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**Boundary Hill East Landfill Detailed Design**

**T2526.05**

Technical Specification

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# Works Overview

Banana Shire Council request quotations for detailed design and associated aspects of the proposed Boundary Hill East landfill (BHE landfill).

These outputs will be utilised to finalise the application for Development Approval and an Environmental Authority, as well as form the basis of the Scope of Work for construction of the site.

The works described in this RFQ are considered a single scope of work, and individual elements of the scope are not separable portions.

As the current Landfill siting, design, operation and rehabilitation guideline, 2021 is currently under review and with a new version anticipated to come into effect prior to the submission of the BHE Landfill Environmental Authority Application, all works of this Scope must be developed in accordance with the Draft Landfill siting, design, operation and closure guideline, 2024[[1]](#footnote-1) (the Draft Guideline). If the Draft Guideline is superseded before these works have been completed, it is expected that the design and supporting documentation will be revised and updated to align with the most current version of the Draft Guideline or Guideline.

# Background

## Project Context

A general and regulated waste landfill is proposed to be constructed by Banana Shire Council at the proposed Lot 4 on SP216326, known as Boundary Hill East landfill site (BHE landfill). The site is located approximately 22km North of Biloela, Queensland. The site is proposed to be developed and operated by Banana Shire Council and is expected to provide additional landfill capacity to the Banana Shire Council area, particularly for commercial waste customers, as the existing Trap Gully landfill site in Biloela approaches capacity and the end of its operational life.

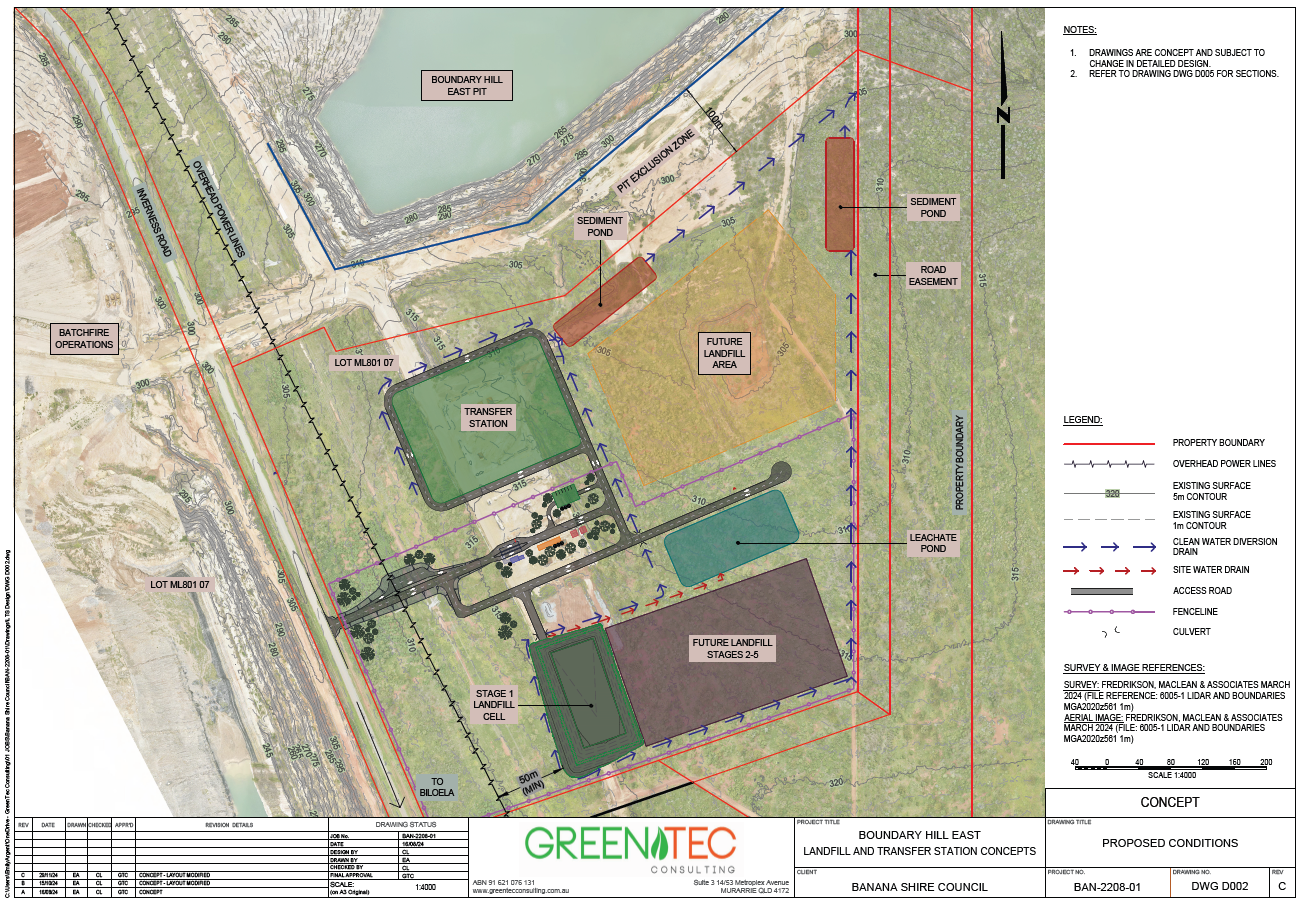
The conceptual design for the site is depicted in Figure 1.

