PM.ANDERSON
CONSULTING

11th October 2024

CEO
Eurobodalla Council
Vulcan Street Moruya

Via email: Katrena.Fuller@esc.gov.au

Attn Katrena Fuller
Re: DA0095/24 – 217A Beach Road Denhams Beach

Dear Katrena,

I refer to our 7th August meeting with the Southern Regional Planning panel regarding the proposed dual occupancy at the above address and the request from the panel for additional information to be provided with respect to the works carried out on site to date. As we understand it, the panel has sought specific additional information as reproduced below:

- Clarification as to the extent of works on adjoining properties completed as emergency environmental protection works and how the proposal interrelates with these works.
- Further details to confirm the integrity of the sea wall given it is proposed to support the beach storage shed and ultimately the dual structure.
- A full site history including documentation and chronology to provide a clear geotechnical picture of what is under the site.
- To ensure the Panel can consider the structural adequacy of the retaining wall on which the proposed dual occupancy will rely, confirmation that the constructed retaining wall and associated works carried out as emergency environmental protection works are authorised.

Please accept this letter and attachments as written response and documentation to these issues as raised to enable Council and the panel to positively determine this application.

Adjoining Properties

As the panel was shown at the briefing, both adjoining properties to the site of the subject site have also had extensive bank stabilisation works carried out as emergency environmental protection works to prevent the steep batters from being

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eroded and shearing off and on to the beach front and Ocean below.

As can be seen in the photos attached to the plans titled Denhams Beach Duplex – Emergency Environmental Protection works J000167 all 3 of these sites resulted in extensive damage and erosion as a result of the significant storm events that occurred twice in 2022. Photos 1-6 on drawing C0002 clearly illustrate the impact of this erosion on the properties and the potential loss that was being experienced by the property owners at this time. Since this time 4 separate property owners on each side have carried out extensive and differing levels of significant work to ensure clfiff stabilisation (and safety) as environmental protection works and to save the embankment from additional erosion and property threatening collapses.

Engineering expertise was sought from Geotech engineers. Geotechnical engineering reports indicated that the landslide risk assessment prior to the two storm-weather collapses were Medium (Coffey, Geotechnical investigation and Landslide Risk Assessment, June 2010),

6 LANDSLIDE RISK ASSESSMENT

No. 217 includes a gently sloping area between the road frontage and the steep slope to the rear of the house, very steep grades over the rear eastern part of the lot, levelling out near the rear boundary at beach level. Given the steepness of the slope at the rear of this site and proximity to the ocean there is some risk of landslide activity on these slopes.

Based on the methodology outlined in Australian Geomechanics Vol. 42, No. 1 dated March 2007, potential landslide hazards that may affect No. 219 include:-

- Failure of steep slope incrementally or as larger sections in extreme wet weather conditions;
- Local slumping of the soil including local failure of retaining walls;
- Gradual creep movement of the existing fill clay soils on the steep slope;
- Undercutting or oversteepening of toe of steep slope by wave or tidal action

The likelihood of the above landslide events occurring and the consequences to property are assessed as follows:-

Table 1: Landslide Event Likelihood and Consequence

Event	Likelihood	Consequences to Property
Failure of Rock Mass on Steep Slope	Rare	Major to Catastrophic
Local Slumping of Soil on Steep Slope	Possible	Minor to Medium
Gradual Creep Movement of Soils on Steep Slopes	Possible	Medium
Undercutting or oversteepening of steep slope by erosion(runoff and wave action) resulting in landslide	Possible	Medium

Based on the above likelihood of the events occurring and consequences to property, the level of risk to property within the existing and proposed building site is considered to be **Moderate** as defined in Appendix C of the above paper. Information on the limitations of the landslide risk assessment are presented in the appendices to this report.

and in "active failure": (ACT Geotechnical Engineers - Geotechnical investigation, June 2023)

4.3 Slope Stability

The visual assessment of the slope instability was conducted during the site investigation. The steep slope at the eastern end of the site dips east at between 40° and 70°. The slope is approximately ~22m high, ranging from RL24 at the top of the bank to RL2 above the sea level at the slope base on the adjacent beach. Figures 3 and 4 show the site photographs.

Large landslides have recently occurred on the neighbouring blocks to the north and to the south from the site. Recent landslides formed several main scarp zones, on the top faces, undermining the property to the north and removing steps to the beach to the south. Exposed in the rupture surface soils comprises topsoil, clay residual soils and XW mudstone and shale bedrock. A few outcrops of bedrock on the slope top faces comprised flat bedded extremely to highly (XW/HW) weathered fine-grained mudstone and shale. The bedding dips steeply north-west from 55° to subvertical. The bedrock is highly fractured with open and closed fractures and partings spacing from 2cm to 4cm.

It has been assessed that the slope failure is active and will likely progress further as evidenced by steep angles on the slope top faces. The failures have occurred due to saturation of the overburden soils and fractured XW bedrock, which is then sliding down the slope.

