

PFAS APPLICATION EPA SUBMISSION RESPONSES

Southern Waste ResourceCo

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1 Executive Summary

Southern Waste ResourceCo's (SWR) site located at 2605 Main South Road, McLaren Vale (site) has been operating as an integrated waste treatment, recycling, resource recovery and disposal facility since 1993.

The management of contaminated waste streams is an area of expertise for SWR, having managed numerous large and complex remediation projects in South Australia over the years.

Pursuant to EPA Licence 32682, the site is approved to receive and dispose of a range of waste streams, including contaminated wastes. On 21 February 2020, SWR submitted an application to the EPA seeking approval for the receipt, storage, treatment and disposal of PFAS (per- and polyfluoroalkyl substances) waste at this existing site (**PFAS Application**). The PFAS Application was submitted in accordance with National PFAS guidance documentation, EPA requirements and pursuant to the *Environment Protection Act 1993*.

The particular cell that this waste will be disposed in, Cell 3, has been designed by engineering experts and independently supervised during all stages of construction to meet a hazardous waste landfill standard and is widely accepted as a best practice containment design for landfills. Featuring a double composite lining system, this cell design ensures the protection of the surrounding environment from its enclosed wastes.

Hydrogeological investigations and monitoring undertaken within the Willunga Basin, supported by detailed site investigations, confirm there is no likely interaction between the SWR site and the underlying groundwater. Any environmental risks and interface issues will be appropriately managed through the site's approved Treatment Area Environment Management Plan and Landfill Environment Management Plan controls, in accordance with SWR's licence conditions and ongoing environmental monitoring undertaken at the site.

Construction of the Cell 3 has not resulted in any increase in operational footprint outside of the existing site boundaries.

SWR understands the community's concerns and has addressed the key issues raised by the community which relate to the EPA's assessment of the PFAS Application in the responses below.

Many submissions covered multiple issues but there were 11 main themes identified which have been addressed in the responses below. The number of submission column (third column in Table 1 below) is aimed at ensuring all 71 submissions have been addressed. The main issue as determined from each individual response has been allocated across the 11 issues identified (i.e. an individual submission may address several of the issues identified but is counted only once in the table against the core theme of that submission).

Key Issue(s) Identified	Response Section	Number of Submissions
Cell Location <i>Proximity of the site and cell to adjacent land-users.</i>	2.1	32
Groundwater Contamination <i>Potential for leakage of PFAS into the groundwater, affecting the surrounding land users including schools and wineries.</i>	2.2	15
Public Health Risk <i>Health risks that PFAS contaminated waste poses.</i>	2.3	13
Site Hydrogeology <i>Potential interaction of PFAS contamination with surrounding aquifers in the Willunga Basin.</i>	2.4	3
Increased Vehicle Movements <i>Potential for an increase in vehicles transporting waste and a residual increase in traffic in the area.</i>	2.5	2
Environmental Monitoring <i>Monitoring of the cell, and over what timeframe.</i>	2.6	1
Landfill Cell Liner Design <i>Potential for leaks within the liner design and the reaction of PFAS inter-mingling with other types of waste.</i>	2.7	1
Air Quality <i>Effect on air quality and dust mitigation.</i>	2.8	1
PFAS Waste Streams and Acceptance Regime <i>Management of the PFAS waste onsite.</i>	2.9	1
PFAS Dedicated Facility <i>Concerns site is a new facility, purpose built for PFAS contaminated waste.</i>	2.10	1
PFAS Waste Application Timeline <i>Concerns approval process has been fast-tracked and hasn't undergone sufficient scrutiny.</i>	2.11	1
Total Submissions Received		71

Table 1: Summary of Key Issues Identified

2 RESPONSES TO SUBMISSIONS

This section provides a response to the submissions received during the public consultation period. The key issues identified within the consultation submissions are addressed individually and in order of number of submissions relating to each specific issue.

2.1 Cell Location

Issue: Respondents raised concerns about the proximity of the site and the cell to adjacent land-users

Response:

As clarified at section 2.10 of this Report, the site is not a newly established facility. The site has been operating as an integrated waste treatment, recycling, resource recovery and disposal facility (**Landfill Facility**) for 27 years following commencement of site operations in 1993. SWR's use of the site as a Landfill Facility is approved and regulated by the EPA pursuant to the conditions imposed on SWR under EPA Licence 32682 and the powers given to the EPA under the *Environment Protection Act 1993*. The site is already licensed to receive, treat and dispose of a range of waste streams including contaminated waste (also termed hazardous waste), and the proper management of such material is a core part of SWR's expertise.