Assessments have been undertaken at the proposed site to inform the conceptual design and potential site layout, including:

* Noise, dust and odour assessments
* Traffic Impact Study
* Flora and Fauna Studies
* Pit Slope Stability

The findings of these assessments have informed the conceptual design, in addition to operational considerations and preferences of Banana Shire Council. Entry and egress to the site has also been designed in such a way as to avoid impacts of landfill activities on mine operations and minimise interactions between landfill traffic and mine traffic.

Figure 1: Concept Design



## Variations from Conceptual Design

The specific location and layout of all aspects shown in the Conceptual Design may be subject to change by Banana Shire Council during the Detailed Design stage.

The following changes are anticipated:

* BSC is likely to only have 1 weighbridge, with some related changes to the roads likely (allowing for traffic control/lights, parking/passing areas to enable two way use of one weighbridge).
* BSC is likely to reduce the transfer station footprint by 50%.
* BSC is likely to change the transfer station ring road to one way.
* BSC is likely to move the fuel shed closer to the machinery shed.
* BSC is likely to move the location of at least some of the water tanks to enable easier access in the case of need for that water for extraction for firefighting purposes.
* BSC is likely to request a change to the layout to enable heavy machinery access to the washbay without crossing the sealed roadways.
* BSC will require a daily cover storage/stockpile area.
* The site is not easily connected to the grid, and therefore, the design requires inclusion of electrical infrastructure, which is likely to include roof top solar panels and a back up generator, in addition to other related electrical infrastructure.
* BSC will likely require a construction laydown area of a minimum of 100m x 100m.
* A landscape buffer may be required, which requires consideration of power transmission lines restrictions.
* Electricity connection is not currently considered in the Conceptual Design. This is proposed to be utilising a generator, or solar panels with a back up generator.

## Site Information

The Boundary Hill East site is currently part of a larger block that is owned and operated by Batchfire Callide Pty Ltd (Batchfire) who have previously used the lot as part of their coal mining activities on ML80107.

The project footprint is proposed to be located within a 185 ha portion of the existing Lot, east of Inverness Road and south of the Boundary Hill East pit. The lot will be subdivided to excise the proposed landfill site from the ongoing mining activities. The site consists of a combination of remnant native vegetation and areas with minor disturbance associated with low impact mining activities (stockpiling of topsoil, laydown areas, roads, above ground pipelines).

Site conditions have been investigated through the following studies:

* The Flora and Fauna Assessment undertaken by Ecosure describes environmental values that are or may be present on site, with controls required to avoid impacts or the triggering of further approvals under both State and Commonwealth legislation.
* The Traffic Impact Study undertaken by Premise found that, assuming operational hours between 6am and 6pm, seven days a week, with access to the site gained via Inverness Road, the development was not likely to significantly increase crash risk in the location.
* The Air Quality Impact Assessment undertaken by Trinity Consultants Australia determined that the air quality modelling assessment conducted for the proposed landfill demonstrates that acceptable air quality can be achieved for the proposed siting and operation of the landfill with no additional control measures required.
* The Noise Impact Assessment undertaken by Trinity Consultants Australia concluded that the proposed landfill operation is expected to have negligible noise impact at the nearby sensitive receptors.
* A Groundwater Assessment was conducted by Australasian Groundwater & Environmental Consultants, which found that, with the available datasets, a landfill base above 260mAHD is unlikely to interact with the water table.

A Geotechnical Investigation is yet to be undertaken, however the detail of this will be provided to the successful tenderer of this Scope of Work once received.

These reports will be provided to the successful tenderer to further inform the detailed design.

## Proposed Site Activities

The following activities are proposed to be undertaken at the Boundary Hill East landfill site:

* Landfilling operations (general and regulated waste);
* Waste and recyclables sorting and segregation;
* Temporary storage of recyclable materials prior to reprocessing by a third party (off-site).

Specifically, the Environmentally Relevant Activities anticipated to be applied for and undertaken are:

* ERA 60 Waste Disposal, accepting a total of an estimated 15,000t/annum, including general and regulated waste (likely to be Threshold 1a).
* ERA 62 Resource Recovery and Transfer Facility Operation (likely to be Threshold 1a, b and 2).
* ERA 54 Mechanical Waste Reprocessing (likely to be Threshold 1).

