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RESPONSE TO SUBMISSIONS REPORT FORMER HYDRO ALUMINIUM KURRI KURRI SMELTER REMEDIATION

RAMBOLL

RESPONSE TO SUBMISSIONS REPORT
FORMER HYDRO ALUMINIUM KURRI KURRI SMELTER REMEDIATION

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1. INTRODUCTION

1.1 Overview

Hydro Aluminium Kurri Kurri Pty Ltd (Hydro) owns the former Hydro Aluminium Kurri Kurri Aluminium Smelter (the Smelter) located at Hart Road Loxford (the Project Site). The Project Site comprises approximately 80 hectares and is surrounded by approximately 1,940 hectares of buffer zone land that is owned and managed by Hydro (together the Hydro Land).

The Smelter commenced operations in 1969, however, smelting activities ceased in September 2012. In May 2014 Hydro formally announced the closure of the Smelter. Since this time Hydro has evaluated the future use of the Smelter and the Hydro Land. This has included development of a land use master plan and attaining Development Consent from Cessnock City Council for some demolition of the Smelter (described as Stage 1 Demolition).

It is Hydro's strategic vision for the Hydro Land to play a key role in allowing the Hunter Region to achieve the economic, employment and environmental objectives identified in the NSW Government *NSW State Plan 2021* and the *Hunter Regional Plan 2036*. Hydro aims to achieve this strategic vision by facilitating the rezoning and development of the Project Site for employment purposes, with the remainder of the Hydro Land to be utilised for significant employment, residential, rural and biodiversity conservation purposes.

Hydro is seeking Development Consent for completion of demolition (described as Stage 2 Demolition) and remediation of the Smelter. The objectives of these activities are to: render the Project Site suitable for employment uses; achieve Hydro's commitment to meeting its corporate environmental and social responsibilities; and to allow for the significant social, environmental and economic benefits of these activities to be sustainably achieved.

An Environmental Impact Statement (EIS) for the Stage 2 Demolition and remediation of the Smelter was prepared to seek Development Consent from the Minister for Planning and Public Spaces as a State Significant Development (SSD) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The EIS was prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued by the Department of Planning, Industry and Environment (the Department).

The EIS was publicly exhibited from 11 August 2016 to 12 September 2016 in accordance with Clause 9, Schedule 1 (formerly Section 89F) of the EP&A Act. During the exhibition interested parties (private individuals, community groups, organisations and government agencies) were invited to make a submission to the Department on the EIS. These submissions have been considered by Hydro and are addressed in this Submissions Report.

1.2 Purpose of the Submissions Report

This Response to Submissions Report (RtS) documents and considers the submissions received on the EIS and outlines Hydro's response to them, as required under Clause 85A of the *Environmental Planning and Assessment Regulation 2000* (formerly Section 89G of the EP&A Act).

The RtS also provides:

- An overview of the Project (refer to **Section 1.3**) and Project changes (refer to **Section 1.4**).
- Details on the stakeholder consultation activities undertaken during and following the public exhibition of the EIS (refer to **Section 2**).
- A summary of the key issues raised during the exhibition (refer to **Section 3**).
- The response to the issues raised in these submissions (refer to **Section 4**, **Section 5**, **Section 6** and **Section 7**).
- Details of changes to the Project from that described in the EIS (refer to **Section 8**).
- Consideration of any changes to the potential environmental impacts due to these Project changes, and to address additional information requested in the submissions (refer to **Section 9**).

1.3 Project Outline

Table 1-1 describes the key elements and activities of the Project as described and assessed in the EIS.

Table 1-1: Outline of The Project

Element	Key Activities
The Works	
Project Site Establishment	• Establishment of environmental controls (erosion and sediment controls, water quality controls). • Construction of the Containment Cell haul road. • Continued use of Stage 1 Demolition compounds. • Continued use of Stage 1 Demolition stockpile and storage areas.
Stage 2 Demolition **AS DISCUSSED IN SECTION 1.4 THIS ELEMENT HAS BEEN WITHDRAWN FROM THE PROJECT**	• Completion of hazardous materials removal. • Establishment and implementation of environmental controls (dust mitigation and water quality management). • Demolition of three concrete stacks and a water tower using detonation. • Mechanical demolition of remaining buildings and structures. • Material collection, separation, processing and storage. • Transportation of recyclable metals off-site. • Grading of former building footprints.
Demolition Material Management **AS DISCUSSED IN SECTION 1.4 THIS ELEMENT HAS BEEN WITHDRAWN FROM THE PROJECT**	• Operation of a concrete and refractory crushing plant. • Manage a large stockpile area in the west of the Smelter. • Ferrous (steel) and non-ferrous (predominantly aluminium and copper) metals would be sorted and sized before being transported off-site for recycling. It is anticipated that there would be up to 20 truck movements per day.
Containment Cell Construction	• Vegetation clearance. • Site preparatory works. • Establishment and implementation of environmental controls (erosion and sediment controls, water quality controls). • Construction of the Containment Cell base layers. • Transport and placement of remediation and non-recyclable demolition materials to the Containment Cell. • Leachate and stormwater management. • Construction of the final Containment Cell capping layers.
Contamination Remediation	• Removal of the Capped Waste Stockpile. • Excavation of the contaminated soils within the Smelter. • Transport of waste material removed from the Capped Waste Stockpile and excavated contaminated soils (including stockpiled soils sourced from other Hydro Land) to the Containment Cell. • Filling and grading following removal of contaminated materials.

Table 1-1: Outline of The Project

Element	Key Activities
Leachate and Groundwater Treatment	• Establish and operate the leachate management system (Capped Waste Stockpile and Containment Cell). • Groundwater monitoring. • Leachate management system, pumping well network and dam decommissioning.
Containment Cell Management	
Monitoring	• Monitoring of leachate and gas generation within the Containment Cell.
Maintenance	• Maintenance of the vegetation cover • Maintenance (if required) of the capping layers.

1.4 Benefits of the Project

As noted in **Section 1.1** it is Hydro's strategic vision for the Hydro Land to play a key role in allowing the Hunter Region to achieve the economic, employment and environmental objectives identified in the *Hunter Regional Plan 2036*.

The Hydro Land is located within the Greater Newcastle Metropolitan Area in the *Hunter Regional Plan 2036* (the Plan). Hydro's plan for the Hydro Land is consistent with, and recognised by the Plan. The Plan specifically identifies the Hydro Land as a Gateway Determination Site, as a development that would help to achieve Goal 4 of the Plan: *Greater housing choice and jobs*. It is also located adjacent to an existing Urban Release Area.

Hydro's plans also help achieve the following priorities:

- Provision of an employment land cluster at Kurri Kurri
- Kurri Kurri to leverage its proximity to the Hunter Expressway and existing significant industrial land
- Development of the Kurri Kurri Corridor for housing and urban renewal
- Focus development to create compact settlements in locations with established services and infrastructure, including the Maitland Corridor growth area
- The Plan states that a "*a strategy for land along the Hunter Expressway that considers its region-shaping potential*" would be prepared, and that "*Industries looking to attract new investment to expand can take advantage of the high level of connectivity provided by the Hunter Expressway*". The Master Plan for the Hydro Land would be consistent with a strategy that aims for industrial development along the Hunter Expressway.

The *Greater Newcastle Metropolitan Plan* (2018) (the Metro Plan) expands on the objectives of the Plan and identifies the detailed strategies and actions for the Greater Newcastle Metropolitan Area.

The Metro Plan identifies the Maitland to Kurri Kurri Priority Housing Release Area. The proposed residential zoned land within the Hydro Land complements the existing residential zoned land that is shown within the Release Area.

The Metro Plan also states that "*Land around the Hunter Expressway should be protected for uses that generate employment growth and become part of Greater Newcastle's network of trading hubs, together with the emergence of Black Hill* ***and re-establishment of employment at the Hydro site***".

The Master Plan for the Hydro Land locates employment and conservation land zonings adjacent to the Hart Road Interchange on the Hunter Expressway, with residential zoned land further to the north.

In addition, the Metro Plan states that "*Another positive legacy of Greater Newcastle's industrial and heavy manufacturing past is land and infrastructure in large holdings in central locations. Examples include* ***the Hydro site at Kurri Kurri close to the Hunter Expressway, with electricity transmission infrastructure,*** *Throsby Basin employment lands adjoining Newcastle City Centre and the Munmorah and Vales Point (still operational) power station sites.*

These sites and other heavy and general industrial lands will continue to be places of employment, and their future role will be to nurture globally competitive growth segments in Greater Newcastle."

The Master Plan for the Hydro Land locates general and heavy industrial land use zonings within the former Smelter site, benefiting from the existing utility infrastructure within and directly adjacent to the Smelter.

Section 2.4.2.2 of the EIS discussed the Planning Proposals that were submitted to Cessnock City Council (covering the Project Site and the majority of the Hydro Land) and Maitland City Council (the northeast section of the Hydro Land), which achieved Gateway Determinations from the Department on 23 March 2016. By issuing its Determinations the Department accepts the strategic merit of the Planning Proposals and the future plans for Hydro Land.

Adoption and implementation of the rezoning proposed in the Planning Proposals would allow for the following:

- Approximately 180 hectares of residential land, which would provide more than 2,000 homes for over 6,000 new residents.
- Construction of these new homes and associated infrastructure would create more than 5,000 construction industry jobs.
- Approximately 200 hectares of employment land, which could facilitate the creation of more than 3,000 new jobs in the future.
- The infrastructure that previously serviced the Smelter would be readily available to support a range of industrial and commercial businesses.
- More than 1,200 hectares of conservation land, providing environmental, social and potentially economic benefits to the local area.

1.5 Project Changes

Following the EIS exhibition period, the subsequent review of submissions and consultation with relevant agencies, Hydro proposes four key changes to the Project as described in the EIS.

This section provides the background to the reasons for the Project changes. A description of the Project changes is provided in **Section 8**. Consideration of the potential environmental impacts associated with these changes are provided in **Section 9**.

1.5.1 Stage 2 Demolition

As discussed in **Section 1.1** Hydro has received Development Consent from Cessnock City Council (Council) for Stage 1 Demolition. Stage 1 Demolition commenced in June 2017. Due to ongoing negotiations with the Environment Protection Authority (EPA) and the Department regarding the need to treat the Capped Waste Stockpile material and the long term management requirements for the Containment Cell, there is a potential that the Project approval would be delayed beyond that in Hydro's overall demolition and remediation program. This could result in the Demolition Contractor having to demobilise from the Smelter and then remobilise once the SSD receives approval. This poses significant time and cost implications for the demolition activities and the entire activities program at the Smelter, as well as subsequent delays to the redevelopment of the Hydro Land and the social, environmental and economic benefits that will result from this.

As a result, Hydro has withdrawn the Stage 2 Demolition (including the sorting, temporary stockpiling and recycling of demolition material) from the SSD application and has included it in a Development Application (DA) to Cessnock City Council. This DA also includes the operation of a Mobile Crushing Plant at a rate of greater than 150 tonnes per day, at multiple locations within the Smelter. The proposed operating rate of the Mobile Crushing Plant results in Stage 2 Demolition being deemed a designated development under Clause 16 of Schedule 3 of the Environmental Planning and Assessment Regulation 2000, requiring preparation of an EIS.

Ramboll, on behalf of Hydro, prepared the EIS for Stage 2 Demolition (the Stage 2 Demolition EIS) and submitted it to Cessnock City Council for determination. The Stage 2 Demolition EIS was prepared with consideration of the relevant comments in the submissions received during the exhibition of the Remediation and Demolition EIS (herewith described as the Project EIS). It

also considers the potential cumulative impacts associated with Stage 2 Demolition and the activities remaining as part of the Project occurring concurrently. The Stage 2 Demolition EIS was on exhibition 22 February 2018 to 23 March 2018, and granted development consent on 9 May 2018 (DA 8/2018/46/1).

Withdrawal of Stage 2 Demolition reduces the level of activity, and the associated environmental impacts, of the Project that the Minister for Planning and Public Spaces is to approve. However, as the Stage 2 Demolition would still occur, the environmental impact assessment and associated mitigation measures remain unchanged. Hydro acknowledges it is important to address the potential cumulative environmental impacts of the activities remaining within the Project and those of Stage 2 Demolition. In summary, there are no changes to the potential environmental impacts, and the associated environmental management measures, described and assessed in the EIS.

The disposal of non-recyclable demolition waste from Stage 2 Demolition in the Containment Cell remains as part of the Project.

1.5.2 Capped Waste Stockpile Material Treatment

Section 5.3.3 of the EIS included a summary of the management options that were considered for the contaminated soils and non-recyclable waste materials at the Smelter, including the Capped Waste Stockpile material. This assessment concluded that placement of all material (including untreated Capped Waste Stockpile material) within an on site Containment Cell was the preferred option.

The EPA's submission on the EIS (dated 4 January 2017) advised that if the Capped Waste Stockpile material did not comply with the levels of leachable fluoride and/ or leachable cyanide prescribed in the *Chemical Control Order in relation to aluminium smelter wastes containing fluoride and/ or cyanide* (State Pollution Control Commission, 1986) (herewith described as the CCO) it would need treatment to comply with the CCO.

The submission did note, however, that the EPA would consider regulatory changes to permit placement of Capped Waste Stockpile material that did not comply with the CCO if it was deemed desirable from a policy perspective. Subsequent negotiations with the EPA concluded that the EPA would need to see that Hydro had considered reasonable and feasible management options for the Capped Waste Stockpile material and that its placement within the Containment Cell without treatment presented the best overall option.

Hydro subsequently prepared the *Capped Waste Stockpile Management Options Evaluation Study* (Ramboll Environ, 2017) (herewith described as the Options Study), which is presented in two parts in **Appendix 1** and **Appendix 2.** The Options Study undertook a combination of quantitative and qualitative assessments of six management options (plus Do Nothing – leaving the Capped Waste Stockpile in situ) against four environmental, health and safety (non-economic) criteria:

- Human Health Risk
- Worker Safety
- Ecological Risk
- Greenhouse Gas Generation.

