PARE PROJECT NO. 20147.00

STORMWATER MANAGEMENT REPORT

NEWTON CENTER FOR ACTIVE LIVING
WALNUT STREET
NEWTON, MA

Assessors Map 24, Lot 1

City of Newton, MA
Newton, MA

Prepared for:

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June 2022

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SUMMARY

Pare Corporation (Pare) has prepared this report to summarize the stormwater management system for the proposed Newton Center for Active Living (Newcal) in Newton MA. The Site is currently developed as the Newton Senior Center. The Site contains the existing building, parking area, walkways, and patio areas. The proposed improvements to the Site include construction of a new building, partially covered parking area, pedestrian walkways, a stormwater management system, and other associated site improvements.

The existing stormwater system is comprised of roof drains and catch basins with run-off flows to City stormwater systems. The proposed stormwater system will include deep sump catch basins collecting run-off in the paved areas and roof drains collecting the run-off from the building. Catch basins will be directed through a water quality unit prior to entering the underground infiltration system. The underground infiltration system is designed reduce peak flow rates through on-site infiltration, overflow from the system will directed to the stormwater system in Highland Avenue.

The proposed development will result in an increase of impervious area of approximately 0.12 acres. The Project includes an underground infiltration area designed to reduce stormwater peak flow rates from the site. The proposed peak flow rates have been significantly reduced for the 2 yr, 10 yr, 100 yr design storms as well as the City of Newton Design Storm.

The increased impervious area of the proposed project is due to an increase in the building footprint, roof drains from the proposed building will be routed directly to the underground infiltration system. Run-off from the paved areas will be directed to deep sump catch basins and then through a water quality unit to further treat the run-off.

The stormwater system proposed for the Newcal has been designed in accordance with the Massachusetts Stormwater Handbook. The system will reduce peak flow rates from the site into the City stormwater systems and will provide treatment of all run-off associated with vehicular paved surfaces.

PURPOSE

Pare Corporation (Pare) has prepared this report to summarize the stormwater management system for the proposed Newton Center for Active Living in Newton MA. The new facility will be located at 345 Walnut Street in Newton, MA. The project will include construction of a Center for Active Living building, parking area and access drive, pedestrian walkways, stormwater management systems, and

other associated site improvements. The project is proposed on a 0.602 +/- acre parcel that is currently developed as the Newton Senior Center. The parcel, which is owned by the City of Newton, is designated on the City of Newton Assessor's Map 24, Lot 1.

The following sections of the report discuss the existing conditions, proposed development, methodology employed to evaluate stormwater runoff for existing and proposed conditions, and design elements for the proposed stormwater management system components. Supporting documentation is provided in the attached appendices.

PROJECT DESCRIPTION

The study area, hereby referred to as the "Site", included in this hydrologic study comprises approximately 0.602 +/- acres of land including the aforementioned parcel. The Site is included within the parcel, except for utility trenching and minor modifications to the intersection within the right-of-way. The Limit of Disturbance (LOD) for redevelopment is approximately 0.62 acres. The Site is bounded to the north by Highland Ave, residential properties to the west, Walnut Pl to the south, and Walnut St to the east.

Wetland resource areas were not found on or near the Site.

There are no NHESP Priority Habitats, Certified Vernal Pools, or Potential Vernal Pools onsite as mapped by MassGIS. The Site is not located in a Zone II Wellhead Protection Area, Interim Wellhead Protection Area, or Zone I Wellhead Protection Area. Additionally, the Site is not located in a Zone A, B, or C Surface Water Protection Area.

According to the FEMA Flood Insurance Rate Map for Middlesex County, Massachusetts (Community-Panel 25017C0552E, revision date June 4, 2010), included in Appendix A of this report, the project Site is located entirely within FEMA Zone X, or "areas determined to be outside the 0.2% annual chance floodplain."

The existing topography of the site generally slopes away from the center of the project area towards the edges, where city's right-of-way is located. Runoff within the Site is collected by two catch basins and piped to the city's drainage network. Off-Site runoff is ultimately captured by inlets within the right-of-way within Highland Ave, Walnut Street, and Walnut Pl.

GEOTECHNICAL INVESTIGATIONS AND SOIL DATA

NRCS Soil mapping indicated that natural soil in the vicinity of the Site is comprised of Urban Land. This soil is not classified with a Hydrologic Soil Group (HSG) rating. HSG rating and infiltration rates have been assumed based on the subsurface investigation.

A subsurface investigation, inclusive of (2) test pits, was conducted to evaluate soil conditions at the Site. Test pit logs from the investigation are provided in Appendix A.

The soil profile varies across the site but generally consists of sand and gravel fill and natural coarse sand deposits. The top layer of urban fill was found to vary between 33" and 63" across the site with coarse sand extending to 10' below the surface. No bedrock, redox, or evidence of groundwater was found on site. It is assumed that bedrock and the estimated seasonal high groundwater level is below the observed 10' depth. Due to the lack of groundwater evidence, it is conservatively assumed that the ESHG is 10' below grade across the site.

Across the site, depth to bedrock and groundwater is preferable for infiltration practices. Infiltration practices will be included to detain and infiltrate stormwater to the maximum extent practicable within the areas of the test pits.

Soil disturbance onsite will include the construction of the foundation for the proposed building, construction of the proposed parking area and access drive, and excavation for all proposed utilities and drainage features. Erosion controls will be used to limit movement of soil offsite, and water will be sprayed as necessary to control dust. Existing catch basins in the vicinity of the site will require inlet protection.

METHODOLOGY

Hydrologic calculations for existing and proposed conditions were performed using HydroCAD Version 10.10 software, which uses TR-55 methodology to calculate runoff and TR-20 methodology for storm routing through the stormwater detention facilities. Site hydrology was evaluated for the 1" storm event as well as the 2-year, 10-year, and 100-year frequency storms in accordance with the guidelines of the Massachusetts Stormwater Handbook. The City of Newton also uses a design storm for all stormwater work in the City. This "Design Storm" has been included in the design for the Site. Existing and Proposed Watershed Maps, indicating the subwatersheds and associated stormwater flow paths may be found in Appendix D.

The hydraulic design calculations were completed using the Rational Method to calculate the accumulated flows to each structure. The stormwater conveyance system was designed using Manning's Equations. The stormwater conveyance system was designed to handle the runoff generated by a 25-year design storm.

EXISTING CONDITIONS OF STUDY AREA

The Site is currently developed as the Newton Senior Center. The Site contains the existing building, parking area, walkways, and patio areas. Under existing conditions, the composite curve number 79 has been generated for the subcatchment area EDA-1 (described below) meaning there is considerable runoff from the Site. Stormwater runoff that is generated from the Site flows overland to the city's drainage system off Site. Drainage within the Site is collected via catch basin and piped to the city's drainage system in the roadway.

The existing Site contains approximately 0.41 acres of impervious area within the hydrologic boundary, which consists of vehicular area, patio areas, walkways, and the existing building. The remaining portions of the Site are grassed areas with trees and landscaping. The existing surface covers were modeled as paved parking, roofs, and grass (in fair condition) in the hydrologic analysis.

The Site was considered to have one analysis area based on existing drainage patterns. Stormwater from the existing Site ultimately flows to a single design point: "DP-1."

Under existing conditions, one watershed was analyzed. The Existing Hydrology Plan, XBT-1, included in Appendix D, depicts the limits of the Existing Drainage Areas (EDA), described below:

- **EDA-1**: EDA-1 is comprised of paved parking, grass and landscaped areas, patio areas, paved walkways, and an existing building in the middle of the Site. Stormwater runoff discharges to the existing drainage system within the city's right of way via overland flow into catch basins and piped runoff from the parking area.

PROPOSED CONDITIONS OF STUDY AREA

The proposed improvements to the Site include construction of a new building, partially covered parking area, pedestrian walkways, a stormwater management system, and other associated site improvements.

The proposed condition has approximately 0.53 acres of impervious surface within the hydrologic boundary, resulting in a net increase of 0.12 acres of impervious area.

The main entrance to the Site is provided by an access drive to the west of the Site connecting Walnut Place to Highland Ave. This access drive is a one-way connection providing 90-degree parking on both sides. Parallel parking spaces are also available on Walnut St with an additional drop off/pick up area on Highland Ave. Walkways help to provide connections from parking to the building at the front and rear of the Site. The covered portion of the parking area will include 8 parking spaces including the 4 provided ADA spaces.

The proposed project will require stormwater management systems to handle the increase in stormwater runoff and pollutant loading to the design point. All new stormwater collection, storage, and treatment systems will be designed and constructed in accordance with the guidelines of the Massachusetts Stormwater Handbook prepared by the Massachusetts Department of Environmental Protection (MADEP). Pre-development runoff rates will be maintained or reduced and released into existing drainage paths downstream of proposed improvements. All proposed impervious vehicular areas will be treated prior to leaving the site in accordance with the handbook. Impervious areas that run offsite with no treatment include pedestrian areas and existing vehicular area adjacent to the roadways. The covered parking area is accounted for as vehicular area in TSS calculations due to the transmission and deposition of sediment and other solids from vehicular traffic. The covered parking area is considered roof area for water quality calculations, as roof area does not require pretreatment prior to infiltration.

The grading scheme is designed to shed water as in the existing conditions to the maximum extent practicable. Grades generally slope away from the building to protect the building from stormwater runoff. Stormwater is conveyed to the proposed best management practices (BMP) via overland flow and a stormwater conveyance system consisting of catch basins, manholes, and HDPE piping.

The drainage system is designed to address flow-rate, quantity of runoff, and quality of runoff from the developed Site. Runoff from the site flows overland into catch basins or from roof areas into roof drains that will be connected to the drainage network. Vehicular runoff will be directed to proposed hydrodynamic separators before joining the roof runoff in an underground infiltration system on the Site via a piped drainage system. Overflow from the infiltration system during large storm events is controlled by the system outlet to provide adequate recharge volume and flow attenuation. Overflow from the infiltration system is connected via a pipe outlet to the drainage system within Highland Ave. The features implemented on the Site include:

- **Source Control and Maintenance**: Properly maintaining sources of pollutants promotes a site that produces higher quality stormwater runoff than sites that do not control sources of pollutants. An example of source control includes the removal of sediment buildup from best management practices during regular maintenance per the Long-Term Operations & Maintenance Plan.

- **Underground Infiltration System**: The underground infiltration system (UGIS) has been designed in accordance with the Massachusetts Stormwater Handbook requirements to promote exfiltration and recharge. The system outlets into the Sites the stormwater drainage system and drains into the City's right-of-way. The outlet of the system is elevated to exfiltrate the entire WQv and provide flow control downstream. The UGIS is designed to provide a separation of greater than 2' from the bottom of the system to ESHGWT. Considering the existing soil characteristics, an infiltration rate of 8.27 in/hr was used. The system has less than 4' clearance to groundwater, therefore a mounding analysis for the system is included as part of Appendix C. The mounding analysis shows that the groundwater mound that forms will not impact the stormwater system, per the requirements of the handbook.