In addition to generally anticipated residential, commercial and construction/demolition waste, the following specific wastes will be accepted, sorted and temporarily stored for disposed into the landfill or sent offsite for treatment or recycling by a third party (as appropriate):

* Paint;
* Chemical Drums for recycling through Drum Muster;
* Batteries;
* Fire Extinguishers;
* Gas Bottles;
* Cooking Oils for recycling;
* Engine Oils for recycling;
* Tyres (1000 per year or more) prior to recycling;
* Vegetation/green waste/timber acceptance and mulching or wood chipping (less than the ERA trigger limit).

The site specifically intends to accept to landfill:

* Biosolids;
* Asbestos and asbestos contaminated soil; and,
* PFAS contaminated soil;

To ensure the above activities are able to be carried out on the site for an expected minimum 30+ year operational lifespan, other supporting infrastructure and considerations to be incorporated in the detailed design are including but not limited to –

* A series of landfill cells and proposed order of filling to support an initial 10-year operational lifespan with space earmarked for a further 20 years of operation following an updated detailed design (future landfill area)
* Leachate pond/s
* Stormwater ponds
* Weighbridge (B Double sized)
* Machinery shed (9m x 30m, enclosed)
* Shed for recycling sorted and temporary storage (20m x 30m with 7 bays, on a concrete slab)
* Washbay (to accommodate light vehicles and landfill plant and equipment)
* Gatehouse
* Lunchroom with kitchen and toilet amenities for operational personnel
* Parking for site visitors and operational personnel
* Hardstand areas to support landfill operations (as deemed necessary)
* Daily cover stockpile area
* Electrical connectivity (likely to be solar and/or generator)
* Telecommunications connectivity

While many of these elements have been incorporated into the conceptual design, it is expected that this will be refined during the detailed design stage.

# Works Deliverables

## Detailed Design

**Detailed Design Required Outputs:**

1. **Designs, delivered as for Approval and later, for Construction, in pdf and dwg formats, certified by an RPEQ, for all aspects of site requiring construction to enable 10 years of operation.**

A detailed design for the BHE landfill site is to be developed in accordance with the Draft Guideline, ensuring a safe and efficient site, in line with Banana Shire Council operational preferences. The detailed design will include:

* Site layout (Section 3.1.1);
* Landfill cell liner system (Section 3.1.2);
* Leachate management aspects (Section 3.1.3);
* Final capping at end of cell life (Section 3.1.4);
* Landfill gas management aspects (Section 3.1.5); and,
* Stormwater management aspects (Section 3.1.6).

The design should consider the following, but not be limited to:

* Landfill classification;
* The conceptual site model (CSM);
* Environmental factors (groundwater, surface water, airborne and ground borne emissions, geotechnical conditions, climate change);
* Compatibility with proposed waste to be received;
* Waste filling method/s;
* Staging of the landfill cells (interface to future cells); and
* Future closure and rehabilitation.

During the development of the Detailed Design, the tenderer should allow for at least 2 x 2hrs of consultation with BSC via Teams.

### Site Layout

The site layout should consider environmental and site-specific conditions and meet the outcomes of Section 6.2 of the Draft Guideline, including but not limited to:

* Lot boundary to the North to be 100m offset from mine pit highwall (Pit Exclusion Zone);
* Layout of all proposed landfill cells to follow west-to-east landfilling operation, including a suitable staged capping plan, maximising available space;
* Consideration of mine traffic and potential interactions;
* Consideration of potential interaction with powerlines which run north/south across the western side of the proposed lot;
* Layout of future landfill area;
* Layout of stormwater collection and management systems;
* Layout of leachate management systems;
* Layout of landfill gas collection systems, if considered to be required;
* Internal access roads, including one-way ring road around the transfer station;
* Weighbridge location and layout to suit two-way traffic and B Double vehicles utilising just one weighbridge;
* Adequate access for B Double vehicles directly from weighbridge to landfill for both regulated and general wastes;
* Layout and details of 20m x 30m 7 bay recycling shed;
* Location of transfer station areas (locations of stockpiles for each waste stream, with a 50% reduction in footprint from conceptual design);
* Location of 9m x 30m machinery shed (fully enclosed);
* Bunded fuel storage area, located closer to the machinery shed than is currently depicted in the conceptual design;
* Location of gatehouse/office;
* Location of washbay for site equipment and vehicle use, with appropriate wastewater management;
* Locations of water tanks to enable access for firefighting purposes;
* Location of electrical infrastructure; and
* Staged capping plan, including –
  + The filling and capping sequences,
  + Site material balance,
  + Progressive stockpile locations, and
  + Progressive cell access including roads and ramps,
* Proposed final landform.

