

SMORGON FUELS PTY LTD t/a



globalresourcerecovery

ENVIRONMENTAL MANAGEMENT PLAN

Revision 1.3

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1 Introduction

1.1 Background and Overview

Smorgon Fuels Pty Ltd, trading as Global Resource Recovery (GRR) was granted an Environmental Protection Licence (EPL 229) by the Northern Territory Environmental Protection Authority (NT EPA) on the 21 December 2017. This License was issued for a period of 2 years to enable collection of data with respect to emissions relating to the operation of the facility and to enable these background levels to be utilised for establishment of longer term trigger values. The current license (EPL 229-01) was issued on 29th June 2020.

GRR has contracted 1.5ha of land for use from Vopak in the East Arm Industrial Precinct (Figures 1 and 2).

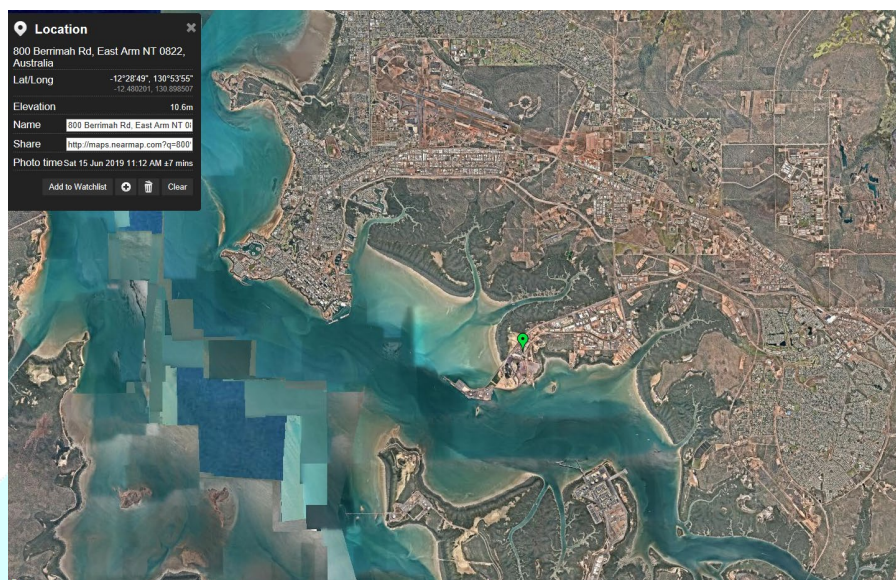


Figure 1: Location of Liquid Waste Treatment Facility, East Arm Industrial Precinct

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Figure 2: Detail of the LWTF showing Boundaries of the Leased Areas

The existing biodiesel production facility has been upgraded and re-purposed into a state of the art Liquid Waste Treatment Facility (LWTF) which can treat a wide variety of industrial liquid waste streams including:

- Acid and alkali waste streams;
- Industrial wash waters including low level amine wash waters;
- Waste oil and Oily Water including bunker oils from shipping;
- Glycol based waste streams;
- Contaminated stormwater and ground water;
- PFAS Separation

In addition to the waste streams above that that can be processed on site, the site has been designed to allow for the consolidation of hazardous wastes such as:

- Solvents;
- Cyanides;
- Chromic Acid;
- Mercury;
- Chlorinated hydrocarbons;
- Pesticides;

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- And similar wastes requiring specialised treatment for consignment and transport to GRR's LWTF in Laverton North, Victoria or other interstate licensed facilities.

The LWTF has the capacity to treat up to 20 million litres per annum of industrial wastewater, 24 million litres per annum of Glycol and up to 10 million litres per annum of used engine oil and oily-water.

The detail of the waste types and projected annual quantities of these wastes to be treated on site or repackaged and consigned to other licensed interstate treatment facilities is described in Table 1. This Table also describes the changes in waste types accepted at the Facility since the issuance of EPL 229 in 2017.

The facility provides local waste management support to the port and maritime industries located within the East Arm Control Area and the Trade Development Zone, the oil and gas sector, mining operations and other industries within the Darwin Region.



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Waste description	store	treat	recycle	dispose	Annual Quantity (tonnes)	Changes in Waste Types accepted
Acidic solution					2000	Added recycling as some of the acids can be reused as reagents or sold to other users
Antimony					50	no change
Arsenic					50	no change
Barium					50	no change
Basic solutions					3000	Added recycling as some of the alkalis can be reused as reagents or sold to other users
Beryllium					5	no change
Boron Compounds					50	no change
Cadmium					50	no change
Chlorates					20	no change
Chromium compounds					300	no change
Cobalt					50	no change
Containers that are contaminated					50	added recycling as some containers can be reused if in good condition after cleaning
Copper					500	no change
Cyanide (inorganic)					50	no change
Encapsulated and chemically fixed, solidified or polymerized waste					50	added this code as some clients want to bring these in for dewatering if too wet for landfill
Ethers					10	added as we have had requests to receive this waste and can be sent to 'geocycle'
Filter cake					200	no change
fire debris and fire washwaters					1000	no change
Fly ash					100	added as this can be used on site as a solidification agents
Halogenated organic solvents					2000	no change but increased volume
Highly odorous chemicals					20	added as some LNG waste can contain mercaptans
Inorganic fluorine compounds excluding calcium fluoride					50	no change
Inorganic sulfides					50	added as some LNG waste does have traces of sulfides can be oxidised in WWTP
Isocyanates					50	no change
lead, lead compounds					500	no change
mercury, mercury compounds					50	added treatment as trace levels of mercury in glycol can be treated in WWTP, high concentrations sent to BMT or Contract resources

Table 1: Listed wastes accepted at the facility

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Waste description	store	treat	recycle	dispose	Annual Quantity (tonnes)	Changes in Waste Types accepted
Nickel Coumpounds					500	no change
Non-toxic Salts					2000	no change
Organic Phosphorus compounds					100	no change
Organic Solvents					500	no change
Organohalogen Compounds that are not specified					50	no change
Perchlorates					5	no change
Phenols phenol compounds					100	no change
Phosphorus Compounds					5	added treatment as phosphorus compounds can be treated in WWTP
Residue From Industrial Waste treatment or disposal					2000	no change
Selenium					20	added as small concentrations can be treated in WWTP
Soils Contaminated with a listed waste					1000	added as soils that cant go to landfill (PFAS) can be accepted and sent to Renex for thermal treatment
Surface Active Agents					1000	no change
Vanadium Compounds					50	no change
Waste chemical substances arising from R&D, lab					50	no change
Waste containing peroxides					100	no change
Waste containing cyanides					10	added as request to receive and send off site for treatment
Biocides					100	no change
Waste from Inks, dyes, pigments, paints					100	no change
Waste from production of organic solvents					5000	no change
Waste from the production and formulation of Photographic waste					50	no change
Waste from production formulation of resins, latex					100	no change
Waste from the production of pharmaceuticals					50	no change
Waste mineral oils unfit for original use					10000	no change
Waste mixtures or emulsions and oily water					24000	no change
Waste pharmaceuticals and drugs					10	no change
Waste resulting from surface active treatment					200	no change
waste tarry residues					50	added as no facility can accept in darwin can send to Renex
PCB					10	no change
Zinc					500	no change

Table 1: Listed wastes accepted at the facility (continued)

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1.2 Objectives, Scope and Structure

The objective of this EMP is to outline the management systems, procedures and controls that are in place to ensure GRR can manage the risks and potential impacts associated with the LWTF to an acceptable standard and in line with the licence conditions set out in EPL 229.

The EMP encompasses environmental management strategies and mitigation measures for all activities conducted on the LWTF site.

1.3 Company Details

Business Name: Smorgon Fuels Pty Ltd, trading as Global Resource Recovery

Business Address: 644 Chapel St South Yarra, Victoria 3141

Primary Contact: David Vinson

Director, Global Resource Recovery

Telephone: 0412 038 226

Email: davidv@globalrr.com.au

1.4 Site Contact

Business Name: Smorgon Fuels Pty Ltd, trading as Global Resource Recovery

Business Address: 800 Berrimah Road, East Arm NT 0802

Primary Contact: Michael Rogers

Telephone: 0474 258 378

Email: michaelr@globalrr.com.au

1.5 Environmental Management System

1.5.1 Environmental Policy

GRR is committed to achieving the highest possible environmental performance across all operational sites. This commitment is encompassed in GRR's Environmental Policy which is attached as Appendix 1. GRR have also developed Standard Operating Procedures (SOPs) for all operations at the Darwin facility which embed this commitment into everyday operations. GRR will ensure that its environmental policy, operational procedures and maintenance methods are understood, implemented and maintained by staff, contractors and subcontractors at all levels involved with the operations.

1.5.2 Organisational Commitment

GRR is committed to the protection of the environment as indicated in the following excerpt from the GRR Environmental Policy:

Global Resource Recovery (GRR) believes that we have a responsibility to care for and protect the environment in which we operate.

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We are fully committed to continually improving environmental protection and prevention of pollution across all our business activities and encourage our business partners and members of the wider community to join us in this effort. This is done by setting and monitoring appropriate objectives and targets.

2 Site Description

2.1 Project Overview

GRR has upgraded and re-purposed the existing biodiesel production facility. The existing biodiesel plant included two separate operational modules (Figure 3). Module 1 was the biodiesel plant and Module 2 was the USP glycerine plant. Module 1 includes storage tanks, heated tanks and centrifuges and has been repurposed to process waste oil and heavily contaminated oily water. Module 2 was sized to take the output of the crude glycerine from the biodiesel plant and process the crude glycerine to USP grade. GRR has upgraded and repurposed the glycerine plant for the drying and distillation of glycols. The equipment installed allows for the removal of water from the glycol followed by final distillation and polishing.



Figure 3: Existing Biodiesel Facility and Conversion to Oil and Glycol Treatment

In addition to the biodiesel plant, other infrastructure important to the development of the LWTF has been refurbished and repurposed. The tank farm has been utilised for the storage of industrial wastewater, acids and alkalis, glycol wastes and glycol product. New storage tanks have been added and the volumes of storage utilised on site are shown in Table 2.

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Tank Reference	Purpose	Volume (L)
07F06A	Wastewater Storage	250,000
07F06B	Glycol Product Storage	250,000
04F01	Wastewater Storage	96,000
04F02	Wastewater Storage	96,000
07F13.1A	Ferric Chloride Reagent tank (Acid)	33,000
07F13.2A	Acid Waste Storage	33,000
07F15	Lime Reagent Storage	23,000
85D01	Trade Waste Treatment	50,000
85D02	Trade Waste Treatment	50,000
85D03	Sludge Storage	51,000
85D04	Sludge Storage	51,000
86F01	RO Feed Tank 1	36,000
86F02	RO Feed Tank 2	36,000
86F03	RO Feed Tank 3	36,000
86F04	PFAS Tank 1	30,000
86F05	PFAS Tank 2	30,000
86F06	Brine 1 and Back wash	30,000
86F07	Brine 2	30,000
86F08	PFAS back wash	30,000
86F09	PFAS Brine	30,000
86F10	RO Permeate 1	30,000
86F11	RO Permeate 2	30,000
86F12	RO Permeate 3	30,000
86F15	Trade Waste Discharge Tank 1	250,000
86F16	Trade Waste Discharge Tank 2	250,000
86F17	Trade Waste Discharge Tank 3	250,000
85F06	Treated Water Storage	60,000
03F01	Sludge Receival Pit	10,000
03F02	Sludge Receival Pit	10,000
03D01	Interceptor Tank	10,000
03F03	Waste Oil Storage	50,000
03F04	Waste Oil Storage	50,000
03F05	Bunker Oil Storage	50,000
10D01	Oil processing Reactor	46,000
10D03	Oil processing Reactor	46,000
10D04	Oily Water Separator	5,000
03F06	Intermediate Oil Storage	50,000
03F08	Product Oil Storage	50,000
03F09	Product Bunker Oil Storage	50,000
10F08	Process Water Distribution	23,000
06F01	TEG/MEG Receival Tank 1	50,000
06F02	TEG/MEG Receival Tank 2	50,000
06F03	MEG receival Tank 3	50,000
06F04	Flammable MEG Receival Tank 4	50,000
11F01	Recovered Flammables Storage	8,000
07F12	Crude Glycol Storage	90,000
07F11	MEG Receival Tank 11	100,000
07F09	Crude TEG Storage	25,000
07F20	Crude TEG Storage	25,000
07F19A	TEG Product Storage	25,000
07F19B	TEG Product Storage	25,000
Vopak Tank Farm	Glycol Storage	3,000,000

Table 2: Existing Tankage Volumes and Reuse in LWTF

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In addition to the tank farm, GRR have utilised the existing fire fighting ring main system and equipment that is regularly tested as part of the Vopak safety system, the administration building, the workshop, cooling towers, natural gas connection and a storm water treatment system.

The locked storm water treatment system prevents accidental discharge of contaminated rainwater and has been designed to collect runoff from the site except within the bunded processing areas. It includes a baffled sediment and oil trap (Plate 1 left) together with a skimmer and oil water separator (Plate 1 right).



Figure 3: Baffled sediment and oil trap (left) and Oil Water Separation System (right)

GRR has also established its own laboratory facilities on site to enable it to test incoming waste streams, monitor and develop treatment methodologies and monitor compliance. The Laboratory is also utilised for analysis of the product glycol and oils generated prior to sale.

2.2 Layout of site

The site is compact and consists predominantly of bunded concrete hardstand, access roads, car park, operational buildings and the administration/laboratory building. A detailed site plan is provided as Appendix 2. The facility will include a range of operational unit areas. These are:

- Storm Water Area;
- Filter Press Area;
- Sludge Tank Area for filter press;
- Sludge Bay;
- Reagent Storage Area;
- Industrial Waste Water Treatment Area;
- Tank Farm for Waste and Product;
- Utilities Area;
- Waste Storage and Consignment Area;

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- Waste Receival Area;
- Waste Glycol Recovery Area;
- Waste Oil and Oily-Water Recycling Area;
- Container Storage Area (Hazardous Waste and Flammable Waste);
- Reverse Osmosis processing area;
- Trade waste Locked Batch Tank;
- Administration Building (Control Room, Offices, Commercial Laboratory)
- Car Park.

2.3 Treatment Processes

2.3.1 Oil Recycling

The oil recycling facility was commissioned during April 2020 and will gradually increase treatment volumes over the next 6-12 months to reach facility capacity. The facility receives 2 types of oils, lubricating oils generated from manufacturing, mining, automotive and oil and gas operations and bunker oil originating from ship operations.

Prior to accepting such oils, the GRR facility receives a pre-acceptance sample or where a pre-acceptance sample can't be provided, a screen of the incoming waste truck is undertaken. Oil is tested for flammability, oil content, sludge and other parameters in order to determine its acceptability into the facility.

Upon acceptability of the pre-acceptance testing the waste stream is booked into the GRR facility and arrives either in bulk tanker or packaged (drums, IBC's). The truck is weighed on the GRR weigh bridge to determine the quantity and the vehicle directed to the receival bay.

At the Receival bay GRR personnel take a representative sample of the truck or packaged waste and provide this sample to the GRR laboratory for testing to confirm that it is commensurate with the pre-acceptance sample and that there are no quality changes that may affect its acceptability (i.e. Flash test). The samples are then be further tested to determine the treatment method to be applied, for oil this effectively involves emulsion breaking to remove the water and sludge.

If the samples fail, the load is rejected and not accepted into the oil processing facility.