The site is situated within the Mineral Extraction Zone, which is primarily used for quarrying activities and is reflective of site's previous use as a quarry. The site is surrounded by extractive industry uses along the Southern and Western boundaries. Some agricultural and horticultural operations exist to the East of the site, as well as a small scattering of residential properties in the South-Western and North-Eastern site boundary. The nearest residential development is in excess of 0.5 kilometres away from the site. Further expansion of residential development in the locality of the site is inconsistent with zoning and is not envisaged by the City of Onkaparinga Development Plan.

As part of SWR's PFAS Application, a range of environmental aspects and impacts were assessed to ensure that the proposed receipt, storage and disposal activities would not pose unacceptable risks to the environment or the surrounding community. Separation distances between the cell and adjacent land uses act as the primary control measure to mitigate environmental risk. The disposal cell has been constructed along the South-Western edge of the site and bordered by two main roads, deemed the most appropriate location within the site for the cell.

In addition, an array of site management practices during cell development, operation, closure and post closure care of the cell will ensure the protection of the adjacent land uses and the appropriate management of any interface issues. These matters are more specifically addressed in the sections below.

2.2 Groundwater Contamination

Issue: Respondents raised concerns about the potential for leakage of PFAS into the groundwater, affecting the surrounding land users including schools and wineries.

Response:

Protection of the environment and surrounding groundwater and surface-water resources have been considered as part SWR's PFAS Application. In particular, SWR's PFAS Application complies with the

recently released EPA guideline entitled “*Landfill Disposal Criteria for PFAS Contaminated Waste*” dated March 2020 (EPA 1125/20) and other National PFAS guidance documentation.

As detailed at section 2.4 below, the hydrogeological conditions at the site are such that the risk of interaction between PFAS waste and groundwater aquifers is considered to be highly unlikely. Nevertheless, SWR will have a range of management measures in place to mitigate the risk of PFAS contaminated wastewater coming in contact with groundwater. Of particular significance, the site will have an integrated leachate collection, management and monitoring system comprising specific leachate management measures for PFAS contaminated waste at the point of receipt, storage, handling, treatment and disposal. These measures are explained below:

Handling and storage of PFAS:

All handling and storage of PFAS contaminated waste will occur within the site’s existing waste treatment facility, which has been purpose built for the undercover storage of contaminated waste. The waste treatment facility is an enclosed facility that is designed to provide a large storage footprint that prevents any stormwater coming in contact with PFAS contaminated waste.

The waste treatment facility has been constructed with a reinforced concrete hardstand that is graded to divert any water (whether it be stormwater or leachate) into an adjacent concrete lined sump. The constructed sump incorporates collection pipework that directs all captured leachate into an adjacent composite lined leachate evaporation pond for disposal.

All aspects of handling and management of PFAS contaminated waste will be reflected in specific detail within the site’s existing EPA approved Treatment Area Environment Management Plan (**TAEMP**).

Disposal of PFAS:

All PFAS contaminated waste will be disposed of within the purpose-built containment cell consisting of a double composite liner profile incorporating primary and secondary leachate collection and extraction layers.

The primary leachate collection system within the cell consists of:

- Perforated HDPE pipework overlaid with a 0.3m thick gravel drainage layer which is designed to collect and direct leachate to the constructed sump arrangement situated along the Northern cell extent; and
- A leachate sump riser pipe which extends the full length of the Western side wall of the cell which has a submersible pump fitted and will be used for the extraction and removal of any leachate generated from the cell.

The secondary leachate leak detection/extraction system within the cell consists of:

- A geocomposite leak detection/drainage layer installed between the primary and secondary liners consisting of a triplanar HDPE drainage core/non-woven geotextile. This is designed to collect and direct leachate to the constructed sump arrangement situated along the Northern cell extent; and
- A leachate sump riser pipe which extends the full length of the Western side wall which will also have a submersible pump fitted and will be used for the extraction and removal of any leachate generated which is not captured in the primary leachate collection system.

