Government of Western Australia
Department of Water and Environmental Regulation

Amendment Notice 2

Licence Number	L6882/1997/13
Licence Holder	Shire of Esperance
File Number:	DER2014/001205-1
Premises	Wylie Bay Sanitary Landfill Site Wylie Bay Road Lot 50 on Plan 411486 BANDY CREEK WA 6450
Date of Amendment	03/08/2018

Amendment

The Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER) has amended the above Licence in accordance with section 59 of the *Environmental Protection Act 1986* (EP Act) as set out in this Amendment Notice. This Amendment Notice constitutes written notice of the amendment in accordance with section 59B(9) of the EP Act.

Date signed: 3 August 2018

Rebecca Kelly

Manager Waste Industries

an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Definitions and interpretation

Definitions

In this Amendment Notice, the terms in Table 1 have the meanings defined.

Table 1: Definitions.

Term	Definition
ACN	Australian Company Number
Amendment Notice	refers to this document
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the *Environmental Protection Act 1986* Locked Bag 33 Cloisters Square PERTH WA 6850 info@dwer.wa.gov.au
CS Act	*Contaminated Sites Act 2003* (WA)
Delegated Officer	an officer under section 20 of the EP Act
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	Department of Water and Environmental Regulation
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
Licence Holder	Shire of Esperance
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report.
Risk Event	as described in *Guidance Statement: Risk Assessment*

Amendment Notice

This amendment is made pursuant to section 59 of the *Environmental Protection Act 1986* (EP Act) to amend the Licence issued under the EP Act for a prescribed premises as set out below. This notice of amendment is given under section 59B(9) of the EP Act.

This notice is limited only to an amendment to Category 64 activities, to extend the landfilling area. No changes to the aspects of the original Licence relating to Categories 13, 57 or 62 have been requested by the Licence Holder.

The following guidance statements have informed the decision made on this amendment:

- *Guidance Statement: Regulatory Principles (July 2015)*
- *Guidance Statement: Setting Conditions (October 2015)*
- *Guidance Statement: Land Use Planning (February 2017)*
- *Guidance Statement: Licence Duration (August 2016)*
- *Guidance Statement: Decision Making (February 2017)*
- *Guidance Statement: Risk Assessment (February 2017)*
- *Guidance Statement: Environmental Siting (November 2016)*

Amendment description

The Licence Holder has applied for an amendment to extend the footprint of the landfill to accommodate approximately 3.5 more years of operational life. The Licence Holder is in the process of closing the landfill and proposes to establish a new facility at Kirwan Road, Merivale. In 2012 the Licence Holder indicated a mid-2019 date for the closure of the Premises, however due to delays in establishing the new facility the Licence Holder has requested additional time to complete the closure of the Premises. The Premises is the sole putrescible landfill for the Shire of Esperance area.

The Licence Holder has indicated that clearing will be required for the landfill extension. All clearing will be undertaken in accordance with CPS 5692/1 which was issued in 2014 and valid until 2029.

The proposed amendment is a continuation of the current activities with no changes to the management of the landfill, and therefore potential emissions and discharges from the general operation of the landfill (e.g. odour, noise, dust, litter and vermin) will not change and therefore a risk assessment for those existing emissions has not been included in this Amendment Notice. The extension of the final landfill area may alter the nature and volume of leachate emissions and therefore leachate emissions have been assessed in this Amendment Notice. This assessment has identified that the landfill extension poses a medium risk which can be mitigated through control measures.

As the landfill is drawing to a close this amendment will also include requirements relevant to the closure, capping and post-closure management of the landfill premises. These requirements are relevant to controlling leachate emissions in the short and the long-term (post closure).

Other approvals

The Licence Holder is also the relevant local government authority, and has advised that planning approval is not required for the landfill extension.

Amendment history

Table 2 provides the amendment history for L6882/1997/13.

Table 2: Licence amendments.

Instrument	Issued	Amendment
L6882/1997/13	14/03/2013	Addition of monitoring requirements at additional bores. Future closure of the landfill in 2019 as proposed by the Shire of Esperance's *Closure and Post Closure Management Plan* for the site, submitted in July 2012.
L6882/1997/13	23/08/2013	Extension of closure date of liquid waste facility to 31 December 2013
L6882/1997/13	19/12/2013	Extension of closure date of liquid waste facility to 30 June 2014.
L6882/1997/13	26/03/2015	Addition of Categories 13 and 62. Inclusion of closure and rehabilitation phases 2-3. Conversion to new licence format.
L6882/1997/13	29/04/2016	Licence amendment for the extension of the Licence duration to 9 August 2025 as part of the implementation of the then DER's *Guidance Statement: Licence Duration*
L6882/1997/13	15/03/2018	Amendment Notice 1 for the extension of the asbestos burial area.
L6882/1997/13		Amendment Notice 2 for the extension of the landfill footprint area.

Existing Licenced Landfill

History and current activities

The Landfill has been in operation since 1986 to service the Esperance community. Prior to 2004 the satellite communities of Salmon Gums, Condingup, Grass Patch, Cascade and Scaddan had small rural landfills to service the towns and adjacent areas. However, these were closed between 2004 and 2010 when the Wylie Bay landfill became the sole sanitary waste facility for the Shire.

The landfill uses the benching or mound method, for disposal of the majority of waste, where the landfill is located above ground level and waste is buried in layers creating a mound. In-situ sand at the site is used as a cover in the absence of clean fill. The existing landfill cells are unlined with no engineered leachate management system.

Landfilling occurs within a designated active landfill area within the premises boundary shown in Figure 1.

Figure 1: Landfill extent.

In addition to Category 64 landfilling, the Premises is licensed for Category 13 (crushing of building material), Category 57 (Used Tyre Storage) and Category 62 (Solid Waste Depot). Activities related to these categories are undertaken in the western portion of the Premises, near the entry.

Current management of the facility

Table 3 provides a summary of management measures currently being undertaken by the Licence Holder, as summarised in their amendment application, and measures conditioned on the current licence to manage potential emissions from the Premises.

Table 3: Current Management Procedures.

Emission Sources	Management Measures
Asbestos	• Covering of waste daily and securing any exposed waste • Ensuring that works or earthworks do not expose previously buried waste • To be wrapped in heavy duty plastic upon entrance to the Premises, or wet down prior to unloading or handling. • Disposal area to be defined on a site plan and not to be within 2m of the tipping surface.
Leachate	• Minimising leachate generation by covering of waste materials daily • Phased installation of a capping system that achieves a maximum permeability of 1x10-9 m/s. • Not permitting direct public access to groundwater
Odour	• Non-conforming waste is not accepted • Waste is covered daily
Landfill Gas	• Managed through a passive system of spiromatic cowls to be installed in the capping system.
Dust	• Restrict vehicles to a maximum speed of 10km/hr at the Premises • Stop closure and rehabilitation works during periods of high winds • Vehicles to enter and exit the Premises via the sealed access road
Storm Water	• Waste is covered daily, and the landfill area is continually re-profiled to encourage diversion of storm water away from the active tipping face
Noise	• Vehicles are restricted to a maximum speed of 10km per hour at the Premises • All equipment and machinery is maintained in good working condition and utilised in a conservative manner
Windblown/Exposed Waste	• Ensure no works expose waste • Regular collection of any windblown waste • Limiting area of tipface • Site closed during high wind and storm events • Waste is covered by the end of the working day
Fire/Smoke	• 600L firefighting trailer is located onsite, typically near the active tipping face • Two water tanks with Camlock fittings and fire extinguishers are located nearby the Materials Recovery Facility • Site closed during high wind and storm events
Illegal dumping or damage to infrastructure from unauthorised access	• Fencing around the Premises that is locked when the Premises is unattended • All buildings locked outside of operational hours • Use of barriers where necessary
Vermin	• Covering of waste • Reducing vermin populations when necessary

Current closure and capping plan

The Licence Holder engaged Cardno to develop the *Closure and Post-Closure Management Plan* (July 2012). This plan estimates that the landfill has a lifespan to mid-2019, however a detailed closure schedule is not included. The Licence was amended on 14 March 2013 to require the Licence Holder to implement the plan and to cease operations at the premises by no later than 9 August 2019.

