Orleans Water Quality Advisory Panel

Water Quality and Wastewater Planning

Program Status Update

November 9, 2016

Agenda

- Approval of Meeting Minutes of October 19, 2016
- Public Comment
- Tri-Town Septage Treatment Facility Decommissioning and Demolition Update
- Update of Financial Analyses
- NT Technology Demonstration Project Status
- Downtown Area Preliminary Design Report - 25% Design
- Monitoring and Modeling Plan (AMP) Update

Break

- Amended CWMP Document: Next Steps
- Goals for Spring Town Meeting
- Environmental-Water Resources Staff Position
- Other Items & Public Comment

Tri-Town Septage Treatment Facility Decommissioning and Demolition Update

- **Decommissioning Plan**
  - Completed
- **Design Phase**
  - Prepared 100% Contract Documents for Demolition for Tri-Town Septage Treatment Facility and Compost Facility
  - Coordination and Permit Meetings
    - Orleans Site Plan Review Committee – Meeting to be Scheduled
    - Old King's Highway Regional Historic District – Need to file an application for demolition

Tri-Town Septage Treatment Facility Decommissioning and Demolition Update (cont.)

- **Schedule**
  - Decommissioning – June 2016 thru August 2016
  - Contract Documents – June 2016 thru November 2016
  - Bidding – November 2016 thru February 2017
  - Town Meeting Appropriations (Brewster, Eastham & Orleans) – May 2017
  - Demolition – September 2017 thru February 2018

- **Estimated Construction Costs**
  - Tri-Town Septage Treatment Facility: $2,300,000
  - Compost Shelter: $450,000

Update Financial Analyses

- **Model Updated to Run Multiple Scenarios**
  - Costs (capital and/or O&M) allocated to different user groups:
    - Downtown commercial property owners
    - Downtown residential owners
    - MHP users
    - Non-Traditional technology users
    - On-site septic site owners (outside of NT areas)
  - Adjusted cost of replacement of on-site system for parcels in N-sensitive areas, assuming NT technologies are effective and permit
  - Costs allocated to either property tax, special assessments, or user fees table (e.g. allocated NT project O&M costs to all parcels in town; allocated NT project capital costs to all parcels in town through tax levy)
- **Evaluating Various Affordability Determination Criteria and Tools**
- **Preparing OWQAP Presentation on Affordability**

Update Financial Analyses (cont.)

- **Next Steps**
  - Confirm and update all cost estimates
  - Link property tax assessment and water use data to model and develop more specific costs per typical user
  - Evaluate phasing to spread capital & O&M costs to reflect actual implementation requirements
    - Implementation and confirmation of NT performance and permittability
    - Realities of downtown system needs and redevelopment plans,
    - Affordability with respect to Town's overall10-year capital plan
    - Update and confirmation of MEP models and TMDL requirements
  - Investigate metrics for non-residential affordability

NT Technology Demonstration Project Status

- **Aquaculture**
- **Permeable Reactive Barriers (PRB)**
- **Nitrogen Reducing Barriers (NRB)**

