Stormwater Management Plan - Proposed Bulk Liquids Storage Facility

27 July 2007

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DISTRIBUTION

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27 July 2007

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CONTENTS

FIGURES

1 INTRODUCTION

Marstel Terminals Newcastle Pty Ltd (Marstel) proposes to construct a bulk liquids storage facility (terminal facility) on land managed by the Regional Land Management Corporation (RLMC) on Kooragang Island in Newcastle, NSW (the Site). The proposed facility will be used for the receival, storage, blending and distribution of high quality fuels and biofuels for customers throughout the Hunter Region.

In line with Marstel's objective for stormwater protection at their other operating facilities, the aim of this stormwater management plan is to ensure contaminated stormwater is effectively isolated and only water that meets acceptable criteria will be discharged to the Hunter River in accordance with the sites Environment Protection Licence (EPL).

This stormwater management plan has been prepared in accordance with the Director General's Requirements relating to this project. Specifically, it aims to address the requirement to detail the proposed stormwater management system (during operation).

The proposed stormwater management system aims to prevent pollution of receiving waters, the Hunter River from on site stormwater through effective design of stormwater controls, appropriate staff training and suitable water quality monitoring and testing. This plan relates to stormwater management throughout for the operational phase of the facility, and does not cover stormwater management issues relating to the construction phase.

Key aspects of the stormwater management system will include:

- Containment of Stormwater from Tank Farm (TF);
- Containment of Stormwater and spills from Road Tanker Fill Stand (RTFS) and pump bay;
- First flush system for stormwater from driveways;
- Prevention of spills;
- Testing of water quality prior to release to the Hunter River of contained stormwater;
- Water quality monitoring;
- Handling and disposal of potentially contaminated stormwater and fire water;
- Segregation of water drained from petrol tanks for offsite disposal;
- System maintenance;
- Contingency plans for the management of potentially contaminated stormwater;
- Staff training.

2 STORMWATER SYSTEM

The stormwater system has been designed to ensure the effective containment of stormwater which falls on the Site, to prevent any leaks and spills which may occur from discharging to the river and to facilitate the discharge of only clean stormwater to the Hunter River under an EPL. Some captured stormwater may be used to irrigate the small amount of landscaped areas on the Site.

In order to ensure that only clean stormwater is discharged from the Site, stormwater originating from different on site catchments will be segregated, tested and treated accordingly. The areas identified as potentially impacting on the quality of stormwater leaving the Site are:

- Stormwater from the Tank Farm (TF);
- Stormwater from the concrete driveways trafficked by tankers;
- Stormwater from the Road Tanker Fill Stands (RTFS) and pump bay
- Stormwater from the emergency access roads; and
- Stormwater from building roofs and car park.

A plan for the Site is presented in **Figure 1** detailing the Site layout, drainage plan, bunding and locations of roadways. **Figure 2** shows the Driveway area layout and associated stormwater collection and retention areas.

2.1 Tank Farm Stormwater System

Bunding will be provided around the TF to contain any leaks or spills, and also to contain foam or contaminated fire water. This bunding will also contain any stormwater which falls on the TF.

The TF bunds will be designed in accordance with Australian Standard AS1940.2004 *The Storage and Handling of Flammable and Combustible Liquids.* The main bund will be designed to contain 100% of the capacity of the largest tank in the TF, stormwater from a 1 in 20 year 24 hour storm and 20 minutes of firewater.

The construction details of TF will be as follows:

- A clay bund liner will be installed in the TF floor to prevent leaks of spills reaching the groundwater.
- The base of TF is contoured away from the tanks (with a minimum of 1:100 fall) towards a valved collection pit;
- Reinforced concrete bund walls which surround the TF will be designed to withstand the hydrostatic pressure for the full height of the walls
- Intermediate bund walls 600 mm high will be constructed to separate internal areas of the TF
- Concrete paving is provided at areas where there is the potential for minor spills or leaks, such as tank outlet valves and drain points. These are intended to ensure that any minor leaks, should they occur, will be visible to the operators.

