TAMALA PARK LANDFILL FACILITY

LEACHATE MANAGEMENT PIPLINE AND TANK FARM

DESIGN AND SAFETY REPORT

LEACHATE PIPELINE AND TANK FARM LAYOUT

Prepared for

MINDARIE REGIONAL COUNCIL

IW Projects Pty Ltd

[redacted]

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1 Introduction

IW Projects, in conjunction with BEC-IWP, was commissioned by the Mindarie Regional Council (MRC) to undertake the design for the development of a leachate storage tanks system, including associated pipework, valves and fittings.

This project is a part of the overall development of a comprehensive leachate management system for the Tamala Park Landfill. The MRC is yet to determine the downstream mechanism for processing of the leachate; hence, this project forms the link between the existing leachate extraction pumping system from the various landfill leachate sumps and eventually the downstream leachate processing facility (once developed).

2 Facility Design

2.1 Project Requirements

The project design was to provide the Mindarie Regional Council (MRC) with the ability to extract leachate from the Tamala Park Landfill leachate sumps and to store up to 250,000 kL/day, for subsequent processing. The “subsequent processing” has yet to be determined by the MRC; hence, the leachate storage facility was required to be flexible and appropriately located to accommodate this future “subsequent process”.

In addition to the storage of the landfill leachate, there was a requirement to receive and store the run-off water from the Tamala Park vehicle washdown facility within the 250,000 kL storage capacity.

The washdown facility run-off water was required to be received whenever the washdown facility was in operation; hence, a bypass pipeline was provided to deliver the washdown water to the landfill in the event that the storage tanks were at maximum capacity and hence, unable to receive any additional liquid from the washdown facility.

Pumping leachate out of the landfill is seen as a discretionary activity and hence, would only be carried out if there was storage capacity available within the tanks.

2.2 Overall Facility Design

To achieve the project requirements, a system incorporating a pipe ring main around the Stage 2 landfill area and a tank farm was developed, with the vehicle washdown facility run-off water being delivered via a separate pump and piping system.

Appendix No. 1 – Pipeline and Tank Farm Drawings provides detail of the proposed infrastructure.

2.3 Project Battery Limits

With there being existing and future infrastructure in addition to that infrastructure being developed during this project, there was a need to clearly define the project battery limits.

The battery limits for this project included the following aspects:

- Pipe ring main around the landfill, including all pipe fittings and equipment;
- Pumping and piping system for the vehicle washdown facility wastewater;
- Connections to the tank farm; and,
- Tank farm, including providing piping and fittings out of the storage tanks, with the pipes terminating within the tank farm bunded area, that can be connected to the future leachate processing system.

The existing landfill leachate sump pumping systems will be connected to the pipe ring main by the MRC leachate management contractor. The connections to the ring main will be via tapping saddles, again, supplied and installed by the leachate management contractor. All pumping controls and instrumentation from the leachate sumps will be provided by the leachate management contractor.

Connection to the future, subsequent downstream processing option(s), which is yet to be determined, would be carried out by the MRC.

2.4 Facility Design Requirements

The following are the facility design requirements stipulated by the MRC:

- 250,000 kL liquid storage capacity;
- Leachate to be received from the existing seven landfill sumps, plus one future leachate sump (Piggy-Back Liner sump);
- Wastewater to be received from the existing vehicle washdown facility, based on a maximum generation rate of 10 kL per day;
- Continuous receival of washdown wastewater; hence, the need for a bypass discharge pipeline back onto the landfill, for use if there was insufficient storage capacity to receive the washdown wastewater in the storage tanks;
- Leachate pipeline to include the following:
    - Scour points (to remove accumulated sediment from the pipeline);
    - Pump connection points (to enable pumping of surface leachate into the ring main, and if necessary, pumping out of the pipeline). These are effectively the same type of infrastructure as for the scour points;
    - Air release valves (to eject accumulated air from the ring main pipeline);
    - Air inlet valves (to enable draining of sections of the ring main pipeline);
    - Isolation valves (to enable isolation of portions of the ring main pipeline); and,
    - Water hammer arrestors (to reduce the water hammer impact of continuous starting and stopping of the Airwell pumps).

- Tank farm:
  - Bunding (to contain accidental spills);
  - 3 x large volume storage tanks;
  - Tank level sensors in wastewater tank and all three storage tanks;
  - Tank level controls:
    - High level shut off at 100% tank operational storge capacity;
    - High/High level alarm and electrically actuated isolation valves (to shut off all incoming flow) at 105% tank operational storge capacity;
    - High/High/High overflow (into bunded area) at 110% tank operational storge capacity;
  - Bund sump to have external sump drain (to gravity drain uncontaminated water out of the bunded area);
  - Spare leachate pipe and wastewater pipe between ring main/landfill and tank farm;
  - Flow metres to monitor input and output liquid volumes;
  - Alarm flashing lights for wastewater tank and all three storage tanks; and,
  - All equipment to be high-quality specified, to operate in an aggressively environment.

2.5 Facility Location

The leachate ring main has been located around the Stage 2 landfill footprint, following along the inside of the existing landfill perimeter road. Although this was a longer pipeline route than the option of going over the top of the landfill; this solution, enabled shorter connections to the existing leachate sumps, no disturbance to the existing landfill cap vegetation or the need to be constantly relocating the pipeline around the active landfill area as the landfill filled up. The selected pipeline location also enables easy access and inspection of the pipeline.

The tank farm was located to the south of the Stage 2 landfill, away from the workshop and southern access road; however, in close proximity to the vehicle washdown facility and adjacent to the existing limestone stockpile area that has been ear-marked for future treatment infrastructure.

2.6 Facility Design Components

2.6.1 Pipeline

The pipeline incorporates approximately 1,200 m of 110 mm diameter HDPE pipe and approximately 600 m of 160 mm diameter HDPE pipe. The pipeline has a pressure rating of PN12.5 (125 m of pressure head or 1,250 kPa). Airwell has advised that, due to the compressor only having a pressure output of approximately 600 kPa to 650 kPa, their pumps have a maximum operating pressure of 550 kPa to 650 kPa.

With the actual pumping pressure being determined by the maximum pressure output from the compressor, if the compressor output pressure was increased, the pumps could perform at a higher pressure. Consequently, if deemed necessary, at some time in the future, there is scope for the MRC to increase the compressor pressure without negatively impacting on the leachate pipeline and associated infrastructure.

The 110 mm diameter pipe can accommodate a flow rate of 6.8 L/s at a liquid velocity of 1 m/s. The 160 mm diameter pipe has a flow rate of 14.5 L/s at 1 m/s. Airwell advise that a single pump has a typical flow rate on 1 L/s; however, this is the average flowrate over a minute (60 L/m). The peak pump flowrate per pump cycle can peak at approximately 3 L/s.

A pipe velocity of 1 m/s is highly efficient in reducing pipe velocity pressure head losses. The pipeline can easily accommodate a flow velocity of 2 m/s; however, there would be the corresponding increase in pressure head losses. Consequently, in the rare circumstance where most Airwell pumps cycle at the same time, the pipeline can accommodate the required flow rate.

At 250 kL per day, if the maximum daily volume was pumped during an 8-hour working day, the average pipeline flow rate for a 160 mm diameter would be 9 L/s, which would result in less than 1 m/s pipe flow velocity; hence, providing some future contingency in the event that more than 250 kL of leachate was required to be pumped within an 8-hour period.

The washdown facility delivery pipe has been designed as a 50 mm diameter HDPE pipe, again with a pressure rating of PN12.5, for consistency with all pipe pressure ratings and to provide a robust pipe in the event of impact damage.

2.6.2 Storage Tanks

Consideration was given to utilising one large storage tank (250 kL), three medium sized tanks (85 kL each) or six smaller tanks (42 kL each). The MRC opted for three medium tanks as this resulted in some operational flexibility to use different tanks at different times or one for the vehicle washdown facility wastewater and two for leachate. It also optimised space within the bunded area and minimised tank and pipeline fittings in comparison to the possible six tank solution.

For a 3-tank solution each tank requires an operating capacity (High level) of 83.4 kL; however, to enable a High/High level alarm and electric actuator isolation valve shut off, and some additional storage before the tank overflows, a minimum tank volume of 92 kL has been nominated. This provides approximately 8.6 kL of additional storage (10%) within which to manage alarm, shut off and overflow levels.

To enable easier facility operations, the MRC opted to have all three tanks interconnected, such that the facility operator only has to open and close valves to direct flow to and from the different tanks. This is as opposed to having disconnected tanks and the operator being required to connect a flexible hose to each tank as and when required (multiple times per day). The main difference between the tank connection scenarios is that due to the Environmental Regulator (Department of Water and Environmental Regulation - DWER) bunding requirements, the interconnected tanks require a significantly larger bunded storage capacity (304 kL versus 101 kL).

2.6.3 Tank Bunding

The DWER requires that the tanks be bunded to accommodate 110% of the volume of the largest tank or all interconnected tanks, or 25% of the total stored volume within the tank farm. Based on 3 x 92 L interconnected tanks, there is a requirement to provide 304 kL of bunded storage.

The tank farm has been designed to have a 2 m space between the tanks and the bund wall and an approximate 0.75 m gap between each tank. Based on this configuration and 6 m diameter tanks, the required bunding area is 10 m wide by 23.5 m long (internal dimensions). With a requirement to contain 304 kL, the bund wall has to be a minimum of 1.3 m high. To accommodate other infrastructure within the bunded area (tank walls, pumps, pipes, fittings, flow metre) the bund wall has been increased to a height of 1.4 m.

The tank farm floor and bund walls have been designed as reinforced concrete to provide long-term integrity and a stable base for the tanks. In addition, the northern corner of the tank farm is approximately 2 m away from the adjacent haul road, and based on the design levels, the tank farm floor level is approximately 0.8 m lower than the road level; hence, the concrete structure is required to provide the necessary support to the bund wall in the event that a heavily loaded vehicle travels along the edge of the road. An Armco barrier between the tank farm and the access road has been included, to prevent a vehicle accidentally driving into the tank farm bund wall.

The area within which the tank farm has been located has a crossfall of approximately 1 m level difference; hence to achieve a level floor within the bunded area, there are lengths of wall that have an external height of significantly less than 1 m. 1 m being the minimum wall height to safely prevent somebody from accidentally falling into the bunded area (internal fall of 1.4 m). As a safety measure, a 1 m high guardrail, with intermediate rail, has been included on top of the 1.4 m high bund wall.

The tank farm also includes a set of steps with handrails to enable easy and safe access and egress to the facility.

2.6.4 Tank Farm Pipework

The tank farm has a duty and standby (spare) 160 mm diameter pipe coming from the leachate ring main. The pipe is connected to each of the three tanks via a tank top inlet.

There is also a 50 mm diameter pipe coming in from the vehicle wash down facility, again via a tank top inlet. There is also a bypass 50 mm diameter pipe, again in duty and standby (spare) arrangement going to the landfill and discharging into the landfill surface.

The 50 mm diameter washdown wastewater pipes(s) are not connected into the leachate ring main, as the wastewater discharge needs to be continuous when the tanks are unable to receive wastewater (due to being too full). The ring main is not designed to be able to have liquid pumped back into the landfill, as all Airwell pumps have non-return valves to prevent leachate from flowing back down into the leachate sumps.

In time, once the landfill progressively fills up, this washdown wastewater pipe will need to be connected to reinjection points or the nearest sump (by others), so that the wastewater is discharged into the landfill, from where it will be pumped out as part of the leachate management system.

Each tank has a 160 mm diameter outflow, interconnected pipe coming from the bottom of the tanks. This pipe terminates within the tank farm and is to be used in future for removing liquid from the tanks to the downstream leachate processing facility.

Space has also been allowed in the tank farm for a future pump and discharge pipework (by others).

2.6.5 Wastewater Pump and Pipeline

The vehicle washdown wastewater flows into an existing belowground tank. The tank has dimensions of approximately 6 m diameter x 1.8 m deep (as advised by the MRC). The MRC also advise that it takes approximately 4 days to fill the tank once it has been emptied. There is current approximately 10 kL/day of washdown water flowing into the tank.

As part of the construction works, the tank will be cleaned out and a submersible macerator pump fitted to the base of the tank, with a float switch to control the pump. There will also be a separate float switch to detect if the liquid level rises to within 300 mm from the tank outflow level. In this event, the float switch will trigger an alarm message to nominated mobile phones.

The pump discharge pipe will be connected to a Principal Supply particulate filter to remove solids before the wastewater is pumped to the tank farm.

Power supply for the pump and communication cable for the alarm float switch will come from the tank farm.

2.6.6 Power Supply

Power supply has been sourced from the adjacent environ sheds, with the cable run following the leachate pipes coming from the landfill.

The power supply is for the electrically actuated isolation valves and the washdown facility wastewater pump.

Two 63 mm diameter electrical cable conduits have been specified (one as a spare). These conduits are larger than required for the tank farm immediate requirements; however, this enables a larger electric cable to be installed in future to accommodate an electric delivery pump and potentially other possible power requirements for the future downstream leachate processing facility.