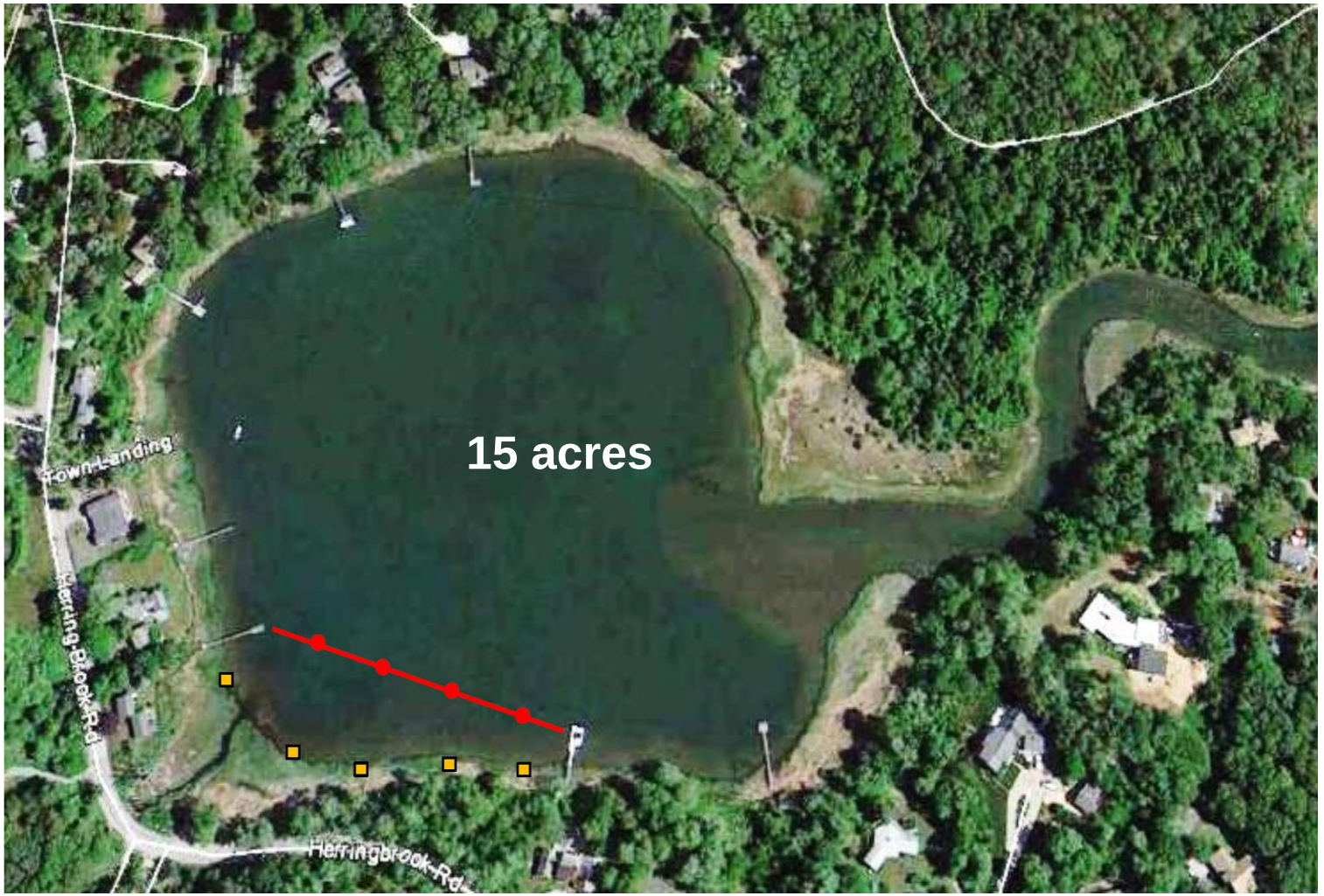
NT Technology Demonstration Project Status

Aquaculture

Anastasia (Sia) Karplus
Science Wares, Inc.

November 9, 2016

NT Technology Demonstration Project Status
Aquaculture – Lonnie's Pond



NT Technology Demonstration Project Status
Aquaculture – Lonnie's Pond Monitoring Water Quality

- **Sampling from June 2016 – November 2016**
- **Weekly grab samples analyzed for:**
  - Temperature, salinity, total nitrogen (nitrate + nitrite, ammonia, dissolved organic nitrogen, particulate organic nitrogen), chlorophyll-a (Chl-a), pheophytin-a, orthophosphate, dissolved oxygen (DO), transparency (secchi depth), and alkalinity
- **Continuous monitoring SONDES for:**
  - DO, Chl-a

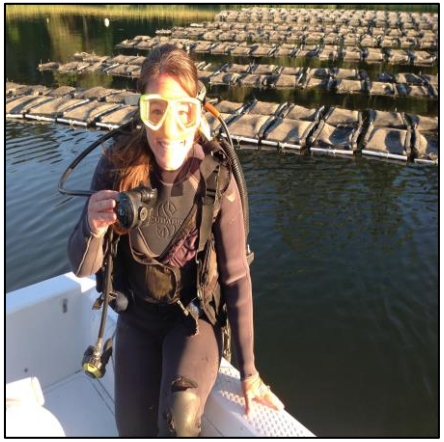
SMAST University of Massachusetts Dartmouth The School for Marine Science and Technology

