



MagnumStone Bridge Abutments Upgrade Highway Overpass

In 2023, a modern two-lane bridge replaced the aging single-lane timber bridge on State Highway 30 in Kopaki, New Zealand. MagnumStone's retaining wall system was selected to construct the [New Zealand Transport Agency](#) project's two critical bridge abutments as part of the infrastructure update.

The MagnumStone walls played a vital role in raising the highway to match the height of the new bridge structure. This was part of a broader goal to enhance long-term safety and reliability of access through the Kopaki region.

The project aimed to enhance critical infrastructure without disrupting the North Island Main Trunk Railway below. [MagnumStone's modular blocks](#) were selected to build the bridge abutments because of the system's proven performance, strength and versatility.

Total Block Installed	2,500 sq. ft. (232 sq. m.)
Maximum Height	24 ft. (7.3 m.)
MagnumStone Manufacturer	Cirtex
Contractor	Downer Group
Engineer	CMW Geosciences

MAGNUMSTONE BRIDGE ABUTMENTS UPGRADE HIGHWAY OVERPASS

Kopaki, New Zealand



■ CHALLENGES & SOLUTIONS: EFFICIENTLY BUILDING BRIDGE ABUTMENTS

The Kopaki bridge abutments presented several unique challenges while constructing these two retaining walls. The combined expertise of Cirtex, Downer and CMW Geosciences easily found flexible solutions with MagnumStone's geogrid reinforced system. Primary challenges included:

- Maintaining traffic at this vital intersection during construction
- Precisely aligning the MagnumStone bridge abutments to meet new bridge deck
- Ensuring railway activity remained safe and operational
- Logistics of delivering blocks to the remote area of Kopaki, NZ

Traffic continued using the aging, single-lane timber Kopaki Bridge while the new bridge was constructed adjacent to the old overpass. Because the rail line and old bridge remained active, crews were diligent about safety, to minimize train and vehicular disruptions. The bridge abutments were installed from its reinforcement zone, ensuring personnel and equipment kept a safe distance from the tracks.

MagnumStone's 2.4° setback and controlled precast production process made calculating the block placement and heights easier to pinpoint and accomplish. Once completed, the MagnumStone bridge abutments accurately connected each side of the highway to this advanced bridge design.

Additionally, the rural and isolated nature of the Kopaki region posed potential logistics concerns. [Cirtex](#) — MagnumStone's block production partner in New Zealand — provided exceptional support, successfully manufacturing and delivering blocks to site as necessary.

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■ WALL DESIGN: MAGNUMSTONE BRIDGE ABUTMENTS' GENERATIONAL DURABILITY

[CMW Geosciences](#) and Cirtex designed both bridge abutments using MagnumStone's precast retaining wall system and Stratagrid geogrid. The [geogrid wall design](#) provides supplemental reinforcement for each retaining wall, maximizing long-term strength and durability for each bridge abutment.

These MagnumStone bridge abutments were not designed to support the bridge load directly, as it is independently supported by pilings. The abutments' primary functions are to raise and stabilize the structure's approaches from State Highway 30. The reinforced retaining walls are engineered to withstand dynamic traffic loads at both ends of the bridge.

Each bridge abutment includes a 90° corner and curved feature, demonstrating MagnumStone's flexible retaining wall design capabilities. The standard blocks cover 8 sq. ft. (0.74 sq. m.) per unit, which accelerate installation and require less truckloads compared to similar block systems. The eastern abutment measured 18 ft. (5.5 m.) tall, while the western abutment reached 24 ft. (7.3 m.).

The blocks' hollow core design is filled with clear crush gravel during installation to add weight and enhance drainage efficiency. Its superior drainage system expedites water removal, contributing to a stronger, long-lasting infrastructure solution with MagnumStone's trusted blocks.

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■ INSTALLATION: VERSATILE MSE SYSTEM RAISES ROADWAYS TO MEET BRIDGE

Once the bridge's headstock was poured and piling was in place, [Downer Group](#) constructed the eastern abutment followed by the western abutment. Cirtex shared best practices through on-site training to Downer crews, demonstrating how to [properly install MagnumStone](#) and the specified geogrid. Installation crews built the abutments from within the retaining wall's reinforcement zone. This helped ensure that equipment and personnel remained a safe distance from the railway tracks.

The hollow core blocks were easily installed using a lightweight compact excavator, then filled with drainage gravel. The abutments stretched 150 ft. (45 m.) on each side to support the state highway's bridge traffic. MagnumStone's SecureLug connectors on the bottom of each unit provided consistent setback and alignment that simplified construction. This resulted in a clean, meticulous finish that perfectly matched the bridge deck's elevation.

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■ AESTHETICS: NATURAL LOOKING BLOCK FACES MATCH KOPAKI'S LANDSCAPE

The abutments feature MagnumStone's deep textured facings, offering a rugged, [natural stone appearance](#) that complements Kopaki's beautiful countryside. The blocks are installed in a randomized running bond pattern that gives the retaining walls a more natural look.

To improve roadside safety, guardrail posts were embedded directly into the hollow core of blocks along the top course. This allowed the railing to be installed closer to the wall face and maximized space behind the wall for other purposes.

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■ PROJECT SUMMARY: SMOOTH TRANSITIONS FOR MAGNUMSTONE BRIDGE ABUTMENTS

The Kopaki Bridge replacement represents another successful infrastructure application of the MagnumStone retaining wall system in New Zealand. With over 2,500 sq. ft. (232 sq. m.) of wall facing, the geogrid reinforced MagnumStone walls provided necessary strength, precision, and adaptability. The retaining walls capably constructed highway-supporting abutments in close proximity to Kopaki's active railway — all while keeping construction simple, safe, and on schedule.

Advantages of choosing MagnumStone for the Kopaki bridge abutments include:

- Reinforced retaining wall system engineered to last generations
- Strength and stabilization to withstand dynamic loading of critical infrastructure
- Wall design versatility to build corners, curves and customized features
- Superior drainage with the retaining wall's hollow core blocks
- SecureLugs deliver consistent setback and alignment for quicker installations

The transition from a deteriorating single-lane timber bridge to an advanced modern structure has set a precedent for future infrastructure upgrades using MagnumStone in similar applications. Thanks to Cirtex's retaining wall expertise and support, CMW Geoscience's designs and Downer's skillful execution, this project was a success. Kopaki now has a safer, more accessible bridge that will last for generations over the North Island Main Trunk Railway.

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From large infrastructure projects to commercial and residential development projects, MagnumStone offers diverse, flexible retaining wall solutions.

Check out the precast system's retaining wall design and installation tools and resources:

- [MagnumStone Retaining Wall Design & Analysis Software](#)
- [MagnumStone Instant Estimator](#)
- [MagnumStone Installation Guides](#)

Contact your [nearest MagnumStone block supplier](#) for further insight, details and expertise.

This project was successfully completed thanks to [Cirtex](#) (MagnumStone producer), [Downer Group](#) (contractor) and [CMW Geosciences](#) (engineer).

CONTACT OUR TEAM TODAY

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