DRAINAGE REPORT
Cusson Automotive
753 John Fitch Boulevard
South Windsor, CT

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Prepared for:

Cusson Enterprises, LLC
29 Mascolo Road
South Windsor, CT 06074

Project No. 2023-014

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I. INTRODUCTION

A. Project Description

Cusson Enterprises, LLC is proposing a development at 753 John Fitch Boulevard in South Windsor, Connecticut. The development will include the initial construction of a 12,000 square foot automotive repair facility with the potential for a future 5,250 square foot addition. This development will result in approximately 2.1 acres of new impervious area. Runoff will be collected and conveyed to a new stormwater infiltration basin to provide treatment, ground water recharge, and peak flow attenuation in accordance with the Connecticut Stormwater Quality Manual. In addition, the drainage system and basin have been sized for the potential development additional areas of the site in the future, including up to additional 1.5 acres of impervious area.

B. Existing Conditions

The project site consists of 9.92-acres at 735 John Fitch Boulevard. The parcel is located on the western side of John Fitch Boulevard approximately 400 feet south of the intersection with Mascolo Road. Currently, the parcel is undeveloped woods and brush. Runoff from the parcel flows southwesterly across the site and ultimately discharges into a wetland at the southwest corner of the parcel. An existing infiltration basin is located within a drainage easement in the northeast corner of the parcel. This infiltration basin collects and infiltrates runoff from the adjacent McDonalds property.

Based on a review of the USDA Soil Survey of Connecticut, the soil in the area to be developed consists of Windsor loamy sand (see Soils Map in Appendix 1). The USDA Soil Survey defines groups of soils into Hydrologic Soil Groups (HSG) according to their runoff-producing characteristics. Soils are assigned to four groups (A, B, C, and D Groups). In group A, are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They typically are deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a hardpan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other nearly impervious material. The classification of Windsor loamy sand is HSG A.

II. STORMWATER RUNOFF ANALYSIS

A. Methodology

Peak runoff flow rates were determined for pre- and post-development conditions using Applied Microcomputer System's HydroCAD™ Stormwater Modeling System. This computer software employs the SCS Technical Release 55 and 20 (TR-55 & TR-20) methodology. The potential stormwater impacts downstream were evaluated for the 2-yr, 10-yr, 25-yr, and 100-yr; 24-hour storm events. The rainfall for these storm events was taken from NOAA Atlas 14 provided in Appendix 2. Based on the present drainage patterns, runoff from the site flows into a wetland

that wraps around the southwest corner of the parcel. As a result, the wetland was selected as the design point.

B. Pre-Development Hydrology

The pre-development site was modeled as a two subcatchments. Subcatchment E1 includes approximately 8.3 acres on-site. Subcatchment E2 includes approximately 2.5 acres of off-site area to the east that sheet flows onto the subject parcel. The proposed development will not have an impact on the McDonald's infiltration basin or it's contributing area. Therefore, that area and the basin were no analyzed. The pre-development drainage area map is provided in Appendix 3. The pre-development runoff characteristics of the contributing areas are provided on the HydroCAD data sheets in Appendix 4. The pre-development discharge rates from the site during the design storms are summarized in Table 1.

C. Post-Development Hydrology

The proposed project will result in approximately 2.1 acres of new impervious area and an additional 1.5 acres of impervious coverage from the possible future development of remaining areas of the site. In order to mitigate the increase in runoff resulting from the increase in impervious area, the development will include a series of catch basins and piping to collect runoff and convey it to a new stormwater infiltration basin at the southwest corner of the parcel. The stormwater infiltration basin has been designed in accordance with the CT Storm Water Quality Manual to provide treatment, groundwater recharge, and peak flow attenuation. Based on the USDA Soil Survey, the soils on site are Windsor Loamy Sand. Therefore, the corresponding Rawls Rate of 8.27 inches/hour for sand was selected for the design infiltration rate of the infiltration basin.

The infiltration basin will be 5 feet deep with a bottom elevation at 53.0. The basin will be equipped with an outlet structure constructed of a standard Type CL catch basin with a 12" orifice as the primary outlet. The top frame and grate will act as an emergency spillway. The storage capacity below the primary outlet was sized to exceed the water quality volume (WQV). Additionally, the basin will be equipped with a sediment forebay and stone filter berm to provide pre-treatment. The sediment forebay and WQV sizing calculations are provided in Appendix 5.

The same design point for the pre-development analysis was used for the post development analysis. The post development site was divided into 11 subcatchments. Subcatchments S1-S5 include the initial development areas where runoff will be collected by the catch basins around the proposed parking lot and diverted to the stormwater infiltration basin. Subcatchments S6 and S7 include the roof runoff from the proposed building that will be directed to the basin. Subcatchment S8 includes the eastern portion of the site that could be developed in the future. Runoff from this subcatchment is anticipated to be collected and piped to catch basin CB3. Subcatchment S9 includes the off-site area that will sheet flow onto our site and will be collected by catch basin CB3. Subcatchment S10 includes the area that will sheet flow directly into the proposed stormwater infiltration basin. Subcatchment S11 includes the area that will continue to flow directly to the design point. Subcatchments S3, S8 and S10 were modeled to include the up to 1.5 acres of impervious area from potential future development.

The post development drainage area map is provided in Appendix 3. The post development runoff characteristics of the subcatchments are provided on the HydroCAD data sheets in Appendix 4. As shown in Table 1, the post-development peak rates of runoff from the site to the design points will be maintained or reduced in comparison to the pre-development rates.

TABLE 1 – COMPARISON OF PRE- & POST-DEVELOPMENT DISCHARGE RATES (CFS) TO THE DESIGN POINT

	2-year	10-year	25-year	100-year
Pre-Development	1.20	3.01	4.26	6.63
Post Development	0.00	1.15	3.43	5.36

D. Pipe Sizing

The piping proposed at the site consists of smooth bore corrugated high density polyethylene pipe with smooth interior walls (CPEP-S). The roughness coefficient used for this pipe type is 0.012. The analysis provided in Appendix 4 indicates headwater elevation in the structure at each pipe inlet for the design storms and compares it to the flood elevation, which corresponds to the top of frame of the structure. The calculations indicate that all proposed pipes will have sufficient capacity to convey the 10-year storm event while maintaining at least 12 inches of freeboard below the top of the structures. This analysis includes the runoff from the potential development of an additional 1.5 acres of impervious surface as detailed on the post development drainage area map.

E. Treatment

The proposed infiltration basin was sized in accordance with the CT DEP Stormwater Quality Manual. As such, it meets the DEP's standards for primary treatment prior to discharge. Additional treatment measures will include oil/trap hoods installed in the catch basins. Maintenance requirements for all stormwater system components are provided on the site plans.

F. Pipe Outfall Protection

Outfall protection for the pipe outfall at the toe of the slope will consist of a modified riprap apron. The apron was designed in accordance with the requirements of the Table 8.6.1 of the CT DOT Drainage Manual provided in Appendix 5.

G. Summary of Results

The proposed design and analysis indicates that the proposed development will not result in negative impacts downstream of the site.

Appendix 1:

SOILS INFORMATION

Appendix 2:

RAINFALL DATA

Appendix 3:

DRAINAGE AREA MAPS

Appendix 4:

HYDROCAD ANALYSES

Appendix 5:

MISCELLANEOUS CALCULATIONS