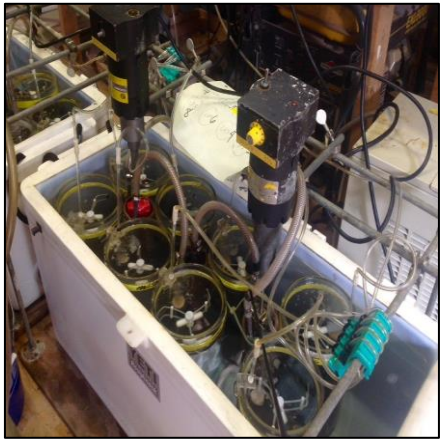
Coastal Systems Program SMAST

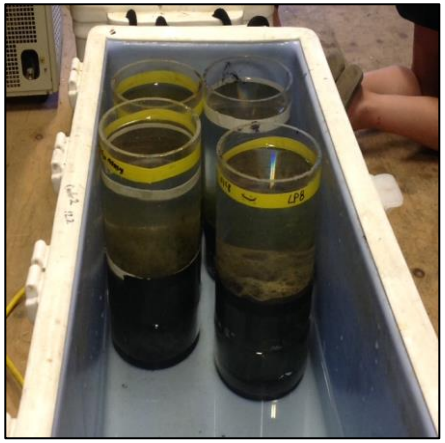
AECOM

NT Technology Demonstration Project Status
Aquaculture – Lonnie's Pond Monitoring Sediment

Collecting sediment cores for incubation and denitrification analysis







NT Technology Demonstration Project Status
Aquaculture – Lonnie's Pond Next Steps - Full-Scale

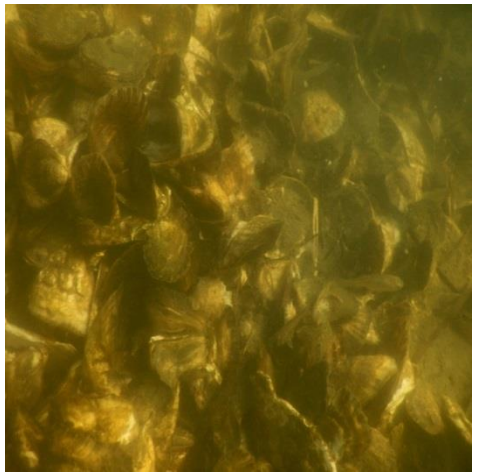
- **February 2017**
  - Based on results of monitoring (SMAST report due January 31, 2017), determine biomass and optimal starting size of shellfish needed to clean-up Lonnie's Pond
- **February/March 2017**
  - Finalize plans for 2017 installation
  - Order seed
  - Estimate long-term costs
- **March 2017**
  - Permitting with Conservation Commission
- **April – June 2017**
  - Purchase seed and gear and install project

NT Technology Demonstration Project Status
Aquaculture – Oyster Bed

- **Phase I: Seven sites evaluated to install one demo**
  - Town Cove, Mill Pond, Little Pleasant Bay, Pochet, Arey's, Lower River, Quanset
- **Phase II: Additional sites evaluated for oyster bed demo**
- **Kent's Point emerged as preferred location for a number of reasons**
- **Process documented in three Tech Memos**

NT Technology Demonstration Project Status
Aquaculture – Kent's Point Oyster Bed

- **Installation Process**
  - November/December 2016
  - ConCom RDA (Application/Hearing)
- **January/February 2017**
  - Order 500 bags of spat-on-shell
- **February/March 2017**
  - Purchase and assemble floating
  - Bags
- **June 2017**
  - Install spat-on-shell in floating
  - bags at Kent's Point