Acceptable oils are transferred into one of two storage areas:

- Lubricating Oils
- Bunker Oils

2.3.1.1 Lubricating Oils

For most lubricating oils the oil is discharged into 2 by 50KL tanks where they are stored until scheduled for processing. Depending on the quality of the waste the methodology applied will vary but the broad scope of processing involves the following steps:

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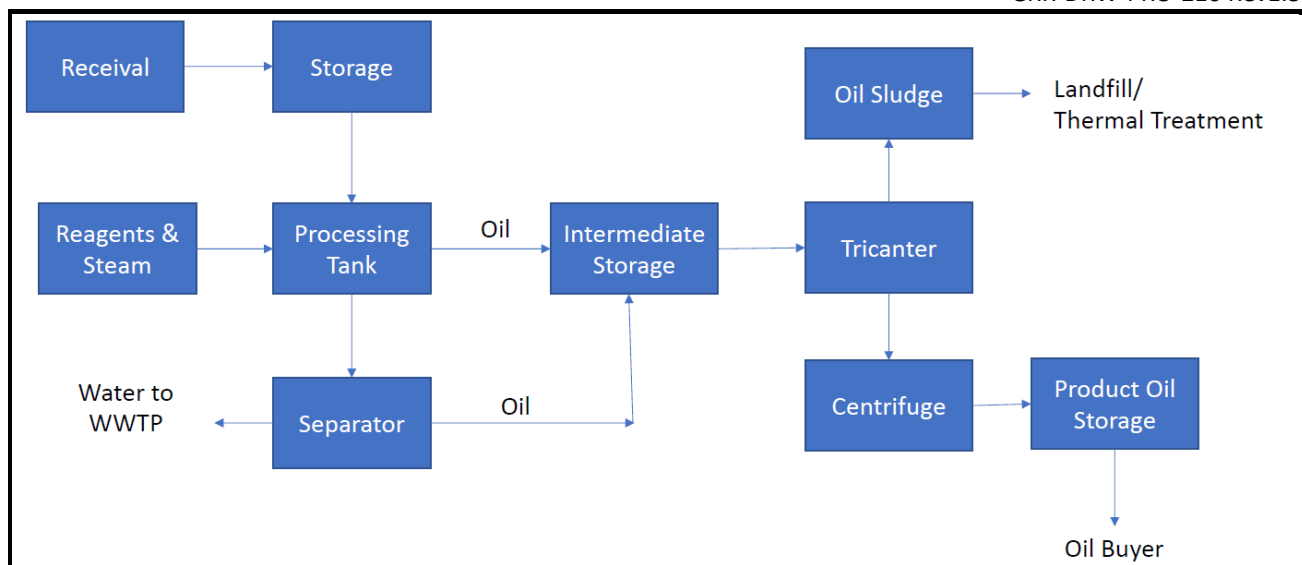


Figure 4: Schematic Diagram of Lubricating Oil Treatment process

The waste oil is transferred from the oil storage tanks to the reactor where reagents like emulsion breaker and acids are added and the tank heated to approximately 90 degrees Celsius in order to break the emulsion between water and oil.

Once separation is achieved the water phase is passed through a honeycomb separator in order to capture any free oil before being discharged to the wastewater treatment plant for further treatment before being discharged as treated water to the sewer system.

Following draining, the oil phase is reheated to maintain temperature and passed through the tricanter in order to remove any particulates or solids within the oil. The oil then passes to an intermediate tank (50KL) or secondary reactor where it can be further sampled to check quality. If the quality is acceptable it is transferred to the product tank (50KL). If it is not acceptable then the treated oil is brought to temperature and passed through a centrifuge to polish it to an acceptable specification for sale.

Bunker Oils

Bunker oils are usually thick, highly viscous oils. The bunker oil once accepted will be discharged into a 50kL bunker oil receival tank. This tank is heated to 60 degrees Celsius so it can liquify the bunker oil and remove any excess moisture. If there is a high level of solids in the oil it is first passed through the tricanter in order to remove these solids. Depending on the quality of the waste the methodology applied will vary but the broad scope of processing involves the following steps:

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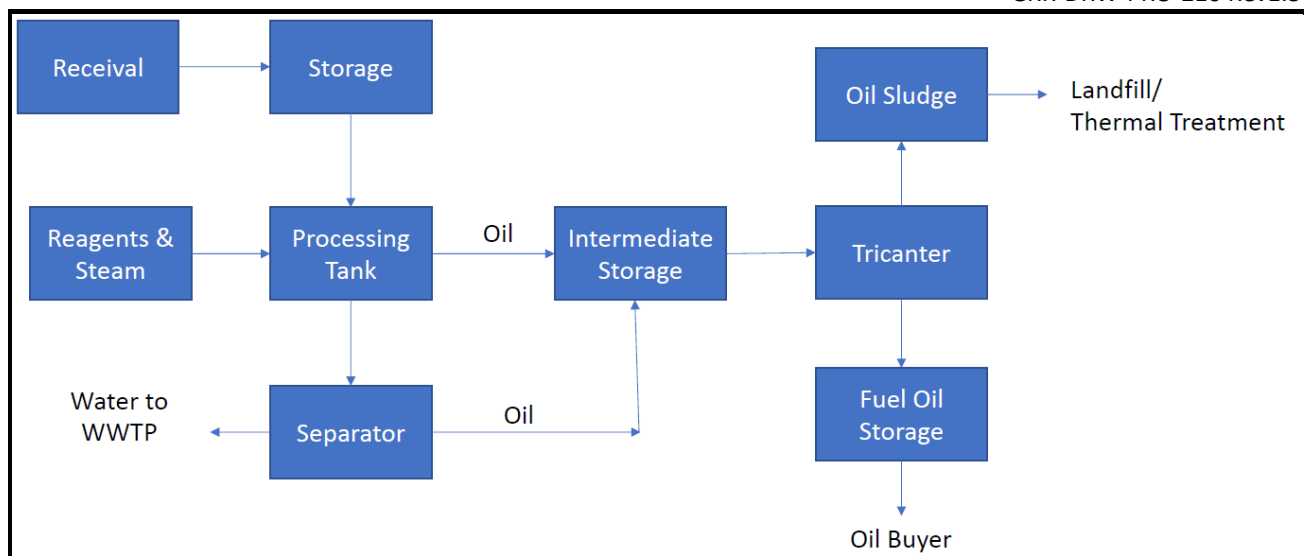


Figure 5: Schematic Diagram of Bunker Oil Treatment process

Once the laboratory has confirmed the bunker oil is within specification for a fuel oil it is sent to a 50KL bunker oil product tank. Clean lubricating product oil may be added at this point in order to lower the viscosity of the product bunker oil. The oil is then consigned for sale and transported by bulk tanker.

2.3.2 Industrial Waste Water Treatment

The industrial wastewater treatment system is located in a newly constructed concrete bunded area Appendix 2 and has a treatment capacity of up to 35 million litres per annum. The treatment process is summarised in Figure 6.

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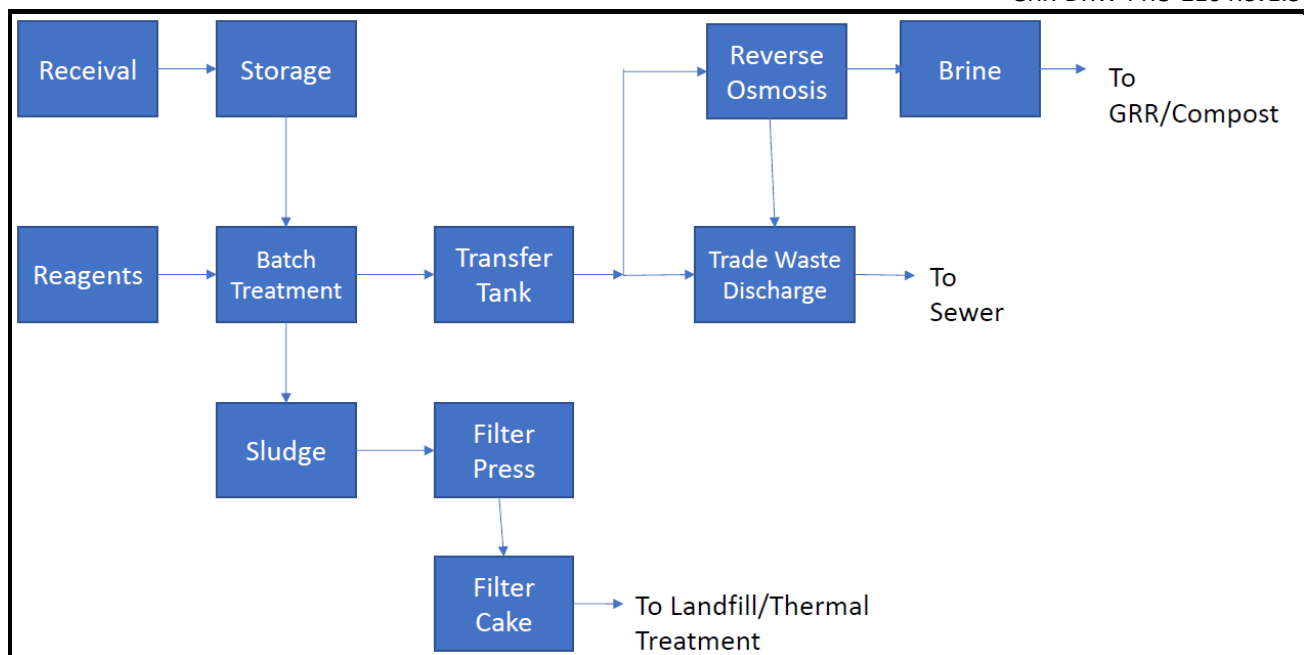


Figure 6: Schematic Diagram of Industrial Waste Water Treatment process

Industrial wastewater arrives at the site in tankers or packaged in IBCs, and is transferred to the wastewater storage tanks. Tanks are then sampled and the laboratory completes treatability trials to evaluate the optimum reagent addition and treatment methodology. For processing, wastewater is drawn from storage in 40kL batches to be treated in one of two 50kL batch treatment tanks.

Depending on the nature of the contaminants in the wastewater, various reagent chemicals are added to the batch and typically include alkalis (such as lime, sodium hydroxide or magnesium hydroxide), acids (such as hydrochloric, phosphoric or ferric chloride) and various coagulants and flocculants. These reagents interact/react with the contaminants in the wastewater to encourage chemical precipitation and then promote enhanced settling of the precipitate into a sludge at the bottom of the treatment tanks. This process generates a relatively clear supernatant and a watery sludge.

The supernatant which contains only trace concentrations of contaminants is transferred to the trade waste batch tanks prior to testing and discharge to the sewer. Should the supernatant contain high concentration of Total dissolved salts (TDS) in excess of Power and Water Acceptability Criteria, it is passed through a Reverse Osmosis unit to remove the TDS and ensure compliance. Once the trade waste discharge tank is full it is locked and sampled and sent to an external NATA Laboratory for Analysis. Once the analytical results are acceptable to the criteria set by Power and Water the batch is allowed to discharge to sewer. The trade waste discharge line monitors pH, temperature, Flow and conductivity as the waste is discharged. Any exceedance of these parameters instigates an automatic shut down and discharge to sewer will cease until the issue is rectified.

The sludge containing the contaminants originally in the wastewater is dewatered through one of two filter presses to make a solid filter cake. This filter cake is regularly sampled and tested to assess its suitability for recycling or disposal to landfill as appropriate.

The brine solution generated by the reverse osmosis system is also be tested and sent off site for final disposal or recycling depending on the final quality of the brine solution.

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2.3.3 Glycol Recovery

The glycol treatment plant was commissioned in April 2020 and will gradually increase production to reach capacity over the next 6-12 months as waste product becomes available. The treatment facility receives 2 types of Glycols, Monoethylene Glycol (MEG) originating from LNG, Mining and Petrochemical operations or as found in automotive coolants and Triethylene Glycol (TEG) primarily used in Oil and Gas Production plants.

Prior to accepting such Glycols, the GRR requests a pre-acceptance sample which the laboratory tests for flash, moisture content, Glycol content and other parameters in order to determine its acceptability into the facility.

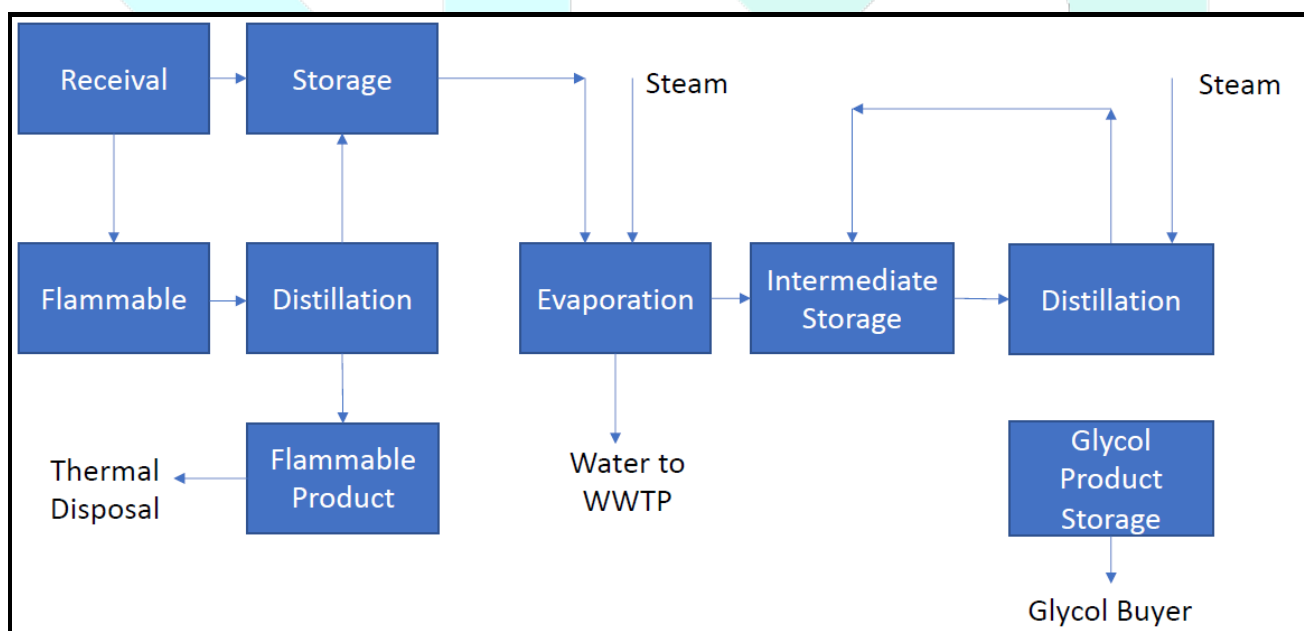
Upon acceptable results from the pre-acceptance testing wastes are booked in and are delivered to site as either bulk tanker loads or in packaged form (drums, IBC's). When waste is delivered, a representative sample of the load is taken and provided to the GRR laboratory for testing to confirm that it is commensurate with the pre-acceptance sample and that there are no quality changes that may affect its acceptability (Flash test etc). Samples are then be further tested to determine the suitable treatment method.

If the samples flash and are therefore deemed flammable, trucks are received in a dedicated area and the product transferred to a flammable Glycol tank (50KL) that has been specifically designed to receive such waste. The flammability usually originates from the contamination of the Glycol from condensate water in the LNG trains. This usually only contains small volumes of hydrocarbons typically 1-5%.

Due to the nature of the waste stream, the site has a number of glycol storage areas:

- Flammable Glycol Tank (50KL)
- Glycol Storage Tanks (3 by 50KL and 1 by 100KL)
- Glycol Storage Tanks (2 by 25KL)
- GRR also has the availability of a 3,000KL storage tank situated on the Vopak tank farm adjacent to the LWTF. This tank is already piped and connected to the facility as it was previously part of the biodiesel feed tanks. This tank has now been incorporated into the GRR site agreement with Vopak.

Depending on the quality of the waste the specific treatment methodology applied varies, but the broad scope of processing involves the following steps (Figure 7):



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Figure 7: Schematic Diagram of the Glycol Treatment process

Flammable Glycol Processing

Flammable Glycol from the flammable glycol storage tank is directed to a purpose-built reactor where it is flashed under vacuum to volatilise and remove the flammable hydrocarbons. The hydrocarbon vapour is then be condensed into an 8000L tank where it is stored until being sent off site for use as a fuel. The removal of hydrocarbons is tested on a constant basis by the laboratory and when the contents of the flammable glycol tank are shown to have low hydrocarbon levels and do not flash the tank is ready for processing in the main treatment plant.

Water Removal

The contents of one of the selected Glycol storage tanks are pumped through heat exchangers to increase temperature to a predetermined set point and vacuum applied. The contents then pass through 2 falling film evaporators and 1 flash evaporator operating in series to remove most of the water and concentrate the Glycol to >85%. Once this is achieved the resultant product is transferred to the Crude Glycol Tank (90KL).

