BUNBURY - HARVEY
Regional Council

STANLEY ROAD WASTE MANAGEMENT FACILITY

LINED CELLS

BUSINESS CASE

Version 1

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Introduction

Bunbury-Harvey Regional Council (BHRC) intends to undertake a comprehensive upgrade to the Stanley Road Waste Management Facility to ensure long term security for the community of the Bunbury Wellington region for waste management needs into the future.

BHRC was established in 1990 as a waste management authority to manage the municipal waste generated from both the City of Bunbury and the Shire of Harvey.

The primary activities of BHRC are waste recovery and disposal and as such, are not responsible for waste collection services which remain the responsibility of the individual Councils.

BHRC has two facilities, being the Stanley Road Waste Management Facility (SRWMF) and the Banksia Road Organics Processing Facility (BROPF). BHRC owns and manages the Stanley Road Waste Management Facility in Wellesley, which encompasses a waste transfer station and a Class 2 landfill. The Organics Processing Facility is managed and operated by BHRC on behalf of the Bunbury Wellington Groups of Councils (BWGC) and is located on leased land in Dardanup.

As a prescribed premise, both facilities are required to hold an Environment Protection Licence under Part V of the Environmental Protection Act 1986 and are managed in accordance with the operating licences issued by the DER.

The strategic objectives for the Facilities are to:

- Ensure the region's municipal waste services are able to meet demands associated with projected population growth, and proposed state and federal government policy.
- Maximise the life of existing landfill facilities.
- Reduce the environmental impact caused by the emission of greenhouse gases from landfill.
- Contribute to the adoption of sustainable farming practices in the South West by producing an affordable, high quality soil addition.
- Create local employment opportunities.

Background

Landfilling at the SRMWF has historically occurred in unlined landfill cells which pose environmental risks to the surrounding environment. The BHRC and the Department of Water and Environmental Regulation (DWER) considers the risk of unlined landfill cells unacceptable, therefore BHRC is in the process of closing and rehabilitating the unlined landfill cells in accordance with the *Closure and Post-Closure Management Plan* (Talis, 2016).

For the long term security of regional and local community landfilling services, BHRC is planning to develop a modern landfill adjacent to the north eastern boundary of the existing landfill footprint using the side slope as part of the new cells. The new cells shall be separated from the closed landfill by installing an impermeable basal lining system, commonly known as a 'piggyback liner'. This piggyback liner acts as both:

- An impermeable basal liner for the new cells; and
- A capping liner for the existing waste mass preventing the ingress of stormwater and leachate into the old waste mass while diverting the landfill gas towards the landfill gas extraction wells.

Further proposed actions include the relocation of the Organics Processing Facility which is currently located in Dardanup to the Stanley Road site along with the construction of an Administration Building and a Waste Education facility.

This Business Case has been developed with a regional focus to secure cost effective waste disposal services for the surrounding communities within the Bunbury Wellington region and to ensure that

the environment and the surrounding land holders are safeguarded from pollution and off-site effects associated with the proposed construction and operation of a lined landfill.

Regional Benefits

Traditional waste disposal operations across regional Western Australia have been undertaken at small local landfill sites that have not been sited or constructed to modern best practice standards. Such facilities have presented a number of environmental and public health risks.

In 1998 The Bunbury Wellington Group of Councils (BWGC) was formed to consider issues such as waste management, on a regional basis. The group consists of the following members:

- Shire of Capel
- Shire of Dardanup
- Shire of Collie
- Shire of Donnybrook-Balingup
- Shire of Harvey
- Shire of Boyup-Brook
- City of Bunbury

The BWGC have been actively exploring the development of a Regional Waste Facility and in recent years, was successful in obtaining funding under the Council Local Government Fund (CLGF) – Regional Allocation to assist with the purchase of a site.

A regional approach to waste management has been under consideration for many years across the Bunbury Wellington region and through collaboration, greater volumes of waste are generated, presenting economies of scale to support options that may not be feasible at an individual LGA level.