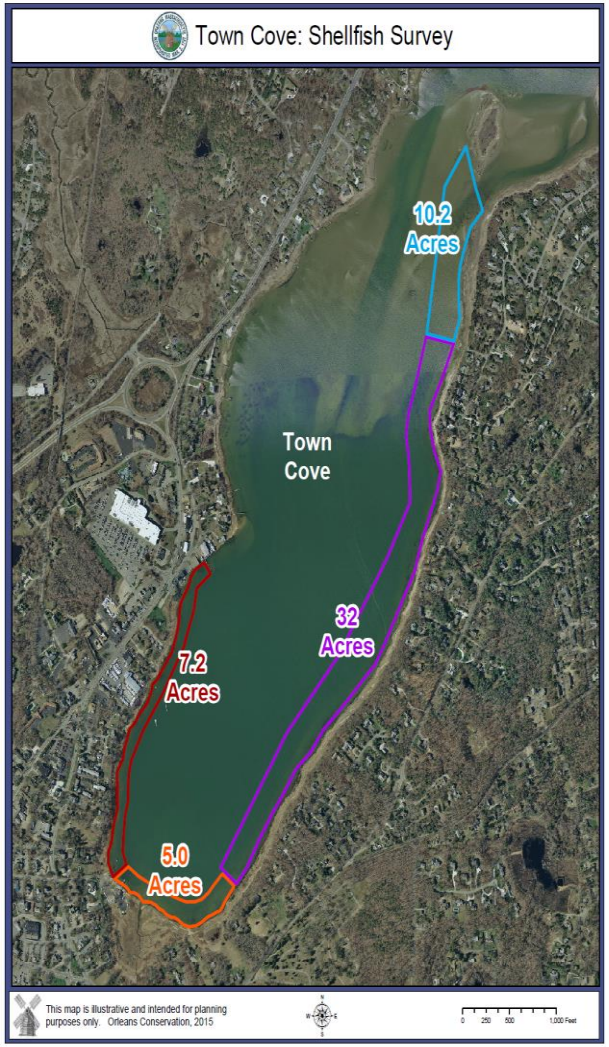
NT Technology Demonstration Project Status
Aquaculture – Expansion / Working with Growers

- **Goal**
  - Build on previous experience with growers to enhance shellfish production through private aquaculture in Pleasant Bay and assess the feasibility of increasing private aquaculture in Town Cove

- **Project Components (November 2016 - June 2017)**
  - Interview questions to gauge growers' willingness to expand shellfish propagation for the purposes of water quality improvements and increased economic benefit
  - Work with growers to identify techniques that could increase production; and establish a feasible estimate for shellfish grown and harvested annually for all leases in aggregate
  - Discuss potential for the private sector growing shellfish in terminal ponds
  - Coordinate with Shellfish and Waterways Committee
  - Evaluate areas in Town Cove for potential expansion of shellfish leases, beginning with a questionnaire to waterfront landowners.

NT Technology Demonstration Project Status
Aquaculture – Quahog Population Survey

- **Purpose of survey:**
  - Establish a baseline quahog population and determine appropriate numbers of additional quahogs to be planted for water quality benefits
- **Scope of Work completed**
- **Population survey to be conducted in early spring**
- **Coordination with interested parties ongoing**



Town of Orleans Massachusetts

Thank You

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NT Technology Demonstration Project Status

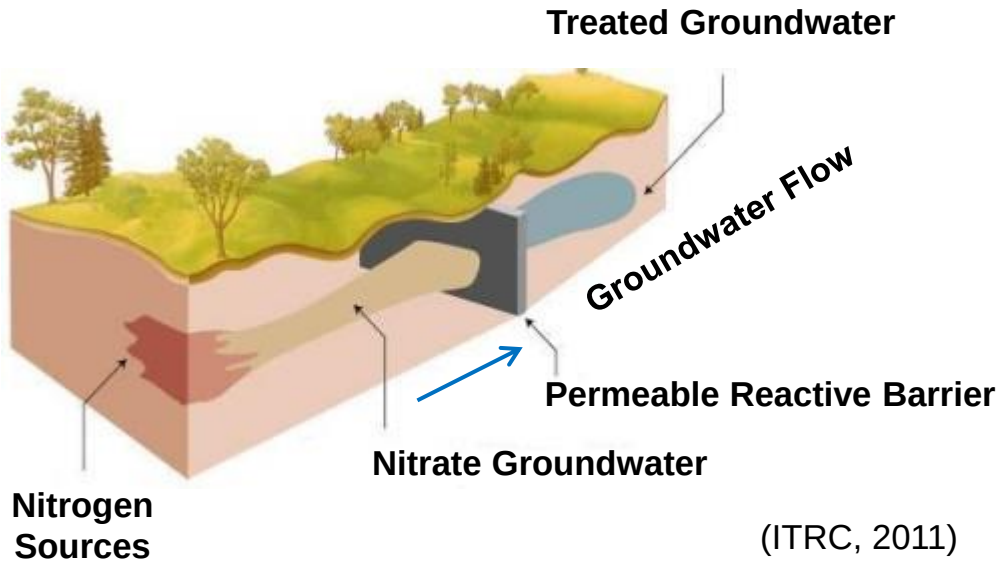
Permeable Reactive Barrier (PRB)