### Landfill Cell Liner System

The design of the lining system should minimise impacts to surrounding environmental and social values to contain and manage leachate and landfill gas, and must meet the outcomes of Section 6.3 of the Draft Guideline, and should incorporate the following as appropriate;

* Liner sub-base;
* Groundwater depressurisation (if required – not anticipated to be);
* Landfill liner; and,
* Leachate drainage.

The design of a lining system should consider:

* The landfill classification;
* The CSM;
* The outcomes of the risk assessments, including the site water balance assessment, hydrogeological risk assessment, geotechnical slope stability risk assessment and landfill gas risk assessment (if required);
* The proposed base and sidewall grading. In particular, detailed slope stability analysis should be undertaken for lining systems on sidewalls with grading steeper than 25%, either as part of the geotechnical slope stability risk assessment or as part of the lining system design;
* The design of other relevant components of the landfill, including the leachate collection system and landfill capping;
* Compatibility with proposed waste to be received and associated byproducts (e.g., leachate);
* Waste filling method. This should consider whether a “fluffy” or “softer” layer of waste can be placed in the initial waste lift to mitigate damage to the liner, or if additional protection measures are required;
* Staging of the landfill, including potential long term UV exposure to the lining system prior to overlying waste placement; and
* Cell geometry, including -
  + Separation from groundwater.
  + Stability.
  + Access for both excavation, liner construction, future stages, operational access and closure.
  + Provision of sumps for the removal of leachate.

The landfill lining system design should be appropriate for the site, the CSM, landfill classification and surrounding environmental values, and each component must meet the minimum requirements as outlined in Tables 14, 15, 16 and 17 in Appendix 5 of the Draft Guideline.

### Leachate Collection and Management Systems

The leachate collection system forms part of the leachate management system and should be designed to minimise the hydraulic pressure on the lining system and meet the outcomes of Section 6.4 of the Draft Guideline. Liner type and leachate collection system design and specifications should be informed by Tables 14 and 15 of the Draft Guideline, with the system designed in accordance with Appendix 5 and Appendix 9 of the Draft guideline, and including the following elements:

* Monitoring network for leachate head in-cell;
* Monitoring network for leachate which may escape the liner (e.g. between or under liners, or around cells/ponds);
* Leachate collection system, incorporating a leachate drainage layer, leachate sump/s, and associated pumping, instrumentation, controls and monitoring (as appropriate – designer is to assess if a passive or pumped system is most appropriate); and,
* Leachate pond/s.

An overview of suggested leachate monitoring should be included, but development of an Environmental Monitoring Program is out of scope.

In addition, if a management approach to clean water segregation during early filling of the landfill cell is proposed, information of this must be provided in the design.

The leachate management system should be designed to meet the minimum requirements set out in the draft Guideline, including the minimum expectations:

**Leachate Management System**

* The design is to be based on the outputs of the site water balance assessment to accommodate the flows predicted during a >20yr minimum rainfall record that includes a period of rainfall containing both 1% AEP event and two consecutive wet years.
* Ensure the simulation includes at least 10% infiltration of interim covers and 80% infiltration in operating cells.
* Include simulation of:
  + leachate treatment and storage systems,
  + capacity of the disposal pathway and any restrictions during wet weather
  + leachate mounding.

**Leachate Head Monitoring Wells**

* Must be stable under the load of the surrounding waste mass and comply with the requirements of applicable Australian Standards for the pipe material.
* A minimum of 2 leachate head monitoring wells per hectare of landfill space are required.
* Wells must enable identification of if leachate levels exceed 300 millimetres above the lining system.
* Wells must enable continued functionality in the post closure management phase.
* Wells must allows for safe and practicable access by landfill personnel to undertake the monitoring.

**Leachate Collection System**

To include procedures for:

* Prequalification testing of the drainage aggregate to be used.
* Installation of the entire leachate collection system (including drainage aggregate, sumps and pipework) to enable it to be completed without damaging the other liner components including geosynthetics and geomembranes.
* Dealing with or managing wrinkles (waves) in the geosynthetics.
* Providing the necessary isolation from surrounding soils and cells to allow liner integrity survey to be conducted.
* Delineating haul roads of sufficient aggregate thickness for trafficking.
* Minimising breakdown of aggregate during placement.
* Recovery of samples of placed aggregate to verify compliance with the grading specification has been achieved in-situ.
* Preventing soil and debris entering the drainage pipework and aggregate layer.
* Supervision of sump installation and inspection of liner for damage.
* Inspection of leachate pipework, perforations, connections, including verification of removal.