All leachate that is collected from the constructed sump in the cell will then be diverted into a composite lined leachate evaporation pond constructed for the evaporation and concentration of PFAS compounds into residue sludge. The leachate ponds will be regularly cleaned with residual sludges removed and will be containerised and transferred for destruction at a dedicated thermal treatment plant specialising in PFAS destruction.

All aspects of the handling and management of leachate associated with PFAS contaminated waste will be reflected within the site's EPA approved Landfill Environment Management Plan (**LEMP**).

Capping and rehabilitation of the cell:

All PFAS contaminated waste that will be disposed within the cell will undergo comprehensive capping and rehabilitation works shortly after closure.

Following the completion of filling works within the cell, an interim cover layer will be placed immediately over the completed cell surface to provide a temporary measure to reduce and limit any stormwater infiltration and leachate generation into the underlying waste body awaiting placement of the final capping layer.

A capping and rehabilitation strategy for the cell will be developed prior to filling completion of the cell, which will include the following key design and construction criteria:

- Installation of an engineered barrier layer, soil protection layer and a vegetative layer or an EPA approved alternative layer of equivalent environmental and engineering performance;
- The capping layer will extend the full cell extent and completely cover the waste body and will integrate with the constructed cell sidewall lining systems to ensure the entire encapsulation of the waste body occurs; and
- The final cell landform will include stormwater management infrastructure to ensure all stormwater is directed off the capped surface and into the existing stormwater management system onsite.

Post closure management and monitoring will be ongoing, under the direction of the EPA, to include frequent inspections and maintenance to ensure long term performance and function of the engineered capping layer.

All aspects associated with the closure and post closure management of the closed cell containing PFAS contaminated waste cell will be reflected within the site's EPA approved LEMP and further detailed within a Closure and Post Closure Management Plan.

2.3 Public Health Risk

Issue: Respondents raised concerns raised over the health risk that PFAS contaminated waste poses to the public.

Response:

PFAS contamination is a national problem. Left in situ on source sites, it represents a risk to human health and the environment. SWR's PFAS Application proposes to provide a solution which allows for the proper management of this risk. As detailed in these responses, the cell has been appropriately sited and the necessary management measures will be in place to ensure the proper on-site

management and disposal of PFAS waste. As is similar to wastes such as asbestos, once the PFAS has been disposed of to the cell, the risks to human health are considerably mitigated. The alternative is that the PFAS contamination is left on source sites which have no controls in place, presenting far greater risk.

2.4 Site Hydrogeology

Issue: Respondents raised concerns over the potential interaction of PFAS contamination with surrounding aquifers in the Willunga Basin.

Response:

The Willunga Basin comprises a number of aquifers: the fractured rock aquifer, Maslin Sands aquifer, Port Willunga formation aquifer and the quaternary aquifer.

The site is situated near the North-Western edge of the Willunga Basin overlying the fractured rock aquifer. The site is over 1 kilometre North of the water-bearing Maslin Sands aquifer and extent of the Port Willunga formation aquifer. Regional groundwater flow in the fractured rock aquifer has been assessed to be occurring in a Westerly direction away from the site, and below the elevation of the Maslin Sands aquifer to the South.

As part of the approval process for the change in use of the site from mining to landfilling, several detailed site hydrogeological investigations were undertaken to consider any interactions and potential site impacts to the adjacent and underlying aquifers. These investigations took into consideration all of the above-mentioned aquifers.

These investigations concluded that there has not been any connectivity established between the groundwater resources underlying the site in the fractured rock aquifer or other the aquifers within the Willunga Basin. Onsite groundwater bores that are established within the fractured rock aquifer and were installed as part of historic sand washing operations had low yields and were moderately saline.

As part of the detailed site investigations undertaken, a conceptual hydrogeological model was developed for the site which is used to inform and provide the basis for planning, design and construction of landfill cells with respect to groundwater elevation, impacts of extractive activities and baseliner levels at the site.

SWR constructs all waste containment cells at the site within the former Proterozoic bedrock (shale) and sand extraction pits that were excavated as part of historical mining operations undertaken at the site.

In particular, the cells are constructed and founded upon the Proterozoic bedrock following removal of the sand resource. Where this bedrock has been encountered to date, it has been found to be extremely weathered and of relatively low permeability. This extremely weathered material is reworked and compacted to form the clay liner used in the construction of disposal cell mineral base and sideliners. EPA requirements for groundwater separation for the waste containment cells are satisfied within the low permeability Proterozoic bedrock underlying the site.

