MIRVAC TX TOWER DECONSTRUCTION

A COLLABORATIVE APPROACH TO DISMANTLING A SYDNEY LANDMARK

AT A GLANCE

CLIENT	MIRVAC
PROJECT	TX TOWER DISMANTLE
LOCATION	SYDNEY AUSTRALIA
SECTOR	DEMOLITION & DEPLANTING
DATE	2017-2021
CRANES	1 X M1280D & M310D

Built in 1965, the former TCN-9 TX transmission tower at Willoughby was one of Sydney's most recognisable landmarks for more than 50 years.

The 233-metre lattice tower replaced what was Sydney's first television tower, built in 1956, and was one of three towers known as 'the Artarmon triangle' that broadcast television on behalf ofmajor media companies before being decommissioned in February 2021.

When our client, Mirvac, acquired approval to redevelop the site into a new residential community in 2017, they knew they needed to remove the tower – they just didn't know how.

After an exhaustive global search to find the best experts, Mirvac assembled a team of leading Australian and international engineers and contractors including Marr Contracting, Robert Bird Group and critical infrastructure experts, Kordia, to come up with a solution for designing and managing the process of dismantling the tower.

THE CHALLENGE

Safely dismantling the tower posed a number of challenges due to its size, height and unique structure, as well as its proximity to residential homes and one of Sydney's busiest freeways.

After exploring a number of more traditional methods of deconstruction – including using a gin pole or helicopters, which would have required shutting down the freeway – Mirvac approached Marr to come up with a solution using our tower cranes and bespoke equipment.

Because the decommissioned tower was not able to accommodate lateral supports, the challenge from a cranage point-of-view was to find a way to get the crane hook height above 233 metres without the need to build expensive and complicated temporary structures to support the crane. And of course, safety was paramount.

OUR SOLUTION

After 18 months of consultation, planning and peer review with the project stakeholders including our lead engineering consultants, Robert Bird Group, to initially assess what was structurally feasible with our existing equipment, we designed a unique approach involving the use of our M2480D tower system and the introduction of guy wires to laterally support the tower crane and allow it to climb to the required height to dismantle the tower.

During the initial design process we moved from concept to reality with the solution evolving to a freestanding Favelle Favco M310D on 193 meters of tower sections, which gave an underhook height of 248 meters. The crane was attached to a single set of stayed guywires at a midpoint (81 meters above ground) anchored into the bedrock viafour independent foundations which were each 41 metres from the centreline of the tower.

The crane was initially erected at a freestanding height of 117 metres where it self-installed the guy wires and then continued climbing to the final 193-meter tower height.

The selection of unique heavy-duty tower sections that Marr was able to deploy to the project from its M2480D fleet of heavy lift tower cranes meant that the crane was able to freestand at the full 193 metres, with the guywires effectively only in place to deal with design requirements as a contingency in the event of a '100-year storm' event.

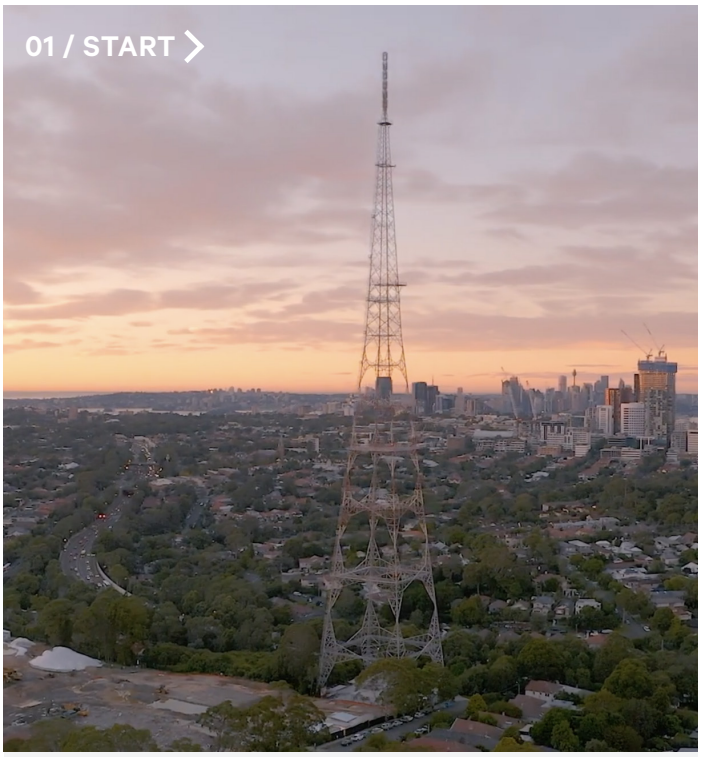
To reduce the number of lifts required, Marr also designed a changeover of cranes, swapping out the 16-tonne capacity M310D used to remove the top parts of the tower, to a 150-tonne capacity M1280D heavy lift luffer (HLL) to remove complete layers of the tower weighing up to 60 tonnes.