**Leachate Ponds**

Leachate Pond design must:

* Achieve equivalent performance to the landfill liner. As leachate ponds are operated under exposed conditions and subject to great hydraulic head and desludging, their design and specification may differ from the landfill liner.
* Ensure the leachate pond is protected from surface water, stormwater, and groundwater inflows.
* Have floors graded and provided with a gas relief system to prevent whales forming and reducing the pond capacity.
* Be able to maintain a minimum 600 mm freeboard.
* Be accessible in all weather conditions for removal of leachate by tanker.
* Incorporate a leachate reinjection system.
* Recommend liner materials that are suitable for exposure to the leachate chemistry, temperature and UV conditions within the pond.
* Include procedures to manage risks of liner disturbance by wind on the exposed liner.
* Be designed in a way that enables ‘de-mucking’ of sediments and solids while protecting the integrity of the liner system. As well as safe access for pond maintenance or leachate treatment.
* Incorporate inlets, outlets and monitoring systems that preserve the integrity of the liner system and avoid submerged penetrations.
* Manage the risk of liner and subgrade deterioration from wave action on the side slopes.
* Provide safe ingress and egress, and access for inspections, maintenance, monitoring and sampling.
* Include design of 1.8m high fencing to manage fauna and human risks and the risk of damage to the liner system.
* Include procedures to manage risk associated with the presence of fauna and flora, e.g., growth of weeds or other vegetation.

### Capping

Capping should achieve the objectives of protecting social and environmental receptors by providing a stable, long-term separation layer between the waste and the final landfill surface. The capping system design should achieve the outcomes listed in Section 6.5 of the Draft Guideline.

Appendix 6 and Tables 18 and 19 outline the specific minimum requirements for the capping system and should be used to determine appropriate design and specifications.

### Landfill Gas Management

The landfill gas management system should be designed to minimise the risk of and impacts on environmental values as well as asphyxiation and explosion potential as a result of landfill gas emissions, and should meet the outcomes described in Section 7.1 of the Draft Guideline.

A landfill gas assessment is to be undertaken in accordance with Deliverable 3.5 of this Scope of Works, and the landfill gas management system design should be based on this assessment. Landfill gas management systems should be designed to manage fugitive emissions and odour, and associated migration risks by utilising barriers, preferential flow paths, extraction and flaring, or as energy generation.

The main control measures for landfill gas are the landfill gas system (as described in this Section) as well as the lining system (Section 6.3 of the Draft Guideline) and the capping system (Section 6.5 of the Draft Guideline). As such, these components should be considered holistically when designing the landfill gas system.

The design of the landfill gas system should consider the:

* Types of waste;
* Leachate generation and management;
* Operational life of the facility (including closure and post-closure);
* Final waste volume;
* Landfill gas generation potential, during and after placement of waste;
* Monitoring results;
* Collection systems;
* Flow rates and calorific value;
* Odour emissions; and,
* Suitability of landfill gas utilisation or destruction systems for the site.

### Stormwater Management

Stormwater and runoff management systems should be designed to minimise the contamination of stormwater through appropriate design and operation of the landfill activity, and should meet the outcomes described in Section 7.3 of the Draft Guideline.

A stormwater management system is to be designed and constructed so that stormwater is managed by intercepting and diverting uncontaminated stormwater away from both disturbed areas and from where the landfill activity is conducted. Contaminated stormwater should be captured and directed to a stormwater management system, such as treatment ponds, and treated prior to any release.

Contact water[[2]](#footnote-2) and leachate[[3]](#footnote-3) should be managed through the leachate management system. All efforts should be taken to prevent uncontaminated[[4]](#footnote-4) or contaminated stormwater[[5]](#footnote-5) from becoming leachate and thus increasing the stress on the leachate management system.

Stormwater management is necessary at landfill sites to:

* Minimise the amount of receiving water contamination;
* Minimise leachate generation by preventing ponding and water from entering the landfill cell;
* Mitigate the risk of contaminated discharge from other landfill activities (e.g., from refuelling, sedimentation, etc.); and
* Mitigate erosion and sediment runoff.

The minimum requirements for stormwater management are described in Appendix 10 of the Draft Guideline and under Deliverable 3.6 of this Scope of Work.

### Road Design

Access to the site will be via Inverness Road, further north than is indicated in Figure 3, taken from the Traffic Impact Assessment, to improve segregation from mining traffic and operations.

As part of the road design, the successful tenderer will be required to actively participate in a risk assessment workshop with Batchfire to manage risks associated with interaction between mine traffic and landfill traffic.



Figure 3: Proposed Site Access Location showing incorrect site access location – now proposed site access is further north than indicated

External road upgrades are to be designed in accordance with consideration of the recommendations made in the Traffic Impact Assessment. These recommendations include –

* The Argoon-Kilburnie / Inverness Road intersection requires BAL / BAR turn treatments and the Dawson Highway / Argoon-Kilburnie Road intersection needs to be upgraded to include CHR(s)[[6]](#footnote-6) treatment for right turning traffic. Argoon-Kilburnie / Inverness Road currently has sufficient carriageway width for the required BAR treatments. The existing right turn treatment on the Dawson Highway / Argoon-Kilburnie Road intersection, may require widening in order to meet the CHR(s) standard.
* The designer should consider if physical upgrades are required, as potentially the outcomes required can be achieved with line marking only.
* It should be noted Dawson Highway is State owned road.