Glycol Purification (Distillation)

The contents of the Crude Glycol tank are then passed through a distillation column operating under preestablished set points in order to purify the Glycol to >99% purity. The resultant product from the distillation column is further purified through activated carbon before being discharged to a 250KL Glycol product tank.

The glycol product is tested to ensure it complies with the desired specifications before being tankered off site for sale.

Where TEG is being processed the system is flushed and the process parameters altered with respect to temperature and a similar process is then followed as per the MEG plant. The main difference is that the TEG will have its own dedicated TEG product tank so as to avoid cross contamination with the MEG.

2.3.4 Repackaging, Consolidating, Storing for Transfer to Third Party Licensed Facility

Some wastes produced in the NT are not treatable at the LWTF. Wastes such as cyanides, chromic acid, concentrated acids and alkalis, some solvents, chlorinated hydrocarbons, pesticides, PFOS, and grease are consolidated in the Quarantine Area (Appendix 2). These wastes are stored in appropriately segregated containers prior to transport to third-party EPA licensed waste treatment or recycling facilities.

2.3.5 Sludge Treatment

In some cases wastewater received has a sludge component to it, or some waste streams like Non Destructive Drilling (NDD) or drilling muds require dewatering. These waste streams are discharged into the sludge pits where they can be separated through a separation tank to remove oil which is diverted to the oil processing facility; water which goes through the wastewater treatment process; and sludge to the sludge tanks where they can be solidified through the filter press.

Some oily sludges may need to be solidified within the sludge pits to avoid blinding the filter presses. The solidified material is tested and depending on quality is either sent to local landfill or to thermal recovery and treatment facilities interstate.

Depending on the quality of the waste the methodology applied varies but the broad scope of processing involves the following steps (Figure 8):

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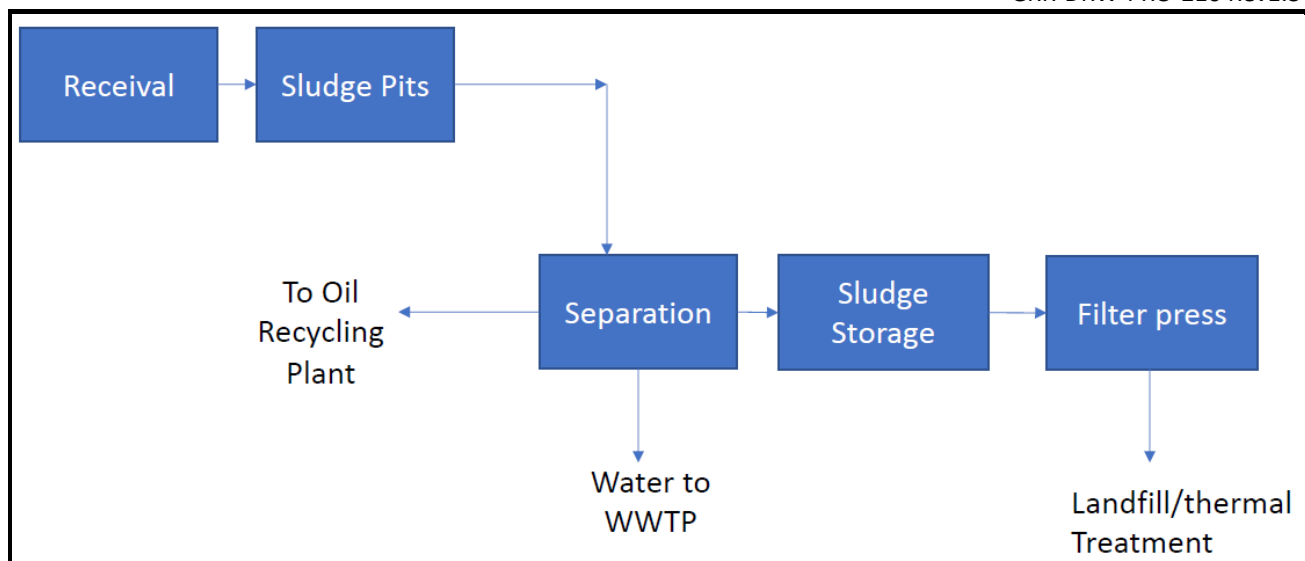


Figure 8: Schematic Diagram of the Sludge Treatment process

2.3.6 PFAS Treatment

THE LWTF has the capability of separating low concentration PFAS wash waters through the GRR Media filters and if necessary, the on-site reverse osmosis facility. Separate PFAS tankage has been installed to eliminate cross contamination with incoming non-PFAS waste waters. The PFAS water is fed through a media filter or the RO to absorb the PFAs onto the media filter or concentrate in the brine in the case of the RO (Figure 9).

The treated water is then sent to the wastewater treatment plant for further treatment while the concentrated PFAS material and brine is sent off site for thermal destruction. This process reduces the volume of PFAS contaminated material sent interstate for treatment.

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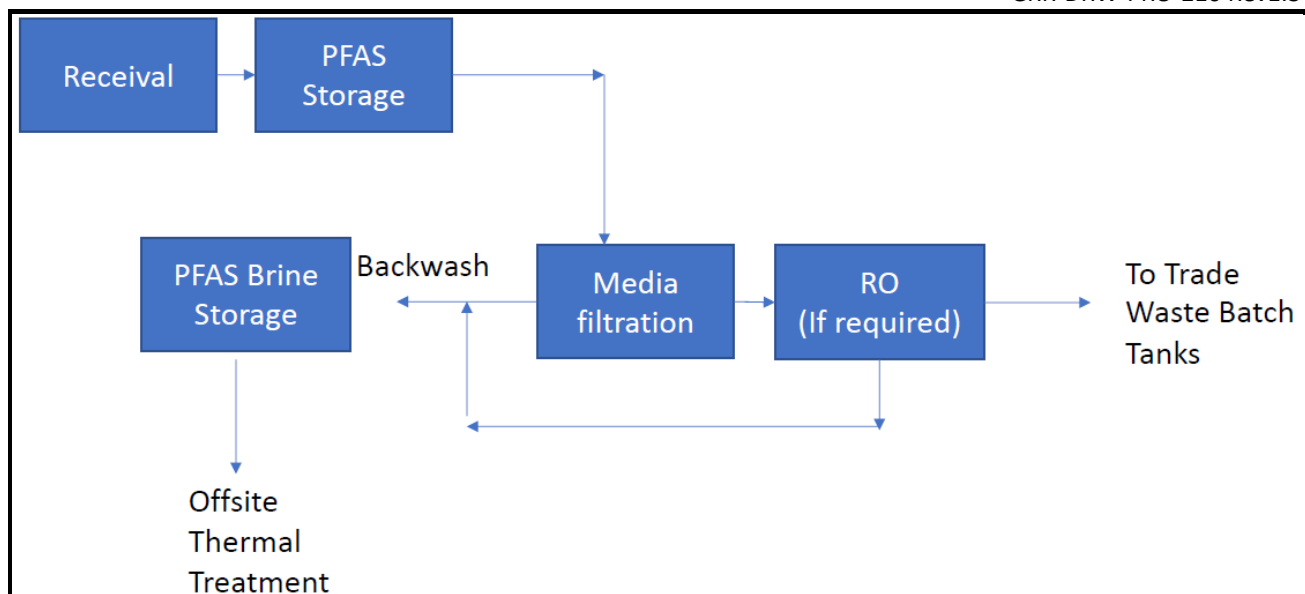


Figure 9: Schematic Diagram of the PFAS Treatment process

2.4 Transport considerations

The site is located within an industrial zone with traffic types consistent with this designated use. No residential traffic enters the area. Access to the site is from a site access road off Berrimah Road. Berrimah Road is the main access to the Port of Darwin and as such carries considerable heavy truck traffic while the access road is used only by the Vopak and the Cement Works.

The site receives in the order of 10 – 15 road tankers with carrying capacities between 20,000L – 30,000L and several rigid tray trucks carrying packaged waste (IBC's or 200L drums) per day, and up to 25 employees, management and visitor cars travel to the site each day. In context of the site location and the quality of access roads it is considered that the impacts on traffic are minimal.

3 Legal and Other Obligations

3.1 Relevant Legislation

The key Commonwealth and Northern Territory legislation applicable to the LWTF are indicated in Tables 2 and 3. All works at the Darwin LWTF will be planned, resourced and implemented in accordance with all relevant legal and regulatory requirements.

Commonwealth and Other

Ozone Protection Act 1989

Hazardous Waste (Regulation of Exports and Imports) Act 1989

Road Transport Reform (Dangerous Goods) Act 1995

Environment Protection and Biodiversity Conservation Act 1999

Environmental Protection and Biodiversity Conservation Act 1999

National Environment Protection Council. 2003 National Environment Protection (Ambient Air Quality) Measure (NEPM)

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National Environment Protection Council. 2011 National Environment Protection (Air Toxics) Measure (NEPM)
National Environment Protection Council. 1998 National Environment Protection (National Pollutant Inventory) Measure (NEPM)
National Environment Protection Council. 2011. National Environment Protection (Used Packaging Materials) Measure (NEPM) as varied 16 September 2011

Table 1: Commonwealth and other legislation relevant to the LWTF

Northern Territory
<i>Waste Management and Pollution Control Act</i>
<i>Environmental Offences and Penalties Act</i>
<i>Work Health and Safety (National Uniform Legislation) Act</i>
<i>Litter Act</i>
<i>Public and Environmental Health Act</i>
<i>Public Health (General Sanitation, Mosquito Prevention, Rat Exclusion and Prevention) Regulations</i>
<i>Dangerous Goods Act</i>
<i>Road Transport (Dangerous Goods) Act 1995</i>
<i>Dangerous Goods (Storage and Handling) Regulations 2000</i>
<i>Bushfires Act</i>
<i>Fire and Emergency Act</i>
<i>Marine Pollution Act</i>
<i>Water Act</i>
<i>Animal Welfare Act</i>
<i>Fisheries Act</i>
<i>Public and Environmental Health Act</i>
<i>Soil Conservation and Land Utilisation Act</i>
<i>Weeds Management Act (NT)</i>

Table 2: Northern Territory legislation relevant to the LWTF

4 Environmental Management Framework

4.1 Environmental Management Systems

GRR are in the process of developing a business wide EMS and it is intended that when complete and implemented it will be certified under ISO 14001. As part of this management system policies have been developed which include an environmental policy which is made known to all employees during the induction process. The EMP documented for the Darwin LWTF is consistent with the EMS framework being developed for the Company.

4.2 Organisational Structure, Roles and Environmental Responsibility

The responsibility for operations lies ultimately with the board who delegate this responsibility through the Site Manager. The Site Manager is supported a Sustainability and Compliance officer who oversees compliance with the sites' environmental and safety obligations, and the day to day operations are managed by the site personnel and it is these people who have the most immediate responsibility regarding environmental management.

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4.2.1 Site Manager GRR

- Provide management direction on all operations in regards to LWTF to ensure compliance with environmental conditions.

4.2.2 Sustainability and Compliance Officer

- Undertake reviews and updates of the EMP;
- Liaising with the Site Manager on management and operation of the LWTF;
- Ensuring site compliance with the requirements of the EMP;
- Provide guidance and support to the Site Manager on environmental matters relating to LWTF;
- Preparing internal and external reports on environmental performance of LWTF;
- Conducting site inspections and assisting with audits where required;
- Issuing corrective and preventative actions and monitoring status of actions;
- Management of the monitoring programmes;
- Ensuring subcontractors on site fulfil their environmental obligations;
- Attendance at meetings in relation to environmental matters associated with the LWTF; and
- Liaising with regulatory authorities and other external stakeholders relating to environmental issues.

4.2.3 All Employees

- Comply with all OHS&E requirements;
- Take all reasonable measures to protect the environment and prevent harm; and
- Report any environmental incidents or issues observed on-site.

4.3 Documentation Control

GRR is required by various Acts to ensure that complete and accurate records of the movement and treatment of industrial waste are created and managed for as long as required to support accountability and legislative requirements.

All Industrial waste received and leaving the Darwin LWTF site for disposal or treatment at other licensed facilities is accompanied by EPA waste certificates. Hard copies of all certificates will be retained on site in Darwin and electronic copies will be retained on the GRR sharepoint. All relevant waste information from the certificates will also be transferred to the master manifest which allows waste tracking using: client, waste type, waste transport certificate number and/or waste quantity.

On arrival of waste at the Darwin LWTF the truck driver provides the required EPA waste transport certificate to GRR Personnel who then assess the waste against the certificates. In most circumstances a salesforce reference number accompanies the load and where this has not occurred, the relevant Sales Manager will be contacted to allow a reference number to be completed before any waste is offloaded. The waste will be sampled and pre-acceptance testing completed prior to discharge into the appropriate off take system or relocation to the appropriate Dangerous Goods (DG) storage areas.

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5 Background Environment

5.1 Landscape

The plant site is bounded by the Northern Cement Works to the south, Berrimah Road to the East and the Vopak tank farm to the North and West.

The site has been fully developed, is generally level, fully bunded and predominantly paved with either concrete or bitumen tarmac. There is a grassed septic tank leech field and some small garden beds, but there is no remnant vegetation or landscape features of significance that requires additional protection.

5.2 Surface and Ground Water

5.2.1 Surface Water

Apart from a small area of garden, the site is entirely covered with buildings, roofed areas, hardstand, bituminised road or concrete operations area. During the wet season, rainfall in Darwin is significant and management of surface water runoff from a largely impervious site is an important consideration for environmental management. Management of surface water runoff is detailed later in the EMP in Section 11.3.2.

5.2.2 Groundwater

There are no known water supply bores on or adjacent to the site. Three bores are registered around 1km east and north-east from the site (Bores 377, 371 and 5161). Data on Bore 5161 is available and shows water of low salinity. However, the bores appear to be low yielding with varying water quality (bore 377 was abandoned due to unacceptable water quality) being often brackish or saline and not suitable for irrigation.

Ground water monitoring has been undertaken through the Vopak site since 2007. Five of these monitoring bores are located sufficiently close to the proposed Liquid Waste Treatment site to provide insight into the chemical status of ground water in the area. The locations of the relevant monitoring bores are shown on Figure 12 and typical ground water data is uploaded to the GRR monitoring spreadsheet. GRR has been and will continue to monitor bore holes 13 and 14. Data for holes 15, 12 and 7 will be obtained from Vopak as Vopak wish to retain operational control of these holes.