There is the option for the MRC to install a solar and battery system at the tank farm to supply all power requirements. If this is adopted, then the above conduits should still be installed to enable future power supply for future (unknown) leachate management systems.

2.6.7 Tank Controls

The tanks have been designed with 316 stainless steel float valves (two per tank) to shut off the incoming leachate and wastewater flow at maximum tank capacity (83.4 kL). This represents the tank High capacity or 100% tank operating capacity. High/High float switch activated alarm and electrically actuated isolation valves have been included that are set at 105% tank maximum operating capacity (87.6 kL) and tank overflows at 92 kL or approximately 110% of operating capacity.

Flowmeters have been included in all of the incoming and outgoing pipelines to accurately measure liquid movement into and out of the tank farm. There are two new 150 mm diameter digital flowmeters for the in and out leachate pipes and two existing (Principal Supply) 75 mm diameter digital flowmeters for the two wastewater discharge pipelines. Digital flowmeters enable connection to the future site telemetry system.

2.6.8 Equipment Reliability

Historical leachate management experience on site has been that equipment tends to regularly fail due to the aggressive conditions of handling leachate. To reduce equipment failure, the MRC has to regularly service and maintain the equipment that comes into contact with leachate.

To minimise future equipment, failure and preventative maintenance, it is a project requirement to utilise good quality equipment within the design and to specify a regular maintenance schedule. To this end, where available, the design specification includes 316 stainless steel equipment and fittings that come into contact with leachate.

A further historical problem has been water hammer in the pipeline causing damaging to the tank fittings. The design includes a number of water hammer arrestors at strategic locations to reduce the water hammer impact along the pipeline. In addition, the air release valves provide a degree of water hammer protection.

2.6.9 Telemetry

The MRC will be installing telemetry on critical infrastructure throughout the leachate management system. This is to allow remote monitoring and operation of the system and to receive alarm notifications and warnings when the system goes beyond set, normal operating parameters.

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2.6.10 Equipment List

Table No. 1 – Equipment List provides information on all pipework and equipment incorporated into the works.

Table No. 1 – Equipment List

Item	Description	Specification	Quantity	Location
1	50 mm diameter HDPE pipe	PE100 DN50 PN12.5 SDR13.6 1.4 L/s @ 1 m/s	260 m	Wastewater Pipeline and tank farm
2	110 mm diameter HDPE pipe	PE100 DN110 PN12.5 SDR13.6 6.8 L/s @ 1 m/s	1,200 m	Leachate Pipeline - north
3	160 mm diameter HDPE pipe	PE100 DN160 PN12.5 SDR13.6 14.5 L/s @ 1 m/s	750 m	Leachate Pipeline – south and tank farm
4	Air Release Valve	Vent-O-Mat 050RGX16 flanged or BSP connection, 50 mm diameter, 316 SS, PN16	4	Leachate Pipeline
5	Air Release Valve	Vent-O-Mat 050RGX16 flanged or BSP connection, 50 mm diameter, 316 SS, PN16	2	Tank Farm
6	Water Hammer Arrestor	No product nominated DN50, PN10, BSP connection	3	Tank Farm
7	Float Valve	Flowjack 3” High Pressure Float Clapper Valve, 316 SS or similar	3	Tank Farm
8	Float Valve	Flowjack 2” High Pressure Float Clapper Valve, 316 SS or similar	3	Tank Farm
9	Float Switch	Strongman Pumps Kelco Q Series Float Switches or similar	3	Tank Farm
10	Float Switch	Strongman Pumps Kelco Q Series Float Switches or similar	1	Wastewater Sump Tank
11	Float Switch telemetry: • To electric actuator valves • To alarm flashing light • To mobile phone signal • To SCADA system	No product nominated Compatible with electric actuator valves and mobile phone signal requirements	3	Tank Farm
12	Float Switch telemetry: • To alarm flashing light	No product nominated	1	Wastewater Sump Tank

Item	Description	Specification	Quantity	Location
	• To mobile phone signal • To SCADA system	Compatible with mobile phone signal requirements		
13	Level Sensor	Gallagher Wireless Water Monitoring System Series 2 or similar	3	Tank Farm
14	Level Sensor	Gallagher Wireless Water Monitoring System Series 2 or similar	1	Wastewater Sump Tank
15	Level Sensor telemetry: • To SCADA system	No product nominated Compatible with mobile phone signal requirements	3	Tank Farm
16	Level Sensor telemetry: • To SCADA system	No product nominated Compatible with mobile phone signal requirements	1	Wastewater Sump Tank
17	100 mm diameter Particulate Filter	Principal Supply – Contractor will need to provide 100/50 reducers to connect to the 50 mm pipe diameter	1	Wastewater Sump Tank
18	50 mm diameter Isolation Valve	John Valves FIG 801, 802, 803 or 804 isolation valve, 2”/50 mm, 316 SS	1	Wastewater Pipeline
19	50 mm diameter Isolation Valve	John Valves FIG 801, 802, 803 or 804 isolation valve, 2”/50 mm, 316 SS	6	Leachate Pipeline
20	50 mm diameter Isolation Valve	John Valves FIG 801, 802, 803 or 804 isolation valve, 2”/50 mm, 316 SS	7	Tank Farm
21	100 mm diameter Isolation Valve	John Valves FIG 802, 803 or 804 isolation valve, 100 mm, 316 SS	7	Leachate Pipeline
22	150 mm diameter Isolation Valve	John Valves FIG 804 isolation valve, 150 mm, 316 SS	2	Leachate Pipeline
23	150 mm diameter Isolation Valve	John Valves FIG 804 isolation valve, 150 mm, 316 SS	10	Tank Farm
24	50 mm diameter Electrically Actuated Valve (valve and actuator)	John Valves FIG 801, 802, 803 or 804 isolation valve, 2”/50 mm, 316 SS, with John Valves electric actuator	2	Tank Farm
25	150 mm diameter Electrically Actuated Valve (valve and actuator)	John Valves FIG 804 isolation valve, 150 mm, 316 SS, with John Valves electric actuator	1	Tank Farm
26	150 mm diameter Digital Flowmeter with weather cover	Euromag MUT2300 DN150 or Similar	2	Tank Farm

Item	Description	Specification	Quantity	Location
27	75 mm diameter Digital Flowmeter with weather cover	Principal Supply item, includes weather cover – Contractor will need to provide 75/50 reducers to connect to the 50 mm pipe diameter	2	Tank Farm
28	Submersible Macerator Pump	ASC - DSK-10A, 1 HP, 0.75 kW, 5L/s @ 6 m head, 304 SS, 2-year warranty or Similar	1	Wastewater Sump Tank
Spare Equipment				
29	50 mm diameter Isolation Valve	John Valves FIG 801, 802, 803 or 804 isolation valve, 2”/50 mm, 316 SS	1	Spare
30	100 mm diameter Isolation Valve	John Valves FIG 802, 803 or 804 isolation valve, 100 mm, 316 SS	1	Spare
31	150 mm diameter Isolation Valve	John Valves FIG 804 isolation valve, 150 mm, 316 SS	1	Spare
32	Air Release Valve	Vent-O-Mat 050RGX16 flanged or BSP connection, 50 mm diameter, 316 SS, PN16	1	Spare
33	Water Hammer Arrestor	No product nominated DN50, PN10, BSP connection	1	Spare
34	Wastewater Macerating Pump	ASC - DSK-10A: 1 HP, 0.75 kW, 5L/s @ 6 m head, 304 SS, 2-year warranty or Similar	1	Spare

2.6.11 Pipeline and Tank Farm Commissioning

The construction Specification includes a requirement to commission the pipeline and tank farm.

The Commissioning Plan (attachment to the Specification) provides the numerous stages and activities associated with the commissioning of the constructed works.

The commissioning process will confirm that functionality of the various components of the constructed infrastructure.

3 Environmental Protection

3.1 Pipeline and Pipework

All pipelines and pipework have been designed to be installed aboveground. This is primarily to enable easy visual inspection of the leachate management system. The exception being where the pipes cross the haul road between the landfill and the tank farm, where the pipelines are buried in a pipe trench

To further facilitate easy inspection of the pipeline, the ring main has been located around the landfill, just on the inside of the landfill perimeter road; hence, the majority of the pipeline inspection can occur while driving around the landfill perimeter. In the event of a leachate spill, this will be easily observed.

All scour points and hi-flo pump connections in the pipeline include isolation valves and screwed (BSP) end caps to ensure no leakage of leachate while the pipeline access point is not in use. When using the pipeline access points, the isolation valve enables total control of the leachate flow from the pipeline to prevent accidental spillage.

All valves are specified as 316 stainless steel to ensure maximum service efficiency and safe operations.

The one negative of having aboveground HDPE pipes is that in the event of a fire, the pipeline will melt, resulting in some leachate within the pipeline potentially being discharged to the environment. In the event of a fire, the MRC is to shut off all the sump pumps to prevent any additional leachate being pumped out of the landfill in case there is fire damage to the leachate delivery pipeline. With the pipeline being positioned on the edge of the landfill perimeter road, there will be minimum vegetation in close proximity to the pipeline; hence, reduced possibility of the pipeline getting damaged by fire. Historically, there have never been any fires away from the active landfill area hence, this is a highly unlikely event, and with minimal consequence, as a surface spillage of leachate can easily be cleaned up.

The MRC stipulated that all pipe connections are to be achieved by fusion couplings as opposed to butt welding, as this joining methodology is deemed to be more reliable.

3.2 Tank Farm

The tank farm incorporates a reinforced concrete floor and bunded area to contain any leachate/wastewater spills. The bunding capacity has been designed to cater for 110% of the total interconnected tank storage capacity, plus an additional 100 mm wall height (23.5 m^3) to cater for the volume consumed by the pipework, (future) pump and any other equipment that may be within the bunded area.

The tank farm bunded area has a sump to empty any uncontaminated (rainwater) or contaminated (leachate/wastewater) within the bunded area. At the request of the MRC, the sump has an external drain to facilitate the easy draining of uncontaminated stormwater from the bunded area. The sump drain has been fitted with an isolation valve and endcap to control the outflow from the sump. It is noted that the sump drain isolation valve is always be closed and the threaded end cap fitted. Only when the sump is to be drained of uncontaminated stormwater is the endcap to be removed and the isolation valve opened.

In the event of contaminated liquid spillage into the tank farm, the sump drain could be used to remove the contaminated liquid from the tank farm, either by connecting a discharge pump to the drain outlet or a water cart; however, care is to be taken to prevent any contaminated spillage from this external drain.

All pipeline access points, valves and tank overflows are located within the tank farm bunded area to prevent any uncontrolled spillage of the leachate/wastewater from any equipment.

The facility design includes tank level sensors, High level float valve shut off at 100% of the tank operating capacity and High/High level (105% of the tank operating capacity) float switches to trigger the electrically actuated isolation valves to shut off all inflow to the tanks and an alarm to mobile phones to notify the MRC that a tank has been overfilled, likely as a result of the failure of a float valve. Effectively, no leachate/wastewater can be pumped into the tanks if any of the three tanks register a High/High level. In addition to the incoming pipelines being shut down by electrically actuated valves, another electrically actuated isolation valve opens the washdown facility wastewater bypass pipeline to enable the washdown facility to continue to operate, with the wastewater being pumped into the landfill while the MRC resolves the tank overfilled situation.

4 Operation

4.1 Overall Leachate Management System

The leachate pipeline and tank farm project is a sub-project of an overall leachate and wastewater management system for the whole site. As a standalone pipeline and tank farm facility, the only activities that can be undertaken (once the landfill leachate sump pumps have been connected) is the initial filling of all three storage tanks with leachate and/or washdown wastewater, thereafter, once the tanks are full, the vehicle washdown facility wastewater can be diverted to the landfill via the bypass pipeline.

The assumption is that the pipeline and tank farm will only be utilised once there is a downstream process developed by the MRC (separate project).

4.2 Normal Operation

Once set up and operational, the pipeline and tank farm will effectively operate without the need for operator intervention. The tanks will fill up, and when some liquid is removed, the inlet float valves will drop, and the valves will open and let more liquid from into the tank(s). The only time that the liquid level in the tanks will drop significantly is if the outflow rate is greater than the inflow rate, which will be a function of the downstream extraction rate. The maximum inflow rate will be determined by the air pressure available to the landfill leachate sump Airwell pumps and the pumping rate from the vehicle wash down facility pump.

The storage tanks are simply large volume receptacles, that are automatically filled and emptied, providing a stored volume buffer to cater for the differential between the inflow and outflow rates, as determined by others.

4.3 Tank Farm

The tank farm pipework and fittings have been designed for a maximum daily flow rate of 250 kL being pumped in an eight-hour period (working day), while maintaining a pipe velocity less than 1 m/s. This is a conservative approach, as the facility could easily operate at a pipe velocity of approximately 2 m/s (double the design velocity). This provides the MRC with the option to pump the maximum daily flow rate over a shorter period during the day or increase the daily facility throughput.

