



**STORM SEWER REPORT
PROPOSED RESIDENTIAL DEVELOPMENT
309 BROADWAY
BLOCK 257 LOT 12
BAYONNE, NEW JERSEY**



SUBMITTED TO

BAYONNE PLANNING BOARD

SUBMITTED BY

309 BROADWAY REALTY LLC



PREPARED BY

**DAL DESIGN GROUP
11 WEST 8TH STREET
BAYONNE, NEW JERSEY 07002**



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METHODOLOGY AND DESIGN

This report has been prepared to analyze the impacts of the proposed development and to determine the operational capability of the proposed underground stormwater detention system as well as compliance with the City of Bayonne's ordinances governing this site.

The project consists of the construction of an eight-unit building on the 3,175 sq. ft. lot located at the southwest corner of Broadway and West 14th Street.

This project does not meet the definition of a "major development" under the State of New Jersey Stormwater Management Regulations (NJAC 7:8). Since this project is not a major development, Section 33-10.23 of the Revised General Ordinances of the City of Bayonne require that "peak runoff after development shall be no greater than the peak runoff prior to development, computed for the two-, ten-, and 100-year design storm".

Models were developed for this analysis based on USDA Soil Conservation Service (SCS) Unit Hydrograph Methodologies and the SCS TR-20 runoff method. Runoff Hydrographs were developed for the purpose of this analysis based on Region D rainfall distribution for a 24-hour period using the HydroCAD 10.20-3f Stormwater Modeling System developed by HydroCAD Software Solutions, LLC.

Three separate storms (2-year, 10-year, and 100-year frequencies) were modeled to determine pre-development flows. The detention system for the project was designed to generate post-development peak runoff rates for the 2, 10, and 100-year design storm events no greater than the pre-construction peak runoff rates. The three storms were modeled in the post-development condition to assess compliance with the design intent.

SOILS

Based on the Hudson County Soils Survey information available from the USDA Natural Resources Conservation Service WebSoil Surveys, the soil characteristics are typical of Hydrologic Soil Group "D".

EXISTING DRAINAGE AREAS

Existing Drainage Area 1, D_{E1} includes the entirety of the project site that previously contained a wood frame dwelling and pavement that have since been demolished. The site has an area of 3,175 sq. ft. and consists primarily of compacted earth.

PROPOSED DRAINAGE AREAS

Proposed Drainage Area 1, D_{P1} includes conventional roof area of the proposed residential structure. Stormwater generated on this roof will be collected and conveyed to the proposed underground stormwater detention pipe where stormwater will be detained and released at a controlled rate to the municipal sewer system. A minimum time of concentration of 6 minutes has been used for this drainage area. D_{P1} has an area of 2,746 sq. ft.

Proposed Drainage Area 2, D_{P2} includes the paved areas located at the two side yards of the property. Stormwater generated in these areas sheet flow directly to the right-of way. A minimum time of concentration of 6 minutes has been used for this drainage area. D_{P4} has an area of 429 sq. ft.

PROJECT DATA

Rainfall Data - 24-hour rainfall depths

Storm Frequency	Depth of rainfall, inches
2	3.31
10	5.02
100	8.31

Existing Site Data

Drainage Area	Area, sf	CN	Tc, minutes
DE1	3,175	89	6

Proposed Site Data

Drainage Area	Area, sf	CN	Tc, minutes
DP1	2,746	98	6
DP2	429	98	6

EXISTING RUNOFF

The following table represents the peak runoff rates under existing conditions. Pre-development hydrographs are provided in Appendix A.

Peak Runoff Summary - Existing Conditions

Storm Event (years)	Total Flow (CFS)
2	0.18
10	0.30
100	0.53

SUBSURFACE DETENTION SYSTEM DESIGN

The underground storm water detention system draining to the combined sewer in Avenue E consists of 36 linear feet of 36" diameter ADS N-12 pipe. Outlet control is provided by a flow control riser located within a 4' diameter ADS manhole. Storm water generated on the building roof is transported to this underground storm water detention system via the direct connection of roof leaders to the system.

Outlet Connectivity

STRUCTRE	ELEVATION
Orifice (2.0")	8.30
Orifice (2.0")	10.80
Overflow at top of 8" riser	11.50
Maximum Elevation	14.60
6" Storm Sewer Outfall	8.50

PROPOSED RUNOFF

The following table represents the peak runoff rates under proposed conditions. Post-development hydrographs for sheet flow to the right-of way are provided in Appendix B. Detention system performance hydrographs are provided in Appendix C.

