

STORM WATER MANAGEMENT REPORT

FOR

**222 South Pleasant Street
Hingham-MASSACHUSETTS**

PREPARED FOR:

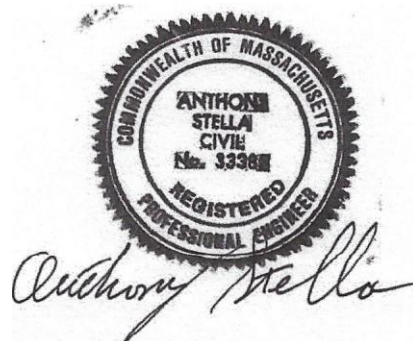
**CPC Pleasant St. LLC
218 Willard Street – Suite 302
Quincy, MA 02269**

PREPARED BY:

**Site Engineering Consultants, Inc.
55 Grapeshot Road
Sharon, MA 02067**

October 6, 2022
(Rev: October 31, 2022)
(Rev: December 1, 2022)

222 South Pleasant Street, Hingham, MASSACHUSETTS Stormwater Management	
Document:	Pre and Post Storm Water Analysis
Codes, Standards and References: 1. Commonwealth of Mass. Stormwater Management Standards 2. NPDES	
Attachments: 1. Narrative, Summary and Results; 2. Soil Survey Map; 3. Operation and Maintenance; .	



Narrative

The following analysis evaluates the hydrological impacts of the proposed construction of a single-family home on a 129,258 square foot parcel of land at 222 South Pleasant Street, Hingham, MA. The lot is presently developed containing a single-family residence, and is shown as parcel 001 on map 149 of the Town of Hingham Assessor's mapping. The parcel is owned by CPC Pleasant Street, LLC.

Soil conditions for the site are identified by the National Resource Conservation Services Soil Survey. Two different soil units exist on the parcel. The rear portion of the property consists of 110 C, Canton-Chatfield-Rock outcrop with 8 to 15 percent slopes. These soils typically exist along moraines, hills and ridges, and are considered well drained. They are classified as a Hydrologic Soil Group B.

The front section of the property consists of 289 C, Hinkley gravelly sandy loam soil with 8 to 15 percent slopes. The soil divide extends approximately along the rear of the existing home. These types of soils typically exist as outwash deltas, terraces, kames and eskers. NRCS classifies the drainage class of these soils as excessively drained and are a Hydrologic Soil Group C.

Soil testing was conducted onsite on March 31, 2022 and April 20, 2022 for septic system design as well as to confirm the area soils for stormwater recharge. The results show that the soils consist predominantly of sand at depths below the ground surface of 22.0 inches. No mottling and groundwater were encountered. The infiltration rate assigned, based on the Rawls Tables, is 2.41 in/hr. This value indicates sandy soils, and a Hydrologic Soil Group of "A / B".

Catchment (Watershed) Basin Development Summary

For all intents and purposes, the predevelopment site conditions contain 3-catchment areas to be evaluated. The Basins are identified as Watershed 1, WS1, which flows north to south; from the existing home toward South Pleasant Street. Watershed 2, WS2, flows north, from the existing home towards the bordering vegetated wetlands along the rear of the parcel. Watershed 3, WS3 conveys runoff from the southeast corner of the lot towards the abutting property.

In addition to the existing dwelling, the predevelopment (existing) parcel consists predominantly of lawn surface and woods/grass combination. WS1 contains 2095.0 sf of impervious area (roof, driveway, etc.) and 8384.5 sf of lawn/grass cover. WS2 consists of 2069.4 sf of impervious surfaces, 28,261.8 sf of lawn surface and 82,256.7 sf of woods/grass area. WS3 is completely made up of pervious surfaces, with 973.0 sf of lawn surface and 10,184.3 sf of woods/grass combination.

For the postdevelopment condition, the site plan proposes construction of a new home, driveway and auto court, unattached garage/office area, recreation court, landscaping and associated site grading. The plan (roof) area of the proposed home will be 5345.9 sf. The driveway and auto court area will consist of approximately 3843.8 sf. Other proposed impervious surfaces (i.e. terraces, pool house, pool terrace, recreation court, etc.) consist of a 11,716.0 sf. for a total postdevelopment impervious area of 21,117.8 sf.

