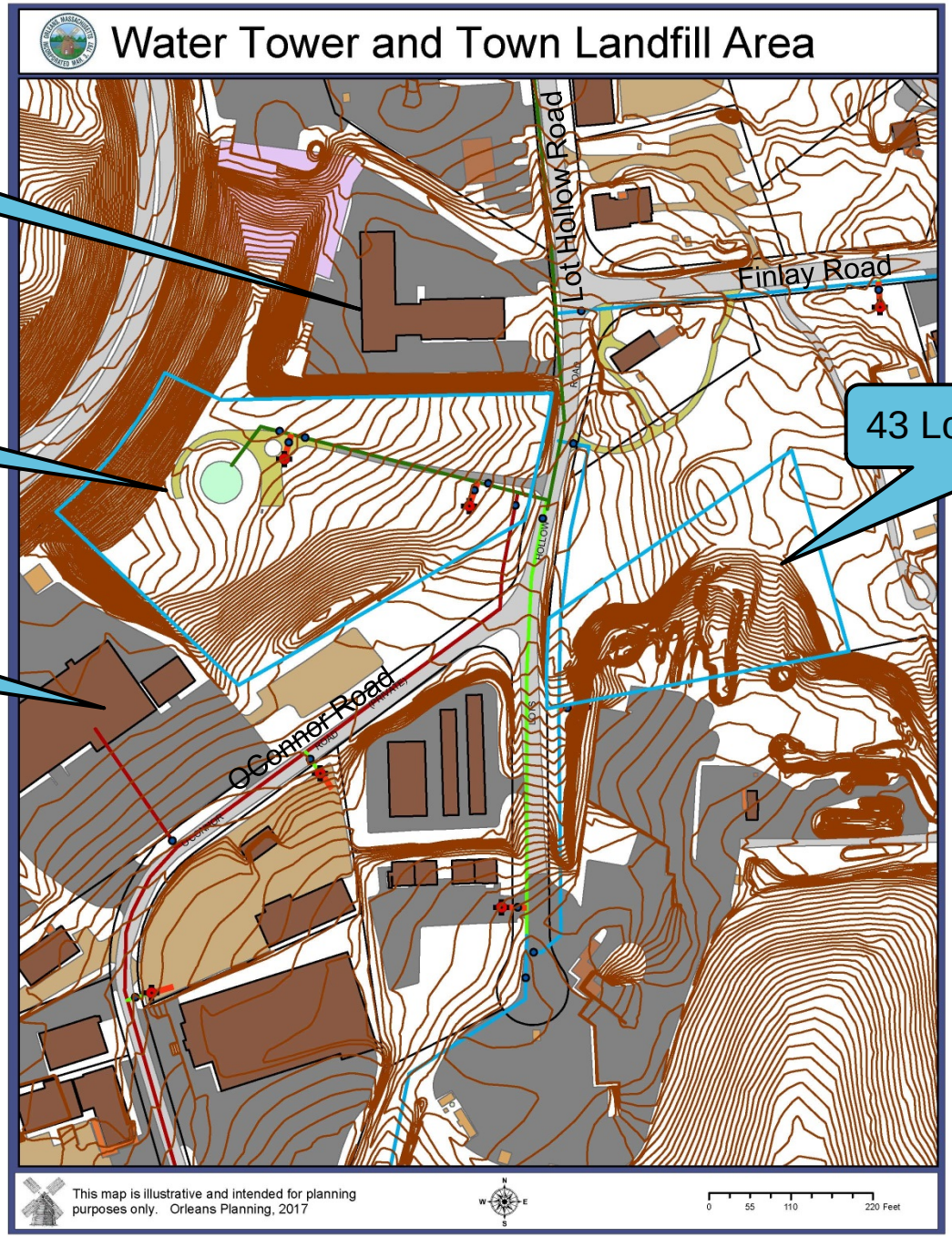
Board of Water and Sewer Commissioners

Aquifer Recharge

September 13, 2017

Agenda

- Location Map – 32 and 43 Lots Hollow Road
- Summary of the Testing Performed
- Summary of the Testing Required
- Description of a Proposed Wick System
- Questions and Answers


Water Tower and Town Landfill Area
Wilkinson Ecological Design
32 Lots Hollow Road
Orleans Toyota
43 Lots Hollow Road
Lot Hollow Road
Finlay Road
OConnor Road
This map is illustrative and intended for planning purposes only. Orleans Planning, 2017
0
55
110
220 Feet

AECOM

Summary of the Testing Performed
43 Lots Hollow Road

- **Installation of Several Soil Borings and Monitoring Wells (Depths to 248 Feet Deep)**
- **Installation of Several Soil Borings and Monitoring Wells on Adjacent Properties**
- **Soils Appear to be Favorable for Wick Discharge – Fine to Coarse Sand**
- **Depth to Water Table Favorable for Wick Discharge – 40 to 85 Feet**
- **Several Pumping Tests Performed In the Area of the Potential Wick Discharge**
- **Water Quality Collected and Analyzed from Several Monitoring Wells**
- **Site is Being Considered for Pumping and Treating Groundwater with High Nitrate and Ammonia Concentrations**