Other considerations for internal road design include -

* Traffic control/lights, parking/passing areas and other requirements as determined as required (considering the anticipated low traffic flows) to enable two way use of one weighbridge; and
* One-way traffic control for the ring road around the transfer station.

## Design Report

**Design Report Required Outputs:**

1. **Design Report developed and endorsed by a design engineer (a RPEQ), identifying:**

* **How the design of the landfill meets the objectives, outcomes, and minimum expectations of this guideline, and**
* **How the ongoing operation and closure phases of the landfill will meet the objectives, outcomes, and minimum expectations of this guideline.**

A report to accompany the design is also required to be developed in accordance with Section 6.1 of the Draft Guideline. This report should outline the rationale behind the design and design criteria, demonstrating compliance with the Draft Guideline and other relevant standards and guiding principles. Findings of risk assessments and studies, and any controls to be implemented to effectively manage identified risks should also be considered in the detailed design and outlined in the report.

## Site Water Balance Assessment

**Site Water Balance Required Outputs:**

1. **Site Water Balance Assessment as standalone document or included in Design Report.**

The Water Balance Model Assessment is to include the following:

* All predicted inputs and outputs, including rainfall infiltration, groundwater ingress, incident rainfall into leachate storage dams, surface runoff, evapotranspiration, leachate generation/disposal/treatment, dust suppression, irrigation, operational water usage and recirculation;
* Consideration of climatic conditions, landfill geometry, waste composition, the leachate collection system, final cover, absorption of leachate by waste and surface vegetation;
* All cells of the landfill;
* Use of probabilistic modelling, applying Monte Carlo simulation (such as the latest version of the Hydrologic Evaluation of Landfill Performance (HELP) model or equivalent) to assess liner and capping performance as part of the overall water balance;
* Use Bureau of Meteorology (SILO) data for rainfall, evaporation and other climate data needed to populate the model;
* Consideration of uncertainties and limitations involved with the input data and model, as well as justification of assumptions and data inputs; and,
* If no historic site records exist, a program should be developed for calibration of the model over time.

## Geotechnical Slope Stability Risk Assessment

**Geotechnical Slope Stability Risk Assessment Required Outputs:**

1. **Geotechnical Slope Stability Risk Assessment as standalone document or included in Design Report.**

Landfill lining and capping systems may be impacted by unstable slopes and geotechnical conditions. Therefore, a Geotechnical Slope Stability Risk Assessment is required.

In addition to the Geotechnical Slope Stability Risk Assessment, detailed slope stability analysis should be undertaken for lining systems on sidewalls with grading steeper than 25%, if proposed in the landfill design.

The assessment is to include consideration of, but is not limited to:

* Any temporary and permanent slopes;
* Drainage;
* Interface strength;
* Parameters of lining system;
* Factors of safety;
* Subsidence; and,
* Final landform stability.

The assessment should clearly outline all assumptions and boundaries. To lower the probability of failure to an acceptable level, a factor of safety should be used to quantify any analytical or numerical calculation methods. Many probabilistic methods have been developed using Monte Carlo simulations that quantify and assess risks of failures and consequences.

The modelling package should demonstrate that sufficient factors of safety are delivered to ensure the structural stability of the residual landform and to prevent environmental harm occurring.

The ongoing adjacent mining operations should be considered in this Risk Assessment, including but not limited to the potential for ongoing blasting.

## Landfill Gas Risk Assessment and Greenhouse Gas Emissions Calculations

**Landfill Gas Risk Assessment Required Outputs:**

1. **Landfill Gas Risk Assessment as standalone document or included in Design Report.**

A Landfill Gas Risk Assessment is required to determine the controls required to appropriately manage landfill gas emissions at the landfill site. The results of the Landfill Gas Risk Assessment should be utilised to develop a landfill gas management system, if warranted, though passive venting is the preferred method if deemed accepted by the risk assessment.

The Landfill Gas Risk Assessment should identify:

* All assumptions and boundaries used;
* Anticipated characteristics (e.g., quantity, rate, and composition) of the landfill gas emitted by the landfill;
* Potential landfill gas emission pathways;
* Landfill gas emission duration;
* Assessment of suitability to adopt passive venting; and,
* The mitigation measures required to minimise landfill gas migration risks.

A model should be used that can be used to estimate landfill methane generation and emissions such as USEPA’s andGem model, the England and Wales Environment Agency GasSim model and the Commonwealth of Australia’s Department of Climate Change NGER Solid Waste Calculator.