Since the proposed site conditions will have an increase in impervious area of approximately 18,634.7 sf, it is expected without stormwater controls, the final construction will have an increase in runoff rate and volume off the property. As shown on the proposed site plans by Site Engineering Consultants, Inc. dated September 19, 2002 and revised September 28, 2022, CIV1, the site plan proposes collecting runoff from the roof and terrace areas and conveying it into an infiltration system to mitigate any increases in runoff rates and volume. The proposed recharge system will consist of 18-StormTech SC-740 Recharger chambers surrounded in 1-1/2 inch crushed stone bedding. The infiltration system will assist in mitigating storm events so that the overall runoff towards the neighboring properties or wetlands resources areas will be less than the pre-existing conditions.

The proposed recreation court will consist of porous pavement with a 16" crushed stone reservoir base below the pavement to provide storage and exfiltration of any runoff across the court area.

Post-Development Summary

Upon completion of the construction of the new dwelling structure and site improvements, runoff and volumes from WS1, WS2 and WS3 will all be reduced. WS4 will include the new home, terrace areas and other new roof areas. All this flow will be routed into the subsurface infiltration / recharge system, as noted above. WS5 will consist solely of the recreation court. Stormwater from this site feature will recharge directly into the ground below, also as noted above.

Therefore, only WS-4 and WS5 will have an increase in impervious area. Due to the changes in reshaping the lot, and considering best management practices for a new residential development, infiltration of stormwater proposed to collect and mitigate the storm events as discussed above. The final comparative discharge points are located in the same vicinity as the existing conditions.

Calculation methods

The proposed storm water control system has been designed to manage the 2-year, 10-year, and 100-year Type III storm events. Run-off rates and run-off volumes were determined using a hydrology software program developed by HydroCad. This program analyzes site hydrology by the graphic peak discharge method documented in Technical Release No. 55 published by the USDA Soil Conservation Service.

The following variables were developed for the contributing watersheds (drainage areas) in order to complete the analysis:

- Rainfall Depth - A hydrologic analysis was performed for the 24-hour 2-year, 10-year, and 100-year Type III storm event (3.35, 4.95, 8.68 inches respectively) for each drainage area. The rainfall depths for the study area were obtained from available charts published in NOAA Atlas Point Precipitation Estimates.
- Run-off Curve Number (RCN) - The RCN is the hydrologic characteristic that determines the depth of rainfall run-off from a given storm event. It is dependent upon soil conditions and land use. Generally, higher curve numbers are associated with less pervious soils and, hence, greater amounts of run-off. The RCN for this project was determined from the Soils Conservation Soils maps and previously used data provided for the site.
- Time of Concentration - The time of concentration is defined as the time it takes run-off to travel from the hydrologically most distant point of the watershed to the design point of interest. This parameter is dependent on the characteristics of the ground surface and condition of the travel path. A minimum time of concentration of 6.0 minutes is assumed in the analysis.

Results of Analysis

A storm water analysis was performed for the 2-year, 10-year, 100-year storm events in order to determine that there will be no impact to abutting properties or resource areas post construction.

STORM WATER RUN-OFF RATES - (WS-1 only)		DESIGN POINT- At edge of Property (WS-1 only)	
Pre- Redevelopment		Post-Construction	
2-Year	0.08 cfs; 0.009 af	2-Year	0.03 cfs; 0.006 af
10-Year	0.33 cfs; 0.024 af	10-Year	0.24 cfs; 0.019 af
100-Year	1.10 cfs; 0.075 af	100-Year	0.094 cfs; 0.064 af

STORM WATER RUN-OFF RATES - (WS-3 only)		DESIGN POINT- At edge of Property (WS-3 only)	
Pre- Redevelopment		Post-Construction	
2-Year	0.01 cfs; 0.002 af	2-Year	0.01 cfs; 0.003 af
10-Year	0.07 cfs; 0.010 af	10-Year	0.11 cfs; 0.010 af
100-Year	0.65 cfs; 0.047 af	100-Year	0.55 cfs; 0.039 af