The Options Study concluded that the placement of the untreated Capped Waste Stockpile material into the Containment Cell presented the preferred option as it represented the least overall short term and long term environmental impact. It was acknowledged that despite this outcome, the EPA believed that regulatory change would be required for it to be permissible. Treatment of the Capped Waste Stockpile material prior to placement in the Containment Cell was found to be the second-best option.

The Options Study was submitted to the EPA on 30 October 2017 for their review and consideration. Since submission of the Options Study there has been substantial communications between Hydro and the EPA:

In a letter dated 6 December 2017 the EPA advised Hydro that:

- The treatment of the Capped Waste Stockpile material prior to placement in the Containment Cell was the EPA's preferred option
- Additional information would be required to be provided to the EPA confirming that the treated Capped Waste Stockpile material would comply with the CCO

In response to this letter Hydro submitted *CWS Waste Management: Option 4 Remediation Design and Proposed Validation of Treatment* (Ramboll Environ, 2017) addressing these requests on 21 December 2017

Hydro submitted a revised version of the *CWS Waste Management: Option 4 Remediation Design and Proposed Validation of Treatment* (which is presented in **Appendix 4**) and additional information addressing the EPA's comments on this document on 15 March 2018.

Additional comments were received from the EPA on 27 April 2018, primarily associated with:

- Further justification of the use of gypsum application as the treatment method, and the proposed gypsum application rate
- The chemical characteristics of the gypsum, and reactants generated in the event that the gypsum and the Capped Waste Stockpile material got wet
- The gypsum application verification and validation process
- The management of the material placement process, including:
  - Management of asbestos risks
  - Unexpected finds protocols
- Compatibility of the proposed HDPE membranes with the chemical characteristics of the leachate

Hydro provided a response to the EPA addressing these issues on 8 June 2018

On 9 July 2018 the EPA issued a letter advising that it accepted the proposed gypsum application methodology.

Hydro has finalised the proposed gypsum application methodology for the treatment of the Capped Waste Stockpile material. The gypsum application process is described in **Section 8.2**.

1.5.3 Omission of Removal of Potentially Recyclable Material from Capped Waste Stockpile

Section 8.5.4 of the EIS notes that "*Potentially recyclable (scrap metals) materials would be removed from materials by excavator (where possible) and transported to the Capped Waste Stockpile recyclable materials storage area. Materials that can be recycled would be stockpiled for cleaning (to the standard agreed with the off-site recycling facility). Cleaned materials would then be transported to the main stockpile area.*"

One of the options investigated by the Options Study (refer to **Appendix 1 and Appendix 2**) included the removal of recyclable materials from the Capped Waste Stockpile material for cleaning to the standard required by recycling contractors.

The Options Study concluded that there were a number of environmental, health and legal factors presented by this option:

- Asbestos is a significant contaminant within the Capped Waste Stockpile. Even with multiple phases of cleaning with high pressure hosing, there is no certainty that all asbestos would be removed
- The sorting and cleaning tasks presented significant worker safety and human health risks, and generated significant greenhouse gas emissions compared to the savings associated with the recycling of the material
- Without absolute certainty that material is asbestos free, it is not possible for Hydro to accept liability for any asbestos that may subsequently be encountered (or any associated health impacts to their employees), and thus recyclers have advised that they would not take this material. As such it would still need to be placed in a landfill

- Due to the sorting and cleaning activities, the time required for the Capped Waste Stockpile to be open and material exposed is significantly increased. This increases the leachate management requirements (with greater potential for exposure to large storm events) and also increases the duration that the asbestos-contaminated material is potentially exposed and subsequent increased potential for asbestos fibre liberation

These factors contributed to the option representing a high net environmental impact.

Based on the detailed analysis of the risks and impacts associated with sorting and cleaning of potentially recyclable material from the Capped Waste Stockpile, Hydro would no longer include the possible removal of any potentially recyclable material. All material from the Capped Waste Stockpile material would immediately be placed within a truck for gypsum application and then placement within the Containment Cell.

1.5.4 Off Site Leachate Treatment

Section 8 of the EIS notes that leachate collected during the removal of material from the Capped Waste Stockpile and within the Containment Cell prior to capping would be diverted to an on site leachate treatment plant (as described in Section 8.5.2.1 of the EIS) prior to discharge to the existing Smelter water management system.

Section 9.1.1.2 of the EIS notes that any leachate collected in the completed Containment Cell would also be treated by the on site leachate treatment plant. Section 9.1.1.2 of the EIS also notes that depending on leachate volumes, a periodic pump out of the leachate collection sump by a licensed liquid waste contractor for treatment at a licensed facility may be preferred.

Since preparation of the EIS Hydro has commissioned preparation of the Containment Cell detailed design (refer to **Appendix 3**) and undertaken further review of environmental and economic factors, including modelling of the quantity of leachate to be generated within the capped Containment Cell. From this it was determined that the management of leachate at all stages of the Project through the pumping out and transportation by a licensed liquid waste contractor for treatment at a licensed facility (as well as the option of the on site leachate treatment plant described in the EIS) should be considered as a leachate treatment option.

As such Hydro is seeking approval for collection of leachate by a third party contractor for treatment at an off-site licensed facility as a leachate treatment method. The option of constructing and operating an on site leachate treatment plant (instead of or in conjunction with the off site treatment) remains part of the Project.

1.5.5 Containment Cell Ownership

Section 9.4 of the EIS described the options for regulation of the Containment Cell following its completion. This included how any future owner of the land containing the Containment Cell would be required to continue implementation of the Long Term Management Plan.

Negotiations between the Department and Hydro concluded that the preferred approach for the regulation of the long term management of the containment cell is a Voluntary Planning Agreement (VPA) between Hydro and the Minister for Planning and Public Spaces.

The VPA would (amongst other things) address the following:

- The land (Lot and Deposited Plan) to be subject to the VPA
- The total and timing of payment of a monetary contribution and the timing of a land contribution from Hydro required for the ongoing implementation of the Long Term Management Plan by a NSW government entity
- The form and value of financial security to be implemented during construction of the Containment Cell.

2. EXHIBITION AND CONSULTATION

2.1 EIS Preparation Phase Stakeholder Consultation

2.1.1 Community Engagement

Keeping the community informed about activities at the Smelter and the future of the Hydro Land has been an integral activity for Hydro.

Hydro has implemented a number of community engagement activities to inform the community about the Project and to identify the community's concerns and issues.

Section 4 of the EIS describes the community engagement activities undertaken by Hydro in planning for the Project, including development of the EIS. The following sections describe the consultation that has occurred during and following the exhibition of the EIS.

2.2 EIS Exhibition Period Stakeholder Consultation

2.2.1 Exhibition Venues

The EIS was on exhibition from 11 August 2016 to 12 September 2016 at the following locations:

- Department of Planning, Industry and Environment website: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6666
- Department of Planning, Industry and Environment Information Centre, Sydney
- Cessnock City Council Administration Building
- Cessnock Library
- Kurri Kurri Library
- Maitland City Council Administration Building
- East Maitland Library
- Rutherford Library

2.2.2 Community Engagement

The community engagement activities described in **Section 2.1.1** continued throughout the formal EIS exhibition period. This included:

Ongoing implementation of the Information and Feedback Mechanisms.
A meeting of the Community Reference Group was held on 18 August 2016. Details on the Project and the key findings of the EIS were presented to the group.
A Community Drop-In Session was held on 30 August 2016 at Kurri Kurri. Copies of the EIS and display material were available for review. Members of the EIS Team were on hand to answer questions and provided advice on how to make a formal submission to the Department on the EIS. A total of 16 people attended the drop-in session, including three members of the Community Reference Group.

To promote the drop-in session and that the EIS was on exhibition:

Letters were sent to 37 neighbours to the Project Site, to 11 CRG members, and to 16 government representatives at Federal, State and Local Government level.

- Enclosed with each letter was the Hydro Winter 2016 newsletter, which contained a variety of information about the Project, including the EIS and the various demolition stages
- The newsletter also directed people to the Hydro website, and to the Hydro YouTube channel, which contains videos of site activity, and of detail around the proposed demolition and remediation components. This video has been viewed 225 times as at 8 March 2018
- Quarter page advertisements were placed in local newspapers: Cessnock Advertiser Wednesday 24 August 206, Lower Hunter Star Thursday 25 August 2016 and Maitland Mercury Friday 26 August 2016
- Facebook advertising was also utilised in the lead-up to the drop-in session, with an advertisement placed on 29 and 30 August 2016. The advertisement targeted people living in Cessnock and Maitland, and towns such as Kurri Kurri, Loxford, Weston, Cliftleigh, Gillieston Heights, Pelaw Main, Buchanan, Sawyers Gully, and Abermain. Over the two days of advertising, the advertisement was made visible 8,821 times, and resulted in 154 clicks through to the Hydro web site

2.2.3 Agency Consultation

Hydro maintained regular contact with the Department throughout the EIS exhibition period, to understand the number of submissions that had been received, and to inform the Department of the stakeholder consultation and other relevant activities that Hydro was undertaking during the EIS exhibition.

Hydro also attended meetings (12 August 2016 and 8 September 2016) and maintained communications with the EPA to discuss the Project, including approvals (other than the Development Consent) required for the Project. This included discussion of the requirements under the CCO and the associated Licence No. 5 granted to Hydro under the *Environmentally Hazardous Chemicals Act 1985* (the EHC Act). These discussions resulted in the preparation of the Options Study (presented in **Appendix 1**) and the subsequent decision to treat the Capped Waste Stockpile Material prior to its placement in the Containment Cell (as described in **Section 8.2**).

2.3 Ongoing Stakeholder Consultation

2.3.1 Community Engagement

Hydro has been and will continue to implement the community engagement activities described in **Section 2.1.1** as determination of the EIS progresses, and as activities at the Smelter and the Hydro Land continue.

At the Community Reference Group meeting on 16 February 2017 Hydro advised of the withdrawal of Stage 2 Demolition from the SSD Project. This news was also included in the Autumn 2017 (issued in June) newsletter that was delivered to local residents and posted on the Hydro Kurri Kurri website.

2.3.1 Agency Consultation

Hydro has been consulting and will continue consultation with government agencies to ensure that that all required approvals are attained, that their concerns are adequately addressed in this report, Environmental Management Plans and other Project documentation, and to keep them informed of activities of interest to their portfolio.

In preparing this report, Hydro undertook the agency consultation described in **Table 2-1**.

Table 2-1: Details of Ongoing Agency Consultation

Agency	Date and Form of Consultation
EPA	Various telephone calls and emails 13 October 2016: Meeting 4 November 2016: Email (from EPA) 9 November 2016: Letter (to EPA) 21 November 2016: Email (to EPA) 28 November 2016: Letter (to EPA) 7 December 2016: Meeting 18 January 2017: Letter (from EPA) 7 February 2017: Meeting/ Site Visit 15 May 2017: Meeting 14 July 2017: Meeting 26 July 2017: Meeting 12 September 2017: Meeting 30 October 2017: Options Study (to EPA) 6 December 2017: Letter (from EPA) 8 December 2017: Meeting (with the Department) 22 December 2017: Additional information (to EPA)

Agency	Date and Form of Consultation
	2 February 2018: Meeting/ Site Visit 8 February 2018: Letter (from EPA) 9 February 2018: Meeting 15 March 2018: Letter and Additional Information (to EPA) 27 April 2018: Letter (from EPA) 30 April 2018: Meeting 8 June 2018: Letter and Additional Information (to EPA) 9 July 2018: Letter (from EPA) 6 September 2018: Meeting (with the Department) 16 October 2018: Meeting/ Site Visit 18 December 2018: Meeting (with the Department)
Department of Planning, Industry and Environment	Various telephone calls and emails 9 May 2017: Meeting 14 July 2017: Meeting 8 December 2017: Meeting (with EPA) 1 May 2018: Meeting 22 May 2018: Meeting 6 September 2018: Meeting (with EPA) 22 October 2018: Meeting and Site Visit (with Senversa) 3 December 2018: Meeting 18 December 2018: Meeting (with EPA) 18 September 2019: Meeting 4 November 2019: Meeting 11 February 2020: Meeting
Cessnock City Council	12 October 2016: Progress Briefing to Councillors 18 January 2017: Meeting 17 May 2017: Meeting
SafeWork NSW	11 September 2017: Meeting

3. CONSIDERATION OF SUBMISSIONS

3.1 Submissions Received

The EIS was on exhibition from 11 August 2016 to 12 September 2016. During this period, the Department received a total of 24 submissions. These were comprised of seven submissions from individual community members, six submissions from non-government organisations, and 11 submissions from government departments and agencies (including one prepared by the Department). Of the 13 submissions from individual community members and non-government organisations one formally supported the Project, and five formally objected to the Project.

Of the seven submissions from individual community members, five were from residents of the local area (Kurri Kurri and Weston). Of the six submissions from non-government organisations two were from the local area (Weston and Heddon Greta).

3.2 Submission Issues Summary

3.2.1 Government Agencies' EIS Submissions

Table 3-1 summarises the issues raised in the 11 government submissions, listed most to least frequent based on the number of submissions that raised the issue (some submissions raised an issue multiple times). **Table 3-1** also identifies where each topic is addressed within this report.