The steepness of the slope and low cohesive strength of the overburden soil are contributing to the overall instability of the site. However, recent landslides have not occurred on the subject site yet and landslide processes have been slowed down due to the mature and dense of vegetation on the slope, which have been protecting the surface and holding it together.

The next landslide will occur once soils again become saturated with water sufficiently such that another slab of soil/debris can fall from the top faces. The next landslide of this location could occur in one year or in several years, but it is difficult to quantify. The existing house is founded at the top of the slope, and it is assessed that the small-scale slumps in the soil profile on the steep slope may undermine the house footing and potentially impact on the stability of the proposed house.

Slope instability could also be triggered by scour at the tow of the cliff due to wave action. The existing wave-cut platform has been formed as waves and tides have scoured and undermined the toe of the cliff. This has resulted in progressive cliff recession over many years.

Two Structural engineers engaged were consulted as to the best methods to retain the embankment and to prevent any further or additional erosion from the site. The main Structural engineer was very clear in his instructions that the cliff face was in real danger of further collapse and that if works were not undertaken, a landslide was highly likely, noting the slope failure – and this would impact site safety and compromise the works being carried - out the neighbouring properties.. Noting, additionally no building works could commence for any future approved DA, until the works were completed due to insurance issues. The design of the environmental protection works on this site were always undertaken to ensure they were consistent with the works on the adjoining properties and to ensure that the cliff face and batter was stabilized professionally and appropriately in accordance with advice and council guidance.

Sea Wall Integrity/Structural Adequacy

The sea wall and retaining wall above the sea wall have been designed by the certified structural engineer to afford bank stabilisation and to act as retaining walls for the development. As the engineering design contained in drawings C0008 illustrate, these 2 walls are connected together with beams that add to the strength of the walls and prevent the walls from rolling over. This additional tie in beam and the significantly wider footings are designed to increase the stability of the walls and a single structural element. In addition, additional structure was added to the cliff face in the form of Terramat to assist with the bank stabilisation. This terramat is then anchored into the existing rock face with 3.0m x 0.03m galvanised anchors at 3.0m centres. These anchors are grouted into the rock at a 15^{o} angle in 90mm holes. The structural engineer has certified that these walls will now stabilise the bank and will provide a sufficient load protection to the proposed dual occupancy. He further states that his design of the structure is enhanced with the proposed building at the top of the embankment is cantilevered off the western elevation to avoid excessive loading at this point.

Site History

The site was purchased by Natalie Colbert (via Canplay Pty Ltd between September (Deposit) and November (Settlement) 2022) . It is understood that prior to this date the site has been vacant residential land for many years.

The site suffered some significant damage as a result of the severe storms that lashed the coast in October 2022. The advice of geotechnical and structural engineers were sought re stabilising the face of the cliff to prevent any additional loss or landslide and diversion of stormwaters that flowed over the face of the cliff.

The works undertaken to ensure that the cliff face was secured included the following:

- Removal of all weeds and other non significant vegetation from the shallow layer of topsoil that remained on the surface,
- Removal of trees based on arborists advice,
- Installation of 315m^2 of terramat webbing on structural engineers advice to increase permanent erosion control, control soil, and reinforce the roots of the grasses and other vegetation,
- Installation of ground anchors into the rock face, and
- Reinstatement and repairs to the pathways and steps leading to the beach – as required for site access and site safety, as well as restoring existing amenity.

It should be noted that all times throughout these emergencies, Council's then planner had been kept informed and her advice sought on multiple occasions as to the necessity and urgency of the works on the subject site for this application to construct the dual occupancy (and the adjacent sites for environmental protection works) to proceed. Specific advice was provided to the Applicant to complete the environmental protection works of vegetation clearance, slope and cliffside stabilization works (October 2023)

From: Development Helpdesk <development@esc.nsw.gov.au>
Sent: Monday, 9 October 2023 9:43 AM
To: Nabil Adhami
Subject: RE: Cliff rectification works - 217A Beach Rd Denhams Beach

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Nabil,

Council has reviewed your proposal. If you consider items 1-4 in your works schedule to be "Environmental Protection Works" a development application is not required for those items.

A development application is required for items 5 & 6.

Kind regards

Lauren Campbell
Duty Development Officer
02 4474 1231 | development@esc.nsw.gov.au

Specific additional advice was requested for the urgent retaining walls to be constructed ahead of DA approval as per the Structural engineer's advice provided in September 2023. The walls were designed and installed to protect cliff side slope and retain the cliffside from storm surge. These walls were completed March 2024.

217 Beach Rd, Denhams Beach
Cliff Stabilisation

Inspected site on 20 Sept, 2023.

The cliff face is susceptible to collapse at anytime in the near future. It would only take a significant rain storm to cause it to collapse onto the beach below.

Work to stabilise the face and construct the top and bottom retaining walls is urgently required.

Work is currently underway on both adjacent properties to stabilise the cliff faces and could be compromised if work on this block is delayed.