Removing the tower in larger sections eliminated the need for the temporary works and the associated engineering to support the tower structure in its partially dismantled state. The solution with the larger crane reduced the lifting requirements from 90 planned lifts to just 36 larger lifts. This had a direct benefit to the project in terms of safety, program and cost.

Marr's involvement in the project also includes providing Mirvac with engineering, procurement and construction (EPC) services to assist in the dismantling of the tower.

THE RESULT

By the time it came to make the first lift and remove the top sections of the tower in August 2021, Sydney was in full lockdown due to the COVID-19 pandemic. Despite the additional logistical challenges posed by lockdown restrictions, by October 2021 the tower was safely dismantled, three months ahead of schedule and without incident.

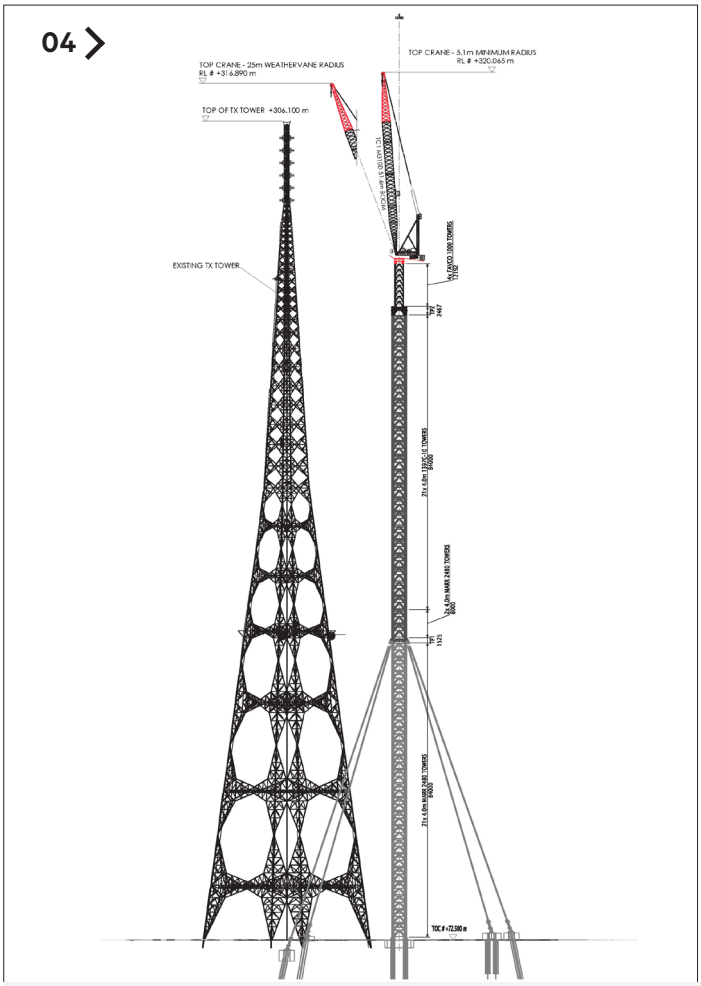


2017: After gaining approval to redevelop the site of the former TCN-9 transmission (TX) tower on Sydney's lower North Shore, our client, Mirvac, was faced with the challenge of how to safely dismantle and remove the tower. Due to its height (233m), unique structure and proximity to residential homes and a busy freeway, it was a complex task from the outset.

Mirvac knew they needed a different way of thinking for designing and managing the process of dismantling the tower and assembled a team of experts – including Marr Contracting, Robert Bird Group and critical infrastructure experts Kordia – to come up with a solution.

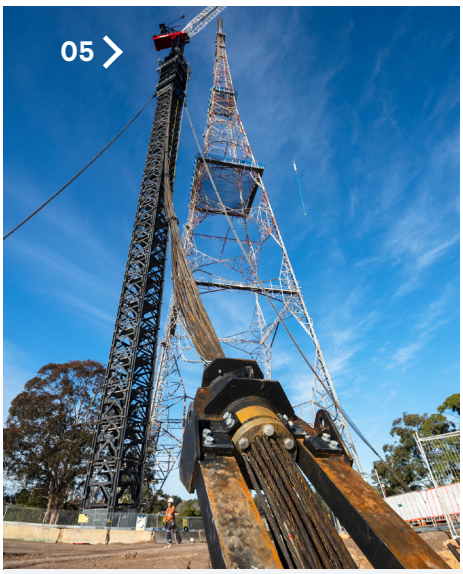
After exploring alternatives including gin poles and helicopters, Mirvac decided on using a crane. However, because the decommissioned tower was not able to accommodate lateral supports, the challenge from a cranage point-of-view was to find a way to get the crane hook height above 233m without the need to build expensive and complicated temporary structures to support the crane.

