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CONTAINMENT CELL LONG TERM MANAGEMENT PLAN

RAMBOLL

CONTAINMENT CELL
LONG TERM MANAGEMENT PLAN

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Date	**19/12/2017**
Made by	**S Taylor**
Checked by	**F Robinson**

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005	19/12/2017	S Taylor	F Robinson	F Robinson	Preliminary Containment Cell LTMP

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ACRONYMS AND ABBREVIATIONS

ACM	Asbestos containing material
ASW	Aluminium Smelter Waste
EHC Act	*Environmentally Hazardous Chemicals Act 1985*
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	Environment Protection Authority
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environment Protection Licence
Hydro	Hydro Aluminium Kurri Kurri Pty Ltd
LEP	Local Environmental Plan
LTMP	Long Term Management Plan, this plan
POEO Act	*Protection of the Environment Operations Act 1997*

GLOSSARY

Council	Cessnock City Council
Hydro	Hydro Aluminium Kurri Kurri Pty Ltd
Operation	The maintenance and monitoring of the Containment Cell following completion of the waste material placement, the capping of material and ancillary infrastructure.
Aluminium Smelter or The Smelter	The former Hydro Aluminium Kurri Kurri Pty Ltd aluminium smelter at Hart Road, Loxford

1. INTRODUCTION

This Containment Cell Long Term Management Plan (LTMP) provides a system to establish and maintain management controls for the Containment Cell to be located at the former Aluminium Smelter site at Hart Road, Loxford New South Wales (NSW).

1.1 The Containment Cell

The Containment Cell will be located within Lot 319 DP 755231 off Hart Road Loxford NSW. Further details on the location of the Containment Cell (such as a registered survey plan and surveyed locations of associated infrastructure) are provided in **Appendix 1**.

Upon completion it will cover approximately six hectares and include the following key characteristics:

- Base liner including clay liners, geosynthetic liners, a drainage layer and leachate collection layer and leachate collection sump.
- Dry entombment of waste materials comprising soils and wastes contaminated with a range of substances primarily including asbestos, fluoride, cyanide, and polycyclic aromatic hydrocarbons; and that have the ability to generate harmful gases primarily ammonia, but also methane.
- Multi-layered capping system, including clay liner, geosynthetic liner, top soils and vegetation cover.
- Drainage infrastructure and a ring road encircling the Containment Cell.
- Fencing or bollards (including a gate) to restrict vehicular access.

The as built design and documentation of the Containment Cell is provided in **Appendix 1**.

1.2 Outline of Long Term Activities

Following completion of the material placement, construction of the capping layer and the establishment of the vegetation, activities at the Containment Cell would be limited to the following categories:

- Visual inspections of the condition of the Containment Cell capping (including vegetation) and associated infrastructure
- Monitoring and reporting of key Containment Cell performance elements
- Contingency actions (such as maintenance and repairs) that may be required as a result of the outcomes of the inspections and monitoring

The inspection and monitoring activities are described in **Table 4-1**. The contingency action process required in response to identification of non-compliance during these inspections and monitoring is described in **Section 4.3**.

1.3 Objective of the LTMP

The objectives of the LTMP are to:

- Provide an easily interpreted reference document that outlines the environmental commitments, safeguards and management measures to be undertaken to provide for the ongoing integrity of the Containment Cell
- Incorporates the management requirements of:
  - Relevant legislation, regulations, planning instruments and licences (if applicable);
  - Commitments made in the Remediation Environmental Impact Statement (EIS), Response to Submissions Report, and the applicable conditions of the Development Consent
  - An active plan under Section 3.4.6 of *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme (3rd Edition)*
- Describe the mechanisms to be implemented to:
  - Restrict activities on the Containment Cell to prevent unacceptable development over the Containment Cell
  - Bind existing and future owners of the Containment Cell to implement this LTMP
  - Secure finances and insurance for the ongoing implementation of the monitoring, maintenance and contingency activities at the Containment Cell
- Provide a transparent reporting and review process (as outlined in this LTMP) to confirm the ongoing integrity of the Containment Cell for consideration by the Appropriate Regulatory Authority (ARA).

This LTMP has been prepared to inform the Development Consent process, and address the relevant requirements of the *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme (3rd Edition)*. The LTMP will be modified and finalised to reflect the relevant conditions of the Development Consent, any licences (where applicable) and any planning, property and funding mechanisms that may be implemented.

2. CONTAINMENT CELL MANAGEMENT CONTROLS

The management of the Containment Cell (through implementation of this LTMP) will be enforceable through the following mechanisms:

- The requirements of the:
  - Development Consent issued and implemented by the Department of Planning and Environment (the Department).
  - Conditions of any licences that may be issued and administered by the Environment Protection Authority (EPA).

  These are described in **Section 2.1**.
- Planning mechanisms that further bind the Containment Cell Owner to implement the LTMP and restrict what activities can occur on the Containment Cell. These are described in **Section 2.1.3**.

  The approvals and licences and the planning mechanisms will include financial security mechanisms to ensure that sufficient funding is available to implement the LTMP. These are described in **Section 2.3**.

Error! Reference source not found. identifies the available mechanisms, when they would be instigated and how they would apply to the long term management of the Containment Cell.

2.1 Approvals and Licences

The Development Consent and licences applicable to the ongoing management of the Containment Cell are provided in **Appendix 2**.

2.1.1 Development Consent

The Department of Planning and Environment (the Department) is expected to grant Development Consent for SSD 6666 (the remediation of the Smelter, including the construction and long term management of the Containment Cell) in 2018. The Development Approval is anticipated to include conditions relating to the long term management of the Containment Cell (as derived from the Department's model Development Consent Conditions for Waste and Remediation Projects) as follows:

CAPPING MAINTENANCE PLAN

XX. The Applicant must prepare and implement a Capping Maintenance Plan for the site. This plan must:

a) Describe the procedures that would be implemented to ensure the integrity of the cap is maintained over time, notwithstanding any proposal to either redevelop the site or leave it vacant; and

b) Describe the procedures that would be implemented to ensure that any part of the cap that is disturbed during any activities on the site is reinstated and maintained to comply with the requirements in Condition XX.