Summary of the Testing Performed (cont.)
32 Lots Hollow Road

- **Installation of One Soil Borings to 45 Feet Deep**
- **Installation of Several Soil Borings and Monitoring Wells on Adjacent Properties**
- **Soils Appear to be Favorable for Wick Discharge – Fine to Coarse Sand**
- **Depth to Water Table Favorable for Wick Discharge – 90 to 105 Feet**
- **Several Pumping Tests Performed South of the Landfill – 350 Feet East**
- **Water Quality Collected and Analyzed from Nearby Monitoring Wells**

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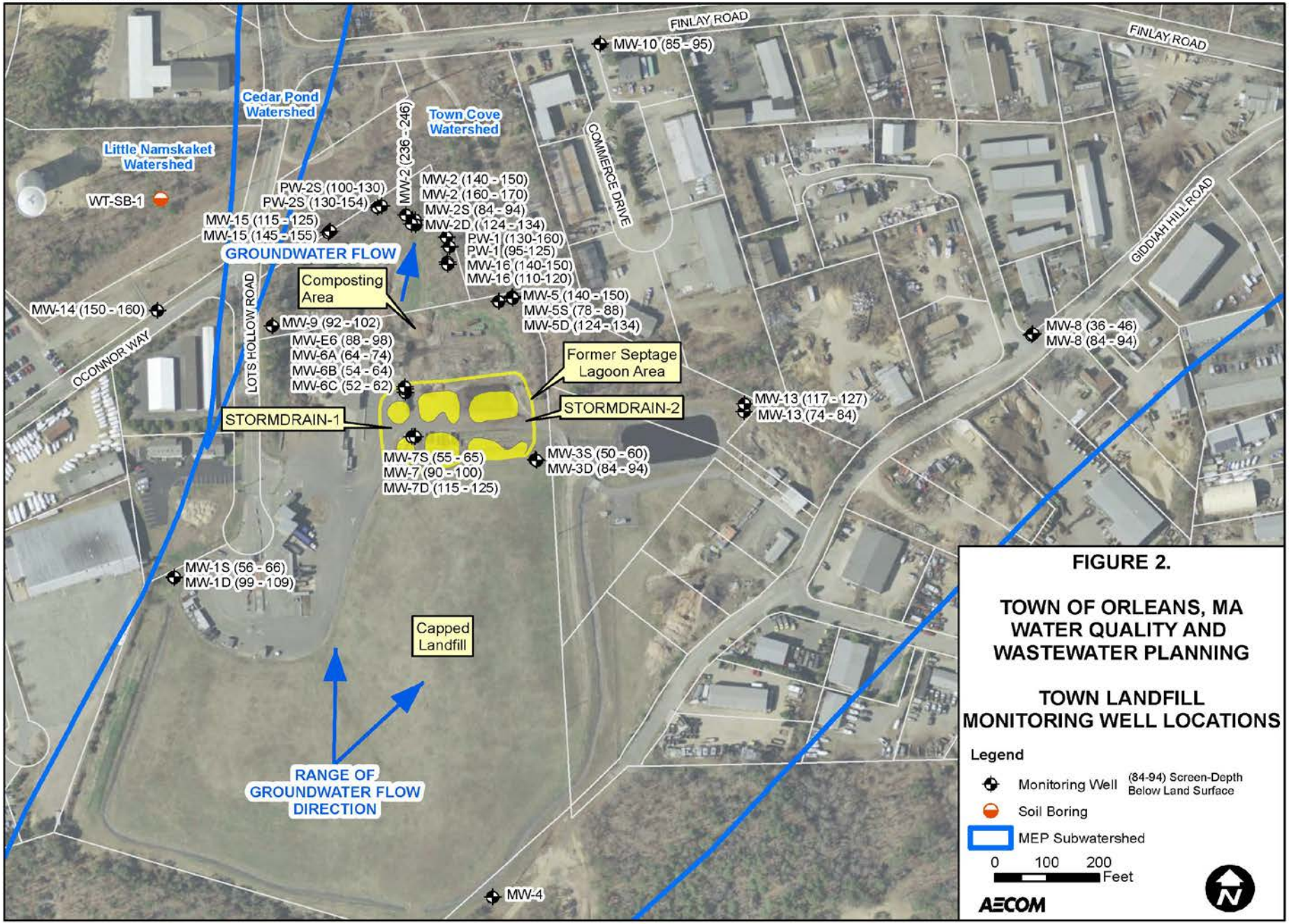


Summary of the Testing Required

- **Confirm with MassDEP the Field Investigation Requirements**
- **Prepare a Hydrogeologic Evaluation Proposal**
- **Conduct Field Investigations**
  - Oversee Drilling and Test Pit Excavation
  - Collect and Analyze Groundwater and Soil Samples
  - Perform Soils Conductivity Testing
  - Analyze and Summarize Field Data
- **Perform Wick Testing**
  - Coordinate with Board of Water and Sewer Commissioners on Placement
  - Install Test Wick
  - Install Observation Wells
  - Perform 8-hour Step Test
  - Perform 30-day Loading Test

Summary of the Testing Required (cont.)

