Project Memo

H373095

2024-01-23

To: Mr. Ryan Clapp and Mr. David Morgan, Environmental Planner + Conservation Agent

From: Ross Mullen

cc: Duke Bitsko, Rob Kenneally, and Chris Ghormley

Town of Arlington
Thorndike Place Stormwater Review

Thorndike Place Stormwater Review

1. Project Overview

The Town of Arlington contracted with Hatch Associates Consultants, Inc. (Hatch) to complete a third-party stormwater review of the proposed Thorndike Place development on December 19, 2023.

1.1 General Information

Project Location: Dorothy Road between Route 2/Concord Turnpike on the south, existing residential neighborhoods to the north and west, and Thorndike Park to the east within the Town of Arlington, Massachusetts.

Project Purpose: Construct a rental and ownership community of 12-multifamily homes within six duplex buildings and a 124-unit senior-living residential apartment building complex. The construction is proposed on a 17.7-acre parcel with 12-acres proposed to be preserved as open space under a Conservation Restriction.

Impaired Waterbodies within 1 Mile of Proposed Project:

- Little River (MA71-21) for Debris, Water Chestnut, Chloride, Copper in Sediment, Dissolved Oxygen, Enterococcus, E. Coli, Flocculant Masses, Lead in Sediment, Odor, Oil and Grease, PCBs in Fish Tissue, Total Phosphorus, Scum/Foam, Transparency/Clarity, and Trash.
- Clay Pit Pond (MA71011): Chlordane in Fish Tissue.
- Black's Nook (MA71005): Water Chestnut, Nutrient/Eutrophication Biological Indicators, and Transparency/Clarity.
- Alewife Brook (MA71-20) for Debris, Water Chestnut, Chloride, Copper in Sediment, Dissolved Oxygen, Enterococcus, E. Coli, Flocculant Masses, Lead in Sediment, Odor, Oil and Grease, PCBs in Fish Tissue, Total Phosphorus, Scum/Foam, Sediment Bioassay, Transparency/Clarity, and Trash.

- Little Pond (MA71024) for Water Chestnut and Harmful Algal Blooms.
- Spy Pond (MA71040) for Curly-leaf pondweed, Eurasian Water Milfoil, Myriophyllum Spicatum, Water Chestnut, Chlordane in Fish Tissue, DDT in Fish tissue, Dissolved Oxygen, Harmful Algal Blooms, and Total Phosphorus.

TMDLs: None (other reaches of Alewife Brook have been included in TMDL studies).

Contact Information:

Contact Information	Applicant	Applicant's Agent
Company Name	Arlington Land Realty, LLC	BSC Group, Inc.
Attention	Peter Mugar	Dominic Rinaldi, PE
Address	116 Huntington Avenue Boston, MA 02116	803 Summer Street Boston, MA 02127
Phone	617-459-9587	617-896-4386
Email	psmugar@gmail.com	drinaldi@bscgroup.com

Reviewed Submittals:

1. *Thorndike Place Residential Community Notice of Intent Cover Letter*; prepared by Dominic Rinaldi of the BSC Group, Inc. on behalf of Arlington Land Realty, LLC; dated September 6, 2023.
2. *Thorndike Place Residential Community Notice of Intent;* prepared for Arlington Land Realty LLC by BSC Group; submitted to the Town of Arlington Conservation Commission; dated September 2023.
3. *Stormwater Report* Thorndike Place Dorothy Road Arlington, MA; prepared by BSC Group for Arlington Land Realty, LCC November 2020, revised August 2021, revised September 2023; dated September 5, 2023.
4. *Thorndike Place Notice of Intent* drawing package; prepared for Arlington Land Realty, LLC by BSC Group, dated September 6, 2023.

2. Findings

The following are Hatch's findings on the Thorndike Place stormwater site design based on our professional judgement and in accordance with the Massachusetts Stormwater Handbook and Stormwater Standards (2008).

2.1 General Findings

The following are a list of general findings and observations:

- The applicant proposes to develop a 17.7-acre parcel, disturbing 4.02 acres and create 1.81-acres of impervious surfacing, leaving the remainder of the parcel under a Conservation Restriction (approximately 12 acres).
- 5 infiltration systems, one infiltration chamber, and one bioretention basin/rainwater garden are proposed to provide stormwater treatment/management.
- Alewife Brook runs through the southeast corner of this property. The Alewife Brook corridor includes wetlands, Bordering Lands Subject to Flood, Buffer Zone to Bordering Vegetated Wetlands, and FEMA floodplain/floodway.

2.2 Standard 1: Untreated Discharges

No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Hatch completed a review of the design relative to Standard 1; the following is a list of our findings:

- Stormwater runoff from the eastern portion of the senior living building (approximately 14,800 square-feet) is directed to a rip-rap apron that drains to a nearby wetland. The applicant should verify discharge from this roof, during extreme events, will not cause erosion and sedimentation into the wetland.