Under proposed conditions, two subwatersheds were analyzed. The Proposed Hydrology Plan, XBT-2, included in Appendix D, depicts the limits of the Proposed Drainage Areas (PDA), described below:

- **PDA-1A**: PDA-1A is comprised of the proposed building, paved walkways, covered and open parking areas, and other areas to the rear and south of the building. Runoff from this drainage area flows overland to the proposed catch basins and into the proposed stormwater management system. This directs the water to a hydrodynamic separator and then anUnderground Infiltration System and outlets larger storm events to the cities drainage system to match the existing conditions.

- **PDA-1B**: PDA-1B is comprised of paved walkways, patio areas, and grassed areas around the perimeter of the building. Runoff from this drainage area flows overland into the cities drainage network as it does in the existing conditions.

STORMWATER MANAGEMENT STANDARDS

This proposed stormwater management system complies with the current regulations of the Massachusetts Department of Environmental Protection (DEP) and the City of Newton Conservation Commission requirements. Compliance and applicability of the ten (10) Stormwater Management Standards are discussed below.

STANDARD #1 – NO NEW UNTREATED DISCHARGES

No new point discharges of untreated stormwater are proposed for the project. Water quality is achieved by source control and conveying stormwater from impervious areas through the proposed best management practices. Stormwater throughout the Site is treated using an underground infiltration system. Portions of the site within, and directly adjacent to, existing roadways will remain untreated as in the existing condition.

STANDARD #2 – POST-DEVELOPMENT PEAK DISCHARGE RATES

MassDEP Stormwater Standard #2 states that runoff rates from the developed Site must not exceed existing runoff rates for the 2-year and 10-year, 24-hour storm events. Standard 2 states that the 100-year, 24-hour storm event must also be evaluated to demonstrate that there will be no increased flooding impacts off-site. The City of Newton describes a "Design storm" with 8.78" of rainfall, this storm was considered in the design and included in the table below.

The proposed stormwater management system is designed to reduce runoff rates from the 2-, 10-, and 100-year, 24-hour storm events. This is achieved by controlling runoff using the proposed underground detention systems and infiltration system and their associated outlet control structures.

Existing and proposed peak runoff rates from the Site were generated for the rainfall events having a return rate of 2-year, 10-year, and 100-year using the SCS TR-20 Method (refer to Appendix B for hydrology calculations). Runoff hydrographs were developed for the existing and proposed conditions for each of the design points of the Site. Results for each storm event and the net difference in pre- and post-development flows are shown in Table 1 below; a negative number indicates flows are decreased in the proposed condition.

Table 1: - Peak Stormwater Runoff Flow Rate (CFS)

Design Point	2-Year Event 3.16"	10-Year Event 4.77"	100-year Event 8.62"	Design Storm 8.78"
DP-1 - Existing	0.69	1.94	4.39	4.50
DP-1 - Proposed	0.05	0.27	3.97	4.05
Change	-0.64	-1.67	-0.42	-0.45

STANDARD #3 – RECHARGE TO GROUNDWATER

Stormwater Standard #3 states that loss of groundwater recharge from the proposed development shall be eliminated or minimized and at a minimum, the recharge volume, which is dependent on soil type,

shall be recharged to the groundwater. The intent of this standard is to ensure that the infiltration volume of precipitation into the ground under post-development conditions is at least as much as the infiltration volume under pre-development conditions. Per the Handbook, a recharge rate of 0.60 inches of runoff is required for A type soils. The required recharge volume is 263 CF and the provided recharge volume is 1,920 CF. The discrepancy between the required volume and the proposed volume is due to the systems need to attenuate peak flows in larger storm events. Calculations documenting compliance with this requirement are provided in Appendix C.

STANDARD #4 – TSS REMOVAL

Stormwater Standard #4 requires that stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). Based on the Site's infiltration rate of greater or equal to 2.41 in/hr, the required water quality volume is 1.0 inch. Water quality control for the site is described below and supporting calculations are provided in Appendix C.

At least 80% TSS treatment is achieved using a treatment train consisting of deep sump catch basins, hydrodynamic separators, and the infiltration system. See Appendix C for calculations for the stormwater facilities.

STANDARD #5 – LAND USES WITH HIGHER POTENTIAL POLLUTANT LOADS (LUHPPL)

Standard #5 specifies that LUHPPLs appropriately reduce and control potential pollutants from entering groundwater or waterways. The site is not classified by the Handbook as a LUHPPL and therefore this standard does not apply.

STANDARD #6 – PROTECTION OF CRITICAL AREAS

The proposed development is not located within a Zone II or Interim Wellhead Protection Area. Standard #6 is not applicable to this project.

STANDARD #7 – REDEVELOPMENT PROJECTS

The project is proposed as a redevelopment. The project is required by the Handbook to meet the Stormwater Standards to the full extent for the net increase in impervious area, required to meet Standards 2, 3, 4, 5, and 6 only to the maximum extent practicable and improve existing conditions for the existing impervious area.

STANDARD #8 – EROSION & SEDIMENT CONTROL PLAN

The project proposes to disturb less than 1 acre of land and is not required to develop a Storm Water Pollution Prevention Plan (SWPPP) in accordance with the Environmental Protection Agency (EPA) National Pollution Discharge Elimination System (NPDES) Construction General Permit (CGP) for discharges from construction activities. The Notice of Intent under the CGP will be required to be prepared and submitted by the Contractor as the Operator of the Site.

Minimum erosion and sediment control features, including perimeter silt fencing, filter socks, and inlet protection are shown on the Project Plans.

STANDARD #9 – OPERATIONS AND MAINTENANCE PLAN

The City of Newton will be responsible for the Operation and Maintenance of the Stormwater Management System post-construction. The Stormwater Operation and Maintenance Plan is included under separate cover.

STANDARD #10 – ILLICIT DISCHARGES

The Stormwater Management System has been designed to route stormwater through and treated by a series of stormwater best-management practices prior to discharge. To Pare Corporation's knowledge, based on the best-available information and in-field reviews of the current Site, there are no known non-stormwater discharges that will be connected to the proposed stormwater collection system that would convey pollutants directly to groundwater or surface waters.

PROPOSED DRAINAGE CONVEYANCE SYSTEM

The proposed stormwater conveyance system includes drain manholes, catch basins, detention systems, and an underground infiltration system. The proposed system has been designed for a 25-year 24-hour storm event utilizing the Rational Method. The Manning equation was used to model the stormwater conveyance system and perform the hydraulic analysis of the system. The following criteria were used to design the conveyance system:

- Manholes are provided at all directional changes, connections, and conduit size increases.
- Pipes are designed to convey the 25-year stormwater event.
- All conduit is HDPE pipe sized 12" diameter or larger.
- Minimum pipe velocity is 2 feet per second.
- Maximum pipe velocity is 12 feet per second.

SUMMARY

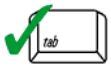
The post-development stormwater management system has been designed in accordance with the Massachusetts Stormwater Handbook requirements. The proposed stormwater management system addresses both the quantity and quality of the stormwater runoff. The stormwater management system promotes recharge and ultimately provides reductions in peak runoff rate within the hydrologic analysis area for the design storm events. TSS loading from the site is managed through source control and best management practices. The development of the property is proposed to improve existing conditions and the stormwater discharges to the area's natural resources.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

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[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

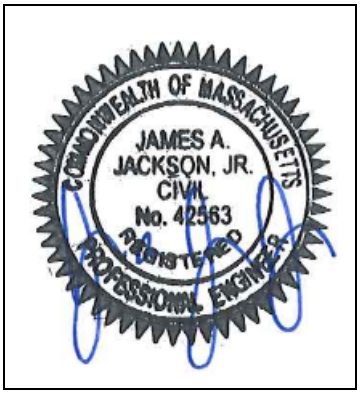
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☒ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☐ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☐ Use of "country drainage" versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): _____

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

☐ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

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[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☒ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☐ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☒ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☐ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ 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 the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached;

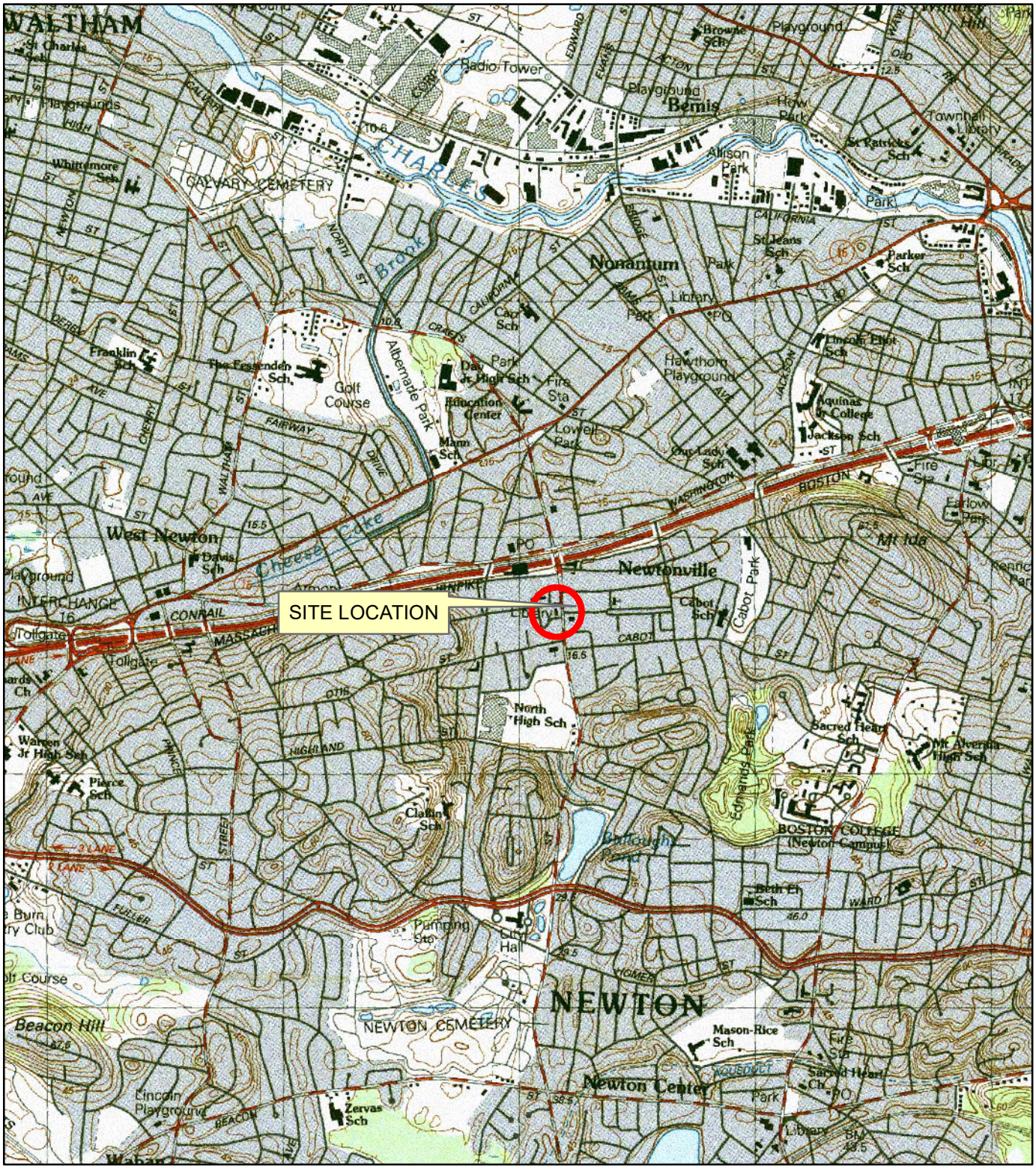
☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

