

CENTRAL INTERCEPTOR



Cutterhead breakthrough at May Road

Construction update:

May Road breakthrough marks major milestone

With the last turns of the cutterhead, Hiwa-i-te-Rangi, our Tunnel Boring Machine (TBM) has broken through both Shafts A and B at our May Rd site in Mount Roskill. This marks just past the halfway point of her 14.7 kilometre journey to Grey Lynn. The tunnel will run from Māngere Wastewater Treatment Plant to Grey Lynn and will be intersected by two link sewers.

Hiwa-i-te-Rangi crunched her more than five metre-diameter cutterhead through a 69m-deep shaft wall to cheers from assembled construction crews who peered down at the action from the surface.

Watercare Central Interceptor executive programme director, Shayne Cunis, said the breakthrough marked an important milestone, one achieved despite significant challenges. The project team is on track to deliver the project in 2026 as planned, despite everything thrown at us, from COVID-19 lockdowns and closed borders to global shipping delays and major weather events.

The past 12 months have been the busiest on the project, with around 600 staff working on 16 sites, from Māngere Pump Station, across the isthmus to Grey Lynn. Hiwa-i-te-Rangi has tunnelled under the Manukau Harbour and passed 110m under the Hillsborough Ridge. She will now be refurbished, to ready her for her remaining seven kilometre journey from May Rd later in the year.



A view to the top of our Māngere Pump Station shaft

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A round-up of our construction sites

(from south to north)

Māngere Pump Station: As of mid-August, the pumps for CI arrived and were carefully lifted into place. Concrete has been poured for the valve chamber, air valve chamber and flowmeter chamber walls. EPR (Emergency Pressure Relief) construction is also underway with concrete for the outfall structure bordering the coast being poured. On the confluence chamber, our 36m-deep piles are now in place, with temporary works underway on construction of the confluence chamber. And on the pump station building, the roof is now completed on the upper level.

PS23, Hillsborough: Diversion chamber construction is ongoing and progressing well, at the main site. For the works up Frederick St towards Hoskins Ave, we've changed our methodology to open trenching. These works will be completed by the end of the year. Service investigations and chamber design for the works near the odour chamber are ongoing.

Keith Hay Park: Six chamber excavations have been completed, with the bifurcation chamber remedial works proceeding well. For the branch 9b diversion, Victoria, our new baby TBM, will bore a tunnel between new chambers in Keith Hay Park and our main construction site.

May Road: We completed the permanent lining for Shaft B after nine month's hard work with many staff working day and night shift since January. The shaft and site are being prepared for tunnelling activities from late 2023. We are now continuing the construction of the GRP (glass-reinforced plastic) liner in Shaft A and in early September Hiwa-i-te-Rangi broke through.

Walmsley Park: Piling for one of our two chambers has been completed and we are about to start sheet piling of the second.

Haverstock Road: We have completed shaft excavation to a final depth of 50m! We have begun permanent shaft lining, with steel reinforced concrete and 13 cascade shelves. These shelves create mini waterfalls, reducing the energy of falling wastewater. We are also creating two new manholes next to Meola Creek, alongside our site, which will divert overflows away from the stream and into the CI tunnel.

Lyon Avenue: CI's deepest caisson shaft has reached its final level, 40 meters deep, three months ahead of schedule, despite challenging ground conditions. The shaft will now be excavated an additional 10 metres, employing the tried and tested shotcrete and rock dowels methodology.

Western Springs: Work will soon start on the two chambers that collect the local networks and the trenching that will connect them to the main shaft. We will begin with the bifurcation chamber adjacent to the Bullock Track and connect that to the shaft. Then we will start the chamber on Stadium Road early 2024 to work in and around the upcoming speedway and concert season.

Tawariki St, Grey Lynn: Our final site on the current alignment opened in April and the site is now established. Piling for the shaft and two diversion chambers is well underway.

Link Sewer C

Haycock Avenue: The current focus is on constructing the diversion chamber in the roadway and installing mechanical gates into the remaining chambers on the site, which isolate flows from entering the Western Interceptor.

Dundale Avenue: The GRP liner has been lowered into the shaft and work continues on fixing it permanently in place, along with other surface works, as we prepare to complete all our site activities, later this year.

Miranda Reserve/PS25: With the GRP (glass-reinforced plastic) liner concreted into place in the shaft, we are connecting it to the completed Link Sewer C tunnel and completing connections from the newly constructed chamber to the front of the site. At PS25, we have completed 90% of the construction of the overflow chamber and excavation around the Western Interceptor for the diversion chamber. For the shaft, we have completed 50% of the wall.

Link Sewer B

Mt Albert War Memorial Reserve: Mine site establishment is complete. Domenica, the mTBM was lowered into the shaft in July and commenced boring with more than 300m completed by mid-September. We hosted our neighbours at an on-site information and site tour day in September.

Norgrove Reserve: Shaft excavation is complete, to 30m. We are preparation for our Stage 2 works in the Reserve, including the construction of three retaining walls.

