Government of Western Australia
Department of Water and Environmental Regulation

Amendment Report

Application for Licence Amendment

Part V Division 3 of the *Environmental Protection Act 1986*

Licence Number	L8974/2016/2
Licence Holder	Eclipse Soils Pty Ltd
ACN	131 802 661
Application number	APP-0030802
File Number	DER2016/000832-1
Premises	Abercrombie Road Resource Recovery Centre Street address Legal description – Lot 115 on Plan 48295 (Volume 2602, Folio 976) and Lot 2 on Plan 29392 (Volume 2219, Folio 775) Abercrombie Road POSTANS WA 6167 As defined by the premises map attached to the revised licence
Date of Report	03/10/2025
Decision	Revised licence granted

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1. Decision summary

Licence L8974/2016/2 is held by Eclipse Soils Pty Ltd (licence holder) for the Abercrombie Road Resource Recovery Centre (the premises), located across Lot 115 on Plan 48295 (Volume 2602, Folio 976) and Lot 2 on Plan 29392 (Volume 2219, Folio 775) Abercrombie Road in Postans.

This amendment report documents the assessment of potential risks to the environment and public health from proposed changes to the emissions and discharges during the operation of the premises. As a result of this assessment, revised licence L8974/2016/2 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this amendment report, the department has considered and given due regard to its Regulatory Framework and relevant policy documents which are available at https://dwer.wa.gov.au/regulatory-documents.

2.2 Application summary

On 28 August 2025, the licence holder applied to the department to amend licence L8974/2016/2 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are being sought:

- Amendment of the assessed design capacity for Category 61A to facilitate the acceptance of up to 150,000 tonnes per annum of delithiated beta spodumene (DBS) from the Albemarle Kemerton Plant for blending into soil product.

The Albermarle Kemerton Plant is managed by Albermarle Lithium Pty Ltd (Albemarle) under works approval W6154/2018/1, with the plant currently operating within a time limited operations period specified on the works approval. DBS produced at the Albemarle Kemerton Plant is considered by Albermarle to be a coproduct of the lithium carbonate production process. DBS is derived from crushed spodumene rock processed through a kiln to convert the crystalline structure from alpha-spodumene to beta-spodumene, with lithium extracted through an acid-leaching circuit, and the remaining material being pH-neutralised. The composition of the DBS which can vary according to the source of the spodumene and its extraction process, is mostly aluminosilicates with quartz and feldspar, water and gypsum (calcium sulphate). DBS is similar in mineral composition to freshly quarried sand, but with a higher gypsum and water content and a finer overall particle size distribution because of crushing to increase lithium recovery. DBS is considered a manufactured *pozzolan*; siliceous or silico-aluminous material that, when finely divided and mixed with water, reacts with calcium hydroxide to form compounds with cementitious properties.

This amendment is limited only to changes to Category 61A activities from the existing licence to facilitate the use of DBS from the Albemarle Kemerton Plant. The licence holder proposes to blend DBS with clay, clean fill and remediated waste soil to produce a structural fill product for deep applications (DBS-based product).

No changes to the aspects of the existing licence relating to Category 67A have been requested by the licence holder, as DBS will not be incorporated into soils containing composts.

Table 1 below outlines the proposed changes to the existing licence.

Table 1: Proposed throughput capacity changes

Category	Current throughput capacity	Proposed throughput capacity	Description of proposed amendment
61A	500,000 tonnes per annual period	650,000 tonnes per annum	Acceptance of up to 150,000 additional tonnes per annum of delithiated beta spodumene (DBS) for blending into soil products.

The table below outlines the requested amendment to the conditions of licence which would facilitate the acceptance and processing of DBS at the Premises.

Table 2: Requested licence amendments

Condition	Requested amendment
1, Table 1: Types of material authorised to be accepted onto the Premises	Insertion of DBS as an approved material type at a rate of 150,000 tpa and an acceptance specification of “no free liquid”
3, Table 2: Material processing requirements	Insertion of DBS a material type to be processed onsite via “receipt, storage, and soil blending” with the following process limits: • *Stockpiles must be sign-posted so they can be clearly identified for appropriate management on-site* • *Stockpiles of unprocessed and processed material must be sign-posted so they can be clearly identified for appropriate management on-site.* • *All unprocessed and processed stockpiles must remain in a damp state to prevent dust lift-off.* • *Stockpiles are limited to a height of 7 m above natural ground level (as defined in the Existing Licence) or less.* • *Activities are ceased if they cause visible dust liftoff where dust emissions are, or are likely to, impact on sensitive receptors.* • *Trucks transporting DBS and products are covered or sealed when transported.* • *DBS to be processed within 7 days upon receival onsite.* • *Processed DBS is to be blended with clays and soils prior to being stockpiled. All DBS waste and product stockpiles must remain in a damp state to prevent dust liftoff.* • *All spills outside stockpiling areas will be cleaned up and material recovered*

5, Table 3: Containment infrastructure	Insertion of DBS receival and processing area depicted in the Premises Maps (Map 1 & Map 2) with the following infrastructure requirements: • Reticulated irrigation system with manual and automated knocker sprinklers, sourcing water from two abstraction bores operating at 120,000 L/hour. • Stockpiles are limited to a height of 35 m AHD (7 m above natural ground level) as per current licence conditions. • DBS is treated on a cell that comprises of compacted clay or other suitable material with a maximum permeability of 1 x 10^{-6} m/s.
20, Table 9: Monitoring of ambient groundwater quality	Addition of Lithium and Antimony as parameters in required monitoring suite for points ARMB1, ARMB5, ARMB6A, ARMB7, and ARMB8 as depicted in the Map of monitoring bore locations in Figure 7 in Schedule 1.

As part of the application validation, it has been identified that the following conditions would also require amendment to facilitate the acceptance and blending of DBS at the premises.