Although all three tanks are interconnected, there is a system of isolation valves that enables the facility operator to use any configuration of tanks (one, two or three). With there being separate inflow pipelines for leachate and washdown wastewater, there is the option to use the tanks separately for leachate or wastewater (can be pumped simultaneously). However, there is only a single outlet pipeline; hence, if there is a need to keep the two liquid types separate, the single pipeline can be used to pump from a particular tank to remove a particular liquid; however, only one liquid type can be removed at any one time.

4.4 Tank Farm Emergency Pump Out

In the event that there is a system failure within the tank farm and the bunded area is flooded, a mobile pump will be required to pump the leachate/wastewater from the bunded area. The mobile pump suction hose can either be dropped into the bunded area or connected to the 50 mm diameter sump drain via a BSP connection.

If the leachate/wastewater is to be pumped to the landfill, then the mobile pump discharge pipe can be connected to the spare (standby) 160 mm diameter pipeline running under the adjacent access road or a layflat hose, installed aboveground, used to transfer the leachate/wastewater to the landfill. To use the spare 160 mm pipeline, all landfill leachate sump extraction pumps will need to be switched off and one of the scour point/hi-flo pump connection points used to let the leachate/wastewater out of the pipeline and onto the landfill surface.

If the leachate/wastewater is to be transferred to the downstream processing facility, then there needs to be a future pipe connection provided when the downstream processing facility is developed.

4.5 Main Pipeline

The main pipeline has been designed with a range of equipment to facilitate efficient operation and opportunity to get access to the pipeline to either pump surface leachate into the pipeline or extract leachate from the pipeline.

There are three air release valves located at the high points around the pipeline and an additional one on the pipeline just before the belowground road crossing. These are designed to remove any accumulated air within the pipeline to ensure efficient liquid transfer without air pocket blockages. The high points also include isolation valves and an additional blanked off “T” pieces with isolation valves. The pipeline isolation valves are to enable the operator to isolate sections of the pipeline, and the additional “T” piece arrangement is to enable air to be let into the pipeline to drain the pipe if required or to use air to push leachate out of a section of the pipeline.

The air release valves also allow air into the pipeline if the pipeline pressure becomes negative. There is an air release valve on one side of the pipeline isolation valve and a “T” piece arrangement on the other side. This allows the operator to drain the pipeline on one side of the isolation valve while maintaining pressure in the pipe on the other side of the isolation valve. With a ring main, the configuration of pipeline isolation valves and air inlet ability allows the operator to isolate a portion (one third) of the pipeline and drain it while the remainder (two thirds) of the pipeline remains operational.

The pipeline also includes seven scour points, which may also be used for connections to the site hi-flo leachate pump. The scour points/hi-flo pump inlets are located at the low points of the pipeline and at other convenient locations for possible future surface leachate pumping into the pipeline.

4.5.1 Wastewater Pump and Pipeline

The wastewater pumping system is automated and controlled by float switches, including High level alarm to nominated mobile phones if the tank level gets to within 300 mm of the overflow level.

Once the pump controls have been set, there should be no operational need to do anything further to the wastewater pumping system.

The delivery pipeline transfers the wastewater to the tank farm, where the wastewater is pumped into the storage tanks. In the event that the tank farm is full, the wastewater delivery will be automatically diverted to the landfill, again, without any requirement for operator intervention.

There is a Principal Supplied particulate filter installed in the pipeline in close proximity to the belowground tank. It will be necessary to occasionally empty the filter sump of accumulated solids. The frequency of when the filter needs to be emptied will be a function of the quantity of solids in the wastewater, which is likely to be highly variable; hence, this operational activity will initially be a trial-and-error process to determine how often the filter needs to be emptied.

5 Maintenance

5.1 General

The pipeline and tank farm infrastructure have been designed using high-quality equipment and fittings; however, due to the aggressive environment of handling leachate, it is essential that the system performance be monitored and maintained to ensure the continuous, efficient operation of the facility.

5.2 Scour Points/Hi-Flo Pump Inlets

Scour points/hi-flo pump inlet are maintenance free and would only be maintained/repaired if identified as being non-functional when required to be used.

5.3 Air Release Valves

Air release valves are virtually maintenance free, but periodic inspection and potential maintenance is required.

All inspection and maintenance is to be carried out in accordance with the manufacturer's recommendations.

5.4 Isolation Valves

All isolation valves are made of 316 stainless steel (marine grade); these are anticipated to operate seamlessly for many years.

Typically, it is not anticipated that the valves on the pipeline will be utilised (opened/closed) very often, as they will be set in the open position and the pipeline utilised. They will only be closed in the rare occasion that there is a need to change/stop the flow in the pipeline.

Most of the valves in the tank farm will similarly be left in the open or closed position under normal, automated facility operation; however, if there is a need to change the liquid type or to utilise different tanks, some of the isolation valves in the tank farm may be used regularly during liquid transfer.

There is no essential requirement to maintain the isolation valves, as they would simply be replaced if they malfunctioned (to enable continuous operation of the leachate management system). The removed valve would be serviced and kept as a spare valve for subsequent use in the event of another valve failure. All isolation valves should be occasionally opened and closed to ensure effective operation; however, this is not an essential activity.

5.5 Float Valves

Float valves are to be inspected regularly to confirm that there is no buildup of any solid residue (evaporites) on the moving parts of the valve, that the float mechanism is hinging freely and that the float valve completely shuts off when the float is at the High level.

5.6 Float Switches

Float switches are to be tested regularly to confirm functionality. This process includes the following activities:

- Each tank is to be manually overfill by holding the float valve down below the tank High level, which will prevent the float valve shutting off, and the tank will continue to fill up.
- Once the tank level gets to 105% of the tank operating capacity (approximately 150 mm above the tank High level), the float switches should automatically activate all electrically actuated isolation valves, which will close both incoming pipelines (leachate and wastewater) and then open the washdown facility wastewater bypass to the landfill. In addition, the float switches should send a High/High alarm messages to the nominated mobile phones.
- The float valve is to then be released and should then automatically shut and prevent the tank from filling any further (approximately 150 mm or an additional 5% of the tank capacity from High/High level to overflow).
- Liquid is then to be removed from the tank to at least 150 mm below the High level, which should then deactivate the float switches and hence reverse the functionality of the electrically actuated isolation valves, which will close the washdown facility wastewater bypass and then open both incoming pipelines. A further message should then be sent to the nominated mobile phones, notifying that the tank level is back within acceptable operating parameters. The system is then back in normal operating position and the test deemed successful.

5.7 Wastewater Pump

The pump should be occasionally lifted out of the tank (lifting chain included in the facility design) and the impeller inspected for blockage or damage. The layflat hose within the tank should also be inspected for damage.

If the pump fails or has significantly reduced flow, the tank will over-fill and the alarm go off. In this event, the pump is to be removed and inspected and if necessary, replaced with the spare macerator pump. The damaged pump is to be repaired or replaced and this then used as the spare.

5.8 Maintenance Period

The aggressive nature of leachate is a function of what is in the leachate and the impact that this will have on the equipment and fittings; hence, the actual period between maintenance activities is dependent on the leachate composition. And, over time, the leachate composition may change and hence the maintenance period, albeit a very slow change.

Initially, the recommendation is that the inspection and maintenance activities occur on a monthly basis to confirm efficient system operations. Should no issues be identified during these monthly inspections and maintenance activities, the period of inspection and maintenance can be pushed out progressively, to potentially quarterly activities. The actual period between maintenance activities will be a function of the performance of each item of equipment or fitting.

6 Safety in Design

6.1 Introduction

Safety in Design is carried out in accordance with the requirements of the *WHS Act 2020 – Section 22* (State) and *Safety Work Australia - Model Code of Practice* (Federal). In summary Safety in Design refers to the design considerations that, as far as possible, reduce the risk to human health and well-being during the construction and operation of the leachate management system.

6.2 Design Considerations

The design of the pipeline and tank farm have considered the safety aspects associated with the construction, operation, monitoring and maintenance of the infrastructure.

This Safety in Design assessment has been undertaken to assist in ensuring that the associated construction, operation, monitoring and maintenance activities are conducted with a full appreciation of any inherent risks in the design and operation of the facility.

The overall design of the infrastructure has focused on simplicity of infrastructure to achieve the necessary functionality through all stages of the asset life.

A risk assessment has been undertaken on the infrastructure design to identify any inherent risks that may exist within the design that could materialise during facility construction, operation, monitoring and maintenance.

The safety risk ratings have been assessed in accordance with the likelihood and consequence of a safety incident from the proposed development impacting human and environmental receptors.

Likelihood is assessed based on the following scale:

- Rare – The risk event may only occur in exceptional circumstances.
- Unlikely – The risk will probably not occur in most circumstances.
- Possible – The risk event could occur at some time.
- Likely – The risk event will probably occur in most circumstances.
- Almost Certain – The risk event is expected to occur in most circumstances.

Consequence is assessed based on the following scale:

- Slight – Minor impact to human or environmental receptors. No personnel injury or any environmental remediation required. Incident reporting and minor on-site corrections required.
- Minor – Low-level impact to human or environmental receptors. Minor personnel injury or environmental impact. On-site medical treatment or immediate environmental remedial action required from on-site available personnel and equipment.
- Moderate – Mid-level impact to human or environmental receptors. Moderate personnel injury or environmental impact. Off-site medical treatment, with personnel returning to work within 24 hours or specialist environmental remedial action required from off-site personnel and equipment, with remedial action completed within 24 hours.

- Major - High-level impact to human or environmental receptors. Significant personnel injury or environmental impact. Off-site medical treatment, with personnel returning to work within five working days or specialist environmental assessment and subsequent remedial action required, with remedial action completed within five working days.
- Severe – Extreme impact to human or environmental receptors. Severe personnel injury or environmental impact. Off-site medical treatment, with personnel either not returning to work or returning to work after five working days or specialist environmental assessment and subsequent remedial action required, with remedial action taking longer than five working days.

Table 2 – Risk Rating Matrix provides the risk rating based on the relevant risk likelihood and consequence.

Table 2 – Risk Rating Matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost Certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

Table 3 – Safety in Design Consideration and Risk Assessment provides detail on all aspects relating to the safety in design considerations.

Table 3 – Safety in Design Consideration and Risk Assessment

Item	*Hazard Description	Design Control	Likelihood	Consequence	Risk
Construction					
1	Earthworks – Deep excavation: Injury due to earthworks collapse	Where possible, all infrastructure is aboveground. Pipe trench depths are kept to a minimum (1 m) and common trenches are used to increase the trench width in comparison to depth.	Rare	Slight	Low
2	Confined Spaces – Storage Tank entry during construction: asphyxiation	If steel panel tanks are utilised, then the tanks will be installed by the tank supplier and hence, the entry into the completed tank will be controlled and undertaken by specialist contractor, that is specifically set up to manage the potential hazard. If plastic tanks are utilised, then the pre-manufactured tanks will be delivered to site and simply installed into the works. Installing fittings and instrumentation will be done externally or from above the tanks. There should be no requirement to enter the tanks after they have been installed by the specialist contractor.	Rare	Moderate	Medium
3	Confined Spaces – Existing Wastewater Tank entry during construction: asphyxiation	When cleaning out the existing vehicle washdown facility belowground wastewater tank, if it is necessary to enter the tank, the appropriate Job Safety Assessment is to be completed to ensure that the works are carried out safely. The belowground tank is	Rare	Slight	Low

Item	*Hazard Description	Design Control	Likelihood	Consequence	Risk
		significantly wider than it is deep; hence, the aspiration risk is extremely low.			
4	Explosion caused by landfill gas accumulation	All infrastructure is located outside of the landfill footprint; hence, minimal exposure to landfill gas. There is some works in close proximity to the edge of the landfill and the leachate sump access points, also in pipe trench excavations are where there is a possibility of landfill gas accumulation. Gas detection (odour and/or instrumentation) utilised to confirm the presence of landfill gas in the works area. Wind will disperse any accumulated landfill gas.	Unlikely	Major	Medium
5	Asphyxiation caused by landfill gas accumulation	No confined space entry. Pipe trenches are shallow. Wind will disperse any accumulated landfill gas.	Rare	Moderate	Medium
6	Working at heights – Fall injury	Three relatively small (low) tanks utilised, as opposed to a single larger (higher) tank. Tank height approximately 3 m. Tank design includes a safe access ladder for each tank.	Rare	Moderate	Medium
7	Traffic Management – Heavy vehicle movement in close proximity to the works area	Tank farm location restricted due to space limitations. Adjacent access road has adequate width to move traffic away from the construction area.	Rate	Major	Medium

[redacted]