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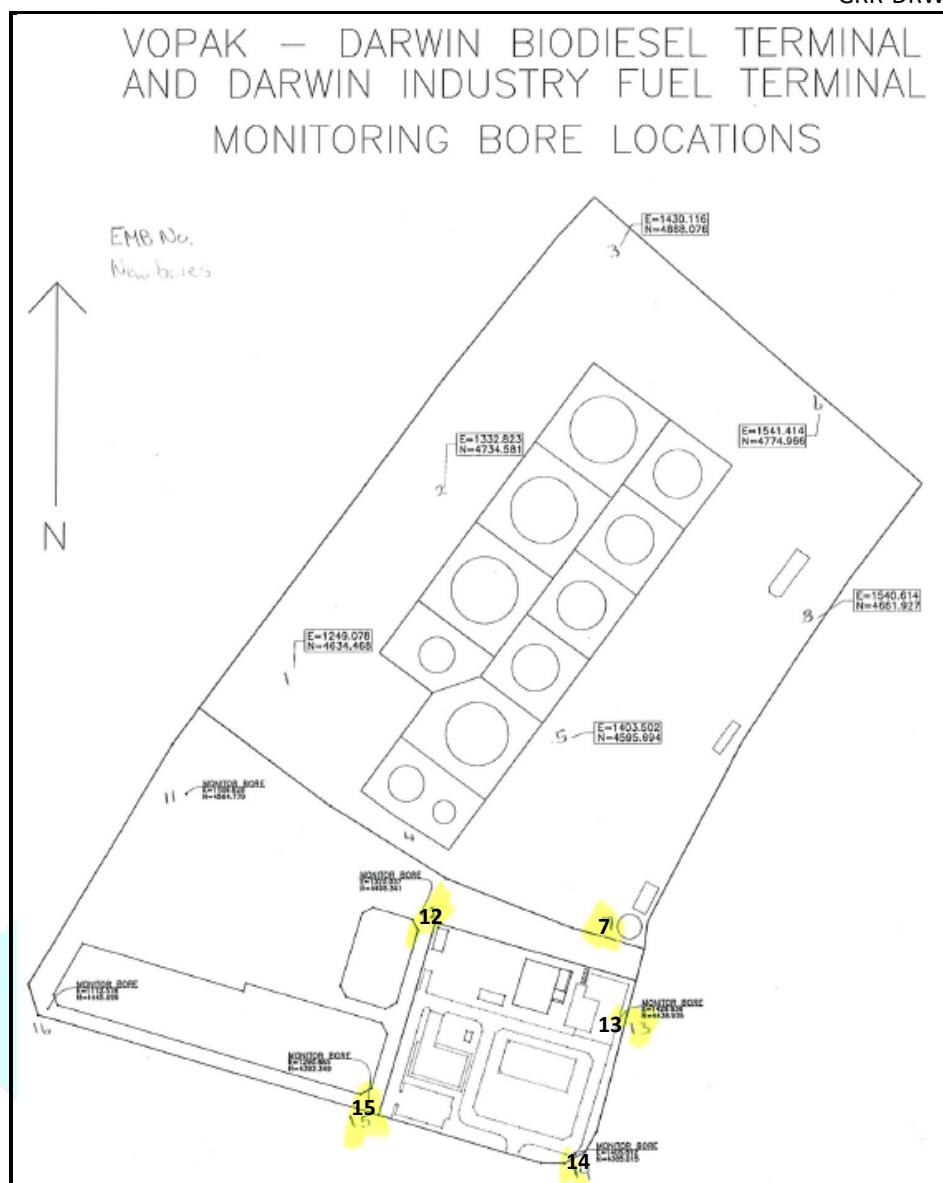


Figure 12: Location of Ground Water Monitoring Bores

While the potential for groundwater contamination is minimised through the extensive use of impervious surfaces across the site and through all storage tanks being above ground and located in bunded concrete containment areas; groundwater contamination is recognised as a potential risk as contamination could be associated with loss of integrity in bunded containment structures in operations areas or through the interaction of surface water with ground water following an uncontained spill outside operational areas. Such occurrences could result in the uncontrolled release of waste materials into the groundwater system which could impact on local marine environment and is addressed in a Groundwater management plan (Section 11.4.2).

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5.3 Air Quality

The site is located in an industrial area, a significant distance from any sensitive receptors. However, the nature of the processes on site mean those potential sources of air emissions from the facility are:

- Waste Receival Area;
- Tank Farm;
- Oil processing area;
- Boiler in utilities area;
- Glycol Processing

These sources of emissions are considered within the Air emissions management plan (Section 11.1.2).

5.4 Land Use History

The site is located in the East Arm Precinct and zoned for industrial use. The land is owned by the NT Government and leased to private organisations for development of the Darwin Industry Fuel Terminal (DIFT). The DIFT lease has since been taken over by Vopak who sub-leased 1.5 hectares to Natural Fuel Limited for the purpose of developing and operating a biodiesel plant. This plant was constructed and operated but finished operation in 2008. Numerous attempts have been made to restart the biodiesel facility but issues of vegetable oil supply and financing made reopening the facility unsuccessful. The site remained in a near operational condition until GRR negotiated with Vopak to assume control of the biodiesel area sub-lease for the purpose of developing and operating a LWTF.

Almost the entire site is covered by buildings and bituminised tarmac and concrete hard stand, roads and bunded areas. There is no evidence that previous activities cause soil erosion or resulted in contamination of ground or surface water. The site is not registered as a contaminated site under the Waste Management and Control Act.

5.5 Climate

The typical climatic regime of the Top End region has two distinct seasons. The 'Dry Season' occurs for approximately five months from May to September. During the dry season, temperatures remain warm to hot during the day usually ranging between the high twenties and low thirties, accompanied by relatively low humidity. Rain is uncommon during the dry season due to the dry south-easterly airstreams that pass over the Top End. Wildfire risk is increased during the dry season and winds are at times quite strong, creating rough seas in coastal waters.

The 'Wet' season consists of a transition period commonly referred to as the 'Build-up' and the 'Monsoon'. The build-up usually occurs from October to December and is the seasonal change between the end of the dry season and the beginning of the monsoon rains. Humidity is greatly increased during this time with daytime temperatures typically in the low to middle thirties in coastal regions with minimum temperatures mostly around the middle twenties. Winds are mainly light and humidity remains high in coastal areas throughout the day. Periods of monsoon activity over the Top End peak in January and February, producing cloudy conditions and frequent rains, this when persistent can produce flooding. Conditions are typically very humid but relatively cool with daytime temperatures often restricted to the high twenties. Rainfall intensity

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can be high and storm water collection and discharge systems and bund holding capacity existing at the plant site have been designed to account for this.

5.6 Natural processes of particular relevance

5.6.1 Storm Surge and High Tide Inundation

The site is located above the highest tides and the Palmerston Area Storm Surge Inundation mapping shows that the site is above the flood level estimate until year 2100.

5.6.2 Fire

Fire is considered a potential risk at the facility due to the storage and treatment of flammable, combustible and other reactive liquids. The nature of the layout of the site is such that fire, if it occurs would be localised within containment areas. The facility includes an adequate and maintained fire-fighting system (Section 7.1.17) which includes foam to deal with potential fires. In addition, site procedures are in place to minimise the risk of fire ignition:

- No smoking in the entire site except for a designated smoking area;
- All motors and electrical equipment rated as Class 1 / Zone 1;
- Permit to work procedures for all contractors on site;
- Fire management and action plan;
- Segregation of incompatible chemicals;
- Fire breaks maintained around boundary of site.

5.7 Flora and Fauna

The 1.5 hectare site was cleared of all native vegetation during the previous development of the biodiesel facility, and no significant flora or fauna remain on the site.

5.8 Significant Sites

There are no significant sites, reserves or conservation zones impacted by the proposed development.

6 Cultural Heritage Environment

The site was extensively disturbed during the construction of the biodiesel facility. The Public Environmental Report published for this development did not identify any areas of cultural significance at this site. This report did refer to two flaked stone points found near the higher sections of Quarantine Island during the archaeological survey for the Darwin Port Expansion – East Arm Environmental Impact Statement (EIS) (Acer Vaughan 1993). During the EIS, sites of cultural significance to Aboriginal people were identified on Catalina Island and the associated sandbar. No sites of cultural significance were identified near the proposed location.

7 Social and Economic Environment

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No other LWTF exists in the NT and all such waste is required to be transported to facilities interstate. Consequently, a considerable transport impost component on waste treatment is transferred to the waste generator which impacts NT business profitability and effectively sends income generated in the NT, interstate.

The GRR plant facilitates NT businesses complying with their environmental responsibilities in the conduct of their activities through the provision of a locally operated LWTF offering state of the art treatment facilities. The operation of the plant will increasingly contribute to reductions in uncontrolled environmental impacts from liquid wastes and hopefully stimulate future industrial growth in the area by providing a mechanism to allow effective waste disposal at an affordable price.

Capital expenditure on the project has been significant (\$20 million) and GRR's policy of utilising local contractors and equipment suppliers where they are competitive in price and quality of workmanship has resulted in significant opportunities for local businesses.

Operation of the LWTF currently directly employs 14 people and at full operation is expected to directly employ a further 14 for a total of 28. The plant also contributes to the income of a range of contractors, truck drivers, operational electronic specialists, skilled boiler makers, electricians and other contractors in the day-to-day operation of the facility. The sampling and testing regime required for the operation of a waste treatment business also requires the services of external laboratories and environmental contractors, adding to the viability and profitability of these businesses.

8 Conceptual Site Model

A Conceptual Site Model was developed to inform the Environmental Risk Assessment. The Conceptual Model is uploaded to the GRR site server and detailed in Table 4 and Appendix 6.

Potential impacts on the environment from the operational LWTP include risks from the handling, storage and treatment of wastes, atmospheric emissions, management of stormwater, contamination through spills and leaks. The facility has included design features to mitigate the potential for occurrence of such risks and a strict adherence to operational procedures and management oversight further alleviate the potential for environmental impacts. Operational procedures have been developed to meet industry best practise and help ensure that the facility is managed and operated in accordance with legislative requirements and community expectations.

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Activity during operations which is a potential source of environmental impact	What can go wrong during operations that could result in an environmental impact	What are the potential vectors from the release of material that could potentially result in an environmental impact		How can the contamination at source move into the wider environment and towards a receptor?	How does a contaminant enter a body or organisms after contact or exposure to	What body or organisms is/are exposed to the contamination? i.e. what is adjacent and/or near to the site
Source/Action	Event/Result	Potential Impact		Pathway (Potential or Actual)	Exposure Route (Potential or Actual)	Receptor (Potential or Actual)
Operation of LWTF -Receival of Chemicals/Waste on site	- Leaking / Damaged IBC Containers arriving at site - IBC is damaged by vehicle or fork lift - IBC Damaged during handling process - Leakage from bulk trucks discharge valve arriving on site - Leakage from hoses or connections during unloading of bulk truck - Incorrect manifest with truck - Unknown or unlabeled waste - Operator error in directing waste to inappropriate storage - Laboratory error in classifying waste - Operator error in directing waste to inappropriate storage	Creation of toxic, flammable or corrosive air emissions (vapours). Creation of odour.		Air	Inhalation, dermal	Employees and contractors of GRR, Surrounding industrial neighbours, Passing Traffic
Operation of LWTF - Storage of chemicals / wastes on site	- Leaking / Damage IBC Containers stored at site - Leaking / Damage bulk storage tanks - Leakage pipes, fittings, hoses or valve connections - Inappropriate Segregation of IBC's - Spill Containment failure	Creation of toxic, flammable or corrosive air emissions (vapours). Creation of odour.				
Operation of LWTF - Processing of Waste - Waste Water Treatment Plant - Waste Oil Recycling Plant - Waste Glycol Recycling - Repackaging of Waste - Sludge Waste	- Failure of tanks, pipes, valves and fittings - Operator error - incorrect treatment chemicals added - Failure of emission control system - Scrubbers failure in removing contaminants - Explosion/Fire - Operation of the boiler	Creation of toxic, flammable or corrosive air emissions (vapours). Creation of odour.				
Operation of LWTF - Disposal of residues	Dewatering of sludge	Creation of Odour				
Operation of LWTF - Sale of Recycled Products	- Leakage of bulk truck pipes or valves during loading - IBC damage during loading	Creation of Odour				
Operation of LWTF - Consignment of Packaged Waste to other EPA Licensed Facilities	- Leaking / Damaged IBC Containers arriving at site - IBC is damaged by vehicle or fork lift - IBC Damaged during handling process - Incorrect Segregation during loading of drums and IBC's	Creation of Odour				

Table 4: Conceptual Site Model

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Activity during operations which is a potential source of environmental impact	What can go wrong during operations that could result in an environmental impact	What are the potential vectors from the release of material that could potentially result in an environmental impact		How can the contamination at source move into the wider environment and towards a receptor?	How does a contaminant enter a body or organisms after contact or exposure to it/them?	What body or organisms is/are exposed to the contamination? i.e. what is adjacent and/or near to the site
Source/Action	Event/Result	Potential Impact		Pathway (Potential or Actual)	Exposure Route (Potential or Actual)	Receptor (Potential or Actual)
Operation of LWTF -Receival of Chemicals/Waste on site	- Operation of trucks and associated equipment during unloading of wastes - Increased Road Traffic Noise	Noise		Acoustic	Hearing	Employees and contractors of GRR, Surrounding industrial neighbours
Operation of LWTF - Processing of Waste - Waste Water Treatment Plant - Waste Oil Recycling Plant - Waste Glycol Recycling Plant - Repackaging of Waste - Sludge Waste	- Operation of process equipment such as compressors, backup generator - Operation of Mobile Equipment such as forklifts	Noise				
Operation of LWTF - Disposal of residues	- Operation of trucks and associated equipment during loading of residues - Increased Road Traffic Noise	Noise				
Operation of LWTF - Sale of Recycled Products	- Operation of trucks and associated equipment during loading of residues - Increased Road Traffic Noise	Noise				
Operation of LWTF - Consignment of Packaged Waste to other EPA Licensed	- Operation of trucks and associated equipment during loading of residues - Increased Road Traffic Noise	Noise				

Table 4: Conceptual Site Model Continued

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Activity during operations which is a potential source of environmental impact	What can go wrong during operations that could result in an environmental impact	What are the potential vectors from the release of material that could potentially result in an environmental impact		How can the contamination at source move into the wider environment and towards a receptor?	How does a contaminant enter a body or organisms after contact or exposure to it/them?	What body or organisms is/are exposed to the contamination? i.e. what is adjacent and/or near to the site
Source/Action	Event/Result	Potential Impact		Pathway (Potential or Actual)	Exposure Route (Potential or Actual)	Receptor (Potential or Actual)
Operation of LWTF -Receival of Chemicals/Waste on site	- Leaking / Damaged IBC Containers arriving at site - IBC is damaged by vehicle or fork lift - IBC Damaged during handling process - Leakage from bulk trucks discharge valve arriving on site - Leakage from hoses or connections during unloading of bulk truck	Impact on land/soil quality, local ecosystem		Land/Soil	Ingestion, dermal, absorption	Local Ecosystem
Operation of LWTF - Storage of chemicals / wastes on site	- Leaking / Damage IBC Containers stored at site - Leaking / Damage bulk storage tanks - Leakage pipes, fittings, hoses or valve connections - Spill Containment failure	Impact on land/soil quality, local ecosystem				
Operation of LWTF - Processing of Waste - Waste Water Treatment - Waste Oil Recycling Plant - Waste Glycol Recycling - Repackaging of Waste - Sludge Waste	- Failure of tanks, pipes, valves and fittings - Failure of bunds - Explosion/Fire	Impact on land/soil quality, local ecosystem				
Operation of LWTF - Disposal of residues	- Failure of tanks, pipes, valves and fittings - Failure of bunds	Impact on land/soil quality, local ecosystem				
Operation of LWTF - Sale of Recycled Products	- Leakage of bulk truck pipes or valves during loading - IBC damage during loading	Impact on land/soil quality, local ecosystem				
Operation of LWTF - Consignment of Packaged Waste to other EPA Licensed Facilities	- Leaking / Damaged IBC Containers arriving at site - IBC is damaged by vehicle or fork lift - IBC Damaged during handling process	Impact on land/soil quality, local ecosystem				

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Activity during operations which is a potential source of environmental impact	What can go wrong during operations that could result in an environmental impact	What are the potential vectors from the release of material that could potentially result in an environmental impact		How can the contamination at source move into the wider environment and towards a receptor?	How does a contaminant enter a body or organisms after contact or exposure to it/them?	What body or organisms is/are exposed to the contamination? i.e. what is adjacent and/or near to the site
Source/Action	Event/Result	Potential Impact		Pathway (Potential or Actual)	Exposure Route (Potential or Actual)	Receptor (Potential or Actual)
Rainwater Management System	• Rain water collection within bunds reduces spill capacity • Incorrect valve position in process bunds • Overflow of rain water from prolonged rain event • Failure of isolation valve • Laboratory error in classifying storm water • Operator error	Impact on surface water quality, impact intertidal and marine flora and fauna		Surface Water	Ingestion, dermal, absorption	Surrounding industrial neighbours, Intertidal zone, Aquatic ecosystem
Operation of LWTF -Receival of Chemicals/Waste on site	• Leaking / Damaged IBC Containers arriving at site • IBC is damaged by vehicle or fork lift • IBC Damaged during handling process • Leakage from bulk trucks discharge valve arriving on site • Leakage from hoses or connections during unloading of bulk truck	Impact on surface water quality, impact intertidal and marine flora and fauna				
Operation of LWTF - Storage of chemicals / wastes on site	• Leaking / Damage IBC Containers stored at site • Leaking / Damage bulk storage tanks • Leakage pipes, fittings, hoses or valve connections • Spill Containment failure	Impact on surface water quality, impact intertidal and marine flora and fauna				
Operation of LWTF - Processing of Waste	• Failure of tanks, pipes, valves and fittings • Failure of storm water containment system • Explosion/Fire	Impact on surface water quality, impact intertidal and marine flora and fauna				
Operation of LWTF - Disposal of residues	• Failure of tanks, pipes, valves and fittings • Failure of bunds	Impact on surface water quality, impact intertidal and marine flora and fauna				
Operation of LWTF - Sale of Recycled Products	• Leakage of bulk truck pipes or valves during loading • IBC damage during loading	Impact on surface water quality, impact intertidal and marine flora and fauna				
Operation of LWTF - Consignment of Packaged Waste to other EPA Licensed Facilities	• Leaking / Damaged IBC Containers arriving at site • IBC is damaged by vehicle or fork lift • IBC Damaged during handling process	Impact on surface water quality, impact intertidal and marine flora and fauna				