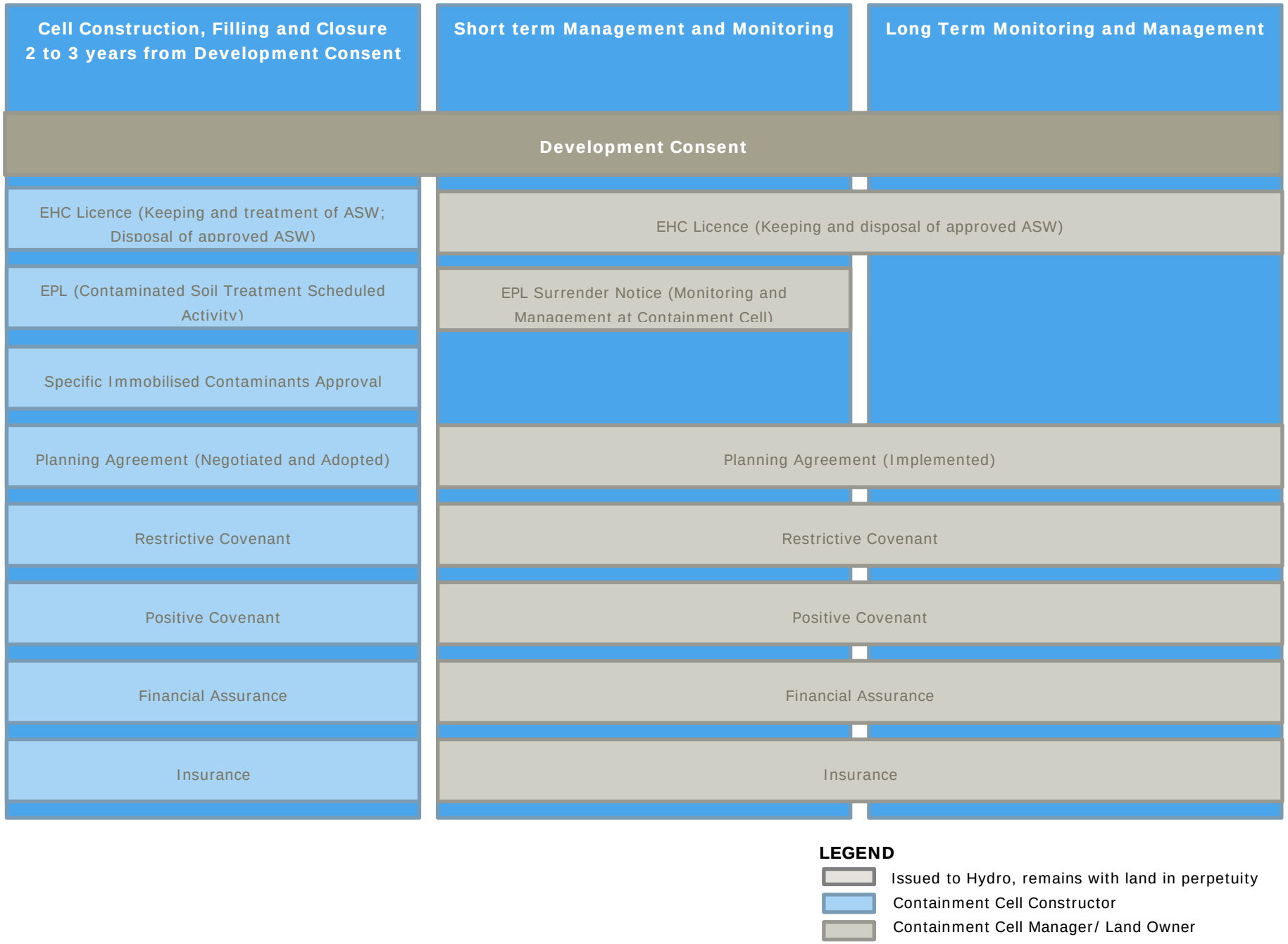
This LTMP addresses this condition.

In addition the Development Consent is expected to include conditions which impose the following obligations to ensure the environmental performance of the Containment Cell:

- Arrangement of a positive covenant
- The registration of a restrictive covenant against the Containment Cell land
- The requirements of a voluntary planning agreement

These are discussed further in **Section 2.1.3**.

Figure 2-1: Containment Cell Regulation Mechanisms



2.1.2 Licences

The Environment Protection Authority (EPA) will be responsible for administering two licences to regulate the Containment Cell:

- Environment Protection Licence (EPL) under the *Protection of the Environment Operations Act 1997* (POEO Act).
- A Licence granted under the *Environmentally Hazardous Chemicals Act 1985* (EHC Act) to permit activities under the Aluminium Smelter Waste Chemical Control Order (EHC Licence).

The EPA will also issue a Specific Immobilised Contaminants Approval under the *Protection of the Environment Operations (Waste) Regulation 2014*. This approval only includes conditions that apply to the placement of the material within the Containment Cell; it does not include conditions relating to the ongoing management of the material and the Containment Cell.

2.1.2.1 Environment Protection Licence

The EPL will address the following key aspects (which have been addressed in this LTMP):

- The scheduled activities (as listed in Schedule 1 of the POEO Act) that are permitted to occur, and regulated under, the EPL.
- The monitoring, inspection and reporting requirements to assess and report on the performance of the Containment Cell. **Table 4-1** reflects the monitoring and inspection requirements of an EPL. **Section 5.1** identifies the reporting requirements of an EPL.
- The planning and property mechanisms (refer to **Section 2.1.3**) and the financial security mechanisms (refer to **Section 2.3**) to restrict the type of activities that can occur on the Containment Cell, and secure the funding to implement the requirements of the EPL.
- The process for determining that the Containment Cell is operating as designed and therefore:
  - The licence can be surrendered (in accordance with Section 80 of the POEO Act).
  - Monitoring can be modified or ceased.

