

Project Profile

Melville Island Bulk Fuel Facility Civil and Concreting Works



Client	AGC
Location	Tiwi Islands (Port Melville, Melville Island), Northern Territory
Duration	September 2014- April 2015 (7 Months)
Contract	Civil and Concreting Works
Cost	\$6.2 million

Project Overview

The Tiwi Islands, located 80km north of Darwin is made up of a number of small islands including Melville Island. McMahon Services were engaged to complete the civil and concreting works at the Melville Island Bulk Fuel Facility. The facility will become part of the ongoing development of Melville Port, which will include a 200 person camp, office complex, waste and hazardous material storage facilities, workshops and warehousing.

This multi-faceted project utilised a number of our in-house service divisions including, civil, building, electrical, plumbing, hydraulics, carpentry, roofing, data and communications and craneage. At its peak, there was 32 personnel working on the project, with a steady flow of 14 during majority of project stages. This included general labour, skilled tradespeople, WHSEQ site safety, supervisors and management.

The scope of works included:

- > Pre-mobilisation and site establishment
- > Organisation of material, plant and personnel ready to commence once mobilised to site
- > Civil preparation and works

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- › Undertake detailed excavations for slab and edge thickenings as part of the subgrade preparation
- › Excavation for the ring beamfooting, including preparation and geotechnical testing to establish if the minimum bearing capacities were achieved
- › Subgrade treatments where bearing capacities could not be achieved

The first items for construction were the three insitu steel reinforced concrete ring beams, with a circumference of 100m and requiring a total of 150m³ concrete, being used as the base for the fuel tanks. Prior to pouring the ring beams the McMahon Services team earthed them, which required the mobilisation of electricians and a drill rig, then casting E-lock into the internal side of the ring beams to allow for the later construction of the HDPE liner.

Following the construction of the ring beams McMahon Services backfilled the inside with conditioned fill, which was needed to be transported to the work area from other parts of the island. McMahon Services excavated the centre point of the internal areas within the ring beams to allow for the construction of the insitu reinforced concrete tank sumps, as well as casting E-lock into the sumps to allow for the attachment of the HDPE liner.

Following the construction of the three tank sump structures, a 100mm thick sand bedding layer was placed over the compacted fill to the inside of all ring beams, mobilising over 600 bulk bags of sand to use as a bedding layer for the HDPE liner and concrete bund slab floor.

The HDPE liner was subsequently installed and welded to the insides of the three ring beams. McMahon Services assisted with design of the HDPE liner and GSE Polylock. The team was able to provide an improved solution that was cost effective and reduced the construction risks involved with the installation of the central tank sumps. A total of 350 metres of GSE Polylock and 2,100m² of 1.5mm thick HDPE liner was installed.

Once the fuel tanks were installed on top of the ringbeams, McMahon Services constructed a bund slab and walls around them. The bundslab spanned over 4000m² and was constructed over 35 separate pours, requiring over 500m³ of 40mpa concrete which was self-batched on site using the Fiori mobile batching plant.

As the bund slab was progressively constructed McMahon Services concurrently constructed the external bund slab walls, nearing 400m to construct. The external walls were 150mm thick, 2.8 metre high and constructed over 19 separate pours, requiring over 150 m³ of 40 Mpa concrete which was self-batched onsite. All raw materials for the concrete manufacture were delivered via barge from Darwin in bulker bags, all formwork for the 2.8m high walls were specially fabricated in Sydney, transported to Darwin and then barged to Melville Island. The walls were constructed by first installing the external shutter, completing the steel reinforcement and finally enclosing the steel reinforcement with an internal shutter. Scaffolding was next installed to the internal shutter to allow for the pouring and finishing of the external walls.

Apart from the construction of the ring beams, bund slabs and walls, the McMahon Services scope also included a number of additional surrounding items. To maintain and accelerate the program, these items were a mix of reinforced concrete items cast onsite and precast concrete items which were made off site and transported to site. A considerable amount of civil earthworks were also completed around the site to the outside of the external bund walls, the works also including the construction of various bunds and containment structures for stormwater management. Rock was required in the construction of this stormwater management detail and the McMahon Services team mobilised a powerscreen to site to win rock from local soils, offering a cost effective solution given the cost to purchase and deliver rock from Darwin in bulkerbags. Other works included the application of water proof membrane to the outside of the external bund walls, various civil stormwater works and the backfilling of various areas with conditioned site won fill to allow for the construction of pavements.

The project required extensive survey set out and checks due to the minimal tolerances of construction. Survey was undertaken by McMahon Services in-house surveyors, which were mobilised from Adelaide and further supported by external surveyors mobilised from Darwin.

All materials and equipment were transported to Darwin and then barged to Melville Island. The concrete batch plant, concrete agitator trucks, concrete pump and Fiori concrete truck were all mobilised from Adelaide for the project utilising extensive pre-planning and effective management.

McMahon Services were able to deliver the project with 75% company-owned plant and equipment, supplemented with 3rd party plant hire equipment from local Darwin businesses. The Tiwi Islands Training and Employment Board assisted with providing local Indigenous employment outcomes for the project. McMahon Services also engaged the Tiwi Land Council Council and local Purlingimpi community throughout the project where possible.

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Working on a remote island presented a number of considerations for the team. McMahon Services were flexible and innovative to drive solutions, ensuring the program was maintained despite Northern Territory's weather conditions, delivery logistics, shipping schedules and the Christmas break period.

McMahon Services' management of these challenges was paramount to the overall success of the project.

