
May 19, 2022

Drainage Report

#575 Route 28 (Main Street), Harwich Port, MA

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Drainage Report Package

#575 Route 28 (Main Street)
Harwich Port, MA

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Harwich Drainage Design

Introduction

This report describes the compliance with the Town of Harwich Drainage Design for the proposed site redevelopment at #575 Main Street (Route 28) in Harwich, MA. The land is owned by the Main Street HP, LLC. The applicant is proposing to construct a new 11,950+/- s.f. mixed-use building at the front of the property along Route 28. The first floor will be developed with retail stores and restaurants with 5 apartments on the second floor. This report accompanies a set of drawings (Site Plan) that represent the proposed work and drainage system, and a set of calculations that identify the stormwater runoff flows and capacity analysis of the receiving facilities. The following narrative briefly describes the intended redevelopment, as it relates to Town of Harwich stormwater management. The proposed stormwater management system conforms to the Town of Harwich standards.

Existing Site Conditions

The property located at #575 Main Street is a private, commercially developed parcel of land approximately 29,800± S.F. in area located in the Village of Harwich Port on Route 28 near Bank Street. The property was formerly the site of Dr. D'Elia's practice office which included his home as well. The building was demolished in the late 1980's and the existing paved parking area is currently open to businesses at #571 Main Street. Adjacent parcels along Route 28 are occupied by various retail stores, service businesses, convenience stores and restaurants. To the south of the property is residential properties. The property is zoned as Commercial-Village (CV) within the Village Commercial Overlay District (VCOD). The property is not located within a DEP approved Zone II for a public water supply and is not located within an area of Priority or Estimated Habitats of Rare Species as mapped by the Natural Heritage and Endangered Species Program (NHESP). The site is outside of any watersheds such as Saquatucket, Wychmere and Allen Harbor. There are no wetland resource areas on or within 100 feet of the site. The closest resource areas, Nantucket Sound and Wychmere Harbor, are located approximately 1,500 feet to the south and 1,300 feet to the west respectively. The site lies within Flood Zone X (non-flood zone) on the Federal Emergency Management Agency/National Flood Insurance Rate Map for the Town of Harwich.

The site is located within the Harwich Port Village District on the south side of Route 28 near Bank Street in the Town of Harwich, Massachusetts. The site varies in elevation along Route 28 around 15 feet above North American Vertical Datum 1988 (NAVD88) to elevation 17.8 feet (NAVD88) along the rear, southern, lot line. Groundwater was not found within the bottom of the drainage test holes at elevation 2.5 feet (NAVD88). Groundwater flows to the south in a direct line perpendicular to Nantucket Sound based on the CDM Smith Comprehensive Wastewater Management Plan (CWMP). The septic and drainage test holes indicate all sands below the top and subsoils are free of silts and clays. The site geology has been mapped by the USGS as being part of a glacial outwash (Carver Coarse Sand). Using the Soil Survey of Barnstable County, Massachusetts as a reference we would expect these soils to have a drainage class of excessively drained and a hydrologic group of Class A. The proposed drainage analysis and design incorporates these findings.

Proposed Conditions:

The applicant proposes to construct a mixed-use building that will house retail shops, restaurants and living space at the existing commercial site. The purpose of the project is to provide retail shops, restaurants, residential apartments and various site improvements that will enhance and improve the area. The proposed project includes a new building, parking lot, drainage structures to improve the site drainage, a new sewage disposal system, as well as landscape and lighting improvements. The proposed project will not involve the use, generation, treatment, storage or disposal of hazardous materials or hazardous wastes except for materials commonly used or sold in retail stores.

The site's proposed new development including the building and parking covers approximately 76% of the contributing drainage area in impervious surfaces. All proposed parking and driveway surfaces are bituminous concrete. Stormwater from the proposed development areas will be mitigated on-site and no stormwater runoff is anticipated to flow off-site. The proposed stormwater systems are designed for the 25-year design storm event as indicated and required by the Town of Harwich Drainage Design (refer to Rainfall Intensity Curve). The system consists of intercepting structures in the form of catch basins and leaching pits to provide groundwater recharge. The general stormwater flow treatment train is catchment – settlement – final discharge. Catchment is achieved with the installation of catch basins at strategic points within the paved surfaces at low points. The flow that enters the catch basins will allow the debris to be retained. The volume of stormwater then flows by gravity to the leaching pits. The roof runoff will be tied into the leaching pits as well to provide additional groundwater recharge.