Gerin Hingee
23 / 10 / 23

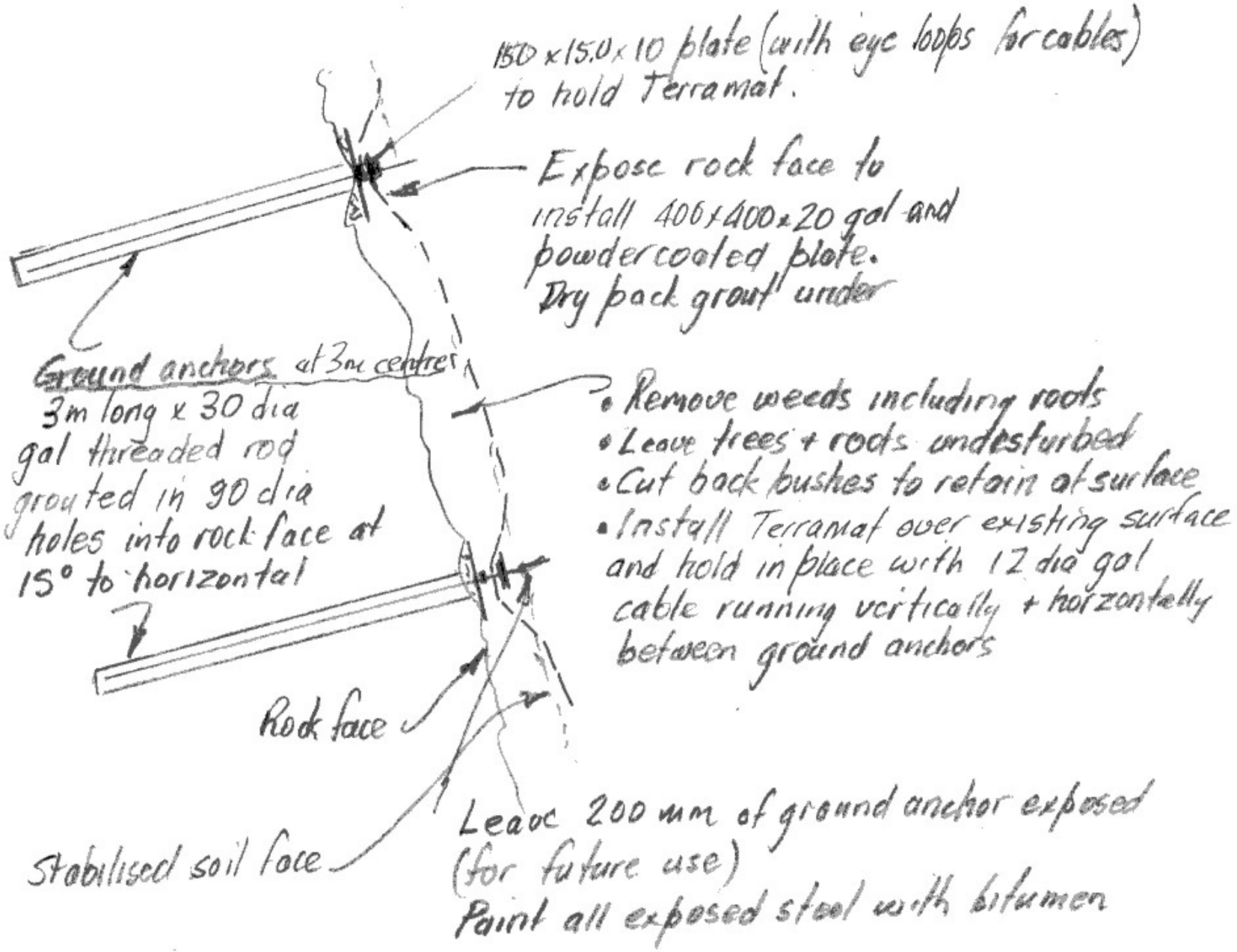
We trust this information assists Council and the panel to finalise a positive determination of this application. Should you require any additional information please do not hesitate to reach out.