Stormwater that accumulates in the TF will be subjected to in-situ testing by Marstel operations prior to its release. If testing shows that it is suitable for release, the bund water is discharged via an API separator (APIS) and valved outlet pit (VOP) to the Hunter River

API Separator (APIS)
The APIS, which is located in the eastern section of the Site, provides final interceptor treatment and emergency isolation of stormwater from the TF.

It consists of a three stage screen for the removal of litter and oil from bund water prior to discharge by pumping to the valved outlet pit (VOP) and then to the river.. The API S also acts as a final sediment trap, capturing any solids contained in the bundwater.

The APIS has a capacity of capacity of 12 cubic metres and the walls are designed to prevent any possibility of overflow.

2.2 Driveways trafficked by Tankers Stormwater System

The main driveway on the site for the trafficking of tankers will be the concrete driveway off Greenleaf Road with a total area of 1400 m^2. The driveway traffic will be controlled through two sliding security gates (one located at each end) with traffic entering from the northern gateway and exiting from the southern gateway.

The roadway will be bound by a 150mm concrete kerb with grate top drainage pits as shown in **Figure 2**. Initial stormwater from the trafficked areas has the greatest potential to be contaminated by leaks from truck engines, and therefore a first flush collection pit (FFCP) has been provided for this driveway. The First flush of stormwater will be directed via grate top pits, sediment and litter traps to the FFCP.

First Flush Collection Pit (FFCP)
This system enables Marstel to effectively manage stormwater from hard surfaces in segregating potentially contaminated first flush stormwater from the subsequent rainfalls.

The first flush collection pit is located to the north eastern end of the RTFS (**Figure 2**) adjacent to the TSCP. This pit has a capacity of 40 m^3 which is capable of containing a first flush quantity for more than 20mm over the area of the driveways.

After the FFCP has reached its capacity, all subsequent flows will be diverted to discharge into the Hunter River via the VOP. The stormwater retained in the FFCP will be tested and if it meets the DEC criteria, discharged by pumping to the river via the VOP. If contaminated the stormwater will be disposed of offsite.

2.3 Road Tanker Fill Stand (RTFS) System

The rollover bunds and grade top pits at the RTFS are designed to segregate and drain any spills, stormwater under the RTFS roof and fire water to the TSCP.

Road tankers are typically constructed of 5-9 m^3 compartments, with up to five compartments per tanker. Each compartment has its own connections and is individually filled.

The potential for rain ingress within the road tanker gantry is limited by roofing over the RTFS.

2.3.1 Truck Fill Area Spill Collection Pit (TSCP)

The TSCP services the RTFS area through the collection and containment of any spills and stormwater ingress under the roof that may occur. Drain pipes located under the RTFS transfer these materials to the truck fill area spill collection pit (**Figure 3**).

The TSCP has a designed capacity to be the “size of the largest tanker of a B Double” plus 20 minutes of fire water, which equates to 70m^3. This capacity will allow for the simultaneous failure of all compartments on a tanker plus the water requirements for the fire containment sprinkler system for a period of 20 minutes.

The stormwater retained in the TSCP will be tested and if it meets the DEC criteria, discharged by pumping to the river via the VOP. If contaminated the stormwater will be disposed of offsite.

2.3.2 Pump Bay System

The pump bay is located externally to the TF for safety and accessibility. The pump bay will be kerbed (150mm) and located on a concrete base. This bay includes protection against vehicle damage and will be roofed to minimise the accumulation of stormwater within the bays. The pump bay will drain via grate top pits to the TSCP for the retention of any stormwater or spills.

2.4 Valved Outlet Pit (VOP)

The VOP is located adjacent to the APIS in the eastern section of the site. The VOP is normally open to discharge directly to the river. It will have an instrument air-driven isolation valve that is hard-wired to the Site emergency shut down system and is capable of rapid closure. In the event of a Site emergency, the isolation valve will be automatically closed to prevent potentially contaminated water leaving the Site via the VOP.

