STORMWATER MANAGEMENT ANALYSIS

COMMERCIAL REDEVELOPMENT PROJECT

192 MILLBURY AVENUE

MILLBURY, MASSACHUSETTS

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HYDROLOGIC STUDY

192 Millbury Avenue
Millbury, Massachusetts

INTRODUCTION

The purpose of this hydrologic study is to determine the existing and proposed drainage flows within the proposed commercial redevelopment project located at 192 Millbury Avenue, Millbury, Massachusetts. Using the SCS TR-55 and TR-20 methods, the predeveloped and postdeveloped flows and volumes have been calculated for the 2, 10 and 100 year storms.

As shown in the published soil survey for Worcester County, South, the majority of the site is classified as Merrimac Fine Sandy Loam with inclusions of Hinckley Sand. These excessively drained soils formed in the delta of a glacial outwash plain. These soils are assigned to hydrologic group "A" by the Natural Resources Conservation Service. On-site inspections of the existing conditions relative to vegetation, topography and soils have been conducted to verify specific drainage runoff properties as they apply to the hydrologic computations. Based upon the observed infiltration capacity of the soils, the hydrologic grouping is incorporated within the drainage computations to determine the rates of storm water runoff. Previous alterations to the topography, soils, vegetation, as well as the proposed structures have been evaluated as part of this study. Using 24 hour rainfall charts for the various design storms, computer generated hydrographs have been created to determine the peak flows toward an identified control point. This specific design point is shown on the site plans along the western shoreline of Dorothy Pond.

The site is located along the western border of Dorothy Pond to the east of Millbury Avenue near the intersection with Shore Terrace. The land formation consists of a glacial outwash terrace that drains toward the pond. The edge of the lake is scattered with large stones that are typical of Merrimac soils. The shore of the lake is subject to moderate scouring and erosion due to the seasonal wave action. Since Dorothy Pond is a manmade impoundment created by the dam on Riverlin Street, the edge of the high water level represents the limit of the resource area.

This project has been divided into two subcatchments as shown on the postdeveloped drainage diagram. Two Infiltration Basins and a Stormceptor® Hydrodynamic Drainage Separator are to be developed on site to control the peak flows during specific design storm events.

Introduction (cont.)

By routing the flows through these structures, an accurate picture of the overall postdeveloped drainage patterns can be obtained. The drainage subcatchments have a unique point source where the proposed drainage flows can be calculated. The impervious area of the proposed building is routed through the infiltration basin beneath the parking lot where the volume of water can be detained in order to reduce the peak flows and infiltrated into the porous sand and gravel.

The proposed surface and subsurface infiltration structures have been designed using the latest Best Management Practices (BMPs) to substantially reduce the amount of total suspended solids within the stormwater runoff. These BMPs have been incorporated into the "drainage train" in order to control the potential flow of sediments within this site. As noted in the Stormwater Pollution Prevention Plan - Operation and Maintenance Schedule, these BMPs are to be utilized as part of an overall drainage management plan to be supervised by the owner. This office will work closely with the owner, to insure the proper use and maintenance of these structures. A copy of the Stormwater Pollution Prevention Plan - Operation and Maintenance Schedule is to be available on site at all times.

A brief description of the "drainage train" to be developed at this site includes a Stormceptor® Hydrodynamic Drainage Separator and two subsurface Cultec® Chamber Basins. Following the latest Stormwater Management Guidelines as promulgated by the Massachusetts Department of Environmental Protection, each of these structures has a known capacity to reduce the amount of Total Suspended Solids (TSS) from the drainage runoff. As shown on the proposed construction plans for this site, this office has incorporated these BMPs in a series where the drainage is channeled through these structures to reduce the velocity and increase the rate of travel time. This "drainage train" further reduces the amount of TSS in the runoff to acceptable levels as it leaves the site. A riprap swale is located at the outflow culvert to reduce the velocity of the drainage runoff and limit the impacts of scouring within the sloped swale.

A summary of the drainage analysis is included within this report. It should be noted that the proposed drainage runoff during the design storms has been reduced to a level less than the existing flows currently found here. The reduction in the intensity of the flows has been achieved by redirecting the drainage runoff through the above described structures. These structures are also designed to recharge the stormwater runoff to acceptable quantities that are significantly less than the existing predeveloped flows. Refer to the following drainage summary for a more accurate description of the design flows.

HYDROLOGIC STUDY

192 Millbury Avenue
Millbury, MA

Summary of Drainage Analysis

As shown on the Site Plan, this property is located along a glacial moraine that sheds drainage into one distinct watershed. The entire site drains toward Cold Spring Brook. The single watershed has been divided into four subcatchments to calculate the postdevelopment flows leaving this property.

Soil tests in this area reveal the soil to be well drained Windsor Loamy Sand. As described above, the entire site will drain into three shallow infiltration basins where the sediments will settle out. All drainage from the rooftop is to pass through a screened distribution box prior to flowing into the subsurface infiltration structure. Refer to the Site Plans for additional details.

Proposed postdeveloped flows and volumes have been shown to be less than the predeveloped flows. Drainage runoff has been calculated for the 2 year, 10 year and 100 year storms as shown in the summary below. By controlling the peak rates of runoff during the design storm events through the various containment measures, the intensity of drainage toward the design point has been held to an acceptable level. The intensity is defined as a measured volume of flow during a specified time interval. $I = Q/T$

Time Span = 0.0 Hours to 24.0 Hours

PREDEVELOPED

	2 YEAR	10 YEAR	100 YEAR
Peak Flow - CFS	0.15	0.52	1.28
Volume – AF	0.011	0.033	0.077

POSTDEVELOPED

	2 YEAR	10 YEAR	100 YEAR
Peak Flow - CFS	0.00	0.39	0.93
Volume – AF	0.00	0.011	0.036