Item	*Hazard Description	Design Control	Likelihood	Consequence	Risk
		There are adequate sight lines in all directions.			
8	Hazardous Substance Contact	Connection of the leachate extraction system to the pipeline will be carried out by the MRC leachate management contractor, post-construction. Washdown facility wastewater pump will be installed into the active wastewater tank. The wastewater is highly diluted and hence, low-hazardous impact. The appropriate hazard identification and assessment will be carried out by the contractor.	Unlikely	Slight	Low
9	Hazardous Substance Spillage	Connection of the leachate extraction system to the pipeline will be carried out by the MRC leachate management contractor, post-construction. Washdown facility wastewater currently flows into the vetiver grass biofilter. This will continue post-construction, until the MRC develop a downstream process facility.	Rare	Slight	Low
Operation					
10	Confined Spaces – Tank entry by operational personnel: asphyxiation	The only confined spaces are the inside of the liquid storage tanks. There is no operational requirement to enter the tanks. In the event of a need to enter a tank for maintenance/repair purposes, this would be undertaken by a specialist contractor that	Rare	Moderate	Medium

[redacted]

Item	*Hazard Description	Design Control	Likelihood	Consequence	Risk
		would undertake the necessary hazard identification and assessment.			
11	Explosion caused by landfill gas accumulation	Above ground infrastructure. No need for any sparks during facility operation. Facility operators are used to working around the landfill, in the presence of landfill gas.	Rare	Major	Medium
12	Asphyxiation caused by landfill gas accumulation	Above ground infrastructure.	Rate	Moderate	Medium
13	Working at heights – Fall injury	Three smaller (lower) tanks utilised, as opposed to a single larger (higher) tank. Tank height approximately 3 m. Tank design includes a safe access ladder for each tank.	Rare	Moderate	Medium
14	Traffic Management – Heavy vehicle movement in close proximity to the tank farm	Tank farm location restricted due to space limitations. Armco barrier and concrete bund wall to protect the corner of the tank farm that is in close proximity to the adjacent haul road. Adjacent access road has adequate width for traffic to stay away from the tank farm. There are adequate sight lines in all directions. Access to the tank farm located well away from the adjacent road conflict area.	Rare	Moderate	Medium

[redacted]

Item	*Hazard Description	Design Control	Likelihood	Consequence	Risk
15	Safe/Easy Access to Tank Farm – Fall hazard when entering and exiting the tank farm due to the 1.4 m high bund wall	Safe access stairs and handrail included in the design.	Rate	Minor	Low
16	Fall hazard into Tank Farm – Accidental falling into the tank farm bunded area	Guardrail with intermediate rail provided around the tank farm bund wall where the external height of the wall is less than 1 m high (due to surrounding earthworks fill behind the wall).	Rare	Minor	Low
17	Hazardous Substance Contact	Sealed pipe and tank system. No contact with any leachate or wastewater. Scour point/Hi-Flo pump access utilisation will result in some minor spillage of leachate when disconnecting pipework. This is unavoidable and the appropriate PPE (gloves/protective glasses) to be utilised.	Possible	Slight	Low
18	Hazardous Substance Spillage	Sealed pipe and tank system. Bunded tank farm. Scour point/Hi-Flo pump access utilisation will result in some minor spillage of leachate when disconnecting pipework. The volume will be a few litres as most (volume in pipe after the isolation valve), which will have no environmental impact. If there is a larger spill >10 litres, the contaminated soil can be removed and sent to landfill and the area backfilled with clean soil.	Possible	Slight	Low

* The hazards identified relate specifically to the design influence in the construction, operation, monitoring and maintenance of the facility. It is anticipated that suitable qualified contractors and site personnel will be utilised during the facility construction and operation.

[redacted]

6.3 Safety in Design Summary

In summary, due to the nature of the project and the design utilise, there should be no significant safety issues that will occur during construction or operation of the leachate pipeline and tank farm.

Appendices

Appendix No. 1 – Pipeline and Tank Farm Drawing Set

[redacted]

Appendix No. 1 – Pipeline and Tank Farm Drawing Set

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MINDARIE REGIONAL COUNCIL

TAMALA PARK LANDFILL

PROPOSED LEACHATE PIPELINE AND TANK FARM

LOCALITY PLAN
NOT TO SCALE

DRAWING SCHEDULE

DRAWING No.	REVISION	DESCRIPTION
MRC - TF - 01	C	COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN
MRC - TF - 02	C	SITE PLAN
MRC - TF - 03	C	SITE DETAILS - SHEET 1 OF 3
MRC - TF - 04	C	SITE DETAILS - SHEET 2 OF 3
MRC - TF - 05	C	SITE DETAILS - SHEET 3 OF 3
MRC - TF - 06	C	TANK FARM LAYOUT PLAN
MRC - TF - 07	C	SECTIONS AND DETAILS - SHEET 1 OF 2
MRC - TF - 08	C	SECTIONS AND DETAILS - SHEET 2 OF 2
MRC - TF - 09	C	VEHICLE WASHDOWN TANK DETAILS
MRC - TF - 10	C	LAYOUT PLAN - SHEET 1 OF 2
MRC - TF - 11	C	LAYOUT PLAN - SHEET 2 OF 2

NOTES:

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS.
2. BEFORE PROCEEDING WITH THE WORK ANY DISCREPANCIES IN THE CONTRACT DOCUMENTS SHALL BE REFERRED FOR DECISION TO THE ENGINEER.
3. DO NOT SCALE FROM DRAWINGS. IF IN DOUBT, ASK!!
4. CONTRACTOR SHALL VERIFY ALL LOCATIONS OF SERVICES, ALL DIMENSIONS AND LEVELS PRIOR TO CONSTRUCTION.
5. ALL MATERIALS & WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AND THE LOCAL AUTHORITY'S BY-LAWS.
6. THE CONTRACTOR IS RESPONSIBLE TO OBTAIN ALL RELEVANT APPROVALS PRIOR TO COMMENCEMENT OF WORKS.

FOR TENDER
22 JULY 2025

REVISIONS	No.	BY	DATE	DESCRIPTION
	C	S.B.Y.	22/07/25	ISSUED FOR TENDER
	B	S.B.Y.	25/06/25	ISSUED FOR APPROVAL
	A	S.B.Y.	26/02/25	PRELIMINARY ISSUE FOR REVIEW

DRC. FILE		DATE
DESIGN	I.W.	02/25
DRAWN	S.B.Y.	02/25
DES. CHK.	I.W.	
DWG. CHK.	I.W.	

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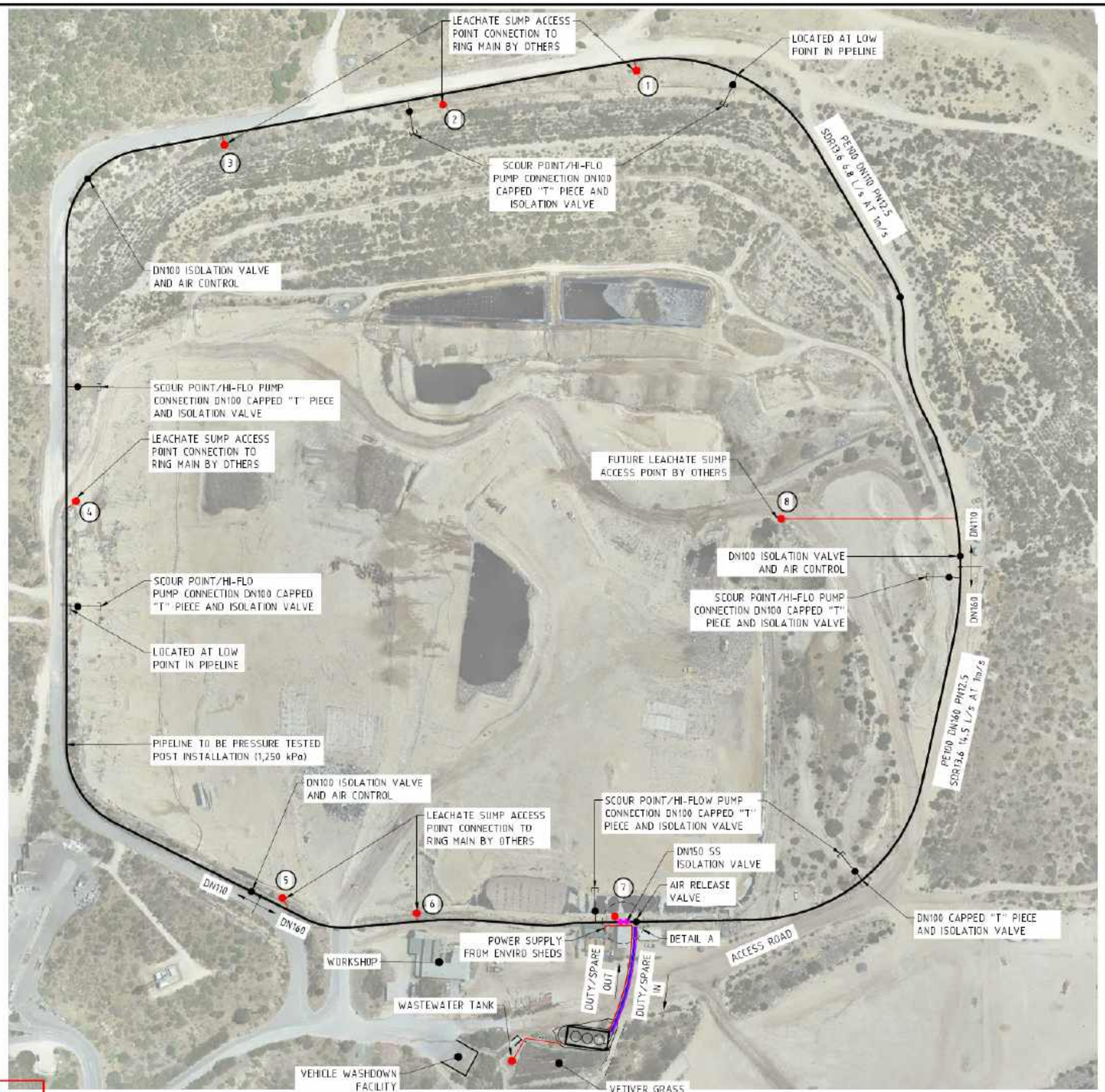
MINDARIE REGIONAL COUNCIL

TAMALA PARK LANDFILL
PROPOSED LEACHATE PIPELINE AND TANK FARM
COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN

SCALE: AS SHOWN
SHEET:
DRG No.: MRC-TF-01
REVISION: C



LAYOUT PLAN
SCALE 1 : 1,250 (A1)

GENERAL NOTES:

1. ALL WORKS SHALL BE IN ACCORDANCE WITH CURRENT LOCAL AUTHORITY SPECIFICATIONS AND STANDARD DRAWINGS. IT IS THE CONTRACTORS RESPONSIBILITY TO COMPLY WITH ALL RELEVANT LEGISLATION.
2. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN THE STABILITY OF ANY TEMPORARY WORKS ON THE SITE.
3. ALL DIMENSIONS ARE IN METERS UNLESS NOTED OTHERWISE. DO NOT SCALE FROM DRAWINGS.
4. IT IS NECESSARY TO CONFIRM ALL SET OUT AND LEVELS WITH THE SUPERINTENDENT PRIOR TO COMMENCING CONSTRUCTION. BEFORE PROCEEDING WITH THE WORK ANY DISCREPANCIES IN THE CONTRACT DOCUMENTS SHALL BE REFERRED FOR DECISION TO THE ENGINEER/SUPERINTENDENT.
5. ANY VARIATIONS FROM THE DRAWINGS TO BE DISCUSSED WITH THE SUPERINTENDENT.
6. NOTES ON DRAWINGS SHALL BE CROSS REFERENCED TO THE SPECIFICATIONS WHICH HAS FURTHER DETAILS OF THE REQUIREMENTS. IF THE DRAWING NOTES AND THE SPECIFICATIONS ARE NOT CONSISTENT THE SPECIFICATIONS TAKES PRECEDENCE.
7. LOCATION AND LEVEL OF EXISTING SERVICES AND STRUCTURES HAS BEEN PLOTTED FROM AVAILABLE RECORDS AND IS INDICATIVE ONLY. THE CONTRACTOR SHALL ACCURATELY LOCATE THESE ON SITE PRIOR TO COMMENCING WORKS AND SHALL PROTECT ALL EXISTING SERVICES DURING CONSTRUCTION. ANY DAMAGE TO EXISTING SERVICES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

NOTE - UNDERGROUND SERVICES
UNDERGROUND SERVICE LOCATIONS SHOWN ON THIS PLAN HAVE BEEN DETERMINED BY FIELD SURVEY AND/OR OFFICE RECORDS, AND MAY NOT REPRESENT ALL SERVICES OR EXACT LOCATIONS. THE CONTRACTOR MUST ACCURATELY LOCATE AND DEPTH ALL SERVICES LIKELY TO BE ENCOUNTERED DURING CONSTRUCTION, PRIOR TO COMMENCING ANY EXCAVATION WORKS. VERY IMPORTANT TO CHECK BEFORE STARTING CONSTRUCTION. ANY CLASHES MUST BE REPORTED TO ENGINEER ASAP.