Rawalpindi Reserve: Shaft excavation is complete, to 28m. We've also excavated a 4m x 4m x 2m cavity for the mTBM to begin her journey to Norgrove Reserve.

Domenica begins her second boring job

In March our micro-TBM completed Link Sewer C, from May Rd, Mt Roskill, to Miranda Reserve in Blockhouse Bay. After refurbishment, she was moved to start work on the 1.1km Link Sewer B pipeline in Mt Albert, a 2.4m internal-diameter pipe which will help prevent overflows into Meola Creek. She began boring in July and laying the sewer pipes, with Norgrove Reserve her first destination, a journey of 800m.



Link Sewer B pipes on their way to our Mt Albert site



Meet the newest member of our TBM family

First, we launched our main TBM Hiwa-i-te-Rangi in August 2019 and then in June 2021 we set Domenica off to bore Link Sewer C. Now we've added a 'baby' to the family, though she's still a good size at 10m long, 1.1m external diameter and 12 tonnes. Too small for human operators, she is manoeuvred by remote control, using hydraulic lines known as umbilicals.

As mentioned previously, all TBMs have female names, so we asked Hay Park School students to help choose one. The students had four Roman goddesses to select from. (Rome is home to one of our main contractor parties, Ghella.) At a naming event at an August school assembly the students chose Victoria, goddess of victory.

Made in Germany, Victoria arrived by ship from her last tunnelling role in Buenos Aires in July. She has been refitted to construct two new pipes by the pipe-jacking method. First is the branch 9b diversion, a tunnel between new chambers in Keith Hay Park and our main construction site. The deepest Victoria will bore is 9m. Once that is completed, she'll bore a new pipe from our main CI site in the carpark south to Richardson Rd, to cater for new Kainga Ora housing in the wider area.



Victoria is ready for her new role in Keith Hay Park

How we're constructing the CI tunnel

The tunnel has an internal diameter of 4.5 metres, with an external diameter of 5.46 metres. The tunnel itself is constructed of 1.6m-wide tunnel rings, made from precast concrete by local company Wilson Group in East Tamaki. The Central Interceptor tunnel will use more than 9,200 rings, each comprising six segments, weighing three tonnes each. That equals some 55,200 segments, meaning the tunnel weighs just under half a million tonnes.

The segments are lined with 3mm of a special polyethylene lining to protect the tunnel from corrosive wastewater once it's in service. The segments come with five different lining colours, each signifying the type of reinforcement the tunnel needs to match different ground conditions.



Six segments for just one ring makes a big load



Part of Wilson Group's segment storage area

A fun way to discover more about the Central Interceptor

When you have a big infrastructure project, it's normally fairly easy to showcase it to the public. But when your project is deep underground and with shaft sites behind big blue walls, how do you do this?

For the Central Interceptor, we have our Discovery Centre (DC). Fully mobile and seven metres long, the trailer features a virtual reality ride, augmented reality experiences and fun touch-screen games as well as lots of project information. We launched the DC in late 2020 and despite the ravages of Covid, have managed to attend a wide range of public engagements over the next two years.

Even with the poor weather we had last summer, including the appalling floods, the team got the DC out for 113 days, hosting some 11,000 visitors, 57% of them children. We're often at MOTAT in the school holidays and Ambury Park in Māngere.

Key to our success in bringing the Discovery Centre to its adoring public is Because Connected Experiences. This creative agency designed and built both the digital and practical games and the visitor spaces, and staffs the DC with friendly, informative people.

Our two main hosts, couple Kat Zukauskas and Mark Langford, are experienced Air NZ flight crew members. During Covid, with airlines flying far less, Kat and Mark joined us and transformed the DC into a first-class visitor experience. Since they're both now back flying, they've also brought in a number of their hospitality-oriented Air NZ colleagues. Kat and Mark even developed a 'lite' DC version, with the games and information kiosks now available for indoor events.

You can check out the DC's calendar here: <https://www.watercare.co.nz/Central-interceptor/>.



Host with the most, Kat, setting up the DC information tent



The DC is popular with all ages

Sustainability and environment:

Electric trucks now on the job

The three e-trucks we recently launched now have their project livery applied and are hard at work. They will transport more than 66,000 tonnes of earth from our CI sites, reducing CO2 emissions by some 300 tonnes over the life of the project. That's the equivalent of driving from Cape Reinga to Bluff more than 800 times.

For every 100,000 km travelled, the trucks will also save 50,000 litres of diesel, as they produce 79% less carbon than diesel trucks. This is the equivalent of powering some 400 average homes for a year!

The vehicles aren't as noisy as diesels either, which will be fantastic for the teams working in residential areas. They also have lift-off battery swapping capability, so they don't have the usual downtime while charging. In addition, they can have the battery swapped out for a fully-charged one in 5–10 minutes – the same time it would take to re-fuel with diesel.



Look for our bright, new and sustainable trucks out on the roads.