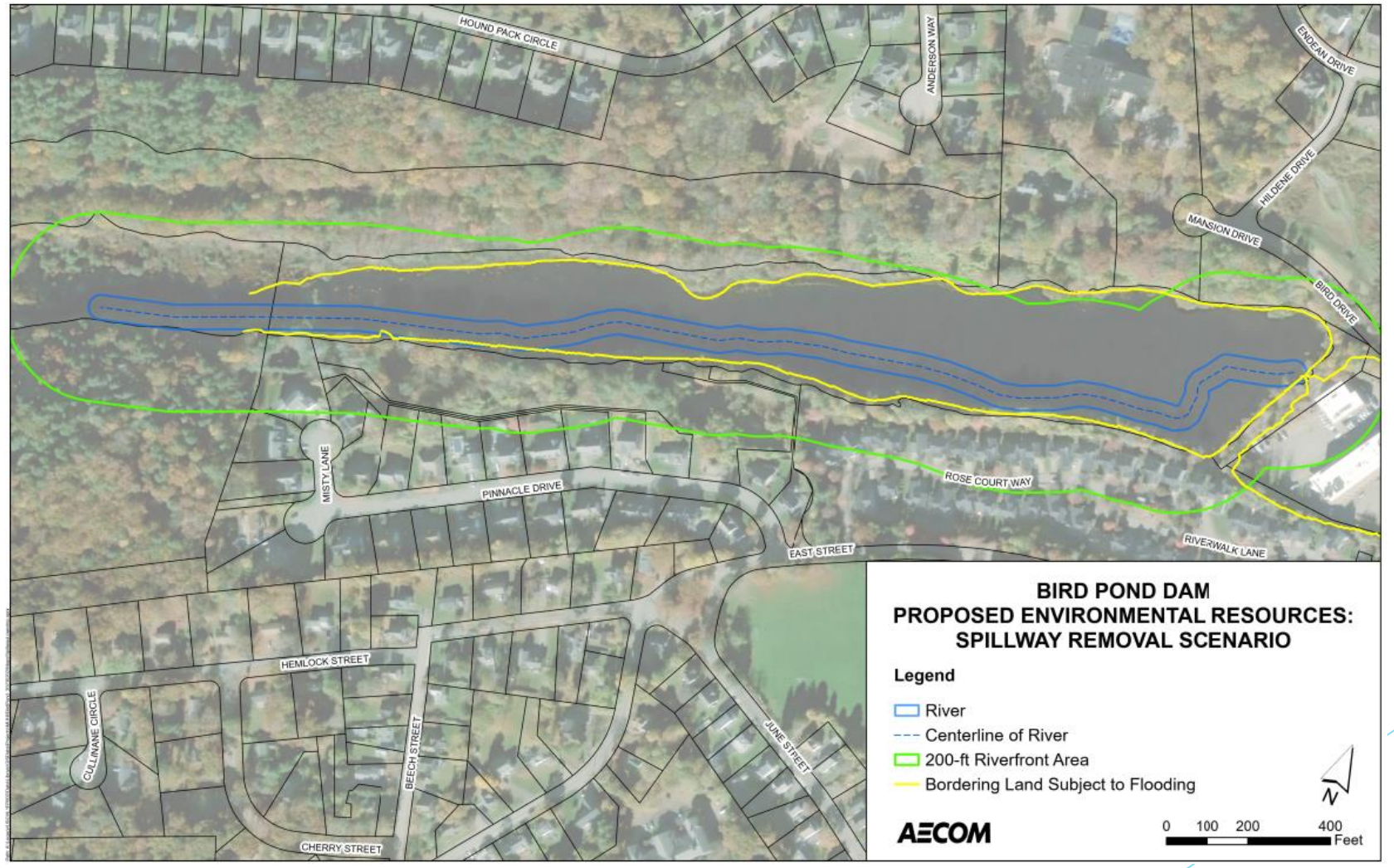
- Undersized culvert conveys flow below occupied buildings
- Very large watershed - 25.4 square miles
- Development immediately downstream
- Washington Street Bridge backwater
- Conclusion
  - Embankment should remain to reduce flood risk immediately downstream
  - Dry pool reduces risk to greatest extent possible compared to other alternatives
  - Dry pool improves conditions across range of flows
  - No concern for “sunny day” failure