2.3 Standard 2: Peak Rate Control and Flood Prevention

Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for land subject to coastal storm flowage.

Hatch completed a review of the design relative to Standard 2; the following is a list of our findings and recommendations:

- Surficial fill soils were designated as a Hydrologic Soil Group C, and infiltration rates (0.52-inches/hour) were selected to be on the edge of published values for HSG C those soils, based varying composition of sandy loam, fine sandy loam and gravely sandy loam.
- FEMA Technical Bulletin 6-93, Below-Grade Parking Requirements for Buildings Located in Special Flood Hazard Areas, clarified FEMA's policy that below grade parking is consistent with their definition of a basement, and that construction of the lowest floor (including basements) below the base flood elevation is prohibited for residential buildings. The FEMA base flood elevation "100-year" is 6.8-feet. As the building is proposed to be used for senior living residences and the proposed floodplain is adjacent to the structure, the proposed underground garage with elevation of 6.0-feet is below the base flood elevation (plus applicable freeboard and floodway surcharge requirements). Therefore, the proposed garage has a significant flood risk, as identified by FEMA.

- The proposed basement elevations of the townhomes (elevation 3.0-feet) are 3.8-feet below the FEMA 100-year flood elevation of 6.8-feet. The proposed separation between these structures appears to be as little as 115-feet. A groundwater mounding analysis of the regional flood along Alewife Brook should be assessed to verify that groundwater intrusion from flooding along the watercourse does not impact the basements of the townhome structures. Note this is distinct from the completed groundwater mounding analysis of the infiltration basins.
- Proposed ACF R-Tank^{XD} s between the townhome units are nearly adjacent to the foundations of these structures with basements. The bottom of the chambers of these units are proposed to be at 6.0-feet (with bottom of stone at 5.67-feet), with the basement elevation of the adjacent townhomes at 3.0-feet. When these basins are filled with stormwater runoff, seepage will likely occur adjacent to the basement foundation wall, which will act as a preferential flow path (planar surface) with least resistance downward. Groundwater intrusion flood risk and seepage from these infiltration systems represents a concerning flood risk.
- Test Pit #1 (2023), located at the proposed ACF R-Tank^{XD} between the westernmost two townhome units, measured a point-in-time groundwater elevation of 1.5-feet, while the proposed basement elevations are at 3.0-feet. The Town of Arlington Zoning bylaws Section 5.8.6.A (2) state that for sites within an Inland Wetland District, at least 4.0-feet of separation should be provided between the floor of occupied levels and the seasonal high-water table.
- Test Pits #2 and #4 pose similar challenges between the proposed basement elevation (3.0-feet) and insufficient separation to the groundwater table, located at 0.8 and 1.5-feet. respectively.
- Test Pits #3 and #5 (2023) measured a point-in-time groundwater elevations (3.5 and 4.0-feet, respectively) above the proposed basement elevations of adjacent townhomes (3.0-feet).
- Note that the seasonal high groundwater table may be higher than the 2023 point-in-time measurements and increase flood risk. Additionally, construction of a sump pump system, to mitigate flooding/groundwater intrusion, at any of these residences could lower the regional groundwater table.

2.4 Standard 3: Recharge to Ground Water

Loss of annual recharge to ground water shall be eliminated or minimized through the use of infiltration measures, including environmentally sensitive site design, low impact development techniques, best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from the pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

Hatch reviewed the proposed infiltration systems for Standard 3: Recharge to Ground Water, below are our findings and recommendations:

- Test Pits #7 and #8 (2023) measured point-in-time groundwater elevations of 0.5 and 2.2, respectively. These test pits lie beneath the proposed Stormtrap infiltration system with a proposed bottom elevation of 6.0-feet. Massachusetts Stormwater guidelines state that at least two feet of separation shall be provided between the *seasonal high groundwater elevation* and the bottom of an infiltration structure. Based on our understanding from the site visit, the 2023 groundwater elevations were collected in May. We recommend collection of additional groundwater information, especially during the spring, to verify this standard is met.
- Additional comments regarding groundwater connectivity, infiltration, and recharge can be found in the section of this review on Standard 2.