STORM WATER RUN-OFF RATES - (W2+WS4)		DESIGN POINT- At edge of Property (WS2+WS4)	
Pre- Redevelopment		Post-Construction	
2-Year	2.04 cfs; 0.163 af	2-Year	2.32 cfs; 0.147 af
10-Year	5.28 cfs; 0.364 af	10-Year	5.31 cfs; 0.351 af
100-Year	14.48 cfs; 0.983 af	100-Year	13.47 cfs; 0.954 af

All runoff from WS5 (recreation court) is infiltrated in place with 0 cfs of runoff and 0 af of volume.

NPDES SUMMARY (STORMWATER CHECKLIST)

Standard 1: No new untreated Discharges

No new discharges to abutting properties are created as part of this project.

Standard 2: Peak Attenuation

The project will not change the peak rate or volume of the stormwater runoff towards neighboring properties

Standard 3: Recharge

The project will provide stormwater recharge.

Standard 4: Water Quality

Utilizing the Infiltration system will provide a reduction of total suspended solids, nutrient and other possible contaminants. In addition, runoff from all non-roof, impervious areas (i.e. auto court, walks, etc.) will be routed through catch basins with 4-ft. sumps or area drains with silt collectors (for terraces).

Standard 5: Land Uses with Higher Potential Pollutant Loads

The project does not propose Land Uses with Higher potential Pollutant Loads- N/ A

Standard 6: Critical Areas

The project is located in a Zone II Well Protection District. Water Quality volume has been calculated for 1-inch of runoff.

Standard 7: Redevelopment

The project is redevelopment project.

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

Erosion and sedimentation controls will be installed before construction and maintained during the project. Disturbed areas will be loamed and seeded.

Standard 9: Long Term Operation and Maintenance Plan

Operations and Maintenance Plan will be the responsibility of the homeowner. The current plan for this area is to monitor after storm events, and provide site cleanup.

Standard 10: Prohibition of Illicit Discharges

There are currently no known illicit discharges within the project limits.

CONCLUSION

This construction of the new single-family home will not impact abutting properties or resource areas.

**CONSTRUCTION MANAGEMENT/ OPERATION & MAINTENANCE PLAN
222 SOUTH PLEASANT STREET
HINGHAM, MASSACHUSETTS**

The proposed project includes stormwater runoff controls associated with the construction of a new home. These controls will require some management and maintenance during construction by the site contractor, and on-going maintenance by the property owner.

Erosion sedimentation Control Plan Procedures

The following protective erosion and sediment control measures are also indicated on the plan and shall be put in place for the construction. Prior to opening sections for excavation (Phasing of site work) erosion barriers shall be installed as shown on the plans or as determined by the engineer or an agent for the town for that location.

1. Install erosion control measures downslope of proposed construction activities beginning any construction activities or disturbance of the lot.
2. Install erosion control around topsoil and subsoil stock piles if done for the lot.
3. Loam and seed and/or permanently mulch finish disturbed areas on site upon substantial completion of construction and final grading.

Staging

Staging areas for equipment and materials will be located on the property where the construction is taking place. The exception would be, if express written permission from another property owner allowing for materials or equipment to be stored. The perimeter of the construction area will be protected by secure fencing and/or barricades. Proper warning signs will be employed and updated regularly as site conditions change through the construction progress.

Land Disturbance

Insofar as possible, disturbance of the land shall be limited to the minimum amount necessary to complete the proposed development. All trees and shrubs shall be conserved except those whose removal is required to perform the proposed work.

The limits of disturbance shall be established in the field prior to construction and generally shown by the erosion control barriers in place on the proposed plans.

Construction activities that generate dust that may cause nuisances will be prevented and mitigated by:

- utilizing wetting agents regularly to control and suppress dust particulates
- Covering Trucks that are used for transport of earth materials
- Covering stored excavated materials that are on site for more than a 2-week period

It is not anticipated that ledge or large boulders will be encountered during the construction; the soil testing onsite and the soil map survey found that the soils are sandy. If such ledge material is found, it is likely hammer drilling would be the recommended process.

