

BAFOKENG CIVIC CENTRE MACWALL
PHOKENG, NORTH WEST PROVINCE

GEOTECHNICAL / REINFORCED SOIL WALLS

Product: MacWall System

Problem

The design and layout of the walkway along the Royal Bafokeng civic centre necessitated the construction of a versatile retaining wall system due to the positioning of the building by the architect.

Construction of the wall system entailed almost vertical segmental block walls varying in height from 1m to 4m, intricate curves and corners, as well as a 4m high freestanding wall enclosing the sump area which would house the civic centre's water-pumping system.

Furthermore, the segmental block wall had to safely support the design loads and simultaneously enhance the aesthetic appeal of the landscaped surroundings.

Solution

In keeping with their tradition of providing innovative, engineered solutions, Maccaferri proposed the use of the MacWall Compac System to address the design and construction complexities inherent in the project.

Extensive stability checks of various cross-sections were carried out by the Maccaferri technical team using in-house design software.

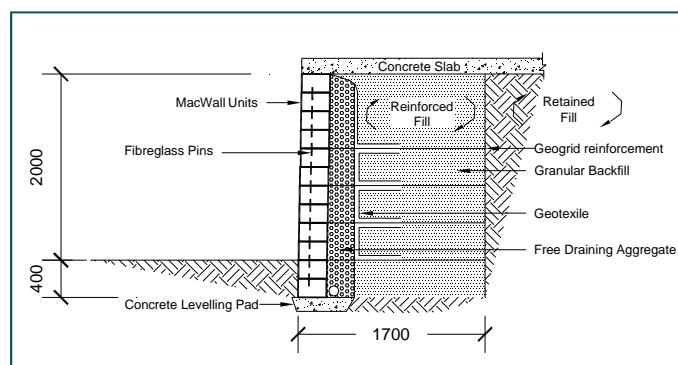
The final design solution consisted of a combination of MacWall Compac units and geogrid reinforcement of varying lengths based on the height of the structure. Through detailed computational analysis, the length of reinforcement was optimised to accommodate space and economic restrictions.

For the 4m high, 7m long freestanding section of wall, a more involved approach was adopted.



Bafokeng Civic Centre

Date: Aug 2003



2m High cross-section

Client name:

ROYAL BAFOKENG ADMINISTRATION

Main contractor name:

KALODE CONSTRUCTION

Consultant:

FOUNDATION & SLOPE STABILITY ENGINEERS

Product used:

350m² OF MACWALL & 630m² OF TERRAM 55/25

Construction info:

Construction date: FEBRUARY 2003

Completion date: JULY 2003



During construction

Date: March 2003

Since the sump area was located immediately behind the MacWall, the use of geogrids was not feasible.

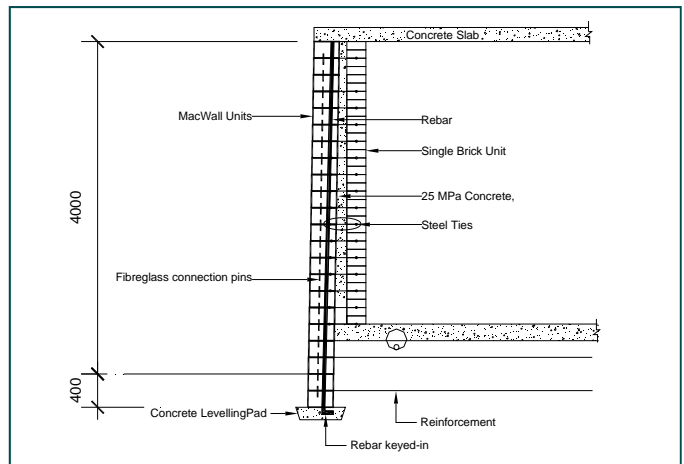
Instead, the units were designed with vertical steel reinforcing bars placed through them and keyed into a concrete leveling slab. A single skin brick wall was constructed behind the MacWall and bonded together with 25MPa low slump concrete. The steel rebar within the MacWall units was anchored to the reinforcement within the brick wall with steel ties at regular intervals.

Benefits

- **Design Flexibility:** The MacWall patented interlocking pin system ensured a positive connection between the structural wall units and the soil reinforcement. The pins connect the MacWall units with a variety of reinforcements such as low-strain geogrids, galvanised steel ladders, double twist wire mesh etc.
- **Versatility of Construction:** The units can be easily constructed to accommodate vertical or sloped faces, curves, corners and other unique geometries.
- **Design Support & Assistance:** Maccaferri's technical team provided the client with design support and assistance. In-house design software allowed for a rapid and simplified design process.
- **Durability:** The MacWall Compac units are extremely durable and are designed for a minimum of 75 year service life. The MacWall retaining wall system permit the construction of walls in excess of 15m in height with the capacity of safely supporting high imposed loads.
- **Aesthetics:** The colour and texture of the MacWall units add further aesthetic value to the surrounding environment.
- **Installation:** Units are quickly and easily positioned due to the unique pin system.
- **Design Standards:** The design of the MacWall retaining system at Bafokeng conforms to stringent requirements as prescribed by leading codes of practice for the design of reinforced soil walls, such as BS8006 and NCMA.
- **Cost-effectiveness:** The system is extremely competitive when compared to other MSE structures.



After construction Date: Aug 2003



4m High cross-section of freestanding wall



MacWall with connection pins Date: March 2003

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