Table 3: Additional condition amendments

Condition	Required amendment
6, Table 4: infrastructure and equipment controls	Insertion of operational requirements for DBS processing area, DBS-based product stockpiling area, and DBS stormwater basin.
10(b)	The Delegated Officer has identified this as an unenforceable condition - relevant company documents to be referenced in licence.
18, Table 7: Monitoring and recording of inputs and outputs	Requirements for the monitoring and recording of Structural soils (produced with DBS) or DBS products and rejected DBS consignments inserted.
19. Table 8: Process monitoring and recording	Testing requirements for DBS-based products inserted, along with reference to licence holder product specifications.
Specified Actions 34-36	Insertion of condition requiring the construction or installation of necessary containment infrastructure within the DBS processing area.
	Insertion of condition requiring submission of an Environmental Compliance Report
	Insertion of a condition detailing Environmental Compliance Report submission requirement.
Definitions, Table 13: Definitions	Definition of delithiated beta spodumene (DBS).
	Definition of DBS-based product required (OR Structural soils)
	Definition of solid.
	Definition of suitably qualified person.

Schedule 1: maps, Figure 1: Map of the boundary of the prescribed premises	Revised map depicting DBS processing area across former landfill area in the Northeast of the premises.

For noting: The premises is currently licenced as a Category 61A solid waste facility for the purpose of soil blending activities. In line with the current premises licence and authorised activities, the acceptance of DBS for incorporation into soil products must also be considered under Category 61A, meaning that for the purpose of acceptance to the premises, the department will consider DBS as a waste. However, as DBS is considered by Albermarle and the licence holder to be a product, it is noted that these two definitions will be considered to apply to DBS in parallel.

The use of DBS and DBS-based products is not related to prescribed activities and is excluded from this assessment. The department considers that it is the responsibility of the person in possession of material to determine whether or not it is a waste. The department recommends that the licence holder seeks its own legal advice on the use and sale of the DBS and DBS-based products, in line with advice within DWER's Fact sheet - Assessing whether material is a waste.

2.3 Premises overview

The licence holder remediates recycled waste materials (soils and greenwaste) to produce clean structural fill and blended water retentive soils at the premises under the current licence at the premises. These recycled products are generated by blending a range of ingredients, including treated or bioremediated contaminated soils, ASS/PASS, and composted green waste. The term 'blended water retentive soils' is used by the licence holder to capture a range of products including soil improver, soil conditioner, mulch and other specialised blended soil products.

The licence holder implements post-treatment validation testing to verify the effectiveness of onsite treatment processes and final product testing to verify the suitability of product quality for the intended end uses.

The following sub-sections describe existing published specifications and standards that may be applicable to the blended soil recycled products produced at the premises, as well as the Licence Holder's current approach to product quality standards for these materials.

2.3.1 ASS/PASS validation criteria

The ASS Treatment Guideline (DER 2015) sets out validation criteria that are required to be met to confirm the effective neutralisation of ASS/PASS. Condition 3 of the Existing Licence requires that treated ASS/PASS are validated in accordance with the procedures outlined in Section 2.5 of the ASS Treatment Guideline. This guideline requires the following validation criteria to be met to confirm the effective neutralisation of soils:

- the neutralising capacity of the treated soil must exceed the existing plus potential acidity of the soil (e.g. field peroxide pH (pHFOX) > 5);
- the neutralising material has been thoroughly mixed with the soil;
- soil pH must be in the range 6.0 to 8.5; and
- excess neutralising agent must remain within the soil until all acid generation reactions are complete and the soil has no further capacity to generate acidity.

2.3.2 Uncontaminated fill specification

The uncontaminated fill specification, as outlined in the Landfill Definitions, is an appropriate end-use standard for assessing whether a waste has been substantially transformed into a fill material product. Waste recycling facility occupiers may use an alternative end use standard to assess whether a waste has been substantially transformed into a fill material product. However, the current waste regulatory framework limits how recycled fill materials that do not meet the uncontaminated fill specification can be used.

2.3.3 Australian Standards

The *Australian Standard 4419 Soils for landscape and gardening use (AS 4419)* may be relevant to assessing whether some of the blended water retentive soils produced at the premises have been substantially transformed from their component waste inputs such as ASS/PASS, Class I contaminated soils or Class IV contaminated soils. AS 4419 specifies physical, chemical and biological requirements for different types of soils, including physical contaminant limits for glass, metal and plastics. AS 4419 does not specify chemical contaminant limits (e.g. hydrocarbons or pesticides) for soils, but requires that all soils fully comply with chemical contaminant provisions of the current version of State or Territory guidelines for use in application to land.

The *Australian Standard 4454 Composts, soil conditioners and mulches* may be relevant to assessing whether some of the blended water retentive soils produced at the premises have been substantially transformed from their component waste inputs. The scope of this application does not include changes to composting activities or green waste acceptance rates at the premises. However, peat that is received as ASS/PASS and initially treated under Category 61A could be an ingredient in soil conditioners and mulches produced at the premises. AS 4454 specifies physical, chemical and biological contaminant limits for soil conditioners and mulches. Condition 19 in the Existing Licence requires the Licence Holder to sample and test blended soils in accordance with the requirements of AS 4419 and composts in accordance with the requirements of AS 4454.

2.3.4 Licence Holder standards

Under the current regulatory framework, end use standards for recycled products can be determined on a site-specific basis by the waste recycling facility occupier. This approach may be used where there is an absence of published specifications or standards for a particular type of recycled product, or the waste recycling facility occupier considers that an alternative end use standard is appropriate based on the intended end use of the recycled product. Waste recycling facility occupiers must satisfy themselves that they can justify the suitability of their chosen standard based on the intended end use of the recycled product.

The licence holder has previously provided the two documents *Quality Control Plan* (Eclipse Soils 2021b) and *Structural Fill Sand Production Protocol* (Eclipse Soils 2021c), which set out end use standards for potential contaminants in clean structural fill and blended water retentive soil products. These standards and target parameters are outlined in Table 4 below. Additionally, based on the Licence Holder's Acid Sulfate Soils Management Plan (Eclipse Soils 2021a), neutralisation of ASS/PASS is considered successful if, after neutralisation, the treated soils meet the following validation criteria:

- individual verification samples have field test results of pH (pHF) > 6 and peroxide pH (pHFOX) > 5.0 and this is confirmed by lab testing; and
- the total potential acidity is less than the laboratory limit of reporting.