Stormwater may enter the VOP from the following locations:

- Pumped from APIS after water has been tested and approved for discharge
- Stormwater from driveway after FFCP has reached capacity
- Pumped from TSCP after water has been tested and approved for discharge

2.5 Emergency Access Roadways

Emergency access roads will surround the Site on three sides. These roadways will be used infrequently, primarily for fire fighting and emergency vehicles.. They will also be used on an occasional basis for Site inspections undertaken by Marstel personnel. These roadways are not included in the operational area of the Site and will be unsealed due to their limited use.

These roads will be graded to allow stormwater to drain directly to the Hunter River

2.6 Building Roofs and Car Park

Rainwater from the roofs of office and workshop buildings, the roof of the RTFS, and the office carpark, will be discharged directly to the stormwater drainage system in Greenleaf Road.

3 MANAGEMENT OF STORMWATER

The operation of the Site has the objective of discharging only 'clean' and uncontaminated stormwater. The Site has been designed with a comprehensive stormwater system based on a containment and testing regime to control the quantity and the quality of water to be released from the Site. This system is detailed in **Section 2.**

Operation procedures implemented by Marstel to ensure quality management of stormwater discharge are described below.

3.1 Operational Procedures

Marstel will implement an operational procedure for the management and operation of the stormwater system at the Kooragang Island terminal. This procedure forms a part of the Marstel Business Management System which incorporates all procedures and work instructions and covers the following aspects:

- Containment, test and release procedures for TF water;
- Operation of the APIS
- Operation of FFCP
- Operation of TSCP
- Operation of VOP
- Maintenance and calibration of the water quality meter;
- Disposal of contaminated stormwater.

3.2 Stormwater Containment Areas

3.2.1 Tank Farm

Under normal operation, stormwater will accumulate within the TF bunds. Periodic emptying will occur when water levels necessitate release. Prior to the release of any TF bund water, in-situ testing will be undertaken by Marstel operators. Bund outlet valves are kept locked closed until testing has indicated that the water in the bund is "clean" and uncontaminated.

In-situ testing parameters for the bund water include a visual inspection for suspended solids, as well as hydrocarbons, grease, foam, visible floating oil, litter or other contaminated material. The bund water is tested while contained within the bund, for the following parameters:

- pH;
- Dissolved oxygen (DO);
- Electrical conductivity.

Testing is performed in accordance with the operational procedure using a multi-parameter water quality meter which provides direct readings, which are recorded by the operator on a stormwater test log sheets.

The acceptance criteria for these tests, and hence release of the bund water to the APIS, are:

- No visual evidence of suspended solids, hydrocarbons, grease, foam, visible floating oil, litter or other objectionable floating materials; and
- pH within the range of 6-9.

On confirmation of the acceptance criteria and authorization from the Terminal Superintendent/Operations Manager, the bund water will be discharged from the bund to the APIS.

If the water is not deemed suitable for release based on the above mentioned acceptance criteria, it will not be authorized for release and will be pumped out of the bund for off-site disposal.

3.2.2 API Separator (APIS)

The released bund water in the APIS will be subjected to further testing prior to release to the VOP. The water in the APIS will again be visually inspected by Marstel operators for suspended solids, hydrocarbons, grease, foam, visible floating oil, litter or other objectionable matter and in-situ tests will be repeated in the APIS for pH, DO and electrical conductivity using the multi-parameter water quality meter.

Marstel will take water samples from the APIS for testing which will be performed by an analytical laboratory endorsed by the National Association of Testing Authorities (NATA). The purpose of the external testing is to ensure that the bund sampling event was representative of the actual water quality. These samples will be analysed by the laboratory for the following parameters:

- pH;
- Electrical conductivity;
- DO;
- Total organic carbon (TOC); and
- Suspended solids.

