

**REHABILITATION AND WIDENING OF QUEENSTON ROAD
NIAGARA-ON-THE-LAKE, ON, CANADA**

Reinforced Soil Walls and Slope Reinforcement

Problem

Because of quite a large volume of traffic, which adversely affects the traffic flows on Queenstone road, the town of Niagara-On-The-Lake required road to be rehabilitated and widened from Concession 7 Road to Townline Road.

The project comprised rehabilitation/reconstruction and widening by 1.5 m on both sides along a 1,050 m long section, including two culvert crossings of existing watercourse in order to facilitate the proposed road widening and to keep the proposed works within the roadway allowance at the culvert crossing area, the geotechnical engineer of the project proposed a soil retaining structures. Also, it was expected that the road reconstruction had a big amount the surplus excavation material that had to be carried out and dispose.

Solution

Maccaferri was approached by the consulting engineering firm of the project at the design stage to check if a solution could be provided for this project.

After checking the information provided, Maccaferri proposed a "Geogrid Reinforced Slope with ParaDrain™".

The Geogrid Reinforced Slope system constitutes retaining structures capable of supporting high fill height under heavy loads. These structures are characterized by a reinforcing element in form of a geogrid inserted into the soil structure as horizontal layers with a wrap-around in the facing area. A erosion control mat for restrain of the fill material is added within the wrap.

To get benefit of the surplus marginal soils excavation on this project. Maccaferri proposed a ParaDrain™ Geogrid as a main soil reinforcement, it consists of high tenacity multifilament polyester yarns that are placed in tension and then co-extruded with a polyethylene sheath into strips. The polyethylene sheath is profiled to provide a shaped drainage channel. The profiled element has a thermally bonded nonwoven geotextile strip bonded on the shoulders of the drainage channel. The geotextile allows excess pore water pressure to dissipate while retaining the cohesive soil.

The final result was a vegetated reinforced slope and the Town was able to save money on hauling due to the use of ParaDrain™.

Client: Niagara-On-The-Lake

Designer / Consultant: Quartek Group

Contractor: Brennan Paving Limited

Products used (Qty.)

- ParaDrain	7,800 m2
- MacGrid EG	9,480 m2
- MacMat	3,520 m2

Date of construction: 08/2018 - 10/2018



Detail of geogrid wrapping



Detail of ParaDrain installation



Detail of form used for wrapping



Reinforced slope during compaction



View of vegetated slope 1



View of vegetated slope 2