Table 4: Licence holder's end use standards for contaminants in clean structural fill and blended water retentive soils.

End use standard	Parameters
Ecological Investigation Levels (EILs) from the *Assessment levels for soil, sediment and water* (DEC 2010)	Metals: arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel and zinc Pesticides: dieldrin, aldrin, DDT/DDD/DDE, heptachlor, heptachlor epoxide, chordane (cis/trans) Hydrocarbons: total petroleum hydrocarbons C_{10}-C_{36} Polycyclic aromatic hydrocarbons: benzo(a)pyrene BTEX: benzene, toluene, ethylbenzene and xylenes
Tested to National Association of Testing Authorities (NATA) accredited laboratory levels of detection	Asbestos

The licence holder's current end use standards for potential contaminants in clean structural fill and blended water retentive soil products are outlined in condition 10 of the current licence, L8974/2016/2. These parameters and end use standards are also based on documents Eclipse Soils 2021b and Eclipse Soils 2021c. The licence holder has additional end use standards for the physical and chemical properties of clean structural fills and blended water retentive soil products (e.g. particle size distribution, plant nutrient content and wettability).

Key finding: Based on the regulatory framework for waste, the Delegated Officer has made the following key findings in relation to the application:

- The Licence Holder's ASS/PASS validation criteria are not consistent with the requirements of the ASS Treatment Guideline (DER 2015b) as they do not include a maximum soil pH value of 8.5. Validation monitoring results reported in the 2020-2021 AER indicate that ASS/PASS neutralised at the premises regularly exhibit pHF and potassium chloride pH (pHKCl) values above the upper limit of 8.5 specified in the ASS Treatment Guideline (DER 2015b). The Licence Holder indicates (Appendix 1) that the cause of high soil pH results in post-treatment validation samples is the naturally high pH of some PASS received at the premises. The Delegated Officer considers this to be an acceptable reason for some post-treatment validation samples deviating from the performance criteria in Section 2.5.6 of the ASS Treatment Guideline. Based on information provided by the Licence Holder about their ASS/PASS treatment method, the Delegated Officer is satisfied that there should be minimal risk of pH overshoot (i.e. generation of excess alkalinity) in treated materials.
- The Licence Holder's current end use standard for clean structural fill and blended water retentive soils is based on assessment levels that have been superseded by more recent publications. The assessment levels outlined in DEC (2010) were superseded by investigation and screening levels published in the National Environmental Protection (Assessment of Site Contamination) Measure 2013 (NEPM ASC) in 2013.
- The NEPM ASC advises that: "Investigation and screening levels are intended for assessing existing contamination and to trigger consideration of an appropriate site-specific risk-based approach or appropriate risk management options when they are exceeded. The use of these levels in regulating emissions and application of wastes to soil is inappropriate…the inclusion of an investigation and screening level in this guidance should not be interpreted as condoning discharges of waste up to these levels." Based on the above guidance, the Licence Holder's use of EILs as a general

end use standard for clean structural fill and blended water retentive soil products is not an appropriate application of investigation levels.

- The uncontaminated fill specification, as outlined in the Landfill Definitions, is an appropriate end use standard for assessing whether a waste has been substantially transformed into a fill material product. Waste recycling facility occupiers may use an alternative end use standard to assess whether a waste has been substantially transformed into a fill material product. However, the current waste regulatory framework limits how recycled fill materials that do not meet the uncontaminated fill specification can be used.

Noting this, the Delegated Officer recommends that the Licence Holder undertake a review of their end use standards to ensure that appropriate investigation levels and limits are used to determine whether products are fit for their determined end use. This is especially pertinent given the Licence's Holder's proposal to incorporate a new material (DBS) into their current soil blending activities. The use of appropriate investigation levels and limits in the Licence Holder's product specifications will provide end users with assurance that products produced at the premises are fit for their intended purpose and will not inadvertently cause emissions and discharges to the environment when used.

2.4 Incorporation of DBS to soil blending activities

The licence holder proposes to use DBS as an additional input for the generation of clean structural fill, which is already produced at the premises as discussed in Section 2.3. DBS will be blended with clay at variable ratios based on end use requirements into clean structural fill products. Blending will broadly be undertaken at the following target ratios:

- 50% DBS: 50% Clay
- 30% DBS: 70% Clay
- 20% DBS: 80% Clay

DBS produced at the Albemarle Kemerton Plant is considered enriched in 10 elements consistent with lithium caesium tantalum (LCT) pegmatites, most are largely insoluble and represent little environmental concern. The exceptions to this are lithium and antimony which have the potential to be elevated above certain screening criteria in leachates, particularly under acidic conditions below pH 6. The *natural* pH of the material is circum-neutral (7.7), at which most potential metal and metalloid contaminants are largely insoluble or present at concentrations well below relevant environmental criteria. If the DBS is exposed to more acidic conditions within the DBS store facility or elsewhere, there is an increased risk of the production of metalliferous drainage, particularly if the pH falls below 4.

The licence holder has provided results from aqua regia digestion testing undertaken in support of this application which demonstrated that the DBS meets the DWER (2010) EILs and will not exceed NEPM EIL's for urban/public open space environments and commercial/industrial zones.

It is the responsibility of waste recycling facility occupiers to determine a suitable end use standard assessing whether DBS has been substantially transformed into a blended soil product. Substantial transformation is a key factor in assessing whether material has ceased to be a waste, and meeting relevant specifications or end use standards is a key consideration in assessing whether a waste has been substantially transformed.

The appropriate selection of end use standards to assess whether waste materials have been substantially transformed into recycled products is dependent on several factors, such as:

- the original waste composition,
- the nature and type of transformation process,

- the proposed end use for the recycled product, and
- the relevance of existing published specifications or standards such as department guidelines or Australian Standards.

Conditions 9 and 10 the Existing Licence specify that products must be tested and shown to conform to end use standards for recycled products. As DBS is proposed to be incorporated into clean structural fill, in line with the requirements of Condition 10, an end use standard has been developed by the Licence Holder for DBS-based products.The clean structural fill will be blended and tested to ensure that it meets both the Ecological Investigation Levels are per Department of Environment and Conservation (2010) – *Assessment Levels for Soil, Sediment and Water*. Contaminated Sites Management Series, and the Unrestricted Use Criteria as per Department of Health (May 2009): *Guidelines for the Assessment of, Remediation and Management of Asbestos* – Contaminated Sites Western Australia.