Table 3-1: Summary of Issues Raised in Government Agency Submissions

Issue	No. of Submissions	Relevant Agencies *	Where addressed in this Report
Water Management	5	DPIE, CCC, MCC, DPI, HNEH,	Section 4 and Section 5.18
Contamination	5	DPIE, CCC, HNEH, DPI, EPA	Section 4 and Section 5.9
Containment Cell Management and Monitoring	4	DPIE, CCC, DPI, EPA	Section 4, Section 5.8 and Section 8.2
Air Quality	4	DPIE, CCC, EPA, HNEH	Section 4 and Section 5.3
Groundwater	4	DPIE, DPI, MCC, HNEH	Section 4 and Section 5.11
Noise and Vibration	4	DPIE, EPA, CCC, HNEH	Section 4 and Section 5.13
Flooding and Hydrology	3	DPIE, CCC, OEH	Section 4 and Section 5.10
Human Health	3	DPIE, HNEH, SW	Section 4 and 5.12
Traffic and Transport	3	DPIE, CCC, RMS	Section 4 and Section 5.7
Biodiversity	2	OEH, CCC	Section 5.4
Containment Cell Design and Construction	2	DPIE, EPA	Section 5.7 and Section 8.2
Spent Pot Lining Management	2	DPIE, MCC	Section 4 and Section 5.16
Bushfire	2	DPIE, RFS	Section 4 and Section 5.5
Capped Waste Stockpile	2	DPIE, EPA	Section 4 and Section 7.1
Project Justification and Alternatives	1	EPA	Section 4 and Section 7.1
Social Impacts	1	HNEH	Section 5.15
Aboriginal Heritage	1	OEH	Section 5.2
Non-Aboriginal Heritage	1	CCC	Section 5.14
Zoning	1	CCC	Section 5.19
Waste	1	DPIE	Section 4
Hazards	1	DPIE	Section 4

DPIE – Department of Planning, Industry and Environment

CCC – Cessnock City Council

MCC – Maitland City Council

DPI – Department of Primary Industries

EPA – Environment Protection Authority
RFS – Rural Fire Service
OEH – Office of Environment and Heritage
Hunter Local Land Services had no issues
SW – SafeWork NSW
RMS – Roads and Maritime Services
HNEH – Hunter New England Health

OEH is now part of the Biodiversity Conservation Directorate of DPIE (ecology) and Heritage Division of DPIE (Aboriginal heritage)

Clause 85A of the *Environmental Planning and Assessment Regulation 2000* requires the issues raised in the Department submission to be addressed. Each of these issues have been addressed individually in **Section 4**.

With the remaining government agencies' submissions, common issues have been collated and summarised in **Section 5**. The agencies raising that issue, and Hydro's response are also provided.

3.2.2 Government Agencies' Draft RtS Review Comments

Government agencies were provided the opportunity to review the draft RtS. This allowed the agencies to:

- Confirm their satisfaction with Hydro's responses to the issues raised in their submissions on the EIS
- Provide comment on the proposed Project changes outlined in **Section 1.5** and described in **Section 8**

The comments received from these agencies and Hydro's response is presented in **Section 5.20**.

3.2.3 Non-Government Submissions

Table 3-2 summarises the issues raised in the 13 non-government (individuals and private organisations) submissions, listed most to least frequent based on the number of submissions that raised the issue (some submissions raised an issue multiple times). **Table 3-2** also identifies where each topic is addressed within this report.

Table 3-2: Summary of Issues Raised in Non-Government Submissions

Issue	Number of Submissions	Where addressed
Project Justification and Alternatives	6	Section 6.9
Containment Cell Design and Construction	5	Section 6.3
Containment Cell Management and Monitoring	5	Section 6.4 and Section 8.2
Spent Pot Lining Management	5	Section 6.11
Air Quality	3	Section 6.2
Contamination	3	Section 6.5
Social Impacts	2	Section 6.10
Traffic and Transport	2	Section 6.12
Greenhouse Gas and Climate Change	1	Section 6.6
Human Health	1	Section 6.7
Noise and Vibration	1	Section 6.8
Waste and Recycling	1	Section 6.13
Water Management	1	Section 6.14
Zoning	1	Section 6.15

With the non-government submissions, common issues have been collated and summarised in **Section 6**. The individuals and organisations raising that issue, and Hydro's responses are also provided.

4. RESPONSE TO THE DEPARTMENT OF PLANNING, INDUSTRY AND ENVIRONMENT ISSUES

The Department provided Hydro with their submission on the EIS on 20 January 2017. Their submission notes that Clause 85A of the *Environmental Planning and Assessment Regulation 2000* requires the issues raised in the Department's submission to be addressed. As such, each of these issues are listed and addressed in **Table 4-1**: Department of Planning and Environment Issues and Hydro Responses

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The Department subsequently commissioned Senversa to undertake a technical review of the Containment Cell detailed design and associated information to provide an opinion on whether:

- The proposed remediation in relation to treatment of waste in the CWS and containment is considered appropriate.
- Environmental risks associated with the proposed containment cell are considered to have been adequately assessed.
- The proposed funding for long-term management of the containment cell adequately considers the relevant environmental risks and is reasonable.

The responses to the issues raised by Senversa in *Independent Review: Potential Liabilities – Proposed Containment Cell: Former Hydro Aluminium Smelter, Kurri Kurri NSW* are provided in **Table 4-2** (technical and environmental issues) and **Table 4-3** (financial and administrative issues).

The issues raised by other government agencies have been collated and addressed in **Section 5**.

Table 4-1: Department of Planning, Industry and Environment Issues and Hydro Responses

Issue No.	Issue	Hydro Response
General		
1	A number of the references throughout the EIS are incorrect; please ensure any future documentation includes correct section references.	Noted.
2	Please provide the recycling strategy for the spent pot lining located within the sheds including the timing of transportation, whether this will interact with demolition works and how any impacts will be managed.	As discussed in Section 1.2 of the EIS, the transportation of the stored spent pot lining to an off-site licensed facility does not require Development Consent. As such it does not form part of the Project. However, the following outlines the strategy for the management of spent pot lining and its interaction with the Project and other activities at the Smelter. Hydro undertook an extensive investigation of facilities that have the potential to directly reuse the untreated spent pot lining or facilities that provide intermediate treatment of the spent pot lining prior to it being transported for use. Hydro looked at: • Facilities in the local area, within NSW, interstate and internationally • Facilities that have existing technology and approvals for the intermediate treatment and/or reuse of spent pot lining • Based on advice from the EPA, facilities that could benefit from the reuse of the spent pot lining, but may require technology upgrades and/or approvals to facilitate this In recognition of the community interest in spent pot lining management, Hydro invited the members of the Hydro Community Reference Group to assist in the development of evaluation criteria for the identified spent pot lining partial treatment and/or reuse options. Based on the input from the Community Reference Group a number of evaluation criteria were developed. The criteria identified by the Community Reference Group were: • Proven capability of the spent pot lining recycler/ operator • Permissibility of the option: does it have, or could it attain, the required approvals (in Australia and overseas if required) • Characteristics, proposed use and potential environmental impacts of the recycled/ processed material • Capacity of the proposed facility, the time it would need to recycle/ process the material, and the market certainty for the recycled/ processed material (if dependent on this) • Commercial and cost considerations: what would the process cost, and is the facility operator willing to provide commercial security to cover its performance

Issue No.	Issue	Hydro Response
		• Sustainability and corporate social responsibility: is the option commercially, environmentally and socially sustainable, and does it satisfy Hydro's corporate social responsibility obligations Following identification of specific facility operators that provide the identified potential intermediate treatment and/or reuse options, Hydro contacted the operators to determine if there was sufficient interest to undertake further negotiations and investigations. Through this process a number of operators expressed their interest; others did not see an operational or commercial benefit to their activities and did not want to progress negotiations further. In some cases, from a preliminary screening of the potential options, where Hydro determined that the option did not score well against the evaluation criteria, the option was not investigated further. Following further negotiations with interested parties, and the receipt of additional information from potential operators regarding the likely commercial arrangements, Hydro has undertaken due diligence investigations of all operators that expressed an interest for which Hydro has determined warrant further investigation. Hydro needed to verify the information that has been provided by the potential operators to ensure that it meets the economic, environmental and/or social requirements of Hydro's company policies, as well as meeting regulatory compliance. Hydro also needs to verify the stated capacity of potential operators to treat and/ or consume the spent pot lining. Upon completion of due diligence investigations of spent pot lining treatment and reuse facilities, including processing trials at two facilities, Hydro identified an operator that can process the spent pot lining that is stored within buildings at the Smelter. The first shipment of spent pot lining was transported to an approved treatment facility in July 2018. As of 30 June 2020 26,600 tonnes (or 33%) of spent pot lining from the storage sheds had been transported to the approved processing facility. Hydro expects a three to four-year timeframe for complete removal of the spent pot lining from the Smelter. Based on such a timeframe the removal of the spent pot lining from the Project Site would likely occur at the same time Project activities are occurring elsewhere within the Smelter. The buildings storing the spent pot lining would not be demolished until all the spent pot lining stored in the building has been removed. Safe vehicular access connecting these buildings to the central Smelter Road that connects to the public road network (Hart Road) would be maintained.

Issue No.	Issue	Hydro Response
		Management measures described in Section 8 of the EIS and throughout Part C of the EIS would mitigate potential impacts on the storage buildings and the spent pot lining during the demolition and remediation activities elsewhere at the Smelter. The response to Issue No. 67c identifies how the potential hazards associated with the storage, handling and relocation of the spent pot lining would be managed if occurring concurrently with Works activities.
3	Please provide copies of any existing approvals and licences for the site.	The existing approvals and licences for the Smelter are provided in **Appendix 5**.
4	Please provide the assessment of alternative management options for demolition materials, aluminium smelter production wastes and contaminated soils as referred to on page 5-41 of the EIS.	The EIS provides a discussion of the alternatives for non-recyclable demolition materials (Table 5.6 of the EIS) and contaminated soils (Table 5.5 of the EIS). However as noted in response to **Issue No 5** the management options for these smaller waste streams are influenced by the management options for the Capped Waste Stockpile material, which represents approximately 67% of the non-recyclable material generated by remediation and demolition that is proposed to be placed in the Containment Cell. Options for recyclable demolition materials were not considered: these would either be reuse on site (concrete and brick) or taken off site to a recycling facility (metals). With regards to the aluminium smelter production wastes, the primary waste (in terms of quantity) is the spent pot lining. Refer to the response to **Issue No. 2** on the process that Hydro has implemented in identifying and implementing recycling and reuse options for spent pot lining. With regards to other aluminium smelter production wastes, Hydro has identified and utilised reuse and recycling options, and is continuing to pursue reuse and recycling options for other materials. If a recycling or reuse option is not identified for these materials, they would be disposed of in accordance with the *Protection of the Environment (Waste) Regulation 2014* and the CCO (where applicable). Such material would be placed within the Containment Cell. The Containment Cell design has accounted for the potential need to place such material in the Containment Cell. Information on the types and quantities of the material that has been recycled to date are provided in **Section 6.13.1**.

Issue No.	Issue	Hydro Response
5	Page 5-45 of the EIS states that investigations were undertaken to evaluate the ability to segregate all of the materials for reuse, or treatment and reuse – please provide this investigation.	The *Capped Waste Stockpile Management Options Evaluation Study* (Ramboll Environ, 2017) (the Options Study) is provided in this RtS in two parts: in **Appendix 1** and **Appendix 2**. The Capped Waste Stockpile represents approximately 67% of the non-recyclable material generated by remediation and demolition that is proposed to be placed in the Containment Cell. As such the management option for this material is the key driver for determining the management of all non-recyclable material generated during demolition and remediation.
6	Please provide further justification as to why off-site disposal was not the preferred option.	The Options Study provided in **Appendix 1** and **Appendix 2** included a more detailed evaluation of the options for management of the Capped Waste Stockpile, including off-site disposal. The evaluation concluded that the on-site Containment Cell presents the best overall option and concurred (through quantifiable data) with the conclusion of the EIS. The findings of the study, including justification of the preferred option, are summarised in **Section 7.1**.
Contamination		
7	The Remediation Action Plan is required to be accompanied by a Site Audit Statement from an Environment Protection Authority (EPA) accredited site auditor. Please provide the Site Audit Statement.	The Site Audit Statement is provided in **Appendix 6**. The Smelter Remedial Action Plan (RAP) provided in Appendix 5 of the EIS has been revised to reflect Project changes and discussions with the Site Auditor. The revised Smelter RAP is provided in **Appendix 7**.
8	Please provide the Site Audit Statement prepared by a site auditor accredited by the Environment Protection Authority which is required to accompany the Remediation Action Plan.	The Site Audit Statement is provided in **Appendix 6**.
9	Please show the following on one plan: capped waste stockpile; • anode waste pile; • diesel spray area; • drainage lines; • east surge pond; • carbon plant; and • bake furnace scrubber.	Figures showing and labelling these locations on an aerial photograph and the Smelter layout plan are provided in **Appendix 8**.

Issue No.	Issue	Hydro Response
10	Please provide the fate and transport modelling (including a figure) of the existing groundwater plume migration to Swamp Creek.	*Groundwater Fate and Transport Modelling: Leachate Plume – Capped Waste Stockpile* (ENVIRON, 2015) is provided in **Appendix 9**. A one-dimensional analytical model (UK EA Remedial Targets Worksheet) was used to simulate the groundwater flow and contaminant transport conditions to predict contaminant (fluoride) concentrations from the source at Swamp Creek. Based on the existing hydrogeological conditions and the presence of an ongoing source (the Capped Waste Stockpile), the model estimated a fluoride concentration of 4.3 mg/L at the receptor distance, (approximately 1,000 metres away), compared to the guideline criteria of 1.5 mg/L. This value is considered to be a conservative estimate given the model assumes a continuous source, and more recent works (such as drains that have been installed to intercept and collect groundwater) are considered to have mitigated the source contribution. The report includes figures that graphically display the significant reduction in fluoride concentrations over a short distance from the Capped Waste Stockpile. The removal of the Capped Waste Stockpile as the source of the fluoride would therefore result in a long term reduction in fluoride concentrations. The proposed Capped Waste Stockpile removal methodology described in **Appendix 3L** (referencing Appendix L of Containment Cell Detailed Design Report contained in Appendix 3), including the collection, removal and treatment of leachate and contaminated rain water, would minimise the potential for the remediation works to result in any short term increase in fluoride concentrations in the groundwater plume.
11	Please provide the contaminated site assessment referred to on page 3-24 of the EIS.	These five contaminated site assessments are provided in **Appendix 10**.