Probabilistic models should be generated if the site is deemed to have a complex CSM and contamination linkages. In this case, the Monte Carlo simulation technique should be applied (e.g., GasSim) using random selection for parameter values from a user-defined range of potential inputs. Modelling should include:

* The Proposed Assessment Scenario;
* Landfill Lifecycle Phases;
* Gases to be Modelled;
* Justification for Modelling Approach and Software;
* Risks to the Environment and Human Health;
* Landfill Gas Emissions;
* Atmospheric Dispersion and Odour;
* Greenhouse Gas Emissions and Global Warming Potential;
* Landfill Gas Management System Completion Criteria;
* Control Measures; and,
* Monitoring and Sampling Plan.

An overview of suggested ongoing landfill gas monitoring should be included if warranted, but development of an Environmental Monitoring Program is out of scope.

1. **Estimated Greenhouse Gas Emissions as a standalone document or memo.**

An estimated Greenhouse Gas Emission calculation is required that complies with the Queensland Government Guideline – Greenhouse gas emissions.

This calculation is required to include emissions associated with the whole of the landfill site and operations, not just the landfill emissions.

## Stormwater Management Plan

**Stormwater Management Plan Required Outputs:**

1. **Stormwater Management Plan as standalone document.**

A Stormwater Management Plan is required to be developed to meet the minimum requirements set out in Appendix 10 of the Draft Guideline, which is to include:

• How the management techniques follow the hierarchy of control mechanisms;

* **Preservation**: Preserving existing valuable elements of the natural stormwater system, such as natural channels and vegetation.
* **Source control**: Appropriate management of the quantity and quality of stormwater, at or near the source of potential contaminants, or changes to flow by using stabilisation or avoidance principles and/or erosion controls.
* **Structural control**: Using structural measures, such as treatment techniques or sediment basins, to improve water quality and control runoff. Applying structural treatment measures on site before the runoff enters a waterway is required to capture mobilised pollutants, and mitigate geomorphic stream damage.
* **Receiving waters management:** As a last line of control, the receiving water should be managed to avoid any residual impacts from stormwater pollutants or flows.

• How the disturbed catchment area will be minimised;

• How separate systems will be implemented and managed for;

* Uncontaminated stormwater (e.g., water from areas onsite that are undisturbed), and
* Contaminated stormwater (e.g., water from refuelling stations, runoff from intermediate cover, etc.).

• How a collection and retention system will be designed and constructed for expected flows to an appropriate hierarchy and standard, including;

* Appropriate risk-based controls for extreme events and failure of diversions and controls,
* Sufficient allowance is made for maintenance practices likely to occur,
* 1% AEP protection against flooding of leachate and landfill gas plant,
* 1% AEP protection against run-on, overtopping of controls or entry of surface water to cells,
* 1% AEP protection against erosion or breach of constructed containment systems, and
* 10% AEP protection against overtopping of constructed drains.

• How stormwater will only be discharged from the site; and

* If the water is from a stormwater storage dam,
* After confirmation that the water is not contaminated, and
* Contained and managed if required during extreme events.

• How erosion and sediment controls will be implemented (e.g., maintaining vegetation in areas prone to erosion, etc.).

* In operational areas,
* In construction areas, temporary works and stockpiles,
* In rehabilitated areas prior to vegetation establishment,
* In drains, channels and other points of concentrated flow, and
* At locations of high flow velocity.

If future stormwater ponds are proposed to be located on top of future capped landfill cells, it should be demonstrated suitable engineering controls are in place to minimise the risk of leaking of stormwater into the landfill cell.

An overview of suggested stormwater monitoring should be included if warranted, but development of an Environmental Monitoring Program is out of scope.

## Construction Quality Assurance (CQA) Plan

**CQA Plan Required Outputs:**

1. **CQA Plan as standalone document or incorporated into Design Report, prepared by the design engineer (RPEQ).**

A Construction Quality Assurance Plan is required to be developed to outline how construction of the landfill cell will be in accordance with the approved design and will comply with the specified quality standards. The CQA Plan will align with the design report, design drawings and technical specifications. The CQA plan is required to be prepared by the design engineer (and RPEQ).

CQA plans should be developed for the lifecycle of each individual landfill cell, for all key components including:

* The liner;
* The leachate management system;
* The landfill gas management system;
* Monitoring infrastructure (not including groundwater wells); and,
* The final capping system.

The minimum requirements for the CQA Plan are outlined in Appendix 7 of the Draft Guideline and should include information regarding:

* Roles, responsibilities, communication lines and definitions;
* Drawings and specifications for the proposed landfill cells and infrastructure;
* Materials testing;
* Hold points for inspection and record keeping; and,
* Variations.

The CQA plan is to be accompanied by a declaration by the design engineer that the minimum expectations of this guideline are met by the CQA plan.