James Begley
MT Environmental Restoration

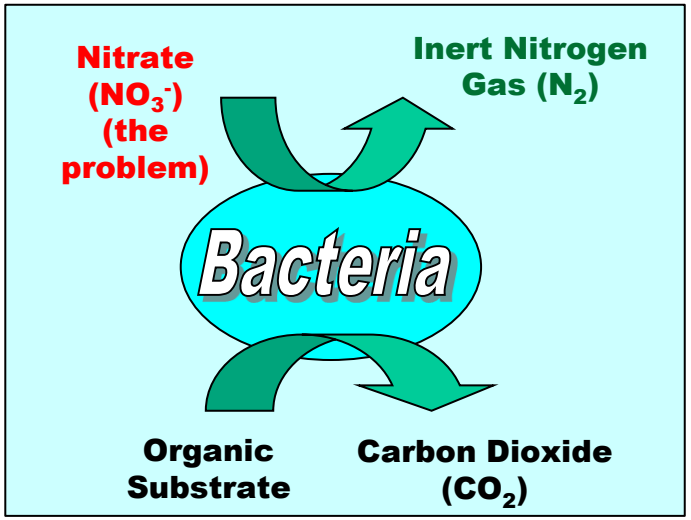
November 9, 2016

NT Technology Demonstration Project Update
PRB - Subsurface PRB

- **A PRB consists of a zone of reactive material installed in the path of a plume (e.g. nitrate)**



(ITRC, 2011)



- **Naturally-occurring bacteria to convert nitrate to inert nitrogen gas (N_2)**
- **Requires anoxic (low oxygen conditions)**

NT Technology Demonstration Project Update
PRB - Activities

- **Evaluated numerous sites for placement of PRB**
- **Collected groundwater and soil samples**
- **Recommended PRB Demonstration Test sites**
  - Eldredge Park
  - Town Landfill
- **Preliminary Engineering Work Plan for PRBs**
  - Conceptual design
- **Final Technical Memos available on Town website**