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Source/Action	Event/Result	Potential Impact		Pathway (Potential or Actual)	Exposure Route (Potential or Actual)	Receptor (Potential or Actual)
Loss of integrity in bunded containment enclosures	Leakage of waste to ground through or under bunding	Impact on ground water quality, impact intertidal and marine flora and fauna		Ground Water	Ingestion, dermal, absorption	Local Ecosystem
Operation of LWTF -Receival of Chemicals/Waste on site	- Leaking / Damaged IBC Containers arriving at site - IBC is damaged by vehicle or fork lift - IBC Damaged during handling process - Leakage from bulk trucks discharge valve arriving on site - Leakage from hoses or connections during unloading of bulk truck	Impact on ground water quality, impact intertidal and marine flora and fauna				
Operation of LWTF - Storage of chemicals / wastes on site	- Leaking / Damage IBC Containers stored at site - Leaking / Damage bulk storage tanks - Leakage pipes, fittings, hoses or valve connections - Spill Containment failure	Impact on ground water quality, impact intertidal and marine flora and fauna				
Operation of LWTF - - Waste Water Treatment Plant - Waste Oil Recycling Plant - Waste Glycol Recycling Plant - Repackaging of Waste - Sludge Waste	- Failure of tanks, pipes, valves and fittings - Failure of bunds - Explosion/Fire	Impact on ground water quality, impact intertidal and marine flora and fauna				
Operation of LWTF - Disposal of residues	- Failure of tanks, pipes, valves and fittings - Failure of bunds	Impact on ground water quality, impact intertidal and marine flora and fauna				
Operation of LWTF - Sale of Recycled Products	- Leakage of bulk truck pipes or valves during loading - IBC damage during loading	Impact on ground water quality, impact intertidal and marine flora and fauna				
Operation of LWTF - Consignment of Packaged Waste to other EPA Licensed Facilities	- Leaking / Damaged IBC Containers arriving at site - IBC is damaged by vehicle or fork lift - IBC Damaged during handling process	Impact on ground water quality, impact intertidal and marine flora and fauna				

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Table 4: Conceptual Site Model Continued

Activity during operations which is a potential source of environmental impact	What can go wrong during operations that could result in an environmental impact	What are the potential vectors from the release of material that could potentially result in an environmental impact		How can the contamination at source move into the wider environment and towards a receptor?	How does a contaminant enter a body or organisms after contact or exposure to it/them?	What body or organisms is/are exposed to the contamination? i.e. what is adjacent and/or near to the site
Source/Action	Event/Result	Potential Impact		Pathway (Potential or Actual)	Exposure Route (Potential or Actual)	Receptor (Potential or Actual)
Non-compliant Discharge of trade waste to sewer	- Laboratory error - Operator error	Contamination upsetting operation of the Power and Water Sewage treatment		Sewerage Treatment Plant	ingestion, dermal, absorption	Power and Water personnel, Intertidal zone, Aquatic ecosystem
Operation of LWTF	Increased road use	Reduced public safety, slower travel times to port		Roads & Traffic	Direct Impact, Collision	General Public,
	Increased road use	Accelerated deterioration of roads due to heavy vehicles			Direct Impact	Port Authority, industrial neighbours
	Disruption to local area native animal habits and activities	Road traffic risks to local species and denied access to feeding, water sources or breeding areas			ingestion, dermal, absorption	Local ecosystem
Operation of LWTF	Inappropriate management of vegetation within the site grounds	Spread of declared weeds on site, potential to increase mosquito breeding, increased fire risk		Operations site	Dermal	GRR personnel, Local ecosystem

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9 Environmental Risk Assessment

9.1 Risk Assessment Approach

GRR used the Conceptual Site Model to identify the aspects and the potential impacts of these aspects that may occur as a result of project activities. These impacts were then assessed to establish their likelihood and consequence to determine the primary risk. The Primary Risk Level (PRL) of the identified potential impact was considered without taking into account any management and mitigation measures that have been employed by GRR.

Avoidance, mitigation and/or management measures have been developed that reduce the risk of the potential impacts. These have been based on the Hierarchy of Control which suggests that wherever possible controls should be implemented in the following order:

- Eliminate the risk;
- Substitute with less risky materials, processes, operations or equipment;
- Use engineering controls;
- Use administrative controls including signs, markings, warning devices and safe system of work;
- Use personal protective equipment;
- Remedial/ clean up procedures.

With an assumption that the management and control measures are effectively implemented, an assessment of the Residual Risk Level (RRL) associated with each of the identified aspects is presented.

9.2 Risk Assessment Criteria

This preliminary risk assessment has used assessment tools based on AS NZS ISO 31000-2009 *Risk Management- Principles and Guidelines*. The descriptors used in the assessment are described in Table 5 & 6.

Likelihood Table			
Level	Likelihood	Expected or actual frequency experienced	
1	Rare	0.0001	Very low probability of the consequences occurring during the project life but not impossible. Only in exceptional circumstances, unheard of in the industry.
2	Unlikely	0.001	Low probability of the consequence occurring during the project life but not rare. Has historically occurred or has been heard of in the industry.
3	Possible	0.01	Even probability of consequences occurring during the project life. Has occurred in GRR business unit or more than once in the business.
4	Likely	0.1	High probability of the consequences occurring during the project life. Has occurred more than once in GRR business unit or numerous times in the industry.
5	Almost certain	1	Very high probability of the consequences occurring during the project life. Occurs multiple times within GRR business unit or guaranteed to occur in the industry.

Table 5: Descriptions used to classify Likelihood

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Consequence Table						
Level	Descriptor	Health and Safety	Environmental	Reputation	Compliance	Financial
Negligible (1)	Minimal, if any impact, effects apparent at a local scale (sub-site) over a short duration (hours)	Minor injury or discomfort - no treatment required	Incident occurred within a bunded area and fully contained. Cleaned up immediately by site staff. No external assistance required. Not notifiable to regulators.	External reputation not affected. No effort or expense required.	Full compliance with licence and regulations.	<\$1000
Minor (2)	Low level impact, effects apparent at a site scale over a short duration (< day)	FAI Injury or illness requiring first aid treatment. Minor modification to work practices.	Low level impact confined within the site boundary. Cleaned up by site staff within a day. No external assistance required. Not notifiable to regulators.	External reputation minimally affected. Local word of mouth exposure. Little effort or expense required to recover. Issues known only within immediate industry.	Full compliance with licence and regulations.	<\$5,000
Moderate (3)	Temporary negative impact able to be reversed at a site and immediate neighbours scale over a medium duration (< week)	MTI/LTI/ADI Injury or illness requiring medical treatment. Lost Time Injury Alternative duties and return to work program required.	Loss of containment from site. Impact is limited to immediate surrounds and clearly defined. Some damage to the environment requiring the allocation of additional resources, exceedance in trigger values. Notifiable incident to regulators. Impact addressed and cleaned up with a week.	Non-headline exposure. Local media exposure. External reputation damaged. Some effort and expense required to recover. May require external services or legal advice.	Minor breach of licence or regulations. Self-reported to regulators. Minor investigation. Improvement notice received.	<\$50,000
Major (4)	Persistent, pronounced (but potentially reversible) impact over a moderate scale and medium duration (< month)	Serious injury or illness, dangerous incident that is Notifiable to WorkSafe. Serious permanent disability. Offsite impact causing injury or illness to a member of the public.	Loss of containment from site. Impact is not limited or clearly defined. Damage to the environment requiring the serious allocation of additional resources and government assistance. Investigation by regulators. Remediation plan required.	Headline exposure. State media exposure. External reputation severely damaged. Considerable effort and expense required to recover. Requires external services or legal participation.	Major breach of licence or regulations resulting in investigation by regulator resulting in prosecution penalties.	<\$100,000
Extreme (5)	Permanent widespread environmental or physical impact, damage to high value asset, over a long duration (> 1 month)	Fatality or multiple fatality. Widespread public health issue.	Unconfined ongoing impact causing irreparable damage to the environment.	Repeated headline exposure. National media exposure. Reputation irrevocably destroyed or damaged.	Serious breach of licence or regulation resulting in investigation by regulator. Licence revoked.	<\$200,000

Table 6: Descriptions used to classify Consequence

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9.3 Risk Determination and Categories

The risk associated with each event was determined by qualitatively evaluating the likelihood and consequence of each event with reference to the risk matrix (Table 3).

GRR DARWIN RISK MATRIX							
LIKELIHOOD	Almost Certain	5	Moderate (11)	High (16)	High (20)	Extreme (23)	Extreme (25)
	Likely	4	Moderate (7)	Moderate (12)	High (17)	Extreme (21)	Extreme (24)
	Possible	3	Low (4)	Moderate (8)	Moderate (13)	High (18)	Extreme (22)
	Unlikely	2	Low (2)	Low (5)	Moderate (9)	High (14)	High (19)
	Rare	1	Low (1)	Low (3)	Low (6)	Moderate (10)	High (15)
		Rating	1	2	3	4	5
			Negligible	Minor	Moderate	Major	Extreme
			CONSEQUENCE				

Table 7: Risk Assessment Matrix

9.4 Control and Management Measures

The GRR Darwin Project includes both Design Control Measures and Operational Management Measures. Design control measures are the primary control measures designed to ameliorate the impact prior to it occurring, encompassing aspects of the project such as infrastructure design and placement. Secondary measures are those that involve management activities during operations e.g. standard operating procedures etc.

9.5 Risk Assessment Register

In identifying potential environmental aspects and impacts associated with the project, a risk assessment register has been completed (Uploaded to GRR sharepoint and attached as Appendix 5). Associated avoidance, mitigation or management measures have also been described.

A review of the risk assessment for potential environmental impacts demonstrates that the operation of the facility has minimal impact on the environment.

10 Environmental Management

10.1 Environmental Management Plans Overview

This section provides specific environmental management plans related to the identified environmental aspects or pathway for impacts. Each plan forms the basis for an environmental inspection monitoring and audit to allow evaluation of compliance with the EMP.

Each of the plans shown in the relevant sections below includes the following components:

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- **Environmental Performance Objectives** – describes the key environmental objectives or goals that the EMP aims to influence for this aspect.
- **Performance Standards** – performance level that must be met for each environmental aspect, for example, discharge limit such as the ANZECC 2000 Guidelines for Fresh and Marine Water Quality.
- **Performance Measurement Criteria** - measurable control indicator that is used to quantify, or evaluate, to determine if the performance standard is met.
- **Mitigation measures** – measures that will be implemented with the aim to eliminate, reduce, or control potential adverse environmental impacts and risks resulting from site activities.
- **Monitoring and Reporting** – actions to measure and report compliance against the objectives and performance standards.
- **Corrective Action** – measure to ensure a non-conformance or non-compliance is corrected.

10.2 General Environmental Management Plan Principles

Tables 8 and 9 outline the general environmental management principles adopted by the Darwin LWTF. These are based on the environmental risk and impact assessment and should be viewed as the minimum requirements for operation.

Environmental Performance	
Environmental Performance Objectives	To reduce the risk of causing environmental harm as far as is practically possible; To reduce the negative impacts of the Darwin LWTF to all environmental aspects; To increase the positive impacts of the LWTF by encouraging industry to use the service provided.
Environmental Performance Standards	Negative impacts are reduced to levels deemed acceptable within the EMP and compliant with all relevant licensing, agreements and legislation.
Environmental Measurement Criteria	Number of non-conformances with the EPL conditions and the EMP; Number of complaints received from stakeholders and the degree of resolution of issues raised; Annual environmental compliance audit to EPL conditions and EMP; Environment inspections & monitoring.

Table 8: General Performance Measures

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Aspect	Mitigation and Control Measures
EMP Compliance	Ensure compliance with this EMP is achieved; Annual environmental audit of the EPL conditions and the EMP; Ensure all site personnel and contractors working on the site have an environmental induction and understand the implications of potential actions, based on the key risks and mitigation measures identified in the EMP; Ensure all employees and contractors working on site are inducted and understand emergency response procedures; Changes to EMP are reviewed by the site S&C officer before inclusion in the EMP; Reporting any incidents, non-conformance, non-compliance or corrective actions of the EMP.
EMP Inspection	Daily walk through site by Site Manager to check on performance and compliance; Weekly work area checklists completed by site staff; Monthly environment inspection against the key aspects of this EMP / EPL.
Reporting	Environmental Reports complete (as required).
Corrective Action	Non-compliance with the EPL/EMP must have a corrective action with accountability and schedule to complete required actions.

Table 3: General Mitigation and Control measures

11 Specific Environmental Management Strategies

Potential impacts on the environment from the LWTF include risks from the handling, storage and treatment of wastes, atmospheric emissions, management of stormwater, and contamination of soil and groundwater via spills and leaks. The design of the facility has included features to mitigate the potential for occurrence of such risks and a strict adherence to operational procedures and management oversight further alleviate potential for environmental impacts.

Specific Environmental Management Plans have been developed where the primary risk level (PRL) has been assessed as moderate or higher.

11.1 Potential Emissions to Air - Odour, VOC, GHG Emissions

11.1.1 Overview of Potential Emissions to Air

Operation of the LWTF requires the use of electricity, natural gas and liquid transport fuels. The consumption of these energy sources has been calculated by GRR to contribute an estimated 12,678 tonne CO₂-e to the atmosphere over each year of operation. The current facility threshold for reporting GHG is 25,000 tonne CO₂-e indicating that the facility is recognised as a minor contributor to GHG.

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Odour generation is often associated with liquid waste treatment facilities. These facilities most often accept grease trap waste and other similar odorous waste streams. No grease trap or similar waste liquids are accepted into the GRR LWTF, so odour is less of an issue, but odours may still be generated by other wastes from time to time.

The boiler operates on natural gas and the stack gas produced is typical of products resulting from the combustion of Natural Gas in a conventional boiler system. The boiler is compliant with the usual emission standards for such steam boilers. For plant safety reasons the boiler system is fitted with a safety relief valve, which will rarely operate and only needs to undergo an annual test.

There is the potential for the generation of emissions from the processing of waste oil and oily-water. The potential for emission occurs during receipt and transfer of the oily waste into storage tanks, during processing from the heating of the waste and then from the storage of the cleaned product. Potential air emissions from storage tanks, oil production and glycol production areas are managed through a wet emission scrubber. GRR has refurbished the existing air emissions scrubber unit and now has combined all air emission sources from the production areas into this unit which then discharges through a single point known as the Cold Stack.

Treatment plant design results in the waste glycol treatment system operating under vacuum with the gaseous stream condensed and directed to the wastewater treatment system. Other than at the point of unloading of these wastes no emission of odour is expected with this process.

The LWTF stores flammable, combustible and other reactive wastes and consequently fire is considered a risk to the operation of the facility. Such an occurrence, apart from the danger to operations personnel, could result in significant smoke and the potential for noxious fumes to enter the atmosphere.

There are a number site design aspects which reduce the opportunity for emissions to air. These include:

- Trafficable and working areas sealed with bituminised tarmac or concrete;
- Use of specially designed receipt system to minimise aspiration of the waste during transfer of the waste into storage tanks;
- Sealed tanks with pressure relief valves and activated carbon filtration to minimise VOC and odour escape to the atmosphere;
- Fossil fuel combustion engines meet Australian Design emission standards;
- Storage of hazardous chemicals in segregated containers in bunded area;
- Storage of materials compliant with appropriate codes of practice and regulations;
- Installation of a fire control system.