2.5 Standard 4: 80% TSS Removal

Stormwater management systems must be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This standard is met when:

- *Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan and thereafter are implemented and maintained.*
- *Stormwater BMPs are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and*
- *Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.*

Hatch reviewed the proposed infiltration systems for Standard 4, below are our findings and recommendations:

- Point-in-time groundwater measurements were provided for review and incorporated into the design to provide at least 2-feet of separation between the bottom of the infiltration structure and the ground water table. The applicant should provide and review the *seasonal high groundwater elevation*, as is required by the Massachusetts Stormwater Handbook, to determine if adequate separation between the groundwater table and the structures is available.
    - Near the existing wetlands, the lowest surveyed elevation shown in the drawings is 3.0-feet. The water surface elevation of the wetland should correlate to the groundwater elevations observed in the test pits. The measured groundwater table varies locally by as much as 4.5-feet between measurements, which is concerning for infiltration as a stormwater management strategy.

- Infiltration as a stormwater practice is challenging for many stormwater site designs near wetlands due to high groundwater tables. Therefore, establishing the seasonal high groundwater table is extremely important.
- The water surface elevation and regulatory water levels of the wetland should be labeled on the plans and in the Stormwater report.

2.6 Standard 5: Higher Potential Pollutant Loads (HPPL)

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention, all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt and stormwater runoff, the proponent shall use the specific stormwater BMPs determined by the Department to be suitable for such use as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53, and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

We concur with the applicant's stormwater report that Standard 5 is not applicable to the project site as the site use is not consistent with a land use with higher potential pollutant load (LUHPPL).

2.7 Standard 6: Critical Areas

Stormwater discharges to a Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or any other critical area require the use of the specific source control and pollution prevention measures and the specific stormwater best management practices determined by the Department to be suitable for managing discharges to such area, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters or Special Resource Waters shall be set back from the receiving water and receive the highest and best practical method of treatment. A "stormwater discharge," as defined in 314 CMR 3.04(2)(a)1. or (b), to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of the public water supply.

The Massachusetts DEP has not identified the project site as a(n):

- Outstanding Resource Water,
- Public water supply (Zone Is, Zone IIs and Interim Wellhead Protection),
- Bathing beach,

- Cold-water fishery, or a
- Shellfish growing area.

We concur with the applicant's stormwater report that Standard 6 is not applicable to the project site.

2.8 Standard 7: Redevelopment Projects

A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

We concur with the applicant's stormwater report that Standard 7 is not applicable to the project site as the project is a new development.

2.9 Standard 8: Erosion, Sediment Control

A plan to control construction-related impacts, including erosion sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan), must be developed and implemented.

Hatch completed a review of the construction drawings, including applicable notes, SWPPP sheet, and Section 3 of the Stormwater Report in accordance with the *Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Area*s. Based on our review, we recommend the following:

- Street cleaning, such as street sweeping or shoveling, should be included to periodically to remove sediment that may have been tracked out of the project site, beyond the construction access. Street cleaning will be especially important following the saw cuts on Dorothy Road.

2.10 Standard 9: Operation and Maintenance Plan

A long-term operation and maintenance plan must be developed and implemented to ensure that stormwater management systems function as designed.

Hatch completed a review of the Operation and Maintenance Plan; based on our review, we recommend the following:

- Per Massachusetts Stormwater Standards, an estimate of the annual O&M budget shall be provided in Section 4.0 *Long-Term Pollution Prevention & Operation and Maintenance Plan* of the Stormwater Report.
- If using asphalt shingles on the townhomes, the loose grit be collected and disposed of, following construction, and prior to 6" roof drains being connected to infiltration basin.

- Long term operation and maintenance for the on-site infiltration basins (both Stormtrap and R-Tank^{XD} systems) must be provided. The O&M plan should include the following provisions:
    - maintain an operation and maintenance log for the last three years, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and the disposal location).
    - make this log available to MassDEP and the Conservation Commission upon request; and
    - allow members and agents of the MassDEP and the Conservation Commission to enter and inspect the premises to evaluate and ensure that the responsibility party complies with the Operation and Maintenance Plan requirements for each BMP.
    - As the stormwater BMPs serve more than one lot, the applicant shall include with the Notice of Intent a mechanism for implementing and enforcing the Operation and Maintenance Plan. The applicant shall identify the lots or units that will be serviced by the proposed stormwater BMPs. The applicant shall also provide a copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of stormwater BMPs.

2.11 Standard 10: Illicit Discharges

All illicit discharges to the stormwater management system are prohibited.

The review has not identified any proposed illicit discharges. We concur with the applicant's stormwater report that Standard 10 is not applicable to the project site.

An unsigned Illicit Discharge Compliance Statement was provided in the Notice of Intent. The Illicit Discharge Compliance Statement should be signed prior to this issuance of permits.

2.12 Miscellaneous Comments

The following is a list of stormwater review comments that do not fit within the Massachusetts Stormwater Standards and do not require response from the applicant.

- Arlington Land Realty address report on the title page of Thorndike Place Notice of Intent drawing package is inconsistent with the address for the same reported in the other reviewed submittal packages.

Ross Mullen

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