

Case Study

application | **Wrapped Face Wall**
location | **Noisy River, Ontario, Canada**
product | **Mirafi® HP570**

job owner
engineer
contractor

County of Deferin
R. J. Burnside and Associates
Nelson Arnold Construction

TenCate™ develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

THE CHALLENGE

In the spring of 2000, the concrete bridge at Highway 24 and the Noisy River went into serious distress and was deemed a significant public safety issue. The structure was designated for immediate replacement. Consideration was needed for these challenging site conditions:

- The contractor was not allowed to temporarily divert the Noisy River, a well known trout stream, or contaminate the river with debris.
- It was deemed impossible to close the road to traffic at any time during construction. Therefore, one-lane signaled detours within the 36 m (118 ft) length of the failing structure

permitted construction of the new structure in two stages.

- The use of high strength woven geotextiles in temporary retaining walls is not widespread in Canada. Recently, two local projects proved the success of this application, which encouraged this project and others to design with temporary geotextile walls.

THE DESIGN

A soil steel structure was recommended for this application. For the detours, two temporary retaining walls, 5.5 and 7.5 m (18 and 25 ft) in height, were constructed using Mirafi® Woven Geotextiles. For the bridge itself, a 9 m (30 ft) span, half round Bridge Plate Arch on new concrete footings was proposed. This bridge plate structure has a rise of 4.5m (15 ft) with 1.83m (6 ft) of granular cover. Plate thickness is 5.0 mm (0.2 in).

THE CONSTRUCTION

The first 5.5 m (18 ft) high temporary wall was constructed beside and above the failing structure. With space on site extremely limited, the wall was required in order to safely provide for one lane of traffic within a half-length of the structure. Once this detour was completed, demolition of the cast-in-place culvert commenced. Prior to demolition, the contractor placed a series of wide flange beams across the river. Steel sheeting was placed in the beams to form a solid barrier to prevent concrete rubble from entering the river. Just outside the old footings, two rows of sheet piling, 150mm (6 in) apart were driven to form the basis for the new footing. The associated re-bar, anchor bolts and unbalanced footing channel were all located prior to pouring concrete. Each portion of the steel erection took place in two stages. The structure contains 30 rings, each comprised of 5 plates. Each individual ring was fully erected prior to starting the next ring.

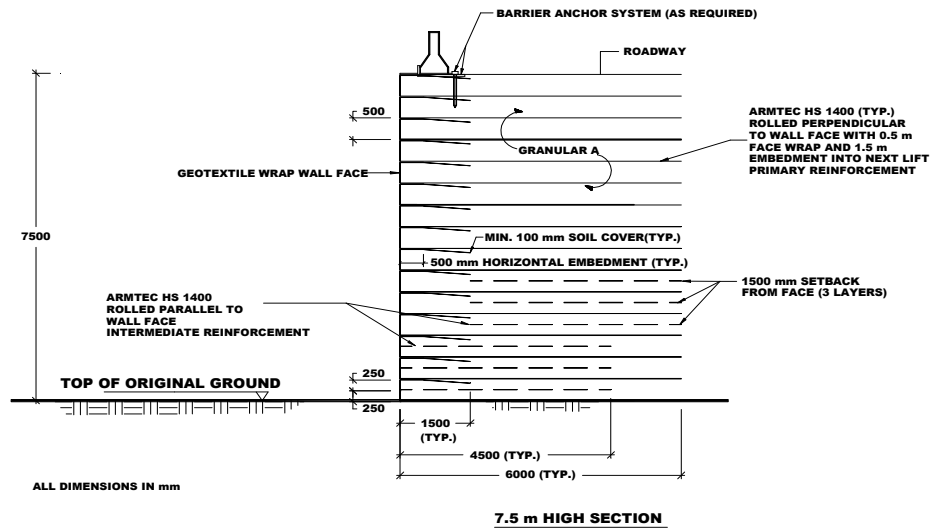


Backfilling of the structure started with construction of the second temporary wall. This wall was built in the same manner as the first wall, using granular fill and Mirafi® HP570 (Armtex HS1400), compacted to 95%. Backfill was placed and compacted in 200mm (8 in) lifts.

Once the backfill and temporary wall were complete, the roadway was paved to complete the second detour. As traffic was diverted to the new detour, stage 2 bridge construction began. Construction of this second stage was very similar to that of the first stage. At the splice point of the two bridge halves, the backfill for Stage 2 was simply compacted against the fabric wall. Due to its flexible nature, this wall could simply be buried in the backfill without impacting the bridge structure.

THE PERFORMANCE

Dufferin County Road was restored to two-lane traffic in early December 2000. This project presented three major challenges: limited on-site space, severe environmental limitations relating to the river and the road could never be closed. Those challenges were met through the creative application of existing products and construction techniques.



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