2.5 Increased Vehicle Movements

Issue: Concerns raised over the increase in vehicles transporting waste and a residual increase in traffic in the area.

Response:

The activities proposed by the PFAS Application will not have any impact on the number and frequency of vehicles accessing the site via the Main South Road entrance. It will not result in an intensification of activity at the site, nor an increase in operational footprint outside of the existing site boundaries.

All vehicle movements associated with PFAS contaminated waste receipt and disposal at the McLaren Vale landfill will utilise the existing site access.

Waste transport vehicles that collect and transport PFAS contaminated waste will be required to hold relevant waste transport licences issued by the EPA and will be required to actively track all PFAS contaminated waste movements on the EPA electronic waste tracker system. This contaminated waste tracking process provides full transparency and accountability associated with the PFAS waste generator, transporter and receiving waste facility to ensure its managed and handled appropriately.

2.6 Environmental Monitoring

Issue: Concerns raised about who will monitor the cell, and over what timeframe.

Response:

The site has a comprehensive and ongoing site environmental monitoring program in place, which assesses groundwater, surface-water, leachate and landfill gas.

Groundwater monitoring within the established groundwater well network onsite has been occurring since 1994. Monitoring of dedicated leachate sumps and leachate evaporation ponds has been occurring since 2002 and routine surface water sampling along stormwater drainage lines has been occurring since 2011. As part of the wider review of the site's landfilling operations, these ongoing monitoring programs have been updated in recent years and satisfy the necessary requirements for the monitoring of PFAS compounds.

Some of the key features of SWR's environmental monitoring program include:

- All environmental monitoring is captured within the site's ISO accredited Environment Management System (EMS) that has been established and holds relevant ISO accreditations (AS/NZS 9001:2008 & AS/NZS 14001:2004) for its ongoing implementation onsite.
- The site monitoring plan has been reviewed and approved by the EPA and occurs in accordance with the site's EPA licence 32682. The licence places site monitoring obligations upon SWR through specific licence conditions ensuring all monitoring occurs based upon the scope/methodologies approved by the EPA.
- All environmental monitoring works are undertaken by an independent and suitably qualified and experienced environmental practitioner with all results provided to the EPA for review and consideration against the site monitoring plan.

Environmental monitoring requirements for the site are defined in detail within the site's EPA approved LEMP and licence conditions. All ongoing site monitoring works occur in accordance with prevailing technical literature and environmental monitoring best practice standards. This documentation includes the following EPA legislative and guidance documents:

- Environment Protection (Water Quality) Policy 2015.
- National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).
- EPA 'Guidelines for Regulatory Monitoring and Testing – Groundwater Sampling', April 2019.
- EPA guideline 'Environmental Management of Landfill Facilities – Solid Waste Disposal' April 2019.

2.7 Landfill Cell Liner Design

Issue: Respondents raised concerns about potential leaks within the liner design and the reaction of PFAS inter-mingling with other types of waste.

Response:

The cell has been designed by specialist landfill engineers for the containment of hazardous wastes and incorporates best practice landfill management design and construction principles.

As set out in section 2.2 above, the double composite liner design includes numerous barrier systems to provide environmental safeguards for the protection of groundwater resources onsite. Leachate storage ponds onsite have been constructed with composite lining systems designed and constructed similarly to that of the hazardous waste containment cells, which temporarily store leachate following extraction.

The leachate ponds are designed to speed evaporation of leachate and enable the concentration of the contaminants (including PFAS compounds) out of solution and into a sludge/residue that will then be directly recovered from the base of the pond. Once the PFAS contaminated sludge/residue is recovered this will then be transferred offsite to an EPA approved facility for final destruction of the PFAS compounds through thermal treatment technology.

As previously noted, SWR expects to only receive limited quantities of PFAS contaminated waste at the landfill facility therefore co-mingled waste streams and interactions with other contaminants are not considered to create an environmental issue onsite.

2.8 Air Quality

Issue: Effect on air quality and dust mitigation.

Response:

SWR already has operational air quality management and mitigation measures in place as standard process to prevent air quality issues that have the potential to cause offsite impacts. All the site operations which pose a dust or odour risk are managed in a systematic way applying the controls

provided for in the site's TAEMP and LEMP. These measures will equally apply to the receipt of any PFAS contaminated waste.