Peak Runoff Summary and Detention Performance

Storm Event (years)	Drainage Area D_{P2} (CFS)	Detention Pipe Outflow (CFS)	Total Proposed Flow (CFS)	Total Existing Flow (CFS)	Percentage of Existing Flow
2	0.03	0.10	0.13	0.18	72%
10	0.05	0.13	0.18	0.30	60%
100	0.08	0.23	0.31	0.53	58%

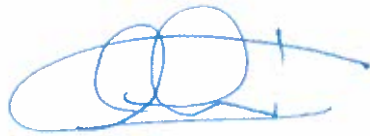
STORM SEWER LATERAL DESIGN

Storm sewer lateral sizing was determined using Manning's Formula with given criteria of a 8" PVC pipe with a 1% slope and a Manning's roughness coefficient of 0.011.

Based on this initial data, the proposed 8" storm sewer has a carrying capacity of 0.95 cfs, and is sufficiently sized to accommodate the 100-year modeled runoff of 0.49 cfs for the building roof drainage assuming failure of the detention system.

CONCLUSIONS

Based on the analysis, the proposed stormwater detention demonstrates that peak flows in the post-development condition are no greater than the peak runoff prior to development at each of the design storm events.



A. Sambade, A.I.A., P.E., P.P.

President

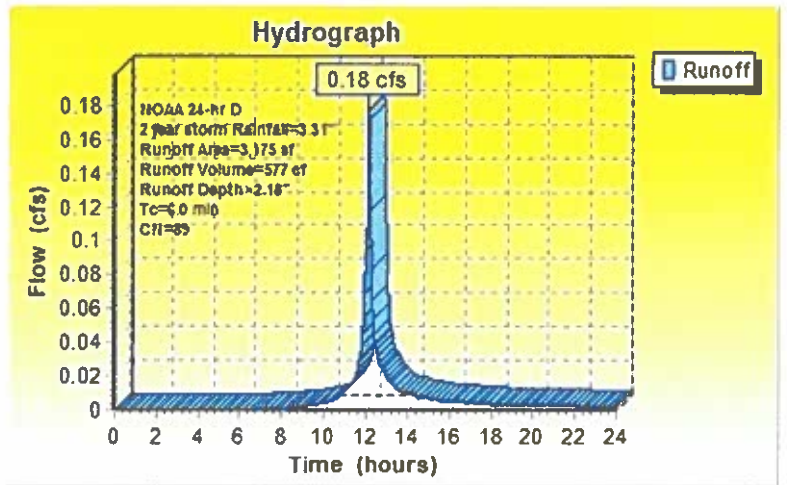
DAL DESIGN GROUP

10/28/2023

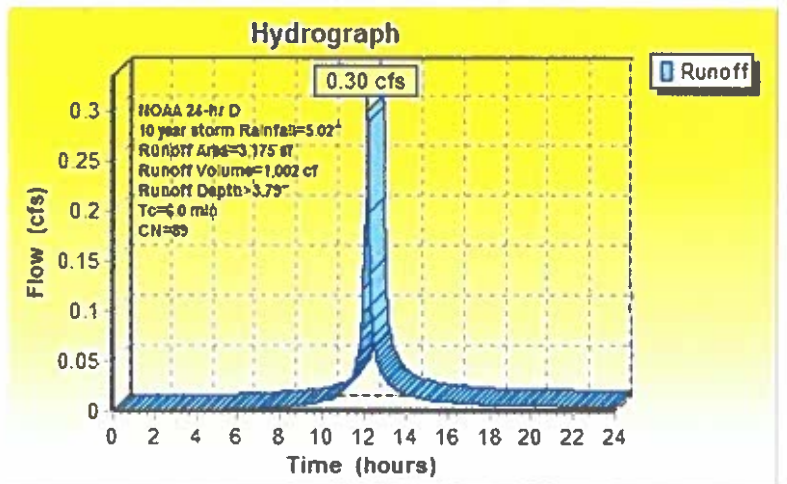
APPENDIX A - EXISTING HYDROGRAPHS