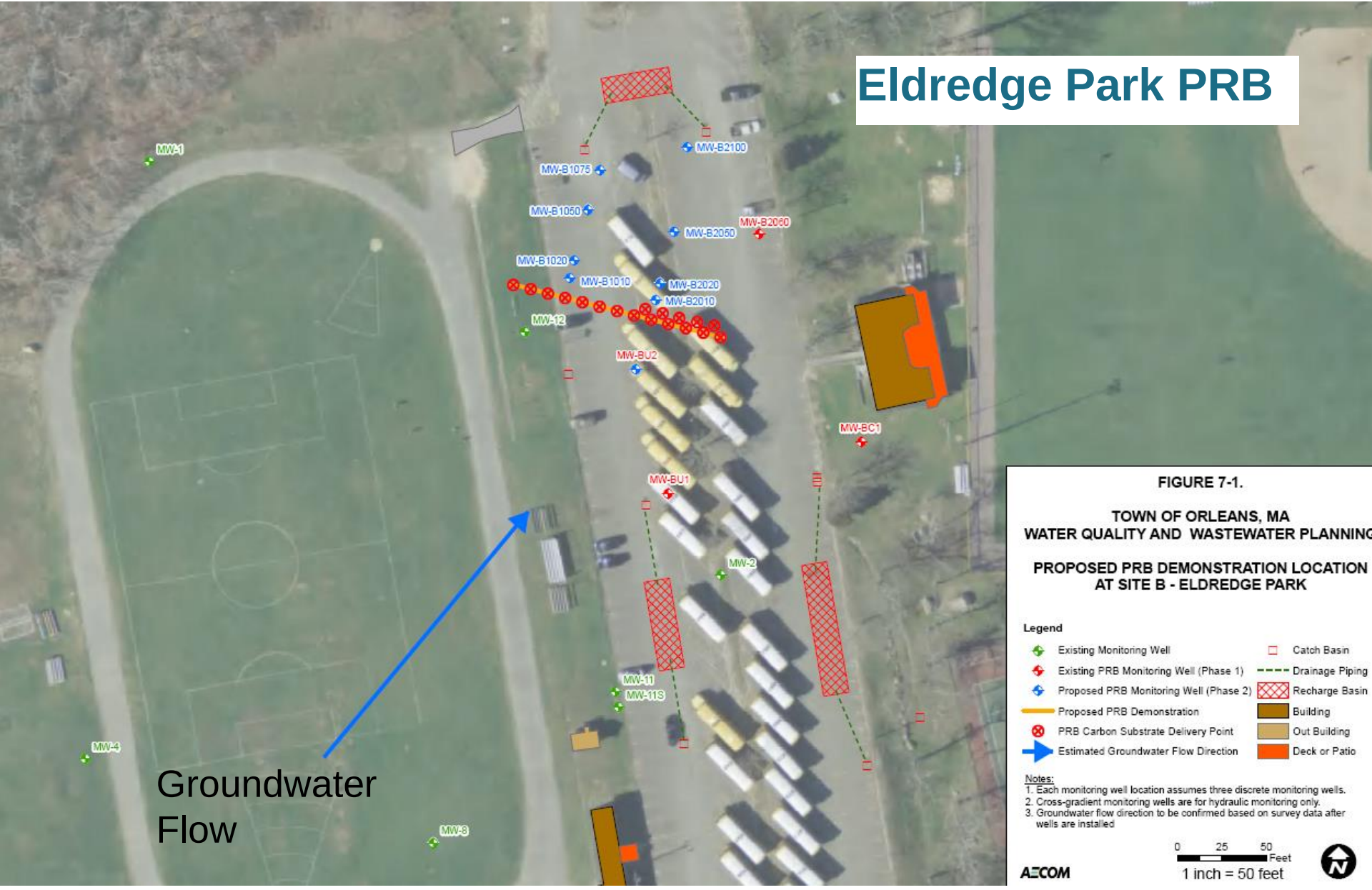
http://www.town.orleans.ma.us/water-quality-advisory-panel/pages/aecom-contract-and-deliverables

NT Technology Demonstration Project Update
PRB - Eldredge Park Soil Boring/Well Installation

NT Technology Demonstration Project Update
PRB - Eldredge Park Well Installation and Testing

- **Phase 1**
  - 4 monitoring wells installed in September and sampled
  - Groundwater flow confirmed to northeast
  - Test results suggested a shift of the PRB line ~ 100 feet to the north
- **Phase 2**
  - Remaining monitoring wells installed week of 31 October
  - Groundwater has been sampled – awaiting results
  - PRB Injection Planned for week of 14 November