## Closure Plan, Rehabilitation Plan and Post Closure Plan

**Closure, Rehabilitation, Post Closure Plan Required Outputs:**

1. **A preliminary concept plan demonstrating how closure, rehabilitation and post-closure activities will be conducted, as a standalone document.**

The objective of the Closure, Rehabilitation and Post Closure Plan is to prevent and minimise environmental harm by effectively managing all the environmental risks that mat persist following the closure of the landfill site. The Closure Plan must meet the outcomes described in Section 10 of the Draft Guideline, specifically including preliminary concepts for:

* The design and operation of final capping and revegetation of cells;
* The approach for future community engagement to identify a suitable and beneficial final land use for the area;
* The closure plan;
* The rehabilitation plan; and,
* The post-closure plan.

The Closure, Rehabilitation and Post Closure Plan are to be developed in accordance with the requirements set out in Table 27 of Appendix 16 in the Draft Guideline.

As the site intends to progress over time, this plan should be developed in a way that enables future amendments to incorporate the changes that will occur to site.

# Tasks and Timelines

To ensure a clear understanding of the project scope and deliverables, a detailed timeline of deliverables should be included in your tender submission. Specifically, a week-by-week breakdown of key milestones and deliverables is required, including as a minimum -

* Start and end dates for each element of the detailed design and report
* Key milestones and their expected completion dates
* Dependencies between tasks
* Resource allocation for each task
* Inputs required from other stakeholders for each task

The timeline should consider factors such site surveys, engineering analysis, and stakeholder consultations. This level of detail will help us better understand your approach to the project and ensure alignment with our expectations. Banana Shire Council anticipates the detailed design work will be completed by **1 October 2025 (subject to change).**

# Reviews

It is anticipated that each document will be reviewed by Banana Shire Council twice (first draft and final review).

# Site Access

The BHE landfill site is currently on a mining lease (ML) where the holder of the lease, Batchfire Callide Pty Ltd, hold all responsibility for site access to what is effectively a mine site. As such, personnel attending site to undertake any work beyond visual inspections will require in addition to their role-specific qualifications and experience:

* Standard 11
* Coal Board Medical
* Batchfire inductions

In addition to personnel access requirements, site travel restrictions should be considered, including:

* Requirement for Batchfire driving licence, or approved escorts to accompany;
* Only mine approved vehicles can be used onsite.

# Available Information

Conceptual design, site assessment reports and LiDAR mapping will be provided. Other relevant information may be requested and, if available, will be provided at the discretion of the client.

# Reporting and Communication

Reporting and communication will be managed by Dynamic Environmental Services as the Project Manager on behalf of Banana Shire Council. Progress against project milestones will be tracked against the project schedule (as per Section 4 of this scope of work), which will form the basis of weekly project meetings. Unless additional meetings are warranted, it is expected that the following meetings will take place -

* 1 x 2 hour kick-off workshop (including project risk assessment)
* 1 x 60 min meeting weekly

Communication protocols and escalation triggers will be agreed in the kick-off meeting, based on project tasks and timelines and project risk assessment.

# Mandatory Site Visit

Tenderers are required to attend a mandatory site visit on 28 May 2025 (time to be confirmed).

Intention to attend the site visit must be provided via email to [bhe@deservices.com.au](mailto:bhe@deservices.com.au) or enquiries@banana.qld.gov.au by 21 May 2025, which is to include company name, personnel name and email addresses for each attendee.

Each tenderer is restricted to a maximum attendance of 2 personnel.

Persons attending the site visit will need to wear steel cap boots, long pants, long sleeved hi-vis shirt, safety glasses and hard hat, and will be required to complete a Batchfire visitor induction prior to the day.

All attendees at the site visit may be subject to a drug and alcohol test.

# Proposal Requirements

It is requested that the submitter provide the following information:

* Previous experience on similar projects
* Key personnel details
* Contact details for two referees who can comment on a similar project undertaken by the tendering company
* Gannt chart (Section 4 - Tasks and Timelines)
* Pricing

# Excluded Aspects

The following aspects will be undertaken as separate scopes of works, and are therefore noted to be excluded aspects of this Scope of Work:

* Development of an aquifer monitoring network;
* Hydrogeological Risk Assessment;
* Development of an Environmental Management Plan;
* Development of an Environmental Monitoring Plan;
* CQA Inspections and Report.

1. [DRAFT Landfill siting, design, operation and closure guideline, 2024 (ESR20151627)](https://intheloop.des.qld.gov.au/90705/widgets/424259/documents/275734) [↑](#footnote-ref-1)
2. Contact water is rainfall running off exposed waste or that has come in contact with exposed waste (e.g., runoff from stockpiles, etc.). [↑](#footnote-ref-2)
3. Leachate is withdrawn from the leachate drainage system after water passes through decomposing waste. [↑](#footnote-ref-3)
4. Uncontaminated stormwater is the runoff from undisturbed areas of the site [↑](#footnote-ref-4)
5. Contaminated stormwater is the runoff from intermediate (clean) cover, rehabilitated areas and other disturbed areas of the site. [↑](#footnote-ref-5)
6. Channelised Right Turn Lanes [↑](#footnote-ref-6)