

STORM WATER MANAGEMENT REPORT
FOR

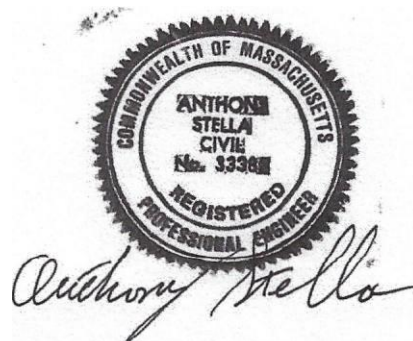
**222 South Pleasant Street
Hingham-MASSACHUSETTS**

PREPARED FOR:
CPC Pleasant St. LLC
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PREPARED BY:
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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, CIV 1, 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 not located in a critical area- NA

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.