2.1.2.2 EHC Licence

An EHC Licence is required for the disposal of approved aluminium smelter waste under the Aluminium Smelter Waste Chemical Control Order. This applies to the material contained within the Containment Cell.

The EHC Licence will (proposed to be consistent with this LTMP):

- Need to be renewed after one year by the Containment Cell Land Owner, but can be held in perpetuity (without need for renewal) following this initial renewal (in accordance with Section 30 of the EHC Act).
- Include conditions relating to:
  - The design, construction and long term management of the Containment Cell.
  - Monitoring and reporting, consistent with the requirements of the EPL (and as described in **Table 4-1** and **Section 5.1**).

2.1.3 Site Auditor Statement

As a condition of the Secretary's Environmental Assessment Requirements for the Remediation EIS, a Site Auditor Statement is to be attained for the Containment Cell. Under the *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme (3rd Edition)* a number of items are to be considered by the Auditor before issuing the Site Audit Statement:

- The requirements of environmental management plans for the management of contaminated sites (including containment cells)
- The characteristics of the proposed on site containment and capping of contaminated soils
- That the management of chemicals and wastes controlled by chemical control orders is in accordance with the *Environmentally Hazardous Chemicals Act 1985* (which includes aluminium smelter waste)
- Groundwater remediation and management
- Hazardous ground gas remediation and management.

This LTMP addresses the requirements if these issues.

2.2 Planning and Property Mechanisms

Copies of the planning and property mechanisms applicable to the Containment Cell Land and its long term management are provided in **Appendix 3**.

These mechanisms will be established through the Development Consent and the EPL as described in **Section 2.1** and will continue to apply to the Containment Cell Land in perpetuity. It is proposed that these mechanisms will reflect the requirements of this LTMP and provide the mechanism by which implementation of the LTMP will continue to be required and enforced.

2.2.1 Restrictive Covenant

2.2.1.1 Limits on Use of Containment Cell Land

A restrictive covenant (pursuant to section 88E of the *Conveyancing Act 1919*) constrains any development from being carried out on the Containment Cell Land that presents a risk of adverse impacts on the cap structure of the Containment Cell.

2.2.1.2 Limits on Divestment of Containment Cell Land

The restrictive covenant contains a mechanism which restricts the Containment Cell Owner from transferring the Containment Cell Land to a third party unless the third party satisfies the ARA that it has the financial capacity to comply with all the long term management obligations for the Containment Cell. The financial capacity requirements were developed in consultation with the EPA prior to surrender of the EPL, including those described in Section **Section 2.3**.

The restrictive covenant would be registered against the title to the land and bind, and be enforceable by the ARA against the Containment Cell Land Owner.

2.2.2 Positive Covenant

A positive covenant (pursuant to Section 88E of the *Conveyancing Act 1919*) is imposed on the Containment Cell Land by the ARA, placing restrictions on the use of that property.

In addition (pursuant to Section 88BA of the *Conveyancing Act 1919*) the positive covenant includes a requirement for maintenance and repair (if required) of the property (as described in **Table 4-1**).

The ARA will be responsible for enforcement of a positive covenant.

2.2.3 Planning Agreement

The planning agreement will operate from the date of surrender of the EPL to regulate the long term environmental management of the Containment Cell. The terms of agreement of the planning agreement will be approved prior to determination of the Development Consent.

Environmental protection measures (including financial assurance obligations) included in the planning agreement are generally consistent with the conditions of the EPL, as amended to address the findings of an environmental performance review report (refer to **Section 5**).

The planning agreement is expected to:

- Specify that a suitably qualified consultant has been engaged to undertake the long term environmental management of the Containment Cell (the Containment Cell Manager)
- Restrict the Containment Cell Land Owner from transferring the Containment Cell land to a third party unless:
  (i) The third party first enters into a deed agreeing to comply with all the obligations in relation to long term management of the Containment Cell as if it were the land owner; and
  (ii) The existing Containment Cell Land Owner satisfies the ARA that the proposed transferee has the financial capacity to comply with the obligations in relation to long term environmental management of the Containment Cell (including those described in **Section 2.3**).

The planning agreement will be registered against the title to the land and be binding on, and enforceable against, the Containment Cell Owner.

2.3 Financial Security Mechanisms

Copies of the financial security mechanisms applicable to the Containment Cell Land and its long term management are provided in **Appendix 4**.

The following mechanisms are expected to be required to ensure the necessary funding is available for the long term management of the Containment Cell:

- Financial assurance to secure the performance of the environmental obligations set out in the LTMP.
- A policy/ policies of insurance for the payment of costs for clean-up action, and for claims for compensation or damages, resulting from pollution caused by the inadequate management, design or construction of the Containment Cell.

These mechanisms will initially be established through the EPL as described in **Section 2.1.2.1** and will continue to apply to the Containment Cell Land in perpetuity. The conditions relating to maintaining and accessing the financial assurance and the insurance will also be documented in the planning agreement (as described in **Section 2.2.3**) to ensure that they continue to be available when the EPL is surrendered.

3. MANAGEMENT ROLES AND RESPONSIBILITIES

The parties responsible for the implementation of the Containment Cell LTMP are described in **Table 3-1**.