25 0 25 50 75 100 125m
SCALE 1:1250 @ A1 SCALE 1:2500 @ A3

FOR TENDER
22 JULY 2025

REVISIONS

No.	BY	DATE	DESCRIPTION
C	S.B.Y.	22/07/25	ISSUED FOR TENDER
B	S.B.Y.	23/04/25	ISSUED FOR APPROVAL
A	S.B.Y.	24/02/25	PRELIMINARY ISSUE FOR REVIEW

		DATE
DRG. FILE		
DESIGN	I.W.	02/25
DRAWN	S.B.Y.	02/25
DES. CHK.	I.W.	
DWG. CHK.	I.W.	

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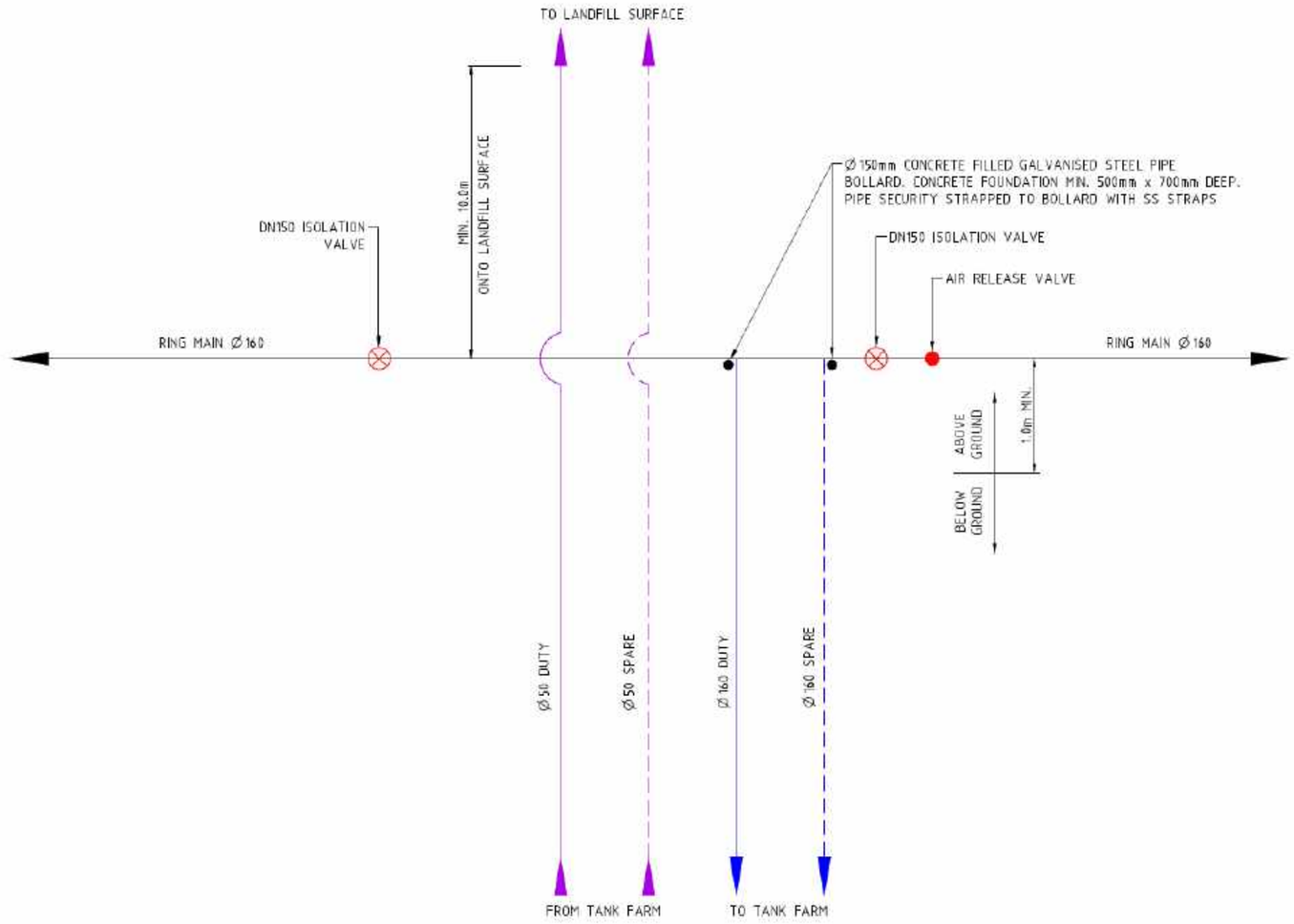
MINDARIE REGIONAL COUNCIL

TAMALA PARK LANDFILL
PROPOSED LEACHATE PIPELINE AND TANK FARM
SITE PLAN

SCALE: AS SHOWN
SHEET:
DRG No.: MRC-TF-02
REVISION: C



DETAIL A – RING MAIN PIPELINE TIE IN

NOT TO SCALE

FOR TENDER

22 JULY 2025

REVISIONS

No.	BY	DATE	DESCRIPTION
C	S.B.Y.	22/07/25	ISSUED FOR TENDER
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		DATE
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DRAWN	S.B.Y.	02/25
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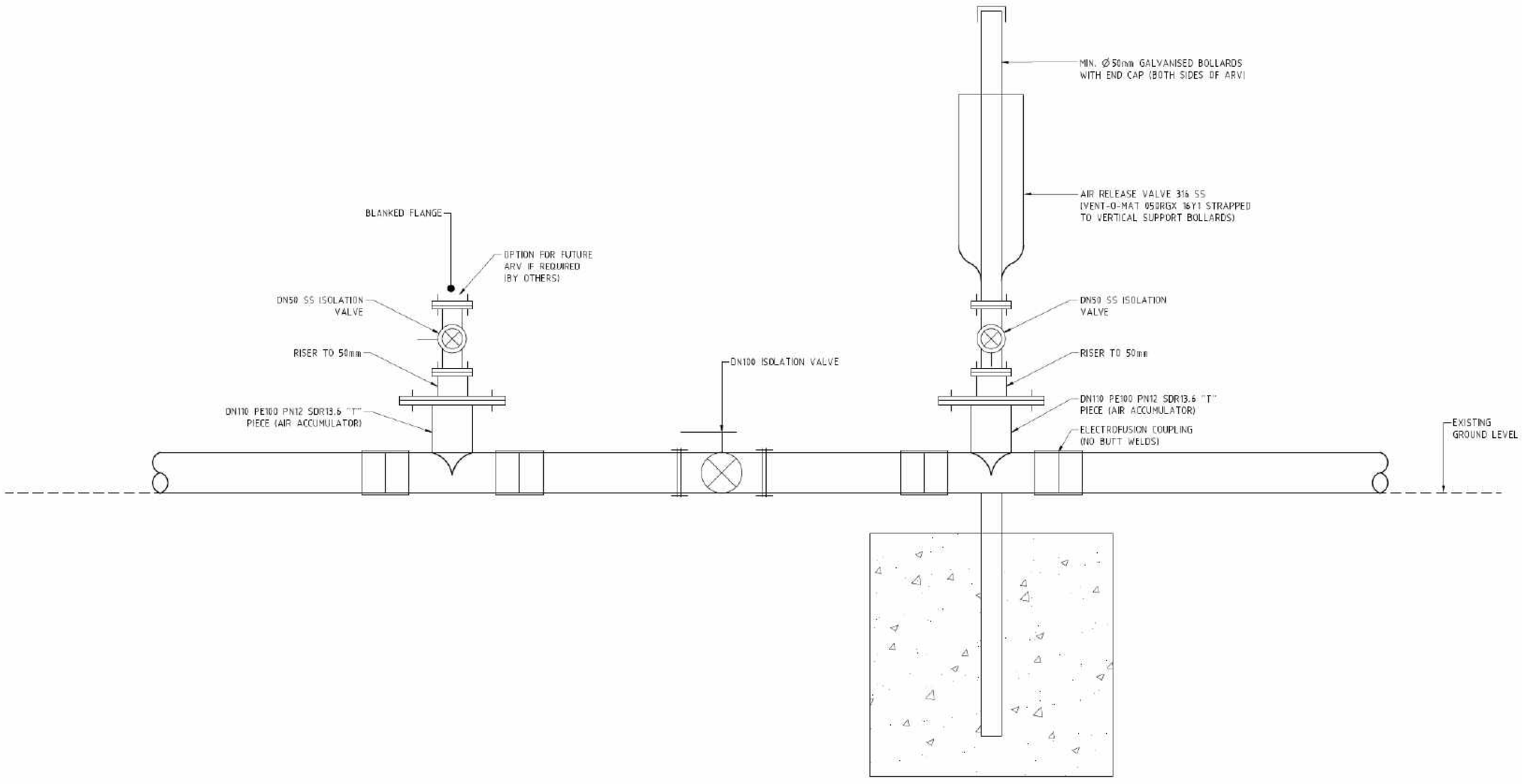
MINDARIE REGIONAL COUNCIL

TAMALA PARK LANDFILL
PROPOSED LEACHATE PIPELINE AND TANK FARM
SITE DETAILS – SHEET 1 OF 3

SCALE	AS SHOWN
SHEET	
DRG No.	REVISION C MRC-TF-03



DN100 ISOLATION VALVE AND AIR CONTROL DETAIL (ELEVATION)
SCALE 1 : 5 (A1)

FOR TENDER
22 JULY 2025

0.1 0 0.1 0.2 0.3 0.4 0.5m
SCALE 1:5 @ A1 SCALE 1:10 @ A3

REVISIONS					DRG. FILE		DATE
	C	S.B.Y.	22/07/25	ISSUED FOR TENDER	DESIGN	I.W.	02/25
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	A	S.B.Y.	24/02/25	PRELIMINARY ISSUE FOR REVIEW	DES. CHK.	I.W.	
	No.	BY	DATE	DESCRIPTION	DWG. CHK.	I.W.	

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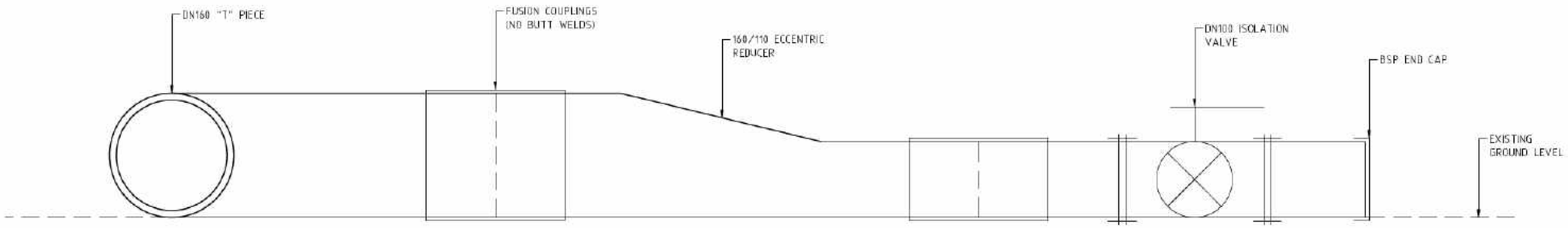
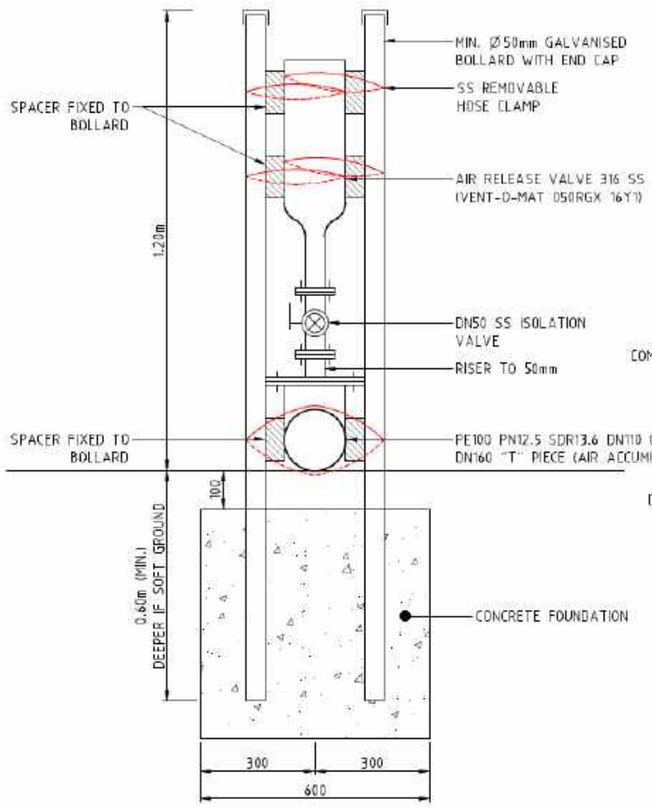
TAMALA PARK LANDFILL
PROPOSED LEACHATE PIPELINE AND TANK FARM
SITE DETAILS – SHEET 2 OF 3