Issue No.	Issue	Hydro Response
12	Please provide the remediation and validation report for the Clay Borrow Pit.	The *Clay Borrow Pit Remedial Action Works Plan* (the RAWP) and the *Validation Report: Clay Borrow Pit Area* are provided in **Appendix 11**. The Site Audit Statement for the Clay Borrow Pit is also provided in **Appendix 11**. It should be noted that no material, including Virgin Excavated Natural Material (VENM) remains in the Clay Borrow Pit that needs to be investigated. The RAWP notes that "*Any imported fill that is proposed to be brought to the site during the remediation project is to be VENM or ENM. The history of the source site must show that the site has not been previously contaminated and a visual inspection of the source material is to be conducted. VENM material must be accompanied by a VENM certificate as outlined by the EPA*." The material to be used in the construction of the Containment Cell would comply with this requirement.
13	Please confirm the status of the immobilisation approval.	In its submission to the Department in response to the EIS, as well as in a letter to Hydro dated 6 December 2017, the EPA advised that an immobilisation approval is not required for the placement of material within the Containment Cell.
14	Page 5-28 of Appendix 5 states that 'Leak detection layers combined with leachate collection systems allow for collection and management of leachate. A water treatment system will be established on site to allow for leachate treatment, however if leachate volumes prove to be significantly reduced with time, as is the expectation, then a pump out system or similar may be adopted.' Please provide further details on the leachate treatment system, where it will be located, its capacity and which contaminants it will be capable of treating, how often it will be monitored and by whom.	As discussed in **Section 1.5.4** following further investigations it was concluded that off site leachate treatment at a licensed facility should be nominated as the preferred option. **Section 8.4** describes the methodology for the off site treatment of leachate at a licensed facility. **Section 7.2** provides details on the on-site leachate treatment plant that could treat the collected leachate, including details on its capacity and the contaminants it would be capable of treating. The Containment Cell Long Term Management Plan (the LTMP) presented in **Appendix 12** notes the inspection and monitoring requirements for leachate, including the qualifications required to be held by the person undertaking the monitoring.
15	Page 5-29 of Appendix 5 states that two rounds of groundwater sampling were conducted across the site. Fluoride concentrations ranged between 0.22 and 43mg/L, and aluminium concentrations ranged between 0.08 and 13.6mg/L. Please provide justification as to why more sampling is not required and why this range is acceptable.	The fluoride concentrations beneath the Smelter are elevated compared to the NHMRC (2011) drinking water criteria of 1.5 mg/L, ANZECC (2000) irrigation criteria of 1 mg/L and stock watering criteria of 2 mg/L. It should be noted that groundwater is not used for irrigation or stock watering purposes down gradient of the Smelter. The beneficial uses of groundwater and surface water at and downgradient of the Smelter have been assessed and relate to the discharge to Swamp Creek, which: supports aquatic ecosystems; is used for recreational fishing; and flows into Wentworth Swamp (which eventually flows into the Hunter River). Monitoring of fluoride and aluminium concentrations occurs at several locations within Swamp Creek and Wentworth Swamp. Monitoring results

Issue No.	Issue	Hydro Response
		are generally below, or only slightly above, the criteria. Monitoring would continue at these locations throughout the Works. The EPA concluded in 2013 that the Project Site (including groundwater) did not pose a significant risk of harm to human health or the environment as defined by the *Contaminated Land Management Act 1997*. It must be noted that remediation and demolition of the Smelter would remove the key sources of these compounds within groundwater, and therefore concentrations are expected to continue to reduce.
16	Page 5-29 of Appendix 5 states that free cyanide was not detected above the laboratory detection limit in groundwater samples, aside from a concentration of 7µg/L in a well at the Anode Waste Pile which was below the site guidelines. Please detail the site guidelines.	The site guideline for free cyanide was the ANZECC (2000) guideline for the protection of 95% of fresh water species of 7µg/L. The free cyanide concentrations on site either equalled (in one sample) or were below the site guideline.

17	It is noted that sampling has not occurred at the following locations identified as areas of concern and potential areas of concern:
	
	• west surge pond;
	• 16 substations;
	• area east of the clay borrow pit;
	• diesel spray area; and
	• anode waste pile.
	
	The EIS stated that further soil, groundwater, human health and ecological risk assessments are required in these areas. Please detail the timing of these assessments and how this would fit in with the timing of the remediation.
		Sampling in these areas cannot occur until the following is undertaken:
		
		• West surge pond: Sampling for total fluoride was completed in 2012. Additional analysis for soluble fluoride was completed in 2018, which indicated that remediation of dam sediments is not required.
		• 16 substations and Transformer Yard:
		  • Substations: Substations that will not remain live were progressively demolished and remediated between 2017 and 2018. Remediation involved the excavated of ballast and soil from the footprint of each substation, with validation sampling completed for petroleum hydrocarbons (TRH, BTEX) and polychlorinated biphenyls (PCBs). PCB-impacted soil was disposed off-site as Scheduled Waste to a licensed facility in Victoria for thermal treatment.
		  • Transformer Yard: the Transformer Yard remains live and therefore cannot be accessed to undertake sampling. Following discussions with prospective purchasers about the potential for ongoing use of the transformer yard, Hydro does not currently intend to decommission the infrastructure.
		• Area east of the Clay Borrow Pit: This area was investigated in 2020 following the removal of the ENM Stockpile. Investigation works involved the excavation and sampling of 16 test pits. Minor amounts of foreign materials including concrete and reinforcing bar were observed within some test pits. Laboratory analysis was completed for a wide range of potential contaminants, including heavy metals, aluminium, TRH, BTEX, PAHs, soluble fluoride and cyanide. Concentrations of contaminants indicated that further investigation or remediation is not required.

Issue No.	Issue	Hydro Response
		• Diesel spray area: Remediation and validation works were completed at the Diesel Spray Area in 2019. A total of 681 tonnes of PAH impacted fill material was excavated and stockpiled for placement into the Containment Cell. Validation sampling was then completed, which indicated that the Diesel Spray Area was successfully remediated. • Anode waste pile: Test pitting was completed in 2019 to delineate the lateral and vertical extent of PAH impacted soil in this area. Delineation works identified two areas where remediation via excavation and relocation to the Containment Cell is required.
18	Please confirm how long the leachate treatment system would operate for once the capped waste stockpile contents have been removed.	As noted in Section 8.11 of the EIS the leachate management system would continue to operate until monitoring indicates compliance with the site remediation criteria in Section 9.3 of the RAP. As discussed in **Section 1.5.4** off site leachate treatment is the preferred leachate treatment option. Details on the off site leachate treatment option is provided in **Section 8.4**, while information relating to the on site leachate treatment plant is provided in **Section 7.2**.
19	Page 8-48 Appendix 5 (the RAP) states that leachate within the capped waste stockpile will be drained to a sump and treated through a water treatment plant established on site. Please provide details on the water treatment plant and leachate treatment system including the type of treatment, location, monitoring and interaction between the two systems.	The leachate treatment system described in the EIS is the same as the water treatment plant described in the RAP; they are not two separate systems. **Appendix 3C** provides detail on the estimated quantities of leachate to be treated, and **Appendix 3C** provides the location of leachate management infrastructure at the Containment Cell and **Appendix 25** shows the location of the proposed leachate storage adjacent to the Capped Waste Stockpile. **Section 8.4** describes the preferred option for the pump out of the leachate by a licensed liquid waste contractor for treatment at an off site licensed facility. **Section 7.2** provides an outline on the leachate treatment plant that could treat the collected leachate on site. In the event that an on site leachate treatment plant is to be operated, Hydro would submit a detailed design for the plant to the Department and the EPA for approval.

Issue No.	Issue	Hydro Response
20	Page 9-56 Appendix 5 states that leachate impacted groundwater is readily identified by brown staining. Leachate will be removed from the footprint of the capped waste stockpile until it is no longer visually observed to be present. Please confirm how leachate and groundwater within the capped waste stockpile will be validated and managed, a visual inspection is not considered appropriate.	As noted, the RAP states that "*Leachate will be removed from the footprint of the Capped Waste Stockpile until it is no longer visually observed to be present*." While this is noted as "Visual Validation" in Table 9-1 of the RAP, this is to validate that all observable leachate has been removed: it is not meant as validation in terms of completion of remediation. With regards to validation of the remediation of the Capped Waste Stockpile footprint, Page 9-56 Appendix 5 of the EIS (the RAP) notes the following: • Sampling of the soils within the footprint of the Capped Waste Stockpile. This would confirm that the source of any leachate (contaminated soils and materials) has been removed. • Quarterly monitoring of the downgradient leachate impacted groundwater for fluoride, cyanide, aluminium and pH would continue for two years following removal of the Capped Waste Stockpile. This would be the key indicator that the source of the off-site contaminant (the contaminated material and the associated leachate from the Capped Waste Stockpile footprint) has been appropriately managed. • In the event that fluoride and cyanide concentrations in the down gradient plume have not reduced following two years of monitoring, the contingency response described in Table 7-4 of the RAP would be implemented. As such the RAP (which has been reviewed and accepted by the Site Auditor, as per the Site Audit Statement in **Appendix 6**) appropriately provides for chemical validation for the remediation of the Capped Waste Stockpile footprint.
21	Page 8-48 Appendix 5 states that where groundwater within the excavation (of the capped waste stockpile) is treated (removed), remediation of groundwater will be considered complete. Please confirm how this would be validated to confirm the completion of the remediation, visual inspection is not adequate.	Refer to the response to **Issue No. 20**.

Issue No.	Issue	Hydro Response
22	Please provide the contingency measures in the event that fluoride and cyanide concentrations in the down gradient plume have not reduced following the two years of monitoring.	The RAP incorrectly refers to Table 7.3 of the RAP as the location of remediation contingency measures. These contingency measures, including those applying to groundwater, are actually provided in Table 7-4 of the RAP. Table 7-4 of the RAP notes that the following would be undertaken in the event that fluoride and cyanide concentrations in the down gradient plume have not reduced following the two years of monitoring: • Evaluate the risk to receptors from the remaining concentrations. • Identify suitable active remedial options, such as further interception, that would further intercept/remove fluoride and cyanide impacted groundwater. Investigate other possible options for treatment and/ or management e.g. long term restrictions to groundwater use through a long term management plan. Fluoride and cyanide concentrations in the down gradient plume are expected to reduce once the removal of the source (the Capped Waste Stockpile) has been completed. As there are no other known sources of fluoride and cyanide contributing to the plume, it is highly unlikely that concentrations would not reduce following removal of the Capped Waste Stockpile. As it is unlikely concentrations would not be reducing within two years of removing the Capped Waste Stockpile, and there are no other known contributors to the plume, no specific mitigation measures can be nominated in the event concentrations are not reducing. Investigations would need to be undertaken to determine: the cause and source of the concentrations; if these concentrations present a risk of harm; and what measures need to be implemented.
23	Confirm whether soil testing has been conducted within the irrigation area, please provide the results and the assessment of this area.	Soil sampling of the Irrigation Area was completed as part of investigations for the 2012 Phase 2 Environmental Site Assessment, which is presented in **Appendix 10**. Six samples of topsoil were collected and analysed for aluminium, fluoride, heavy metals and total petroleum hydrocarbons (TPH). One of these samples was also analysed for polycyclic aromatic hydrocarbons (PAHs). Results for aluminium, TPH, heavy metals, benzo(a)pyrene TEQ and total PAHs were below site criteria and consistent with soil concentrations outside of the Irrigation Area. Total fluoride concentrations ranged from 200mg/kg to 510mg/kg. Soluble fluoride is the portion of the fluoride that is available in the environment. Based on laboratory analytical results for soluble fluoride completed by Ramboll, soluble fluoride results are approximately 200 times lower than total fluoride.

Issue No.	Issue	Hydro Response
24	Page 13-71 Appendix 5 states that the contractor is responsible for removing asbestos. Please provide the measures that the contractor will take to remove asbestos.	The methodology for the Capped Waste Stockpile Removal and Management included in Section 8.5 of the EIS and Containment Cell Materials Emplacement and Capping in Section 8.8 of the EIS was prepared on the basis that the Capped Waste Stockpile material contains asbestos. The Constructability Assessment included in the Containment Cell Detailed Design Report in **Appendix 3L** also addresses how the material is to be managed on the basis it is asbestos containing material. Section 13.1 of the RAP describes the Asbestos Management Protocol that applies to an unexpected discovery of asbestos containing material (as described in Table 13-1 of the RAP). As the protocol would apply to the unexpected asbestos it therefore excludes that known to be present in the Capped Waste Stockpile and in soils stockpiled at the Smelter. Section 13.1.2 of the RAP identifies more specific details on the measures to be implemented by a licensed asbestos removal contractor in the unlikely event that unexpected asbestos containing material is encountered by the Remediation Contractor.
25	Detail how the spent pot lining will be treated including the treatment method and where it will be treated before it is disposed of in the containment cell.	Refer to the response to **Issue No. 2** for how the stored spent pot lining is managed. The Capped Waste Stockpile contains mixed smelter waste, which includes weathered spent pot lining. As discussed in **Section 7.1** and detailed in the Options Study presented in **Appendix 1** and **Appendix 2**, the option of sorting and/ or treating spent pot lining disposed of in the Containment Cell was considered. Following preparation of the Options Study, and subsequent consultation with the EPA, it was concluded that the gypsum application methodology described in **Section 8.2** would be implemented for the Capped Waste Stockpile material.
26	Please detail the contaminants of concern within the stacks.	There were no contaminants of concern within the stacks. A review of the stack as built design drawings indicated that no hazardous materials (such as asbestos containing materials) were used in the construction of the stacks. Asbestos roping was used in the steel ductwork that connects to the stack. This asbestos was removed by a licensed contractor prior to demolition of the stack. Demolition of the stacks was removed from the Project. It has been approved as part of the Development Consent for Stage 2 Demolition (DA 8/2018/46/1) granted by Council on 9 May 2018. The stacks were successfully demolished on 9 May 2019.

