

Project Info



07 / 12 / 16



CC5™ Bulk Rolls



200m²



Vertical layers



Muscat, Oman



BLC



CC used to protect waterfall slopes to prevent erosion caused by water flow



CC lined waterfall slope and water collection pool being hydrated

In December 2016, Concrete Canvas® (CC) GCCM* was used to protect a slope in order to prevent erosion as a result of water flow in Oman.

The slope is made up of a sand-based substrate due to the location of the site. Artificial waterfalls had been created, which had resulted in significant surface erosion due to the varying flow rates.

Poured concrete and shotcrete were considered for the project, but would have been costly and taken a significant amount of time to be installed. CC was instead specified for the project, reducing costs and the time required to carry out the installation. CC also allowed the client to incorporate rocks into the design, positioned below the material to create a more authentic waterfall aesthetic.

In preparation for the installation, the slopes were graded in order to create the right fall for the water. A small pool was also created at the toe of the slope to collect the water, allowing it to be recycled in order to reduce water usage.

The CC was delivered to the site in bulk rolls and suspended from a spreader beam and PC400 excavator. The material was pegged within an anchor trench at the crest of the slope and deployed vertically down its face. Subsequent layers of the material were positioned so as to overlap the last by 100mm.

*Geosynthetic Cementitious Composite Mat



The overlapping layers were then jointed using Clearfix adhesive sealant and screws positioned in two rows at 50mm intervals. The first row of screws was positioned around 10mm from the edge of the material, and the second approximately 100mm. The material edges at the toe of the slope are secured using ground pegs and mortar. Stainless steel ground pegs were also used to pull the CC into the base of the rocks, creating the waterfall effect. The edges were then banked into a mound to ensure the water stayed within the confines of the waterfall. Any leftover material was used to line the collection pool below.

Once installation was completed, the team hydrated the CC using a hose and 4500-gallon truck. The team positioned the hose pipe at the toe of slope, aiming the hose pipe at the crest to allow the water to run down its face in order to hydrate it fully. The material was left for 30 minutes before a second hydration. The CC was hydrated for the third and final time the following morning, ensuring a successful installation and full hydration despite the temperatures in the region, which could otherwise accelerate the process and result in the CC not setting fully. The process was then repeated for a second water fall.



Slope prior to works



CC easily accomodated the slope profile



CC deployed using excavator



Completed installation of waterfall 1 and introduction of formworks for pool



CC laid across pool floor of waterfall 2

Both waterfalls were lined within two days, with the installation team working between 8am – 6pm each day. The works were completed within the time scale given by the client, despite the volume of civil works required in preparing the site, and working around obstructions. On the second waterfall in particular, a significant amount of cutting and preparation had to be carried out to ensure the CC would sit flush against the substrate.

The client was on site during the installation and was very pleased with the work done, and felt that CC delivered over and above their expectations. The Senior Engineer working on the project has also said they will be promoting CC for any future works they are involved in.