The acceptance criteria for the bund water in the APIS is:

- No visual evidence of suspended solids, as well as hydrocarbons, grease, foam, visible floating oil, litter or other objectionable matter;
- pH within the range of 6-9;
- TOC concentration less than 40 mg/L; and
- Suspended solids concentration less than 60 mg/L.

Following confirmation of the acceptance criteria being met (as determined by the final laboratory report), the bund water will be pumped to the VOP for discharge to the river.

If the bund water is not suitable for release from the APIS based on the testing, it will be pumped out of the APIS for disposal off-site.

3.2.3 First Flush Collection Pit (FFCP)

As described in **Section 2.2.1** , the first flush of stormwater off the concrete driveways during a rain event has the greatest potential for contamination. The first flush from the trafficked driveways is directed through a sediment and litter trap and sump which removes any particles or solid items that may be present in the stormwater. The first flush then flows to the FFCP, where it is retained for testing. Once the FFCP reaches its capacity subsequent stormwater flow will automatically divert to the VOP prior to release to the Hunter River.

As a waste minimisation and cleaner production initiative, Marstel will separate the oil and grease from the water in the FFCP prior to disposal as trade waste. A sample of the water retained in the FFCP will be analysed by a NATA-endorsed analytical laboratory as per the APIS testing.

3.2.4 Truck Fill Spill Collection Pit (TSCP)

All stormwater, accidental spills and fire water from the RTFS and Pump Bay will be contained in the TSCP (Refer to Section 2.3). The water in the TSCP will be tested as per the FFCP. Clean water will be pumped to discharge through the VOP to the Hunter River. Contaminated water will be disposed of off-site.

3.3 Valved Outlet Pit (VOP)

As described in **Section 2.4**, the VOP provides the only discharge point to the Hunter River. The VOP pit has an isolation valve that is hard-wired to the Site emergency shut down system and is capable of rapid closure.

Marstel has implemented a comprehensive system of containment and testing of stormwater, as described previously, which, in combination with the design of the stormwater system at the terminal, ensures that all stormwater released to the VOP has already been tested to verify its quality, or is clean run off subsequent to the first flush of rainwater.

The isolation valve at the pit is therefore normally open. However, this valve will be closed in the event of a Site emergency to prevent potentially contaminated water leaving the Site via the VOP. For example, in the event of a fire, the isolation valve would be automatically closed, to prevent potentially contaminated fire water from leaving the Site via the stormwater drainage system

3.4 Contaminated Stormwater

As mentioned previously, in the event that stormwater is not suitable for release to the Hunter River, the contaminants will be separated and disposed of off-site by a licensed contractor. The remaining water will be retested and if clean, discharged to the river via the VOP.

Off-site disposal requires a licensed liquid waste contractor to attend the Site, pump the contaminated stormwater out of the containment area and transport the water off-site for appropriate disposal.

4 MAINTENANCE OF STORMWATER SYSTEM

Maintenance is an important aspect to the effective operation of the Marstel Site, in particular the maintenance of the stormwater system to ensure the integrity of the associated equipment is upheld. Effective maintenance of the stormwater system will prevent the risk of contamination, and unintentional release of stormwater, due to poorly maintained equipment.

Marstel has a maintenance program in place for the entire terminal which sets out the activities to be undertaken on a regular basis, such as the inspection and testing of individual equipment items. Marstel has implemented Work Instruction within the terminals maintenance program that addresses the maintenance of the stormwater system. The key features of the Work Instruction include:

- Responsibilities and duties for stormwater maintenance activities;
- Inspection of bunds and stormwater pits;
- Recording of data during inspections.

The Work Instruction addresses the main areas of the stormwater system that require maintenance, including the bunds, the TSCP, the FFCP, the final APIS and the VOP

The Work Instruction requires the Terminal Superintendent to visually inspect any water in these areas every working day. The visual inspection checks for evidence of any suspended solids, hydrocarbons, visible floating oil, grease, foam, litter or other objectionable floating matter. The results of the inspection are recorded in the daily Inspection log.