Issue No.	Issue	Hydro Response
Water		
27	Please provide a stormwater assessment of the site during construction and operation including a plan showing surface water flows, sumps, drainage lines, dams and treatment systems (including surface water and leachate). The stormwater assessment should include a water balance including the amount of impervious area, the storage capacity of any sediment basins, discharge points, and water quality objectives. The stormwater management of the capped waste stockpile should not be left up to the contractor.	**Appendix 13** presents the Stormwater Management Report that includes the following: • The predicted flood levels (1% Annual Exceedence Probability Level and Probable Maximum Flood Level) of the adjacent watercourses • A hydrological model of the unnamed watercourse • The key elements of the Smelter water management system (including storage capacity) • A water balance for the Smelter during the Works (accounting for the hardstand areas of the Smelter and the use of collected surface water in dust suppression). Further information on the water balance are presented in **Section 7.3**. Section 8.2.1.2 of the EIS notes that "*in addition to the continued operation of the existing Smelter water management system, additional initial and long term soil and water management controls would be installed. This would include installation of sediment fencing and hay bales downstream of the Containment Cell, the Capped Waste Stockpile, haul road footprint and other earthworks areas, as well as surface water diversion drains for the Containment Cell and other earthworks areas*." A Soil and Water Management Plan (SWMP) for the decommissioning and demolition activities at the Smelter has been prepared by Hydro as part of an overarching EMP. The Demolition Contractor was required to prepare a Demolition SWMP that complied with the Hydro EMP. This included the development and implementation of an Erosion and Sediment Control Plan that has been regularly revised as required to reflect the changing nature of the demolition activities. This process would continue at the Smelter, with the Hydro EMP (including SWMP) revised to incorporate the Project; the Remediation Contractor would be required to prepare a Remediation Works EMP (including SWMP) that complied with the over-arching Hydro EMP. **Appendix 3J** includes the Erosion and Sediment Control Plan that would be implemented during construction of the Containment Cell. This would be incorporated into the Remediation Works EMP (including SWMP). Erosion should not occur at the Containment Cell following capping and vegetation establishment. The LTMP presented in **Appendix 12** includes measures and actions to be implemented in the event that erosion, or events that could lead to erosion (such as loss of vegetation, occur,

Issue No.	Issue	Hydro Response
		The Response to **Issue No. 28** notes how stormwater and leachate would be managed as separate systems: a discharge of treated water from the leachate treatment plant (if the system described in **Section 7.2** is used) to the Smelter water management system would be the only way that the stormwater management system and leachate management system interact. **Section 7.2** outlines the leachate treatment plant that could be used at the Project Site. This includes details on its potential mobility. The Response to **Issue No. 28**, **Appendix 3C** and **Appendix 3L** describe how leachate and clean water at the Capped Waste Stockpile would be separated and managed. The Project is not expected to affect water flows upstream or downstream of the Project Site as: • Only a small section of the Project Site is below either the 5% or 1% Annual Exceedence Probability (AEP) flood level. The elements below these levels would not include any filling that would result in a change to upstream or downstream flows or flood levels. • As noted in response to **Issue No. 30**, the bridge over the unnamed ephemeral watercourse would be designed to maintain existing flows. It would also have a construction methodology that would not have an adverse impact on water flows in the event of a storm event. As shown in the water balance presented in **Appendix 13** the Project would not require any increase in discharges from the Smelter. Hydro is owner of the Smelter and the Project proponent, and therefore has the overall responsibility for environmental management and compliance. The successful Remediation Contractor would, however, be responsible for remediation of the Smelter (including excavation of the Capped Waste Stockpile) on behalf of Hydro, with appropriate compliance monitoring and auditing undertaken by Hydro as outlined in Section 24.2 of the EIS. The Works described in the EIS would be the responsibility of a Remediation Contractor, including the Capped Waste Stockpile material removal and the associated water and leachate management. Hydro would retain overall responsibility for the Works and the Smelter. This includes: • The implementation of an overarching Decommissioning, Demolition and Remediation Works EMP. Hydro has prepared this EMP for existing activities at the Smelter, which would be upgraded to incorporate the Project, including the commitments in the EIS and this RtS, as well as Development Consent requirements. • The monitoring and auditing of the Remediation Contractor's compliance with the Development Consent and the EPL.

Issue No.	Issue	Hydro Response
		The contract for the Remediation Contractor would clearly describe the environmental obligations and requirements. This would include preparation and implementation of their own Remediation Works EMP (compliant with the Hydro EMP) with specific environmental management procedures. This approach has been successfully implemented by Hydro with the Demolition Contractor on Stage 1 Demolition. Such contractual arrangements for environmental management requirements are regularly implemented on major projects where contractors undertake works.
28	The EPA considers any surface water that has come in contact with contaminated material to be leachate, please detail how leachate and surface water would be managed on the site.	The Works methodology presented in Section 8 of the EIS and the information provided in **Appendix 3C** and **Appendix 3L** describe a number of measures to be implemented to separate clean water from the exposed Capped Waste Stockpile material, the working area of the Containment Cell, and collected leachate. This includes: • Management of stormwater runoff from the majority of the Project Site as clean water, which would continue to be collected and managed within the existing Smelter water management system. • Stormwater would be diverted around the Containment Cell and would be directed to the three sediment detention basins via a series of culverts and swales. Any sediment would be collected prior to discharge to the unnamed watercourse. • The Containment Cell would be constructed with four initial internal cells, separated by internal bunds. Material would be placed within one internal cell at a time: this would allow any rain collected within unfilled cells to be managed as clean water; only water within the filled cell would need to be considered and managed as leachate. • Minimising the area of the Capped Waste Stockpile uncovered at any time. This would allow water from the remaining capped area to be diverted away from the exposed material and managed as clean water; only the water from the exposed material would need to be considered and managed as leachate. • Retaining, maintaining and (if required) improving the clay bund (that originally surrounded the perimeter of the stockpiled waste prior to its capping) to contain leachate and stop surface water entering the area. This clay bund is visible at the base of the capping to the stockpile. • Leachate generated and collected during both the Works (would be stored as shown in **Appendix 3L** at the Containment Cell, and as shown in **Appendix 25** for the Capped Waste Stockpile. Leachate stored in these locations would either be treated off site as described in **Section 8.4** (which is the preferred leachate treatment approach) or on site as described in **Section 7.2.**

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		The key elements of the existing Smelter water management system are shown in **Appendix 13**. This includes the open and covered main drains, and the dams. These elements would be retained and maintained as required throughout the Works. As noted in the EIS all but the North Dams would be removed and filled prior to completion of the capping of the Containment Cell. At this time demolition and remediation is expected to be complete and therefore rain water generated within the Project Site would be managed as clean water.
29	Please show all nearby watercourses on a plan, including: • Wentworth Swamp; • Swamp Creek; and • Ephemeral ponds and watercourses.	**Appendix 14** includes a figure showing these watercourses.
30	The EIS states the unnamed watercourse is an ephemeral watercourse. Construction would require temporary blockage of the unnamed watercourse. In the event that a rain event occurs during the temporary blockage, flows would be diverted around the construction works. Please provide the location of the diverted watercourse and associated environmental impacts.	As discussed in Section 8.2.6.2 of the EIS a culvert is proposed to be constructed at the unnamed watercourse as part of the haul road connecting the Capped Waste Stockpile and the Containment Cell. The detailed design of the unnamed watercourse crossing culvert is presented in **Appendix 3J**. The structure has been designed consistent with the culvert upgradient on the unnamed watercourse for the Hunter Expressway. As noted in the EIS, the unnamed watercourse is ephemeral. As such it is expected that for most of the construction period there would be no or minor flows within the watercourse. Section 8.2.6.2 of the EIS does note that construction would require temporary blockage of the unnamed watercourse, which may require flows to be diverted around the construction works during a rain event. Given the design, size and nature of the crossing (the culvert), and the watercourse formation, it is not expected that the watercourse would be completely blocked when water is in the creek. In the event that any diversion is required, it would remain within the watercourse formation itself. In the event that a major storm event was predicted, construction would cease and materials and equipment would be appropriately removed or secured to allow flows to occur unimpeded.

Issue No.	Issue	Hydro Response
31	It is noted that two aquifer systems are present at the site, one shallow aquifer within alluvium and one deeper aquifer within the underlying bedrock/residual clay. Please confirm the depths of the aquifers and whether the containment cell intercepts these aquifers and how groundwater infiltration would be managed. This should be provided within a groundwater assessment.	The shallow aquifer is located at depths ranging between 0.3m below ground surface (bgs) and 2.5m bgs. The deep aquifer was located at depths ranging between 7m bgs and 11m bgs during drilling and between 3.5m bgs and 7m bgs during subsequent sampling, which indicates that the deep aquifer is confined. The shallow aquifer exists only in the eastern portion of the Smelter and immediately east of the Smelter, associated with complex interbedded Quaternary sediments comprising estuarine muds, fluvial channel sands, sandy levee deposits and high energy flood deposits, as reported in ENVIRON (2016) *Hydro Aluminium Kurri Kurri Smelter, Capped Waste Stockpile, 12 Month Groundwater Monitoring Report*. The Containment Cell is proposed to be located to the west of the smelter. The geology in this area comprises a veneer of topsoil overlying a profile of weathered in-situ siltstone/ shale/ sandstone as residual sandy silty clays and gravelly clays becoming extremely weathered rock, with groundwater present in the secondary porosity of the underlying rock profile, confined by overlying clays. Ground conditions at the proposed location of the Containment Cell are reported in ENVIRON (2015) *Preliminary Geotechnical Investigation, Proposed Containment Cell Site, Clay Borrow Pit* which is provided in **Appendix 15** The geotechnical conditions, including depth to groundwater, at the proposed Containment Cell location, were further investigated in the Geotechnical Assessment presented in **Appendix 3D** as part of the Containment Cell Detailed Design Report. It found that the base of excavation for the Containment Cell would be between one to three metres above groundwater. As such groundwater is not expected to be intercepted during construction.

Issue No.	Issue	Hydro Response
32	Detail the fate of the sediment ponds at the end of the project.	Sediments from the two North Dams have previously been analysed and do not require removal. Hydro proposes that the dams would remain at the completion of the Project. Towards the end of the Works, the leachate basins constructed for the Project would have contaminated material removed (including the HDPE liners) and disposed of within the Containment Cell (at this stage the level of leachate would be manageable and transported off site for treatment). These dams would then be filled with suitable material. The sediment detention basins to be constructed at the Containment Cell would not collect contaminated water or leachate (only rain water from clean surfaces). Once it is determined that there is sufficient vegetation cover on the Containment Cell these basins would be decommissioned and filled with appropriate material. No sediments would need to be removed from the basin prior to filling. As discussed in Section 8.6.1.2 of the EIS the sediments in the west, east and south surge ponds may potentially need to be placed in the Containment Cell if it is determined they are contaminated. The fate of these ponds would be determined as part of the Final Landform Plan which would be prepared during the Works and submitted to the Department and the EPA.
33	Page 8-49 Appendix 5 states that the extent of sediments impacted by PAHs in the drainage lines associated with the East Surge Pond are shown on Figure 7. Sediments from these drainage lines are to be excavated and stockpiled for dewatering prior to relocation into the Containment Cell. Please detail how these drainage lines would be managed in the event of rain, and their final landform.	As discussed in Section 13.2.2 of the EIS the East Surge Pond forms part of the existing Smelter water management system, and ultimately drains to the North Dams. Sediment removal from the East Surge Pond would be one of the last tasks prior to capping of the Containment Cell. or leachate (only rain water from clean surfaces). If deemed necessary following sample analysis, contaminated sediments from the East Surge Pond would be placed in the Containment Cell. It is envisaged that any runoff through this area resulting from a rain event during sediment removal would continue to drain to the North Dams. It is anticipated the demolition and other remediation activities would have been completed at this stage, removing the primary potential sources of contaminants and thereby reducing the potential for contaminated water generation.

