

Drainage Technical Memorandum

Introduction

The project site is located on the Bates College Campus, at the intersection of College Street and Mountain Avenue in Lewiston, Maine as shown on Figure 1. The proposed project includes the construction of a 150-bed dormitory, courtyard area, access drive and associated utilities.

This technical memorandum addresses storm water management within the area of new construction, including runoff analyses, and water quality.

Existing Conditions

The project area is currently occupied by lawn area, and is adjacent to existing Rand Hall and its associated parking area and driveway. Mount David abuts the project area to the north, and contributes flow to the project area.

Soils on the site include Hollis fine sandy loam and Hollis very rocky sandy loam, with hydrologic soil group C/D, Hartland very fine sandy loam with hydrologic soil group B, and Made Land, with an unclassified hydrologic soil group. For purposes of the hydrologic analyses, Made Land was assumed to be hydrologic soil group D. Soils on the site are shown on the NRCS soil map included as Attachment B.

Under existing conditions, stormwater runoff flows from the top of Mount David and across the project area to two design points. Design Point 1 was analyzed as the existing combined sewer system in College Street, which also receives flow from the 10-inch pipe in Mountain Avenue. Design Point 2 was analyzed as the existing combined sewer system in Mountain Avenue that runs northeast of the project area. The existing conditions hydrologic analyses show one drainage area to each of the design points.

Drainage area EX-1 is approximately 4.4 acres, and includes a portion of existing Rand Hall and all of its associated parking and driveway, grass in good condition, and a portion of Mount David. Drainage area EX-2 is approximately 1.5 acres, and

includes grass in good condition, a portion of Mount David, and the flat-roof portion of existing Rand Hall. See Figure 2 for existing drainage areas and design points.

Proposed Conditions

Under proposed conditions, stormwater runoff flows from five subcatchment areas to the two design points analyzed in the existing condition.

Proposed drainage area PR-11 is approximately 1.3 acres and includes a significant portion of the proposed parking and driveway areas. This area flows to the proposed underground detention system.

Proposed drainage area PR-12A is approximately 0.5 acres and includes the bicycle barn, existing sidewalk, and lawn and wooded areas that flow overland to College Street. Proposed drainage area PR-12B is approximately 0.5 acres and includes the area in front of existing Rand Hall, a portion of Rand Hall's roof, and the existing walkway. This area also flows overland to College Street.

Proposed drainage area PR-13 is approximately 2.2 acres, and includes remainder of the parking and driveway areas, a portion of the building, some woods, and the lawn areas surrounding the proposed building. This area flows overland to College Street at the intersection with Mountain Avenue.

Proposed drainage area PR-2 is approximately 1.5 acres and includes mostly undisturbed woods and lawn area, and includes the flat-roof portion of existing Rand Hall. This area flows to the closed drainage system in Mountain Avenue. See Figure 3 for proposed drainage areas.

The proposed project is designed to mitigate increases in stormwater runoff over existing stormwater peak flows with site layout that balances existing and proposed impervious areas, as well as an underground detention system to control flows to their predevelopment condition.

Hydrologic Analyses

The rainfall-runoff response of the Site under existing and proposed conditions was evaluated for storm events with recurrence intervals of 2, 10, and 25-years. Rainfall volumes used for this analysis were based on the Natural Resources Conservation Service (NRCS) Type III, 24-hour storm event as given in Appendix D of the Maine DEP *Stormwater Management For Maine: Best Management Practices* dated November 1995; they were 3.0, 4.6, and 5.4 inches, respectively. Runoff coefficients for the pre-

and post-development conditions, were determined using NRCS Technical Release 55 (TR-55) methodology as provided in HydroCAD.

Drainage areas used in the analyses were described in previous sections and shown on Figures 2 and 3. The HydroCAD model is based on the NRCS Technical Release 20 (TR-20) Model for Project Formulation Hydrology. Detailed printouts of the HydroCAD analyses are included in Appendix A. Table 1 presents a summary of the existing and proposed conditions peak discharge rates.

**Table 1:
Peak Discharge Rates (cfs*)**

Design Point	2-year	10-year	25-year
<u>Design Point 1: College Street Combined Sewer</u>			
Existing	4.6	9.6	12.3
Proposed	4.7	9.1	11.7
<u>Design Point 2: Mountain Avenue Combined Sewer</u>			
Existing	1.7	3.7	4.8
Proposed	1.7	3.6	4.7

* expressed in cubic feet per second

The closed drain system is designed for a 25-year storm event in accordance with Article XIII Section 4.f of the Lewiston Zoning Ordinance. Drainage pipes were sized using Manning's Equation for full-flow capacity and the Rational Method to estimate runoff. Additionally, the performance of the system was analyzed using StormCAD, a HEC-22 based program. Hydraulic calculations are included as Attachment A.

Water Quality

Stormwater will be treated prior to discharge to the existing combined sewer systems. Stormwater entering the Stormtech underground detention system will be treated in the "isolator row", where suspended solids will settle out. The isolator row is Maine DEP approved method for stormwater treatment. An operation and maintenance plan for the stormwater management system is included in Attachment E.

For all other flows, water will be treated with the use of a water quality device, similar to Stormceptor or Vortech systems which achieve a high rate of pollutant removal. Total suspended solids (TSS) removal calculations are provided in Attachment F.

Groundwater Protection

The project area is not located in an area of significant sand and gravel aquifers, according as shown on the Significant Sand and Gravel Aquifers maps, Lewiston Quadrangle. The project area is located in an area with "less favorable aquifer characteristics". Soils on the site do not have a high infiltration potential, so the potential for groundwater contamination is low. In addition, the water will be treated prior to discharge to the underground infiltration/detention area, as mentioned earlier. The project does not propose any subsurface wastewater disposal on the site.

Floodplain

According to the FIRM Flood Insurance Rate Map for the City of Lewiston, Community-Panel Number 230004 010 B, dated September 28, 1979, the site is not located with the flood plain zone. A copy of the community panel is included in Attachment C.

State NPDES Permit

Before construction is to begin, the Proponent will submit a Notice of Intent (NOI) for Stormwater Discharges Associated with Construction Activity under a National Pollutant Discharge Elimination System (NPDES) General Permit to the ME DEP. As a condition of that permit a Stormwater Pollution Prevention Plan (SWPPP) will be prepared by the construction contractor for the project and it will remain onsite until construction is completed. Erosion and sedimentation control measures are shown on the planset, and are included in Attachment D of this memorandum.