Eldredge Park PRB



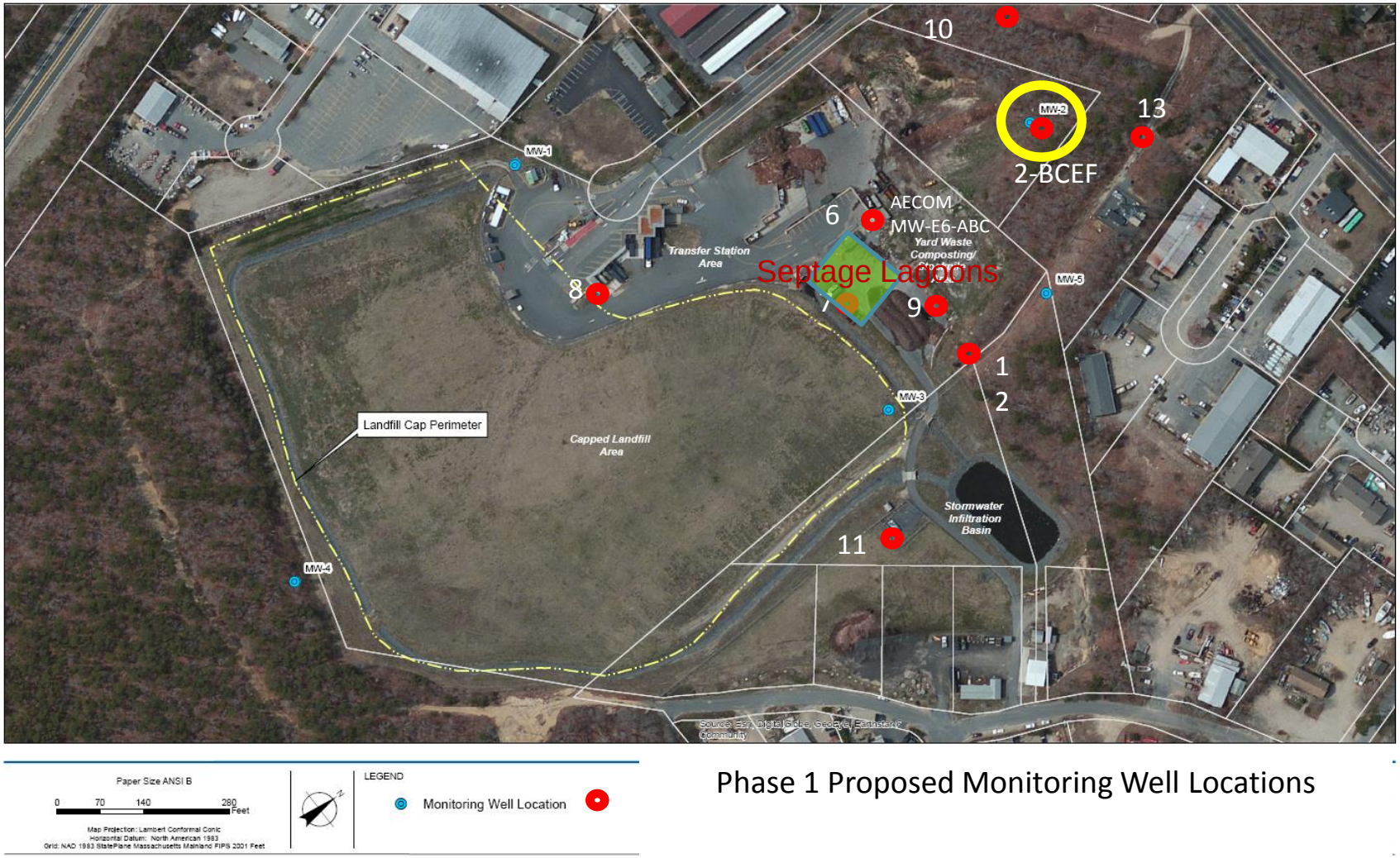
NT Technology Demonstration Project Update
PRB - Landfill Overview

- **Issues**
  - Total groundwater nitrogen flux from the landfill is not well defined
  - 1,4-dioxane has been detected in landfill monitoring wells at concentrations 4 to 6 times higher than the relevant Massachusetts Standard of 0.3 µg/L (concentration at MW-2S = 1.4 to 1.9 µg/L)

- **Field investigation and analysis at Landfill planned to develop conceptual site model and alternatives to remove total nitrogen and address 1,4-dioxane**
  - Phase I groundwater assessment work to start in November 2016
  - Phase 2 additional assessment, risk evaluation, feasibility of alternatives, and conceptual design of corrective actions

- **Coordination with DPW during facility redesign/construction to address source areas and corrective actions**

NT Technology Demonstration Project Update
PRB – Landfill Plan



Phase 1 Proposed Monitoring Well Locations

Thank You

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NT Technology Demonstration Project Status

Nitrogen Reducing Barriers (NRB)

Thomas Parece
AECOM

November 9, 2016

NT Technology Demonstration Project Status
Nitrogen Reducing Barriers (NRB)