Issue No.	Issue	Hydro Response
Financial Assurance		
34	Please provide an independent review of the costing details of the long term management and maintenance of the containment cell for the life of the cell	Quantity surveying firm Muller Partnership prepared an independent costing of the long term management and maintenance activities at the Containment Cell, based on the activities described in the LTMP (as described in response to **Issue No. 37** in this table and provided in **Appendix 12**). The Muller Partnership independent costing was reviewed by the Department's consultant Senversa in November 2018 (refer to **Table 4-3**In response to this review some minor adjustments were made. The independent costing (including these minor adjustments) is provided in **Appendix 16**.
Containment Cell		
General		
35	Please detail the depth of excavation required for the containment cell.	The Containment Cell Detailed Design is provided in **Appendix 3**. The drawings presented in **Appendix 3J** include cross sections that present the depth of excavation for the Containment Cell. These drawings show that the maximum depth of excavation is approximately 5.6m below the existing ground level. The Geotechnical Assessment presented in **Appendix 3D** included investigations of the depth to groundwater within the proposed Containment Cell footprint. The Geotechnical Assessment found that the base of excavation for the Containment Cell would be between one to three metres above groundwater. As such groundwater is not expected to be intercepted during construction. The distance between the base of the Containment Cell and groundwater was one of the key criteria for selection of the proposed Containment Cell Location.
36	Provide a detailed justification for the type of containment cell proposed based on the contaminants of concern and best practice.	The primary justification for the Containment Cell design is to comply with the EPA *Environmental Guidelines: Solid waste landfills* (2016). These guidelines apply to landfills in NSW used for the disposal of general solid waste and restricted solid waste. Under the *Protection of the Environment Operations (Waste) Regulation 2014* the material to be placed in the Containment Cell would be considered restricted solid waste when untreated, and would be characterised as general solid waste following treatment. As such it is considered the applicable guideline to be followed for the design of the Containment Cell. The capping and base designs for the Containment Cell, including the leachate and gas management systems, have been developed in accordance with this guideline. The cell has been designed to keep the encapsulated material dry, but (in accordance with the guidelines) includes a leachate management system that allows leachate, if generated, to

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		be collected. Similarly despite the likelihood that only low levels of gas would be generated, it includes a gas collection system. The Options Study in **Appendix 1** and **Appendix 2** provides a detailed justification for the Containment Cell.
37	The Department notes that a number of matters are deferred to the Operation Environmental Management Plan (OEMP) for the containment cell. To ensure these matters are assessed, a draft OEMP is to be submitted.	The monitoring, management and maintenance requirements of the OEMP (which is now titled the Containment Cell Long Term Management Plan) (the LTMP) are detailed in the LTMP presented in **Appendix 12**.
Engineering		
38	Please provide a geotechnical assessment of the Clay Borrow Pit and demonstrate that it is a suitable location for a contaminant cell.	Ground conditions at the proposed location of the containment cell are reported in ENVIRON (2015) *Preliminary Geotechnical Investigation, Proposed Containment Cell Site, Clay Borrow Pit*, as provided in **Appendix 15** and are also addressed in the Containment Cell Detailed Design Report in **Appendix 3D**.
39	Please provide the validation requirements for the construction of the containment cell as stated on Page 9-51 Appendix 5.	As noted in Section 9 of the RAP (Appendix 5 of the EIS) the Validation requirements for the Containment Cell form part of the Containment Cell Detailed Design. The Detailed Design would be amended if required to reflect applicable Development Consent conditions and requirements of the Department, the EPA and the Site Auditor. Section 9 of the RAP also notes that the Containment Cell Validation Specification would follow the principles outlined in Section 9 of the RAP and be suitable to attain a Part A Site Audit Statement from the Site Auditor.
40	Please detail the contingency measures for containment cell leaks including leak detection.	The Project includes a number of measures to avoid a Containment Cell leak from occurring, or to minimise the potential impact in the unlikely event that a leak occurred: • Location: as discussed in Section 5.3.6 of the EIS the Containment Cell is located in an area underlain by low permeability residual clays and bedrock; acceptable distance to groundwater; above the 1% AEP and Probable Maximum Flood (PMF) levels; and approximately 300 metres from a watercourse. In addition, the modelling presented in **Appendix 17** concluded that in the unlikely event that a leak occurred, an estimated volume of 4L per year (compared to 400L per year of leachate generated within the Containment Cell) would leak from the Containment Cell and that (using both a reasonable conservative assessment and a highly conservative assessment using a time-variant solution set at 100 and 10000 years, respectively) following the entry of leachate into the groundwater no leachate migration would occur to any significant distance from the source and would not travel to the surface water receptor.

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		A volume of 4L per year for a leak was based on 1% of the maximum predicted long term annual leachate generation. This was considered an appropriate, and conservative, rate based on the highly unlikely event that every layer within the Containment Cell barrier system failed and leaked. • Design: The Containment Cell Detailed Design presented in **Appendix 3J** incorporates measures to (a) avoid the conditions that could generate a leak; (b) allow collection of the leachate for removal and treatment; and (c) in the event that a leak did occur, allow for its detection and management. • Quality Control: The quality control procedures described in **Appendix 3I** in the Containment Cell Detailed Design would be implemented so that the Containment Cell design and material placement are undertaken in accordance with the design and in a manner which minimises the potential for future leaks. • Material Management: The construction of the Containment Cell and placement of material within the cell would be managed to minimise and manage any water that enters the cell. Rain water that falls in the section of the Containment Cell subject to material placement would be captured and treated. Material removal and transportation from the Capped Waste Stockpile would cease during rain events to minimise the residual moisture that would be in the material before it is placed in the cell. • Monitoring and Management: The monitoring and management measures described in the LTMP (refer to **Appendix 12**) would identify any damage that could lead to a potential leak or the generation of leachate that needs to be removed for treatment. The LTMP also notes the measures to be implemented to remove the 400L/ year of leachate treated within the Containment Cell for treatment (either on site as described in **Section 7.2** or off site as described in **Section 8.4.2**).
41	Please provide the construction methodology, including construction quality assurance procedures, and timeframes for the construction of the containment cell.	The construction methodology and the quality assurance procedures are described in the Containment Cell Detailed Design Report in **Appendix 3L** and **Appendix 3I** respectively. **Appendix 3N** includes the Preliminary Construction Schedule for the Containment Cell.
Leachate Management		
42	Please confirm how water entering the containment cell will be managed.	**Appendix 3L** of the Containment Cell Detailed Design Report details how water entering the Containment Cell during material placement would be managed. The LTMP in **Appendix 12** describes the measures to be implemented to manage leachate within the completed Containment Cell.

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43	Please detail the containment cell leachate treatment system, the daily volume of leachate anticipated, where the leachate will discharge to and its capacity.	Modelling of leachate generation within the Containment Cell prior to and following capping of the cell has been undertaken as part of the Containment Cell Detailed Design Report presented in **Appendix 3C**. The modelling indicates that annual leachate generation is predicted to peak at approximately 1,948 kL per month during material placement, through to 3884 kL in the first year following capping, before reducing to 388L per year after five years of capping. As discussed in **Section 1.5.4** management of leachate at all stages of the Project would be through regular (during the Works) or periodic (following completion of the Containment Cell, as defined in the LTMP presented in **Appendix 12**) pumping out of the leachate collection sump before the leachate is: • Transported by a licensed liquid waste contractor for treatment at an off site licensed facility as described in **Section 8.4**; or • Treated by an on site leachate treatment plant as outlined in **Section 7.2** As discussed in **Section 1.5.4** off site treatment is now the preferred leachate treatment option. One or both of these methods, however, could be implemented. **Section 8.4** and the LTMP presented in **Appendix 12** discuss how the leachate pump out and off site treatment would be managed.
Waste Management		
44	Please provide an assessment of how waste will be placed/ compacted in the containment cell to avoid subsidence.	The primary factor that would minimise the potential for subsidence is the nature of the material. The material is non-putrescible, and it would not contain items typically found in municipal landfills that could rust and deteriorate, resulting in voids that could further lead to subsidence. The isolation from water provided by the capping would further minimise the potential for subsidence. **Appendix 3L** includes details on how the Contractor would be required to deliver, place and compact the material. Hydro has invited experienced civil contractors experienced in this type of work to tender for the Remediation Contractor role. The Technical Specification issued to the tenderers has a required waste compaction density of 1.6T/m^3. All waste going into the Containment Cell would be weighed and regular surveys of the material placed within the Containment Cell would be undertaken in order to monitor the density on a macro scale.

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45	Please provide the measures to ensure that the waste in the containment cell is securely contained and that there will be no migration of contaminants from the containment cell that could pose a significant risk of harm to human health or the environment (e.g. volatilisation to air or entering the surface or groundwater).	As noted in response to **Issue No. 36**, the Containment Cell design has been developed in accordance with the EPA *Environmental Guidelines: Solid waste landfills* (2016). This is the primary assurance that the waste would be securely contained, and contaminants would not migrate and pose a significant risk of harm to human health or the environment. The modelling presented in **Appendix 17** concluded that in the unlikely event that a leak occurred, an estimated volume of 4L per year (compared to 400L per year of leachate generated within the Containment Cell) would leak from the Containment Cell and that (using both a reasonable conservative assessment and a highly conservative assessment using a time-variant solution set at 100 and 10,000 years, respectively) following the entry of leachate into the groundwater no leachate migration would occur to any significant distance from the source and would not travel to the surface water receptor. The quality control procedures presented in **Appendix 3I** would confirm that the Containment Cell has been constructed in accordance with the design, and therefore the EPA guidelines. It should be noted that the EPA concluded in 2013 that the Project Site, including the existing Capped Waste Stockpile, did not pose a significant risk of harm to human health or the environment as defined by the *Contaminated Land Management Act 1997*. It is considered highly unlikely that remediation of the Smelter and a purpose built Containment Cell designed, constructed and managed in accordance with the EPA guidelines would increase the risk of harm to human health or the environment above existing levels.

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46	Please provide a comprehensive characterisation of materials that will be placed into the containment cell (including asbestos), to determine that they will be compatible for long term storage, noting that different types of waste require different management systems and treatment.	Since preparation of the EIS, additional investigations have been undertaken of the contents of the Capped Waste Stockpile, including six core samples taken through the entire depth of the material. Details on the characteristics of the Capped Waste Stockpile based on these cores, including the results of sample analysis, are provided in **Appendix 1(2)** and **Appendix 4**. The results presented in **Appendix 1(2)** and **Appendix 4** confirm the conclusion of the EIS that, due to the nature of the materials to be placed in the Containment Cell, there are no compatibility issues. No compatibility issues have been encountered with the materials within the Capped Waste Stockpile: the other wastes to be placed in the Containment Cell are the same or similar to those in the Capped Waste Stockpile and therefore there should also be no compatibility issues once in the Containment Cell. One of the factors that influenced the Containment Cell design is the fact that the materials do not need to be isolated or separated due to compatibility issues. **Appendix 2** describes how gypsum would be applied to the Capped Waste Stockpile material so that it complies with the leachable fluoride levels in the CCO. In assessing the gypsum application option Hydro assessed if the gypsum (or by-products from its reaction with water) presented any compatibility issues. No such issues were identified.
47	Please provide details on the waste tracking system to ensure that materials placed within the containment cell can be easily located or relocated as required. The system shall include measures for documenting the classification, location, volumes and any treatment of the deposited waste.	The specification for the Remediation Contractor would include the requirement for the development of a Project Site waste recording and management system that collects this information, and would be retained and accessible during construction and material placement, as well as following completion of the cell. As discussed in **Section 8.2** this would also include records from the weighbridge to be used for the Capped Waste Stockpile material (to determine the quantity of gypsum to be applied). These requirements would be incorporated into the Remediation Environmental Management Plan that would be submitted for approval by the Department, the EPA and the Site Auditor prior to the commencement of the Works.
48	Please provide a strategy to manage any hot spots found during the remediation of the site.	The most likely outcome of any hotspot encountered during remediation would be the need to dispose of additional soils within the Containment Cell. Section 7.5 of the RAP (Contingency Plan) notes that the Containment Cell design has capacity for an additional 50% of material above the amount estimated in the EIS.

Issue No.	Issue	Hydro Response
Human Health Risk Assessment		
49	Confirm whether the Human Health Risk Assessment considered future employees of the industrial estate.	With regard to the areas of existing contamination, the RAP set out the validation criteria for the Project Site which is appropriate for commercial and industrial land use, as set out in the *National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013*. The Project Site would not be redeveloped for commercial or industrial land use prior to being validated. With regard to consideration of the future land users, the Human Health Risk Assessment (HHRA) (Appendix 12 of the EIS) was conducted based on the Project Site having met the appropriate criteria. Regarding the potential human health risk from the Containment Cell, Section 8.5 of the HHRA considers the "Health Risks Associated with the Containment Cell". Section 11 (Conclusions) of the HHRA notes that "*Potential health risks due to the Containment Cell were also considered to be low and acceptable because the proposed design excludes water from entering the cell, thereby stopping the generation of leachate and minimising the potential for gas generation*". These findings would apply to the future employees of an industrial estate that may be developed at the Project Site.
50	Page 11-69 Appendix 5 states that a site specific health and safety plan detailing procedures and requirements that are to be implemented will need to be developed for the remediation works. A draft health and safety plan should be provided.	The RAP (as noted) and Section 8.1.2 of the EIS note the need for a Work Health and Safety Management Plan (WHSMP). A WHSMP is already in place for the current activities at the Smelter. **Appendix 18** includes an outline of the Works WHSMP based on this existing plan and the commitments in the EIS. This WHSMP identifies the potential health and safety risks associated with the Project and the measures to be implemented to mitigate these risks.
51	Page 58 of Appendix 12 states that no soil data has been collected from the capped waste stockpile and the vapours and gases that will be produced when the capped waste stockpile is exposed are unknown. Please detail how the safety of workers would be monitored and managed if the soil contaminants, vapours and gases are unknown.	Page 58 of the HHRA also notes that despite no soil samples being taken from the Capped Waste Stockpile at the time of the HHRA, the wastes and materials within the Capped Waste Stockpile is "*relatively well understood*". The HHRA referred to the Phase 2 Environmental Site Assessment (ENVIRON, 2012) which documented the known and potential contents of the Capped Waste Stockpile. The findings of subsequent investigations of the Capped Waste Stockpile (refer to **Appendix 1(2)**) were consistent with the information used to inform the HHRA. These investigations included taking six full depth core samples from the Capped Waste Stockpile for analysis and the subsequent treatability studies. With regards to the statement that vapours and gases generated when the Capped Waste Stockpile material is exposed and removed, the HHRA then goes on to note that subsurface gas monitoring has been undertaken to determine what gases are likely and are generated.

