



GEO-FOUNDATIONS Contractors Inc.

CN Sunfish Pond



Date: 2006
Technology: Soil Nailing

Geo-Foundations was contracted by CN Rail in 2006 to create a system for rapidly installing grout-flushed soil nails into an existing embankment supporting a twin railroad overlooking Sunfish Pond in Burlington, Ontario. The soil nailing was a key component in the design for upgrading and stabilizing the embankment prior to its being expanded to host a third rail. The soil nail installation system was required to be fully functional – capable of moving along the crest of the slope, installing several soil nails per hour and positioning the shallow-plunging soil nails as far as 7 metres downwards from the south crest of the slope – while maintaining its zero clearance status to ensure uninterrupted and safe passage of trains on the north track during soil nail installation.

A reduced tail swing hydraulic excavator, with a long reach boom, was outfitted with a custom-built drill mast to achieve the reach and angle of drilling required. The mast and its mounting bracket were fabricated in Geo-Foundations' shop along with quick-connect plumbing mated to the excavator's controls.

In total, 405 grout-flushed, 40 mm hollow bar soil nails, each embedded 12 metres, were installed. After soil nail installation was complete, a separate mounting bracket and vertical mast arrangement were fabricated to allow installation of inclinometer casings, whose locations were typically 5 metres downslope of the crest in locations otherwise inaccessible to any drill rig.

Soon after the completion of grout-flushed soil nail installation at the Sunfish Pond site, Geo-Foundations was contracted by CN to complete a similar slope stabilization project on a single-track embankment north of Latuque, Quebec. For the Latuque site, where a reduced tail swing unit was

not required, but where the soil nails had to be drilled farther (9 metres) down the slope, a larger excavator was used. At Latuque, 128 grout-flushed, 9-metre deep, 40 mm hollow bar soil nails were installed.



Sunfish Pond: south slope of rail embankment with new soil nails



Sunfish Pond: zero-clearance rig installing soil nails during night shift



Soil nailing at Latuque, Quebec