If any corrective maintenance of the stormwater system is required, the equipment will then be isolated to prevent the accumulation of stormwater during the maintenance activities.

5 STORMWATER MONITORING AND DATA COLLECTION

As outlines in **Section 3**, Marstel's stormwater management system involves testing at various stages to ensure that stormwater released from the Site is clean and uncontaminated. Additional monitoring of stormwater is also undertaken in accordance with the requirements of the EPL licence for the Site. The collection and recording of stormwater data is described below.

5.1 Testing Required by Management System

As set out in the management system, the following testing activities will occur:

- In-situ inspection and testing by Marstel operations at the bunds;
- In-situ inspection and testing by Marstel operators at the truckfill area spill collection pit (TSCP)
- In-situ inspection and testing by Marstel operators at the APIS
- Laboratory testing of stormwater in the APIS;
- Laboratory testing of stormwater in the FFCP; and
- Laboratory testing of stormwater in the TSCP, when water has accumulated.

In-situ inspection and test results are recorded on log sheets maintained by the Terminal Superintendent.

Final reports from analytical laboratories performing testing of stormwater are maintained on-site by Marstel.

5.2 Monitoring Required by Licence

The EPL Licence that will be issued for the terminal will determine the parameters to be tested and the relative frequency. Visual inspection will also be undertaken by Marstel operators and the results recorded on log sheets maintained by the Terminal Superintendent. The remaining tests are performed by a NATA-endorsed analytical laboratory.

The stormwater sample is taken from the final stage of the pit so that the sample is representative of the water being discharged from the pit.

As with other regular stormwater testing activities, the test results are maintained on-site.

5.3 Maintenance of Stormwater System

As described in **Section 4**, various data is recorded during the inspection and maintenance of the stormwater system. This data is recorded and maintained in Marstel's Maintenance (Inspection & Testing) files.

6 SPILL PREVENTION AND MANAGEMENT

As stated previously, Marstel's objective for stormwater management is to ensure that only clean and uncontaminated stormwater is ultimately discharged to the Hunter River. This objective applies equally during the course of normal terminal operations, during and after a spill or leak event, and during and after any emergency incident that has generated contaminated fire water. Marstel will therefore endeavour to prevent the contamination of stormwater in the event that a product spill occurs at the terminal.

Marstel's terminal has been designed to minimise the potential for accidental releases of product through the implementation of a comprehensive and robust system for the management of stormwater at the Site. The system has been designed to prevent the release of contaminated stormwater to the Hunter River. These measures enable Marstel to minimise the risk of stormwater contamination or accidental release of contaminated stormwater.

However, Marstel has also assessed the risk to stormwater in the event that spill does occur, and developed contingency plans to minimise this risk.

6.1 Management of Stormwater in the Event of a Spill

The design of the stormwater system at the Site is to ensure that, even in the event of a spill, the risk of stormwater contamination is minimal. The design also prevents the potential for spilt product to be discharged from the Site via the stormwater system.

Should a spill occur within the tank farm at the terminal, the product would be contained within the bunded area, as the bund outlet valves are normally locked closed.

Any spills that might occur at the RTFS would be retained by the TSCP. As the bunded area does not have an outlet connection, the spilt product would be retained within the TSCPand would not present any risk to contaminate stormwater.

6.2 Overflow of Containment Areas

A spill protection measure has been incorporated into the design of the bunding at the terminal to prevent the risk of overflow.

The terminal has been designed to the requirements of EPA. These requirements include bunding to contain the volume of the largest tank, plus 1hr of a 1 in 20 year storm event, plus 90 minutes fire water plus 100mm freeboard.

The design of the terminal's stormwater system minimises the potential for product to be discharged from the Site via the stormwater system.