04 >



After 18 months of consultation, planning and peer review with the project stakeholders to initially assess what was structurally feasible with our existing specialist equipment, we designed a unique approach involving the use of our M2480D tower system and the introduction of guy wires to laterally support the tower crane, allowing it to climb to a freestanding height that had never been done before.

05 >



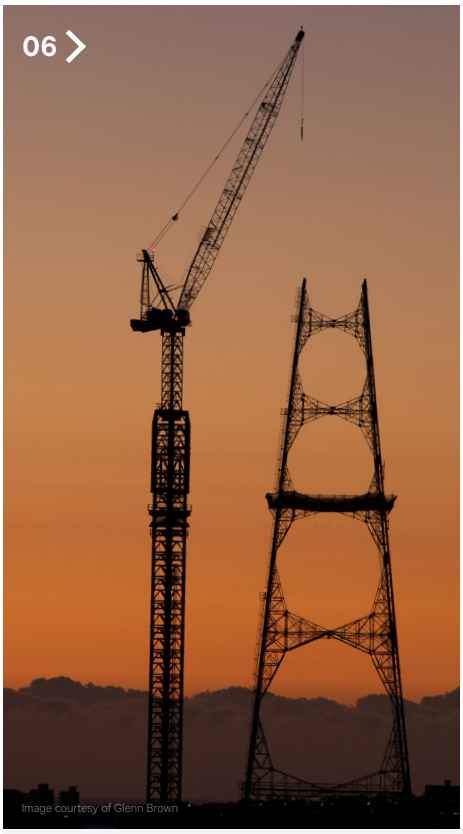
The cranage solution evolved to a freestanding Favelle Favco M310D on 193m of heavy-duty tower sections, which gave an underhook height of 248m. The crane was attached to a single set of stayed guywires at a midpoint (81m above ground) anchored into the bedrock via four independent foundations which were each 41m from the centreline of the tower.

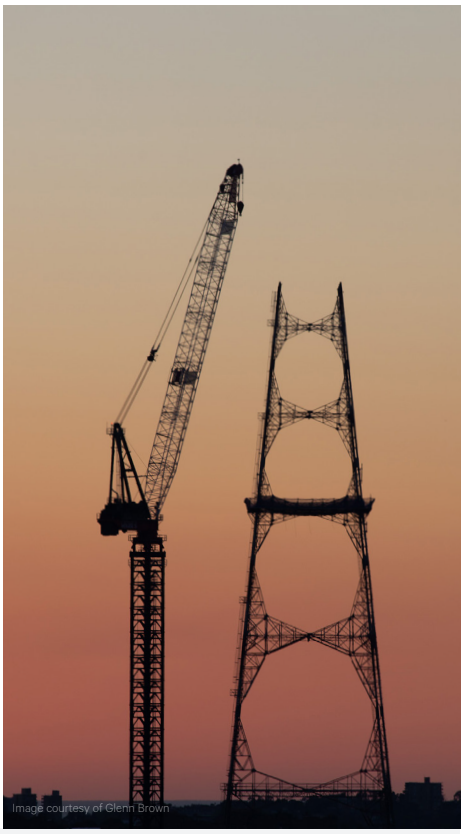
"

Mirvac has an industry-leading reputation for upholding the highest standards of safety and our design team is comprised of experts in their field. Partnering with Marr as our cranage experts meant we were in safe hands.

"

CLANCY SPROUSTER,
SENIOR DEVELOPMENT MANAGER - RESIDENTIAL DEVELOPMENT NSW, MIRVAC





To reduce the number of lifts required, Marr's also designed a solution for swapping out the 16-tonne capacity M310D used to remove the top parts of the tower, to a 150-tonne capacity M1280D heavy lift luffer (HLL) to remove larger sections of the tower weighing up to 60 tonnes lower down – reducing the number of lifts from 90 to just 36.

April 2020: A pre-assembly trial of the climbing transition from the larger tower sections to the smaller sections was held at Marr's yard with project stakeholders

Early August 2021: With Sydney in a full COVID-19 lockdown, the first sections of the tower were safely removed and over the next three weeks the top half of the tower was removed in sections.

Late June/ early August 2021: Marr's Grove GMK6400 mobile crane installed the M310D tower crane to a freestanding height of 117 meters. Over the next week the crane was climbed to its full height of 193m with an underhook height of 248m.

Late August – late October 2021: After completing the lighter lifts at maximum height, Marr's crew climbed the M310D down to its original freestanding height of 117m where it was removed by Marr's Grove GMK6400 and replaced by one of Marr's M1280D Heavy Lift Luffers freestanding on 76m of tower to lift the larger sections and layers of the tower weighing up to 60 tonnes. The project was completed – safely and without incident, three months ahead of schedule.

> One of the things I'm most proud of is how the team took what was a really complex issue and came up with a great way of pulling down a large, complex structure in the middle of an urban area without incident.

TOBY LONG, GENERAL MANAGER - RESIDENTIAL DEVELOPMENT NSW, MIRVAC