Table 3-1: LTMP Roles and Responsibilities

Party	Responsibilities
Containment Cell Manager	• All inspections, monitoring and contingency actions (if required) as described in **Section 4**. • Report on the performance of the Containment Cell and the LTMP as described in **Section 5.1** • Review of the performance of the LTMP, including a review of the inspection and monitoring results, to determine if the LTMP requires revision (as described in **Section 5.2** and **Section 5.3**)
Containment Cell Owner	• Management of, and compliance with, the Containment Cell Management Controls described in **Section 2**.
Containment Cell Constructor	• Any damage resulting from, and repairs required to be made to the Containment Cell due to, inadequate design, inadequate construction and material placement as well as after construction, as notified by, and as agreed with, the Containment Cell Owner.
Appropriate Regulatory Authority	• Implementation of the applicable property, planning and funding mechanisms. • Review the reports (as required) prepared in response to a non-compliance.
Site Auditor	• Issue the Site Audit Statement upon completion of the Containment Cell. • Review the reports (as required) prepared in response to a non-compliance.

4. INSPECTIONS AND MONITORING

4.1 Inspections

Inspections of various elements of the Containment Cell would be undertaken in accordance with the schedule outlined in **Table 4-1**. The regularity of the inspections is based on the potential risks associated with the particular elements.

Inspections would be undertaken by:

- The Containment Cell Construction Contractor during the Containment Cell vegetation layer establishment,
- The Containment Cell Manager for all remaining elements and following completion of vegetation layer establishment.

4.2 Monitoring

The Containment Cell Manager will undertake monitoring as described in **Table 4-1** to determine that the Containment Cell is: functioning in accordance with the design; not resulting in a detrimental environmental impact; functioning in compliance with relevant approvals and licences.

Environmental monitoring will be undertaken by suitably qualified and experienced personnel accepted by NSWEPA under the *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme (3rd Edition)* and NEPM Schedule B(9) (and their successors as applicable), in accordance with relevant procedures and guidelines (or their future equivalents as applicable), including but not limited to:

- Guidelines that are made under Section 105 of the CLM Act
- *Approved Methods for Sampling and Analysis of Water Pollutants in NSW* (EPA, 2004).
- Australian Standard AS 5667.1:1998 *Water Quality – Sampling – Part 1: Guidance on the Design of Sampling Programs, Sampling Techniques and the Preservation and Handing of Samples* (Standards Australia, 1998).
- *Standard Methods for the Examination of Water and Waste Water*, 20th Edition, section 1060 (American Public Health Association, 1998).
- *Approved Methods for Sampling of Air Pollutants in New South Wales Guideline* (DEC, 2007).

The monitoring results will be collated, reported and retained in accordance with the requirements outlined in **Section 2**.

4.3 Contingency Response

There is the potential that the monitoring or inspections identify potential non-compliances with the LTMP (and therefore the Development Consent, any applicable licences and the CLM Act).

A Containment Cell Risk Workshop identified cell performance risks that may occur in the future and evaluated these in accordance with a risk ranking process. Mitigation measures were developed and have been incorporated in Table 4-2 of the LTMP. The Risk Register has been included in **Appendix 8**.

If the inspections or monitoring identify non-compliance, one of the following will be undertaken (as specified in **Table 4-2**):

1. Implementation of the specific remedial action to repair or replace readily identifiable damage to infrastructure
2. Where a specific remedial action is not readily identifiable, the following process (identified as **Contingency Process** in **Table 4-2**) will be implemented:
    - Implement temporary safety and environmental controls (as appropriate) to control environmental impacts and/ or potential safety risks resulting from the non-compliance
    - Review the notification requirements of the approvals and licences described in **Section 2** and report the incident if/ as required.
    - Investigation of the potential source/ sources of the non-compliance
    - Assess the environmental and safety risk associated with the impacts of the non-compliance
    - Develop and implement a Contingency Strategy to address the non-compliance

- Assess the performance of the Contingency Strategy implementation in addressing the non-compliance
- Prepare and submit a report that describes this process and its outcomes. The report will be submitted to one or more of the following (as required by the CLM Act, the Development Consent and/ or any applicable licences):
    - The Containment Cell Land Owner and/ or the Containment Cell Constructor (as appropriate based on the cause of the non-compliance)
    - The ARA (where required by the Development Consent and/ or any applicable licences)
    - The Site Auditor

Table 4-1: Containment Cell Inspection and Monitoring Requirements

Issue / Key Task	Inspection / Monitoring Activity	Indicative Frequency	Person / s Responsible
Containment Cell Vegetation Cover			
To inspect the condition of the Containment Cell vegetation cover	Undertake a Containment Cell walkover to determine that:		
	• Appropriate coverage is maintained (following the initial 52 week contractor maintenance period)	• Quarterly (for two years following 52 week maintenance period) • Annual thereafter • Immediately (within 24 hours) following a 5% Annual Exceedance Probability or greater storm event as determined by BOM 061260, Cessnock Airport • Immediately following an earthquake event of a magnitude of ≥ 5 recorded within a 20km radius • In response to a report of potential damage • In response to a bushfire reported within 500 metres of the Containment Cell	Containment Cell Manager
	• Inappropriate plants (such as deep rooted tree species) have not propagated on the capping layer	• Annual	Containment Cell Manager
	• Vehicle damage to surface layers from motorcycles and/or cars	• In response to a report of potential damage	Containment Cell Manager
	• Grazing animals (or evidence of their presence) on the Containment Cell	• Monthly (for first 12 months) • Quarterly (for following two years) • Annual (upon completion of quarterly monitoring)	Containment Cell Manager
Containment Cell Capping			
Inspect the condition of the Containment Cell capping	Undertake a Containment Cell walkover to determine that: • The capping layers are stable: no visual evidence that slumping or erosion is occurring along the top surface layer or water egress is occurring out through the surface layer (i.e. piping)	• Annual • Immediately following a 5% Annual Exceedance Probability or greater storm event as determined by BOM 061260, Cessnock Airport • Immediately following an earthquake event of a magnitude of ≥ 5 recorded within a 20km radius • In response to a report of potential damage	Containment Cell Manager
Containment Cell Infrastructure			
Inspect the condition of the Containment Cell gas vents	Undertake a visual inspection to determine that the gas vents are undamaged	• Quarterly (when gas monitoring undertaken) • Annual (following cessation of gas monitoring) • In response to a report of potential damage	Containment Cell Manager