The Shire of Dardanup previously examined the prospect of developing a Regional Waste Management Facility in the *Banksia Road Regional Waste Management Facility Business Plan* that was developed by Sinclair Knight Mertz (SKM) in 2003. Five years later, the development of a Regional Waste Management Facility was identified as the key priority in the *Wellington Regional Strategic Waste Management Plan* (2008) along with the formation of a Regional Council for Waste Management. In 2010, the BWGC commissioned IW Projects to further the implementation of these priorities through the production of a *Feasibility Study for the Formation of a Regional Council for Waste*. To further develop the Regional Landfill Facility concept, the BWGC commissioned Talis Consultants to complete a *Regional Landfill Viability Study* (2013).

In 2013 the BWGC was successful in obtaining funding (currently $4,561,663.16) under the CLGF Regional Funding Round to assist with the purchase and development of a Regional Waste Facility in

Dardanup. The purchase of the site in Dardanup was ultimately unsuccessful due to commercial reasons. The BWGC has since been investigating alternative sites and solutions such as those detailed in the *Regional Waste Management Strategy* (Talis, 2015). The BWGC decided in August 2017 that the preferred option for pursuing a Regional Waste Facility was to utilise $3,100,000 of the allocated CLGF funds to invest in upgrades to the existing SRWMF.

The new lined landfill cells at SRWMF will build capacity in the region by delivering a waste management facility that will help meet the current and future waste management needs of the region in accordance with best practice design and operating principles. It will also deliver new employment opportunities during the construction and operational stages. Further employment opportunities are expected to be created with proposed resource recovery initiatives at the facility that would not be viable without the economy of scale and economic efficiencies associated with continued landfilling operations at the SRWMF.

These cells will help retain benefits in the region by ensuring that waste disposal costs remain competitive, and that employment opportunities associated with resource recovery and waste disposal operations remain located in the region. Commercial business opportunities to local businesses will be provided with the construction, operation and maintenance of the facility. In addition, short and long-term local environmental benefits will be achieved through this project. The project will dramatically improve the sustainability of waste management practices in the region by ensuring waste disposal operations have the financial viability required to comply with best practice environmental management guidelines, including the use of lined landfill cells with state of the art environmental protection systems. A landfill gas collection and treatment system will be incorporated into the project which also provides the opportunity for energy recovery from the landfill activities. The whole site will be progressively rehabilitated across its life with a best practice capping system. Such services are a significant advancement on the environmental performance of the current waste management infrastructure in the Region.

The construction of the lined landfill cells proposed will facilitate the commencement of a major upgrade program for the SRWMF that will ensure the regional community is provided with state of the art waste disposal services for the next 25 years. The project will improve the economic viability of providing additional resource recovery services, including organic waste, electronic waste and household hazardous waste recycling. Throughout the project, the community will be provided with the highest standard of resource recovery and waste management services within regional Western Australia allowing BHRC to be the leader in waste management.

The upgrade of the SRWMF into a best practice Regional Waste Management Facility, its ongoing operation, and the provision of additional services will stimulate the local economy by providing new economic and employment opportunities to the local community.

Economic Analysis

The capital cost of developing the Facility's first lined landfill cell as proposed for this project is estimated to require $7.6 million of capital investment. This will be funded through the Reserves held by BHRC and further funding opportunities available such as funding granted to BWGC through the Council Local Government Fund (CLGF) – Regional Allocation.

In order to assess the economic viability of the project the BHRC has calculated the whole of life cost to dispose of waste in lined landfill cells. The calculation was based on the assumption that a total of eight lined landfill cells would be constructed and operated over a 26-year period to provide the capacity for approximately two million tonnes of waste. It was estimated that the total capital and operational cost to construct, operate, close and rehabilitate these landfill cells would be approximately $60 million over the 26-year period.

