Reconstruction of Amberlea Creek Valley Corridor to Protect Frenchman's Bay Provincially Significant Wetland

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Aquafor Beech Limited, in partnership with Terraprobe, were retained by the Toronto Region Conservation Authority and City of Pickering to provide comprehensive geomorphic and geotechnical services as part of the Amberlea Creek Erosion Control Project Class Environmental Assessment. The EA was carried out following the Conservation Ontario's Class Environmental Assessment for Remedial Flood and Erosion Control Projects, as opposed to the more common Schedule B Municipal Class EA Process, and was premised on recommendations from the City of Pickering Stormwater Management Master Plan for Frenchman's Bay Watersheds (2009).

The study area extended from the confluence with Frenchman's Bay, upstream approximately 600 m to the outlet of a culvert designed to convey the 100 year return of the entire watershed under Highway 401. At the culvert outlet, Amberlea Creek had scoured so significantly that the base level of the bed had degraded almost 4 m in elevation, with approximately 2 m of standing water within the scour pool, and the footing of the culvert undermined.

Integrated geomorphic and geotechnical assessments were completed to define the erosion risks associated with the creek and valley corridor, in which the parts of the stream system were defined as heavily incised, exhibiting signs of active erosion and instability, and contributing excess sediment to Frenchman's Bay. Critical slope conditions were observed at a number areas where the creek had eroded the bank to the point of critical failure, putting public safety and private properties at risk.

Where significant instabilities and risks were observed, the approach for restoration included major reconstruction of the entire valley corridor, including slope regrading, reconnection of the floodplain, riffle-pool construction, and an engineered scour pad at the culvert outlet.

Where this design differed from a common channel restoration exists within the flexibility for planform adjustment. This was achieved through burying engineered retaining walls into the slope restoration, allowing the channel flexibility to naturally migrate throughout the confined valley setting without risk of future geotechnical slope instabilities occurring. The reconstruction was implemented within Winter 2015 / 2016, and a three year monitoring program is currently being undertaken following the TRCA's Natural Channel Design Monitoring guidelines.