



Boundaries LLC
179 Pachaug River Drive
P.O. Box 184
Griswold, CT 06351
T 860.376.2006 | F 860.376.5899

www.boundariesllc.net

MEMORANDUM

September 24, 2020

**Re: Culvert Sizing Narrative
Proposed Wetlands Crossing, 179 Gallup Road**

This proposal involves the construction of a wetland crossing to access land at the rear of 179 Gallup Road. The wetlands are adjacent to the southerly end of Palmer Pond and were field delineated by Demian A. Sorrentino, C.S.S., on February 19, 2020. The location of the proposed wetland crossing is in Zone X per the current FEMA map and matches the location of an existing cart path that crosses the wetlands. The existing cart path contains a 2' x 2' stone culvert. As part of the construction of the wetland crossing, the cart path will be improved with appropriately sized culverts to replace the existing stone culvert and to manage stormwater flows. The drainage area and surface conditions were determined using the Town of Voluntown GIS mapping, publicly available aerial photography, topography obtained in part from field survey and supplemented with CT DEEP LIDAR, and visual site inspection. The majority of the watershed is wooded with some gravel roads/driveways and a grass field. The watershed area is 77.2 acres and has an overall C-value of 0.23.

The watershed analysis was completed using the Rational method. Times of concentration were estimated using multiple segment flow paths as described in the NRCS TR-55 manual. In accordance with CT DOT guidelines for wetland crossing and culvert sizing, the 25-year 24-hour storm was analyzed using a time of concentration of 77.4 minutes and a rainfall intensity of 1.96 inches per hour. Rainfall intensity data is from the NOAA Precipitation Frequency Data server accessed on September 22, 2020. The proposed crossing will cross the wetlands over one (1) 30-inch diameter and two (2) 15-inch diameter HDPE pipe culverts. The areas at the inlets will be stabilized with a 4-foot wide riprap swale spanning the entire length of the crossing. The outlets will be stabilized with preformed rip rap scour holes. Side slopes of the crossing will be stabilized with 12" of rip rap. Sediment fence will be installed downgradient of the proposed crossing to protect adjacent undisturbed wetlands.

The 25-year design flow of 36.3 cubic feet per second will have an upstream water surface elevation of 453.5, providing 0.6 feet of freeboard below the crossing surface.



The proposed culverts and crossing have been designed to meet Army Corps of Engineers guidelines. The plans were developed such that construction of the proposed crossing will be completed in accordance with Army Corps of Engineers General Permit 18. The proposed crossing meets the following requirements as stated in the General Permit:

- Permanent or temporary impacts are less than or equal to 5,000 square feet in non-tidal wetlands.
 - The wetland activity is limited to approximately 3,890 square feet.
- There is no work in non-tidal Special Aquatic Sites.
 - There is no proposed activity in Special Aquatic Sites.
- No slip lining or culvert relining that changes invert elevation.
 - The proposed culverts are new and not slip-lined or relined. The existing invert elevations of the stone culvert are matched by the new culvert.

Sincerely,



David C. McKay, P.E.