Issue / Key Task	Inspection / Monitoring Activity	Indicative Frequency	Person/s Responsible
Inspect the condition of the safety barrier fencing/ bollards restricting vehicular access to the Containment Cell	Undertake a visual inspection to determine that the safety barrier fencing/ bollards and gate are in a safe and working condition to suitably restrict vehicular access	• Annual • Immediately following an earthquake event of a magnitude of ≥ 5 recorded within a 20km radius • In response to a report of potential damage	Containment Cell Manager
Inspect the condition of the on site water treatment plant to be used for leachate treatment whilst the water treatment plant remains on site	Inspect the treatment plant as required by the manufacturer Undertake the scheduled maintenance activities as required by the manufacturer	• In accordance with manufacturer's operating manual until decommissioning of the on-site water treatment plant	Containment Cell Manager
Assess the water quality discharged from the on site water treatment plant following leachate treatment whilst the water treatment plant remains on site	Undertake treated leachate monitoring in accordance with the procedure included in **Appendix 5 (to be developed)** Compare analysis results to criteria included in **Appendix 5 (to be developed)**	• Prior to discharge from water treatment plant until decommissioning of the on-site water treatment plant	Containment Cell Manager
Inspect the Containment Cell final perimeter road	Inspect the condition of the Containment Cell perimeter road for damage and is fully accessible	• Annual • Immediately following a 5% Annual Exceedence Probability or greater storm event • Immediately following an earthquake event of a magnitude of ≥ 5 recorded within a 20km radius	Containment Cell Manager
Leachate Monitoring			
Inspect the leachate collection system for the generation of leachate	Following the Standard Operating Procedure **Appendix 5 (to be developed)**	• Monthly for the first 12 months following completion of deposition and install of cap, followed by quarterly Review frequency and continuance of monitoring depending on results in accordance with **Section 5.2**. • One week following a 5% Annual Exceedence Probability or greater storm event • One week following an earthquake event of a magnitude of ≥ 5 recorded within a 20km radius	Containment Cell Manager

Issue / Key Task	Inspection / Monitoring Activity	Indicative Frequency	Person / s Responsible
Groundwater Leak Monitoring			
Monitoring the subsurface groundwater sump	Using a hand held probe, monitor water quality changes within the groundwater sump and water quantity in accordance with the procedure in **Appendix 6 (to be developed)**	• Monthly for the first 12 months following completion of deposition and installation of the cap, followed by quarterly Review frequency and continuance of monitoring depending on results in accordance with **Section 5.2**. • One week following a 5% Annual Exceedence Probability or greater storm event • One week following an earthquake event of a magnitude of ≥ 5 recorded within a 20km radius	Containment Cell Manager
Gas Monitoring			
Monitor the gases generated from the Containment Cell	Undertake Containment Cell gas monitoring in accordance with the procedure included in **Appendix 7 (to be developed)**	• Quarterly Review frequency and continuance of monitoring depending on results in accordance with **Section 5.2.**	Containment Cell Manager

Table 4-2: Containment Cell Contingency Response

Issue	Potential Cause/s	Management Control	Possible Strategy/ Strategies	Follow Up Monitoring/ Response	Person/s Responsible
Containment Cell Capping					
Physical damage to the Containment Cell capping is identified during visual inspection	• Vandalism and/ or public activities • Erosion/ slippage • Material Settlement	Contingency Process	• Reconstruct the damaged capping layer/s	As required by the Contingency Strategy	Containment Cell Manager
Containment Cell Vegetation Cover					
Vegetation cover is not appropriately established	• Drought/ low rain • Disease • Excessive animal grazing • Inappropriate plant species used • Bushfire • Vandalism and/ or public activities	Contingency Process	• Topsoil reconditioning • Irrigation/ watering of vegetation • Additional planting • Replant with suitable species • Use of herbicides/ pesticides	As required by the Contingency Strategy	Containment Cell Manager
Vegetation cover is not maintained as required	• Drought/ low rain • Disease • Excessive animal grazing • Inappropriate plant species used • Bushfire • Vandalism and/ or public activities	Contingency Process	• Topsoil reconditioning • Irrigation/ watering of vegetation • Additional planting • Replant with suitable species • Use of herbicides/ pesticides	As required by the Contingency Strategy	Containment Cell Manager
Propagation of inappropriate vegetation species	• Seeds of trees/ deep rooted species spread from surrounding area to Cell and germinates	• Physically remove inappropriate vegetation species, ensuring that roots have been removed. • Minimise damage to vegetation to be retained. • Compact soils if they have been loosened/ disturbed through plant removal. • Cover disturbed weed removal area with mulch.	Refer to Management Control	When undertaking vegetation cover annual inspection, revisit removal area to confirm that no regrowth has occurred or seedlings have propagated	Containment Cell Manager
Grazing animals (or evidence of their presence) are identified on the Containment Cell		• Contingency Process	• Permitted animal control • Installation of fencing around the Containment Cell	As required by the Contingency Strategy	Containment Cell Manager
Containment Cell Infrastructure					
Inspection identifies damage to gas vents	• Vandalism and/ or public activities (damage to or blocking of vent) • Storm damage • Bushfire	Damage to gas vent repaired by an appropriately qualified person	Refer to Management Control	Inspect following completion of repairs to confirm repairs have been satisfactorily completed	Containment Cell Manager
Inspection identifies damage to barrier fencing/ bollards, including gate	• Vandalism and/ or public activities • Storm damage • Erosion • Vehicle Accident • Bushfire	Damage to barrier fencing/ bollards repaired by an appropriately qualified person	Refer to Management Control	Inspect following completion of repairs to confirm repairs have been satisfactorily completed	Containment Cell Manager
Inspection identifies that unauthorised vehicular access to the Containment Cell has occurred	• Damage to fencing/ bollards (as above) • Unsuitable design of barrier fencing/ bollards	Contingency Process	• Damage to barrier fencing/ bollards repaired by an appropriately qualified person • Identify location/s of breach and make required changes to the barrier fencing/ bollards	As required by the Contingency Strategy	Containment Cell Manager
Inspection identifies the need for maintenance of the on site water treatment plant Equipment supplier's/ Manufacturer's operating manual includes scheduled maintenance tasks	• Scheduled maintenance • Parts and chemical/ oils replacement • Damaged parts	Maintenance undertaken by an appropriately qualified person in accordance with equipment supplier's/ manufacturer's (as applicable) operating manual	Refer to Management Control	Inspect following completion of repairs to confirm repairs have been satisfactorily completed	Containment Cell Manager
Inspection identifies damage to the Containment Cell perimeter road that makes it inaccessible for maintenance vehicles	• ~~Inadequate construction~~ • Storm damage • Erosion	Road repairs undertaken by an appropriately qualified person to a the as-built standard	Refer to Management Control	Inspect following completion of repairs to confirm repairs have been satisfactorily completed	Containment Cell Manager

