

Bridle Ridge Subdivision

By James Parent



Fig. 1: Bridle Ridge Subdivision - Mid Wall

In the summer of 2018 Morningstar Homes retained GeoPacific Consultants for the geotechnical design of a proposed development of 109 single family residential lots.

Morningstar Homes has proudly built several thousand quality single family homes in the Lower Mainland of British Columbia over the past 20 years. Morningstar Homes is also an affiliate of Polygon Homes, one of the largest and prominent builders in British Columbia, building over 30,000 homes since 1980.

The development site is located in the Silver Valley area of Maple Ridge, B.C, north of Dewdney Trunk Road and west of Golden Ears Park. The site consists of a single lot, bounded to the north by BC Hydro Right-of-Way and Malcolm Knapp Research Forest, Marc Road to the east, single family residential subdivision lots to the south and Blaney Bog Reserve to the west. The lot encompasses an area of approximately 74 acres (30 hectares), is roughly rectangular in shape and generally slopes east to west with a maximum grade differential of approximately 430 ft (130 m).

GeoPacific specializes in the design of tie-back shoring systems including shotcrete, sheet pile, soldier pile and jet grout shoring. GeoPacific has completed deep excavation shoring designs for excavations up to 95 ft (29 m) below street grade in Vancouver, Burnaby, Surrey, Portland and San Diego. GeoPacific has pioneered the use of jet grout shoring for cut-off walls in Western Canada including projects in: North Vancouver (The Pier), Surrey (Infinity), and Vancouver (Fairmont Pacific Rim and Olympic Village).

Upon review, the geotechnical engineer concluded that tiered retaining walls with a total finished height of 40 ft (12 m) were required at the east and west boundary of the property as well as the interior of the subdivision for lot separation (Fig. 1). It was determined to use permanent shotcrete soil nail retaining walls for the cut portion of the property. A traditional geogrid-reinforced retaining wall system would have required substantially more disturbance to the hillside to allow for conventional bottom-up construction. Therefore, a top-down system was preferred given the retaining wall height.



Fig. 2: Beginning of project



Fig. 4: Pan



Fig. 3: Tier 3



Fig. 5: West end



Fig. 6: Drilling

Vancouver Shotcrete and Shoring Inc. was awarded the opportunity to construct the top down construction of permanent soil anchored shotcrete and soil anchor retaining walls. After excavation of the slope within the approved shoring sequence, a 4 in. (100 mm) structurally reinforced shotcrete was applied against a sheet membrane drainage system (Delta Drain). This is a time sensitive procedure due to excavated panels required to be shotcreted the same day. After tier one structural shotcrete was complete and all anchors were tested and

locked off, excavation of the lower tier was bulked out and drilled, then the shotcrete sequence proceeded again. When an entire lift was completed, scaffold was erected and a second layer of reinforcing steel was added. Thereafter, a 4 to 6 in. (100 to 150 mm) decorative rockscape finish was applied. The second layer was then hand shaped and carved by our in-house finishing crew. After curing, the rockscape finish was acid stained and painted to match the local rock formation coloring.

Morningstar was pleased to be working with Vancouver Shotcrete & Shoring and is proud of the work it has done on the Bridle Ridge project. Morningstar & Polygon are also working with the company on a second project at Nelson Street in the City of Mission.

BY THE NUMBERS:

- 1,500 ft (460 m) long with up to 42 ft (13 m) tall 4 tier permanent shotcrete and soil anchor retaining wall.
- Over 34,000 ft² (3160 m²) of custom hand carved rockscape finish.
- 40,000 ft (12,200 m) of 1 in. (25 mm) high grade anchor bar.
- Over 790 yd³ (600 m³) of 5000 psi (35 MPa) shotcreted concrete.
- Follow this link for a video of the project- <https://vimeo.com/542930187/32e699bcef>

