SMAP Project – Sydney Ocean Outfalls

OIL/GAS | SEWER | STORMWATER | POWER | WATER | **TELCO** | TREATED WATER| BRINE WATER

PROJECT OVERVIEW

UEA was engaged by Sub.Co as a leading Maxi Rig HDD Contractor to complete a series of six 1000m ocean outfall bores from Maroubra Beach in Sydney, NSW, as part of the new Sydney, Melbourne (Torquay), Adelaide and Perth (SMAP) transcontinental hyperspeed optic fibre cable network. SMAP marks the first stage of HyperOne – Australia's first national fiber backhaul network.

LOCATION
Maroubra, NSW

CLIENT
Sub.Co South

PIPE
149mm Steel Conduit

GEOLOGY
Sand & sandstone

LENGTH
6 x 1000m

TECHNIQUE
HDD

SCOPE OF WORKS

UEA provided an all-inclusive, turnkey package, ranging from HDD design and engineering, installation of the HDD launch compound, survey, supply of all HDD conduit and equipment, HDD installation, management of all seafloor diving operations, roping, proving and capping of all conduits, supply and installation of three beach man-hole underground access chambers, works as executed survey, removal of HDD launch pad and full site restoration.

CHALLENGES

Ocean outfalls come with a variety of challenges not encountered during land-based HDD operations. Due to the complexity and significantly increased costs associated with ocean geotechnical investigations, limited information was available to determine the nature of the ground conditions present along the HDD alignments. A seafloor dive survey was conducted at the HDD exit locations to determine the seabed profile and depth of sand overlying rock present, which highlighted a layer of over 6m of sand. Due to the shallow exit angle required to allow an easy transition of the fibre cable from the seafloor to the outfall conduit, conventional mud motor drilling would not be suitable for seafloor punch-out due to the ground conditions

being unable to support the weight of the tooling and preventing the required pitch to be maintained. To combat this, UEA tripped out all rods and tooling upon transition from rock to sand when nearing exit and engaged a jetting assembly tool, providing a significant reduction in weight of tooling to allow steerable drilling through the sand at exit – a timely process when drilling such long distances.

Though the entry points for the six HDDs were only separated by less than 15m, there was a 250m separation between bores one and six. Across this 250m span, ground conditions experienced varied more than expected, ranging from hard rock to soft and fractured rock to sands and voids. As these conditions changed along the bores, maintaining drilling fluid returns took absolute priority due to the sensitive nature of marine environments. Bore profiles were amended, new tooling deployed and drilling fluid properties reviewed to ensure bores were completed successfully across all encountered conditions.

The complexity of diving operations to remove the drill tooling and install the subsea completion pieces required significant manual hands-on works by the dive team whilst on the seafloor. Because of this, diving operations could only occur in the calmest of sea states – a tall ask when working in the open ocean. UEA worked closely with our diving contractor to streamline diving activities and monitor weather forecasts in conjunction with the drilling program to give the best opportunity for diving works to occur speedily, safely and without delay. On only one occasion did the drilling program have to be altered due to a severe week-long weather system that produced several meter high swells preventing any diving works from occurring.

Three pre-cast beach manholes (BMHs) were installed and buried at the entry location – two outfall bores per BMH. It was critical that each conduit was accurately located on the design alignments and profiles to ensure they matched the penetrations in the front wall of the BMHs. During the installation process, groundwater was encountered well above the design RL of the BMH bases, requiring ground stabilisation measures to be implemented to ensure the BMHs were adequately supported. This combined with unstable sandy conditions and then found presence of potential acid sulphate (PASS), major modifications were required to installation methodologies and the materials used. The BMHs were installed with significant waterproofing measures – to minimise not only the ingress of water into the BMH but also any contact of groundwater to the BMH exterior.

SUMMARY

Though the project presented a multitude of challenges, the UEA team worked diligently with key project stakeholders to ensure the effective execution and successful delivery of the turnkey package. UEAs strong performance ultimately resulted in the award of an additional 5.9km of ocean outfall drilling for the SMAP Project in Torquay, Victoria.