Compliance With EPA Phase II Stormwater Program

The Project involves an overall disturbance of greater than one (1) acre and is therefore under jurisdiction of the Environmental Protection Agency's (EPA) Phase II Stormwater Program. Comply with the program in accordance with EPA's 2017 Construction General Permit including the following:

1. Prepare a SWPPP and maintain a copy on site throughout construction period. The SWPPP must be kept current and shall be amended according to the conditions described in the permit.
2. Submit a Notice of Intent (NOI) fourteen (14) days prior to commencement of earth disturbing work.
3. Post a sign or other notice of permit coverage.
4. Comply with SWPPP including control of stormwater and non-stormwater discharges through use of structural and non-structural best management practices, inspections, maintenance and corrective action activities, spill prevention and emergency response.
5. Submit a Notice of Termination following completion of all construction activities and having met permit requirements for termination.

Sequence of Construction

The first construction operation is to install the erosion sedimentation control measures as shown on the plan. The site is proposed to be constructed in one phase. Prior to construction, the erosion control barrier will be in place by the contractor for the specific location. Any top or subsoil stock piled will be in an area as approved on the plan or by the engineer. Stockpile will have erosion control measures around such piles until the piles are removed. The staked erosion control measures in the back right side of the property are limits of proposed grading.

Earthwork Operations During Construction

Grading taking place during as the site is excavated and filled shall be done in a manner to allow drainage toward erosion sedimentation control measures. Concentrated runoff shall not be permitted.

All construction vehicles shall be prohibited from driving over, or parking on areas designed to infiltrate stormwater and/or wastewater. These areas include, but are not limited to; the proposed septic system, the stormwater recharge area and proposed recreation court. Construction fencing shall be placed around these areas.

Subgrade compaction in these areas is prohibited. If the soils in these areas becomes compacted, the contractor shall scarify the subgrade to the approval of the Engineer.

Stabilization

Following substantial completion of the remaining construction, disturbed soil areas surrounding the building or driveway shall be fine graded and permanently stabilized.

Insofar as seasonably possible, all disturbed areas shall be stabilized by establishment of a permanent seedbed or installation of permanent mulching immediately following fine grading.

Maintenance of Erosion and Sedimentation Control Measures

During construction, all erosion and sedimentation controls shall be inspected weekly and after each rainstorm event. Accumulated sedimentation deposits and silt shall be periodically removed from the upstream side of the erosion control barriers. Additional erosion control measures to be placed as necessary or as directed by the Engineer or agent from the town.

Responsibility For Implementation of Erosion Control Measures and Emergency Contacts

The Site Contractor and/or the current homeowner shall be personally responsible for implementation of the erosion control measures and the enforcement thereof.

SITE CONTRACTOR: TBD : PHONE: TBD

Construction hours will be from 7:00 AM to 6:00 PM, Monday through Friday, Saturday 8:00 AM to 5:00 PM. Construction activities that occur within the Town Right of Way will be limited to the Street permit requirements.

After Construction

The major system components associated with maintenance needs are the roof drain manifold, catch basin, area drains, trench drains, infiltration systems and recreation court surface. These facilities will need to be cleaned periodically as noted below. Cleaning of these structures shall be done by the property owner or via a specialty Contractor with hydraulic cleaning ability and or landscaping knowledge as part of a long-term maintenance program.

In addition, in an effort to remove phosphorous concerns from the site, the property owners are shall properly dispose of grass clippings and leaf litter, and if required, use slow-release phosphorous fertilizers. In addition, the owners shall properly dispose of any pet waste.

In addition to the facilities noted below, the property owner should maintain any roof gutters/drains on a regular basis to prevent clogging and overflow of the gutters. The following outlines the major maintenance issues associated with the project:

Roof gutters, leaders and manifold Cleaning:

The pipe network of the new dwelling collects roof drainage and discharges to a StormTech SC-740 recharger system unit below grade. This pipe network should be inspected after completion of construction to assure that all debris were removed and no construction material will cause the system to clog or restrict the outlet.