The Licence Holder applied for a works approval in 2014 to authorise the works required to carry out Phase 1 of capping, and in support of this application the Licence Holder engaged Talis Consultants Pty Ltd to develop the *Environmental Assessment and Management Plan, Wylie Bay Landfill Closure and Rehabilitation* (February 2014). This plan does not include a specific closure schedule, however it makes reference to capping occurring over a period of 7.5 years. The proposed capping design consisting of 200mm topsoil, 1,000mm sub-soil, a drainage layer, low permeability geosynthetic clay liner and 300mm sandy gas collection layer (refer to Figure 2).

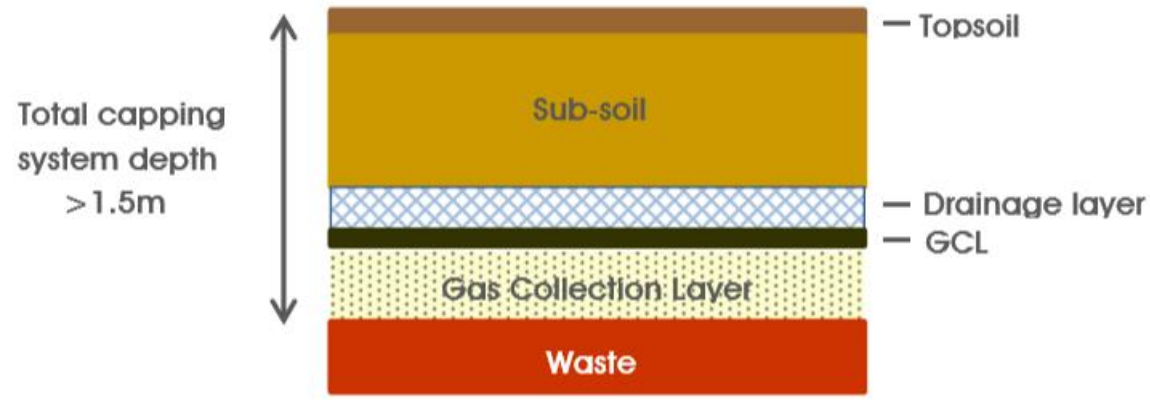


Figure 2: Capping system design

The works approval W5664/2014/1 issued on 21 August 2014 required the Licence Holder to carry out Phase 1 capping works in accordance with both the 2012 and 2014 closure documents. Phase 1 of capping did not commence before the works approval expired on 24 August 2017.

In 2015 the Licence was amended to permit all phases of capping to occur under the Licence rather than requiring a works approvals for each phase. During this amendment process, the Licence Holder responded that the capping plan had been revised to three phases as shown in Figure 3 instead of the original four phases proposed in the 2012 and 2014 plans, however this would have no impact on the timeline of the capping. The Licence was updated to require that the capping occurred in accordance with the Talis, February 2014 document, and the Licence Holder's response to the draft licence depicting three phases (dated 9 March 2015), removing reference to the Cardno, July 2012 document.

The requirement to cease accepting waste by 9 August 2019 was also removed during this amendment as the licence was due to expire on this date anyway. The Licence was later amended on 29 April 2016 to give effect to the Department's *Guidance Statement: Licence Duration*, extending the expiry to 8 August 2025. This amendment inadvertently removed the obligation on the Licence Holder to cease accepting waste by mid-2019, however the Licence Holder is still constrained to approximately this date due to the airspace available in the current landfill footprint.

As there is no detailed schedule for capping in the documents referenced in the licence, there is no specific date for any of the phases or the final capping to occur. Phase 1 of these capping works have now been complete, and landfill areas in Phase 2 and 3 are still currently being filled. It is estimated that the capping of the existing landfill would be completed in late 2019.

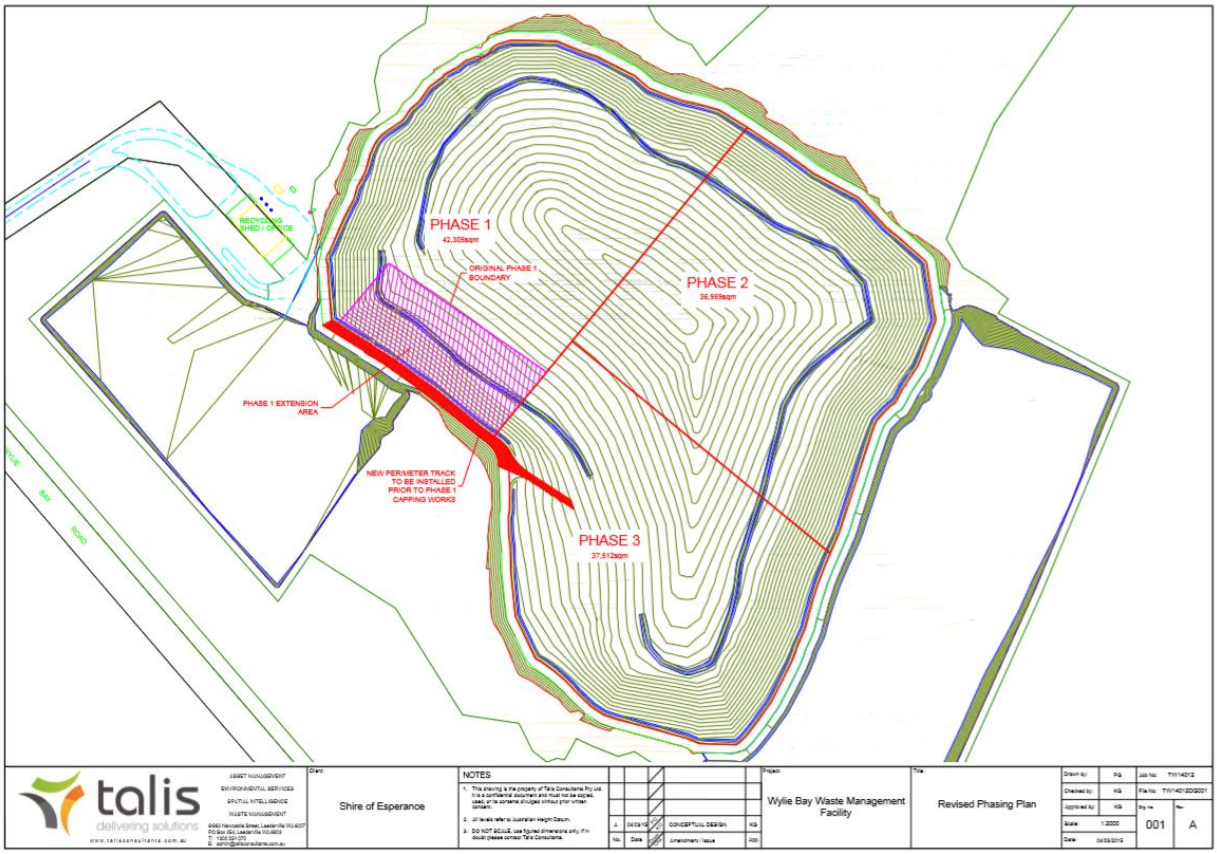


Figure 3: Revised three phase capping plan

Groundwater monitoring

The current licence requires quarterly and six-monthly groundwater sampling at eight bore locations as depicted in Figure 4 and report the results in an annual report.

Figure 4: Locations of boreholes and estimated groundwater level contours

The monitoring results over the past two years (2016 and 2017) indicate that ammonia nitrogen (a key indicator for landfill leachate) has been found in bores considered to be down gradient from the landfill in levels above the Australian and New Zealand Guidelines for Marine Water Quality (ANZECC Guidelines) trigger value for 95% protection of species (0.91 mg/l). The results provided by the Licence Holder for the quarterly sampling events each year for each bore are detailed in Table 3, and the cells shaded red indicate exceedances of the 0.91 mg/l trigger value.