2.5 Contaminated sites assessment

The documentation provided in support of the amendment application did not include a risk assessment for the proposed reuse scenarios for the clay-DBS blends, although the use of a blend with Bassendean Sand was previously assessed by MBS consultants. Consequently, the department's Contaminated Sites branch has carried out a preliminary risk assessment for the clay-DBS blend using a methodology developed by the UK Environment Agency (2006).

Based on the provided leaching test results for the blended clay-DBS material, the contaminated sites branch considers that all of the analytes (except for sulfate ions) would pass a Level 1 assessment for protecting the underlying groundwater from contamination. The elevated concentrations of sulfate ions in leachate from the clay-DBS blended material (up to 428 mg/L) has the potential to affect soil fauna and vegetation in areas where this material is used.

Consequently, the contaminated sites branch undertook a Level 2 assessment to assess the potential impacts of sulfate leaching from the clay-DBS blend on groundwater quality. Assuming a dilution attenuation factor of 20, this assessment indicated that leaching from this material could cause increases in sulfate concentrations in underlying groundwater. The same impacts would be expected for the sand-DBS blend that was previously tested by MBS.

These increases in sulfate concentrations would be unlikely to be of significance in most of the areas where the clay- and sand-DBS blended materials would be used; but could be of concern in the immediate vicinity of some groundwater-dependent wetlands on the Swan Coastal Plain. This is because increases in sulfate inputs from groundwater to such wetlands would have the potential to disrupt nutrient cycling in these systems, which could lead to an increased risk of eutrophication and a loss of aquatic biodiversity (Zak *et al.,* 2020). Consequently, it is recommended that these materials are not used within 200 metres of wetlands of environmental significance.

Leachate from unblended DBS may contain environmentally significant concentrations of lithium, antimony and sulfate ions, which is why this material must generally be mixed with other materials before being used as construction fill. Leached concentrations of lithium and antimony can be lowered to acceptable levels by blending DBS with other soil materials. However, sulfate concentrations in leachate from blended products can remain problematic on sandy soils near freshwater wetlands.

Leaching tests were undertaken for aerobic soil conditions, where infiltrating rainwater can leach and transport contaminants of potential concern from a soil profile to the water table. However, this testing regime does not adequately characterise the potential for minerals in a recovered material to release contaminants of potential concern under saturated and anaerobic conditions. Under anaerobic conditions, microbially-driven chemical reactions can trigger the release of some contaminants from adsorption sites on iron oxyhydroxide minerals, particularly if the groundwater contains elevated concentrations of dissolved organic carbon. The contaminants

of potential concern in the clay-DBS and sand-DBS blended materials that could be released into groundwater by this process are manganese, antimony and arsenic. Further testing using anaerobic kinetic tests and local groundwater would be required to assess this risk. These tests typically need to be conducted over several months.

Based on this preliminary risk assessment, the contaminated sites branch considers that the clay-DBS and sand-DBS blended materials will generally be suitable as a replacement for virgin excavated natural material in construction projects. However, due to the limited suite of chemical tests that were carried out on these blended products, the department's Contaminated Sites expert advisors recommend that these blended soil products should not be placed below the permanent water table or in seasonally inundated areas without further testing.

Key findings: The Delegated Officer considers the following in relation to the contaminated sites assessment:

- Contaminant levels within DBS indicate that DBS-based products generally indicate that the material is suitable as a replacement for virgin excavated natural material in construction projects.
- Elevated concentrations of sulfate ions in leachates from DBS and DBS-based products may result in impacts to freshwater wetland ecosystems and as such, it is recommended that these materials are not used within 200 metres of wetlands of environmental significance.
- The potential for minerals in DBS and DBS-based products to release contaminants of potential concern under saturated and anaerobic conditions has not been adequately characterized. It is therefore recommended that these materials should not be placed below the permanent water table or in seasonally inundated areas without further testing being undertaken.
- As the offsite use of DBS and DBS-based products falls outside of DWER's regulatory remit, it is recommended that end users of DBS and DBS-based products undertake their own due diligence assessment as to whether the material is suitable for their intended end use. It should also be confirmed that these materials will be used in a manner that will not cause pollution to land or waters, noting the liability surrounding pollution (and subsequent remedial actions) will fall to the end user, not the licence holder.

3. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk assessments* (DWER 2020).

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises operation which have been considered in this amendment report are detailed in Table 5 below. Table 5 also details the proposed control measures the licence holder has proposed to assist in controlling these emissions, where necessary.

Table 5: Licence holder controls

Emission	Sources	Potential pathways	Proposed controls
Dust	Dust emissions from DBS delivery vehicles Unloading DBS Dust liftoff from DBS stockpiles Fugitive dust liberated during DBS Soil blending Fugitive dust emissions from blended DBS soil stockpiles. Loading and transport of DBS soil product Tracking of DBS off of the Premises on truck wheels	Air/windborne pathway	DBS delivered in damp state. Stockpiles of unprocessed and processed material to be signposted so they can be clearly identified and management onsite. Dust suppression system comprising two bores delivering 97 m^3 of water per hour through a 63 mm made to a series of both manual and automated knocker-type sprinklers fed via 63 mm Polypipe. A 15,000 L water truck is available for additional dust suppression as required. Stockpiles are limited to a height of 7 m above natural ground level (as defined in the Existing Licence) or less. Activities are ceased if they cause visible dust lift-off where dust emissions are, or are likely to, impact on sensitive receptors. Trucks transporting DBS and products are covered or sealed when transported. DBS to be processed within 7 days upon receipt onsite. Processed DBS is blended with clays and soils prior to being stockpiled. All waste and product stockpiles must remain in a damp state to prevent dust liftoff. All spills outside stockpiling areas will be cleaned up and material recovered as soon as practicable. An existing washdown bay and collection sump is located next to the DBS Area. Trucks will be washed as required to prevent any DBS material impacting roads from truck wheelers or bodies. This is the current system for managing other materials entering site.
Noise	Vehicle movements	Air/windborne pathway	Physical separation from sensitive receptors. Site operations are restricted to between 6am to 6pm Monday to Saturday.
Leachate	Storage of DBS and blended soil	Seepage to soils and groundwater	1.1-hectare compacted clay pad for receival, storage, and processing of DBS with a minimum permeability of 1 x 10^{-6} m/s. Loads of DBS with free-flowing liquids are not accepted. Constructed 4,000 m^3 runoff collection sump adjoining processing area. The stockpiling area will be surrounded by a clay