EPL 229-01 requires GRR to monitor air emissions from two point sources within the facility; AEP1 – Boiler Stack and AEP2- Cold Stack. Emissions from both points are required to be tested on an annual basis.

11.1.2 Air Emissions Management Plan

The Air Emissions Management Plan (Tables 10 & 11), includes management of dust from sludge and filter cake storage, odour emissions from the processing and storage of wastes, VOC emission from the processing and storage of waste and products, greenhouse gas emission and the emissions potentially associated with explosion or fire at the LWTF. Further details relating to air monitoring from identified point sources has been included in the EPL as Attachment C - Air Emissions Monitoring Plan.

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Environmental Performance	
Environmental Performance Objectives	To minimise dust for GRR employees, personnel at adjacent facilities and the general public; To minimise emissions of VOCs through the use of best available reduction technology in all aspects of the LWTF. To minimise emissions of greenhouse gases from the production processes (including electricity and natural gas). To minimise odour nuisance for GRR employees, personnel at adjacent facilities and the general public; Manage and mitigate the risk of fire
Performance Standards	To keep the GHG emissions from equipment to industry standards; Minimise the release of VOC and odour through correct operation of waste receival system, maintenance on tank ventilation and on equipment used in processing waste; Complaints from personnel or other stakeholders; No fires.
Performance Measurement Criteria	No Complaints from employees or other stakeholders.

Table 4: Air Emissions Management Plan Performance Measures

Activity	Mitigation and Control Measures	Frequency
Operation Liquid Waste Treatment and Storage	Monitor dust emissions from solid waste holding areas and bins, cover waste in skips and utilise water sprays to damp down dust as required;	As required
	Schedule regular maintenance of gas boiler and other equipment using hydrocarbon fuels;	As per equipment requirements
	Sludge waste storage bins are emptied when full within 24 hours;	Daily
	Odorous Wastes to be covered immediately;	Daily
	All liquid waste and hazardous waste must be received in sealed containers and shall be placed in the short-term quarantine area prior to categorization and moved to segregated storage and/or transport interstate;	As required
	Appropriate training of operations staff;	Biannual/as required
	Supervision and adherence to the operating procedures;	Daily
	Appropriate maintenance of the firefighting system in conjunction with Vopak;	As required
	Training of operators in firefighting emergency response;	Biannual
	Maintenance of a fire break around the site;	Monthly
	Enforcement of smoking to designated safe area;	Daily
	Enforcement of safe working practices including hot work permits;	Daily
	Ensure all employees and sub-contractors are aware of the potential environmental issues and controls through inductions, toolbox and pre-start meetings;	As required
	Regular appraisal by S&C Officer of operations area and site in general to identify issues;	Daily

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	Inspections of equipment burning fossil fuels by third party contractor to ensure operational efficiency;	As per equipment requirements
Monitoring	All infrastructure is to be inspected and maintained according to the asset management system;	As required
	Weekly environment checklist completed by Site S&C officer and compiled into Incident Register;	Weekly
	Monthly environment inspection against the key aspects of this EMP / EPL;	Monthly
	Air monitoring as per the requirements of the EPL	As required
	Atmospheric monitoring may be conducted if complaints are received from personnel or the public;	As required
	Update staff training records	Monthly
	Complete monthly Environment Report and include an updated Complaints Register, environmental issues identified during the period, actions taken to rectify issues and status of recommended works;	Monthly
Reporting	Update Incident Register, Inspection Reports, file weekly checklists on sharepoint;	Weekly
	Rectify any leaks or defects in the system within 24 hours;	Daily/As required
	Should a staff member become aware of any odour issue they are to report the incident to their Supervisor or S&C Officer. The Supervisor/S&C Officer shall then implement an appropriate strategy to deal with the situation;	As required

Table 11: Air Emissions Management Plan Mitigation & Control

11.2 Potential Emissions to Land

11.2.1 Overview of Potential Emissions to Land

Virtually the entire site is covered by buildings, bituminised roads and bunded concrete hard stand.

The potential for contamination of land is therefore primarily associated with operational spillage associated with a failure in the integrity of the concrete retaining systems through fractures or joints and runoff from roads and hardstands that may transfer to underlying or adjacent unsealed land surface. Operation of the facility to date has shown that no egress of contamination to land has occurred and that the integrity of the roads, hardstand and bunded areas are such that the chance of contamination occurring is very low. Inspections on the integrity of the surfaces are regularly undertaken and any issues identified are rectified promptly.

A baseline inspection and monitoring report was completed by EcOz Consultants (EcOz) in July 2017 who collected and tested soil samples from four locations within the facility. As the majority of the facility is sealed, soil samples were collected from available soil; the garden beds, unsealed surfaces surrounding the perimeter of the facility and in front of the office building within the facility. Where available, sample sites were located at points most likely to receive surface water runoff, to increase the chances of detecting any contaminants that would be present in runoff from the sealed surfaces. This study found that:

- Metal concentrations in the soil were below relevant Guidelines;

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- Ammonia was below the laboratory detection limit, and nitrate and nitrite concentrations were generally low. The majority of nitrogen was in the organic form (TKN), which is attributable to organic matter in the soil (e.g. plant material);
- Phosphorus was present in relatively high concentrations at all sites;
- Oil and grease was detected in quite high concentrations at three of the four sampling sites;
- Some forms of PFAS were detected in minor concentrations in all soil samples although concentrations were significantly below the guideline values available for PFOA, and the sum of PFHx and PFOS;
- The concentrations of all other analytes were below laboratory detection limits; PAHs, TPHs and BTEXN, PCBs, phenols, glycols and pesticides.

No further soil sampling has been undertaken by GRR following this baseline survey.

11.2.2 Land Management Plan

The Land Management Plan includes management of transportation of liquid and hazardous waste to and from the site and the transportation of recycled product from the site during operation of the LWTF. The Management Plan is detailed in Tables 12 & 13.

Environmental Performance	
Environmental Performance Objectives	To minimise the risk of accidents during movement of industrial waste or product in or out of the LWTF; To work promptly and effectively with Emergency Services should a road accident occur involving spillage of liquid industrial waste; To minimise environmental impacts should an accident result in a spill; Manage and mitigate the risk of fire should a road accident occur involving the spillage of liquid industrial waste.
Performance Standards	No significant impacts or environmental harm has occurred.
Performance Measurement Criteria	No traffic accidents involving vehicles carrying industrial liquid waste destined or leaving the LWTF; In the case of a traffic accident occurring, work efficiently with Emergency Services to minimise impacts on the environment and maximise the safety of personnel involved and the general public.

Table 12: Land Management Plan Performance Measures

Activity	Mitigation and Control Measures	Frequency
Transport of Industrial Liquid Waste to/from and Product from LWTF.	All vehicles used to transport Industrial Liquid Waste or Hazardous Waste are properly licensed to transport such waste;	As required
	Establish close relationship with logistics company to ensure that vehicles used to transport liquid waste have; appropriate vehicle maintenance, drivers are well trained in emergency response and drivers records indicate they adhere to road rules and have a suitable driver safety record;	As required

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	Ensure transport vehicles have appropriate spill equipment and signage;	As required
	Ensure that drivers have been trained in the issues surrounding the transport of hazardous waste and specifically in emergency response.	As required
Monitoring	Induct all drivers coming on site	As required
	Spot inspections of emergency response equipment on trucks by the S&C Officer when trucks are on site to ensure appropriate equipment is present and adequately maintained.	As required
	Environmental Incident Register managed by the S&C Officer;	As required
Reporting	Complete monthly Environment Report and include issues associate with the transport of wastes and product to and from the LWTF;	Monthly
	Update Incident Register, Inspection Reports, file on server.	Weekly
Corrective Action	Address any issues associated with driver capability, training or inadequacies in emergency response equipment carried on trucks within 24 hours;	Daily/As required
	Should a staff member become aware of any issue associate with trucks delivering waste to site or transporting waste from site they are to report the issue to their Supervisor or S&C Officer. The Supervisor/S&C Officer shall then implement an appropriate strategy to deal with the situation.	As required

Table 13: Land Management Plan - Mitigation & Control

11.3 Potential Emissions to Surface Water

11.3.1 Overview of Potential Emissions to Surface Water

As the site discharges directly to the East Arm of Darwin Harbour, egress of contaminated water from the facility is possibly the greatest environmental risk posed by the operation of the LWTF.

To mitigate this risk as far as possible, the site drainage has been designed to include the following mitigation measures:

- The site drainage has been designed such that rainwater falling on the site is segregated into lower risk and higher risk areas. Lower risk areas such as roads, roofs and non-production areas are piped directly to a baffled stormwater holding pit prior to leaving the site through a channel in the adjacent Vopak site. This discharge point is kept closed by default to retain any spilled material on-site in the case of an accident. The pit includes an oil skimming system in combination with an oil water separation system to recover floating oil prior to discharge. Sediment collected in runoff is settled behind baffle plates in the storm water pit reducing sediment discharge to the environment;
- Higher risk areas such as tank farms and production areas are bunded and piped to a blind collection pit adjacent to the main stormwater pit. Each bund is also able to be isolated from the stormwater system by a valve located at the discharge sump. Bunded operational and storage areas are by design kept isolated from the storm water system. Water collected within the bunds is assessed as per the requirements of the EPL and either released to the storm water system or retained and directed to the liquid waste storage tanks for processing through the wastewater treatment circuit as required. Other operational areas (the Filter press area, Wastewater treatment

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plant, Truck receival area and Sludge Receival / Truck wash area) have been designed to be roofed to minimise rainfall collection and have blind sumps to facilitate collection of any spilled material. Any rainfall collected in these areas is tested / analysed and treated through the WWTP before being discharged to sewer, rather than be discharged to stormwater.

To further mitigate the risk of accidental releases to environment the site has been kerbed and profiled to retain over 100mm of rainfall before overflowing to environment.

Industrial waste waters, Oily wastes and Ethylene Glycol wastes are the largest volume wastes accepted on site and are received, handled and stored in purpose designed and built receival, treatment and storage tanks to minimise the potential for release. However, it is considered that in the event of a leak or other process failure, these materials could be discharged into storage or production area bunds which could potentially enter the stormwater system during intense rainfall events or through loss of bund integrity.

Smaller volumes of a range of industrial liquid wastes are received on the site in packaged form (e.g. drums and IBCs). These are loaded and unloaded inside the main production area bund, and stored in a purpose built covered, bunded hardstand area to minimise the risk of release. Release of these materials under normal operating conditions is considered unlikely, however it is considered that in the case of a damaged container or accidental spill, these materials could be released onto the concrete hardstand in and around production areas and then have potential to enter the stormwater system during intense rainfall events or if bund integrity is lost.

In the event of a fire it is considered likely that fire fighting foam/fire retardant chemicals would enter into the runoff collection system that directs water to the storm water pit. Overflow of fire water into the local environment could create a contamination issue.

The design aspects of surface water management on site have the purpose to allow for the capture, segregation and assessment of all surface water prior to discharge and ensure that any contaminated surface water can be transferred to storage tanks for treatment prior to release from site. A summary of the design measures incorporated into the site to manage and mitigate the risk of contaminated water being discharged environment is provided below:

- Profiling of the site, perimeter kerbing and restricting site drainage through a single discharge point allows capture, testing and treatment (if required) of stormwater prior to discharge to environment;
- All bunding complies with *AS1940: 2004*, *AS3780: 2008*, and *AS4452: Storage and handling of Toxic substances*. The net capacity of a bunded compound in the tank storage area is at least 100% of the net capacity of the largest tank plus 10% of the second largest tank with an additional allowance for rainwater based on a 50 year ARI (Australian Rainfall Intensity);
- Storage and treatment tanks are designed and constructed in accordance with Australian Standards *AS1940: The storage and handling of flammable and combustible liquids*, *AS3780: Storage and handling of Corrosives*, and *AS1692: 1989 Tanks for flammable and combustible liquids* as well as all other regulations and guidelines (e.g. *AIP GL12 – 2003 Guidelines for Safe Above Ground Fuel Storage on Farms and Industrial Sites*);
- Blind and/or Lockable discharge sumps are included in all bunded areas to enable any material spilled in that bund to be collected rather than discharging to the stormwater system;
- Discharge sumps in each area are, by design, kept isolated from the stormwater system so that in the event of a spill occurring, materials can be collected and cleaned up before impacting the stormwater system;

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- Spill kits are located throughout the site so that operators can quickly contain spills and minimise any ingress of contaminants to the stormwater system;
- All rainwater collected in bunded storage and production areas is kept isolated from general runoff, tested and, if contaminated, disposed through the industrial water treatment system and then to trade waste rather than through the stormwater discharge system;
- Site stormwater discharge point is kept closed by default to prevent release of contaminated water to environment in the event of a spill outside bunded areas.
- The large volume (~150m³) of the stormwater pits allows adequate settling time to remove sediment from runoff prior to overflow from the storm pit.
- The storm water pit includes baffles to hold back floating oil from entering the storm water discharge. Any oil is continually removed by a floating skimmer connected to an oil water separator;
- Pumps of sufficient capacity to allow the movement of fire water into temporary storage in road tankers or if available into the industrial wastewater storage tanks are available on site.

11.3.2 Surface Water Management Plan

The Surface Water Management Plan includes management of treatment operations, potential breach of the bunded areas, spills outside the bunded areas and failure of the storm water treatment system during operations of the LWTF. The Management Plan is detailed in Tables 14 & 15.

Environmental Performance	
Environmental Performance Objectives	To minimise contaminants from wastewater entering the environment. To negate/minimise the impact of spills on surface water. To maintain all operations at a high standard to prevent contamination of the surrounding surface water
Performance Standards	No significant impacts to surface water quality outside the leased property area; No visible oil or sediment run-off outside the LWTP Operations Area; The wastewater discharged to sewer will comply with the parameters established by Power and Water Corporation and stipulated in the Trade Waste Agreement; Discharges to storm water will comply with the Surface Water Monitoring Plan in Attachment A of the EPL; No uncontained spills or leaks occur.
Performance Measurement Criteria	No incidents or monitoring in breach of the EPL conditions Water quality monitoring in compliance with Surface Water Monitoring Plan in EPL

Table14: Surface Water Management Plan Performance Measures

Activity	Mitigation and Control Measures	Frequency
Operation of Liquid Waste Treatment and Storage	Appropriate training of operations staff;	Ongoing/as required
	Supervision and adherence to the operating procedures;	Daily
	Appropriate maintenance of the firefighting system in conjunction with Vopak;	As required
	Training of operators in firefighting & emergency response;	Biannual

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	Ensure all employees and sub-contractors are aware of the potential environmental issues and controls through inductions, toolbox and pre-start meetings;	As required
Overflow of Operations Area Bunds to Storm Water	Bunds maintained in empty condition as a matter of protocol to allow for intense rainfall events;	As required
	S&C Officer ensures water in bunds is removed expeditiously to appropriate disposal option;	As required
	Stormwater discharge point kept closed by default to prevent discharge of contaminated water	Continuous
	Use onsite laboratory and test-kits for testing of water in bunds to assess disposal options;	As required
	Appropriate training of operations staff;	Biannual/as required
	Supervision and adherence to the operating procedures;	Daily
	Isolate storm water discharge system until overflow water removed to wastewater treatment system or shown to be suitable for discharge to storm water;	As required
	Ensure all employees and sub-contractors are aware of the potential environmental issues and controls through inductions, toolbox and pre-start meetings;	As required
Spill of Waste Outside Bunded operations Area	S&C Officer ensures spills are cleaned up expeditiously;	Immediate/As required
	Inspections to ensure appropriate spill equipment and signage in use;	As required
	Stormwater discharge point kept closed by default to prevent discharge of contaminated water to environment	Continuous
	Appropriate training of operations staff in clean-up procedures and use of spill equipment and signage;	Biannual/as required
	Supervision and adherence to the operating procedures;	Daily
	Isolate storm water system in area of spill by using available spill kits until spill is cleaned up;	As required
	Isolate storm water discharge system if spill is large until spill has been cleaned up and wash down water removed to waste water treatment system.	As required
	Forklift speeds on site limited to a maximum of 5km/h to minimise the chance for spillage of waste during transfer;	Daily
Failure of storm water treatment system	Ensure all employees and sub-contractors are aware of the potential environmental issues and controls through inductions, toolbox and pre-start meetings;	As required
	Appropriate training of operations staff;	Biannual/as required
	Supervision and adherence to the operating procedures;	Daily
	Isolate storm water discharge system until equipment operating correctly. Removed water to waste water treatment system until shown to be suitable for discharge to storm water;	As required