Yours faithfully

Paul Anderson
Director
PM.Anderson Consulting Pty Ltd

217 Beach Rd, Denhams Beach

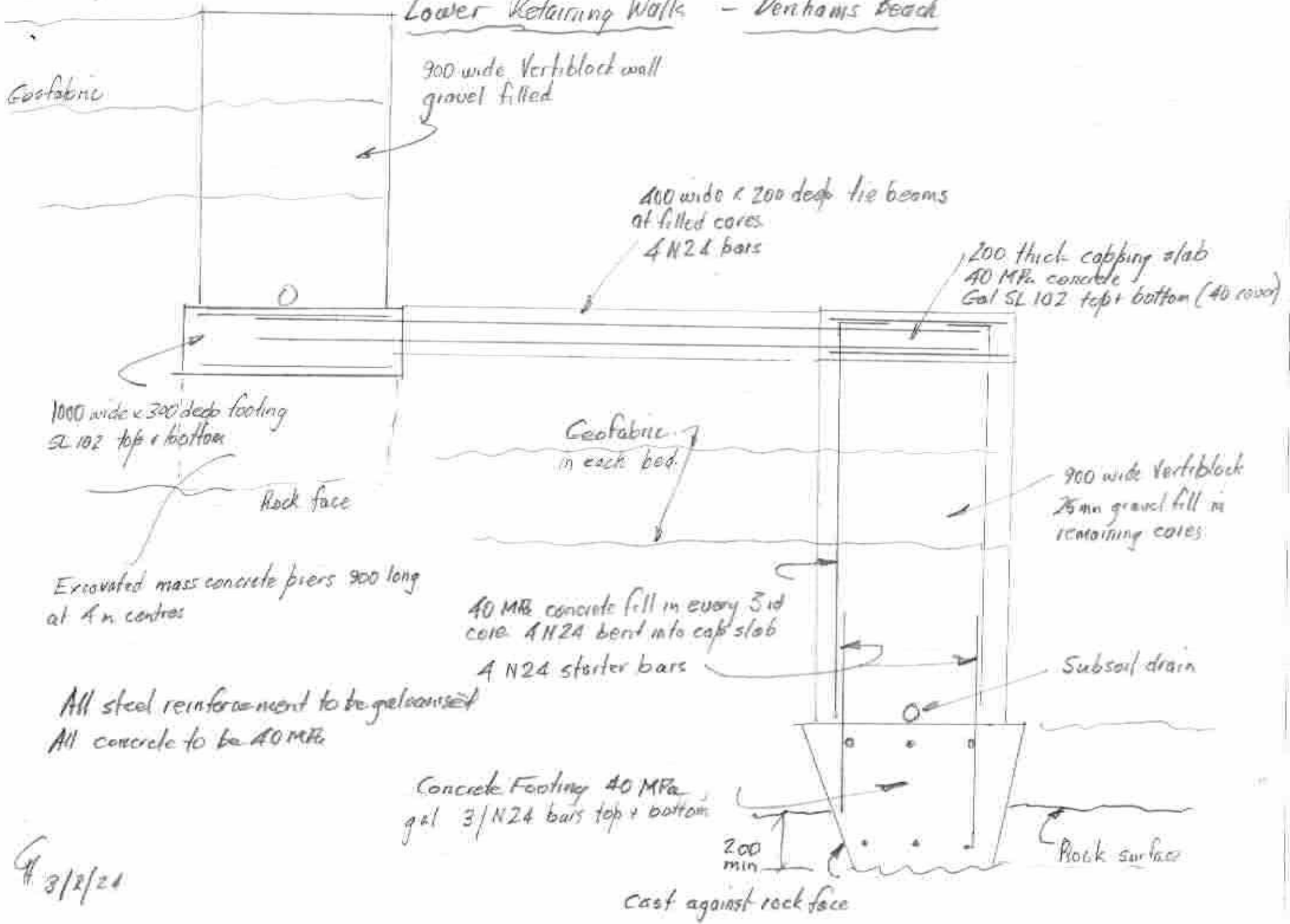
Slope Stabilisation



Hingee
22/9/23

Steve / Nabil

Lower Retaining Walls – Denhams Beach



3/2/21

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- Sized for residential and commercial use
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- A beautiful, cost-effective earth retaining solution

Right look.
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When you need a solution for retaining walls and other landscape projects, nothing stacks up quite like Verti-Block. Unique in size, shape, and flexibility of use, Verti-Block is an ideal solution for residential and commercial projects alike.

Unique size and design

A hollow block measuring 2′ × 4′ × 3′, Verti-Block is perfectly proportioned for the most popular types of landscaping projects, including gravity walls up to 14′ high—even higher when reinforced. Its hollow design makes it affordable and easier to handle than solid blocks. Plus, Verti-Block is less labor intensive than small, hand-laid blocks and offers a more practical solution than a cast-in-place retaining wall.

Interlocking Verti-Blocks

Verti-Block interlocks with a unique male-and-female design. You'll get unmatched strength with more flexibility for landscape applications.