The proposed drainage system is sized in accordance with the Harwich Drainage Design, refer to attached calculations.

HARWICH DRAINAGE DESIGN - APPENDIX 1

	<u>SURFACE</u>	<u>AREA</u>	<u>C</u>	<u>CA</u>
C1	LAND	0.10	0.40	0.04
C2	PAVE/ROOF	0.52	1.00	0.52

C average = 0.55 0.90
0.61

Q=CIA I= 3

Q= 1.66 CFS
747 GAL/MIN
901 SF OF LEACHING

Q - LEACHING AREA

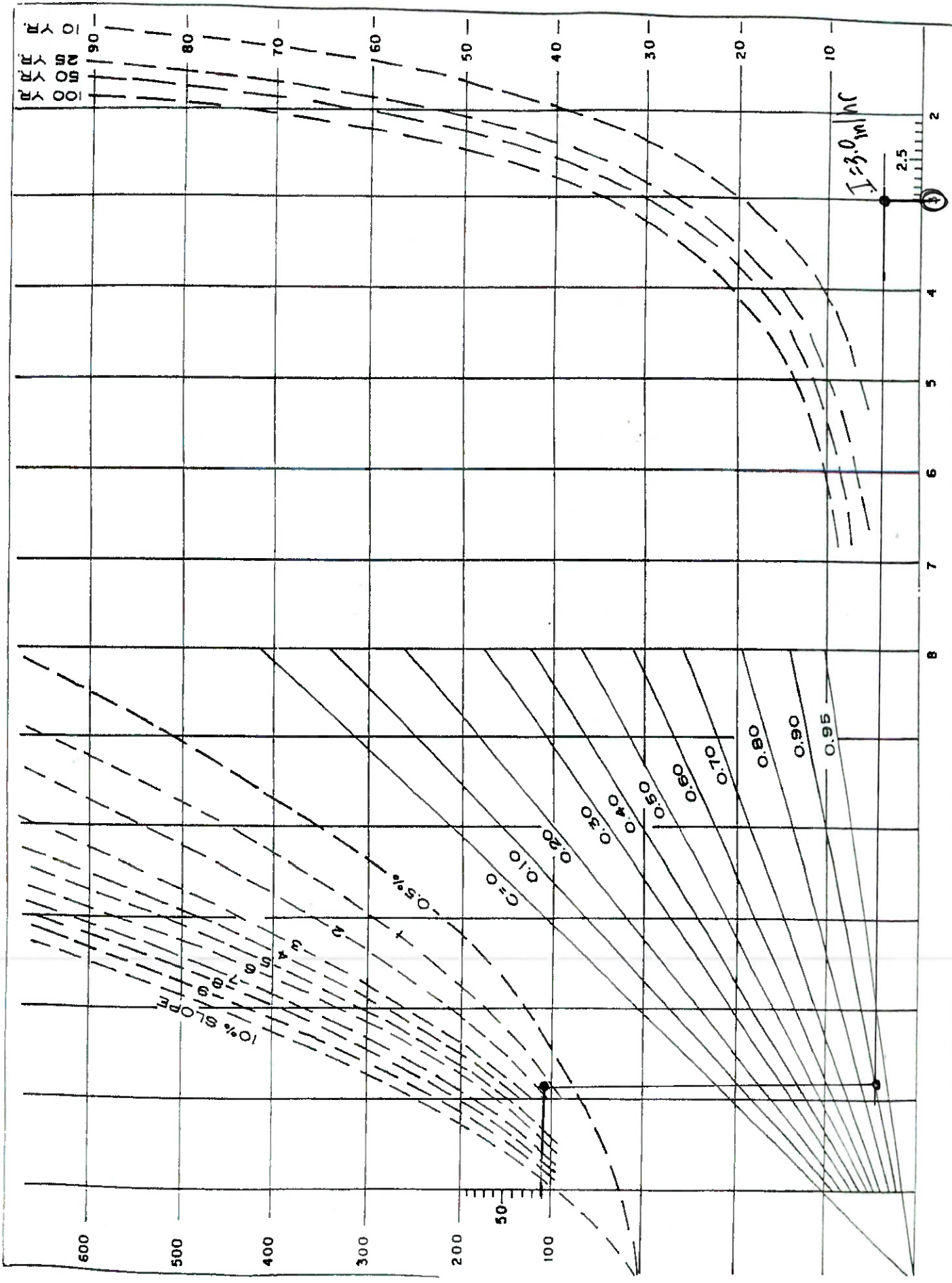
REQUIRED 0.70
PROVIDED 0.83 OK



Rainfall Intensity Curve



RAINFALL INTENSITY CURVES





Soil Logs



Location: #575 Route 28, Harwich Port

(4/14/22)

Leaching Pit #1 Test Pit

0"-12"	A	Loam	10YR 3/3
12"-40"	B	Loamy Sand	10YR 5/8
40"-84"	C1	Coarse Sand	2.5Y 7/2
84"-132"	C2	Medium Sand	2.5Y 5/8

No H2O, No Mottles – 5% Gravel

Perc Rate – Less than 2 min/inch

Leaching Pit #2 Test Pit

0"-10"	A	Loam	10YR 3/3
10"-38"	B	Loamy Sand	10YR 5/8
38"-84"	C1	Coarse Sand	2.5Y 7/2
84"-132"	C2	Medium Sand	2.5Y 5/8

No H2O, No Mottles – 5% Gravel

Perc Rate – Less than 2 min/inch

Leaching Pit #3 Test Pit

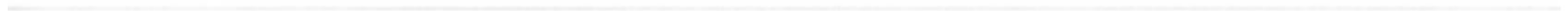
0"-10"	A	Loam	10YR 3/3
10"-36"	B	Loamy Sand	10YR 5/8
36"-84"	C1	Coarse Sand	2.5Y 7/2
84"-150"	C2	Medium Sand	2.5Y 5/8

No H2O, No Mottles – 5% Gravel

Perc Rate – Less than 2 min/inch