Table 3: Ammonia Nitrogen (mg/L) levels in groundwater monitoring results.

	WBL1	WBL4	WBL6	WBL7	WBL9	WBL20	WBL28	WBL29	WBL30
Jan 2016	2.10	<0.01	4.90	0.04	<0.01	28.00	1.30	16.00	N/A
Apr 2016	1.50	0.01	6.50	0.03	<0.01	33.00	1.30	17.00	<0.01
Jul 2016	2.00	<0.01	6.00	0.03	<0.01	32.00	0.69	21.00	<0.01
Oct 2016	25.00	<0.01	7.00	0.04	2.50	30.00	0.74	<0.01	<0.01
Jan 2017	6.00	<0.01	7.40	<0.01	<0.01	19.00	1.00	22.00	<0.01
May 2017	6.30	<0.01	8.80	<0.01	<0.01	31.00	1.20	35.00	<0.01
Jul 2017	3.90	<0.01	7.80	<0.01	<0.01	34.00	0.92	38.00	<0.01
Oct 2017	3.60	<0.01	7.90	<0.01	<0.01	41.00	1.30	40.00	<0.01

N/A: Bore was not constructed on this date.

The Licence Holder has also provided the below Figure 5 showing the trend in ammonia nitrogen levels since 2015.

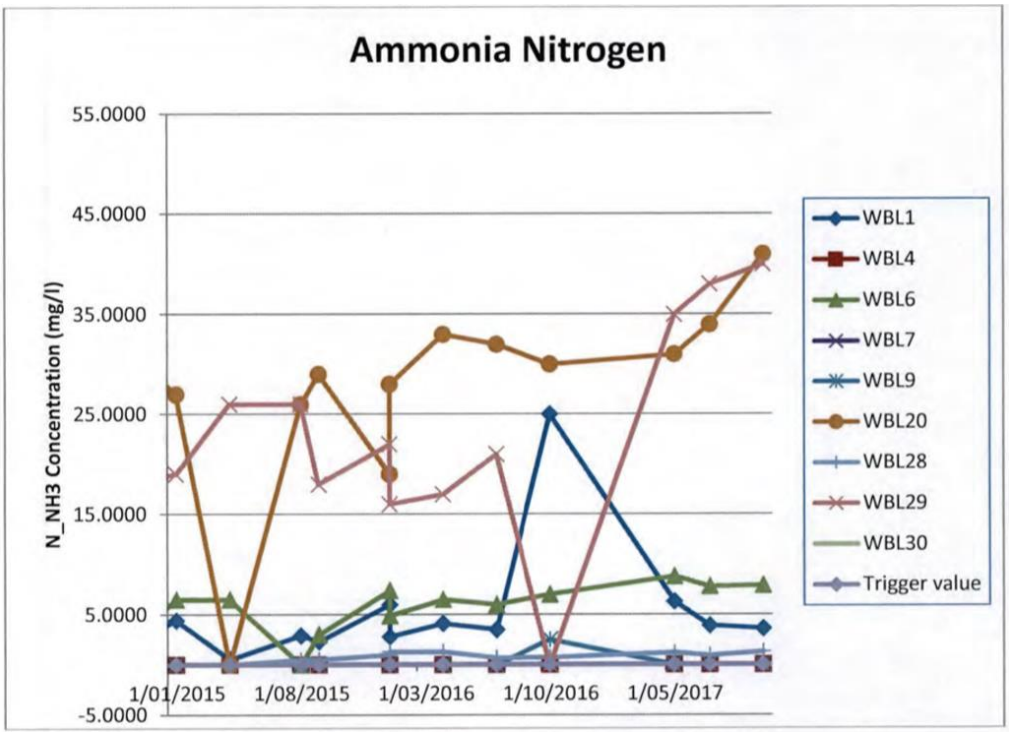


Figure 5: Ammonia Nitrogen concentrations (mg/L).

Groundwater monitoring at the Premises has also indicated that copper and zinc were found at levels above the ANZECC guidelines during one monitoring event in 2016 but do not appear to be above these trigger levels during other occasions.

Although these results indicate that there is some leachate contamination present in groundwater beneath and downgradient at the site, it is considered that the current bore network and the monitoring completed to date at the Premises has not adequately delineate the nature and extent of contamination .

The spatial extent of the plume has not been fully delineated down-gradient of monitoring bores WBL6 and WBL20. The potential for contamination to be present at greater depths in the aquifer has also not been explored as nested bores have not been installed.

Additionally, the potential for off-site contaminant sources has not been fully determined. For example an area to the north east of the Premises contains an infiltration pond system operated by the Water Corporation which is a discharge point for the Esperance Wastewater Treatment Plant which is licensed separately under Part V of the EP Act.

A hydrogeological investigation was carried out in August 2016 by Talis Consultants on behalf of the Licence Holder in response to Improvement Conditions on the licence requiring assessment of the bore network and impacts to receptors. This report summarised that the bore network was sufficient and that there were limited impacts to receptors. However as discussed above DWER considers that the current bore network may not capture the full extent of the leachate plume, and the conclusions of the August 2016 Talis report should be reassessed following additional groundwater investigations near the landfill site.

Groundwater monitoring has not yet included laboratory analysis for perfluoroalkyl and polyfluoroalkyl substances (PFAS), which are contaminants of potential concern at landfill facilities. PFAS are highly persistent in the environment, moderately soluble, can be

transported long distances (in some cases many kilometres) and transfer between soil, sediment, surface water and groundwater. Further groundwater investigations are required to characterise and delineate groundwater contamination at and near to the Premises, including the potential presence of PFAS.

Contaminated Sites Act 2003

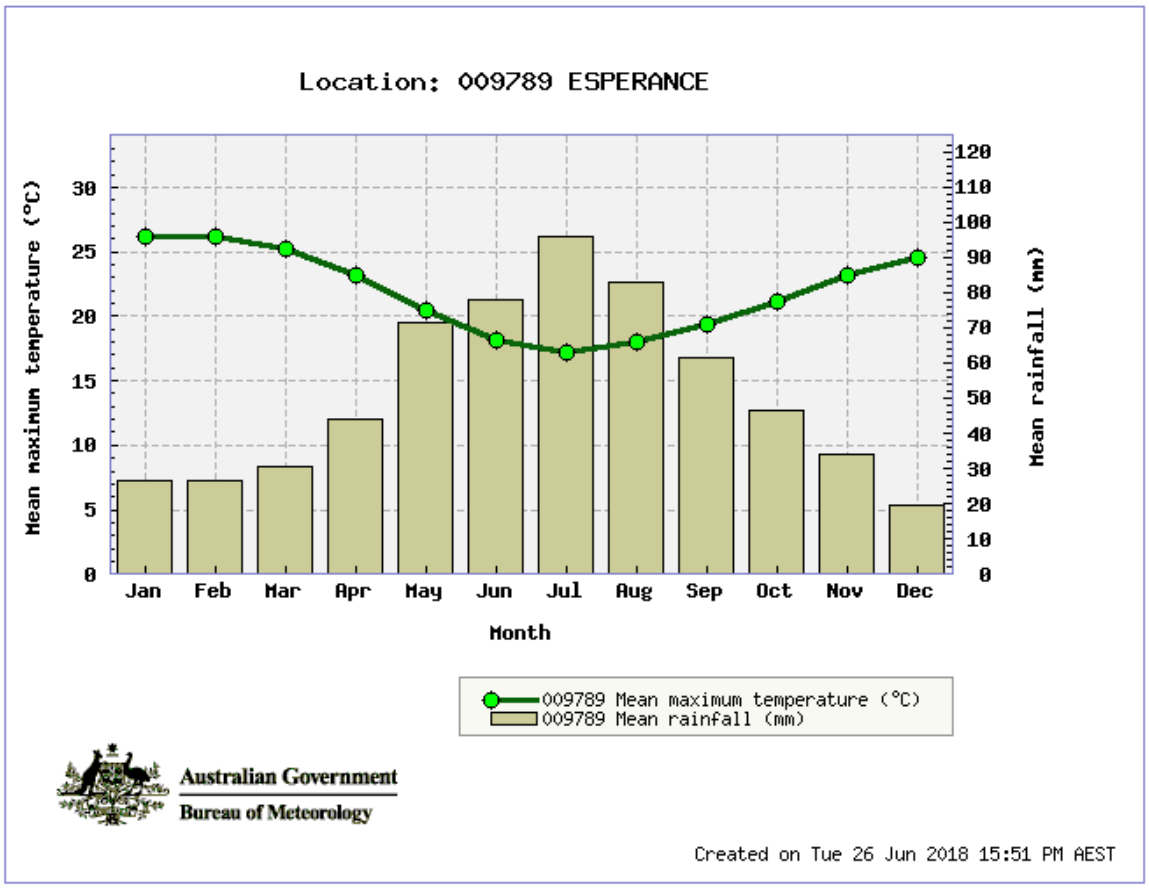
The Premises was classified under the *Contaminated Sites Act 2003* (the CS Act) on the 23 February 2007 as '*possibly contaminated – investigation required*'.