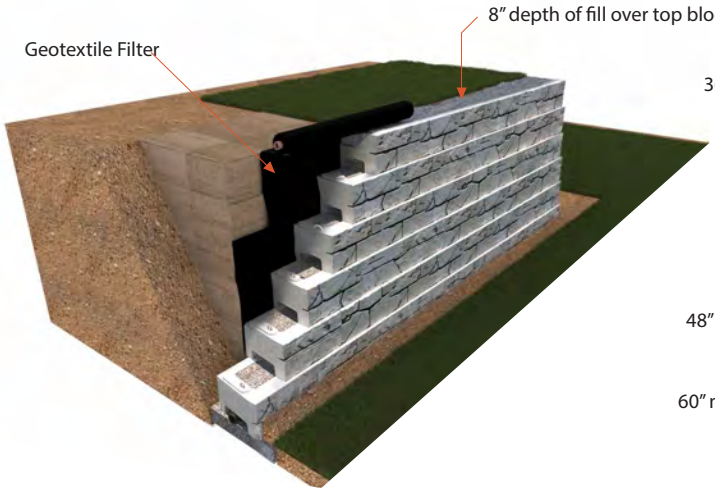
Strong and versatile

Even more appealing, Verti-Block is incredibly strong and versatile thanks to its interlocking design. Featuring a male-and-female style connection, Verti-Block units ensure you'll get a secure fit that guarantees the correct amount of setback on every installation. Verti-Block's hollow design saves money by using less concrete and lowering transportation costs. It also ensures the right amount of crushed stone backfill. Experienced installers know that too much crushed stone wastes money—too little can build hydrostatic pressure and cause the retaining wall to fail.

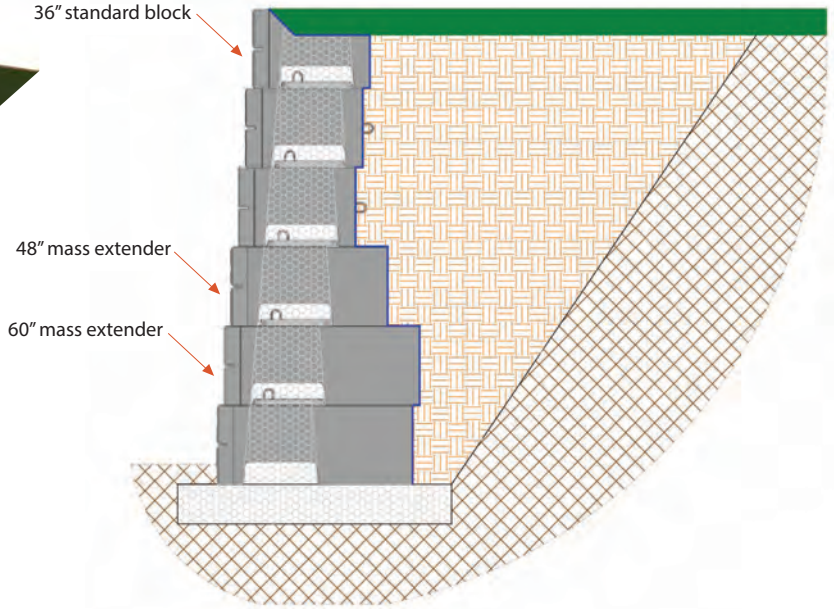
Easy installation

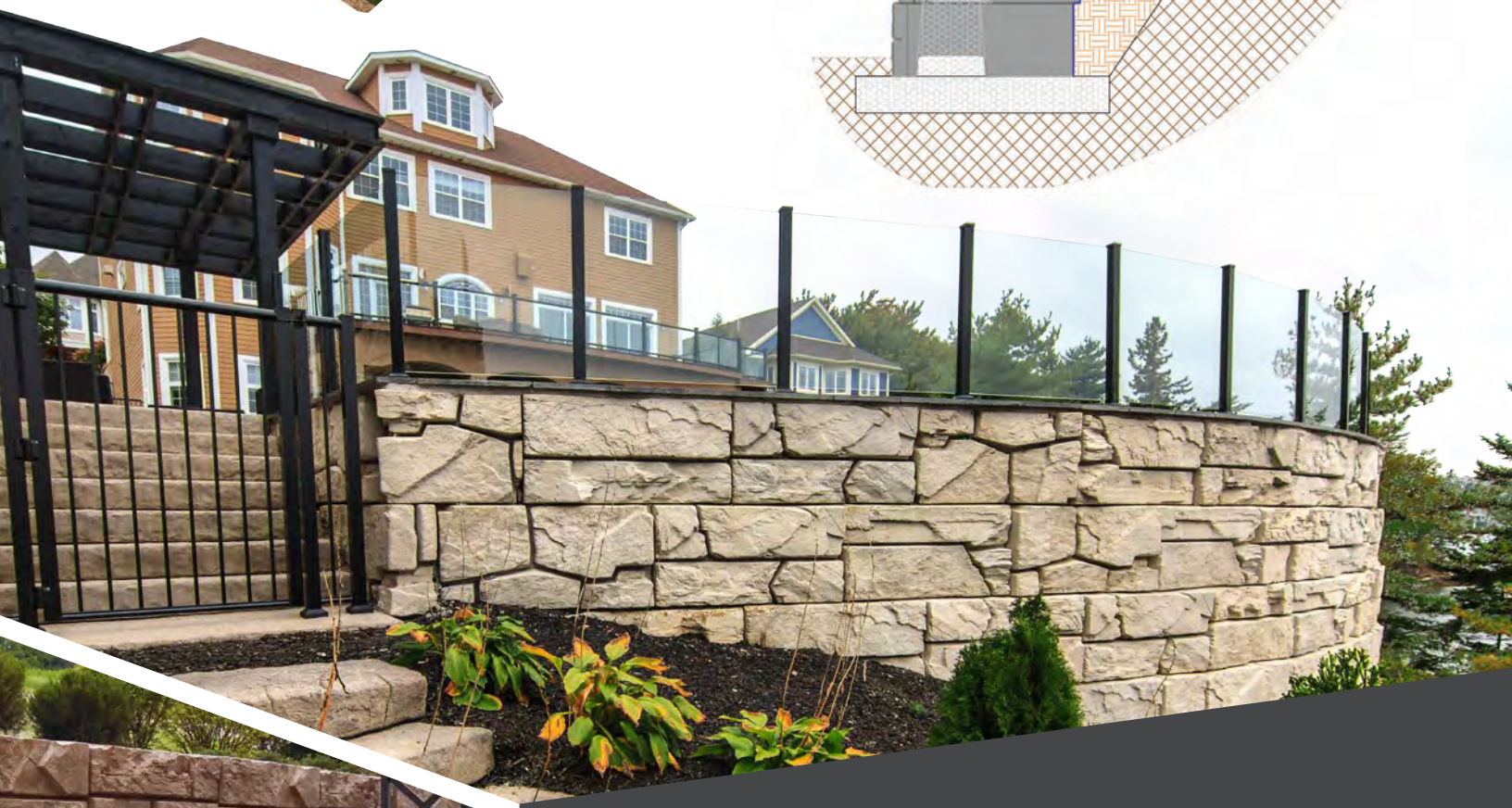
Verti-Block was created with landscaping in mind—meaning we've made it easy to transport and install, even in tight access spots. Blocks can be moved and put into place with smaller equipment; there's no need for heavy machines like a telehandler or crane. The male-and-female connection eliminates placement error, ensuring strength and an exact installation every time.