To cover these costs we would be required to charge a gate fee of approximately $30 per tonne. The calculated break-even gate fees illustrate the project's viability based on a comparison of other similar waste management and landfill facilities. This project will help ensure that best practice and competitively priced waste disposal services are available for the Bunbury Wellington region for the next two to three decades. This will benefit rate payers across the region by minimising the potential for significant rate increases to deliver waste management services in the future. The project will also provide long term security to the commercial and industrial sector within the region by ensuring that competitively priced waste management services can be obtained.

BHRC has calculated in its Long Term Financial Plan that the funding for the cells from the reserves available would allow for commencement of the project in the 2020/2021 financial year. If alternative funding was to become available the project could commence immediately funding is secured.

Financial Assumptions

BHRC has invested heavily in infrastructure and as a consequence, it is important that these assets are managed in such a way as to deliver the best value over their useful life for the benefit of the member councils.

Given the extent of forward planning, this business case is underpinned by detailed financial modelling that requires significant judgments and estimates to be made about the future conditions and trends and as such, modeled results will not always translate accurately into financial performance for a particular year.

The following key assumptions have been taken into account in developing this plan:

- In the absence of formal contracts, financial modelling is based on the most conservative probable outcome.
- BHRC is intended to be an autonomous, self-funded entity.
- Ongoing operations will generally be funded from internally generated cash flow.
- Conservative use of debt to fund major new assets or significant upgrades.

Given the significant role that financial management plays in any operation, BHRC is committed to ongoing prudent financial management of its resources as outlined in the Long Term Financial Plan.

Projected Funding Costs

Project Items	CLGF Funding	Reserve Funding	Total Funds ($)
General Construction Provisions	$0	$200,000	$200,000
Earthworks	$2,210,000	$0	$2,210,000
Geo-synthetic Liners	$0	$2,300,000	$2,300,000
Leachate Collection System	$0	$2,000,000	$2,000,000
Evaporation Pond	$890,000	$0	$890,000
TOTALS	**$3,100,000**	**$4,500,000**	**$7,600,000**

Reserve Funding Program

BHRC operates on a cost for service fee which includes both the pure cost per tonne for landfill operations as well as the cost per tonne for managing the waste through the transfer station. Any surplus achieved for the year is retained to sustain future management of the landfill.

Reserve	2017/2018	2018/2019	TOTALS
Lined Cell Construction	$120,000	$1,807,142	1,927,142
Borrowing		$2,572,858	$2,572,858
CLGF Funding	$3,100,000		$3,100,000
TOTALS	$3,220,000	$4,380,000	$7,600,000

Project Timelines

The table below lists the key tasks, dates and responsibilities for the delivery of the project.

Main Activities / Milestone	Milestone Date	Responsibility
Environmental approvals granted	22/09/17	BHRC & DWER
Tender released for liner contractor	25/09/17	BHRC
Relocation of site yard and water bore	13/10/17	BHRC
Clearing of site	03/11/17	BHRC
Clay imported to site for liner	20/10/17	BHRC
Groundwork's and shaping	01/12/17	BHRC
Liner contract awarded	15/12/17	BHRC
Establishment of leak detection system	05/01/18	BHRC
Construction of leachate evaporation pond	12/01/18	BHRC
Geo-synthetic liner completed	02/03/18	BHRC
Leachate collection system installed	13/04/18	BHRC
Lined cell completed and ready for operational use	13/04/18	BHRC

Performance Indicators

The challenges faced today by waste management go beyond simple quantification and characterization of the collected waste. These challenges involve not only regulations and legislation but also performance assessment of the system's efficiency. Efficiency is measured in terms of achievement of management targets and resource optimization.

Key Performance Indicators will be used to measure impacts and variations in the implementation of this project as listed below:

- Overall stakeholder satisfaction with the BHRC
- Meeting Timelines for Construction
- Meeting costing allocations
- Maintaining Financial Integrity

Once the project is completed, Key Performance Indicators listed below will be used to measure the success of the project

- Stakeholder satisfaction with waste management services
- Level of satisfaction with environmental initiatives and projects
- Level of satisfaction with regional development initiatives and projects
- Financial sustainability of the organisation
- Percentage of materials that are diverted from landfill

Implementation

It is anticipated that this project will commence as soon as Approvals have been granted by the DWER and funding applications have been finalised.