The parcel of land to the north east of the Premises containing an infiltration pond system operated by Water Corporation is also currently awaiting classification under the CS Act.

Environmental Setting

Climate

Meteorological data from the Bureau of Meteorology (BoM 2016) Esperance station number 009789 located approximately 7.5km east of the Premises has been used to source data for rainfall and temperature. The average yearly mean rainfall and mean maximum temperature for the Esperance station is shown below in Figure 6.



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean maximum temperature (°C) for years 1969 to 2018	26.2	26.2	25.2	23.2	20.5	18.1	17.2	18.0	19.4	21.2	23.2	24.6	21.9	49
Statistics	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**	**Years**
Mean rainfall (mm) for years 1969 to 2018	26.7	26.3	30.3	43.9	71.5	77.8	95.9	83.0	61.7	46.5	33.8	19.8	618.2	49

Figure 6: Esperance mean rainfall and mean maximum temperature.

Topography and Hydrology

The Premises is generally sloping to the south with contours between 20 to 2m Australian Height Datum (AHD) across the Premises as shown in Figure 7. The Landfill area is predominately 8 to 4 m AHD with a ridge up to 12 m AHD directly to the south.

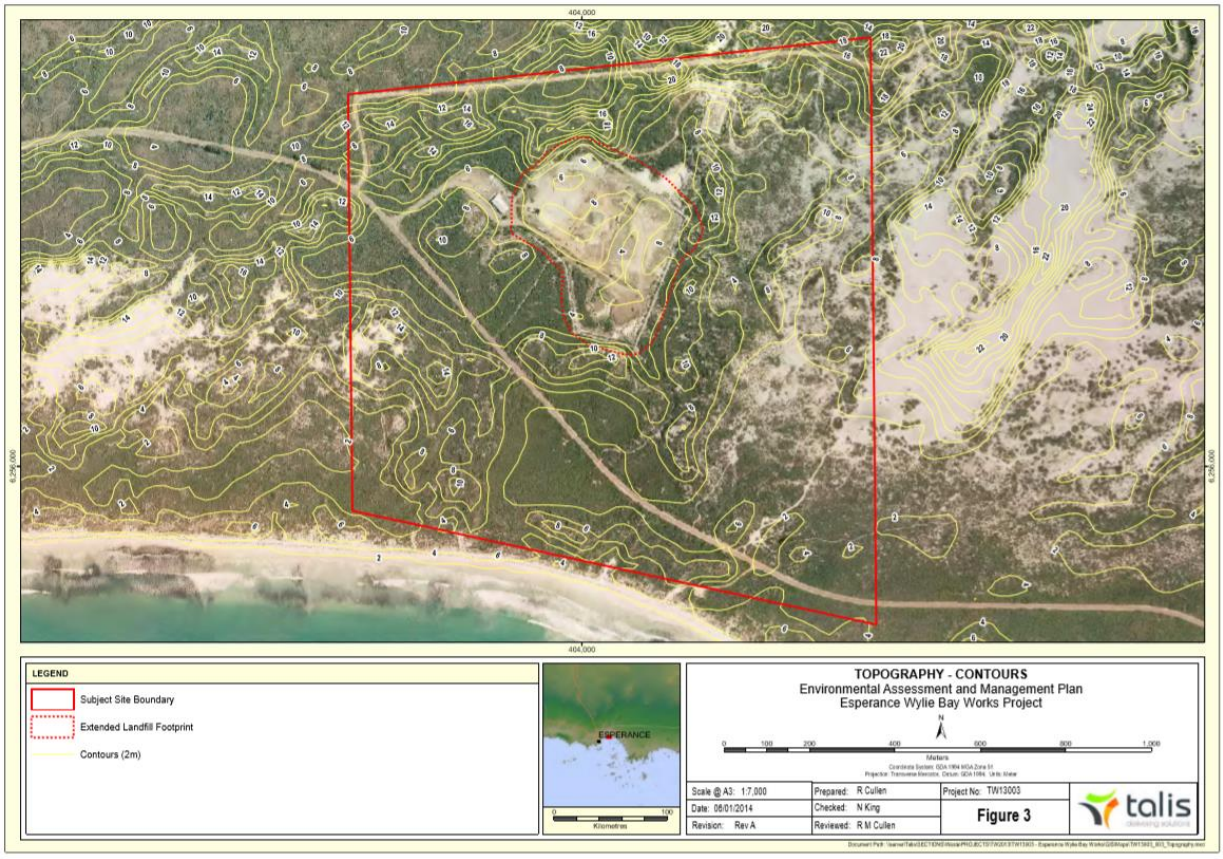


Figure 7: Topography of the Premises.

The Premises is located approximately 650m from the Esperance Bay which enters the Great Australian Bight. The Lake Warden RAMSAR wetland system is located approximately 2km to the north, as shown in Figure 8, which is considered to be up gradient from the landfill.

