

# Brentford Waterside Sewer Diversion

<b>Client:</b>	Ballymore Group
<b>Location:</b>	Brentford, West London
<b>Value:</b>	£560k
<b>Duration:</b>	3 Months

## In Brief...

Barhale were required to install a new sewer system to facilitate the construction of a mixed use residential and retail development, on a 4.79 hectare brown field site in Brentford, west London.

Barhale's works involved the installation of 190m of new 600mm diameter concrete pipeline, along with 6no 1500mm diameter manholes along the run. This will enable flows from the new development to tie into the existing Thames Water network.



Shoring system between interconnecting manholes (MH6 – MH7)



PCC ring installed on manhole base (MH3)

## Technical Features...

All works were undertaken via open cut techniques. The pipeline was installed at depths of between 3.5 – 4.5m throughout the site, using a combination of methods, including:

- Drag boxes
- Trench boxes
- Trench sheets and frames

## Constraints...

The works at Brentford posed a number of challenges for the team to overcome. Works took place on a large site, with multiple contractors working concurrently on behalf of Ballymore. This included the main demolition contractor as well as Archaeologists from MOLA (Museum OF London Archaeology). The Barhale team participated in joint Daily Activity Briefings held between Ballymore and their on-site contractors. This drove collaboration by ensuring that each party understood the planned activities and requirements of the other for the next day.

All works took place adjacent to the River Brent, which feeds directly into the River Thames. As such the site was subject to tidal changes throughout the programme. Our team subsequently had to manage fluctuations in the water level during excavation. This often meant works were only able to take place during low-tide times. Pumping was used to manage ground water, which took place via a settlement tank into a designated foul-water sewer, as identified within the discharge licence. A temporary dam was also constructed to enable excavation to progress through an existing slipway; below the high tide level.

There has been a strong industrial heritage in Brentford for over 150 years. Throughout its life, the development area had been home to; industrial docks, factories and vehicle garages. This history had an adverse effect for Barhale's delivery team. Large portions of the new sewer run had to pass through sections of contaminated ground. Prior to works commencing, Barhale undertook WAC analysis to assess the ground risks and procure certified waste carriers who could safely remove the contaminated spoil. All contaminated spoil was separated from the rest of the muck, with specialist hauliers called in to remove it. Himalayan Balsam was also found in one area of site. Again, this was appropriately contained under the supervision of an Environmental Specialist, and removed from site by a licenced waste carrier.

Owing to its strategic importance as a major Dock in the early 20th Century, Brentford came under an intense period of bombing during both World Wars. As a result, several areas within the site were identified as both moderate and high risk for Unexploded Ordnance (UXOs). To mitigate this risk Barhale engaged a specialist UXO Company who delivered a bespoke briefing to the workforce. This included; the types of ordnance that may be encountered, how to identify UXOs, and actions to take in the event of coming into contact with a UXO. Fortunately, all works were undertaken without any contact with UXOs.

### Constraints Cont...

During the latter stages of the project, the team encountered a section of Marine Silt ground formation. This very soft ground was not suitable to support the new pipeline without additional treatment. In fact the ground was so soft that during excavation, one of the Barhale operatives was able to fully submerge his shovel into the ground with minimal force.

The Delivery Team consulted Barhale's Engineering Manager to discuss solutions. The installation of de-watering well points was first mooted, however there was concern that this may extract fines from the ground, causing settlement which could inadvertently damage the foundations of a nearby road bridge.

After a period of investigation, the team opted to trial the use of rock armour stone to provide a solid bed upon which to lay the pipes. This method involved removing as much of the bad ground as possible through excavation, whilst simultaneously pumping any excess water. Large stones (100 – 300mm) were then placed in the trench and compacted using a 35t excavator. This method proved successful in stabilising the bad ground, enabling the team to continue with the sewer run. Furthermore, this method removed the risk of damage to the adjacent bridge foundations, did not cause an unforeseen delay in the programme and was more cost effective than a dewatering alternative.

There were also numerous chartered and unchartered services along the new sewer route. Full Stats packs were given to the excavation gangs as part of the permit to dig briefings. All areas were CAT scanned prior to works commencing and thereafter at 300mm increments throughout the dig. In line with Barhale's safe digging practices, hand dig methods were used exclusively within 500mm of a known service. As a result of these stringent safe digging practices, the team did not encounter any service strikes or near misses throughout the programme.

One of the most challenging elements of work involved the construction of a 3.5m deep manhole underneath an existing road bridge; which had just 3.9m clearance. To ensure the team did not come into contact with the bridge during the manhole construction, a specialised excavator was procured with both a slew restrictor and a height limiter. Construction of the manhole, which was facilitated via a sheeted cofferdam design, was undertaken under the control of a designated Banksman at all times.



*Oversized stone was compacted to stabilise a section of bad ground*

### Customer Benefits/Feedback...

All works were delivered on time, in accordance with the programme, ensuring no delay was caused to the Client's wider project. All contaminated spoil and hazardous waste was disposed of safely, with no adverse effect caused to the local ecology (i.e. River Brent).

The team overcame several challenges throughout the programme, including poor ground conditions, tidal working and a series of underground risks; not least UXOs. Despite this they were able to deliver complex elements of work without having any adverse effect to existing infrastructure, such as the existing road bridge which sat atop one of the new manholes. Furthermore, as a result of extensive safe digging techniques, the team did not encounter any service strikes, in a service laden area.



*One of the new manholes during construction*