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	Regular monitoring of stormwater treatment system by S&C Officer through observation, hand held testing and testing through on site laboratory. Ensure compliance with monitoring plan in EPL.	Daily
Monitoring	Regular appraisal by S&C Officer of operations area and site in general to identify issues;	Daily
	Regular inspections of storm water treatment system to ensure appropriate operation;	Biannual
	All infrastructure is to be inspected and maintained according to the asset management system;	As required
	Water Quality Monitoring Plan Implemented. Regular monitoring to evaluate quality of storm water discharge.	As required/ daily in wet season
	Weekly environment checklist completed by S&C officer and compiled into Incident Register.	Weekly
	Monthly environment inspection against the key aspects of this EMP / EPL.	Monthly
Reporting	If contaminant levels identified exiting site that may cause environmental harm to surface water or the marine ecosystem (exceed EPL Trigger Value), report to NT EPA and immediately take remedial action to eliminate impact.	As required
	Liaise with NT EPA within a reasonable time period if an exceedance of EPL has occurred;	As required
	Complete monthly Environment Report and include an updated Complaints Register, environmental issues identified during the period, actions taken to rectify issues and status of recommended works.	Monthly
	Incident reports, Inspection check list on server	Weekly
	S&C Officer to record spills over 20L in Incident Register. For spills over 200L the Site Manager must be notified.	As required
	Update staff training records	Monthly
Corrective Action	If stormwater event or spill occurs that has the potential to cause environmental harm and/or breaches the EPL, then notify NT EPA as soon as reasonably practicable.	As required
	Undertake investigations to understand the cause of the surface water contamination, design and implement a remediation plan.	As required
	Should a staff member become aware of any water quality related issue they are to report the incident to their Supervisor or S&C Officer. The Supervisor/S&C Officer shall then implement an appropriate strategy to deal with the situation.	As required

Table 15: Surface Water Management Plan - Mitigation & Control Measures

11.3.3 Water Monitoring Plan

While GRR are confident that the comprehensive design and operational control measures outlined above will be sufficient to prevent the accidental discharge of contaminated water to environment, a Surface Water Monitoring Plan has been developed which details the analytes and frequencies for undertaking surface water monitoring at the Darwin LWTF to ensure that this is the case.

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Surface water monitoring will be conducted in the final chamber of the baffled stormwater discharge pit (-12.479694, 130.898194) and will consist of a hierarchy of testing. An initial field check of parameters likely to indicate the presence of contamination will be conducted prior to any stormwater release and on a daily basis when wet season conditions require continuous discharge which, should they be outside the limits, will result in the water being retained onsite for treatment through the WWTP. And a second sampling program for parameters that are unsuitable for field testing to build a baseline dataset and trigger investigation where required will be undertaken monthly.

The Surface Water Monitoring Plan has been uploaded to the GRR site. The surface water monitoring plan is compliant with EPL 229-01 and the data collected will be uploaded to the GRR monitoring spreadsheet.

11.4 Potential Emissions to Groundwater

11.4.1 Overview of Potential Emissions to Groundwater

Groundwater monitoring has been undertaken throughout the Vopak site since 2007 and an environmental site assessment study was conducted by EcOz Environmental Consultants in mid-2017 to review this data and provide a baseline for future GRR operations. This baseline study has been used to inform the proposed groundwater monitoring program.

The potential for groundwater contamination at the LWTF is considered to be low as all operational areas of the site are impervious and all storage and production areas are bunded. However, potential groundwater contamination could be associated with loss of integrity in bunded containment structures in operations areas or through the interaction of surface water with ground water following an uncontained spill outside operational areas. Such occurrences could result in the uncontrolled release of waste materials into the groundwater system which could impact on local marine environment.

11.4.2 Groundwater Management Plan

The Groundwater Water Management Plan includes management of the potential for a loss of integrity in the bunded structures in operations areas and the potential for interaction of surface water contamination with groundwater in areas outside the bunded areas. The Management Plan is detailed in Tables 16 and 17.

Environmental Performance	
Environmental Performance Objectives	To minimise contaminants from wastewater entering the environment. To negate/minimise the impact of spills on groundwater. To maintain all operations at a high standard to prevent contamination of the underlying groundwater
Performance Standards	No significant impacts to groundwater quality outside the leased property area; Groundwater sampling and monitoring will be undertaken in line with the Ground Water Monitoring Plan in Attachment B of the EPL; No uncontained spills or leaks.
Performance Measurement Criteria	No incidents or monitoring in breach of the EPL conditions or Environmental Harm. Groundwater monitoring program developed and implemented to monitor potential impacts from groundwater.

Table 16: Groundwater Management Plan - Performance Measures

Activity	Mitigation and Control Measures	Frequency
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Overflow of Operations Area Bunds to Storm Water	Groundwater sampling in compliance with Ground Water Monitoring Plan in Attachment B of the EPL.	As required
Spill of Waste Outside Bunded operations Area	Groundwater sampling in compliance with Ground Water Monitoring Plan in Attachment B of the EPL.	Immediate/As required
Monitoring	Ongoing evaluation of groundwater data by S&C Officer to track changes and highlight potential issues of contamination;	Monthly
	In the event of the recognition of an increasing trend in groundwater parameters advice sought regarding the potential impacts and an integrity assessment of bunded and hardstand areas undertaken.	Biannual
Reporting	If groundwater contaminant levels identified at the site that may cause environmental harm to the marine ecosystem, report to NT EPA and immediately take remedial action to eliminate impact.	As required
	Liaise with NT EPA within a reasonable timeframe if an exceedance of EPL has occurred;	As required
	Complete monthly Environment Report and include environmental issues identified during the period, actions taken to rectify issues and status of recommended works.	Monthly
	Update Incident Register, Inspection Reports, file weekly check lists on server.	Weekly
	S&C Officer to record spills over 20L in Incident Register. For spills over 200L the Site Manager must be notified.	As required
Corrective Action	If a rising trend in groundwater parameters suggests that contamination is occurring from the LWTF and this has the potential to cause environmental harm and/or breaches the EPL, then notify NT EPA as soon as reasonably practicable.	As required
	Undertake investigations to understand the cause of the groundwater contamination, design and implement a remediation plan.	As required

Table 17: Groundwater Management Plan - Mitigation and Control

The site has two groundwater monitoring bores located within its boundary EMB 13 (-12.480093, 130.899119) and EMB 14 (-12.480813, 130.898873), these bores will be used to undertake regular groundwater monitoring.

11.5 Management of Liquid Waste Treatment Facility

The Management Plan for general management of the LWTF has been divided into the following sub-sections:

- Waste Acceptance Criteria;
- Leaks and Spills Management Plan;
- Hazardous Materials Management Plan;
- Solid Waste Management Plan;
- Fire and Cyclone Management Plan;
- Pest and Biting Insect Management Plan

11.5.1 Waste Acceptance Criteria

The GRR LWTF accepts liquid wastes from various industrial companies and from waste transporters that do not have their own waste treatment facility and therefore require a third-party facility to treat the waste. The liquid waste accepted into the facility is commensurate with the capabilities of the treatment processes employed at the site. For this reason, waste such as grease trap waste will not be accepted into the facility.

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Liquid Waste can only be accepted if it complies with the Waste Acceptance Criteria and procedure (Tables 18 and 19).

Environmental Performance	
Environmental Performance Objectives	Manage the acceptance of wastes to ensure that EPL compliance is maintained
Performance Standards	All waste to be accompanied by a completed GRR Reference Number and Manifest No waste accepted outside EPL requirements
Performance Measurement Criteria	No waste is accepted that is not compliant with waste acceptance criteria;

Table 18: Waste Acceptance Performance Measures

Activity	Mitigation and Control Measures
Acceptance Training	Relevant staff are trained on the types of waste accepted and pre-approvals that are required; Ensure all site personnel are aware of the types of waste that are accepted through inductions, toolbox and pre-start meetings.
Gate Inspection	Conduct visual inspection of vehicle load and question driver regarding the type of wastes within the load. Ask for manifest, Salesforce reference number and Waste Transport Certificate; Review EPA Transport Certificates and other relevant documentation to verify the type of wastes and prior approval if applicable; Obtain a representative sample of the liquid waste and send to laboratory for preliminary acceptance testing; Liquid waste loads compliant with EPL are accepted and truck directed to appropriate unloading station.
Waste Criteria	Any waste not listed in the EPL, cannot be accepted into the LWTF. The following waste codes are licensed and can be accepted, if the applicable disposal procedures and compliance with this EMP are followed:

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Waste description	store	treat	recycle	dispose
Acidic solution				
Antimony				
Arsenic				
Barium				
Basic solutions				
Beryllium				
Boron Compounds				
Cadmium				
Chlorates				
Chromium compounds				
Cobalt				
Containers that are contaminated				
Copper				
Cyanide (inorganic)				
Encapsulated and chemically fixed, solidified or polymerized waste				
Ethers				
Filter cake				
fire debris and fire washwaters				

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Waste description	store	treat	recycle	dispose
Fly ash				
Halogenated organic solvents				
Highly odorous chemicals				
Inorganic fluorine compounds excluding calcium fluoride				
Inorganic sulfides				
Isocyanates				
lead, lead compounds				
mercury, mercury compounds				
Nickel Compounds				
Non-toxic Salts				
Organic Phosphorus compounds				
Organic Solvents				
Organohalogen Compounds that are not specified				
Perchlorates				
Phenols phenol compounds				
Phosphorus Compounds				
Residue From Industrial Waste treatment or disposal				
Selenium				
Soils Contaminated with a listed waste				
Surface Active Agents				
Vanadium Compounds				
Waste chemical substances arising from R&D, lab				
Waste containing peroxides				
Waste containing cyanides				
Biocides				
Waste from Inks, dyes, pigments, paints				
Waste from production of organic solvents				
Waste from the production and formulation of Photographic waste				
Waste from production formulation of resins, latex				
Waste from the production of pharmaceuticals				
Waste mineral oils unfit for original use				
Waste mixtures or emulsions and oily water				
Waste pharmaceuticals and drugs				
Waste resulting from surface active treatment				
waste tarry residues				
PCB				
Zinc				

Table 19: Waste Acceptance Criteria

11.5.2 Leaks and Spills Management Plan

Whilst every effort will be made to avoid spills, on occasion, accidents will occur which result in spills of waste or chemicals within the bunded areas or in the hardstand areas. These spills need to be cleaned up quickly and effectively to minimise the risks to personnel and to the environment.

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Environmental Performance	
Environmental Performance Objectives	Manage the storage, transport and handling liquid and solid waste and of all chemicals used during operations to ensure that spills and leaks are prevented; Ensure spill contingency plans and emergency response plans are communicated to all personnel; Ensure rapid and effective control, containment and clean-up of chemical spills or leaks; Ensure that surface water run-off is controlled to avoid pollution of local marine or groundwater systems.
Performance Standards	Significant impacts or environmental harm does not occur.
Performance Measurement Criteria	No incident in breach of the EPL conditions causing environmental harm; No waste is accepted that is not compliant with waste acceptance criteria; No liquid waste spills to enter stormwater system.

Table 20: Leak and Spill Management Plan Performance Measures

Activity	Mitigation and Control Measures	Frequency
Spill Event	Source of the spill is to be controlled as soon as practicable. S&C Officer ensures spills are cleaned up expeditiously;	As required
	Fully stocked spill kits suitable for all types of spills possible on the site will be maintained at ready locations;	As required
	Bunds to remain isolated from stormwater system to contain spilled material. Spills outside bunds will be contained using absorbent material and/or drain covers to prevent spilled waste entering the stormwater system;	As required
	Stormwater discharge point kept closed by default to prevent discharge of contaminated water;	Continuous
	All ignition sources are to be removed from the vicinity and assessment of fire risk conducted;	Immediate
	Personnel must wear appropriate PPE when cleaning up spill and other personnel stay up-wind of the spill to avoid inhalation of fumes;	Immediate
	All spilt and contaminated material shall be removed to appropriate containment;	As required
	Spills are to be reported and investigated through appropriate incident reporting protocols;	As required
	Appropriate training of operations staff in clean-up procedures and use of spill equipment and signage;	Biannual/as required
	Supervision and adherence to the operating procedures;	Daily
	Isolate storm water discharge system if spill is large until spill has been cleaned up and wash down water removed to waste water treatment system.	As required
Monitoring	Forklift speeds on site limited to a maximum of 5km/h to minimise the chance for spillage of waste during transfer;	Daily
	S&C Officer to record spills over 20L in Incident Register. For spills over 200L the Site Manager must be notified.	As required

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	Monthly environment inspection against the key aspects of this EMP / EPL.	Monthly
	All infrastructure is to be inspected and maintained per the asset management system;	As required
	Weekly environment checklist completed by S&C officer and compiled into Incident Register;	Weekly
	Regular appraisal by S&C Officer of operations area and site in general to identify issues;	Monthly
	Inspections of spill management equipment;	Monthly
Reporting	If a spill occurs that has the potential to cause environmental harm and/or breaches the EPL, then notify NT EPA as soon as reasonable.	As required
	Undertake investigations to understand the cause of the spill, design a remediation plan and implement plan.	As required
	Complete monthly Environment Report and include environmental issues identified during the period, actions taken to rectify issues and status of recommended works;	Monthly
	Update Incident Register, Inspection Reports, file weekly check lists on server.	Weekly
Corrective Action	Clean up spills immediately and rectify the source of any leaks or defects in the system within 24 hours.	Daily

Table 21: Leak and Spill Management Plan Mitigation & Control

11.5.3 Hazardous Waste Management Plan

Hazardous waste compliant with the EPL but unsuitable for treatment at the LWTF, is repackaged where required and consigned to an appropriate alternative licensed waste treatment facility. Where necessary, the Darwin facility acts as a temporary storage site until wastes can be consolidated and transferred to another licensed facility. Storage of these products is limited to 40 tonnes (B Double truck load). The wastes are stored in a covered quarantine area consisting of two 40-foot shipping containers fitted with a dome shelter, in accordance with appropriate segregation protocols within the bunded operations area.

Environmental Performance	
Environmental Performance Objectives	Ensure all hazardous materials are managed appropriately to minimise the risk of fire, explosion and the release of fugitive emissions; To prevent contamination of environment.
Performance Standards	Significant impacts or environmental harm does not occur.
Performance Measurement Criteria	No incident in breach of the EPL conditions causing environmental harm; No waste is accepted that is not compliant with waste acceptance criteria Materials are managed appropriately, to standards set by the <i>Dangerous Goods Act</i>

Table 22: Hazardous Waste Management Plan Performance Measures

Activity	Mitigation and Control Measures	Frequency
Handling and Storing Hazardous Materials	All hazardous substances on site to be stored appropriately within bunded areas and managed with due consideration of the material SDS requirements.	As required

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	Ensure SDS's are available at the central register.	As required
	Appropriate training of operations staff in hazardous waste handling procedures;	As required
	Supervision and adherence to the operating procedures;	As required
	All infrastructure is to be inspected and maintained per the asset management system;	As required
	Weekly environment checklist completed by S&C officer and compiled into Incident Register;	Weekly
	Regular appraisal by S&C Officer of operations area and site in general to identify issues;	Monthly
Monitoring	All infrastructure is to be inspected and maintained per the asset management system;	As required
	Weekly environment checklist completed by S&C officer and compiled into Incident Register;	Weekly
	Regular appraisal by S&C Officer of operations area and site in general to identify issues;	Monthly
Reporting	Complete monthly Environment Report and include environmental issues identified during the period, actions taken to rectify issues and status of recommended works;	As required
	Update Incident Register, Inspection Reports, file weekly check lists on server.	As required
Corrective Action	Undertake investigations to understand the cause of any issues associated with the handling or storage of hazardous waste and design a remediation plan and implement plan.	As required

Table 23: Hazardous Waste Management Plan Mitigation and Control

11.5.4 Solid Waste Management Plan

The treatment of industrial wastewater, the refining of waste glycol and the cleaning of waste oil and oily water generates solid waste in the form of a sludge. These sludges may pose a risk to the environment and need to be handled appropriately to minimise potential environmental impacts.