Verti-Block Gravity Wall



Increase wall height and stability with Mass Extenders



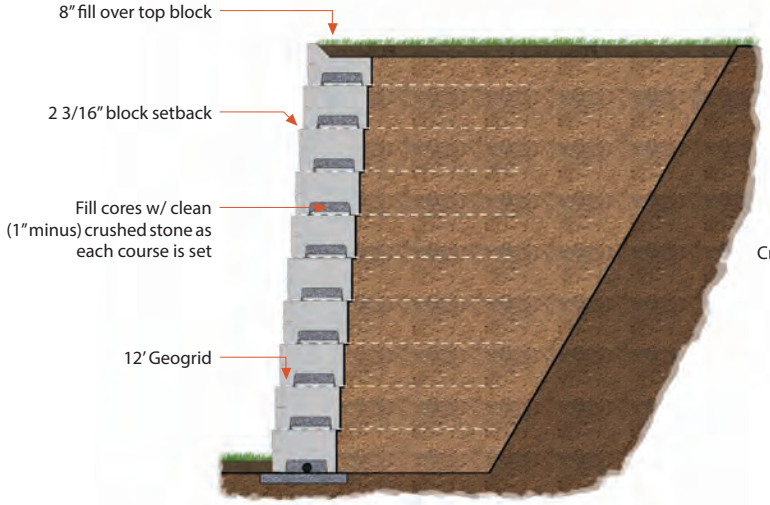


Engineered for strength

While the hollow nature of Verti-Block makes it cost effective and easier to handle, it also improves its ability to retain earth. Even in poor soil conditions, Verti-Block can be stacked higher than other blocks without the use of tiebacks or geogrid.

The male-and-female design of Verti-Block adds a stronger connection than blocks relying on friction alone. The crushed stone fill also interlocks and creates a continuous mass for greater strength.

Reinforced Verti-Block Wall



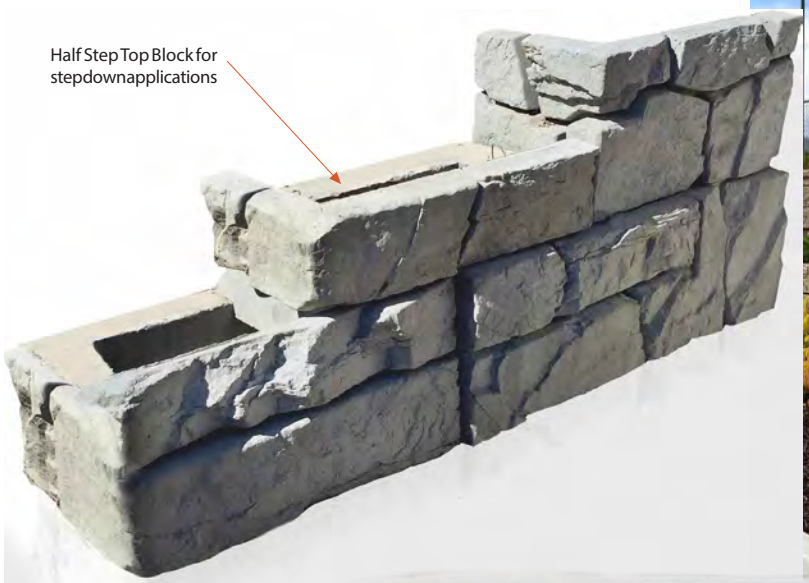
A cost effective solution

Best of all, Verti-Block delivers tremendous cost savings. As a hollow block, Verti-Block is lighter, requiring less manpower, equipment, and transportation costs. It's quick to install, and the product itself is less expensive to manufacture than solid block options. The internal drainage through the block's infill means no over-or under-excavating because no additional crushed stone backfill is required.