Drainage Calculations (25-Year Storm)



PROPOSED DRAINAGE
 BASED ON STORM AVERAGE RAINFALL
 DRAINAGE AREA 1
25 YEAR - 1 HOUR STORM

DRAINAGE CALCULATIONS
 AVERAGE FLOW FOR QUANTITY

SURFACE	AREA (SF)	AREA (acres)	C	RAINFALL	CFS	CFM
LAND	4,299	0.10	0.40	3	0.12	7.11
GRAVEL	-	0.00	0.60	3	0.00	0.00
PAVE/ROOF	22,453	0.52	1.00	3	1.55	92.78
TOTAL	26,752				1.66	99.89

IN A 60 MIN STORM, THERE WILL BE **5,993** CF OF RUNOFF

DURATION OF STORM **60** MINUTES

THE BASIN WILL LEACH DURING ENTIRE STORM DURATION AT A PERCOLATION RATE OF **2** MIN/INCH

USING A PIT WITH CRUSHED STONE

RADIUS	3
WIDTH OF CRUSHED STONE =	4
DEPTH OF STONE	8
LEACHING TIME (MINUTES) =	60

VOLUME 895 C.F. *stone porosity of 0.45
 VOLUME LEACHED= 5,153 C.F.

CAPACITY= 6,048 C.F.

OF PITS REQUIRED 0.99
 TOTAL CAPACITY **5,993** C.F.
 REQUIRED CAPACITY **5,993** C.F. **OK**

4. Pipe Sizing - Runoff Coefficient, C

Runoff, Q = **1.665** cfs

Pipe Diameter, $d = (2.16 * n * Q / S^{0.375})^{0.375}$ n = 0.011 for plastic
 Velocity, $V = 1.273 * Q / D^2$

Contribution Area

Pipe Slope, S =	0.010	
Pipe Diameter, d =	0.706	feet
Diameter used =	9	inches
Velocity, V =	3.771	ft/s

Pipe Slope, S =	0.010	
Diameter used =	12	inches
Velocity, V =	2.121	ft/s