



*Retaining Excellence™*

## Ocean View Terrace

**British Columbia, Canada**

### The Design Benefits of Keystone 133Elite® Help Overcome Steep Site Challenges

#### Project Site

The hillside location of Ocean View Terrace, a living community in a premier neighborhood of Nanaimo, British Columbia, Canada, offered scenic views and the challenge of creating buildable land on a steep slope while preserving a large portion of the natural surroundings.

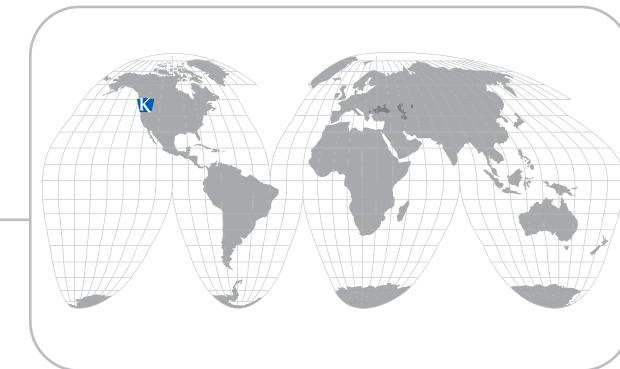
To create building areas for homes and roadways on the tight site, approximately 15,000 feet of Keystone 133Elite® structural segmental retaining walls were built. With a larger block size and natural, Hewn stone-like aesthetic, the Keystone 133Elite provided a final solution that maximized installation and also enhanced the development's overall look with a fresh design.

#### Design/Installation

Ocean View Terrace is located on a north-facing slope with a 2:1 ratio. From the beginning, development was focused on designing a community that complemented its natural surroundings. According to the developer, Hartman Land Design, the primary goals were creating reasonable road and driveway grades and ample lot sizes and maintaining unobstructed scenic views.

The development's wall design included a combination of segmental retaining walls and earthen walls. As called for by the local approving authority, the segmental retaining walls were specifically to be used in the highly visible areas, which carried an aesthetic impact.

"We needed an architectural wall and what we first considered did not meet our aesthetic need. It was also important that a versatile wall product was selected because there are no straight lines on the project. The walls needed to allow for curves and grade changes. It was the combination of the Keystone 133Elite's aesthetic, economic and design benefits that were key to its selection," said Ron Hartman, Hartman Land Design, Ltd.



<b>Project:</b>	Ocean View Terrace
<b>Location:</b>	Nanaimo, British Columbia, Canada
<b>Project Owner:</b>	Hartman Land Design, Ltd
<b>Keystone Product:</b>	Keystone 133Elite®
<b>Keystone Manufacturer:</b>	Basalite Concrete Products (Surrey, British Columbia)
<b>Wall Coverage:</b>	Eight walls totaling approximately 15,000 square feet
<b>General Contractor:</b>	HUB Excavating
<b>Engineer:</b>	UMA Engineering Ltd
<b>Geotechnical Engineer:</b>	Lewkowich Geotechnical Engineering Ltd.



CASE STUDY





A total of eight Keystone 133Elite walls were built throughout the development, which split the site into several areas to accommodate the building lots and roadways. To help fully maximize building space, the Keystone 133Elite walls have a near vertical design with only a two-degree batter.

"The Keystone 133Elite's ability to construct a near vertical wall increased the site's accessibility and was very influential to the overall planning of the development," said Brian Nemez, Technical Sales, Basalite Concrete Products, Canada.

The terraced, split road design featured splitting a conventional road into two pieces, so the land on each side of the road could be accessed. A steep median was incorporated into the two roads to prevent steep driveways.

Vehicular traffic along with other factors resulted in a uniform live load of 20kN/M2 (approximately 400 psf). The site, which offers a heavily wooded eight-acre nature park linked by walkways, required a dead load of 10kN/M2 (approximately 200 psf) to also be incorporated into the wall design. Since the walls are located in a seismically active area, a peak acceleration of .25 was used. The Keystone 133Elite utilizes a pin system that ensures positive mechanical connection. The high-strength fiberglass pins provide built-in alignment and ensure each unit is securely interlocked within the wall face.

Along with the minimal setback, the majority of the walls also have a 2:1 slope from the top to the bottom. Overcoming the site's steep slope required reinforcing the wall with geogrid. Some walls required geogrid installation up to 13 feet behind the wall. The development also had a higher water content that required an intricate drainage system.

The Keystone 133Elite walls range in height with the tallest wall nearing 16 feet. The 8"x 24" face dimension of Keystone 133Elite not only better suited the aesthetic of the taller walls, but also helped increase the installation and shipping benefits. Keystone 133Elite's larger face dimension produces 1.33 square feet of wall area with the same effort that nets one-square foot with other wall systems. While a larger-sized block, the design of the unit's tail section reduces the overall weight of the unit and allows for installation without needing any special equipment. A lower overall weight also resulted in more square footage being delivered per truck.

Ocean View Terrace will undergo more development phases, which include continual use of the Keystone 133Elite for additional retaining wall projects. The continued use of the Keystone 133Elite was based on its structural performance, aesthetic and contractor's preference.



For more information on Keystone 133Elite or other innovative Keystone products, please visit [www.keystonewalls.com](http://www.keystonewalls.com) or call 800-747-8971. Keystone Retaining Wall Systems, Inc. is a subsidiary of CONTECH Earth Stabilization Solutions (ESS) Inc. ([www.contechess.com](http://www.contechess.com)).