- **Prepared a Draft Technical Memorandum on Nitrogen Reducing Barriers Feasibility – 10/06/16**
- **Prepare Final Technical Memorandum on Nitrogen Reducing Barriers Feasibility**
- **Identify Potential Funding Sources for Demonstration Test**

Downtown Area Preliminary Design Report - 25% Design

- **Scope of Work**
  - Topographic Survey, Subsurface Investigation, and Cultural Resource Evaluation
  - Update Collection System Type Evaluation and Preliminary System Configuration
  - Update WWTF Process Selection
  - Prepare Design Data
  - Program Cost Estimate
- **Key Scope of Work Components**
  - Recommend System Configuration and Technologies
  - Recommend Procurement Method
  - Updated Cost Estimates
- **Complete Prior to Spring 2107 Town Meeting**

Monitoring and Modeling Plan (AMP) Update
SMAST Technical Assistance: FY-17/18 Scope

- **Water Quality Project Baselines**
  - Marine and fresh waters
  - Organize WQ data base, QA/QC, gap analyses
  - Baselines for demonstration projects
- **Shellfish Demonstration Project Implementation**
  - Lonnies Pond continuation
  - Town Cove quahog inventory
  - Kent's Point demonstration plan
  - Expansion of existing grants
- **MEP Model Updates**
  - Pleasant Bay MEP prep in cooperation with PBA Towns
  - Nauset: Remodel/confirm with new boundary condition

Monitoring and Modeling Plan (AMP) Update (cont.)
SMAST Technical Assistance: FY-17/18 Scope

- **Cedar Pond – Rock Harbor Creek Planning**
  - Monitoring and technical assistance
  - Preliminary alternatives review for plan update or Rerun MEP for saline Cedar Pond and evaluate
- **Namskaket Watershed Plan (with Brewster)**
  - Consolidate and review data bases
  - Define stresses, threats
  - Scope additional studies and watershed plan scope
- **Fresh Water Ponds**
  - Update and organize data base
  - Update pond trophic screening and prioritization
  - Develop draft plan and budget for priority project
- **Landfill Nitrogen – Town Cove N-Loading Assessment**

Break

Amended CWMP Document: Next Steps

- **Comments Compiled (and Provided to OWQAP)**
- **Major Issues and Recommendations to be Discussed with BOS on 11/09/16**
- **Updated ACWMP will be provided to BOS on 11/30/16**
- **BOS to provide comment and "agreement" on 12/9/16 to distribute the ACWMP to CCC and MassDEP for their review and comment on compliance with regulatory processes**
- **Continue to update ACWMP throughout Spring 2017**
- **Final ACWMP to be completed and submitted by June 30, 2017**

Goals for Spring Meeting
Plans, Decisions and Resolutions

- **Integrated WQ and Wastewater Management Plan - ACWMP**
- **A viable cost allocation framework and actual cost allocation ranges for all customer categories**
- **“Affordability” guidelines for residents and businesses based on national, state and local criteria**
- **Downtown Rezoning Proposal consistent with Town Comprehensive Plan and**
- **Recommendation on the feasibility of D/B or D/B/O delivery plan for the Downtown Area**

Goals for Spring Meeting (cont.)
Projects Recommended for Implementation

- **25% Design of Downtown system and project delivery plan**
- **Conceptual "Layout/Design" for a Landfill PRB or other remediation solution**
- **Freshwater Ponds: Initial Project & Management Plan**
- **2nd Shellfish Demonstration Project**
- **Plan for continuation of Lonnies Pond Project**
- **On-Site NRB Demonstration Project concept design (in cooperation with the Barnstable County Test Center)**

Proposed OWQAP and Other Meetings

- **OWQAP Meeting**
  - December 14, 2016, 9:00 am to Noon
- **Public Information Activities**
  - NT Technologies Working Groups
    - Shellfish Working Group - November 14, 2016, 2:00 pm
    - PRB / NRB Working Group - TBD
    - Downtown Collection System Working Group - ???
  - Status Reports on NT Demonstration Projects

Other Items and Public Comment

- **Public Comments and Questions**

Thank You