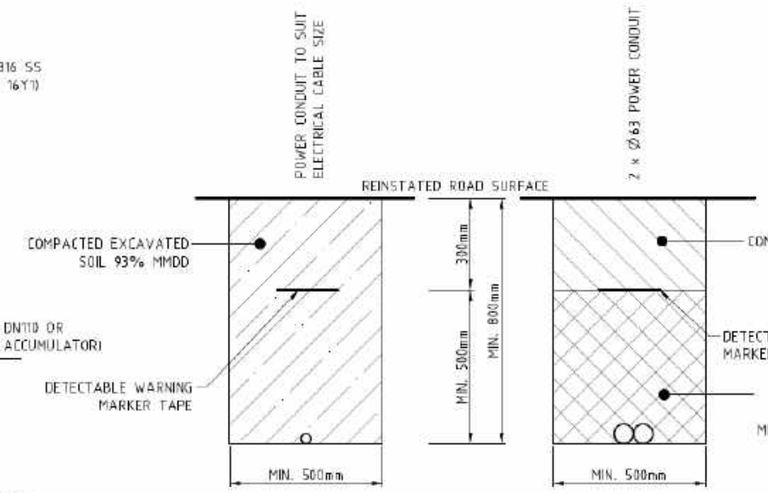
SCALE	AS SHOWN
SHEET	
DRG No.	REVISION C MRC-TF-04



SCOUR POINT/HI-FLOW PUMP CONNECTION (ELEVATION)
NOT TO SCALE

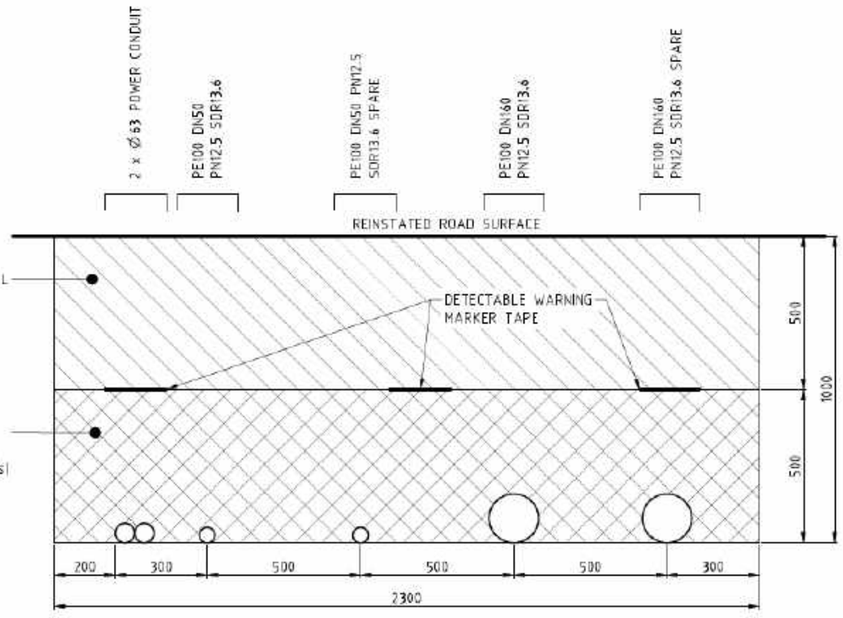


AIR RELEASE VALVE
NOT TO SCALE



ELECTRICAL CABLE TRENCH DETAIL TANK FARM TO WASTEWATER TANK
SCALE 1 : 10 (A1)

ELECTRICAL CABLE TRENCH DETAIL ENVIRO SHED TO PIPE SERVICES TRENCH
SCALE 1 : 10 (A1)



PIPE SERVICES TRENCH DETAIL - ROAD CROSSING
SCALE 1 : 10 (A1)

FOR TENDER
22 JULY 2025

0.1 0 0.1 0.2 0.3 0.4 0.5m
SCALE 1:5 @ A1 SCALE 1:10 @ A3

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DRAWN	S.B.Y.	02/25
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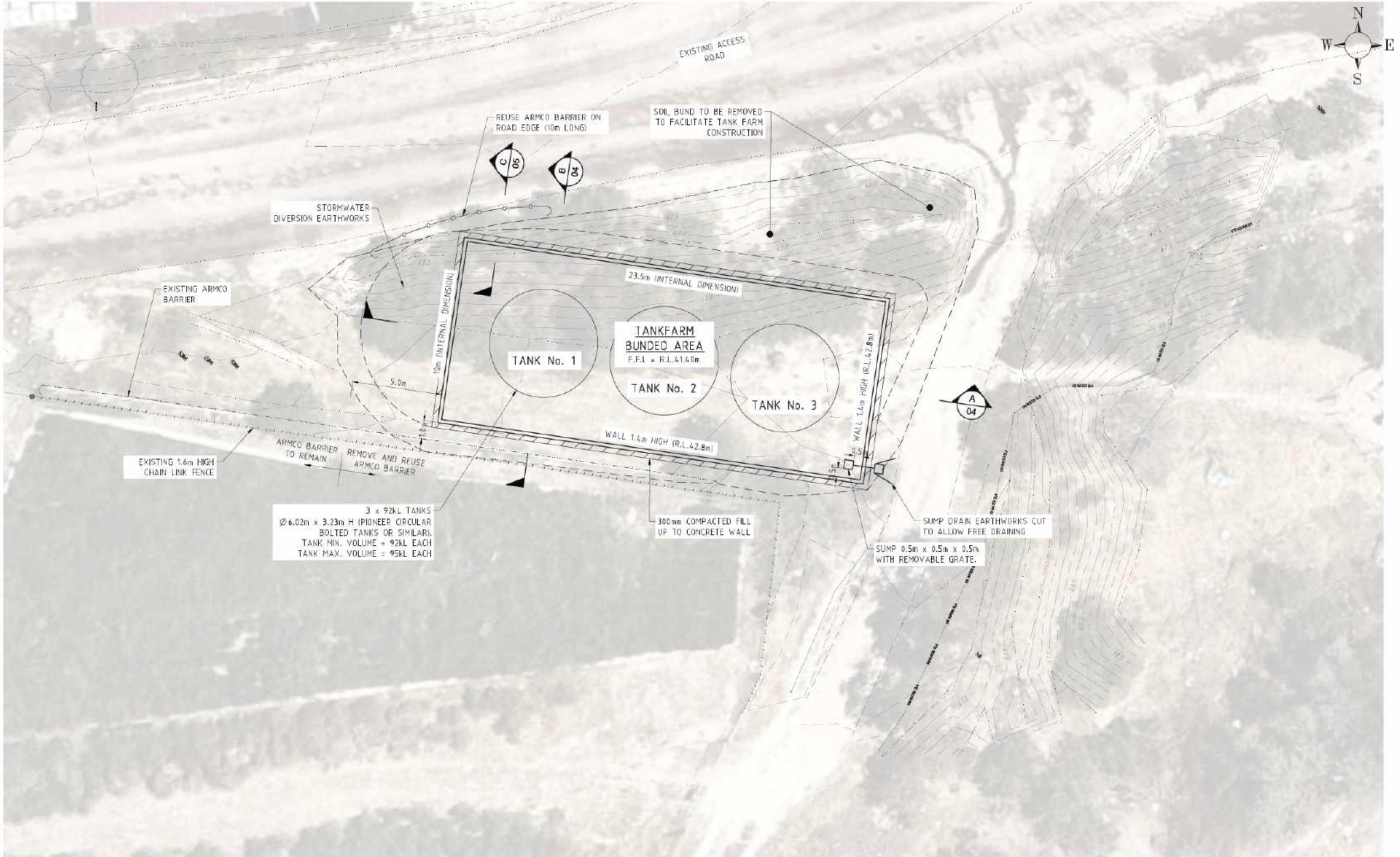
MINDARIE REGIONAL COUNCIL

TAMALA PARK LANDFILL
PROPOSED LEACHATE PIPELINE AND TANK FARM
SITE DETAILS – SHEET 3 OF 3

SCALE	AS SHOWN
SHEET	
DRG No.	REVISION C MRC-TF-05



FOR TENDER
22 JULY 2025

LAYOUT PLAN
SCALE 1 : 100 (A1)

2 0 2 4 6 8 10m
SCALE 1:100 @ A1 SCALE 1:200 @ A3

REVISIONS	No.	BY	DATE	DESCRIPTION
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		DRG. FILE		DATE
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DRAWN	S.B.Y.	02/25
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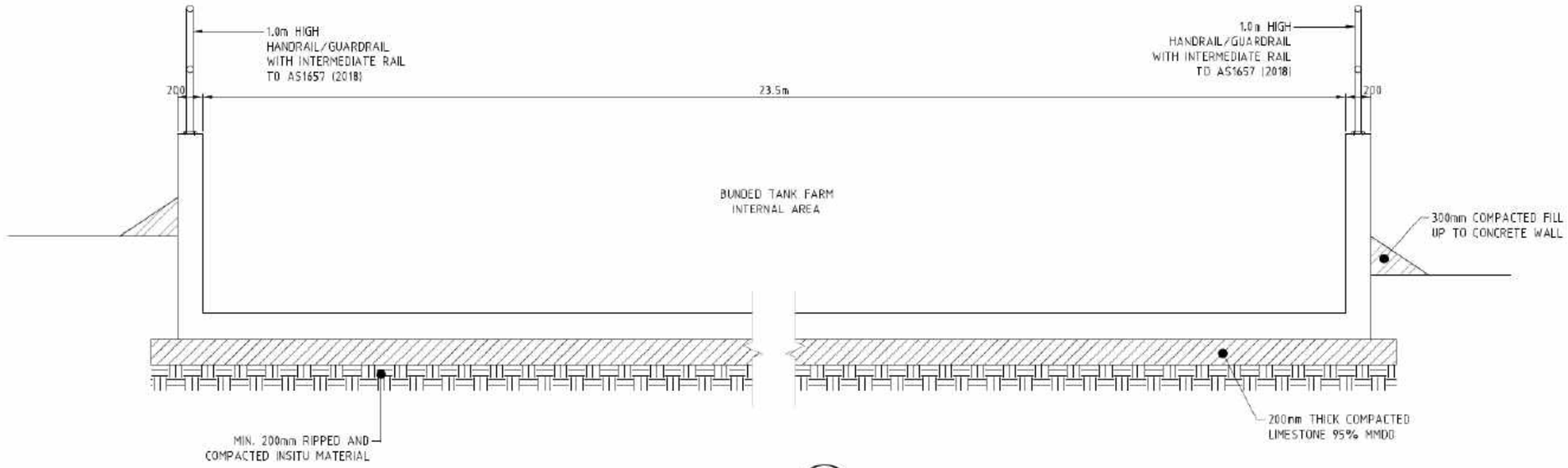
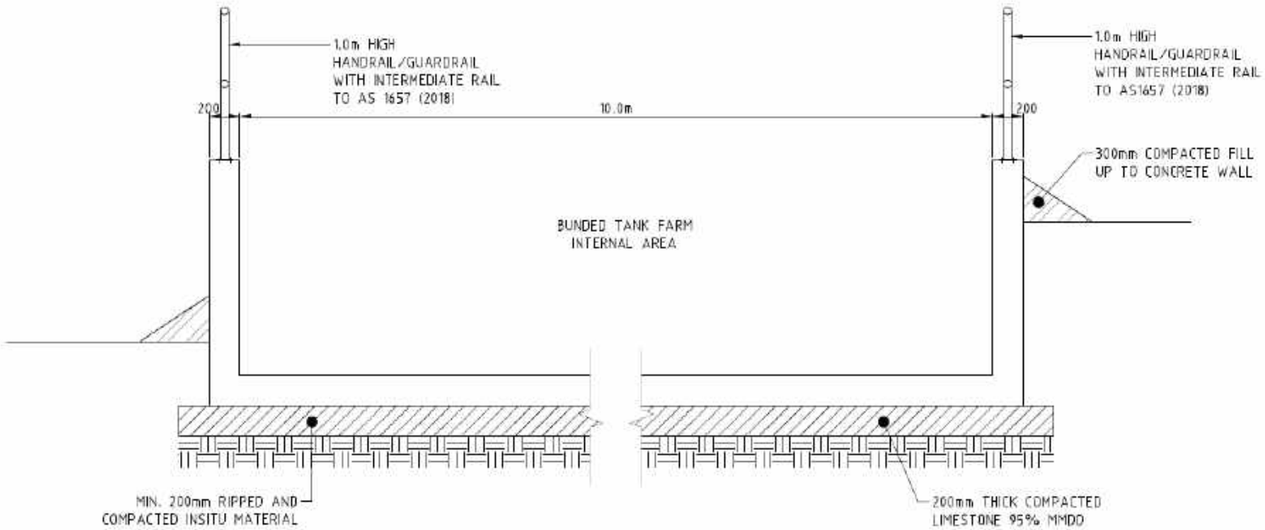
MINDARIE REGIONAL COUNCIL

TAMALA PARK LANDFILL
PROPOSED LEACHATE PIPELINE AND TANK FARM
TANK FARM LAYOUT PLAN

SCALE: AS SHOWN
SHEET:
DRG No.: MRC-TF-06
REVISION: C



TANK FARM BUNDING SECTION A / 03
SCALE 1 : 20 (A1)



TANK FARM BUNDING SECTION B / 03
SCALE 1 : 20 (A1)

0.2 0 0.2 0.4 0.6 0.8 1m
SCALE 1:10 @ A1 SCALE 1:20 @ A3

0.4 0 0.4 0.8 1.2 1.6 2m
SCALE 1:20 @ A1 SCALE 1:40 @ A3

FOR TENDER
22 JULY 2025

NOTE:
ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE SPECIFIED.