As described previously, the final APIS provides the final emergency isolation of bundwater prior to manually pumping to the VOP for discharge to the Hunter River. The VOP has an isolation valve that is hard-wired to the Site emergency shut down system and is capable of rapid closure. This valve will be closed in the event of a Site emergency to prevent potentially contaminated water leaving the Site via the VOP.

Therefore in the event of a spill, the isolation valve at the VOP would be rapidly and automatically closed. Should any product enter the stormwater system as a result of the spill, the closed isolation valve would prevent the product from being discharged from the Site via the stormwater drainage system.

6.3 Spill Cleanup Provisions

Spill containment provisions including absorbents, neutralising material and clean up equipment are available at appropriate and accessible locations at the terminal.

7 MANAGEMENT OF CONTAMINATED FIRE WATER

The stormwater system at the terminal has been designed to contain fire water in the bunds and stormwater collection pits if required.

7.1 Handling and Disposal of Contaminated Fire Water

Marstel will develop a procedure for the handling and disposal of contaminated fire water in consultation with DECC

8 STAFF TRAINING

Training is a key component to ensuring the safe and effective operation of Marstel's terminal with regular training ensuring that personnel are aware of their responsibilities and duties.

Marstel incorporates regular training of staff as part of its operational approach with an element of this training program addressing the Site's stormwater system and equipment used in the testing of water. The basis to this program is ensuring that staff have an excellent understanding of the design and operation of the stormwater system. Additionally, staff must be aware of the risks of stormwater contamination.

As described previously, Marstel's approach to the management of stormwater requires the involvement of operators for inspection and in-situ testing of stormwater, staged containment and release of stormwater, inspection and maintenance of stormwater equipment, and stormwater protection during emergency situations. To ensure that the discharge of stormwater is being managed appropriately, Marstel conducts regular training sessions with its operators.

Key features of the stormwater training program include:

- Induction training for new personnel;
- Periodic review of the stormwater management procedures and activities with all personnel; and
- Periodic review of the emergency and contingency plans and procedures with all personnel.

Figures

GREENLEAF ROAD

ssover

Sliding security gate

Sliding security gate

Carpark

Driveway drainage pipe

Bund wall

Bund wall

Roofed area

Truck loading gantry

Truck loading gantry

Truck loading gantry

Pumps

Nominal 2100 high Bund wall

Driveway grate top first flush distribution pit

Driveway first flush collection pit

Truck fill area spill collection pit

Driveway first flush collection pit overflow pipe

Intermediate Bund wall

Stormwater Easement - Not Used (to be removed)

Lot 3

Water Board Easement - Not Used (to be removed)

1	Fire Pump House	6	ND5 - Unleaded Petrol 30 x 17m
2	Fire Water Tank	7	ND6 - Premium Unleaded Petrol 30 x 17m
3	Office	8	NN2 - Bio Diesel 16 x 17m
4	Workshop	9	NN3 - Bio Diesel 16 x 17m
5	NN1 - Diesel Tank 44 x 17m	10	ND4 - Ethanol 16 x 17m