Supplemental Alternatives Analysis Summary

- Town input on alternatives sought
- If dam were removed, infrastructure and businesses between dam and Washington St would likely experience increased risk of flooding
- Spillway Removal appears to offer more benefit than other alternatives
  - Other spillway lowering scenarios create higher risk of flood hazards downstream
  - Reduced flooding up to 500-year flood compared to existing conditions
  - Less expensive than lowering the permanent pool elevation by only two feet
  - Eliminates “Sunny Day” Failure Risk
  - Dam remains jurisdictional
- Upstream impervious blanket with cutoff trench selected for repair
- Negligible change in structural stability for various spillway elevations

Bird Pond Dam Spillway Removal Concept

Anticipated Future Wetland Resource Areas



Bird Pond

Existing and Proposed Views

Existing View from Dam/Bridge, looking Upstream (West-Southwest)

Future View from Dam/Bridge, looking Upstream (West-Southwest)

Existing View across the pond, looking North

Future View across the pond, looking North

Existing View of the Spillway, looking Southeast from the bank

Future View of the culvert, looking Southeast from the bank

Existing View of the Top of the Dam, looking North

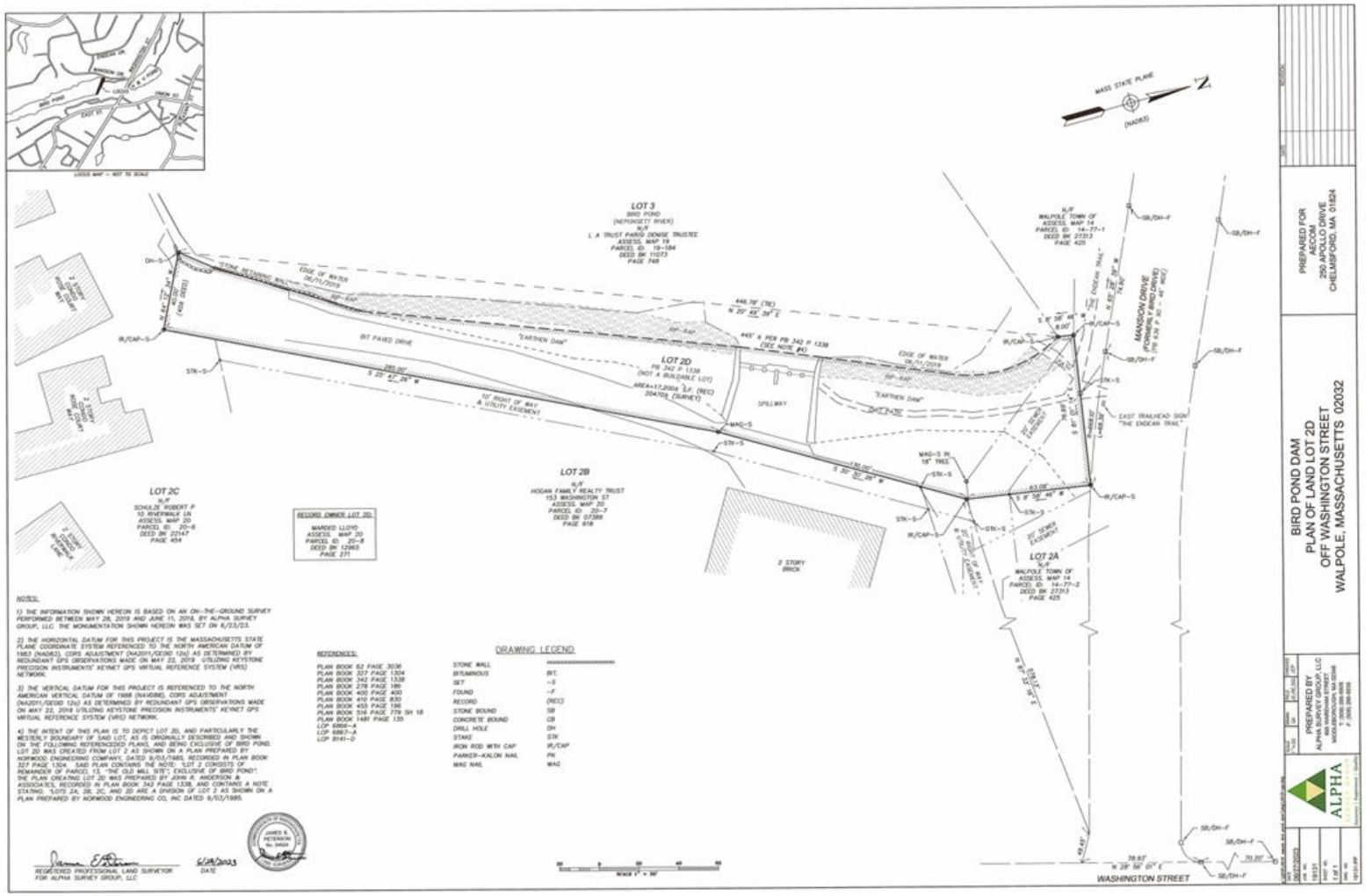
Future View of the Top of the Dam, looking North