- **Wick Testing Evaluation and Report**
  - Evaluate Discharge Capacity of site
  - Evaluate Capacity and Number of Final Wicks
- **Conduct Groundwater Modeling**
  - Modify the existing USGS Monomoy Lens Groundwater Model for Site Specific Conditions
  - Perform and Evaluate Groundwater Modeling Scenarios/Results
  - Evaluate Impacts of Groundwater Discharge to Existing Groundwater Flow and Quality
- **Submit Hydrogeologic Evaluation Report to MassDEP**
  - Wick Design
  - Proposed Number, Location and O&M of Wicks
  - Secondary Discharge Area(s)
- **Submit a Groundwater Discharge Permit Application to MassDEP**

Description of an Existing Wick System

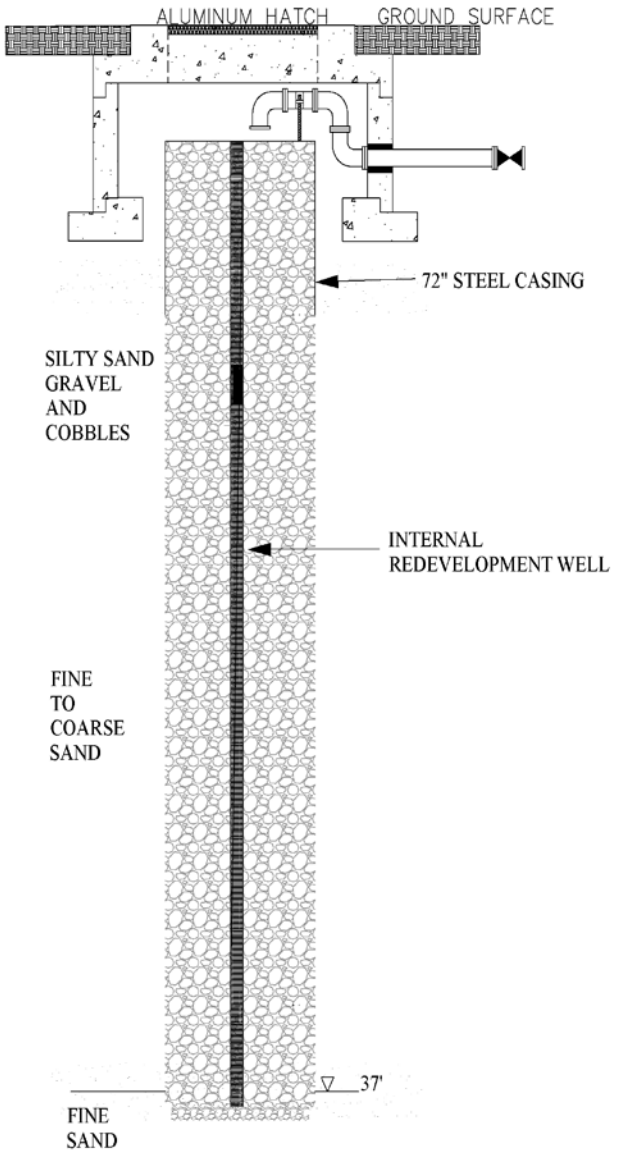
- **Technology: Wicks**
- **Considerations:**
  - Depth to Groundwater
  - Soil Type
  - Topography
- **Capacity Required: 360,000 gpd**

Description of an Existing Wick System (cont.)
Erickson Retirement Communities - Linden Ponds

- **Retirement Community**
  - Hingham, MA
  - 2,266 Units
  - 4,000 People
- **Restaurants, Medical Center, Pharmacy, Pools, Health Spas, Beauty Salon, Library, Game Rooms, Banks, Theater, more**

Description of an Existing Wick System (cont.)
Erickson Retirement Communities - Linden Ponds Wick Design

- Column of Stone
- 4 to 6 Feet in Diameter
- 50 to 65 Feet Deep
- No Well Screen
- Access by Vault
- Vault Less Than 10 ft. sq.



Description of an Existing Wick System (cont.)
Erickson Retirement Communities - Linden Ponds Wick Installation

Description of an Existing Wick System (cont.)
Erickson Retirement Communities - Linden Ponds Wick Completion

Preliminary Layout of a Proposed Wick System

- **Final Wick Design Based on Loading Test Results**
- **Number and Spacing of Proposed Wicks based on Loading Test Results**
- **O&M Requires Alternating Discharging to Several Wicks**
- **MassDEP Requires Conventional Secondary Discharge Area(s)**

Town of Orleans Massachusetts

Thank You