DRAINAGE AREA D_{E1} - EXISTING SITE

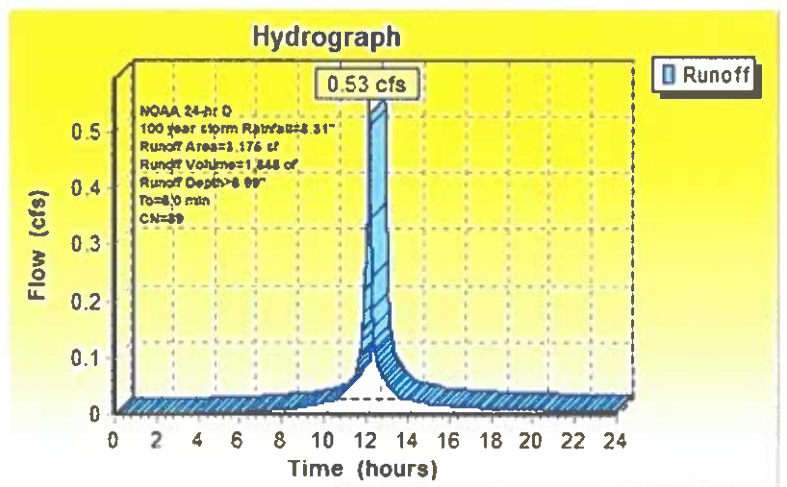
2-YEAR HYDROGRAPH



10-YEAR HYDROGRAPH

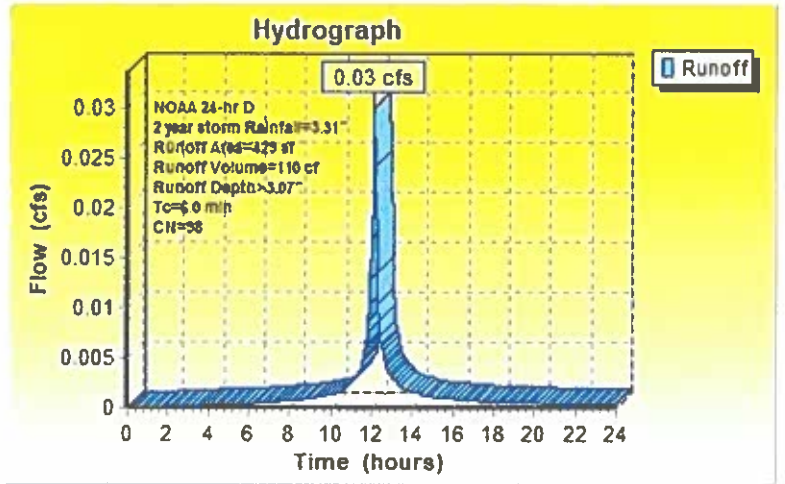


100-YEAR HYDROGRAPH

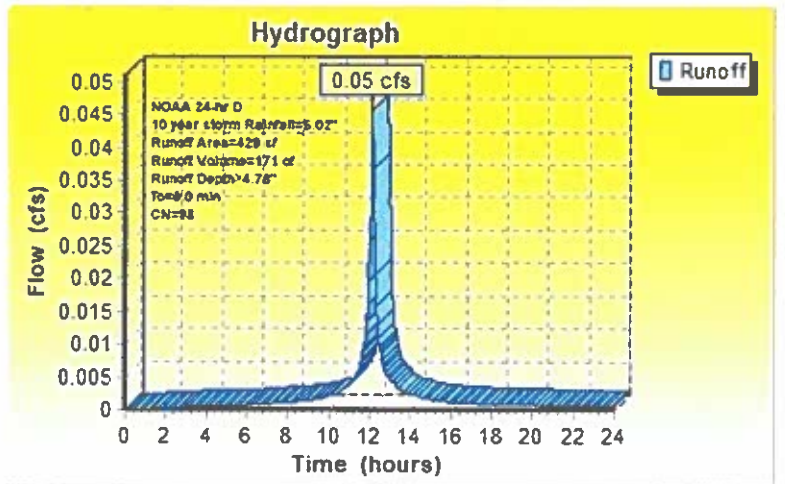


APPENDIX B - PROPOSED HYDROGRAPHS

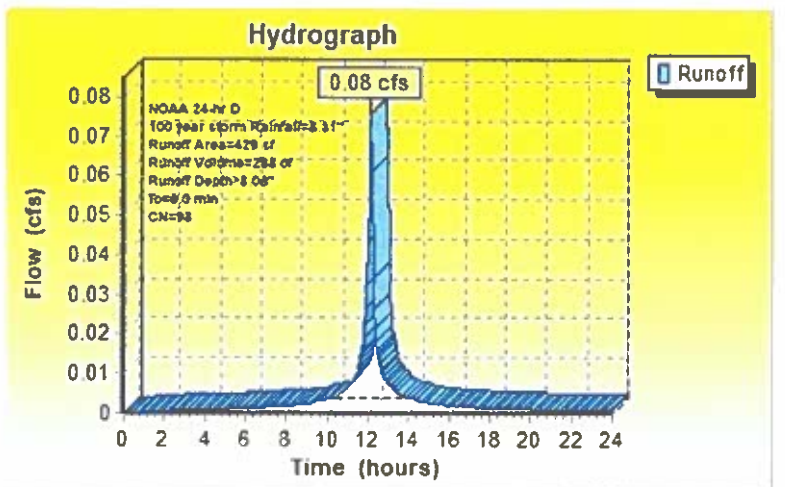
DRAINAGE AREA D_{P2} - PROPOSED SHEET FLOW TO R.O.W.



2-YEAR HYDROGRAPH



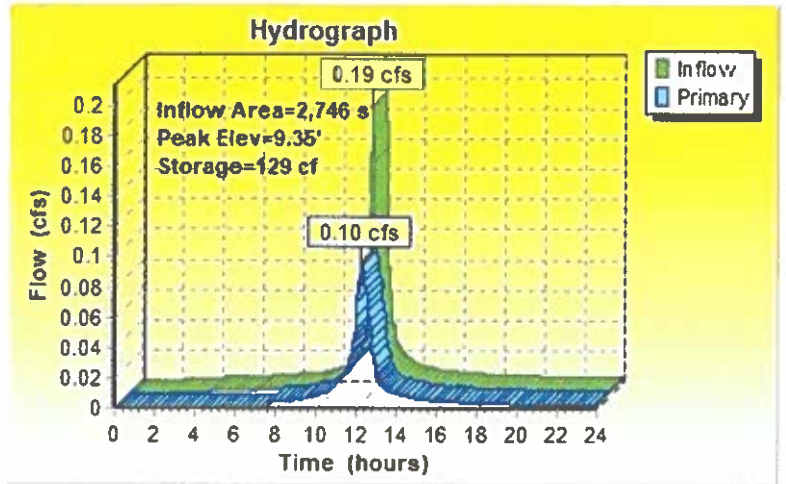
10-YEAR HYDROGRAPH



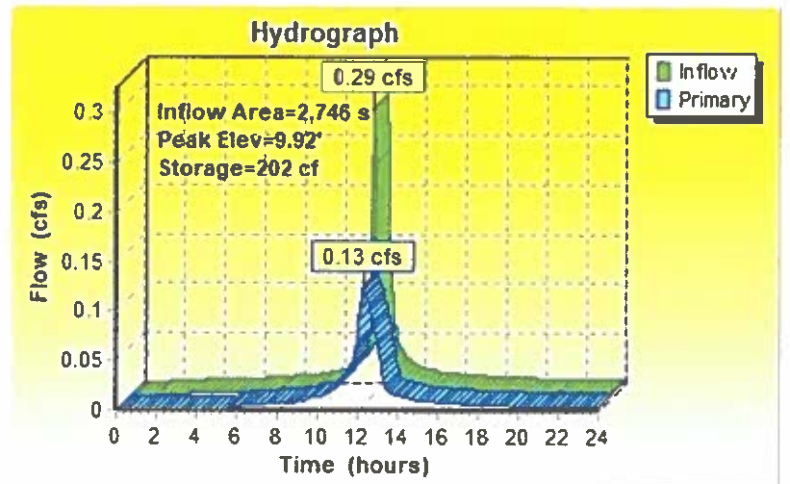
100-YEAR HYDROGRAPH

APPENDIX C - DETENTION SYSTEM PERFORMANCE

2-YEAR HYDROGRAPH



10-YEAR HYDROGRAPH



100-YEAR HYDROGRAPH