Issue	Potential Cause/s	Management Control	Possible Strategy/ Strategies	Follow Up Monitoring/ Response	Person/s Responsible
Leachate					
Monitoring identifies that leachate is at a level requiring removal and treatment	• Residual moisture within the material has entered the leachate collection system	Leachate is removed and treated using one of the following methods:			
		• A licensed waste contractor would collect in truck for off-site treatment and disposal.	Refer to Management Control	Contractor required to provided waste dockets/ evidence of licensed treatment and disposal	Containment Cell Manager
		• Treated by an on site water treatment plant prior to discharge.		Implementation of treated leachate monitoring as described in **Table 5-1.**	Containment Cell Manager
Monitoring identifies that leachate volume is increasing outside of naturally expected variation as determined by a statistical test	• Excess water entered the material during material placement and cap construction • Moisture remains within the Containment Cell • Breach of all the Containment Cell capping layers	Contingency Process	• Review rainfall/ climate data for material placement period to assess likelihood of excess moisture in the material • Increased rate of leachate monitoring, pump out and treatment. • Identify and repair breaches to damaged Containment Cell capping layers if required	As required by the Contingency Strategy	Containment Cell Manager
Monitoring identifies that leachate extraction points are damaged and inaccessible	• Damage due to vandals or truck movement	Contingency Process	• Repair pipework		
Gas					
Monitoring identifies: • LELs for any gases are reached or exceeded OR • Ammonia concentrations are ≥15% overall gas discharges AND • Concentrations have increased over four monitoring rounds as determined by a statistical test.	• Moisture remains within the Containment Cell • Gas capture and ventilation system damaged	Contingency Process	• Assess risk to human health and the environment as well as containment cell performance • Install new (taller or additional) gas ventilation stack • Install scrubbers • Pump out of gas from the Containment Cell • Prohibit public access to the top of the Containment Cell	Continue gas monitoring as described in **Table 5-1**	Containment Cell Manager
Monitoring identifies that gas concentrations and/or volume is increasing outside of naturally expected variations as determined by a statistical test	• Moisture remains within the Containment Cell • Gas capture and ventilation system damaged	Contingency Process	• Assess risk to human health and the environment as well as containment cell performance • Install new (taller or additional) gas ventilation stack • Install scrubbers • Pump out of gas from the Containment Cell • Prohibit public access to the top of the Containment Cell	As required by the Contingency Strategy	Containment Cell Manager
Groundwater Leak					
Monitoring identifies leachate has entered the groundwater sump	• Breach of all the Containment Cell base layers	Contingency Process	• Assess risk to human health and the environment as well as containment cell performance • Identify potential location/s of breach to Containment Cell base layers • Implement pump out and treatment of groundwater sump if required. • Assess capping system currently in-place	As required by the Contingency Strategy	Containment Cell Manager

5. PERFORMANCE REPORTING AND AUDITING

5.1 Reporting

5.1.1 Annual Return

The EPL will require the preparation and submission of an Annual Report in accordance with the POEO Act that includes the following:

- Statement of Compliance
- Monitoring and Complaints Summary
- Statement of Compliance - Licence Conditions
- Statement of Compliance - Load based Fee
- Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan
- Statement of Compliance - Requirement to Publish Pollution Monitoring Data
- Statement of Compliance - Environmental Management Systems and Practices.

This reporting is expected to be required for as long as the EPL is in place, and for a period after a Surrender Notice has been issued (as a condition of the surrender).

5.1.2 Incident Reporting

Under the EPL and the POEO Act the EPA must be notified of incidents that have the potential to cause environmental harm. In addition, the CLM Act imposes a Duty to Report contamination as soon as practical following becoming aware of the contamination.

As part of the Contingency Process (refer to **Section 4.3**) the Containment Cell Manager will need to determine (in accordance with a Pollution Incident Response Management Plan) if the EPA needs to be notified of an incident at the Containment Cell and/ or contamination beyond the Containment Cell.

5.1.3 Retention of Monitoring Results

The Containment Cell Manager will be required to maintain a record of all monitoring results for the Containment Cell as required by the Development Consent, any licences issued by the EPA or the other mechanisms described in Section 2 of this LTMP.

5.2 Performance Auditing

Table 4-1 identifies monitoring activities and with indicative monitoring frequencies. Over time monitoring may show certain conditions that would support a reduction in monitoring frequencies.