Without the additional grant funding, it is anticipated the project will not commence until 2020/2021. This would allow the funding to come from the Reserve Account for the entire project.

Environmental Management

A Landfill Environmental Management Plan (LEMP) has been developed by *Ask Waste Management Consultancy Services (2017)* detailing the environmental risks associated with the proposed construction and operation of the facility with lined landfill cells and outlines measures that can be taken to mitigate any risks identified. The LEMP has been developed to ensure that the environment and the surrounding community is safeguarded from pollution and off-site effects associated with the proposed construction and operation of the lined landfill cell. It describes the level of environmental performance expected and practices for managing, operating, and monitoring the Facility.

The Stanley Road site is underlain by an unconfined superficial formation and a series of confined aquifers resulting from alternating sand and clay layers. This overlies a shale unit at a depth of approximately 38m bgl, which caps the Leederville formation. The site is also underlain by the Yaragadee aquifer at a greater depth.

The depth to the surface of the superficial aquifer varies with topography. In low-lying areas the depth to groundwater can be as shallow as 4m bgl. The superficial aquifer extends to an underlying confining clay layer at approximately 10m bgl, giving a typical saturated thickness of approximately 6m (ATA, 2006).

Regionally, the direction of groundwater flow is westerly, towards the Leschenault Inlet. Locally, groundwater flow is inferred to be south westerly as a result of the influence of the Wellesley River.

The Wellesley River, which flows into the Brunswick River, is located approximately 600m southeast of the Site. The Leschenault Inlet is located approximately 3 km west of the site, receiving water from numerous rivers and connected to the Indian Ocean.

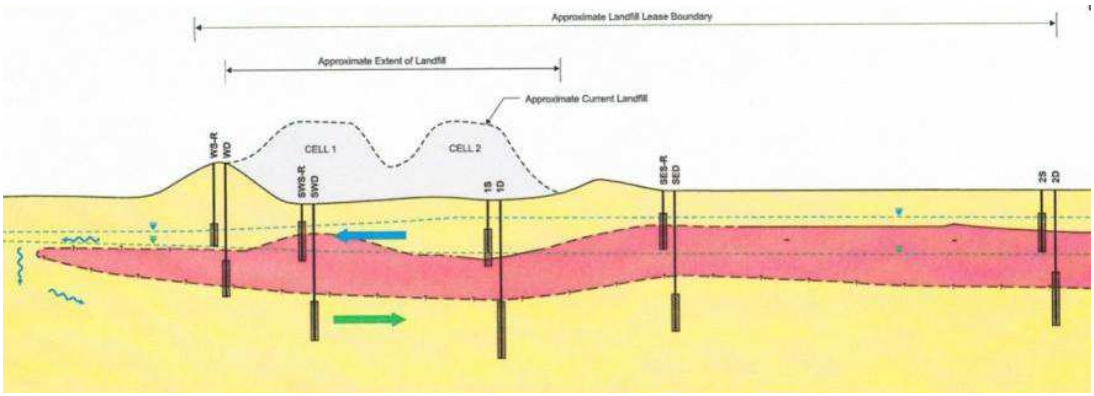
BHRC is currently undertaking a re-survey of all monitoring wells on site in order to establish depth and directional flow to ensure that we manage all surface and groundwater on site in accordance with our DEWR Licence.

The following section provides key best practice environmental management guidelines that will be employed to minimise environmental impacts for the unlined landfill cells at the Facility.

Water

The BHRC will undertake all practical measures to prevent the emission of contaminated waters from the Facility. Management of water at the Facility is aimed at:

- Minimising the generation of contaminated water
- Preventing deterioration of water quality standards in local surface waterways and groundwater in the vicinity of the site
- Ensuring that water is available to meet operational requirements.