APPENDIX A

Existing Conditions & Soils Information

Site Locus and Aerial Map
Zoning Map
Test Pit Logs

Soils Map
FEMA Firmette
IDF Curve
TR-55 Curve numbers
Design Storms



MASS GIS

SITE LOCATION MAP

SCALE: 1 " = 2,000 '

N
W E
S

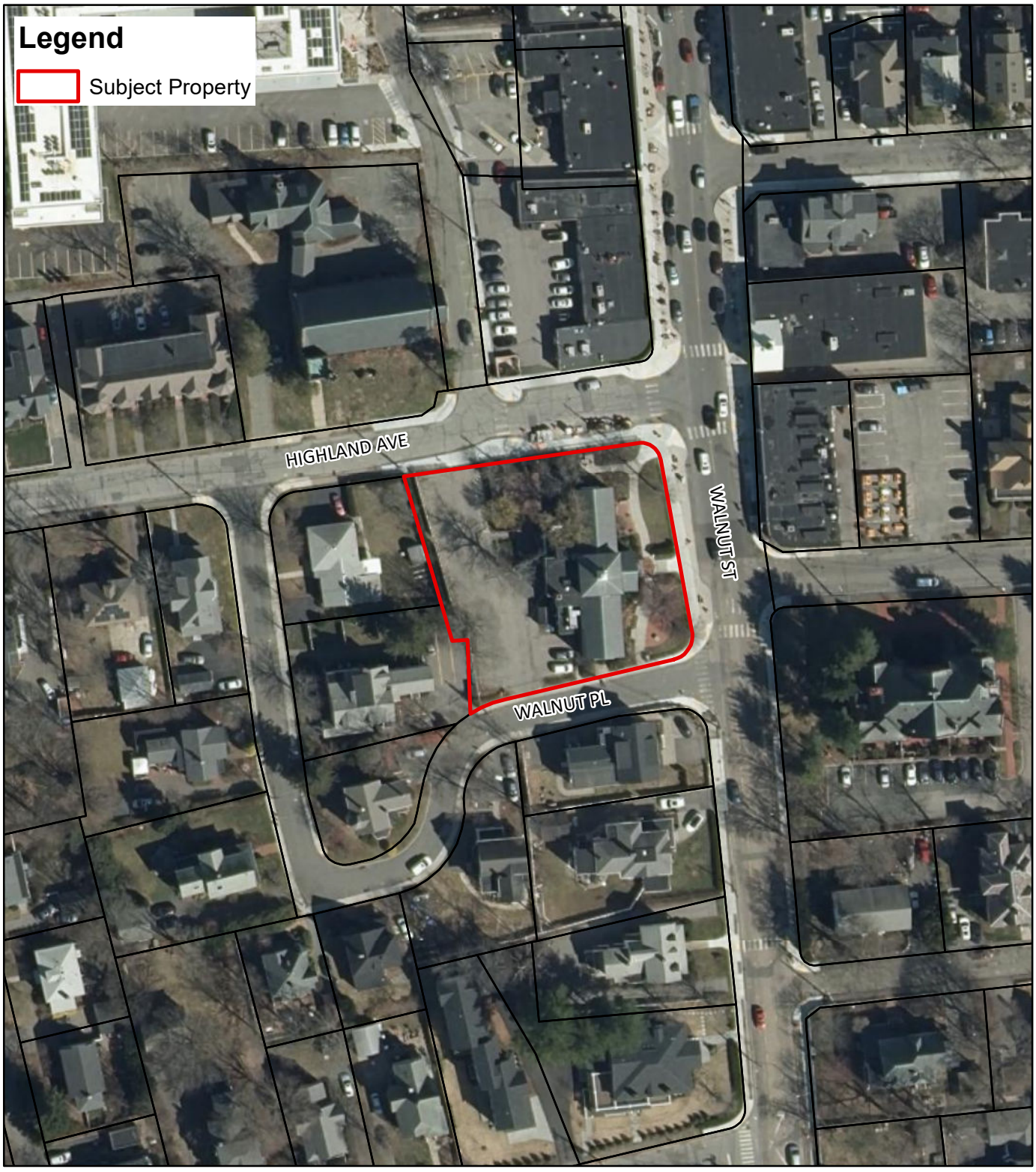
8 BLACKSTONE VALLEY PLACE
LINCOLN, RI 02865
(401) 334-4100

10 LINCOLN ROAD, SUITE 210
FOXBORO, MA 02035
(508) 543-1755

PARE PROJECT No. 20147.00 MAY 2022

FIGURE 1

SENIOR CENTER
NEWTON, MA



ANNOTATED AERIAL PHOTOGRAPH

SCALE: 1 " = 100 '

N
W E
S

8 BLACKSTONE VALLEY PLACE
LINCOLN, RI 02865
(401) 334-4100

10 LINCOLN ROAD, SUITE 210
FOXBORO, MA 02035
(508) 543-1755

PARE PROJECT No. 20147.00

MAY 2022

FIGURE 2

SENIOR CENTER
NEWTON, MA

Map Scale: 1:495 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 5 10 20 30

Feet
0 20 40 80 120

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 21, Sep 2, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 25, 2020—Oct 4, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

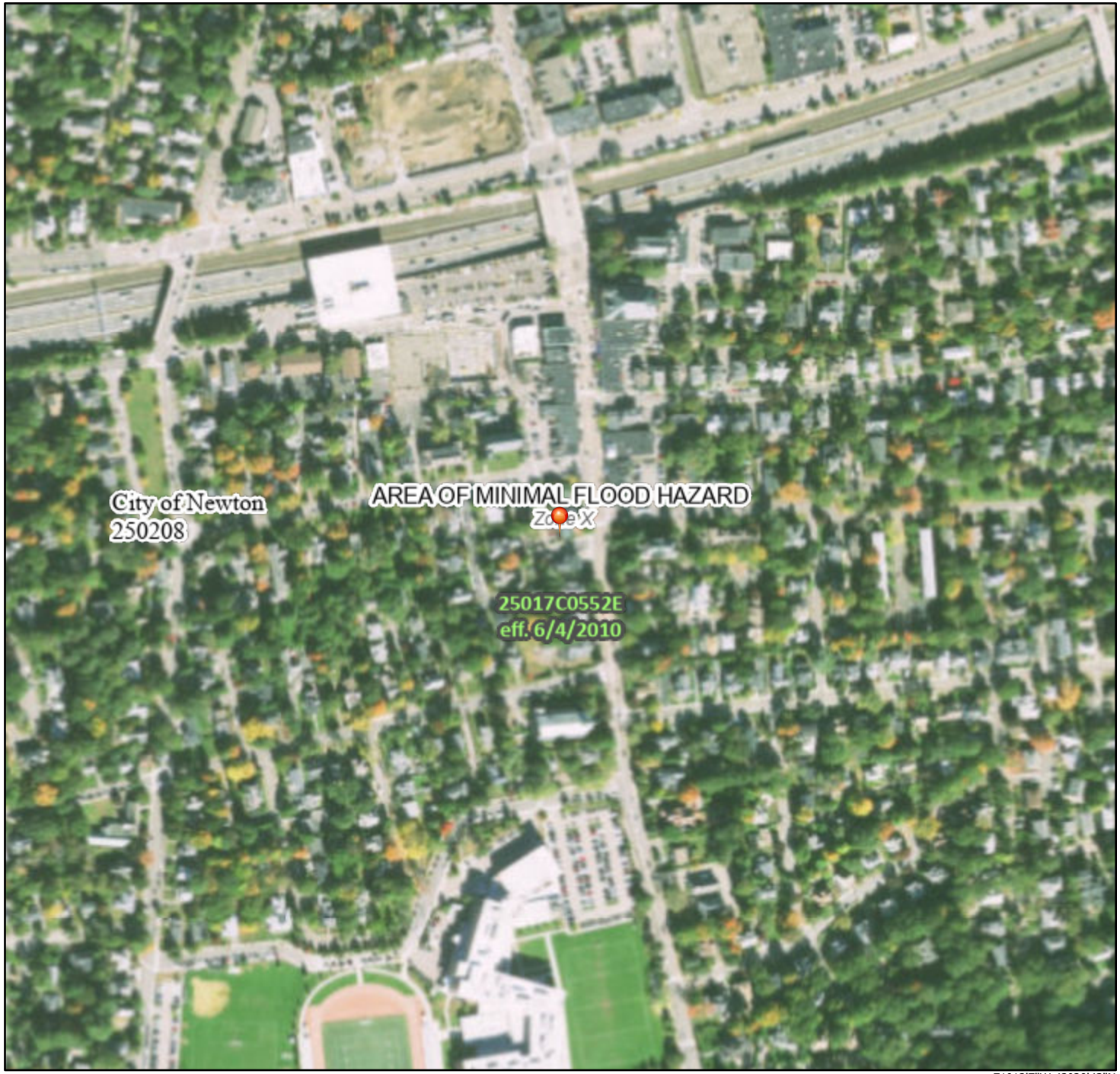
Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
602	Urban land	1.1	100.0%
Totals for Area of Interest		**1.1**	**100.0%**