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0 10m

Drainage pipe

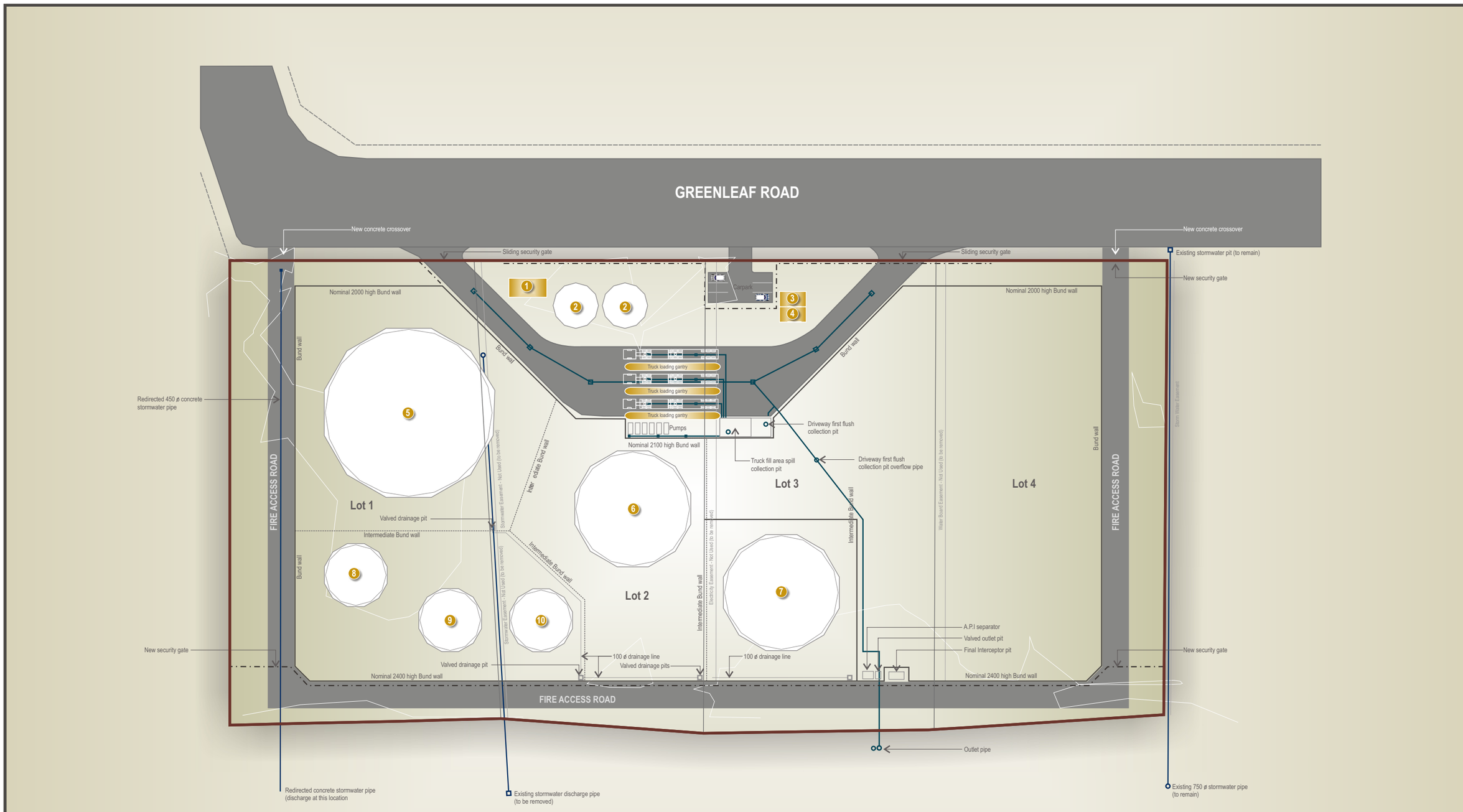
GP Denotes grate top pit in driveway

GP1 Denotes grate top pit in loading gantry

Figure 2

Proposed Driveway Layout

Environmental Assessment -
Kooragang Island Bulk Liquids Storage Facility
Marstel Terminals
Kooragang Island



1	Fire Pump House	6	ND5 - Unleaded Petrol 30 x 17m
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5	NN1 - Diesel Tank 44 x 17m	10	ND4 - Ethanol 16 x 17m

