

Project Info



15 / 08 / 16



CC13™ Bulk Rolls



242m²



Transverse layers



West Harrow, London



Balfour Beatty



To provide open ditch lining, preventing track surface water run-off from flooding neighbouring properties

Balfour Beatty



The completed installation

In August 2016, Concrete Canvas® GCCM* was used to create an open drainage channel to control surface water run-off from London Underground's Metropolitan line between North Harrow and Harrow on the Hill.

The nearby track drainage outfall located at the toe of the embankment had become dis-established, which required the track catchment serving the outfall to require regular over pumping. This proved to be a costly activity, but necessary to ensure that the neighbouring gardens were not put at risk from flooding.

The solution was to re-establish the outfall and create an open channel to provide storm water storage capacity, directing water along the base of the embankment and retaining wall structure (see below) in to the existing sewer located within the highway. This included the clearing and management of existing weep holes into the newly constructed ditch.

Traditionally, open ditches have been used in off track locations to convey water to a suitable discharge point, but there is a large cost associated with the maintenance of these assets over their life-cycle. This extends to the fact that access is often difficult and restrictive, making digging activities and movement of materials challenging. In this example, it was no different and access to the site was by means of a narrow path located at the downstream end of the site.

*Geosynthetic Cementitious Composite Mat

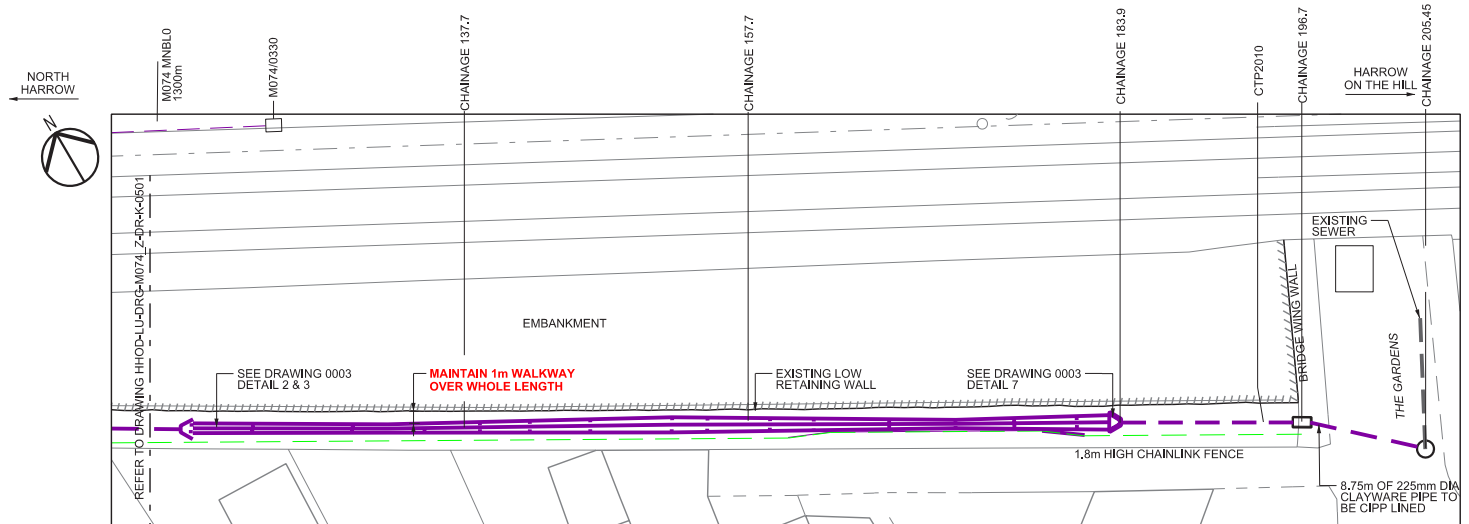




A Mini Excavator being used to grade the Channel profile



Any protrusions were grouted to provide a neat finish



Technical drawing of the site and installation to scale



Any protrusions were grouted to provide a neat finish



There was restricted access to the site



The completed installation

In order to overcome the characteristic problems associated with open ditches, the London Underground design team was looking for a cost effective solution, which is easy to install and will maintain the shape and capacity of the ditch for many years to come, whilst reducing their maintenance responsibilities. The use of precast units was considered, but ruled out on the basis that sections would need to be lifted in and the space was already restrictive. Other options comprised the use of pumped concrete, which required temporary works and known to be a slow, costly and labour intensive option. London Underground ultimately specified Concrete Canvas® for the works.

Concrete Canvas® is a cement impregnated geotextile that hardens on hydration to form a durable, fibre reinforced, impermeable concrete layer. CC can be cut to the exact section of any given channel, eliminating waste and accommodating variations in profile. CC's main advantages over conventional concrete are speed and ease of install, cost savings, durability and being environmentally friendly.

Because site storage was unavailable, CC13™ bulk rolls were delivered to the Track Partnership compound nearby, where the material was cut into bespoke lengths and delivered to site as the work progressed.

Track Partnership used a mini excavator and ditching bucket to excavate the channel profile to the required levels. Once a 10m section had been excavated, CC13™ was transported by wheelbarrow and deployed in a transverse layup. As the works commenced upstream, layers of CC were folded back, so that the next layer could be aligned with a 100mm overlap, allowing water to flow over the joints rather than in to them.

The Concrete Canvas® extended up the side of the ditch and butted up to the existing concrete retaining wall, where it was pinned in place and then grouted to create a neat finish. This allowed water to flow out of the weep holes and onto the Concrete Canvas®, where it would pass directly into the open channel, preventing saturation of the path. Once in place, hydration was carried out using 20 litre water containers filled from a bowser at the entrance to the site.

London Underground have been impressed with the Concrete Canvas® material and the ability to accommodate unforeseen changes. Concrete Canvas® is now being considered for other London Underground schemes.