Emission	Sources	Potential pathways	Proposed controls
			bund to a minimum height of 0.5 metres. Unprocessed DBS will be stored onsite for no longer than 7 days. DBS will be incorporated into clean structural fill product at a ratios of: • 50% DBS: 50% Clay, • 30% DBS: 70% Clay, or • 20% DBS: 80% Clay
Lithium, antimony and sulfates	Sale of soil products containing DBS	Sale and bulk movement offsite for development projects (and subsequent infiltration to soil and groundwater)	Eclipse proposes to process the DBS through blending with clay and soils to produce Structural Fill Sand and Clay Products that meets the following specifications: • Geotechnical specifications according to specific project requirements. • Ecological Investigation Levels are per Department of Environment and Conservation (2010) - Assessment Levels for Soil, Sediment and Water. Contaminated Sites Management Series. • Unrestricted Use Criteria as per Department of Health (May 2009): Guidelines for the Assessment of, Remediation and Management of Asbestos - Contaminated Sites Western Australia.

3.1.2 Receptors

In accordance with the *Guideline: Risk assessments* (DWER 2020), the Delegated Officer has excluded employees, visitors and contractors of the licence holder from its assessment. Protection of these parties often involves different exposure risks and prevention strategies and is provided for under other state legislation.

Table 6 below provides a summary of potential human and environmental receptors that may be impacted because of activities upon or emission and discharges from the prescribed premises *(Guideline: Environmental siting* (DWER 2020)).

Table 6: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Residential areas of Medina and Orelia	The nearest residential area is approximately 730 m south of the premises boundary. No residential receptors were identified down hydraulic gradient of the premises.

Recreational receptors	There is an area zoned for parks, recreation and drainage located about 780 m west of the premises boundary. Visitors to the Spectacles wetlands about 1.2 km east of the premises boundary. Visitors to the Perth Motorplex about 1.4 km west of the premises boundary.
Industrial receptors	The premises are surrounded by the Alcoa Kwinana Alumina Refinery to the east and north, the Kwinana Wastewater Treatment Plant further east and WA Limestone to the west. The Latitude 32 industrial area is located 200 m north-west of the premises boundary. There are several industrial receptors located down hydraulic gradient of the premises in Postans, Kwinana Beach, Naval Base, and the Latitude 32 industrial area
Beneficial groundwater users	Based on groundwater monitoring undertaken at the premises, the depth to the water table of the superficial aquifer ranges from about 13.5 m below ground level (BGL) at ARMB5 to 23 m BGL at ARMB8. The depth of the water table below ground level is shallower (about 3.5 to 4 m BGL) in previously excavated quarry voids on the premises. The surface geology and superficial aquifer at the premises are within the Tamala Limestone formation. Based on the Perth Groundwater Map, the regional groundwater flow direction is west north-west, towards Cockburn Sound. Aurora Environmental (2021) report that relative groundwater levels measured during quarterly monitoring indicate a local groundwater flow direction to the west south-west. There are two abstraction bores operated by the Licence Holder within the premises boundary and additional abstraction bores on the lots surrounding the premises. Groundwater flow at the premises may be locally affected by drawdown from on- and off-site abstraction bores. The Delegated Officer considers that the regional groundwater flow direction to the west north-west is the most reliable representation of potential contaminant transport pathways from the premises. However, the localized influences from groundwater abstraction also require consideration when interpreting groundwater monitoring data and inferring potential contaminant transport pathways. The premises is within the Cockburn Groundwater Area which is a proclaimed area under the *Rights in Water Irrigation Act 1914.* Groundwater in the superficial aquifer below the premises is fresh to brackish. The main beneficial use of groundwater in the superficial aquifer in the vicinity and down hydraulic gradient of the premises is likely to be non-potable use for irrigation, dust suppression and industrial purposes. More than ten groundwater licences have been granted at sites down hydraulic gradient of the premises.
Environmental receptors	**Distance from prescribed activity**
Groundwater dependent ecosystems	Shallow groundwater may also support groundwater dependent ecosystems of the Swan Coastal Plain including wetlands (see below) and groundwater dependent vegetation such as shrubland scrub heath and tuart woodlands.

Geomorphic Wetlands of the Swan Coastal Plain	The following wetlands were identified as potentially down or cross hydraulic gradient of the premises: - Unnamed resource enhancement basin dampland – 1.8 km north-west - Unnamed resource enhancement basin dampland – 780 m north north-west - Unnamed multiple use basin dampland – 880 m north north-west - Long Swamp, conservation basin sumpland – 1.3 km north - Unnamed resource enhancement basin sumpland – 2.9 km north-west