Property owners will appreciate the affordability and value of Verti-Block. Add that to the right look and right strength of this unique product, and you'll know Verti-Block is the right solution for a great landscape installation.

Property owners will appreciate the affordability and value of Verti-Block.

Verti-Block Versatility

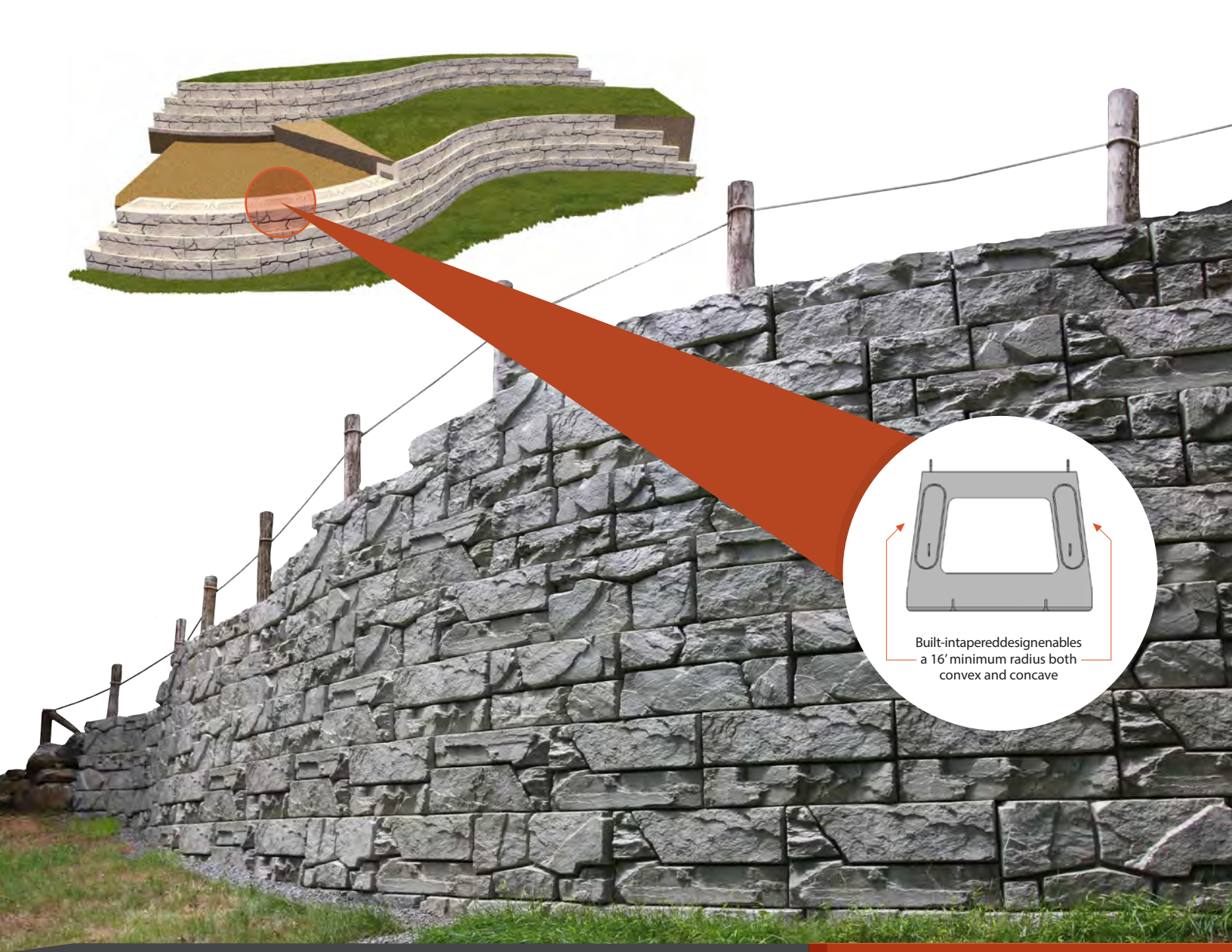


Double-Sided Verti-Block
parapet wall with 6"Cap

A look like no other

Beyond its structural purpose, Verti-Block is a favorite of property owners for its beautiful rockwork look. Verti-Block showcases a 5-inch depth of relief, hiding joints, and making a finished wall appear more like stacked stone. Plus, Verti-Block is easily stained to complement its surroundings with a beautiful, weather and UV-resistant finish.