National Flood Hazard Layer FIRMette

FEMA

71°12'44"W 42°21'10"N



71°12'7"W 42°20'43"N

Feet 1:6,000

0 250 500 1,000 1,500 2,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

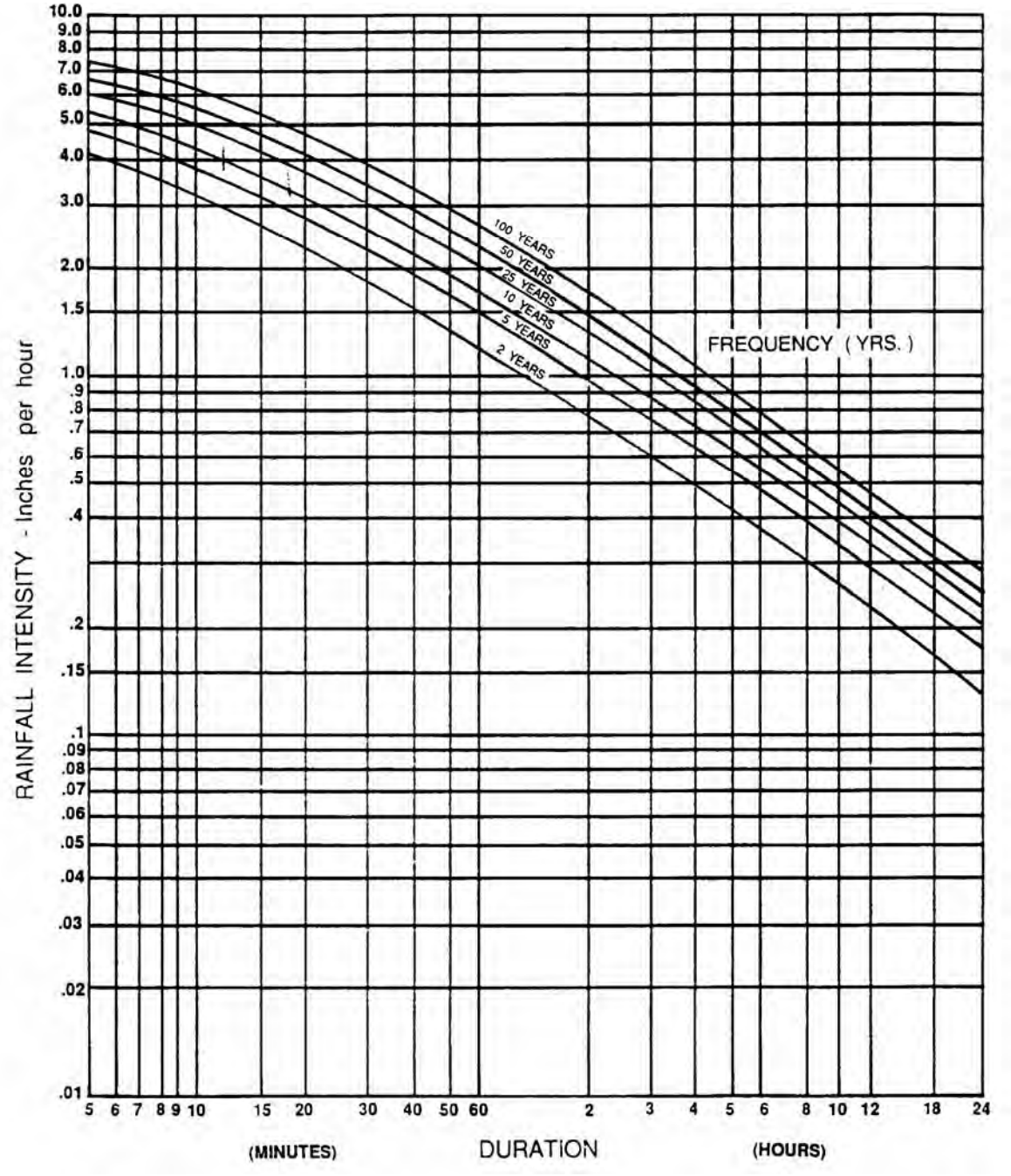
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/24/2022 at 10:14 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Exhibit 8-12

Intensity – Duration – Frequency Curve for Boston, MA



Source: TR55 - Urban Hydrology for Small Wetlands, NRCS

Table 2-2a Runoff curve numbers for urban areas [1]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

F-1. Rainfall Data for Massachusetts from *Rainfall Frequency Atlas of the United States* (TP-40)

- Users of this Handbook should note that current MA DEP written guidance (see DEP Waterlines newsletter -- Fall 2000) requires the use of TP-40 Rainfall Data for calculations under the Wetlands Protection Regulations and the Stormwater Management Policy. More stringent design storms may be used under a local bylaw or ordinance. However, DEP will continue to require the use of TP-40 in any case it reviews under the Wetlands Protection Act and Stormwater Management Policy.

Adjusted Technical Paper 40 Design Storms for 24-hour Event by County

County Name	1-yr 24-hr	2-yr 24-hr	5-yr 24-hr	10-yr 24-hr	25-yr 24-hr	50-yr 24-hr	100-yr 24-hr
Barnstable	2.5	3.6	4.5	4.8	5.7	6.4	7.1
Berkshire	2.5	2.9	3.8	4.4	5.1	5.9	6.4
Bristol	2.5	3.4	4.3	4.8	5.6	6.3	7.0
Dukes	2.5	3.6	4.6	4.9	5.8	6.5	7.2
Essex	2.5	3.1	3.9	4.5	5.4	5.9	6.5
Franklin	2.5	2.9	3.8	4.3	5.1	5.8	6.2
Hampden	2.5	3.0	4.0	4.6	5.3	6.0	6.5
Hampshire	2.5	3.0	3.9	4.5	5.2	5.9	6.4
Middlesex	2.5	3.1	4.0	4.5	5.3	5.9	6.5
Nantucket	2.5	3.6	4.6	4.9	5.8	6.5	7.2
Norfolk	2.5	3.2	4.1	4.7	5.5	6.1	6.7
Plymouth	2.5	3.4	4.3	4.7	5.6	6.2	7.0
Suffolk	2.5	3.2	4.0	4.6	5.5	6.0	6.6
Worcester	2.5	3.0	4.0	4.5	5.3	5.9	6.5

PARE CORPORATION

8 BLACKSTONE VALLEY PLACE, LINCOLN, RHODE ISLAND

ENGINEERS *** PLANNERS *** CONSULTANTS

TEST HOLE NO. **TP-1**

SHEET 1 OF 2

Property Owner: City of Newton

Project: NewCAL Senior Center Contractor: City of Newton

Property Location: 345 Walnut St Excavator:

Date of Test Hole: 5/25/2022 - 8:30 AM

Soil Evaluator: Chris Webber State / Date of Exam: MA / April 23, 2019

Weather: Sunny Shaded: Ye☐ N☑

SAMPLE DESCRIPTION

Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox Description			Texture	Structure	Consistence	Percent Gravel Cobbles Stone
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Con.				
Fill	0-63"			--	--				--	--	--	--
C	63-126"			10 yr 4/2	--				Stony Coarse Sand	Single Grain	Loose	15% G 10% C 10% S

Soil Class: Urban Land Total Depth of Test Hole: 126" (10'-6")

Depth to Groundwater or Seepage: N/A Depth to Impervious or Limiting Layer: N/A Machine Limit

Estimated Seasonal High Water Table: 47.25 Surface Elevation of Test Pit: 57.75

COMMENTS:

Horizons measursed from eastern wall of test pit. Fill layer extends further down on east side of pit, with several irregular colors/debris

Brick at 42", Clam shells at 55", rotted tree limb at 55"

Some moisure in soil at pit bottom, GW table is likely close

TEST HOLE NO. **TP-**

PARE CORPORATION

8 BLACKSTONE VALLEY PLACE, LINCOLN, RHODE ISLAND

ENGINEERS *** PLANNERS *** CONSULTANTS

TEST HOLE NO. **TP-2**

SHEET 2 OF _2

Property Owner: City of Newton

Project: NewCAL Senior Center Contractor: City of Newton

Property Location: 345 Walnut St Excavator:

Date of Test Hole: 5/25/2022 - 10:30 AM

Soil Evaluator: Chris Webber State / Date of Exam: MA / April 23, 2019

Weather: Sunny Shaded: Ye☐ N☑

SAMPLE DESCRIPTION

Horizon	Depth	Horizon Boundaries		Soil Colors		Re-Dox Description			Texture	Structure	Consistence	Percent Gravel Cobbles Stone
		Dist	Topo	Matrix	Re-Dox Features	Ab.	S.	Con.				
Fill	0-33"			--	--				--	--	--	--
C	33-120"			10 yr 4/3	--				Stony Sand	Single Grain	Loose	15% G 10% C 10% S

Soil Class: Urban Land Total Depth of Test Hole: 120" (10')

Depth to Groundwater or Seepage: N/A Depth to Impervious or Limiting Layer: N/A Machine Limit

Estimated Seasonal High Water Table: 47.5 Surface Elevation of Test Pit: 57.5

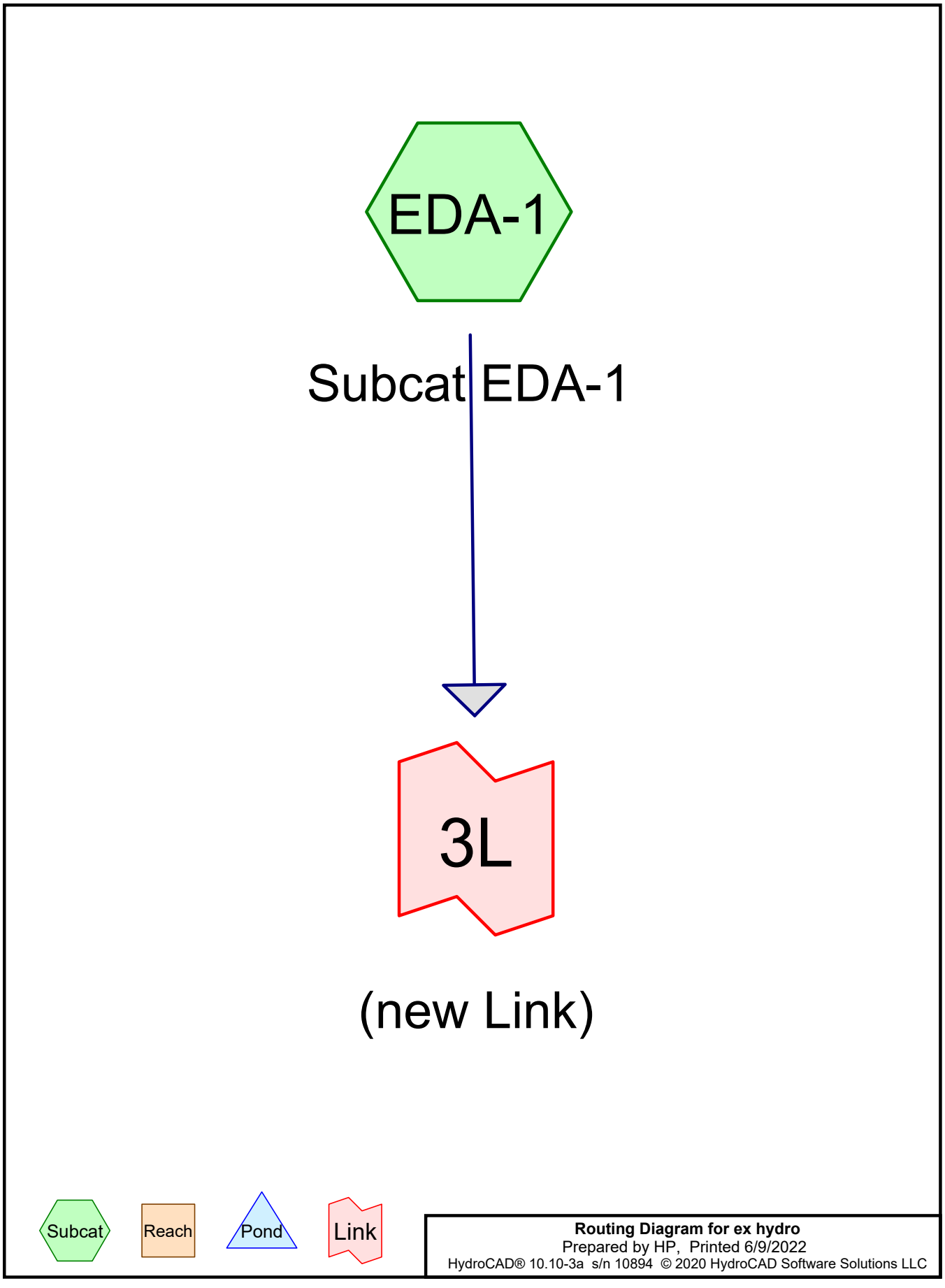
COMMENTS:

Brick, ceramics, and organics found down to 33"

TEST HOLE NO. **TP-**

APPENDIX B

Hydrologic Calculations – Existing and Proposed Conditions
Hydraulic Design Table



Routing Diagram for ex hydro
Prepared by HP, Printed 6/9/2022

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EDA-1: Subcat EDA-1 Runoff Area=0.602 ac 67.07% Impervious Runoff Depth>1.16"
Tc=0.0 min CN=79 Runoff=0.97 cfs 2,531 cf

Link 3L: (new Link) Inflow=0.97 cfs 2,531 cf
Primary=0.97 cfs 2,531 cf

Total Runoff Area = 26,232 sf Runoff Volume = 2,531 cf Average Runoff Depth = 1.16"
32.93% Pervious = 8,639 sf 67.07% Impervious = 17,593 sf

Summary for Subcatchment EDA-1: Subcat EDA-1

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.97 cfs @ 12.05 hrs, Volume= 2,531 cf, Depth> 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.16"

Area (ac)	CN	Description
0.283	98	Paved parking, HSG A
0.003	98	Paved parking, HSG A
0.001	98	Paved parking, HSG A
0.001	98	Paved parking, HSG A
0.008	39	>75% Grass cover, Good, HSG A
0.025	39	>75% Grass cover, Good, HSG A
0.022	39	>75% Grass cover, Good, HSG A
0.001	39	>75% Grass cover, Good, HSG A
0.027	39	>75% Grass cover, Good, HSG A
0.022	39	>75% Grass cover, Good, HSG A
0.023	39	>75% Grass cover, Good, HSG A
0.007	39	>75% Grass cover, Good, HSG A
0.008	39	>75% Grass cover, Good, HSG A
0.023	39	>75% Grass cover, Good, HSG A
0.031	39	>75% Grass cover, Good, HSG A
0.002	98	Roofs, HSG A
0.113	98	Roofs, HSG A
0.602	79	Weighted Average
0.198		32.93% Pervious Area
0.404		67.07% Impervious Area

Summary for Link 3L: (new Link)

Inflow Area = 26,232 sf, 67.07% Impervious, Inflow Depth > 1.16" for 2-Year event
Inflow = 0.97 cfs @ 12.05 hrs, Volume= 2,531 cf
Primary = 0.97 cfs @ 12.05 hrs, Volume= 2,531 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EDA-1: Subcat EDA-1 Runoff Area=0.602 ac 67.07% Impervious Runoff Depth>2.35"
Tc=0.0 min CN=79 Runoff=1.94 cfs 5,130 cf

Link 3L: (new Link) Inflow=1.94 cfs 5,130 cf
Primary=1.94 cfs 5,130 cf

Total Runoff Area = 26,232 sf Runoff Volume = 5,130 cf Average Runoff Depth = 2.35"
32.93% Pervious = 8,639 sf 67.07% Impervious = 17,593 sf

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EDA-1: Subcat EDA-1 Runoff Area=0.602 ac 67.07% Impervious Runoff Depth>5.56"
Tc=0.0 min CN=79 Runoff=4.39 cfs 12,154 cf

Link 3L: (new Link) Inflow=4.39 cfs 12,154 cf
Primary=4.39 cfs 12,154 cf

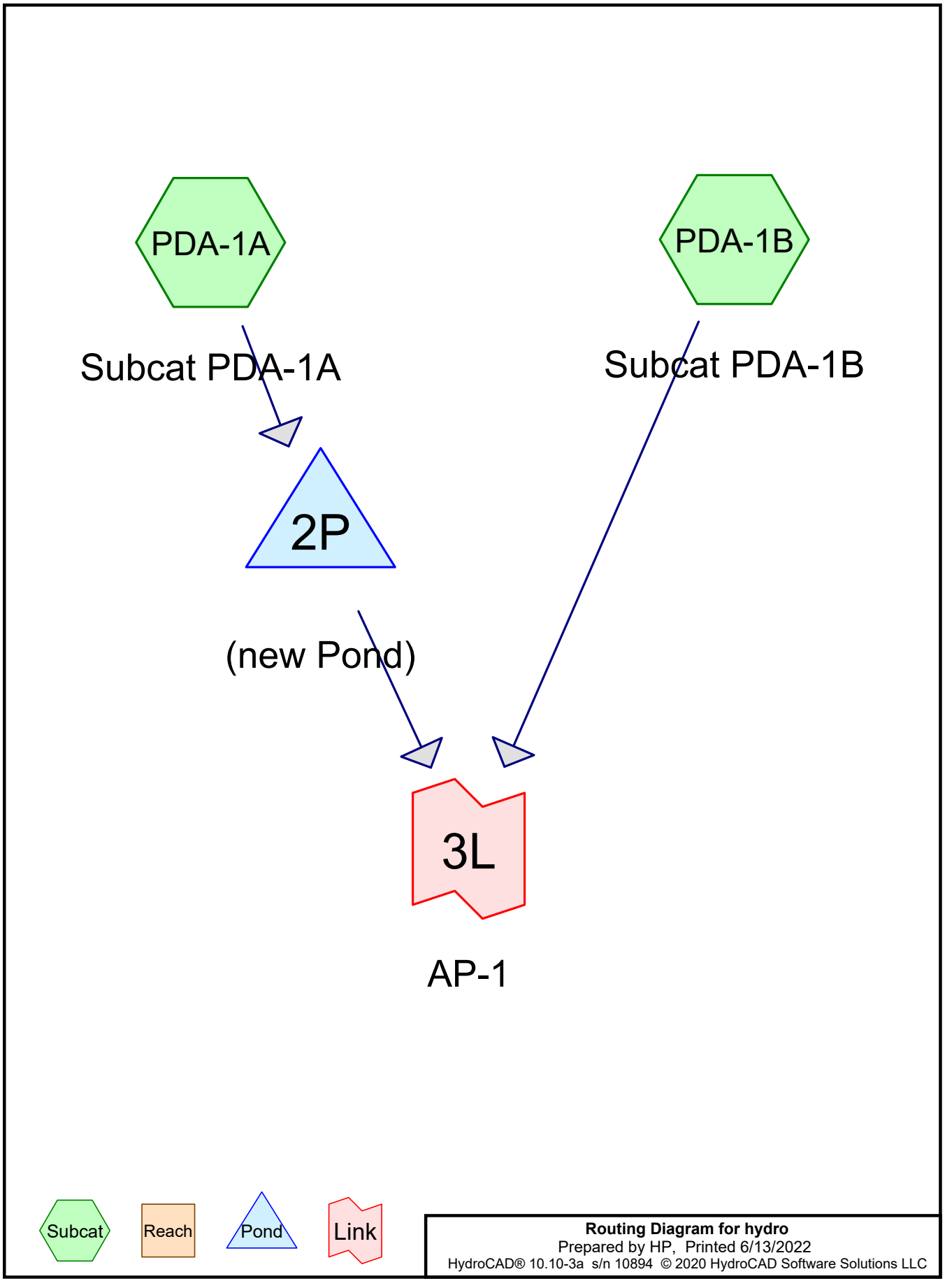
Total Runoff Area = 26,232 sf Runoff Volume = 12,154 cf Average Runoff Depth = 5.56"
32.93% Pervious = 8,639 sf 67.07% Impervious = 17,593 sf

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EDA-1: Subcat EDA-1 Runoff Area=0.602 ac 67.07% Impervious Runoff Depth>5.70"
Tc=0.0 min CN=79 Runoff=4.50 cfs 12,456 cf

Link 3L: (new Link) Inflow=4.50 cfs 12,456 cf
Primary=4.50 cfs 12,456 cf

Total Runoff Area = 26,232 sf Runoff Volume = 12,456 cf Average Runoff Depth = 5.70"
32.93% Pervious = 8,639 sf 67.07% Impervious = 17,593 sf



Routing Diagram for hydro
Prepared by HP, Printed 6/13/2022
HydroCAD® 10.10-3a s/n 10894 © 2020 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PDA-1A: Subcat PDA-1A Runoff Area=24,716 sf 88.36% Impervious Runoff Depth>2.03"
Tc=0.0 min CN=91 Runoff=1.51 cfs 4,177 cf

Subcatchment PDA-1B: Subcat PDA-1B Runoff Area=1,510 sf 66.77% Impervious Runoff Depth>1.10"
Tc=0.0 min CN=78 Runoff=0.05 cfs 138 cf

Pond 2P: (new Pond) Peak Elev=51.54' Storage=0.025 af Inflow=1.51 cfs 4,177 cf
Discarded=0.23 cfs 4,174 cf Primary=0.00 cfs 0 cf Outflow=0.23 cfs 4,174 cf

Link 3L: AP-1 Inflow=0.05 cfs 138 cf
Primary=0.05 cfs 138 cf

Total Runoff Area = 26,226 sf Runoff Volume = 4,315 cf Average Runoff Depth = 1.97"
12.88% Pervious = 3,379 sf 87.12% Impervious = 22,848 sf

Summary for Subcatchment PDA-1A: Subcat PDA-1A

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.51 cfs @ 12.05 hrs, Volume= 4,177 cf, Depth> 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.16"

Area (sf)	CN	Description
120	98	Paved parking, HSG A
777	98	Paved parking, HSG A
23	98	Paved parking, HSG A
10,780	98	Paved parking, HSG A
0	98	Paved parking, HSG A
76	39	>75% Grass cover, Good, HSG A
40	39	>75% Grass cover, Good, HSG A
1,241	39	>75% Grass cover, Good, HSG A
77	39	>75% Grass cover, Good, HSG A
512	39	>75% Grass cover, Good, HSG A
930	39	>75% Grass cover, Good, HSG A
10,140	98	Roofs, HSG A
24,716	91	Weighted Average
2,877		11.64% Pervious Area
21,839		88.36% Impervious Area

Summary for Subcatchment PDA-1B: Subcat PDA-1B

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.05 cfs @ 12.05 hrs, Volume= 138 cf, Depth> 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-Year Rainfall=3.16"

Area (sf)	CN	Description
26	98	Paved parking, HSG A
965	98	Paved parking, HSG A
17	98	Paved parking, HSG A
28	39	>75% Grass cover, Good, HSG A
360	39	>75% Grass cover, Good, HSG A
113	39	>75% Grass cover, Good, HSG A
0	98	Roofs, HSG A
0	39	>75% Grass cover, Good, HSG A
1,510	78	Weighted Average
502		33.23% Pervious Area
1,008		66.77% Impervious Area

Summary for Pond 2P: (new Pond)

[82] Warning: Early inflow requires earlier time span

Inflow Area = 24,716 sf, 88.36% Impervious, Inflow Depth > 2.03" for 2-Year event
Inflow = 1.51 cfs @ 12.05 hrs, Volume= 4,177 cf
Outflow = 0.23 cfs @ 12.48 hrs, Volume= 4,174 cf, Atten= 85%, Lag= 26.2 min
Discarded = 0.23 cfs @ 12.48 hrs, Volume= 4,174 cf
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 51.54' @ 12.48 hrs Surf.Area= 0.019 ac Storage= 0.025 af