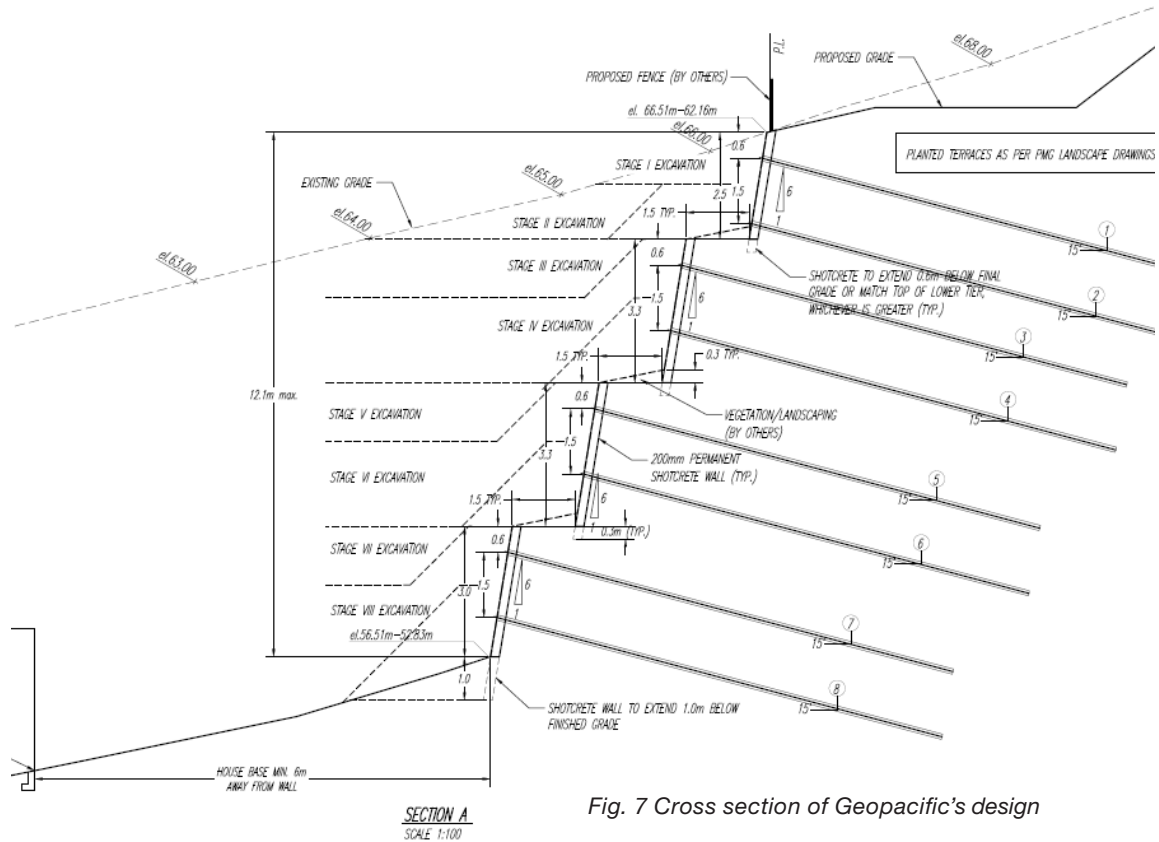


Fig. 7 Cross section of Geopacific's design

VANCOUVER SHOTCRETE & SHORING, INC.

Incorporated in 2005, Vancouver Shotcrete & Shoring Inc. (VSS) was launched to provide customers with viable and sustainable options for their construction needs. VSS has serviced various municipalities and private companies with their top-quality shotcrete projects. As a member of the American Shotcrete Association (ASA), VSS has highly qualified personnel with more than 30 years of experience in shotcrete shoring. All of our key personnel are certified by ACI and follow up-to-date shotcrete standards and specifications. As per the ASA mission, we encourage and promote the safe and beneficial use of the shotcrete process.



James Parent is a partner at Vancouver Shotcrete and Shoring Inc. (VSS). He is an ACI-Certified Shotcrete Nozzleman who has worked in the Decorative and Structural Shotcrete industry for over 25 years. Currently James is the Division Manager of VSS Pools, VSS Rockscapes, and VSS Special Projects doing Limited Access and High Angle Slope Stabilization and Shotcrete Shoring.

2021 HONORABLE MENTION

Project Name
Bridle Ridge Subdivision

Location
British Columbia, Canada

Shotcrete Contractor
Vancouver Shotcrete and Shoring Inc.

Architect/Engineer
GeoPacific Consultants

Material Supplier/Manufacturer
Graystone Ready Mix Inc.

Equipment Manufacturer
REED Concrete Pumps

General Contractor
Morningstar Homes, Ltd.

Project Owner
Morningstar Homes, Ltd.