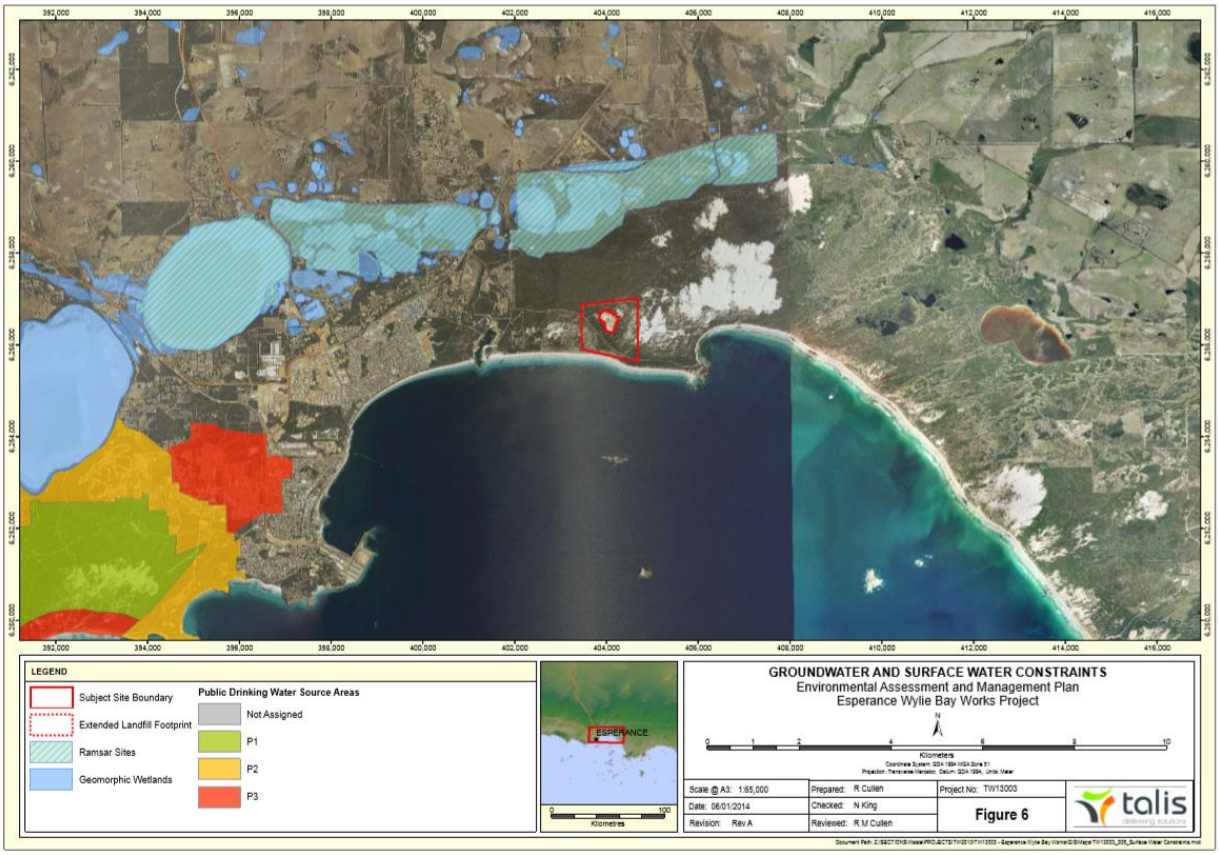


Figure 8: Surface water receptors.

Geology

DWER's GIS mapping system indicates that the soil type at the Premises is A15 which is described as coastal dunes and their intervening swales with saline flats, swamps and lakes, some lunettes, some estuarine areas. Chief soils are calcareous sands on the recent dunes fronting the coast and siliceous sands on the older dunes and lunettes.

Bore logs from the new bore WBL30 constructed in February 2016 identified generally uniform fine to coarse grained dune sand to approximately 6 m depth.

Hydrogeology

The 2016 Talis Hydrogeological Investigation identified that groundwater flows in a southerly direction discharging to Esperance Bay, with possible tidal influences near bore WBL28. Standing water levels ranged from 0.152 m to 3.445m AHD and the groundwater is considered to be an unconfined medium-grained sand aquifer. Groundwater is fresh to brackish, with TDS concentrations increasing towards the coastline and a pH ranging between 7.4 and 7.8.

Sensitive Receptors

Table 4 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 4: Receptors and distance from activity boundary.

Residential and sensitive premises	Distance from Prescribed Premises
Residential Property	Approximately 1.4 km west

Residential and sensitive premises	Distance from Prescribed Premises
Town centre	Approximately 10 km west

Table 5 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 5: Environmental receptors and distance from activity boundary.

Environmental receptors	Distance from Prescribed Premises
Esperance Bay	Active landfill area approximately 650m from the coastline
Groundwater	Approximately 0.88m to 6.15m below ground level

Proposed Landfill Extension

The Licence Holder is proposing to extend the footprint of the landfill by an additional 18,410 square metres. Figure 9 depicts the current footprint in blue, and the proposed additional landfill area in red.

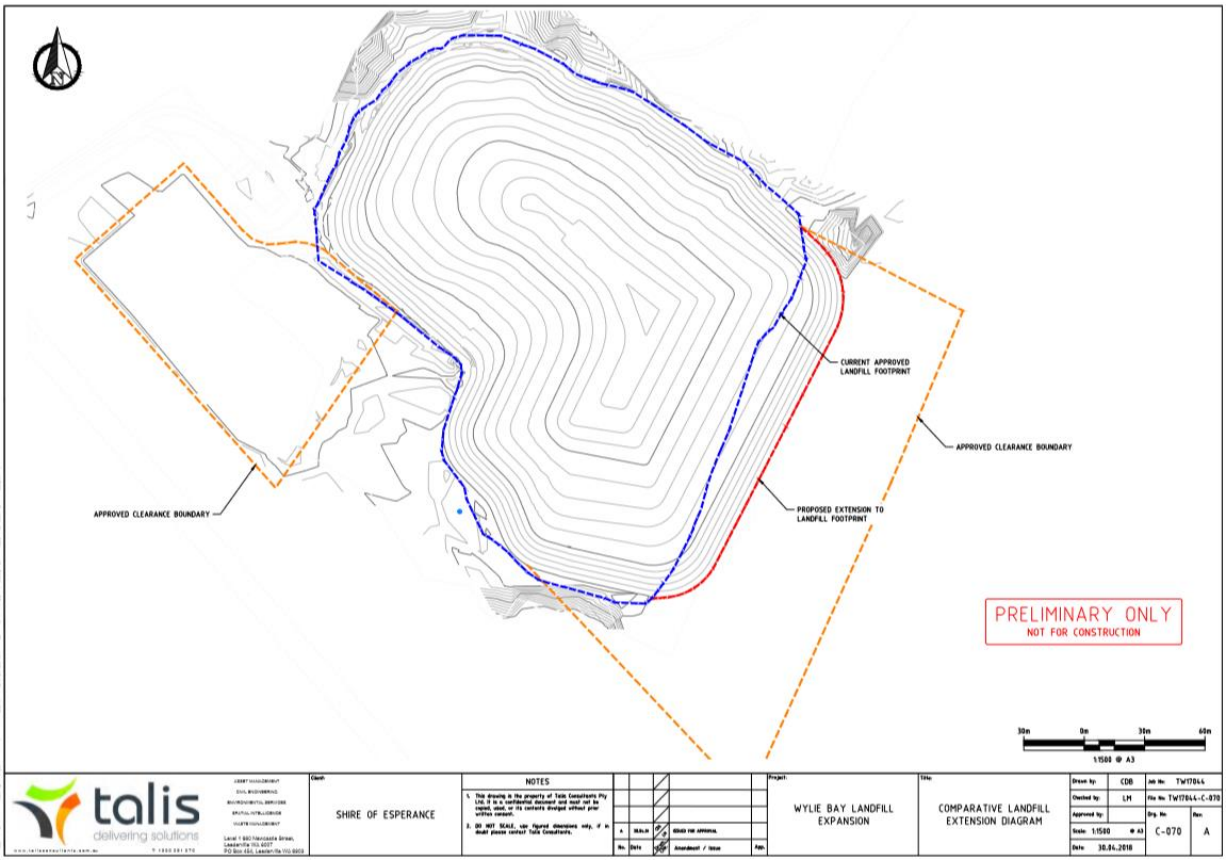


Figure 9: Proposed landfill extension area *(also refer to Figure 3 for locations of existing landfill phases 1 - 3).*

The additional footprint is requested to accommodate an additional three years of operational life, equating to an additional 150,000 cubic metres in total, based on the maximum licence throughput of 50,000 cubic metres per year.

Capping

As mentioned above, the Licence Holder has completed capping of Phase 1. The Licence Holder has stated that they will concentrate on filling the Phase 2 area (as depicted in Figure 3) to allow final fill profiles to be achieved to permit capping in this area as soon as possible. Waste will then be filled in Phase 3, and should the proposed new premises become operational earlier than expected, the Licence Holder has indicated that waste will stop being accepted and Phase 3 capping will occur with reduced slopes.

The Applicant has proposed the finish dates in Table 6 for ceasing waste acceptance and conducting landfill capping:

Table 6: Updated Capping timeline.

Capping Phase	Waste Acceptance End Date	Start Date	Finish Date
Phase 1	Early 2017	April 2018	June 2018
Phase 2	November 2020	December 2020	April 2021
Phase 3	May 2023	June 2023	October 2023

These revised capping dates represent an approximate extension of three to four years from the original proposed date for final capping.

Risk assessment

Source

The proposed landfill extension increases the potential for leachate generation due to the increase in volume of the waste mass and the delay in finalising the final capping. The additional waste is expected to total approximately 150,000 tonnes, of which 57% is likely to be putrescible, resulting in approximately 85,500 tonnes of additional putrescible waste being added.

The proposed extension will delay the final capping of the landfill by approximately three to four years. It is possible that if the new facility is up and running sooner than expected the waste acceptance will cease at a lower total volume and capping may occur prior to 2023, therefore these figures represent the worst case scenario.