All sludge generated is dewatered through the filter press and is analysed and classified against solid waste classification criteria. Where disposal of filtercake is possible in the NT, EPA Victoria Guidelines (IWRG631) are used for classification, with NT EPA specific criteria adopted as they become available (IWRG631 is attached as Appendix 4). Where disposal is not feasible in the NT, Solid Waste Classification criteria of the receiving state (likely to be South Australia, Victoria or New South Wales) is used. The sludge is then consigned to either an appropriately EPA licensed landfill or a third party licensed facility for disposal. Wherever possible and feasible, reuse opportunities for the filter cake generated from the treatment process are researched and pursued.

Where laboratory analysis and assessment of waste filter cake and sludge from the sludge receival bay has determined that this particular waste does not meet leachability standards, the waste is transferred in wet form to avoid issues of dust. Based on laboratory treatability trials appropriate fixation and immobilisation chemicals (i.e. lime, cement, LSS (sulphide based treatment), geopolymers, Magnesium Oxide) are added to immobilise and chemically fix the contaminants. The treated solid material, now in a solid spadeable

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consistency, is placed in a skip for curing, retesting and classification. Once compliance with appropriate Solid Waste Classification criteria is confirmed the waste is disposed of to the appropriate landfill.

Environmental Performance	
Environmental Performance Objectives	Ensure that the amount of waste generated from operations is minimised by maximising re-use and recycling protocols. Ensure that all waste generated is separated (where specific wastes may be recycled or processed) and disposed of appropriately in order to minimise the potential impact on the receiving environment. To prevent contamination of environment.
Performance Standards	Significant impacts or environmental harm does not occur.
Performance Measurement Criteria	No incident in breach of the EPL conditions causing environmental harm; All solid waste disposed appropriately.

Table 24: Solid Waste Management Plan Performance Measures

Activity	Mitigation and Control Measures	Frequency
Handling and Storing Solid Waste	All sludges generated from the LWTF to be stored appropriately within bunded and impervious areas and managed with due consideration of the potential for odour generation;	As required
	Sludge sampled and tested for suitability for disposal to landfill, alternative disposal mechanism or stabilisation required;	As required
	Appropriate training of operations staff in solid waste handling procedures;	As required
	Supervision and adherence to the operating procedures;	As required
	All infrastructure is to be inspected and maintained according to the asset management system;	As required
	Regular appraisal by S&C Officer of operations area and site in general to identify issues;	Monthly
Monitoring	All infrastructure is to be inspected and maintained according to the asset management system;	As required
	Weekly environment checklist completed by S&C officer and compiled into Incident Register;	Weekly
	Regular appraisal by S&C Officer of operations area and site in general to identify issues;	Monthly
Reporting	Complete monthly Environment Report and include environmental issues identified during the period, actions taken to rectify issues and status of recommended works;	As required
	Update Incident Register, Inspection Reports, file weekly check lists on server.	As required
Corrective Action	Undertake investigations to understand the cause of any issues associated with the handling or storage of sludges or other solid waste generated on site and design a remediation plan and implement plan.	As required

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Table 25: Solid Waste Management Plan Mitigation and Control

11.5.5 Fire and Cyclone Management Plan

Fire is considered a potential risk at the facility due to the storage and treatment of flammable, combustible and other reactive liquids. The nature of the layout of the site is that fire, if it occurs would be localised within containment areas. The facility includes an adequate and maintained fire-fighting system which includes foam to deal with potential fires.

Cyclones are a relatively common occurrence in Darwin. The processing plant and associated infrastructure have been designed and constructed according to the most relevant Australian and International Standards. Design and construction complies with AS 1170: 2002 *Structural Design Actions – General Principles*, which details the structural design requirements to combat various cyclone intensities.

Environmental Performance	
Environmental Performance Objectives	To minimise the risk of fire; To minimise the damage from fires if they occur; To ensure safety of site personnel and surrounding areas; To ensure proper emergency procedures are in place in case of a life-threatening situation; To ensure personnel health and safety in the event of a cyclone; To reduce the risk of damage to infrastructure in the event of a cyclone; To prevent contamination of environment.
Performance Standards	To keep the number of fires on site at zero; Risk of fire impacting site and escalating consequences from site flammables is reduced to as low as reasonably practical.
Performance Measurement Criteria	No incident in breach of the EPL conditions causing environmental harm; No fires occurring on site; Emergency response planning considers and implements fire risk measures.

Table 26: Fire and Cyclone Management Performance Measures

Activity	Mitigation and Control Measures	Frequency
Fire or Cyclone Event	In case of serious fire ensure site is shut down and all equipment and infrastructure are secured.	As required
	Effective maintenance and testing of fire control system with Vopak;	As required
	Segregated storage of flammable materials separate from ignition sources or hot works areas according to AS1940;	As required
	All fires will be treated in accordance with the Emergency Response Plan;	As required
	Appropriate training of operations staff in use of firefighting equipment and procedures;	As required
	Firefighting equipment present in strategic locations across site and in vehicles;	As required
	Fire extinguishers must be working and nearby at all times, and be inspected and tagged regularly in accordance with AS1851 requirements;	quarterly

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	Supervision and adherence to the operating procedures including: No smoking in the entire site; All motors and equipment Class 1-Zone 1 rated; Permit to work procedures for all contractors on site	As required
	Fire breaks maintained around boundary of site;	Monthly
	All infrastructure is to be inspected and maintained per the asset management system;	As required
	Regular appraisal by S&C Officer of operations area and site in general to identify issues;	Monthly
	Personnel to be trained in Emergency Response – Firefighting;	As required
	Appropriate training of operations staff in emergency procedures and induction and training involves fire management.	Biannual/as required
	Respond to cyclone warning according to GRR Cyclone Management Plan.	As required
Monitoring	All infrastructure is to be inspected and maintained per the asset management system;	As required
Monitoring Reporting	Weekly environment checklist completed by S&C officer and compiled into Incident Register;	Weekly
	Regular appraisal by S&C Officer of operations area and site in general to identify issues;	Monthly
	Complete monthly Environment Report and include environmental issues identified during the period, actions taken to rectify issues and status of recommended works;	As required
Reporting Corrective Action	Update Incident Register, Inspection Reports, file weekly check lists on server.	As required
	Undertake investigations to understand the cause of any issues identified that may impact on fire occurrence or intensity on site and design a remediation plan and implement plan.	As required

Table 27: Fire and Cyclone Management Mitigation and Control

11.5.6 Biting Insect Management Plan

The nearby mangroves and coastal hinterland are a likely breeding habitat for biting midges and mosquitoes. Biting insects are therefore commonly an issue at the facility. Operations personnel are informed of the issue and encouraged to use the protective measures detailed in the publication *“Personal Protection for Mosquitoes & Biting Midges in the NT”*.

The impact of mosquitoes can be minimised by ensuring breeding sites are not available. Potential breeding sites generally require at least temporary water pooling but can also occur in damp vegetation. The design of the facility ensures that rain falling on the site is directed to the storm water pit. Tarmac and concrete roads and hardstand areas generally ensure that water pooling does not remain for extended periods after rain. Rain collected in bunded areas is pumped to the treatment storage as soon as possible after rainfall to minimise the opportunity for mosquito breeding. The landscaped area is regularly mown and the garden maintained to minimise the potential for mosquito breeding.

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Biting midges breed in mangrove mud along drainage lines and at the margins of mangroves. In the dry season these midges can be in very large populations which often encroach on nearby residential or industrial land. No breeding controls are possible on site and personnel are encouraged to follow the Guidelines indicated above for personal protection should the midges be in sufficient number to cause an issue.

Environmental Performance	
Environmental Performance Objectives	To minimise potential mosquito breeding sites and to provide adequate protection for and information to personnel regarding mosquito borne diseases and biting midge protection.
Performance Standards	Significant outbreaks of mosquitoes have not occurred.
Performance Measurement Criteria	Mosquito breeding site not present on LWTF site.

Table 28: Biting Insect Management Plan Performance Measures

Activity	Mitigation and Control Measures	Frequency
Vector Control	Conduct daily Inspections of vector presence;	Daily
	Maintain drains to prevent unnecessary water pooling, ensure water not collecting in storage areas, depressions on site and in bunded areas.	As required
Monitoring	Encourage site personnel to use the protective measures detailed in the publication " <i>Personal Protection for Mosquitoes & Biting Midges in the NT</i> "	As required
	Regular appraisal by S&C Officer of operations area and site in general to identify areas where breeding may be taking place;	As required
	Appropriate training of operations staff in induction to ensure an understanding of the methods of personal and the potential health impacts of mosquito bites.	As required
Reporting	Update staff training records	Monthly
	Update Incident Register, Inspection Reports, file weekly check lists on server.	Weekly
Corrective Action	Rectify any potential mosquito breeding sites by changing drainage or modifying equipment or storage areas.	As required
	Should a staff member become aware of any biting insect issue they are to report the situation to their Supervisor or S&C Officer. The Supervisor/S&C Officer shall then implement an appropriate strategy to deal with the situation.	As required

Table 29: Biting Insect Management Plan Mitigation and Control

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12 Audit, Reporting and Review

12.1 Inspections and Audits

GRR will commission an audit to be conducted by an independent and suitably qualified person on an annual basis to evaluate the extent to which compliance has been achieved with the EPL, the WMPC Act and the Water Act. A written report must be prepared and signed by the qualified person who conducted the audit. The written report must be provided in full to the NT EPA within five (5) business days of being signed.

12.2 Non-conformance, Corrective and Preventative Action

Any non-conformance, corrective or preventative actions identified during an inspection or audit will be recorded in the Corrective and Preventative Action (CAPA) Register and issued to the relevant party for rectification. The CAPA Register will detail the non-conformance, identified actions, responsible persons and due date for completion.

12.3 Incidents

All environmental incidents or near-misses must be reported to General Manager as soon as practicable. Reports can be made verbally but must be followed up in writing using the approved Incident Reporting Form. EPL non-compliances and any serious environmental incidents must be reported to the GRR CEO.

Incident reports must have the following information, including the:

- Date, time and circumstance under which the incident became known;
- Known or estimated dates and times at which the incident commenced and ended;
- Details of the person initially reporting the incident;
- Actual and potential causes and contributing factors to the incident;
- Risk of environmental harm arising from the incident;
- Action(s) that have or will be undertaken to mitigate any environmental harm;
- Corrective actions that have or will be undertaken to prevent a reoccurrence; and
- If no action was taken, why no action was taken.

A record of all environmental incidents, near-misses and EPL non-compliances are maintained in the Incident register.

12.4 Reporting

The S&C Officer will ensure all EPL non-compliances are reported to the NT EPA by completing the Non-Compliance Notification via NT EPA Online, as soon as practicable after (and in any case within 24 hours after) first becoming aware of the non-compliance. Any exceedance of trigger values associated with surface or ground water will be reported to the NT EPA within 10 (ten) business days of the exceedance.

The S&C Officer will prepare and submit an Annual Return to the NT EPA via NT EPA online, outlining compliance with the EPL conditions in the preceding 12-month period. The Annual Return will be submitted within 10 business days after the EPL commencement date anniversary each year.

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12.5 EMP Review and Continuous Improvement

The EMP will be reviewed at least every twelve months to ensure that it adequately addresses the identified issues and the activities being undertaken during the operation of LWTF.

The review will consider as a minimum of:

- NT EPA comments or recommendations;
- Audit findings;
- Environmental monitoring outcomes;
- Incidents and non-conformances;
- Changes in organisational structure and responsibilities; and
- Changes in standards and legislation.

13 Training and Awareness

13.1 Environmental Inductions

All project personnel, subcontractors and consultants are required to undertake a site induction which, as a minimum, addresses the following environmental topics:

- Details of the EPL and conditions and consequences of non-compliance with the EPL;
- The significant environmental risks and details of the EMP;
- Location of significant environmental sensitive areas; and
- Incident management procedures (e.g. the action to be taken in emergencies, communication lines and contact details for emergency services and site representatives).

13.2 Environmental Awareness

Ongoing environmental awareness will be disseminated through project team meetings, through the use of pre-start messages and toolbox talks to ensure all parties are kept informed.

13.3 Emergency Planning and Response

13.3.1 Emergency Planning and Procedures

GRR have an Emergency Management Plan for the LWTF which addresses as a minimum the procedures and responsibilities in preparation for, and response to, a disaster such as:

- Cyclones,
- Plant fires
- Wildfires
- Floods and tsunamis,
- Earthquakes,
- Terrorist acts

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GRR will ensure that there are always appropriately trained First Aid and Fire Safety responders on-site and that emergency response procedures and equipment posters are displayed on-site identifying contact details, first aid kit locations and other key emergency information.

14 Communication

The LWTP is located in an industrial area with only two close neighbours – Northern Cement and Vopak Fuel Terminal. Residential areas are located more than 4.7 km away and the Port more than 2 km distant. As a consequence, consultation has focused on engagement with the nearest neighbours, the need for the LWTF and the requirements of various agencies and government departments. The following stakeholders are regularly consulted;

- Northern Territory Environmental Protection Agency;
- Power and Water Corporation;
- Department of Lands and Planning;
- NT Worksafe;
- Darwin Port;
- Vopak Terminal Darwin;
- Northern Cement Limited;
- Darwin Chamber of Commerce;
- Industrial and Commercial waste generators;
- Industrial waste collectors and transporters.

A Consultation and Communication Plan has been implemented. This plan is detailed in Tables 30 and 31.

Environmental Performance	
Environmental Performance Objectives	To ensure no nuisance to adjacent businesses, users of Berrimah Rd or the public in general; To minimise environmental and social impacts from LWTF operations.
Performance Standards	Complaints received in relation to nuisance and impacts caused by LWTF operations
Performance Measurement Criteria	No complaints from adjacent business regarding nuisance from the LWTF Operations; No significant impacts to stakeholders; All complaints received have been investigated and responded to within 48 hours.

Table 30: Communication and Consultation Plan Performance Measures

Activity	Mitigation and Control Measures	Frequency
Regulator (NT EPA)	Seek approvals and maintain regular contact with NT EPA LWTP design upgrades, monitoring and reporting in accordance with conditions of EPL.	As required
Vopak Terminal Operator	Seek approvals and maintain regulator contact in accordance with lease agreement. Cooperate in emergency response training and maintenance of firefighting system.	As required

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Communication	Update GRR website to include information regarding the Darwin LWTP. Regular communication with Chamber of Commerce, industrial and commercial waste generators and other stakeholders.	As required
Complaints	All complaints shall be treated as an environmental incident and logged in a complaints register including details of the complaint, issue and time / date. Verification of the incident shall be reviewed and if justified an action to address the issue assigned; All complaints shall be responded to within 48 hours, with documentation added to the register; Ensure all employees and sub-contractors are aware of the potential environmental issues and controls through inductions, toolbox and pre-start meetings.	As required
Reporting	Environmental Reports complete; Environmental Reports shall include an updated complaints register.	As required
Corrective Action	Complete all external interactions with stakeholders in a communication / consultation register detailing contact details, time / date, location, issues raised, responses given and actions (who, what, when), and each will be addressed.	As required

Table 31: Communication and Consultation Plan Mitigation and Control

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References

GRR (2016) Notice of Intent Liquid Waste Treatment Facility, Darwin

NTEPA (2015) Guideline for the Preparation of Environmental Management Plan

NTEPA (2013) Guideline for Conceptual Site Models

Territory Biofuels Ltd. (2012) Operations Environmental Management Plan

URS (2016) Shoal Bay Waste Management Facility Environmental Management Plan.

Darwin Harbour Baseline Sediment Monitoring (2012)

https://denr.nt.gov.au/_data/assets/pdf_file/0011/253739/darwin_harbour_sediment_survey_2012_full_authorship.pdf

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List of Appendices

- Appendix 1: Environmental Policy
- Appendix 2: Darwin LWTF Site Plan
- Appendix 3: Surface and Ground Water Sampling Data
- Appendix 4: IWRG631 – Solid Industrial Waste Classification Guideline
- Appendix 5: Risk Assessment
- Appendix 6: Conceptual Site Model

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