

REPORT
FINAL
DRAINAGE
INVESTIGATION
FOR
STORMWATER CONTROL

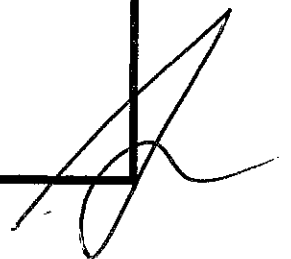
640-646 Ridge Road
Lyndhurst, NJ

FOR
Planning Board

Prepared By:

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Union City, NJ 07087
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GE # 40534

October 3, 2021

A handwritten signature in black ink, located in the bottom right corner of the page. The signature is stylized and appears to be the name of the preparer, Guy Lagomarsino.

Introduction

Presented herein are the results of the drainage investigation conducted for the proposed change use from vacant lot to mixed use/apartments building located at 640-646 Ridge Road. The purpose of the investigation was to explore the pre and post development site conditions for rain runoff conditions. This study addresses pre-existing conditions, and the final post developed site conditions. In order to determine the necessary BMP requirements for the post development, the design used hydraulic software methods to achieve the post developed rain runoff storm-water requirements for the project site. **The existing lot is not changing in previous except a conversion from commercial to mixed use. In keeping with State regulations, we proposed to install a detention system on site to collect the water before releasing to the street in a slow manner. At minimum, a 10year 100% capacity storm event is required, which the detention system was primarily designed for, reductions for higher storm events also were achieved.**

Project Description

The existing lot of 9720 sf has 8670SF of impervious coverage with the asphalt covering the most of the entire lot and a weed area on the rear yard. The proposed construction has increase in the imperious coverage a total of 9320 SF for the new building and parking. The proposed runoff shall collect water in an storm tech open piping detention with an overflow weir and orifice at the exit to the street sanitary system. See attached plans for reference.

Existing Site Runoff Characteristics

The existing site had no detention of runoff from the site. All water on site flowed to the sidewalk curb, then to the corner catch basins. The flows were moderate since the site did not have any major slopes.

During a significant storm event the existing site conditions did not contain the rain fall and flows onto Ridge road. The rain flows from a higher elevation and the flow continues onto the existing concrete front area to the street gutter.

Engineering Recommendations for (BMP) Best Management Practice

Proposed Site Characteristics

The proposed building is situated on the wide street with a vacant lot used as parking lot. The design has fulfilled the criteria set by the NJDEP checklist. 10 yr storm events are individually less than the pre condition. Since the site was less before impervious area, then the new site will have only an increase of 800SF. This detention system allows for full storage up to a 10 yr. event and REDUCES flow during higher rain events. .

Design Hydrology for On-Site

The hydraulic analysis for the area focused in on design the detention facility to meet the required hydrograph based NBMUA requirements.

The permanent hydraulic and water quality features below have been designed, and the existing features checked on site for this project's work. This section contains the calculations and analyses needed to size detention as follows;

The Design Hydrology calculations for a 10 year storm event :

- *Q for 10 yr – 10 min (house only)*
 $A=4217\text{sqft} = 0.09\text{ac}$ $t\textcircled{C}=10\text{min}$ $I=6.7 \text{ "/hr}$
 $Q(E)=0.09 \times 0.95 \times 6.7 = 0.57\text{cfs}$
- *Proposed Roof & parking Runoff: Volume of Runoff in the roof and parking*
 $R=8237\text{sqft} \times 0.98 \times 2.95 \text{ "/12ft} = 1984\text{cf}$
- *Seepage storm tech Volume = 31cuft per chamber X 64 chambers +inlet and outlet*
 $= 1987\text{ft}^3$
With 6" stone base below and above= 31cuft Volume as per table in specifications
- *Pipe capacity $A(\text{roof})=4217\text{ft}^2 = 0.09\text{Ac}$*

$C=0.98, I=6.7 \text{ "/hr},$

$Q \text{ (peak)}=0.09 \times 0.98 \times 6.7 = 0.622 \text{ cfs @ } 6'' \text{ dia pipe is } 4.3 \text{ f/s}$

Pipe capacity of a 6" dia pipe is allowed to maintain a flow rate of 5f/s

- *Rainfall data collected from the Department of Commerce Precipitation Frequency Data. BASED REQUIREMENTS FOR A DESIGN STORM OF noted above 64 chambers of storm tech 310 chambers with gravel bed is equivalent to 1987 cf of void storage.*

- **Rate of Recharge**

Determining the outflow rate from the drywell. Perc test determined a permeability of between 8 inches per hour.

Convert inches per hour to CFS per square foot of drywell bottom.
 $8'' \text{ per hour} \times 1 \text{ hr} / 3600 \text{ sec} / 1 \text{ ft} / 12'' = 0.00011574 \text{ cfs/sf}$

The total outlet from the bottom of the drywell is then calculated as
 $0.00011574 \text{ cfs/sf} \times 50.2 \text{ SF} = 0.00583$

2. The draining time of the drywell is calculated as:
 $680 \text{ cf} / 0.00583 \text{ cfs} = 162423 \text{ sec} = 44.8 \text{ hours draining}$

Most reviewing agencies set a time of 72 hours by which the drywell must drain.

Conclusion

The existing site conditions of the site were substandard and don't effectively recharge precipitation due to lack of vegetation and broken asphalt surface. The new building shall detain the water in a collected pond before allowing the water to flow through the weir at a slow rate of discharge. The proposed site improvements will decrease the water runoff from the site for a 10yr storm event and moderately for higher rain events the contractor/owner for properly maintains of the system and will be responsible to adequately slope detention piping to the weir exit.

The proposed final site conditions do reflect the current NJ DEP stormwater Standards for the BMP.

OPTIMIZED ENGINEERING ASSOCIATES, P.C.

CIVIL ♦ STRUCTURAL ♦ GEOTECHNICAL

PERCOLATION TEST DATA

W.O. No.: 2021-221 Client: Sergio Guzman Date: 9/21/2021

Project: 640-646 Ridge Road Lot No.: _____

Project Engineer: Guy Lagomarsino, P.E.

Inspector: Guy Lagomarsino, P.E. #40534

Percolation Test Location: (see reverse) Project Site Area side west rear yard MID SECTION OF YARD

Weather Conditions: sunny Temperature: 76

TEST HOLE NO.	TEST HOLE DEPTH	TEST HOLE DIA.	TIME	PERCOLATION TEST RUNS (TIME FOR 1" DROP IN WATER LEVEL)					STABLE RATE
TP-1	4ft	12"	FINISH	2:38:53	2:47:25	2:57:22	3:26:21	3:35:22	7min
			START	2:32:10	2:40:40	2:50:15	3:18:54	3:28:23	
			TIME	0:06:43	0:06:45	0:07:07	0:07:27	0:06:59	

COMMENTS:

COMMENTS: TP-1 location is at the location of proposed detention system on the mid rear of the house

The drop of 1" at a rate of 7min within the test pit results in a total hourly rate of 8" per hour