REVISIONS					DRG. FILE		DATE
	C	S.B.Y.	22/07/25	ISSUED FOR TENDER	DESIGN	I.W.	02/25
	B	S.B.Y.	23/04/25	ISSUED FOR APPROVAL	DRAWN	S.B.Y.	02/25
	A	S.B.Y.	24/02/25	PRELIMINARY ISSUE FOR REVIEW	DES. CHK.	I.W.	
	No.	BY	DATE	DESCRIPTION	DWG. CHK.	I.W.	

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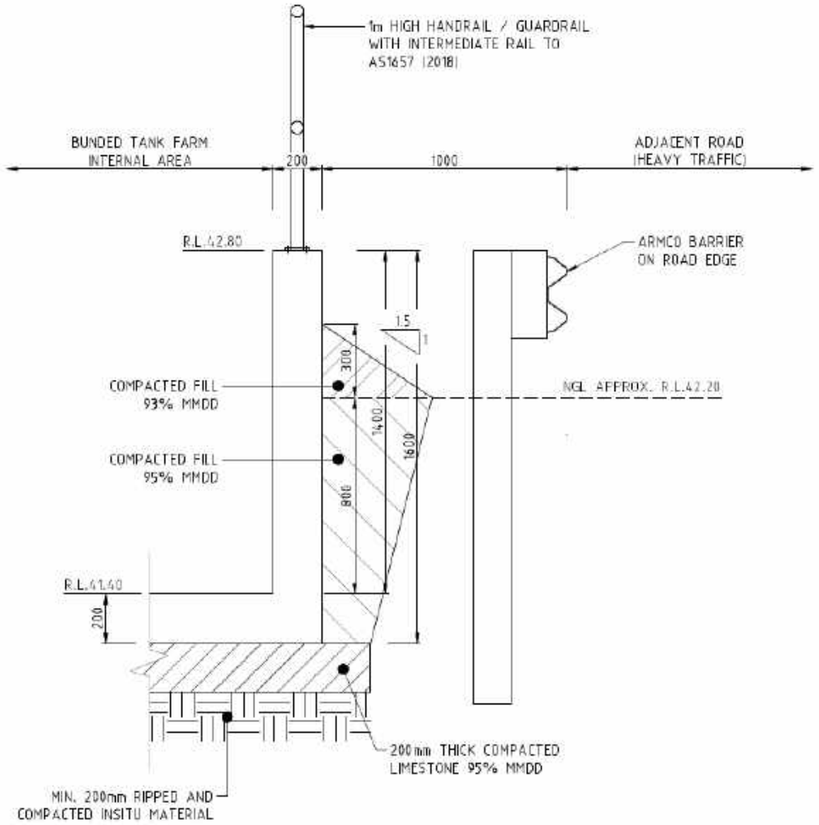
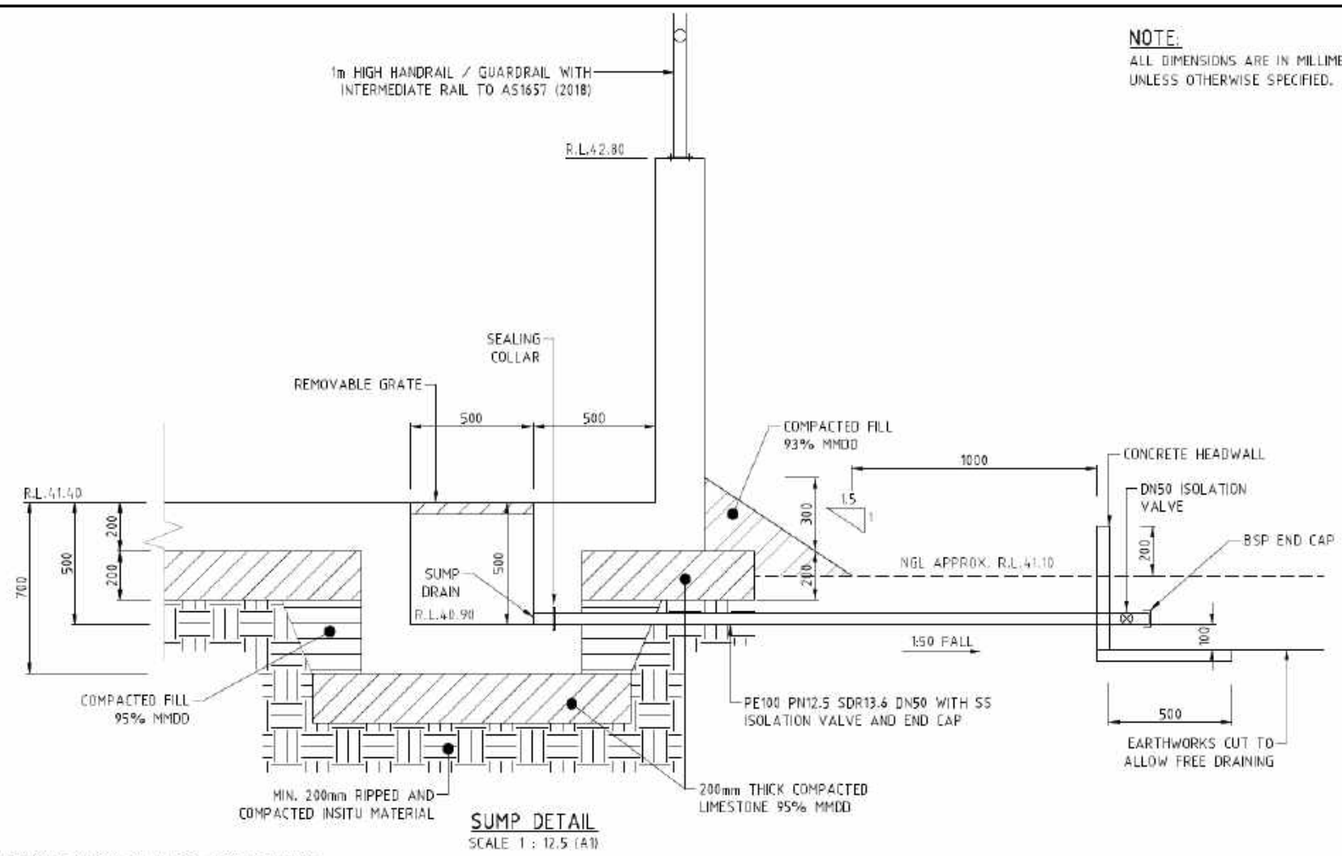
MINDARIE REGIONAL COUNCIL

TAMALA PARK LANDFILL
PROPOSED LEACHATE PIPELINE AND TANK FARM
SECTIONS AND DETAILS – SHEET 1 OF 2

SCALE	AS SHOWN
SHEET	
DRG No.	REVISION C MRC-TF-07

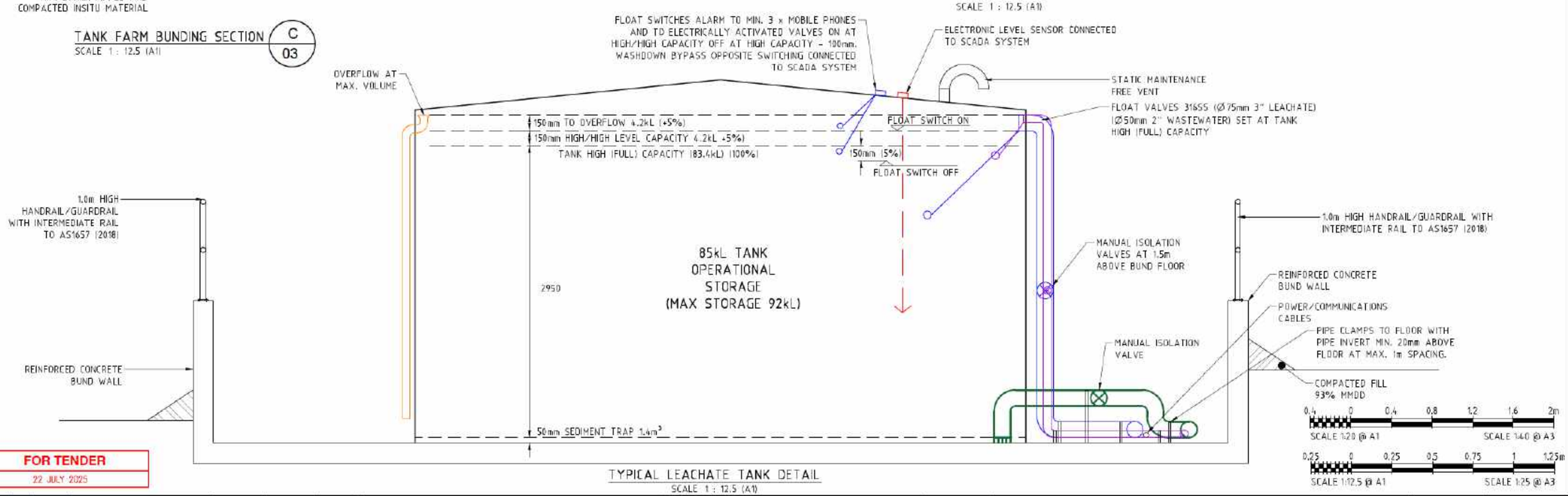


TANK FARM BUNDING SECTION C/03
SCALE 1 : 12.5 (A1)



SUMP DETAIL
SCALE 1 : 12.5 (A1)

NOTE:
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.



TYPICAL LEACHATE TANK DETAIL
SCALE 1 : 12.5 (A1)

FOR TENDER
22 JULY 2025

REVISIONS	No.	BY	DATE	DESCRIPTION
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DRG. FILE		DATE
DESIGN	I.W.	02/25
DRAWN	S.B.Y.	02/25
DES. CHK.	I.W.	
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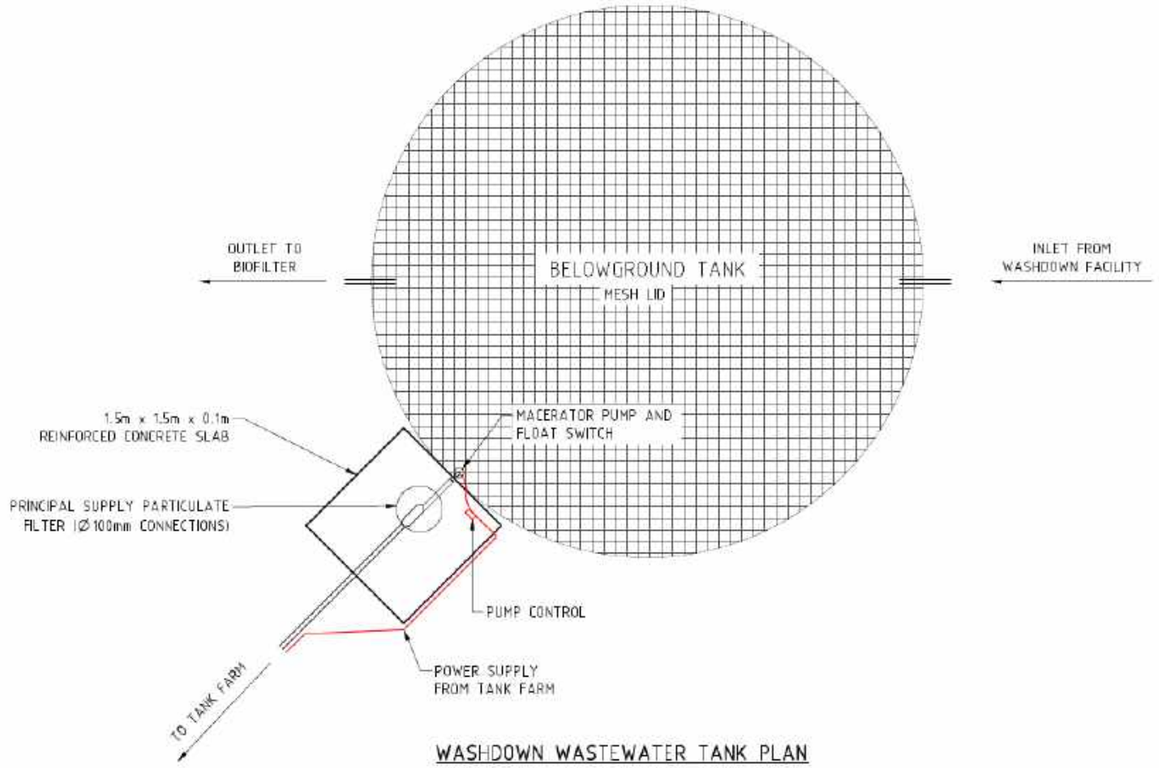
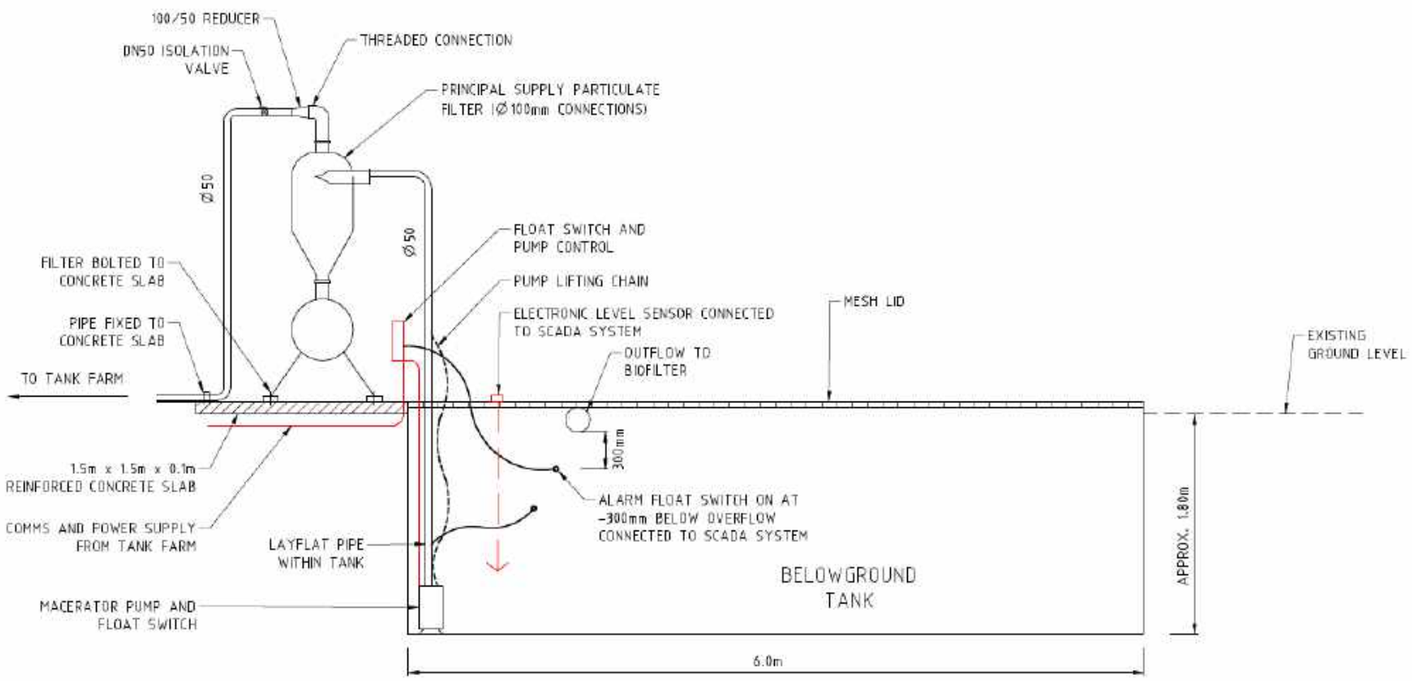
MINDARIE REGIONAL COUNCIL