Stormwater

Stormwater on a landfill site is water which falls on undisturbed areas of the site, and water which falls outside waste filled areas but over disturbed areas (i.e. cleared or construction, intermediate cover and final landfill cap) and is potentially contaminated with sediments. Poor control of stormwater can have impacts not only on receiving waters downstream of the site but also on the practicality and cost of site operations. Providing adequate surface water drainage is therefore a critical component of any landfill facility design.

As the cell is completed, the BHRC will aim to prevent future leachate generation and proactively manage surface water. This will ensure that:

- Surface water generated on the top of the capped areas will be diverted to intermediate stormwater swales situated approximately mid-way up the slope
- The purpose of these swales is to prevent excessive erosion by breaking the vertical distance the stormwater has to travel
- Once collected in these swales the water will be diverted through storm pipes to the perimeter swale at the toe of the capped area
- The perimeter swales at the toe of the cap will collect all stormwater caught between the intermediate swale and the toe of the cap. The water collected in the perimeter swale will then be diverted to one of three stormwater dams to the east, west and north of the landfill footprint.

Leachate

The BHRC propose to install and maintain a landfill liner and leachate collection system and will undertake the following actions:

- Directing clean stormwater run-off away from the active landfill area
- Regular compaction and covering of the landfilled waste
- Keeping any 'contaminated' stormwater run-off generated within the active tipping area separate from clean stormwater run-off
- Only operating one active landfill face
- Intermediate covering of landfilled areas that will be inactive for a period of 90 days or more
- Progressively constructing the final capping across the site as the final landform is reached.

Landfill Gas

Landfill gas (LFG) is a natural by-product of the anaerobic biological decomposition of the organic fraction of solid waste disposed of in putrescible landfills. LFG consists primarily of Methane (CH4) and Carbon Dioxide (CO2), but may contain many other constituents in small quantities. Once the LFG has been generated it often moves through and out of the landfill via the path of least resistance.

BHRC will install active and passive collection systems that collect and combust the gases so that they no longer pose environmental and health issues.

Odour

The biodegradation of wastes in landfill can result in the formation of offensive odours that have the potential to impact the amenity of surrounding land users. Odour may also be associated with load transport, the tipping face, leachate and LFG. The BHRC shall ensure that odour emitted from the premises does not unreasonably interfere with the health, welfare, convenience, comfort or amenity of any person who is not on the premises.

Dust

Although the DWER Environmental Assessment Report identified dust generation from the Facility as being not significant, all practicable measures will be taken by the BHRC to minimise dust emissions arising from the operations of the Facility and the construction of the landfill cell.

Litter

A hierarchy of control measures are available, based firstly on load containment, load handling and tipping and moving through to secondary control measures such as mobile screens, nets and litter picking.

Vectors

Potential disease vectors onsite include rats and other rodents, foxes, feral cats and dogs, insects, birds and other animals, each of which can carry disease and be a threat to public health. Vermin control contractors are used on the site and based on the results of their monitoring activities, the site has a minimal number of cats, foxes and rodents. However, birds (e.g. Gulls, Ibis and Emus) have been experienced at the site in significant numbers.

Control measures used include:

- Regular pushing up and compaction of the waste.
- Application of adequate cover material.
- Adequate perimeter fencing and gates.
- Elimination of ponding water on the property, except as designed for runoff storage or treatment or natural water bodies.
- Vermin control such as baiting and trapping, carried out on a four month programme.

Noise

BHRC shall take all reasonable and practical measures to prevent or minimise the discharge of noise emissions from the operations at the Facility. Such measures include only operating machinery during standard business hours, regular maintenance of mobile plant and restricting speed limits of mobile equipment.

Environmental Monitoring

All monitoring will be undertaken as per the licence conditions as stipulated by the DWER. Currently these include:

- Surface water quality
- Groundwater quality
- Landfill Gases