Maintenance of this system is subject to continuous monitoring after storm events to determine frequency of maintenance needs. The roof leaders should be cleaned manually, after all major storms, or at a minimum, seasonally, to remove accumulated solids and debris. This is required to prevent clogging and overflow of the infiltration units and potential overtopping the drain and discharging offsite. Assuming that the manifold is maintained and cleaned routinely, the roof runoff should be routed to the infiltration system.

Monitoring should include noting if standing water or sediment buildup is an issue. In addition, inspections should include observing the flow of stormwater out of the gutter laterals during storm events to determine that the water is being collected. Initial observations should be compared to later observations to determine the loss of infiltration capacity.

Subsurface Infiltration System Maintenance

The stormwater recharge chambers shall be inspected on an annual basis by opening the inspection ports and noting any accumulated debris or water within the chambers. Any silt, sediment or debris which has built up within the chambers shall be removed manually or by mechanical means (vacuumed).

Catch Basin and Deep Sump Manhole Inspection and Maintenance:

The catch basin shall be visually inspected on an on-going basis to determine the depth of debris (silt, sediment, leaves, etc.) within the structure. Material within the basin should be removed after the depth extends to the invert (bottom) of the outlet pipe.

The deep sump manhole shall be inspected on an annual basis, preferably late fall or early spring. If the depth of silt, sediment, leaves, etc. extends to the invert (bottom) of the outlet pipe, this material shall be removed before entering the stormwater recharge system.

Recreation Court Maintenance:

Maintenance of the porous hot mix asphalt recreation court will include monitoring to ensure that the paving surface drains properly after storms. If standing water is observed, or water is exfiltrating slowly, the recreation court should be power washed to dislodge silt and sediment particles and then vacuum swept. At a minimum, this should be done annually.

Pool Maintenance:

According to information provided by the pool manufacturer:

Custom Quality Pools proposes to build a pool and spa at the address stated above, using a Sta-Rite system III Multimedia cartridge, no back-wash filter. This allows the pool to be filtered without discharging water. The primary sanitization is a Delta U/V ES-40 ultra-violet light. The second means of sanitization is chlorine. The U/V system allows the pool to be sanitized with a minimal amount of chlorine. The chlorine level in this pool should be maintained at .5 to 1.0 parts per million. The chlorine is dispensed by putting 3 oz. tablets in the skimmers that are built into the apron of the pool. The chlorine is added approximately once a week. This would be 6 oz. of chlorine to approx. 30,000 gallons of water.

The pool water will be drawn down once (1) annually, at the winterization. This water will be slow drained down approximately 2' from standing water line of pool. No chlorine is added to this pool for 2 weeks prior to winterization. Discharge water from the pool will be connected to the storm drain system and be conveyed into the subsurface recharge system.

Maintenance Responsibilities

The maintenance of the Drainage System is the exclusive responsibility of the Property Owner. The actual work can be manually accomplished by the owner or representative or it could be subcontracted to a company that specializes in the cleaning of storm drainage facilities. Inspections should be performed by the owner and/or by an independent individual such as the design engineer or other experienced individual in the field, with reports to be provided to the Town of Hingham upon request.

STORMWATER MANAGEMENT REPORT
222 SOUTH PLEASANT STREET
HINGHAM, MASSACHUSETTS

INSPECTION REPORT:

Inspection Firm., _____

Inspectors Name: _____

Date: _____

Components Inspected: _____

Signed: _____

SYSTEM MAINTENANCE:

Maintenance Firm: Date. _____

Gutters Cleaned: Yes No Comments: _____

Downspouts Flushed: Yes No Comments: _____

Manifold and other pipes Cleaned: Yes No Comments: _____

Catch Basin Cleaned: Yes No Comments: _____

Trench Drains and Area Drains Cleaned: Yes No Comments: _____

Yard planting/re-vegetating: Yes No Comments: _____

Estimate of Material Removed: _____

Disposal Location: _____

Other Comments. _____

Signed: _____