Table 5-1 identifies parameters and the conditions that should be met to support a reduced monitoring frequency. In some circumstances the need to continue monitoring would be assessed. These parameters and conditions will be described in the EPL.

Table 5-1: Monitoring Parameters and Condition to Reduce Monitoring Frequency

Monitoring Parameter	Current Frequency	Condition	Proposed Revised Frequency
Gas	Quarterly	Methane <5% Ammonia <50ppm And a stable or decreasing trend	Annual (five years) Cease after five years of complying with trigger levels
Leachate	Quarterly	Volume of leachate being generated is determined to be stable or decreasing with time	Annual Cease after five years of no leachate generation
Groundwater Leak	Quarterly	pH <8.0 F <15mg/L	Annual

5.3 LTMP Review and Improvement

A review of the performance of the LTMP will be undertaken:

- Biennially for the first ten years following completion of the Containment Cell.
- Following a breach of or non-compliance with the LTMP.

Where a breach of or non-compliance with the LTMP has occurred, the review will be required to identify if a change to the relevant procedures (as described in **Table 4-1**) or management controls of the LTMP is required.

At these review periods, the LTMP will also be revised to incorporate any changes in regulation that apply to the management of the Containment Cell.

If the LTMP is amended, the Containment Cell Manager will be responsible for the Control Copy and will provide a copy of the revised LTMP to:

- Containment Cell Land Owner.
- Containment Cell Constructor.
- EPA.
- Department of Planning and Environment.

6. KEY REFERENCES

Ramboll Environ. 2016. *Environmental Impact Statement: Former Hydro Aluminium Kurri Kurri Smelter Demolition and Remediation*.

Guidance documents referenced in Section 105 of the Contaminated Land Management Act.

7. LIMITATIONS

Ramboll Environ Australia Pty Ltd prepared this report in accordance with the scope of work as outlined in our proposal to Hydro Aluminium Kurri Kurri Pty Ltd dated October 2017 and in accordance with our understanding and interpretation of current regulatory standards.

Site conditions may change over time. This report is based on conditions encountered at the site at the time of the report and Ramboll Environ Australia Pty Ltd disclaims responsibility for any changes that may have occurred after this time.

The conclusions presented in this report represent Ramboll Environ Australia Pty Ltd's professional judgment based on information made available during the course of this assignment and are true and correct to the best of Ramboll Environ Australia Pty Ltd's knowledge as at the date of the assessment.

Ramboll Environ Australia Pty Ltd did not independently verify all of the written or oral information provided to Ramboll Environ Australia Pty Ltd during the course of this investigation. While Ramboll Environ Australia Pty Ltd has no reason to doubt the accuracy of the information provided to it, the report is complete and accurate only to the extent that the information provided to Ramboll Environ Australia Pty Ltd was itself complete and accurate.

This report does not purport to give legal advice. This advice can only be given by qualified legal advisors.

7.1 User Reliance

This report has been prepared for Hydro Aluminium Pty Ltd for their information and for their use in negotiations with government agencies, the Site Auditor and potential Containment Cell Owners. It may not be relied upon by any other person or entity without Ramboll Environ Australia Pty Ltd's express written permission.

APPENDIX 1
CONTAINMENT CELL AS BUILT DESIGN DRAWINGS
(to be included when completed)

APPENDIX 2
APPROVALS AND LICENCES
(to be included upon granting)

APPENDIX 3
CONTAINMENT CELL PLANNING AND PROPERTY MECHANISMS
(to be developed)

APPENDIX 4
CONTAINMENT CELL FUNDING MECHANISMS
(to be developed)

APPENDIX 5
LEACHATE MONITORING PROCEDURE
(to be developed)

APPENDIX 6
GROUNDWATER SUMP MONITORING PROCEDURE
(to be developed)

APPENDIX 7
GAS SAMPLING PROCEDURE
(to be developed)

APPENDIX 8
CONTAINMENT CELL RISK REGISTER

Hydro Containment Cell Risk Register 16 November 2017

High Risk	Medium Risk	Low Risk
RR ≥ 10	5 ≤ RR < 10	RR < 5

"L = Likelihood" "S = Severity" "RR = Risk Rating"