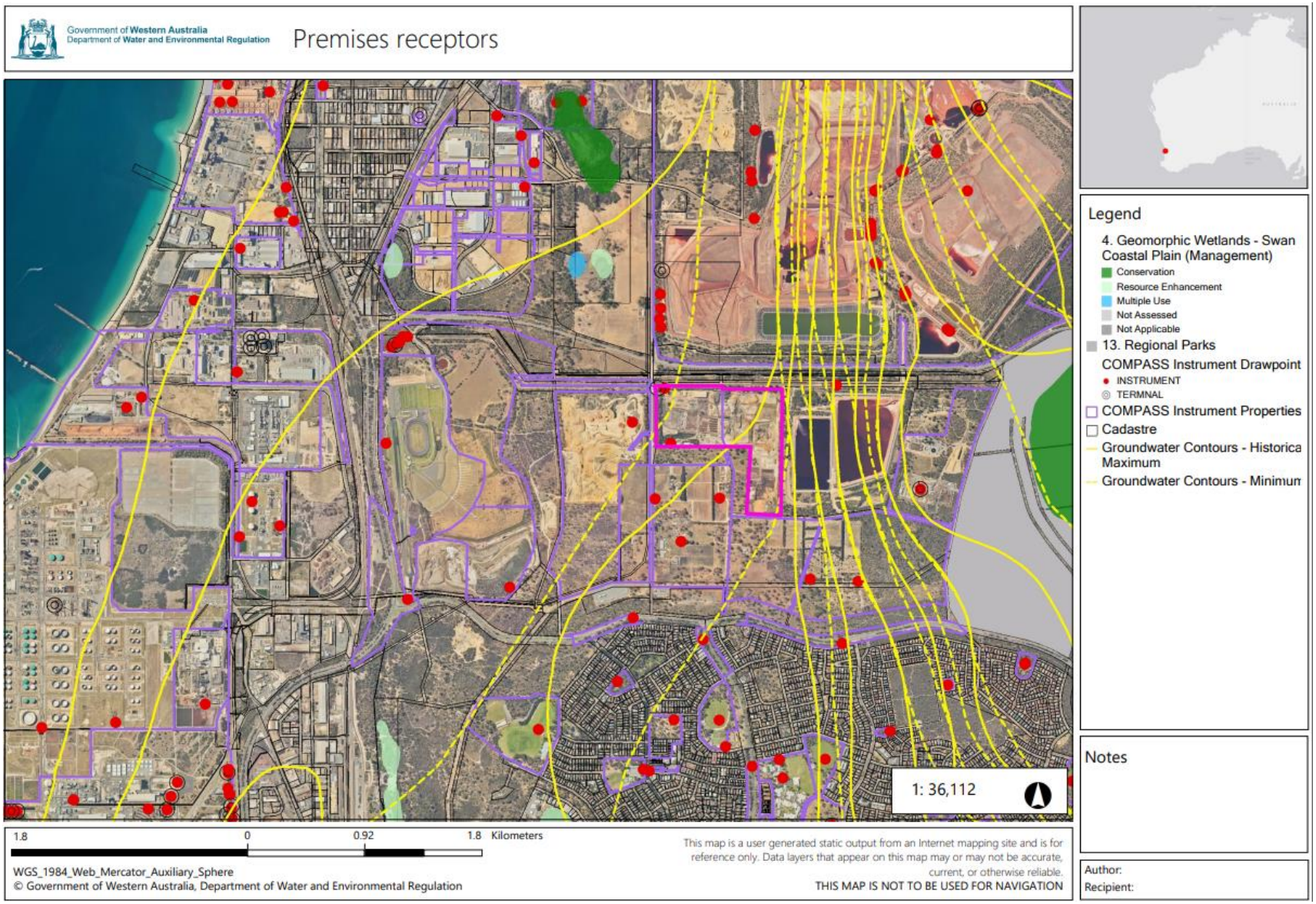

Figure 1: Relative distances to sensitive receptors from the premises.

The premises boundary is shown by the pink line. Purple lines show sites with groundwater licences; red dots show groundwater licence drawpoints and yellow lines show the historical maximum (solid) and minimum (dashed) superficial aquifer groundwater contours from the Perth Groundwater Map. Threatened ecological communities and fauna are not shown.

3.1.3 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for those emission sources which are proposed to change, and considers potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the licence holder has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the Delegated Officer considers the licence holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the licence as regulatory controls.

Additional regulatory controls are imposed where the licence holders' controls are not deemed sufficient. Where this is the case the need for additional controls are documented and justified in Table 7.

The revised licence L8974/2016/2 that accompanies this amendment report authorises emissions associated with the operation of the premises i.e. acceptance of DBS for incorporation into blended soil products.

The conditions in the revised licence have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 7: Risk assessment of potential emissions and discharges from the premises operation

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence holder's controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence holder's controls**				
DBS acceptance and storage	Dust	Air/windborne pathway causing impacts to health and amenity	Residences	Refer to Section 3.1.1	C = Minor L = Possible **Medium Risk**	Y	Condition 3, 7, and 8 **Condition 35, 36, and 37**	Refer to section 3.2
	Noise	Air/windborne pathway causing impacts to health and amenity	Residences	Refer to Section 3.1.1	C = Slight L = Rare **Low Risk**	Y	N/A	N/A
	Contaminated leachate/Sediment laden stormwater	Soil infiltration potentially causing ecosystem disturbance or impacting groundwater quality	Beneficial groundwater users	Refer to Section 3.1.1	C = Moderate L = Possible **Medium Risk**	Y	Condition 20, 35, 36, and 37 **Condition 35, 36, and 37**	Refer to section 3.2
Sale of soil products containing DBS	Lithium, antimony, and sulfates	Sale and bulk movement offsite for development projects, with offsite impacts on ecosystem disturbance or impact to groundwater quality	Beneficial groundwater users, groundwater dependent ecosystems	Refer to Section 3.1.1	C = Moderate L = Possible **Medium Risk**	N	Condition 10, 18 and 19 **Condition 20**	Refer to section 3.2

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk assessments* (DWER 2020).

Note 2: Proposed licence holder's controls are depicted by standard text. **Bold and underlined text** depicts additional regulatory controls imposed by department.

3.2 Detailed risk assessment – DBS impacted leachate

3.2.1 Pathway and receptor

Infiltration of contaminated stormwater has the potential to degrade soil and groundwater quality of the superficial aquifer. Soil beneath the premises may become impacted through the accumulation of contaminants including antimony in the unsaturated zone. Contaminants which are transported to the superficial aquifer may impact the beneficial use of groundwater for non-potable purposes down hydraulic gradient from the premises. There is the potential for some contaminants to undergo natural attenuation within the superficial aquifer as groundwater flows down hydraulic gradient.