All incoming PFAS contaminated waste received at the McLaren Vale landfill will be received and handled at two dedicated locations onsite:

- PFAS waste for disposal: incoming PFAS contaminated waste will be directed to the active disposal area within cell 3 where site personnel will be ready to place the waste and commence application of daily cover of the deposited waste.
- PFAS waste for storage: incoming PFAS contaminated waste received for temporary storage and/or remediation will be transferred directly into the undercover waste treatment facility awaiting further process works to commence.

Air quality management and mitigation measures include a combination of vehicle traffic controls, and strict controls over active tipping areas and the application of daily cover. Frequent monitoring, inspections and audits of existing PFAS contaminated waste handling and management procedures will occur by SWR personnel to consider the requirement for introduction of any new dust suppression measures to be implemented onsite.

2.9 PFAS Waste Streams & Acceptance Regime

Issue: Respondents raised concern about how PFAS waste will be managed onsite.

Response:

In accordance with the EPA's guideline entitled '*Landfill Disposal Criteria for PFAS Contaminated Waste*' dated March 2020 (EPA 1125/20) PFAS impacted waste streams include:

- PFAS-contaminated soil;
- PFAS-contaminated activated carbon; and
- PFAS-contaminated sludge.

All incoming PFAS contaminated waste will be tested, assessed and classified by a suitably qualified and experienced environmental practitioner to confirm the chemical status of any PFAS contaminated waste prior to receipt at the site. A waste classification report will be provided to experienced SWR technical officers and approved for acceptance prior to any receipt of PFAS contaminated waste at the site.

Testing and assessment of incoming PFAS contaminated waste will occur in accordance with prevailing technical literature and best practice principles within the waste classification field. This documentation includes:

- EPA waste guideline '*Landfill Disposal Criteria for PFAS-Contaminated Waste*', March 2020 (EPA 1125/20)
- National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)
- EPA '*Standard for the Production and Use of Waste Derived Fill*', updated October 2013
- EPA '*Current Criteria for the Classification of Waste – including Industrial and Commercial Waste (Listed) and Waste Soil*', dated March 2010

The EPA has set strict PFAS contaminated waste and acceptance and disposal criteria (see **Table 1** below) that must be complied with by landfills approved to receive PFAS contaminated waste in South Australia. It is expected that the EPA will reflect the approved PFAS contaminated waste criteria within the site's EPA Licence 32682 which will be used as a primary point of compliance for the site.

Table 1 – SA EPA Approved PFAS Waste Disposal Criteria

Single Composite Lining Systems - Landfill Criteria		
Parameter	Dry Weight Conc. (mg/kg)	Leachate Conc. (ug/L)
PFOS + PFHxS	50	0.70
PFOA	50	5.60
Double Composite Lining Systems - Landfill Criteria		
Parameter	Dry Weight Conc. (mg/kg)	Leachate Conc. (ug/L)
PFOS + PFHxS	50	7
PFOA	50	56

2.10 PFAS Dedicated Facility

Issue: Respondents raised concerns that the site is a new facility, purpose built for PFAS contaminated waste.

Response:

The site has been in operation for almost 30 years, having received development approval and an EPA licence in 1993 to commence waste disposal activities. The site currently has the necessary development approvals and licences for:

- Waste recycling and resource recovery operations;
- Hazardous waste treatment and disposal operations;
- General waste disposal operations; and
- Organics processing and composting operations.

While it is intended that PFAS with low levels of contamination would be accepted at the site, subject to EPA requirements, it is expected to represent less than 5% of the total incoming waste. The cell will continue to receive and dispose of other waste streams, in addition to any PFAS contaminated waste, therefore it will not be a dedicated contaminated PFAS waste containment cell.

2.11 PFAS Waste Application Timeline

Issue: Concerns the approval process has been fast-tracked and hasn't undergone sufficient scrutiny.

Response:

The submission of SWR's PFAS Application followed the development of the PFAS National Environment Management Plan and coincided with the finalisation of the EPA's guideline entitled 'Landfill Disposal Criteria for PFAS-Contaminated Waste', March 2020 (EPA 1125/20). SWR's PFAS Application has been submitted in accordance with the EPA's procedural requirements and consistent with SWR's EPA licence conditions and the *Environment Protection Act 1993*. SWR has followed all due process.