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		Based on this information the HHRA has been conservative in its conclusion with regards to the contents of the Capped Waste Stockpile and gas generation, which is reflected in its recommendations in Section 11 of the HHRA.
52	Page 64 Appendix 12 states that potential health risks due to the containment cell were also considered to be low and acceptable because the proposed design excludes water from entering the cell, thereby stopping the generation of leachate and minimising the potential for gas generation. If this is the case why is a leachate collection layer required?	As has been noted in response to other issues, the Containment Cell design is prepared in accordance with the EPA *Environmental Guidelines: Solid waste landfills* (2016). This includes the requirement for a leachate collection system. In addition, while the Containment Cell is designed to avoid generation of leachate, the leachate collection system is proposed as a further contingency in the event that leachate is generated, either through residual moisture in the material when the cell is capped, or in the unlikely event of a leak in the cap. It would also capture leachate and contaminated rainwater from within the Containment Cell prior to the final capping of the Containment Cell.
53	Provide details on the engineering controls that will be used to manage the exposure of contaminants to employees and the associated environmental impacts with these engineering controls ie decontamination shed.	One of the key approaches that Hydro has taken to protect employees from contaminants when undertaking remediation activities is to avoid tasks where there is the potential for exposure. As discussed in Section 5.3.3.2 of the EIS, and confirmed in the Options Study (**Appendix 2D**), a key issue associated with the option of sorting and cleaning potentially recyclable materials within the Capped Waste Stockpile is the significantly increased risk to human health through exposure to contaminants. Categorising, sorting and cleaning of the materials would require personnel to be close to the material. Given the difficulties in categorising many of the wastes in situ, as well as the high likelihood that material is cross-contaminated by asbestos (requiring intense cleaning, but not being able to guarantee it is free of asbestos), there is no environmental or economic benefit to be gained by putting personnel at increased risk in such conditions. Further, as Hydro could not guarantee that potentially recyclable material would be free of asbestos, recycling facilities cannot accept this material (both from regulatory and human health protection perspectives). By dealing with the Capped Waste Stockpile as one material source the risk to personnel (both on site and off site) is significantly reduced. By handling the Capped Waste Stockpile material in this method, the time required to relocate the material, and therefore have material exposed, is reduced (as presented in **Appendix 2B** the separation and cleaning of potentially recyclable materials from the Capped Waste Stockpile would triple the time that the Capped Waste Stockpile removal would take).

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		The other proposed approach to protect personnel from exposure to contaminants is separation: by distance and/ or physical separation. This includes: • All material from the Capped Waste Stockpile and other contaminated locations would be excavated and transported to the Containment Cell by personnel within machinery in enclosed cabins that would have appropriately filtered air conditioning units. As noted in Section 22.4 of the EIS, real-time ambient air monitoring would be undertaken inside machinery housings, and workers within these housings would also have appropriate respirators available for use if required. • The construction methodology described in **Appendix 3L** notes that material will be placed into the Containment Cell by using spotters around the perimeter of the cell during the first three to four metres of waste placement. These spotters would be a safe distance from the actual material placement activities, and would be provided appropriate personal protective equipment. Wherever possible, Hydro proposes to avoid "double-handling" of contaminated materials. This reduces the potential for generation of airborne contaminants, as well reducing the number of tasks requiring employees to handle contaminated material. Contaminated material would be excavated and placed into the back of the truck for transportation to the Containment Cell. As discussed in Section 22.4 of the EIS and within the HHRA, where personnel do need to undertake manual activities in or near the Capped Waste Stockpile and other contaminated materials, they would be provided with appropriate personal protective equipment, including masks or respirators as appropriate as well as a wet decontamination unit if required. A number of the proposed controls that would be used to manage the exposure of contaminants to employees relate to Stage 2 Demolition activities, which has been withdrawn from the SSD Application. These measures, however, have been described in the Stage 2 Demolition EIS approved by Cessnock City Council (DA 8/2018/46/1).

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Capped Waste Stockpile		
54a	Page 8-48 Appendix 5 states that the capping from the capped waste stockpile will be removed, with separation of the capping layers and stockpiling for later reuse. Please detail where the capping will be re-used and why the existing capping is suitable for re-use.	Investigations of the Capped Waste Stockpile (as described in **Appendix 1(2)** and **Appendix 4**) concluded that greater than 80% of the clay capping remains uncontaminated and suitable for reuse where clay is required in the Containment Cell. During the capping material removal the clay would be sampled and analysed to determine if it is geotechnically and chemically suitable for use in the construction of the Containment Cell capping. Where it is deemed unsuitable for the Containment Cell capping it would be used as the seal bearing layer underneath the geosynthetic clay liner and the LLDPE liner in the Containment Cell. Therefore any unsuitable clay (and any potential contaminants) would be contained within the Containment Cell.
54b	Page 9-56 Appendix 5 states that sampling and analysis of capping soils to demonstrate suitability for reuse will be undertaken from soil stockpiles. Samples will be collected at rates of one per 1000m^3. Please justify why one sample per 1000m^3 is considered acceptable and provide the management measures to ensure reuse of the capping does not result in contamination of the containment cell or other areas.	This rate of sampling, particularly with a significant quantity of material, is an accepted approach. It provides sufficient results to provide a statistically acceptable number of results to characterise the material. If these results do not provide a clear result additional samples would be analysed.
55	Page 8-48 Appendix 5 states that the capping layers will be removed in stages to minimise the surface area of waste exposed to rainfall. Please detail the stages and how the exposed waste will be managed during rainfall.	The detailed methodology, program and stages of the cap removal would be developed by the Remediation Contractor, consistent with the methodology presented in **Appendix 3L** and the preliminary schedule presented in **Appendix 3N**. With regards to the management of the exposed waste during rainfall, Section 8.5.4 of the EIS states that "*Removal of waste materials would cease in rain events and the exposed stockpile materials covered. The exposed area would be covered either with the stockpiled wet weather cover material or an alternative cover (such as plastic sheeting)*". **Appendix 3L** provides further information on the management of the Capped Waste Stockpile during rain events.
56	Intrusive investigations have not been undertaken at the capped waste stockpile. Please confirm whether sampling would be undertaken as the capped stockpile is excavated? Please demonstrate how the environmental and safety impacts can be managed if the contaminants are not fully known.	As noted in response to Issue No. 46, since preparation of the EIS additional investigations have been undertaken of the contents of the Capped Waste Stockpile, including six core samples taken through the entire depth of the material. Details on the characteristics of the Capped Waste Stockpile, based on visual observations and the results of sample analysis, are provided in **Appendix 1(2)** and **Appendix 4**.

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Waste		
57	Please detail the location of the recyclable materials storage area and recycled materials stockpile (see Page 8-48 Appendix 5)	Section 8.2.5 of the EIS describes the stockpile areas and how they would be managed. Figure 8-1 of the EIS shows the storage and stockpile areas. The specific location of stockpiles for recyclable materials within these areas would be developed in consultation with the Demolition Contractor.
58	Page 8-48 Appendix 5 states that where spent pot lining is identified to be reactive by visible emission of gas, the contractor will segregate this material to a treatment area. Please explain how employees would be able to visibly identify the gas and provide an alternative method to visible gas detection. Please identify the location of the spent pot lining treatment area and how the spent pot lining would be treated.	Reference to the "visible emission of gas" from reactive spent pot lining was based on a requirement of the EPA letter dated 24 July 2015 to include such a measure. Analysis and investigations undertaken by Hydro determined that only spent pot lining recently removed from the pot and fully immersed in water for an extended period provides a small visual indication of a reaction: no visible gases or reactions from moist spent pot lining occur. Gas testing undertaken in accordance with the Organisation for Economic Co-operation and Development (OECD) Dangerous Goods Class 4.3 testing requirements concluded that "*No gas, including flammable gas, was observed to evolve throughout the duration of the test for each sample*". The laboratory analysis report is presented in **Appendix 2C**. Further to this, the spent pot lining within the Capped Waste Stockpile had been exposed to rain water, and therefore subject to reactivity and weathering, for between two to 25 years prior to placement of the capping in 1995. As no visibly reactive spent pot lining would be encountered no treatment, and associated treatment area, would be required.
59	Please detail how waste will be managed to ensure recyclables do not enter the containment cell.	The vast majority of recyclable wastes would be demolition wastes, including concrete, brick and metals. Section 8.7.6 of the EIS discusses the types and estimated quantities of these recyclable wastes. This section also describes the waste management and recording system that would be implemented to record the quantities of wastes being removed from a location and its arrival at the stockpile location or the crushing plant. As described in **Section 8.2** this would also include records from the weighbridge used for the Capped Waste Stockpile material (to determine the quantity of gypsum to be applied). Section 8.5.4 of the EIS noted that potentially recyclable (scrap metals) materials in the Capped Waste Stockpile would be removed from materials by an excavator (where possible) and stockpiled for cleaning. However, the Options Study (**Appendix 1** and **Appendix 2**) concluded that this was unviable. This is further discussed in **Section 8.3**.

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Noise		
60	Please detail why works outside of the standard construction hours are required. Noting that noise levels are expected to exceed the sleep disturbance criteria at some sensitive receivers.	Section 8.12 of the EIS notes that most of the Works would occur during standard construction hours. However, this section also listed benefits to the Project, the environment and surrounding community presented by the ability to undertake such activities outside standard hours. There are a number of activities that may need to be undertaken outside of standard construction hours, including (but not limited to): • The welding of Containment Cell lining. Due to the time to undertake the welding, and the climatic conditions required for the welding to be undertaken correctly, this may require welding to occur (and operation of associated equipment, such as generators and mobile lighting) beyond standard construction hours. • The operation of leachate pumps to remove leachate from the Containment Cell and the Capped Waste Stockpile. In the event that a rain event has occurred and leachate is generated within the emplaced material within the Containment Cell, or within the exposed Capped Waste Stockpile material, there may be a requirement to pump leachate from these areas to the leachate storage outside of standard construction hours. • The operation of pumps to remove clean water from unfilled areas of the Containment Cell. Clean water would collect within the unfilled sections of the Containment Cell. There may be sufficient water collected as to require the pumping out of this water. • The transportation of leachate for off site treatment. Leachate transportation outside of standard construction hours may be required prior to, during or following large storm events during the Containment Cell construction. This would allow the management of the additional leachate that may be generated as a result of the storm event, and maintain the on site leachate storage capacity. • If required the on site leachate treatment plant (and associated equipment, such as generators and mobile lighting) may be required to continue operating beyond standard construction hours prior to, during or following large storm events during the Containment Cell construction. This would allow the management of the additional leachate that may be generated as a result of the storm event, and maintain the on site leachate storage capacity. • The transportation of gypsum to the Project Site. Delivery of the gypsum outside of standard construction hours would allow the delivery trucks to take the gypsum through the Project Site to the storage shed when remediation and demolition activities are not occurring. • Installation, management and maintenance of environmental controls. In the event that a storm event that was not forecast occurred, or was larger than predicted, the

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		Remediation Contractor may need to: install additional, or manage the existing, environmental controls; or undertake environmental management activities. Depending on the time of day of the storm event this may require activities outside the standard construction hours. • Prolonged wet weather would limit the Remediation Contractor's ability to remove material from the Capped Waste Stockpile, and transport it for placement in the Containment Cell. Delays in the material removal program present a number of environmental, human health and commercial risks. The ability to remove and relocate the material outside of standard construction hours would assist in mitigating these potential risks. Noise modelling was undertaken as part of the Noise and Vibration Impact Assessment (Appendix 7 of the EIS). As part of this, modelling was undertaken to determine the number and types of machinery and equipment that could be operated concurrently outside standard construction hours in compliance with the EPA *Interim Construction Noise Guideline* (ICNG) and not exceed sleep disturbance criteria at any sensitive receivers. Table 7.5 of the Noise and Vibration Impact Assessment breaks down the types of equipment and machinery that could be operated for the key Works activities and scenarios during day, evening and night time periods outside of standard construction hours. Table 7.5 of the Noise and Vibration Impact Assessment shows that a number of machinery could be operated concurrently outside of standard construction hours in compliance with the ICNG. Table 7.9 of the of the Noise and Vibration Impact Assessment also showed that the limited activities defined in Table 7.5 of the of the Noise and Vibration Impact Assessment would not exceed sleep disturbance criteria at any sensitive receivers. These tables indicate that activities listed above, and a number of activities, could be undertaken in compliance with the ICNG and not exceed sleep disturbance criteria at any sensitive receivers. As noted in Section 8.12 of the EIS the Noise and Vibration Management Plan prepared for the Works would include a procedure for determining if activities proposed to occur outside of standard construction hours (different to those identified in Table 7.5 of the Noise and Vibration Impact Assessment) would comply with the ICNG and not exceed sleep disturbance criteria at any sensitive receivers. It would also allow for the development of mitigation and management measures if required. Such an approach would be consistent with Condition No. 6 of the Development Consent from Cessnock City Council for Stage 2 Demolition (DA 8/2018/46/1) which states "*Other proposed works may be permitted outside the nominated work hours with restricted*

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		equipment as detailed in the Environmental Management Plan to be reviewed and authorised by Council prior to the commencement of works".
61	Please provide the proposed hours of operation for each stage of the project.	The majority of the Works would occur within the standard construction hours as approved by Cessnock City Council for both Stage 1 Demolition and Stage 2 Demolition (7:00am to 6:00pm Monday to Friday, and 7:00am to 1:00pm Saturday). However as discussed in response to **Issue No. 60**, the ability to work outside these hours (limited to activities that comply with the ICNG and not exceed sleep disturbance criteria at any sensitive receivers) provides a number of benefits to the Project, the environment and surrounding community.
Bushfire		
62	Given the containment cell's close proximity to bushland, please detail how the containment cell has been designed to withstand bushfires and the mitigation measures that would be implemented during construction to prevent a bushfire and in the event of a bushfire.	Section 8.1.1.1 of the EIS addresses Fire and Incident Management. The EIS addresses the potential risk of bushfire within the surrounding bushland impacting on the Project Site, and the risks of the Works causing fire. The EIS identifies a number of measures for addressing fire risk. With specific reference to the Containment Cell, the EIS includes the following: • Existing fire breaks and trails surrounding the Smelter would be maintained and accessible throughout the Works. • The vegetation clearance required for construction of the Containment Cell includes allowance for construction of a service road around the Containment Cell. This cleared vegetation would provide a sufficient buffer between the Containment Cell construction, as well as access for fire fighting vehicles if required. • The Smelter Access Plan (refer to Section 15.4 of the EIS) would include provision for safe egress from the Project Site (particularly the Containment Cell) in the event that bushfire presents a risk to the Project Site and personnel. It would also include provision for emergency vehicle access to the Project Site. The LTMP in **Appendix 12** notes how the Containment Cell would be monitored and managed following completion. This includes inspection of the Containment Cell if a bushfire is reported within 500 metres of the cell. In the unlikely event that the Containment Cell is impacted by bushfire, the maintenance measures described in the LTMP would be implemented. **Appendix 3J** includes the design for the access road to the Containment Cell (5m width), and the Containment Cell perimeter road (4.6m width plus a 1m shoulder on either side). RMS has a minimum width standard of 2.5m for heavy vehicle access