Bird Pond Cost Breakdown of the Alternatives*

Item	Dam Repair	Dam Repair with Spillway Removal
Site Preparation and Final Restoration	$20,080	$20,080
Excavation, Grading and Backfill	$104,310	$134,530
Demolition of Existing Dam and Appurtenances	$123,050	$167,470
Repair of Existing Dam and Appurtenances	$2,006,000	$2,231,780
Water Diversion and Sediment Controls	$100,000	$100,000
Allowances (Sequence of Work Factor, Police)	$175,900	$203,920
SUBTOTAL - BASE CONSTRUCTION COST General Contractor Overhead & Profit (25% of Base) Estimate Contingency (35% of Base and OH&P)	**$2,529,340** $632,330 $790,410	**$2,857,780** $714,450 $893,060
TOTAL ESTIMATED CONSTRUCTION COST	**~$3,952,080**	**~4,465,280**

*Costs are based on 2nd quarter 2023 and not escalated

Bird Pond Dam Ownership



- Most of dam structure on Parcel 2D owned by Lloyd Marded
- Embankment/retaining walls on Parcel 2B owned by Hogan Family Realty Trust
- Impoundment owned by private party Denise Parise LA Trust c/o Michael Lamperti; purchase agreement by Wall Street Development Corp

Anticipated Permits

- MassDEP/Walpole Conservation Commission Wetlands Protection Act (WPA) Notice of Intent/Order of Conditions
- MassDEP 401 Water Quality Certification
- US Army Corps of Engineers General Permit Pre-Construction Notification (PCN)
- Massachusetts Historical Commission Project Notification Form (PNF)
- US Fish and Wildlife Service Endangered Species Consultation
- Chapter 253 Dam Safety Permit
- Chapter 91 Massachusetts Public Waterfront Act
- Massachusetts Environmental Policy Act (MEPA) Environmental Notification Form (ENF) and Environmental Impact Report due to decrease in impoundment capacity
- FEMA Compliance

Conclusions

- Dam reduces risk of flood impacts to downstream businesses and infrastructure
- Spillway removal preferred
- Operating a dry dam reduces risk and offers incremental protection
- DCR would fund and implement repair design, permitting and construction
  - Repair design not yet completed and extensive permitting
  - Public ownership needed to implement repairs
  - Land rights
  - Construction access easements needed
  - Ongoing inspections required
  - Long-term operation and maintenance needed (mowing, rip-rap vegetation removal)
- Town input on alternatives sought

Next Steps

- Public Meeting Tuesday September 17, 2024
- Select Board Meeting Tuesday October 8, 2024
- Reach Consensus on selected alternative
- DCR would fund and implement repair design, permitting and construction
- Additional field data collection/advance design
- Multiple local, state and federal permits, including MEPA
- Continued outreach with public
- Continued collaboration with Town of Walpole
- Final Design
- Bidding and construction

Questions?