Plug-Flow detention time= 32.1 min calculated for 4,173 cf (100% of inflow)
Center-of-Mass det. time= 31.7 min (799.5 - 767.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.50'	0.028 af	**29.92'W x 27.21'L x 5.50'H Field A** 0.103 af Overall - 0.033 af Embedded = 0.070 af x 40.0% Voids
#2A	50.25'	0.033 af	**ADS_StormTech MC-3500 d +Cap**x 12 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 12 Chambers in 4 Rows Cap Storage= +14.9 cf x 2 x 4 rows = 119.2 cf
		0.061 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.50'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 45.00' Phase-In= 0.01'
#2	Primary	53.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.23 cfs @ 12.48 hrs HW=51.54' (Free Discharge)
↑**1=Exfiltration** (Controls 0.23 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=49.50' (Free Discharge)
↑**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: (new Pond) - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech®MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 4 rows = 119.2 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

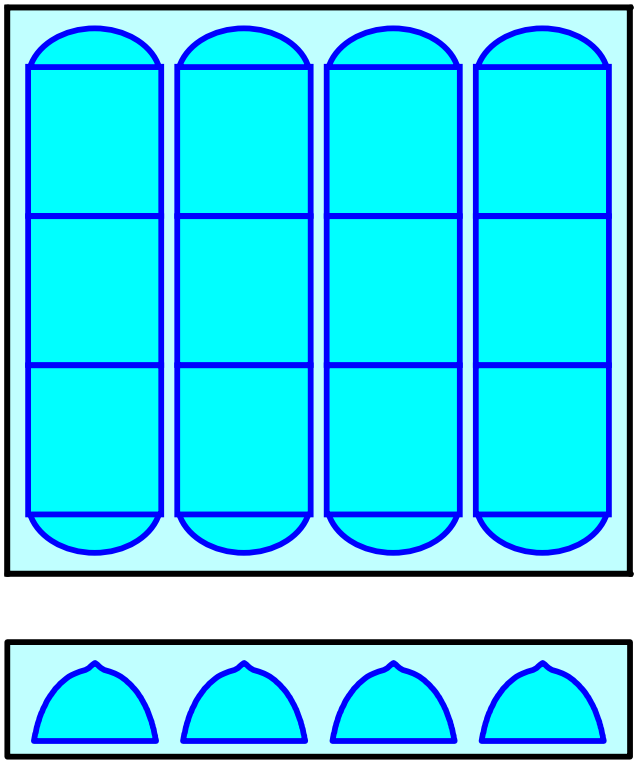
3 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 25.21' Row Length +12.0" End Stone x 2 = 27.21' Base Length
4 Rows x 77.0" Wide + 9.0" Spacing x 3 + 12.0" Side Stone x 2 = 29.92' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

12 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 4 Rows = 1,438.6 cf Chamber Storage

4,477.2 cf Field - 1,438.6 cf Chambers = 3,038.6 cf Stone x 40.0% Voids = 1,215.4 cf Stone Storage

Chamber Storage + Stone Storage = 2,654.0 cf = 0.061 af
Overall Storage Efficiency = 59.3%
Overall System Size = 27.21' x 29.92' x 5.50'

12 Chambers
165.8 cy Field
112.5 cy Stone



Stage-Discharge for Pond 2P: (new Pond)

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
49.50	0.00	0.00	0.00
49.60	0.16	0.16	0.00
49.70	0.16	0.16	0.00
49.80	0.17	0.17	0.00
49.90	0.17	0.17	0.00
50.00	0.17	0.17	0.00
50.10	0.18	0.18	0.00
50.20	0.18	0.18	0.00
50.30	0.18	0.18	0.00
50.40	0.19	0.19	0.00
50.50	0.19	0.19	0.00
50.60	0.19	0.19	0.00
50.70	0.20	0.20	0.00
50.80	0.20	0.20	0.00
50.90	0.20	0.20	0.00
51.00	0.21	0.21	0.00
51.10	0.21	0.21	0.00
51.20	0.21	0.21	0.00
51.30	0.22	0.22	0.00
51.40	0.22	0.22	0.00
51.50	0.23	0.23	0.00
51.60	0.23	0.23	0.00
51.70	0.23	0.23	0.00
51.80	0.24	0.24	0.00
51.90	0.24	0.24	0.00
52.00	0.24	0.24	0.00
52.10	0.25	0.25	0.00
52.20	0.25	0.25	0.00
52.30	0.25	0.25	0.00
52.40	0.26	0.26	0.00
52.50	0.26	0.26	0.00
52.60	0.26	0.26	0.00
52.70	0.27	0.27	0.00
52.80	0.27	0.27	0.00
52.90	0.27	0.27	0.00
53.00	0.28	0.28	0.00
53.10	0.32	0.28	0.04
53.20	0.45	0.28	0.17
53.30	0.66	0.29	0.37
53.40	0.92	0.29	0.63
53.50	1.24	0.29	0.95
53.60	1.60	0.30	1.30
53.70	1.97	0.30	1.67
53.80	2.36	0.30	2.05
53.90	2.71	0.31	2.40
54.00	2.99	0.31	2.67
54.10	3.24	0.32	2.93
54.20	3.48	0.32	3.16
54.30	3.70	0.32	3.38
54.40	3.91	0.33	3.59
54.50	4.11	0.33	3.78
54.60	4.30	0.33	3.97
54.70	4.48	0.34	4.14
54.80	4.65	0.34	4.31
54.90	4.82	0.34	4.47
55.00	**4.98**	**0.35**	**4.63**

Stage-Area-Storage for Pond 2P: (new Pond)

Elevation (feet)	Surface (acres)	Storage (acre-feet)
49.50	**0.019**	0.000
49.60	0.019	0.001
49.70	0.019	0.001
49.80	0.019	0.002
49.90	0.019	0.003
50.00	0.019	0.004
50.10	0.019	0.004
50.20	0.019	0.005
50.30	0.019	0.006
50.40	0.019	0.008
50.50	0.019	0.009
50.60	0.019	0.011
50.70	0.019	0.012
50.80	0.019	0.014
50.90	0.019	0.015
51.00	0.019	0.017
51.10	0.019	0.018
51.20	0.019	0.020
51.30	0.019	0.021
51.40	0.019	0.023
51.50	0.019	0.024
51.60	0.019	0.025
51.70	0.019	0.027
51.80	0.019	0.028
51.90	0.019	0.030
52.00	0.019	0.031
52.10	0.019	0.032
52.20	0.019	0.034
52.30	0.019	0.035
52.40	0.019	0.036
52.50	0.019	0.038
52.60	0.019	0.039
52.70	0.019	0.040
52.80	0.019	0.041
52.90	0.019	0.043
53.00	0.019	0.044
53.10	0.019	0.045
53.20	0.019	0.046
53.30	0.019	0.047
53.40	0.019	0.048
53.50	0.019	0.049
53.60	0.019	0.050
53.70	0.019	0.051
53.80	0.019	0.052
53.90	0.019	0.053
54.00	0.019	0.053
54.10	0.019	0.054
54.20	0.019	0.055
54.30	0.019	0.056
54.40	0.019	0.056
54.50	0.019	0.057
54.60	0.019	0.058
54.70	0.019	0.059
54.80	0.019	0.059
54.90	0.019	0.060
55.00	0.019	**0.061**

Summary for Link 3L: AP-1

Inflow Area = 26,226 sf, 87.12% Impervious, Inflow Depth > 0.06" for 2-Year event
Inflow = 0.05 cfs @ 12.05 hrs, Volume= 138 cf
Primary = 0.05 cfs @ 12.05 hrs, Volume= 138 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PDA-1A: Subcat PDA-1A Runoff Area=24,716 sf 88.36% Impervious Runoff Depth>3.43"
Tc=0.0 min CN=91 Runoff=2.48 cfs 7,068 cf

Subcatchment PDA-1B: Subcat PDA-1B Runoff Area=1,510 sf 66.77% Impervious Runoff Depth>2.26"
Tc=0.0 min CN=78 Runoff=0.11 cfs 285 cf

Pond 2P: (new Pond) Peak Elev=53.24' Storage=0.046 af Inflow=2.48 cfs 7,068 cf
Discarded=0.29 cfs 6,789 cf Primary=0.24 cfs 273 cf Outflow=0.53 cfs 7,062 cf

Link 3L: AP-1 Inflow=0.27 cfs 558 cf
Primary=0.27 cfs 558 cf

Total Runoff Area = 26,226 sf Runoff Volume = 7,352 cf Average Runoff Depth = 3.36"
12.88% Pervious = 3,379 sf 87.12% Impervious = 22,848 sf

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PDA-1A: Subcat PDA-1A Runoff Area=24,716 sf 88.36% Impervious Runoff Depth>6.82"
Tc=0.0 min CN=91 Runoff=4.76 cfs 14,038 cf

Subcatchment PDA-1B: Subcat PDA-1B Runoff Area=1,510 sf 66.77% Impervious Runoff Depth>5.45"
Tc=0.0 min CN=78 Runoff=0.25 cfs 685 cf

Pond 2P: (new Pond) Peak Elev=54.47' Storage=0.057 af Inflow=4.76 cfs 14,038 cf
Discarded=0.33 cfs 10,023 cf Primary=3.74 cfs 4,005 cf Outflow=4.07 cfs 14,028 cf

Link 3L: AP-1 Inflow=3.97 cfs 4,690 cf
Primary=3.97 cfs 4,690 cf

Total Runoff Area = 26,226 sf Runoff Volume = 14,723 cf Average Runoff Depth = 6.74"
12.88% Pervious = 3,379 sf 87.12% Impervious = 22,848 sf

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PDA-1A: Subcat PDA-1A Runoff Area=24,716 sf 88.36% Impervious Runoff Depth>6.96"
Tc=0.0 min CN=91 Runoff=4.85 cfs 14,327 cf

Subcatchment PDA-1B: Subcat PDA-1B Runoff Area=1,510 sf 66.77% Impervious Runoff Depth>5.58"
Tc=0.0 min CN=78 Runoff=0.25 cfs 703 cf

Pond 2P: (new Pond) Peak Elev=54.51' Storage=0.057 af Inflow=4.85 cfs 14,327 cf
Discarded=0.33 cfs 10,138 cf Primary=3.81 cfs 4,178 cf Outflow=4.14 cfs 14,317 cf

Link 3L: AP-1 Inflow=4.05 cfs 4,881 cf
Primary=4.05 cfs 4,881 cf

Total Runoff Area = 26,226 sf Runoff Volume = 15,030 cf Average Runoff Depth = 6.88"
12.88% Pervious = 3,379 sf 87.12% Impervious = 22,848 sf

APPENDIX C

TSS Removal Calculation
Recharge Calculation

PROJECT	Newton Center for Active Living	PROJECT NUMBER	20147.00
SUBJECT	Required Recharge Volume		
COMPUTATIONS BY	GL	DATE	6/9/2022
CHECK BY	JJ	DATE	6/10/2022

Groundwater Recharge Calculation

A. Resources:

MassDEP Stormwater Handbook, 2008 Volume 3

B. Data:

Existing Impervious Area =	17,594	SF
Proposed Impervious Area =	22,846	SF
Net Increase =	5,252	SF

C. Equation

$$R_v = F \times Impervious\ Area$$

Rv = (0.60'/12") x 5,252 SF

R_v = Require Recharge Volume, Ft^3 (soil group A = .60 in)

F = Target Depth Factor

Impervious Area = net impervious area

C. Calculations:

Required Recharge Volume:

Soil Group	Impervious Area (SF)	Required Volume (CF)	Volume Provided* (CF)
A	5252	263	1920

*Volume provided by the *Underground Infiltration System* below the invert out at el. 53.00'

PROJECT	Newton Center for Active Living	PROJECT NUMBER	20147.00
SUBJECT	Total Suspended Solids Removal Efficiency		
COMPUTATIONS BY	GL	DATE	6/9/2022
CHECK BY	JJ	DATE	6/10/2022

Total Suspended Solids Removal Summary

A. Resources:

MassDEP Stormwater Handbook, 2008 Volume 2 and Volume 3

B. Calculations

TSS Removal Summary

Watershed	Vehicular Impervious Area (SF)	TSS Removal Rate	Weighted Removal Rate
PDA-1	9,800	0.94	9,212
TOTAL	**9,800**		**9,212**

CUMULATIVE REMOVAL EFFICIENCY = **0.94**

CUMULATIVE REMOVAL EFFICIENCY = **94%**

NOTE: See weighted TSS Removal Calculations on page 2.