Pathways

As the landfill is unlined there is a direct pathway for leachates to migrate to the underlying geology. The highly permeable sandy soils provide a pathway for leachates to migrate through to groundwater. Groundwater flows predominately to the south towards Esperance Bay and therefore any leachates in the groundwater may eventually discharge to the bay. Due to the distance to the bay (650m) and the highly permeable soils, there is considered to be a pathway to this receptor.

Available groundwater monitoring indicates leachate has entered groundwater beneath the landfill and has migrated down-gradient in a south-southwest direction. Leachate indicators, including ammonia nitrogen concentrations have been reported above ANZECC Guidelines and concentration trends in some bores are potentially increasing over time. Uncertainty remains, as the contaminate plume from the landfill has not been fully delineated and the extent to which other contaminant sources in the area (e.g. the Water Corporation discharge point) may be impacting groundwater has not been fully addressed.

Receptors

Groundwater is considered a receptor, as well as a pathway, and the final discharge point is considered to be Esperance Bay. On-site and off-site soils may also be impacted by leachates seeping through the unlined landfill and coming into contact with contaminated groundwater. As all RAMSAR wetland surface water bodies are located up-gradient they are not considered to be receptors (unless otherwise indicated by further investigations).

As discussed there are remaining uncertainties around the nature and extent of groundwater contamination. While it is considered that there is a source pathway and receptor linkages, the full extent of the impacts need to be investigated further before a complete assessment of the risk can be determined.

Table 7 below summarises the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. The table identifies that the emissions present a material risk to public health or the environment, requiring regulatory controls.

Table 7: Risk assessment for proposed amendments during operation.

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
Category 64	Burial of additional putrescible wastes in an extended landfill footprint and delaying of final capping	Leachates from additional landfilled wastes which are likely to contain approximately 57% putrescible wastes.	On-site soils	Direct emission, overland flow	Contamination of soils	Moderate	Possible	Medium	The Delegated Officer considers that leachate emissions from the burial of putrescible wastes may cause mid-level on site impacts and low level off site impacts. The level of site investigations to date indicate that this risk event could occur at some time however further monitoring is required to determine the full extent of any impacts.
			Groundwater approximately 0.88m to 6.15m below ground level	Seepage	Contamination of surface water, impacts to humans in contact with groundwater				
			Esperance Bay located 650m south	Seepage, overland flow	Health impacts to humans and animals exposed to contaminants				

Summary of Uncertainties

Decision

The Delegated Officer considers that there is a risk to the environment from the proposed amendment as additional waste is being placed into an unlined landfill and the final capping of the landfill will be delayed, which in combination increase the potential for leachate to be generated above current levels.

The assessment has identified a number of uncertainties:

1. Intentions for ceasing of waste acceptance and finalising Phase 2 and 3 of the capping is scattered throughout a number of different documents and correspondence.
2. The available groundwater monitoring monitoring data has indicated that some contaminants are found in the vicinity of the premises above assessment criteria, however the impacts on downgradient receptors (Esperance Bay) and the extent to which other sources may be impacting the results needs to be further investigated.

Based on all available information, the Delegated Officer considers that there is an overall medium risk of leachate emissions from the proposed amendment and this is acceptable subject to control measures. As the proposed activity is a continuation of current activities the controls currently on the licence in relation to landfill management are considered suitable and will remain on the licence.

Additional controls will be added to the licence to progress the landfill to closure, ensuring that the capping limits leachate generation as soon as possible. Conditions relating to the timing of capping the landfill is considered necessary as the premises does not have any leachate management infrastructure within the landfill and it is not possible to retro-fit this control measure. Requiring the capping to occur by a specified date is the best option for limiting future leachate generation. As the intentions for capping are spread across a number of documents, a condition will be added requiring a consolidated closure plan to be submitted to the Department. The requested amendment to add additional aspiromatic cowls due to the landfill extension has been accepted as part of this amendment, and once an updated management plan is provided all aspects relating to the closure of the premises may be reviewed.

To address the gaps in groundwater data and enable the contaminant plume to be delineated, conditions will be added to the licence requiring the installation of additional monitoring bores, addition of PFAS parameters as per PFAS guidelines, the submission of cross sections of the landfill, and the requirement to submit data in an excel spreadsheet to assist DWER's review of the data. DWER will continue to review the monitoring data and may revise the risk rating or licence conditions or closure requirements if required.

Other conditions considered necessary to facilitate the proposed amendment include specifying that all clearing is to occur in accordance with Clearing Permit CPS 5692/1 (attachment 1).

Minor administrative amendments have also been made to adjust the licence numbering to correct an error in Amendment Notice 1.

Licence Holder's comments

The Licence Holder was provided with the draft Amendment Notice on 24 July 2018. Comments received from the Licence Holder have been considered by the Delegated Officer as shown in Appendix 2.

Amendment

1. Definitions of the Licence are amended by the insertion of the text shown below:

'ASTM D5092-04(2010)e1' means the ASTM International standard for Standard practice for design and installation of groundwater monitoring wells;

'PFAS' means perfluoroalkyl and polyfluoroalkyl substances; PFAS are a family of manufactured chemicals which do not occur naturally in the environment. Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are two of the most well-known PFAS and are contaminants of emerging concern in Australia and internationally;

2. Condition 1.3.20 of the Licence, as inserted by Amendment Notice 1 is amended by the deletion of the text shown in strikethrough below and the insertion of the red text shown in underline below:

1.3.~~20~~24 The Licensee must not depart from the specifications in Table 1.3.4 except:

(a) where such departure is minor in nature and does not materially change or affect the infrastructure; or

(b) where such departure improves the functionality of the infrastructure and does not increase risks to public health, public amenity or the environment;

and all other Conditions in this Licence are still satisfied.

Table 1.3.4: Works specifications	
Column 1 Infrastructure	Column 2 Specifications (design and construction)
Asbestos disposal landfill area: as shown in the plan in schedule 1 of the licence	The Licens~~s~~ce Holder must ensure that the extended landfill area; 1. is designed to accept asbestos waste; 2. will be no greater than 43,500 cubic metres (m^3) in volume; 3. will not involve the clearing of more than 2,780 square metres (m^2) or 0.28 ha of vegetation; 4. is not constructed within 35m of the premises boundary.
Additional landfill area: as shown in the plan in Schedule 1 of the licence	The Licence Holder must ensure that the additional landfill area; 1. is no greater than 150,000 cubic metres (m^3) in volume 2. is cleared in accordance with Clearing Permit CPS 5692/1 (Appendix 3) 3. is located within the area as depicted in the Premises Map in Schedule 1
Landfill capping Phase 1	The Licence Holder must complete Phase 1 capping by 10 August 2018
Landfill capping Phase 2	The Licence Holder must complete Phase 2 capping by 30 April 2021
Landfill capping Phase 3	The Licence Holder must complete Phase 3 capping by 31 October 2023

3. The Licence is amended by the insertion of the following Condition 1.3.25:

1.3.25 The Licence Holder shall submit a CQA Report to the CEO within 30 days following the completion of capping works for each Phase.

4. The Licence is amended by the insertion of the following Condition 1.3.26:

1.3.26 The Licence Holder shall cease accepting waste and landfilling at the Premises by 31 December 2022.

5. Condition 2.2.1 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the red text shown in underline below:

2.2.1 The Licensee shall ensure that where waste is emitted to air from the emission points in Table 2.2.1 and identified on the map of emission points in Schedule 1 it is done so in accordance with the conditions of this Licence.

Table 2.2.1: Emission points to air			
Emission point reference	**Emission point reference on Map of emission points**	**Emission Point**	**Source, including any abatement**
A1-A~~26~~30	1-~~26~~30	Spiromatic cowls	Landfill gas

6. Condition 3.8.1 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the red text shown in underline below:

3.8.1 The Licensee shall undertake the monitoring in Table 3.8.1 according to the specifications in that table and record and investigate results that do not meet any target specified.