The eventual fate of shallow groundwater migrating from the premises is likely to be discharged to the Cockburn Sound marine environment about 3.4 km to the west, recharge to a deeper aquifer or extraction from one of the licensed groundwater production bores between the premises and the coast. Shallow groundwater may also be taken up by groundwater dependent vegetation or discharged to wetlands down hydraulic gradient from the premises

As per previous assessments, nearby wetlands have been screened out of the risk assessment because they are either not likely to be directly down hydraulic gradient from the premises or are more than 1.5 km from the premises. Cockburn Sound has also been screened out of the risk assessment because it is 3.4 km from the premises and the potential contaminant loading resulting from contaminated stormwater infiltration at the premises is considered minor compared to other nearby industrial sources.

3.2.2 DBS material characterisation

DBS is considered enriched in 10 elements consistent with lithium caesium tantalum (LCT) pegmatites, most are largely insoluble and represent little environmental concern. The exceptions to this are lithium and antimony which have the potential to be elevated above certain screening criteria in leachates, particularly under acidic conditions below pH 6. The 'natural' pH of the material (as produced) was 7.7. DBS has a circum-neutral pH (7.7) at which most potential metal and metalloid contaminants are largely insoluble or present at concentrations well below relevant environmental criteria. If DBS is exposed to more acidic conditions, there is an increased risk of the production of metalliferous drainage, particularly if the pH falls below 4.

The provided aqua regia digest results demonstrate that DBS meets the DWER (2010) ecological investigation levels (EIL) and will not exceed NEPM EIL's for urban/public open space environments and commercial/industrial zones .DBS does not exceed the criteria for Class 1 landfill waste under DWER Landfill Waste Classification system (DWER, 1996) and therefore are able to be disposed of in a Class 1 facility if required.

However, a review by DWER's contaminated sites branch of leaching test results for DBS has identified that under anaerobic conditions, microbially driven chemical reactions can trigger the release of some contaminants of potential concern from adsorption sites on iron oxyhydroxide minerals, particularly if the groundwater contains elevated concentrations of dissolved organic carbon. The contaminants of potential concern in the clay-DBS and sand-DBS blended materials that could be released into groundwater by this process are manganese, antimony and arsenic. Further testing to confirm the risk of contaminant release has been recommended to run over several months using anaerobic kinetic tests on underlying groundwater.

3.2.3 Licence holder controls

The proposed DBS Processing Area will comprise a self-bunded area comprised of compacted clay. The available compacted clay has been tested in a lab and found to have a minimum permeability of 1 x 10^{-8} m/s, making the clay impermeable for the purpose of leachate containment. Any liquid run off will be contained by a bund wall and collected within a dedicated

sump, for recirculation to the DBS via fixed irrigation sprinklers. The clay bund will be a minimum of 0.5 metres high. Beneath the DBS hardstand there is approximately 15 metres of natural clay material before ground water.

The DBS cell is isolated from the rest of the site, with its own self-contained bunded area. Additional stormwater infrastructure will also be constructed to contain stormwater run-off from this area.

3.2.4 Additional regulatory controls

Given the above, the Delegated Officer considers that infrastructure controls proposed to be constructed in the DBS Processing Area should sufficiently mitigate potential emissions of contaminants resulting from DBS leachate. However, the Delegated Officer has added sizing requirements to the stormwater basin, to ensure that the basin can contain run off from the DBS Processing Area and DBS-based product stockpiling area resulting from a 1% annual exceedance probability. This will ensure the basin will not overflow during heavy rainfall events and the 300 mm freeboard requirement can be maintained.

Noting recommendations from DWER's contaminated sites branch, Antimony and Lithium will also be added to the premises current ambient groundwater monitoring schedule to ensure no infiltration of DBS impacted leachate will be occurring.

The provision of end use standards for DBS-based products will also provide DWER, the licence holder and end users of the product with assurance that materials being removed offsite are suitable for the end use proposed and that the use of this material will not result in environmental harm or pollution.

4. Consultation

Table 8 provides a summary of the consultation undertaken by the department.

Table 8: Consultation

Consultation method	Comments received	Department response
City of Kwinana advised of proposal (16/09/2025)	No comment received,	N/A
Department of Mines, Petroleum and Exploration advised of proposal (16/09/2025)	No comment received,	N/A
Licence Holder was provided with draft amendment on (24/09/2025)	Refer to Appendix 1	Refer to Appendix 1

5. Conclusion

Based on the assessment in this amendment report, the Delegated Officer has determined that a revised licence will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

The licence has been amended to capture DBS as an approved material for acceptance and processing at the premises, as well as imposing necessary conditions for the construction of necessary containment infrastructure.

5.1 Summary of amendments

Table 9 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the revised licence as part of the amendment process.

Table 9: Summary of licence amendments

Condition no.	Proposed amendments
Cover page	Assessed production / design capacity for Category 61A increased from 500, 000 to 650, 000 tonnes per annual period.
1, Table 1	• References to waste changed to material. • Insertion of DBS as an approved material type at a rate of 150,000 tpa and an acceptance specification of “no free liquid”
3, Table 2	• References to waste changed to material. • Insertion of DBS a material type to be processed onsite via “receipt, storage, and soil blending” with corresponding process limits.
5, Table 3	DBS processing area, DBS-based product stockpiling area, and DBS stormwater basin inserted into containment infrastructure table with corresponding infrastructure requirements.
10	Amended to refer to relevant company documents for all saleable products produced on the premises.
17, Table 7	Requirements for the monitoring and recording of Structural soils (produced with DBS) or DBS products and rejected DBS consignments inserted.
19, Table 8	Testing requirements for DBS-based products inserted, along with reference to licence holder product specifications
20, Table 9	Addition of Lithium and Antimony as parameters in required monitoring suite for points ARMB1, ARMB5, ARMB6A, ARMB7, and ARMB8 as depicted in the Map of monitoring bore locations in Figure 7 in Schedule 1.
26	Insertion of condition requiring the licence holder to maintain a record of DBS volumes and analytical results.
35	Insertion of condition requiring the construction or installation of necessary containment infrastructure within the DBS processing area.
36	Insertion of condition requiring submission of an Environmental Compliance Report
37	Insertion of a condition detailing Environmental Compliance Report submission requirement.
Definitions, Table 14	Definition of AS 1289.6.1.2-1998
	Definition of AS 1289.3.4.1
	Definition of AS 1726
	Definition of delithiated beta spodumene (DBS).
	Definition of DBS-based product required

	Definition of solid
	Definition of suitably qualified person
	Definition of structural soils
Schedule 1: Maps, Figure 1	Revised map depicting DBS processing area across former landfill area in the Northeast of the premises.