TOTAL SUSPENDED SOLIDS REMOVAL

11091.00 - Somerset Berkley Regional High School

BMP	TSS Removal Rate	Starting TSS Load	TSS Removed	Remaining Load
PDA-1				
Deep Sump Catch Basins*	25%	1.00	0.25	0.75
Hydrodynamic Separator**	60%	0.75	0.45	0.30
Underground Infiltration System*	80%	0.30	0.24	0.06
	total TSS removal:		**94%**	

Drainage Area	Vehicular Area (SF)	% of Total Vehicular Area	TSS Removed	Weighted % TSS Removal
PDA-1	9,920	1.00	94.0%	94.0%
Total	9,920	1.00		**94.0%**

Total Annual TSS Removal Rate = **94.0%**

Notes:

* Based on Table 5-3 of EPA Storm Water Runoff Management Measure

** Based on TARP Reports of Hydrodynamic Separators

APPENDIX D

XBT-1 Existing Hydrology
XBT-2 Proposed Hydrology

MAP 24, LOT 2
N/F LANDS OF
MARC GERMANI
BK. 24791, PG. 146

MAP 24, LOT 3
N/F LANDS OF
37 WALNUT PLACE, LLC
BK. 68855, PG. 373

MAP 24, LOT 1
N/F LANDS OF
CITY OF NEWTON
NO RECORD DEED

EDA-1

WALNUT STREET
(PUBLIC VARIABLE WIDTH)
(ASPHALT PAVEMENT)

WALNUT PLACE
(PUBLIC VARIABLE WIDTH)
(ASPHALT PAVEMENT)

Scale: 1"=20'
0 10' 20' 40'

PARE

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

Newton Center for Active Living

345 Walnut Street
Newton, Massachusetts

REVISIONS:

PROJECT NO.:	20147.00
DATE:	APRIL 2022
SCALE:	1"=20'
DESIGNED BY:	JJ
CHECKED BY:	JJ
DRAWN BY:	SB
APPROVED BY:	JJ

DRAWING TITLE:
EXISTING HYDROLOGY PLAN

DRAWING NO.:
H1.0

SHEET NO. ___ OF 8

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PDA-1A

PDA-1B

MAP 24, LOT 2
N/F LANDS OF
MARC GERMANI
BK. 24791, PG. 146

MAP 24, LOT 3
N/F LANDS OF
37 WALNUT PLACE, LLC
BK. 68855, PG. 373

MAP 24, LOT 1
N/F LANDS OF
CITY OF NEWTON
NO RECORD DEED

MAP 24, LOT 4

WALNUT STREET
(PUBLIC - VARIABLE WIDTH)
(ASPHALT ROADWAY)

WALNUT PLACE
(PUBLIC - VARIABLE WIDTH)
(ASPHALT ROADWAY)

MULTI STORY
MASONRY BUILDING
BFPA=4,919± SF

BLDG
HT=37.6'±

BLDG
HT=36.9'±

Scale: 1"=20'
0 10' 20' 40'

PARE

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

Newton Center for Active Living
345 Walnut Street
Newton, Massachusetts

REVISIONS:

PROJECT NO.:	20147.00
DATE:	APRIL 2022
SCALE:	1" = 20'
DESIGNED BY:	JJ
CHECKED BY:	JJ
DRAWN BY:	SB
APPROVED BY:	JJ

DRAWING TITLE:
PROPOSED HYDROLOGY PLAN

DRAWING NO.:
H2.0

SHEET NO. ___ OF 8

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PARE PROJECT NO. 20147.00

STORMWATER OPERATION AND MAINTENANCE PLAN
LONG TERM POLLUTION PREVENTION PLAN

NEWTON CENTER FOR ACTIVE LIVING
NEWTON, MASSACHUSETTS

Prepared for:

City of Newton
1000 Commonwealth Ave
Newton, MA 02459

Prepared by:

Pare Corporation
10 Lincoln Road
Foxboro, MA 02035

June 2022

STORMWATER OPERATION AND MAINTENANCE PLAN
LONG TERM POLLUTION PREVENTION PLAN
TABLE OF CONTENTS

PREAMBLE

Name of Site: **Newton Center for Active Living**

Location: **City of Newton, MA**

Owner's Name: **City of Newton**

PREAMBLE: This Operation and Maintenance Plan (O&M) and Long Term Pollution Prevention Plan were prepared for the Owner of the Metropolis Rink, in cooperation with local authorities and personnel within the City of Newton, to establish a basis for continuing maintenance, inspection, and pollution prevention for the Newton Center for Active Living. The Operation and Maintenance Manual and Long-Term Pollution Prevention Plan stresses the importance of maintenance of the drainage system and best management practices.

The Owner of the site has a direct influence on the operation of the site and holds financial responsibility. As such, the Owner should play a direct role in the development of a continuing maintenance program, which includes important elements such as inspecting, monitoring and maintaining the site. It is recommended that as personnel change, a comprehensive briefing be conducted for new workers/personnel to familiarize them with the site structures and the components of the Operation and Maintenance Manual, Long Term Pollution Prevention Plan, and other documents specific to the site. If ownership and/or financial responsibility of the stormwater management system changes, the owner shall notify the Ashland Conservation Commission per the Ashland Stormwater Management By-Law.

RESPONSIBLE PARTIES

Owner: City of Newton

Operator: City of Newton

Contacts: City of Newton

I, the undersigned, understand the Operation and Maintenance procedures outlined in this manual and will be the responsible party for the Operation and Maintenance set forth in this manual (Sign, Print Name, and Date)

Signature:_____
Name (Printed):_____
Date:_____

STORMWATER OPERATION AND MAINTENANCE PLAN

General Operation and Maintenance Notes

Following construction, the completion of the inspection and maintenance requirements below shall be the responsibility of the Property Owner.

Maintenance inspections should be performed by qualified Town of Ashland personnel who are familiar with the site, its operation, and have been educated on the procedures for observing, identifying, and documenting deficiencies. The operations and maintenance log shall be completed during each maintenance inspection. A sample O&M log is included in Appendix A.

1. Monitoring shall be routinely conducted to observe operation and assess performance. Site personnel conducting monitoring shall be educated on the intent of the design and operation of each system to continue effectiveness of the inspections.

2. Special inspections shall be made immediately following major events such as floods, earthquakes, vandalism, and major storm events (greater than 3.10").

3. Maintenance inspections shall be performed on all structural practices to assess operational capability and structural stability. If at any time there is a question of structural or hydraulic integrity that may affect public safety, inspection shall be done by a professional engineer.

4. Trash, litter, sediment and other debris shall be removed from any stormwater management system facility (including but not limited to catch basins, manholes, inlets, outlet structures, and stormwater best management practices (BMPs)) at least twice a year, once in the spring and once in the fall, at the cost of the Owner.

5. The parking lot, entry drives, and sidewalks shall be swept by the Owner as early as possible every spring and once in the fall to remove sediments.

6. A maintenance schedule for mulching, edging, mowing, pruning, weeding, and aeration shall be developed by the Owner to maintain landscape areas.

7. All sediments removed shall be disposed of at an approved and permitted location.

8. All observations made during scheduled inspections (notes, photographs, etc.) shall be recorded in an inspection form. Inspections and Observations shall include the location, extent of the area (length, width, depth, height), and descriptive detail including: sediment buildup, color/quantity of sediment, condition of concrete/structures, extent of moist wet, or saturated areas, adequacy of surface drainage, and changes in condition. All maintenance required shall be recorded in these forms. All maintenance and repair records shall be retained for a minimum of five years. Example inspection forms have been included in Appendix A for use.

9. All cleaning and maintenance of drainage system BMP's shall be the responsibility of the Property Owner. See OM-1 in Appendix A for the location of each stormwater system. Additional inspection, maintenance, and repair notes for the stormwater system are as follows:

Catch Basins, Manholes, and Area Drain Inspection, Maintenance, and Repair Notes

1. Inspect catch basins, drain manholes, yard drains, and trench drains quarterly for sediment build up and for continuous flow through. Any debris shall be cleared that could potentially block the flow of stormwater.

2. Deep sump catch basin units should be inspected and cleaned four times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin.

3. Clean outlets of all drainage structures when observed to be clogged.

Underground Infiltration/Detention System Inspection, Maintenance, and Repair Notes

1. The system shall be maintained as recommended by the manufacturer.

2. Following storm events with rainfall exceeding 3.1"
    - Inspect infiltration/detention system for trash, debris, sediment, erosion, standing water, and overall performance. Defects shall be repaired by the Owner.

3. Bi-annually
    - Inspections shall be performed a minimum of two times per year on the inspection ports and drainage structures of the underground infiltration/detention system to ensure proper operation of the system.

4. Jetvac maintenance is recommended if sediment has been collected to a depth of 3" in the pretreatment row. More frequent maintenance may be required to maintain minimum flow rates through the pretreatment row. The jetvac process shall only be performed on the pretreatment row.

Grass and Lawn Maintenance

1. Grass shall be mown or cut back if it impedes water movement or grass health.

2. Inspect eroded areas of landscape and re-seed or re-mulch, as necessary.

3. Inspect area drain grates within landscaped areas monthly and clean of debris, as necessary.

LONG TERM POLLUTION PREVENTION PLAN

Pollution Prevention and Source Controls

In addition, the following site-specific controls and performance procedures shall be followed to prevent potential sources of pollution.

1. **General Inspection and Monitoring Requirements**
   The inspection and maintenance schedule should follow the above Operations and Maintenance Plan.

2. **Removal of Debris**
   Trash, litter, sediment and other debris shall be removed from any stormwater facility (including catch basins, manholes, inlets, diversion and outlet structures) per the above Operations and Maintenance Plan.

3. **Sweeping**
   The parking lot, entry drives, and sidewalks shall be swept by the Owner twice a year per the above Operations and Maintenance Plan.