Convex and Concave Verti-Block Walls



Perfect for landscape projects big and small

Verti-Block is ideal for a variety of landscaping projects including residential communities, commercial campuses, schools, parks, back yards, and more. Able to accommodate winding landscapes and even tight curves, Verti-Block is designed to add interest to any landscape while securely retaining earth.

For projects also requiring a privacy wall or traffic barrier, Verti-Blocks allow fencing or railing to be constructed directly on top of the Verti-Block structure. Fencing can be placed right to the edge of the wall for an attractive, continuous appearance.

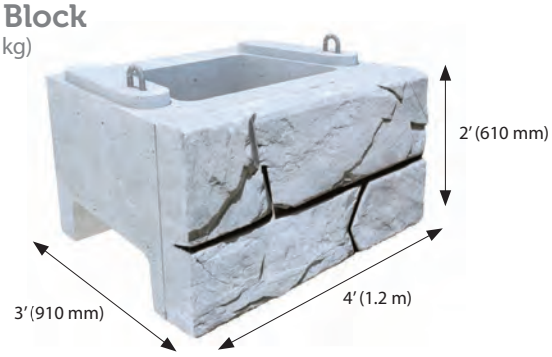
Consider Verti-Block for applications such as:

- Gravity walls
- Reinforced walls
- Terracing
- Plantable retaining walls
- Base for fencing or railings
- Property dividers

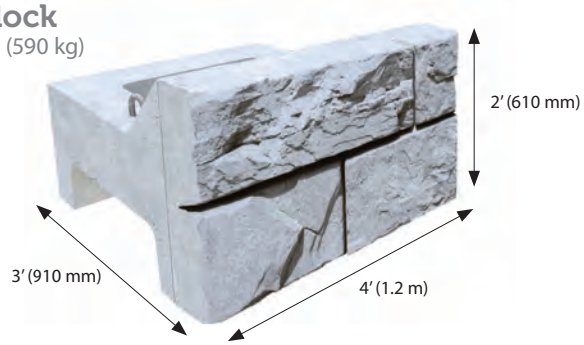
Verti-Block Units

Verti-Block is available in a range of shapes to accommodate all your landscape design needs

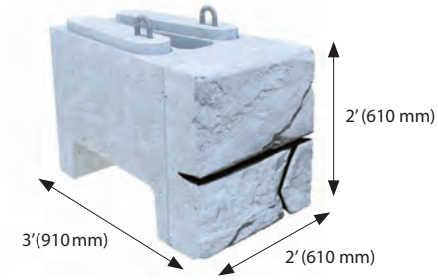
Standard Block
1,755 lbs. (790 kg)



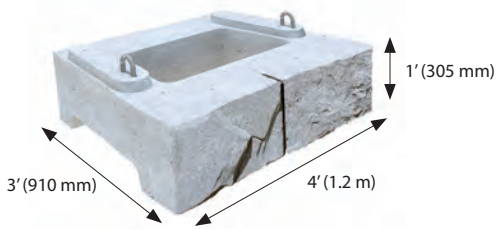
Top Block
1,308 lbs. (590 kg)



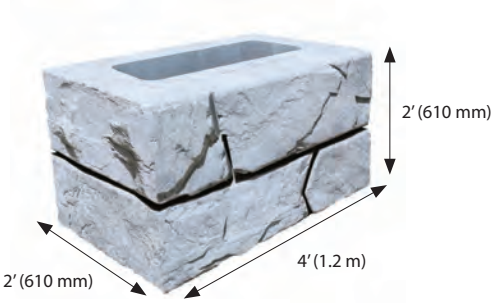
Half Block
1,066 lbs. (480 kg)



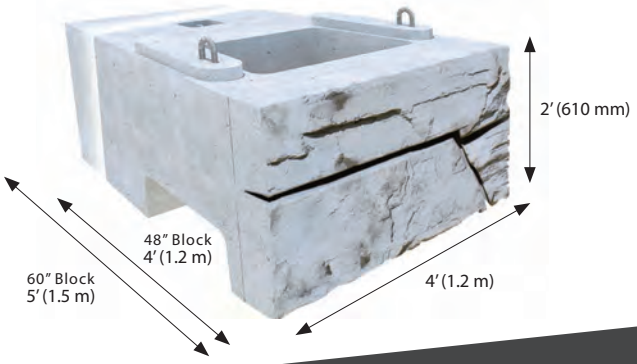
Half Step Block
973 lbs. (440 kg)



Corner Block
1,596 lbs. (720 kg)



Mass Extender
48″ Block 2,674 lbs. (1,210 kg)
60″ Block 3,509 lbs. (1,590 kg)



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Verti-Block Units

Recognized worldwide for outstanding aesthetics and a patented system that produces top-quality construction materials, Verti-Block continues to help contractors, developers, and property owners with smart precast solutions.

Baines Masonry is your local, licensed Verti-Block manufacturer. Please contact us for a quote or additional information on your next retaining wall project.