Table 3.8.1: Monitoring of ambient groundwater quality				
Monitoring point reference and location	**Parameter**	**Units**	**Averaging period**	**Frequency**
Bores WBL1,- WBL4, WBL6, WBL7, WBL9, - WBL20, WBL28, and WBL29 as depicted in Schedule 1 WBL29a, WBL29b, WBL20a and WBL20b once constructed in accordance with condition 4.1.2	Standing water level (SWL)	m(AHD)	Spot sample	Quarterly
	pH	-	Spot sample	
	General: electrical conductivity, total dissolved solids, redox potential, chloride, sulphate, sodium, potassium, calcium, magnesium, bicarbonate, biochemical oxygen demand (BOD).	mg/L	Spot sample	
	Nutrients: ammonia-nitrogen, nitrate-nitrogen, total nitrogen, total phosphorus, phosphate.	mg/L	Spot sample	
Bores WBL1,- WBL4, WBL6, WBL7, WBL9, - WBL20, WBL28, and WBL29 as depicted in Schedule 1	Metals: aluminium, arsenic, cadmium, chloride, chromium, copper, iron, lead, manganese, mercury, nickel, potassium, zinc.	mg/L	Spot sample	Six-monthly
	Hydrocarbons:			

Table 3.8.1: Monitoring of ambient groundwater quality				
Monitoring point reference and location	**Parameter**	**Units**	**Averaging period**	**Frequency**
WBL29a, WBL29b, WBL20a and WBL20b once constructed in accordance with condition 4.1.2	monoaromatic hydrocarbons (BTEX), total recoverable hydrocarbons (TRH), polyaromatic hydrocarbons (PAH). Pesticides: organochlorine pesticides, organophosphate pesticides.			
Bores WBL1,- WBL4, WBL6, WBL7, WBL9, - WBL20, WBL28, and WBL29 as depicted in Schedule 1, and WBL29a, WBL29b, WBL20a and WBL20b once constructed in accordance with condition 4.1.2	PFAS: Perfluorooctane sulfonate (PFOS), Perfluorooctanoic acid (PFOA), 6:2 Fluorotelomer sulfonate (6:2 FTS), 8:2 Fluorotelomer sulfonate (8:2 FTS), Perfluoroheptanoic acid (PFHpA), Perfluorobutane sulfonate (PFBS), Perfluorobutanoic acid (PFBA), Perfluorohexanoic acid (PFHxA) Perluorohexanoic sulfonate (PFHxS), Perfluoropentanoic acid (PFPeA)	µ/L	Spot sample	Six-monthly

Note 1: SWL shall be determined prior to collection of other water samples.
Note 2: electrical conductivity, pH and redox potential are permitted to be measured in the field in accordance with Australian Standard 5667.

7. Condition 4.1.2 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the red text shown in underline below:

4.1.2 The Licensee, for improvements not specifically requiring a written submission, shall write to the CEO stating whether and how the Licensee is compliant with the improvement within one week of the completion date specified in Table 4.1.1.

Table 4.1.1: Improvement program		
Improvement reference	**Improvement**	**Date of completion**
IR1	~~The Licensee shall submit to the CEO a proposal for the installation of additional monitoring bores to the south of the landfill site. Installation timeframes, monitoring bore number and locations shall be capable of determining the full spatial extent of groundwater contamination and tracking the movement of the contaminant plume over time.~~ At the current bore locations WBL20 and WBL29 the Licence Holder must: 1. Drill a pilot hole which is geologically logged and determine the full thickness of the superficial aquifer at each site; and	~~30/6/2015~~ 31 October 2018

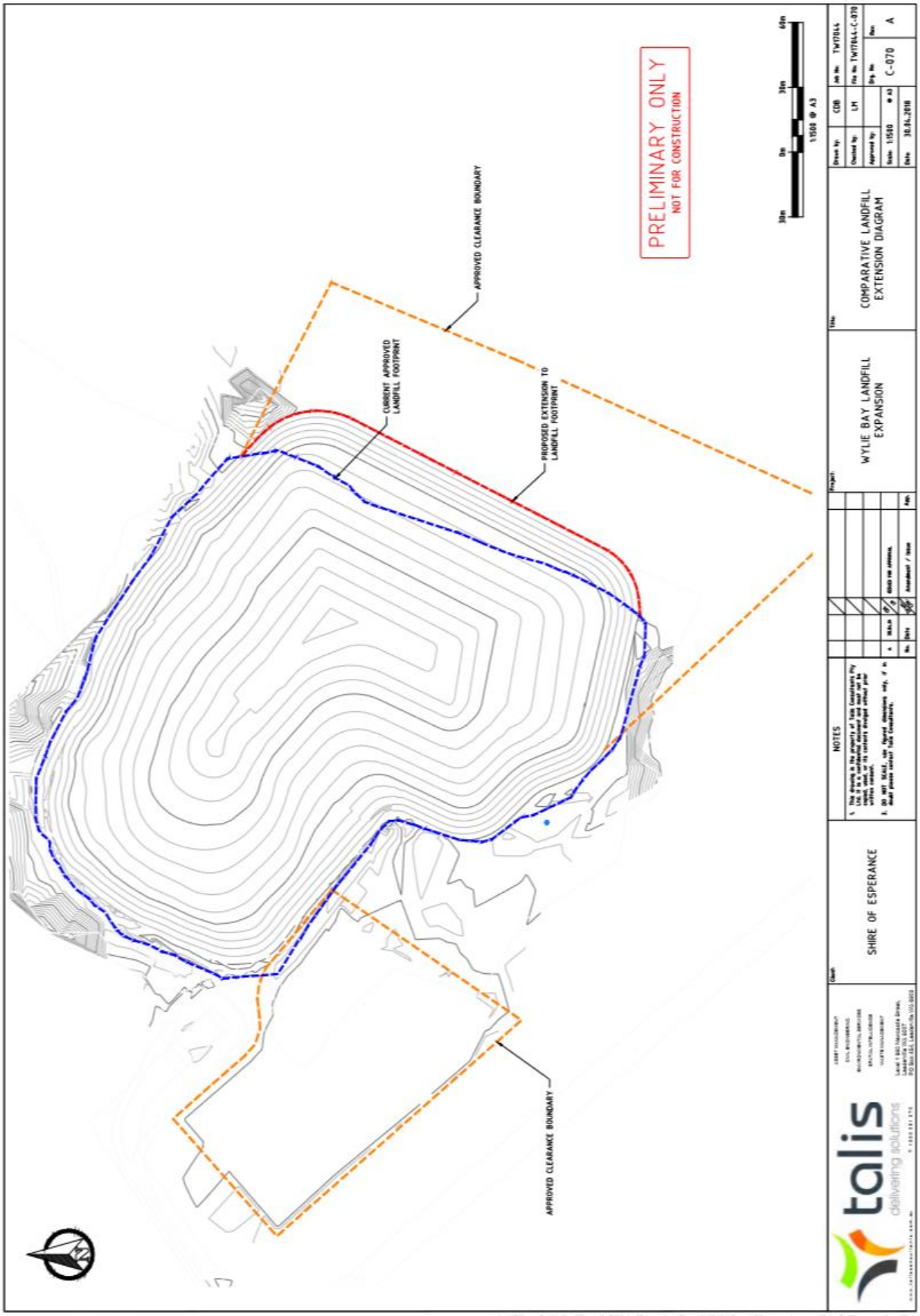
Table 4.1.1: Improvement program		
Improvement reference	**Improvement**	**Date of completion**
	2. Construct two bores at each site, in accordance with the ASTM D5092-04(2010)e1 Standard practice for design and installation of groundwater monitoring wells, one with a 3-metre long screen at the base of the aquifer (named WBL20a and WBL29a) and another with a 3-metre screened interval constructed half-way between the base of the aquifer and the water table (named WBL20b and WBL29b). 3. Provide all bore logs and depth to water at the time of installation	
IR2	~~The Licensee shall submit to the CEO a report utilising a risk-assessment approach that determines the potential environmental impacts of groundwater contamination on the receiving environment. The risk assessment should consider the potential impacts of contaminants on the hyporheic zone (i.e. organisms that live beneath the sand adjacent to and within the surf-zone) and not just within the water column in the ocean where extensive dilution of contaminants is likely to take place.~~	~~31/12/2015~~
IR3	The Licensee shall submit to the CEO the final locations of the spiromatic cowls used to vent landfill gas for each Phase of rehabilitation where the locations differ from those depicted in Schedule 1.	Within 14 days from completion of each Phase.
IR4	The Licence Holder must prepare and submit to the CEO an updated Closure and Post Closure Management Plan (CPCMP). The updated CPCMP must align with the modified footprint of the landfill and licence conditions that specify the timeframes for completion of capping.	1 December 2018
IR5	The Licence Holder must provide at least three cross sections of the landfill area depicting the depth of the landfilled material and depth to groundwater in m AHD.	1 December 2018