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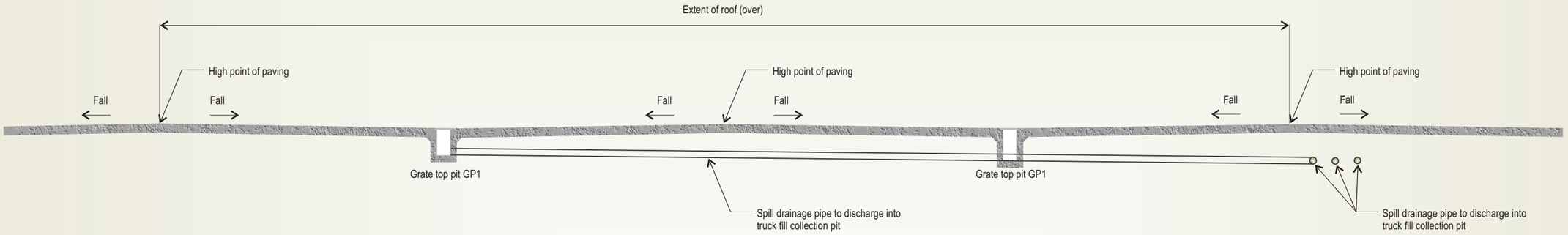
0 25m

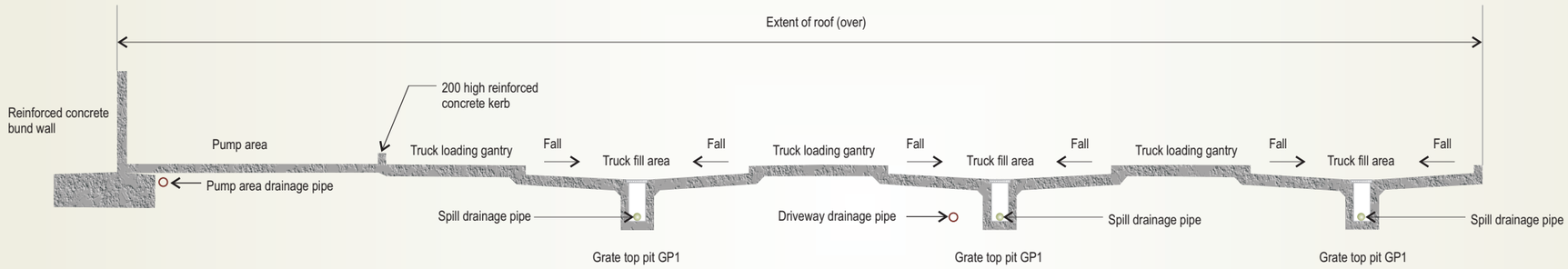
Figure 1

Site Plan

Environmental Assessment -
Kooragang Island Bulk Liquids Storage Facility
Marstel Terminals
Kooragang Island



Typical Longitudinal Section Loading Gantry



Typical Cross Section Loading Gantry

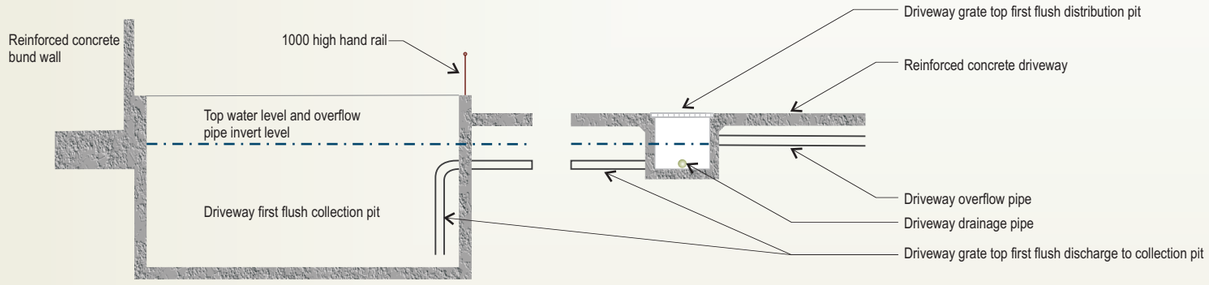


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Figure 3

Typical Gantry Pit Spill Cross Sections

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Kooragang Island Bulk Liquids Storage Facility
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