TAMALA PARK LANDFILL
PROPOSED LEACHATE PIPELINE AND TANK FARM
SECTIONS AND DETAILS – SHEET 2 OF 2

SCALE	AS SHOWN
SHEET	
DRG No.	REVISION C MRC-TF-08



WASHDOWN WASTEWATER TANK PLAN
NOT TO SCALE



WASHDOWN WASTEWATER TANK SECTION
NOT TO SCALE

NOTE:
EMPTY TANK CONTENT TO BIOFILTER AND CLEAN OUT TANK PRIOR TO PUMP INSTALLATION

FOR TENDER
22 JULY 2025

REVISIONS					DRG. FILE		DATE
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	A	S.B.Y.	24/02/25	PRELIMINARY ISSUE FOR REVIEW	DES. CHK	I.W.	
	No.	BY	DATE	DESCRIPTION	DWG. CHK.	I.W.	

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TAMALA PARK LANDFILL
PROPOSED LEACHATE PIPELINE AND TANK FARM
VEHICLE WASHDOWN TANK DETAILS

SCALE	AS SHOWN
SHEET	
DRG No.	REVISION C MRC-TF-09

N
W E
S

FLASHING LIGHT ALARM DISPLAY (4 OFF - T1, T2, T3 AND WWT)

Ø50 DIGITAL FLOW METER WITH WEATHER COVER CONNECTED TO SCADA SYSTEM (PRINCIPAL SUPPLY)

PE100 DN160 PN12.5 SDR13.6

DN150 DIGITAL FLOW METER WITH WEATHER COVER. CONNECTED TO SCADA SYSTEM

ELECTRICALLY ACTUATED ISOLATION VALVE DN150 CONNECTED TO SCADA SYSTEM

DN150 ISOLATION VALVE

POWER/COMMUNICATION CABLES

SAFE ACCESS LADDER

1.4m HIGH CONCRETE WALL AT R.L.42.8m

DN150 ISOLATION VALVE

2 x Ø63 POWER CONDUIT

DUTY IN

SPARE IN

DUTY OUT

SPARE OUT

DN160 T-PIECE

CLOSED DN50 ELEC. ACTUATED VALVE (OPEN AT HIGH/HIGH) SECOND ACTION CONNECTED TO SCADA SYSTEM

OPEN DN50 ELEC. ACTUATED VALVE (CLOSED AT HIGH/HIGH) FIRST ACTION CONNECTED TO SCADA SYSTEM

DN150 ISOLATION VALVE AT 1.5m HIGH

DN150 ISOLATION VALVE

FLOAT VALVE 316 SS 3"

TANK INSPECTION HATCH

FLOAT SWITCHES HH ON LOW OFF CONNECTED TO SCADA SYSTEM

ELECTRONIC LEVEL SENSOR CONNECTED TO SCADA SYSTEM

TANK No. 1

OVERFLOW AT MAX. VOLUME

TANK No. 2

TANK No. 3

SAFE ACCESS LADDER

END CAP

DN50 WATER HAMMER ARRESTOR BSP CONNECTION WITH ISOLATION VALVE.

DN150 ISOLATION VALVE

DN50 AIR RELEASE VALVE ON TOP OF WALL WITH VERTICAL SUPPORT.

FROM VEHICLE WASHDOWN FACILITY

1.4m HIGH CONCRETE WALL AT R.L.42.8m

FLOOR LEVEL R.L.41.4m

DN50 WATER HAMMER ARRESTOR BSP CONNECTION WITH ISOLATION VALVE

PE100 DN50 PN12.5 SDR13.6 (FROM WASTEWATER TANK)

92kL TANK 6.02m x 3.23m (PIONEER CIRCULAR BOLTED TANK OR SIMILAR) TANK MIN. VOLUME = 92kL TANK MAX. VOLUME = 95kL

PUMP BY OTHERS

STEPS AND HANDRAILS TO AS1657 (2018)

CONCRETE FOUNDATION

MIN. 0.5m

EXTERNAL SUMP DRAIN TO DISCHARGE. EARTHWORKS CUT TO ALLOW FREE DRAINING.

SUMP 0.5m x 0.5m x 0.5m WITH REMOVABLE GRATE

NOTE:
ALL PIPES WITH PIPE CLAMPS TO FLOOR WITH PIPE INVERT MIN. 20mm ABOVE FLOOR AT MAX. 1m SPACING.

TYPICAL TANK FARM LAYOUT PLAN

SCALE 1 : 50 (A1)

FOR TENDER
22 JULY 2025

TANK FARM LAYOUT IS INDICATIVE ONLY. ACTUAL LAYOUT TO SUIT SPACE AVAILABILITY AND SINGLE SAFE LADDER ACCESS TO TOP OF TANKS.

SCALE 1:50 @ A1 — SCALE 1:100 @ A3

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DRG. FILE			DATE
DESIGN		I.W.	02/25
DRAWN		S.B.Y.	02/25
DES. CHK.		I.W.	
DWG. CHK.		I.W.	

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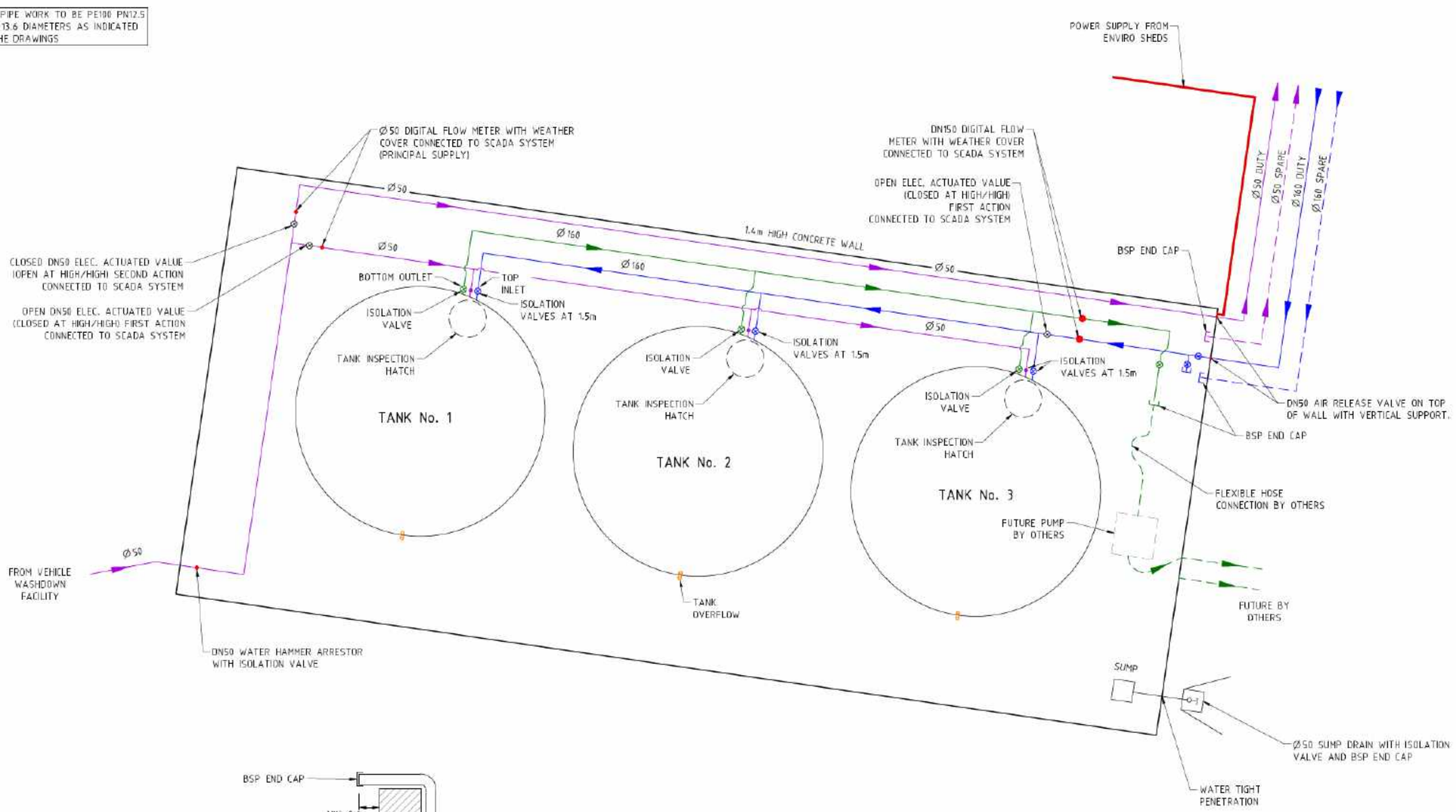
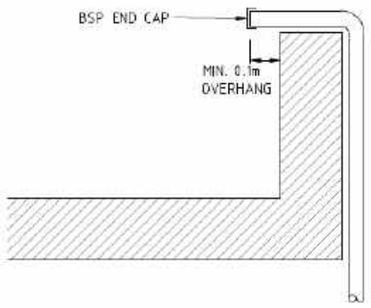
TAMALA PARK LANDFILL
PROPOSED LEACHATE PIPELINE AND TANK FARM LAYOUT PLAN – SHEET 1 OF 2

SCALE	AS SHOWN
SHEET	
DRG No.	REVISION C MRC-TF-10

ALL PIPE WORK TO BE PE100 PN12.5 SDR 13.6 DIAMETERS AS INDICATED IN THE DRAWINGS



PIPING DIAGRAM
SCALE 1 : 50 (A1)



SPARE PIPE TERMINATION DETAIL
NOT TO SCALE

FOR TENDER
22 JULY 2025

1 0 1 2 3 4 5m
SCALE 1:50 @ A1 SCALE 1:100 @ A3

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DWG. CHK.	I.W.		

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MINDARIE REGIONAL COUNCIL

TAMALA PARK LANDFILL
PROPOSED LEACHATE PIPELINE AND TANK FARM
LAYOUT PLAN – SHEET 2 OF 2

SCALE	AS SHOWN
SHEET	
DRG No.	REVISION C MRC-TF-11