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#	Potential Risk	Potential Causes or Key Contributing Factors	Initial Risk L	S	RR	Mitigation Measures / Responsibility (i.e. how to mitigate the "Initial Risk")	Residual Risk L	S	RR	Management Measures / Responsibility (i.e. how to manage the "Residual Risk")
1.1	Increased leachate (following steady state hand-over to O&M provider)	Rainfall event	4	2	8	• Constructed as designed • Effective mitigation of other key risks (e.g. vandalism, fauna, flora)	4	2	8	Ensure weather event forecatsing is part of management process and awareness.
1.2		Cap integrity	2	5	10		1	5	5	Visual monitoring of cap for damage is part of management process
1.3		Liner integrity	2	2	4		1	2	2	Monitoring of Leachate in 4 x primary collection sumps, leak detection sumps, groundwater sumps. This as prrt of the management process will demonstrate trends and trigger the appropriate management actions.
2.1	Failure of leachate piping/pumping systems	Blockage/Calcification	3	3	9	• Constructed as designed • Sufficient frequency of monitoring / inspections • Repair damage from construction activities before completing cap • Careful execution of maintenance works	2	2	4	Regular monitoring and pumping as part of the management process would identify blockages. Camera inspection if blockages found and or starting to form could be identified and managed through mechanical clearing and or back flushing.
2.2		Displacement	3	3	9		2	2	4	Visual monitoring of cap for surface displacement is part of management process. Repairs would be part of capital works.
2.3		Breakage (over time)	4	3	12		3	2	6	Regular monitoring and pumping as part of the management process would identify failues of the piping/pumping access to sumps. Camera inspection if blockages found and or starting to form could be identified and managed through mechanical clearing and or back flushing.
2.4		Installation damage	3	3	9		1	3	3	Quality assurance by Hydro, Hydro Contractor and GHD design.
2.5		Reverse flow	3	3	9		2	2	4	Monitoring of Leachate in 4 x primary collection sumps, leak detection sumps, groundwater sumps. This as part of the management process will demonstrate trends and trigger the appropriate management actions.
2.6		Bush fire	3	3	9		2	3	6	Ensure that bush fire awareness is part of the management process. Management of vegetation on containment cell and surrounding area as part of management process. Develop a bush fire management plan in conjuction with local authorities. Maintain Cap vegetation regularly that so it would not promote propagation of grass fires from embers.
3.1	Increased gas production (requiring capture rather than natural venting	Rainfall event	4	1	4	• Constructed as designed • Effective mitigation of other key risks (e.g. vandalism, fauna, flora)	4	1	4	Quality assurance by Hydro, Hydro Contractor and GHD design and construction. Note that leachate generation performance will drive handover conditions
3.2		Cap integrity	2	5	10		1	5	5	Quality assurance by Hydro, Hydro Contractor and GHD design
3.3		Liner integrity	2	2	4		1	2	2	Quality assurance by Hydro, Hydro Contractor and GHD design
4.1	Gas not venting	Blockage in vent system	2	2	4	• Constructed as designed • Sufficient frequency of monitoring / inspections	2	2	4	Regular monitoring of gas collection system for consistancy in gas levels recorded.
4.2		Displacement/Subsidence	3	2	6		3	2	6	Quality assurance by Hydro, Hydro Contractor and GHD design
4.3		Fundamental blockage (i.e. explosive)	1	5	5		1	5	5	Regular monitoring of gas collection system for consistancy in gas levels recorded.
5.1	Change in Regulation	Revocation of permission to retain waste in an onsite cell	1	5	5	• Robust record keeping so as to evidence compliance in a risk-based approach • Pro-active stakeholder engagement and community management	1	5	5	
5.2		Restriction on off-site disposal of leachate	1	5	5		1	5	5	
5.3		Increase in monitoring / reporting obligations	4	3	12		3	2	6	Management process has reporting levels at least at the level EPA + stakeholders require which is timely and informative.
5.4		Change in licensing costs	3	2	6		2	2	4	Management process has reporting levels at least at the level EPA + stakeholders require which is timely and informative.
6.1	Failure of (all) Liners (and recording of leachate in GW	Earthquake	1	5	5	• Selection of a Geologically stable site • Selection of a naturally contained site (i.e. 1000 year migration timeline of leachate to nearest water tributary)	1	5	5	Monitoring of Leachate in 4 x primary collection sumps, leak detection sumps, groundwater sumps. This as part of the management process will demonstrate trends and trigger the appropriate management actions.

Hydro Containment Cell Risk Register 16 November 2017

High Risk	Medium Risk	Low Risk
RR ≥ 10	5 ≤ RR < 10	RR < 5

"L = Likelihood" "S = Severity" "RR = Risk Rating"

	recording of leachate in GW outside of cell)					water tributary)					
6.2		Compounding failure of individual elements (NB: refer to risk assessments for cap and liner integrity)	2	5	10	• Constructed as designed • Maintained and regularly monitored as specified	1	5	5	Monitoring of Leachate in 4 x primary collection sumps, leak detection sumps, groundwater sumps. This as prrt of the management process will demonstrate trends and trigger the appropriate management actions.
7.1	Failure of vegetation over cap	Drought	3	2	6	• Planting drought tolerant species • Ongoing vegetation maintenance • Maintaining bushfire buffer zones	2	2	4	Regular visual monitoring of the cap vegetation. Ensure weather fortcasting and rainfall levels is part of management process and awareness. Develeop drought plan with triggers for short term irrigation of the cap vegetation.
7.2		Bush fire	3	3	9		2	3	6	Ensure that bush fire awareness is part of the management process. Management of vegetation on containment cell and surrounding area as part of management process. Develop a bush fire management plan in conjuction with local authorities. Maintain Cap vegetation regularly that so it would not promote propagation of grass fires from embers.
7.3		Natural term of life	4	1	4		4	1	4	Regular visual monitoring of the cap vegetation. Replace areas of dead or failing cap vegetation as part of management process.
8.1	Subsidence (of the Cap)	Settlement of contents	2	4	8	• Constructed as designed	2	4	8	Quality assurance by Hydro, Hydro Contractor and GHD design and construction. Regular visual inspection of the cap for surface displacement.
9.1	Vandalism	Trail Bike Riders	3	2	6	• Maintained and regularly monitored as specified	2	2	4	Regular visual monitoring of cap integrity, security of containmenmt cell area to be to be part of management plan.
10.1	Fauna Damage	Grass eating animals (removing vegetation)	4	1	4	• Maintained as specified, including pest control measures	3	1	3	Regular visual monitoring of cap integrity to be to be part of management plan.
10.2		Burrowing animals (compromising the Cap)	3	2	6		2	2	4	Regular visual monitoring of cap integrity to be to be part of management plan.
11.1	Water Ingress	(Major) rainfall event	2	3	6	• Constructed as designed	2	3	6	Quality assurance by Hydro, Hydro Contractor and GHD design and construction. Note that leachate generation performance will drive handover conditions
11.2		Flooding	1	3	3		1	3	3	Ensure weather event fortcatsing is part of management process and awareness. Monitoring of Leachate in 4 x primary collection sumps, leak detection sumps, groundwater sumps. This as part of the management process will demonstrate trends and trigger the appropriate management actions.
12.1	Destablising of cap	Deep rooted trees	3	3	9	• Planting shallow rooting species • Removing inappropriate species as saplings	1	3	3	Regular visual monitoring of the cap vegetation.