References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
3. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
4. Department of Environment and Conservation (DEC) 2010, *Contaminated Sites Management Series: Assessment levels for soils, sediment and water*. Perth, Western Australia.
5. Eclipse Soils 2021b, *Quality Control Plan,* Perth, Western Australia. (DWER record A2068828)
6. Eclipse Soils 2021c, *Structural Fill Sand Production Protocol,* Perth, Western Australia. (DWER record A2068828)
7. UK Environment Agency, 2006. *Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination*. UK Environment Agency technical guidance document which is available from the following website: https://www.gov.uk/government/publications/remedial-targets-worksheet-v22a-user-manual.
8. Zak, D., Hupfer, M., Cabezas, A., Jurasinski, G., Audet, J., Kleeberg, A., McInnes, R., Kristiansen, S.M., Petersen, R.J., Liu, H. and Goldhammer, T., 2021. *Sulphate in freshwater ecosystems: a review of sources, biogeochemical cycles, ecotoxicological effects and bioremediation*. Earth-Science Reviews, 212, 103446.
9. Aurora Environmental 2021, 2020/2021 Quarterly groundwater monitoring report, Abercrombie Road Resource Recovery Centre, Abercrombie Road, Kwinana, WA. (DWER record DWERDT483771)
10. DER 2015, Treatment and management of soil and water in acid sulfate soil landscapes, Perth, Western Australia.

Appendix 1: Summary of licence holder's comments on risk assessment and draft conditions

<table>
<tr><th>Condition</th><th>Summary of licence holder's comment</th><th>Department's response</th></tr>
<tr><td>Condition 10 (b)</td><td>

End Use Standard for General Structural Fill

Geotechnical Parameters

<table>
<tr><th>Test</th><th>Limits</th></tr>
<tr><td>California Bearing Ratio</td><td>Minimum 12%</td></tr>
<tr><td>California Bearing Ratio Swell</td><td>Maximum 1.5%</td></tr>
<tr><td>Linear Shrinkage</td><td>Maximum 1%</td></tr>
<tr><td>Organic Matter</td><td>Maximum 2%</td></tr>
<tr><td>Large Particles (>100mm)</td><td>0%</td></tr>
</table>

Environmental and Human Health Parameters

Meeting Ecological Investigation Levels are per Department of Environment and Conservation (2010) – Assessment Levels for Soil, Sediment and Water. Contaminated Sites Management Series.

Meeting Unrestricted Use Criteria as per Department of Health (May 2009): Guidelines for the Assessment of, Remediation and Management of Asbestos – Contaminated Sites Western Australia.

End Use Standard for Deep Structural Fill

Geotechnical Parameters

<table>
<tr><th>Test</th><th>Limits</th></tr>
<tr><td>California Bearing Ratio</td><td>Minimum 10%</td></tr>
<tr><td>California Bearing Ratio Swell</td><td>Maximum 2.5%</td></tr>
</table>

</td><td>

Noted. Condition amended to require that soil meet the:

- the uncontaminated fill requirements in Table 6 and Table 7 of the Landfill Definitions OR
- Ecological Investigation Levels are per Department of Environment and Conservation (2010) – Assessment Levels for Soil, Sediment and Water. Contaminated Sites Management Series, AND the
- Unrestricted Use Criteria as per Department of Health (May 2009): Guidelines for the Assessment of, Remediation and Management of Asbestos – Contaminated Sites Western Australia.

</td></tr>
</table>

<table>
<tr><th>Condition</th><th>Summary of licence holder's comment</th><th>Department's response</th></tr>
<tr><td></td><td>
<table>
<tr><td>Linear Shrinkage</td><td>Maximum 10%</td></tr>
<tr><td>Organic Matter</td><td>Maximum 2%</td></tr>
<tr><td>Large Particles (>100mm)</td><td>0%</td></tr>
</table>
Environmental and Human Health Parameters
Meeting Ecological Investigation Levels are per Department of Environment and Conservation (2010) – Assessment Levels for Soil, Sediment and Water. Contaminated Sites Management Series.
Meeting Unrestricted Use Criteria as per Department of Health (May 2009): Guidelines for the Assessment of, Remediation and Management of Asbestos – Contaminated Sites Western Australia.
</td><td></td></tr>
<tr><td>Condition 19. Table 8</td><td>CBR, Linera Shrinkage and Organic Matter testing will be conducted on a weekly basis on Fill products. Additional testing types and frequency will be conducted on a volume basis based on end use requirements and client requirements. At a minimum the following testing will be conducted on every 400m3 of Structural Fill produced:
a.EILs testing
b.Asbestos testing</td><td>Noted. Weekly CBR, Linera Shrinkage and Organic Matter testing inserted into Process monitoring and recording table.</td></tr>
<tr><td rowspan="3">35, Table 13 – DBS processing area</td><td>Confirmed, hardstand area will be a minimum 1.1Ha</td><td rowspan="2">Noted and reflected in final version.</td></tr>
<tr><td>Required site works will be completed by 9th if October 2025</td></tr>
<tr><td>See attached map Detailed DBS Stockpiling and Processing Map including washdown bay</td><td>Revised Figure 1 inserted into and referenced within amended licence.</td></tr>
<tr><td>35, Table 13 – Wheel wash</td><td>An existing washdown bay and collection sump is located next to the DBS Area. Trucks will be washed as required to prevent any DBS material impacting roads from truck wheelers or bodies. This is the current system for management of other materials entering site.</td><td>Noted. Wheel wash infrastructure removed from DBS infrastructure design and construction/installation requirements table.</td></tr>
<tr><td>Schedule 1: Maps, figure 1</td><td>Full site plan attached Full Site Plan Depicting DBS Area.</td><td>Revised Figure 1 inserted into and referenced within amended licence.</td></tr>
</table>