

## HYDROLOGY AND HYDRAULICS REPORT

The Wilson Stream drainage basin characteristics produced by the Hydrology Section of the MaineDOT Environmental Office are as follows:

<b>Drainage Area</b>	27.1 mi <sup>2</sup>
<b>Wetlands</b>	4.06 %

In accordance with MaineDOT policy, the USGS regression equations (Hodgkins, 1999) were used to compute the peak discharges and they are as follows:

<b>Q<sub>1.1</sub></b>	478.6 ft <sup>3</sup> /s
<b>Q<sub>50</sub></b>	2944.6 ft <sup>3</sup> /s
<b>Q<sub>100</sub></b>	3413.0 ft <sup>3</sup> /s
<b>Q<sub>500</sub></b>	4585.7 ft <sup>3</sup> /s

The existing Canal Street Bridge is a 51' long riveted steel thru girder bridge. The bridge is located at the Wilson Stream outlet of Wilson Pond in Wilton, Maine. Wilson Pond is immediately upstream of the bridge and there is a dam located 200' downstream of the bridge. The hydraulic performance and analysis of the existing and proposed structures were examined qualitatively using the 1989 FEMA Flood Insurance Study for the town of Wilton as a reference.

FEMA provides 100-year flood event discharge and a flood elevation at the Canal Street Bridge site location. FEMA's 100-year discharge is confirmed to be accurate when compared to the MaineDOT USGS regression Q<sub>100</sub> discharge. FEMA's 100-year flood elevation at the bridge is equal to 575.17' (NAVD 88). The FEMA 100-year elevation at the bridge was determined, by FEMA, to be equal to the elevation of Wilson Pond's water surface during a 100-year flood. Contrary to the FEMA study, the lake water of Wilson Pond drops in profile as it enters into Wilson Stream and exits the pond. The Department has determined that the 100-year flood elevation at the existing bridge structure shall be represented as 573.5'. Evidence of the drop in water surface can be seen in a photograph taken during an actual 100-year flooding event (Flood of April 87' see attached).

The proposed bridge location and changes to the hydraulic opening at the bridge are minimal therefore the 100-year flood elevation at the new bridge remains 573.5'. The proposed bridge replacement will involve a detail build superstructure. The minimum bottom chord elevation used for the Detail Build Specification will be 6" above the 100-year flood elevation. Superstructure elements that are too deep and fall below the 574' elevation will not be allowed. The existing causeway and downstream dam will not be changed and will not have an effect on hydraulics of the new bridge.

Heavy riprap is being specified and will protect the new integral abutments from scour. Heavy riprap will also enable the use of steeper slopes, minimizing wetland impacts.

	<b>Existing</b>	<b>Proposed</b>
<b>Total Area of Opening</b>	361 ft <sup>2</sup>	428 ft <sup>2</sup>
<b>Headwater El. @ Q<sub>100</sub></b>	573.5 ft	573.5 ft
<b>Hydraulic Opening Above Q<sub>100</sub></b>	25 ft <sup>2</sup>	78 ft <sup>2</sup>