4. **Snow Removal**
   Snow removal shall be performed to protect public safety and the environment. Snow shall not be dumped and/or stored in critical areas or in areas where infiltration is proposed, including, but not limited to the adjacent wetland, wetland resource area, or footprint of the bioretention area. Snow storage areas shall be surrounded by silt fence and have the maximum practicable buffer. Avoid long-term pileup of snow on grass paved surfaces to minimize possible damage from snow mold and other related diseases. Debris shall be cleared from each snow storage areas prior to disposing snow in each area. Recommended snow stockpile locations are shown on OM-1 provided in Appendix A.

5. **Proper Storage of Deicing Materials**
   Deicing Materials shall be stored under a roof or secure enclosure to protect groundwater and surface water sources for public water supplies.

6. **Grass, Tree, and Shrub Fertilization**
   All fertilizer types and amounts shall be in accordance with Town of Ashland maintenance practices. Fertilizer use shall be minimized to the maximum extent practicable. If used, fertilizer should not be installed more than twice a year (once in spring and once in fall).
   The following techniques shall be implemented to prevent pollution from fertilizer:
   a. Fertilizer shall be stored under a roof or secure enclosure.
   b. Partially used bags shall be transferred to a sealable bag or a bin to avoid spills.
   c. Don't fertilize before a rain storm.
   d. Consider using organic fertilizers. They release nutrients more slowly.
   e. Have your soil tested before applying fertilizers to your lawn and gardens. A standard soil test costs $9.00. You may not need to add any fertilizer. (Call the UMass Extension Soil Testing Lab at 413-545-2311 or download a soil test order form at http://www.umass.edu/soiltest/.)

7. **Insect, Disease, and Chemical Weed Control**

Low-impact pest management strategies shall be implemented whenever damage is detected or harmful organisms are present. Periodic inspection of all plants by trained personnel is necessary to detect problems during early stages of insect or disease infestation. Application of all chemicals including insecticides and fungicides shall be carried out in accordance with manufacturer's guidelines and State laws and only by individuals with current State Pesticide Applicators License. Store insecticides, fungicides, and herbicides in original containers that are closed and labeled, in a secure area out of reach of children and pets and away from food.

8. **Lime Application**
   Lime as required to maintain a proper pH based on soil samples throughout the landscape area(s) and an analysis of the existing nutrients (N-P-K) and pH.

9. **Proper Storage, Use, and Disposal of Household Hazardous Chemicals and Solid Waste**
   Hazardous chemicals should be stored in accordance with MSDS specifications. Stormwater shall be prevented from entering areas with hazardous materials to the maximum extent feasible. Any hazardous materials anticipated to be stored on site shall be stored in adequate indoor storage areas to prevent potential contact with stormwater. Spill containment shall be provided in areas where a spill might occur. Solid waste shall be placed in secure receptacles that are covered and in a location so that a licensed solid waste management company in Massachusetts can remove them from the site.

10. **Spill Response**
    Ensure the cleanup of liquid/solid spills occurs immediately, if a significant spill occurs. Retain and maintain an appropriate oil spill cleanup kit on-site for rapid cleanup of material spills. Ensure that an employee trained in spill containment and cleanup is present during loading/unloading activities. Notify MassDEP as required: http://mass.gov/dep/cleanup/dealin01.htm

Telephone List
Updated: August 2020

1. OPERATOR: Town of Ashland
   CONTACT: Ashland Town Hall, Town Manager
   PHONE: 508-881-0100

2. DEPARTMENT OF PUBLIC SAFETY
   CONTACT: Department of Public Works Director
   PHONE: 508-881-0120

APPENDIX A

Example Inspection Forms
Sample Operations and Maintenance Log
OM – 1 Operation and Maintenance Plan (11” x 17”)

CATCH BASIN (CB) INSPECTION FORM

Newton Center for Active Living
345 Walnut St, Newton, Massachusetts

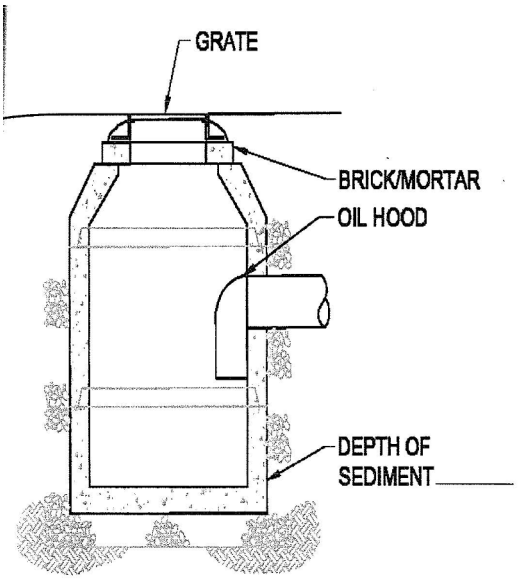
Owner: _____

Property Manager: _____

Inspected by: _____

Date of Inspection: _____

Catch Basin Inspected #_____



Acceptable ☐ Needs Work ☐

NOTES:

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Date of cleaning: _____ By Whom: _____

Date of repair: _____ By Whom: _____

Note any discrepancies and suggested corrective actions

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Manhole (MH) INSPECTION FORM

Newton Center for Active Living
345 Walnut St, Newton, Massachusetts

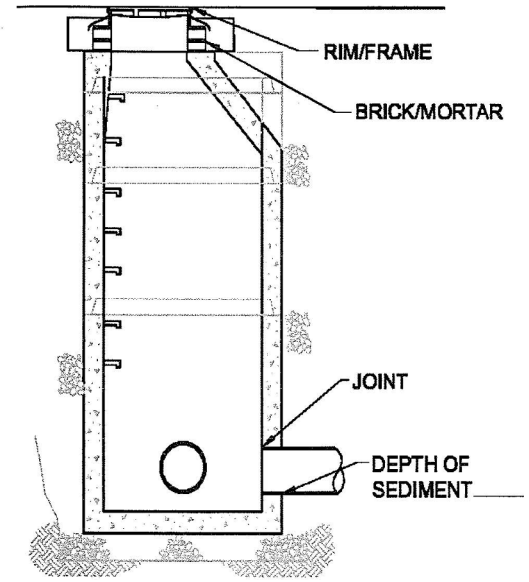
Owner: _____

Property Manager: _____

Inspected by: _____

Date of Inspection: _____

Manhole Inspected #_____



Acceptable ☐ Needs Work ☐

NOTES:

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Date of cleaning: _____ By Whom: _____

Date of repair: _____ By Whom: _____

Note any discrepancies and suggested corrective actions

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UNDERGROUND DETENTION SYSTEM (UGDS) INSPECTION FORM

Newton Center for Active Living
345 Walnut St, Newton, Massachusetts

Owner: _____

Property Manager: _____

Inspected by: _____

Date of Inspection: _____

Detention system Inspected #_____

Acceptable ☐ Needs Work ☐

NOTES:

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Date of cleaning: _____ By Whom: _____

Date of repair: _____ By Whom: _____

Note any discrepancies and suggested corrective actions

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Sample Operation and Maintenance Log

Site Maintenance Supervisor: _____ Date: _____

☐ Routine ☐ Response to Rainfall Event _____ in ☐ Other _____

BMP	Frequency	Date Performed	Comments
Yard Drain/Trench Drain Catch Basins/ Manholes	Quarterly Inspections		
	Maintenance as necessary		
Drywell	Inspected after major storm event		
	Maintenance as necessary		
Bioretention Area	Inspect after major storm event		
	Maintenance as necessary – at least twice a year		
Vegetated Areas	Maintenance as necessary		
Spring Clean Up	Between April and May		
Sweeping	Biannually		
Grass Fertilization	First Application		
	Second Application		
Tree and Shrub Fertilization	Annual Application		
Grass Mowing	As required		
Mulching	AS required; At least biennially for the Bioretention Area		
Edging	As required		
Weed Control	As required		
Pruning	As required		
Aeration	As required		
Lime Application	As required		
Fall Clean up	Between October and December		
Drainage Piping	Annual Inspection		
	Maintenance as necessary		

HIGHLAND AVENUE
(PUBLIC-VARIABLE WIDTH)
TWO WAY TRAFFIC
(ASPHALT ROADWAY)

WALNUT STREET
(PUBLIC-VARIABLE WIDTH)
TWO WAY TRAFFIC
(ASPHALT ROADWAY)

WALNUT PLACE
(PUBLIC-VARIABLE WIDTH)
TWO WAY TRAFFIC
(ASPHALT ROADWAY)

CTE DRAINAGE
CTE WATER
4" CLDI WATER
DMH-04
DMH-03
DMH-02
CB-03
CB-04
CB-01
CB-02
WQU-01
AD-1
AD-2
AD-3
UNDERGROUND INFILTRATION SYSTEM-1

MAP 24, LOT 2
N/F LANDS OF
MARC GERMANI
BK. 24791, PG. 146

MAP 24, LOT 1
N/F LANDS OF
CITY OF NEWTON
NO RECORD DEED

MAP 24, LOT 3
N/F LANDS OF
37 WALNUT PLACE, LLC
BK. 68855, PG. 373

MAP 24, LOT 4
N/F LANDS OF
ANNE M. SERAFIN &
ROBERT DEPHOURE
BK. 20998, PG. 127

Scale: 1"=10'
0 5' 10' 20'

DRAIN INVERT TABLE

STRUCTURE	RIM (FT)	INV. IN (FT)	INV. OUT (FT)
AD-1	55.65		52.65 S
AD-2	55.65	52.25 N	52.15 W
AD-3	55.66	51.50 E	51.40 NW
CB-01	55.65		50.82 W
CB-02	55.75		53.00 E
CB-03	55.67		53.79 W
CB-04	55.75		53.79 E
DMH-02	55.90	53.64 W 53.64 E	51.14 S
DMH-03	56.67	52.49 S	52.39 W
DMH-04	56.10	52.20 E	
WQU-01	55.85	50.50 E 52.70 W 50.40 N	50.40 S

ARCHITECT
bh+a
Bargmann Hendrie + Archetype, Inc.
9 Channel Center Street, Suite 300
Boston, MA 02210
(617) 350 0450

PROJECT NAME
Newton Center for Active Living
345 Walnut Street,
Newton, MA. 02460

CLIENT
City of Newton

PROJECT TEAM

CIVIL ENGINEER
Pare Corporation
10 Lincoln Rd. Suite 210
Foxboro, MA 02035
Tel: 508.543.1755

CIVIL ENGINEER
Kyle Zick Landscape Architecture, Inc.
136 Bromfield St. Suite 202
Boston, MA 02108
Tel: 617.451.1018

REVISIONS

DATE

DRAWING TITLE
O&M PLAN

DRAWING INFORMATION

06/15/2022 DATE OF ISSUE	
Site Plan Approval DESCRIPTION	
1" = 10' SCALE	JAJ/SETB DRAWN BY
3399.00/20147.00 PROJECT #	FILE NAME

DRAWING NUMBER
O&M-1

V.2.1

C:\Local Revit\3399 Newton Community Center_345 Walnut St_CIVILNPE.rvt
5/2/2022 4:27:39 PM Author