8. Condition 5.2.1 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the red text shown in underline below:

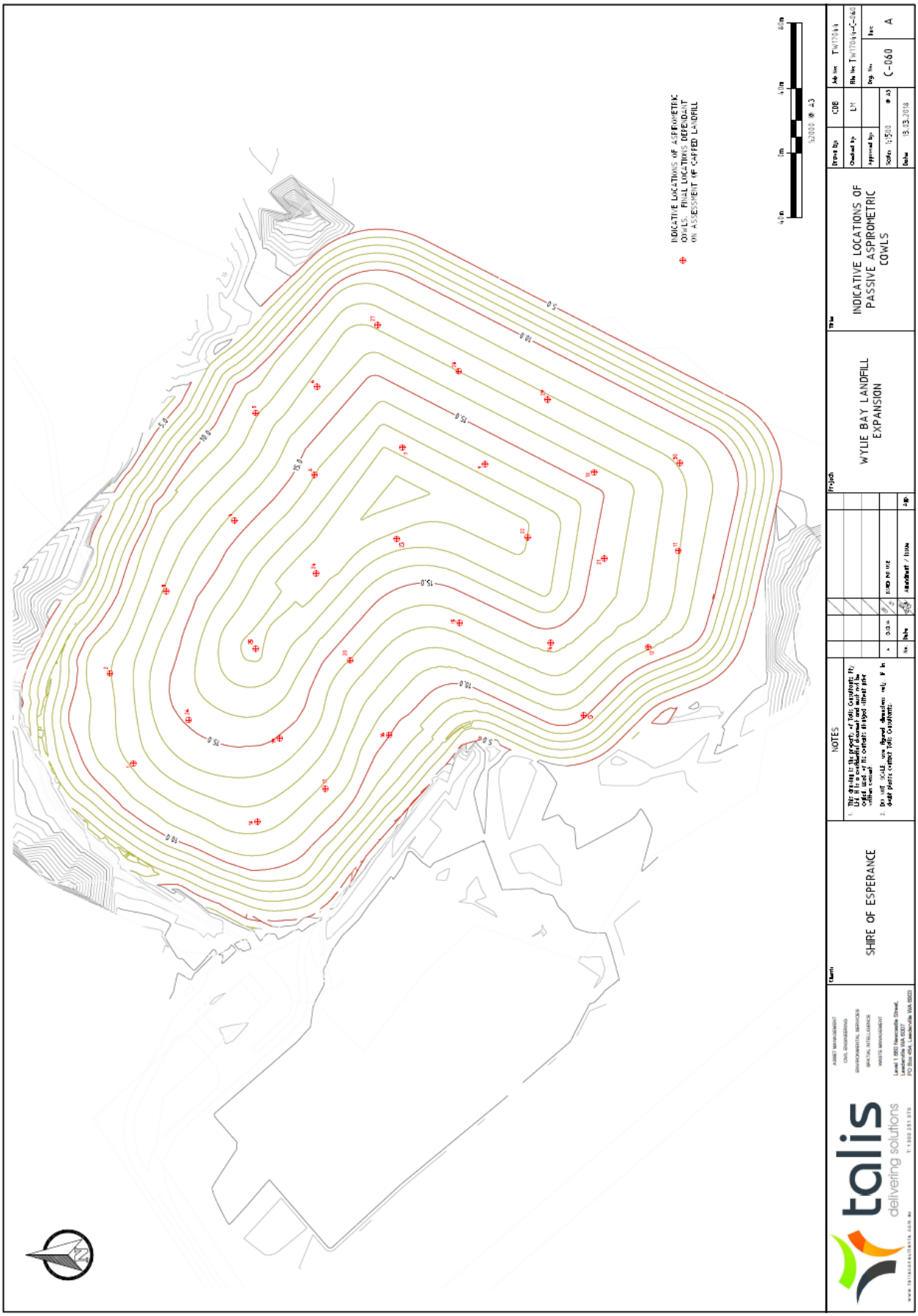
5.2.1 The Licensee shall submit to the CEO an Annual Environmental Report within 90 calendar days after the end of the annual period. The report shall contain the information listed in Table 5.2.1 in the format or form specified in that table.

Table 5.2.1: Annual Environmental Report		
Condition or table (if relevant)	**Parameter**	**Format or form[1]**
-	Summary of any failure or malfunction of any pollution control equipment and any environmental incidents that have occurred during the annual period and any action taken	None specified
Table 1.3.1	Record of the number of tyres stored on site each week	
Table 1.3.1 and 5.1.6	Record of waste transport certificates for the previous annual period	
Table 1.3.2	Summary of current and future landfilling practices	
Table 3.1.1	Rehabilitation monitoring	
Table 3.6.1	Inputs and outputs	
Table 3.8.1	Monitoring results for all parameters	Raw data of all parameters to be provided in an excel spreadsheet as an attachment to the Annual Report
5.1.3	Compliance	Annual Audit Compliance Report (AACR)
5.1.4	Complaints summary	None specified
5.1.5	Copy of site plan marked with the location/s used for quarantine waste, Special Waste Type 1 and 2 disposal	None specified

9. The Licence is amended by the insertion of the following maps in Schedule 1:



Premises map



Map of point source emissions to air

Appendix 1: Key documents

	Document title	Availability
1	Wylie Bay Waste Management Facility – Extension of Landfill Footprint Licence Amendment – Supporting Information, Talis Consultants, 23 March 2018	DWER records (A1680778)
2	Closure and Post-Closure Management Plan, Cardno, July 2012	DWER records (A530575)
3	Environmental Assessment and Management Plan, Wylie Bay Landfill Closure and Rehabilitation, Talis Consultants, February 2014	DWER records (A728261)
4	Wylie Bay Waste Management Facility – 2016 Annual Audit Compliance and Environmental Report	DWER records (A1386154)
5	Wylie Bay Waste Management Facility – 2017 Annual Audit Compliance and Environmental Report	DWER records (A1683408)
6	Desktop Hydrogeological Data Review, Wylie Bay Waste Management Facility, Talis Consultants August 2018	DWER records (A1677928)
7	DER, July 2015. *Guidance Statement: Regulatory principles.* Department of Environment Regulation, Perth.	accessed at www.dwer.wa.gov.au
8	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.	
9	DER, November 2016. *Guidance Statement: Risk Assessments*. Department of Environment Regulation, Perth.	
10	DER, November 2016. *Guidance Statement: Decision Making*. Department of Environment Regulation, Perth.	
11	DER, *Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)*, Department of Environment Regulation, Perth.	

Appendix 2: Summary of Licence Holder comments

The Licence Holder was provided with the draft Amendment Notice on 24 July 2018 for review and comment. The Licence Holder responded on 1 August 2018.

Condition	Summary of Licence Holder comment	DWER response
N/A	Correction of premises location description.	Premises description amended to reflect '*Lot 50 on Plan 411486*'.
1.3.24, Table 1.3.4, Column 2, Row 3	Request to extend the Phase 1 capping completion date to 10 August 2018.	Completion date amended to 10 August 2018.

Appendix 3: Clearing Permit 5692/1