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		(http://www.rms.nsw.gov.au/business-industry/heavy-vehicles/road-access/general-access-vehicles.html); therefore these roads would be accessible for firefighting vehicles.
Air Quality		
63	Please provide an air quality assessment of the containment cell during operation including an assessment of any air quality impacts associated with venting the containment cell and cell lining failure.	Section 8.8.3 of the EIS states that "*Due to the nature of the material to be placed in the Containment Cell, and the cell design, the potential for the generation of gases in sufficient quantities to cause odour impacts is low. Gas well monitoring at the existing Capped Waste Stockpile has shown that gas generation has significantly reduced since the cap was installed, and there are no odour issues associated with the Capped Waste Stockpile. As such the gas collection layer and gas vents are a contingency rather than an inherent part of the Containment Cell*." The following investigations relating to gas generation have been undertaken: • Hydro has undertaken monitoring at the Capped Waste Stockpile since its capping in 1995. The monitoring results from the twelve gas vents (installed within the gas collection layer) show ongoing reductions in gas generation since the capping. • In 2015 Ramboll Environ installed six groundwater wells and six additional gas wells within the gas collection layer. Ramboll has been undertaking gas monitoring of these wells since December 2016. A copy of the annual report for December 2016 to October 2017 is presented in **Appendix 21**. The report concluded that while concentrations of gases exceed the applicable guidelines, there is a low flow rate and therefore the gas concentrations identified did not pose a human health risk • As discussed in response to **Issue No 58**, gas testing was undertaken of stored spent pot lining in accordance with the OECD Dangerous Goods Class 4.3 testing requirements concluded that "*No gas, including flammable gas, was observed to evolve throughout the duration of the test for each sample*". The laboratory analysis report is presented in **Appendix 2C**. • Testing was also undertaken of Capped Waste Stockpile material using the OECD Dangerous Goods Class 4.3 testing requirements. The laboratory concluded that for the samples provided, no gas, including flammable gas, was observed to evolve throughout the duration of the test for each sample. Through the cell design and material management prior to its placement in the Containment Cell (including minimising the handling of the material, which in turn minimises the potential to create fresh reactive surfaces that could generate gas), it is expected that gas generation and ventilation within the Containment Cell would be consistent with, or improved from, that recorded from the Capped Waste Stockpile.

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		Based on the findings of the cited investigations and the cell design, it is expected that gas emissions from the Containment Cell would be minimal. As such an air quality assessment of the Containment Cell is not deemed necessary. Despite this, a gas collection layer is included as a contingency to allow for ventilation of any gas that may be generated and monitoring. As the material to be placed in the Containment Cell would be non-putrescible and isolated from water, it is expected that any gas generation would peak immediately after capping (due to any residual moisture that may be in the material) before significantly reducing over a short timeframe. As has been discussed in response to other issues and in the EIS, the Containment Cell is designed in accordance with the EPA E*nvironmental Guidelines: Solid Waste landfills* (2016). These guidelines, and therefore the Containment Cell design, include a number of contingencies (primarily multiple capping layers) that would minimise the potential for a complete failure of the Containment Cell capping. In addition, the majority of the material to be placed in the Containment Cell that could generate gases (the Capped Waste Stockpile) has already been exposed to moisture and therefore has a low residual reactivity. Therefore the potential for any adverse gas generation, and associated air quality impacts, due to cell lining failure is considered low. The LTMP in **Appendix 12** describes the proposed gas monitoring program to be implemented following completion of the Containment Cell, and the actions to be taken in the unlikely event that the results pose a potential risk. The Containment Cell Detailed Design Report (presented as part of **Appendix 3**) documents the investigations undertaken to determine the height that the gas vent stack would need to be to minimise potential air quality impacts. This primarily relates to managing the potential risks to people that may walk near the gas vent.
Traffic		
64	Please provide details on where employees will park during construction.	Section 8.2.4 of the EIS notes that the existing Smelter car parking immediately south of the existing Administration Buildings (at the northeast corner of the intersection of Hart Road and Dickson Road) would continue to be available throughout the Works. Figure 3-2 of the EIS also indicates the location of the existing Smelter car parking. Sufficient parking (over 130 parking spaces) would be available for the predicted peak personnel on-site during the Works.

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65	Please identify on a plan the intersections which were assessed as part of the traffic assessment.	Figure 1-1 of the Traffic Impact Assessment shows the key roads in the local road network. Figure 5-5 and Figure 5-6 of the Traffic Impact Assessment provide details on the key movements at intersections that were assessed in the Traffic Impact Assessment. Figure 5-7 and Figure 5-8 of the Traffic Impact Assessment provide layouts of the key intersections. **Appendix 20** presents a figure showing these key intersections.
66	Please confirm whether the number of trucks using the highway was based on the worst case scenario.	Section 5.1.4 of the Traffic Impact Assessment details the estimated traffic volumes (car trips and truck trips) for the key Works tasks. It then goes on to describe the assumptions that the Traffic Impact Assessment was based on. The assessment considers the peak Works activities phase for the peak hour traffic.
Hazards		
67	The EIS provides some information on the activities associated with hazardous materials that may result in hazardous events. This information, however is incomplete and sometimes too generic. The following additional information is required to ensure the proposed safeguards are appropriate, comprehensive and effective and will further minimise the risks as outlined in HIPAP No 4: Details on the spent pot lining which will be relocated from the capped waste stockpile to the new containment cell and in particular:	See below.
a.	Its composition and estimation on the maximum quantity which may be involved in an accident. Although not reported in the EIS, the SPL is generally classified as a Class 4.3 Dangerous Good. These materials will emit flammable and sometimes toxic gases in contact with water. The quantity of the released flammable and toxic gases (and therefore the potential impacts) will depend on the quantity of SPL which may contact with water /moisture and on the composition of the SPL. If the requested information is not available, then a conservative assumption should be made.	The Capped Waste Stockpile contains mixed aluminium smelter waste: spent pot lining is one of these wastes. It is estimated that approximately 18% (or 62,000 tonnes) of the 338,500 tonnes in the Capped Waste Stockpile is spent pot lining. Section 2.4.1 of the EIS does acknowledge that the spent pot lining in the Capped Waste Stockpile is pre-classified as a Class 4.3 Dangerous Good. It is also a Class 9 Dangerous Good due to the presence of asbestos. The gases that could potentially be generated by the Caped Waste Stockpile material when in contact with water are hydrogen sulphide, carbon monoxide, ammonia, methane, hydrogen and carbon dioxide. Hydro has commissioned a number of investigations into the characteristics of the Capped Waste Stockpile. This included gas generation:

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		• Hydro has undertaken monitoring at the Capped Waste Stockpile since its capping in 1995. The monitoring results from the 12 gas vents (installed within the gas collection layer) show ongoing reductions in gas generation since the capping. • In 2015 Ramboll Environ installed six groundwater wells and six additional gas wells within the gas collection layer. Ramboll has been undertaking gas monitoring of these wells since December 2016. A copy of the annual report covering December 2016 to October 2017 is presented in **Appendix 21**. The report concluded that while concentrations of gases exceed the applicable guidelines, there is a low flow rate and therefore the gas concentrations identified did not pose a human health risk. • As discussed in response to **Issue No 58**, gas testing was undertaken of stored spent pot lining in accordance with the Organisation for OECD Dangerous Goods Class 4.3 testing requirements concluded that "*No gas, including flammable gas, was observed to evolve throughout the duration of the test for each sample*". The laboratory analysis report is presented in **Appendix 2C**. • Testing was also undertaken of Capped Waste Stockpile material using the OECD Dangerous Goods Class 4.3 testing requirements. The laboratory concluded that for the samples provided, no gas, including flammable gas, was observed to evolve throughout the duration of the test for each sample. Due to this low reactivity and low gas generation, combined with the small proportion of the Capped Waste Stockpile that is spent pot lining (approximately 18%), it is difficult to quantify the amount of gas, if any, that could be generated if the aluminium smelter wastes got wet. In addition, due to the heterogeneous nature of the material within the Capped Waste Stockpile it is extremely difficult to estimate what quantity of reactive material could be exposed at one time and therefore at risk of encountering water. As such Hydro has taken a conservative approach with: the proposed removal methodology and management measures to protect the environment and human health (both the onsite worker and the surrounding community); and the design of the gas management system within the Containment Cell.
b.	Clear identification on the types of flammable and toxic gases which may be emitted in case of accidental contact of SPL with water and all control measures proposed to be implemented to reduce the likelihood of this occurrence. It is noted that a number of control measures are proposed in the EIS, but some appear too generic and it is not evident that they are arising from analysis of the hazards. The Department further notes	As discussed in response to **Issue No 67a**, the gases that could potentially be generated by the Caped Waste Stockpile material when in contact with water are hydrogen sulphide, carbon monoxide, ammonia, methane, hydrogen and carbon dioxide. However, gas generation is expected to be low. The EIS acknowledges the need to minimise the potential for the Capped Waste Stockpile to be exposed to additional moisture. As a result the removal and management procedures to minimise such exposure form an integral part of the Works methodology. Section 8.5.4 and Section 8.5.5 of the EIS notes the measures that would minimise the potential for the

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	the following in relation to the proposed control measures:	Capped Waste Stockpile material to come into contact with water. In addition, the proposed Capped Waste Stockpile material handling procedure minimises the potential to create fresh reactive surfaces that could generate gas if exposed to water. As such the analysis of the hazards (Section 14.2 of the EIS) considered the risk when these inherent measures are implemented during the Works (as described in Section 8 of the EIS). Therefore the risk specifically associated with the Capped Waste Stockpile materials during the Works was deemed to be of a Minor On-site Potential Residual Consequence and Rare Likelihood. The Human Health Risk Assessment also assessed the potential risks to human health presented during the Works (considering the inherent health and safety measures of the methodology described in Section 8 of the EIS). It did identify additional measures (refer to Section 22.4 of the EIS) that would be implemented when handling the Capped Waste Stockpile material. **Appendix 3L** provides further details on the proposed handling of the Capped Waste Stockpile material, and associated control measures. Section 22 of the EIS identifies: the monitoring to be undertaken during the removal of the Capped Waste Stockpile material to determine if these gases are generated; the controls and measures to isolate personnel from potential exposure to such gases; and the personal protective equipment that personnel would be required to wear to protect them from the generation of such gases. The requirement for this monitoring and personal protective equipment arose from analysis of the potential human health risks identified in the Human Health Risk Assessment (Appendix 12 of the EIS).
	i. the proposed air monitoring for ammonia, cyanide gases and hydrogen (Sec. 22.4) in several locations around the capped waste stockpile, although useful, would not be reliable at all times and at all meteorological conditions. What additional measures would be implemented to ensure that an incidental release of toxic or/and flammable gases will be detected in timely manner?	One of the benefits of establishing multiple monitoring locations around the Capped Waste Stockpile is to account for differing meteorological conditions, particularly different wind directions. These locations are unlikely to be fixed for the duration of the Capped Waste Stockpile removal program, but rather would be dynamic to reflect the stage of the program. These monitors provide the best and most immediate measure to identify if there is an incidental release of gases (as noted in response to **Issue No 67b**) at levels that pose a potential risk to human health and/ or safety. Monitoring is required as any release of these gases would not be visible. The monitoring units would also be established so that they would be operable in wet weather.

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		In addition, Section 22.4 of the EIS notes that real time ambient air monitoring would also be undertaken inside machinery housings (such as excavator cabins). As the operators of such machinery are likely to be the closest to the exposed Capped Waste Stockpile this would also provide an immediate indication of any potential issues (such as an incidental release of the gases noted in response to **Issue No 67b**). In such events the operators would be able to use the appropriate respirators that would be provided in the machinery housing. The Outline Workplace Health and Safety Plan provided in **Appendix 18** outlines the following: • The process of maintaining and ensuring integrity of the in-cab monitors. • Training required for the operators on the operation of the monitoring equipment and in responding to adverse monitor results • Inspection of the monitors as part of daily start up • Responsibility for the management of the monitors Section 22.4 of the EIS also notes that all workers at the Capped Waste Stockpile material would be required to wear a range of personal protective equipment, and have access to a respirator appropriate for ammonia, methane, hydrogen, hydrogen cyanide and hydrogen sulphide.
	ii. the "opportunistic recycling of SPL" listed in Sec 8.8.1 of the EIS suggests that the SPL would emit a "visible gas". Details on the chemical reaction (reactants and products) should be provided, together with the methodology of the "opportunistic recycling".	With reference to the "visible emission of gas" from reactive spent pot lining, this was based on the requirement of the EPA to include management of such material. Analysis and investigations undertaken by Hydro have determined that only spent pot lining freshly removed from the pot, and fully immersed in water has the potential to generate a small visual indication of a reaction: no visible gases or reactions result from moist spent pot lining. As noted in response to **Issue No. 67a**, gas testing was undertaken of both the stored spent pot lining and the Capped Waste Stockpile material in accordance with the OECD Dangerous Goods Class 4.3 testing requirements. These assessments concluded that for the samples provided, no gas was observed to evolve throughout the duration of the test for each sample. As noted in response to **Issue No. 67b**, in the event that a reaction did occur, the reactive gases would be hydrogen sulphide, carbon monoxide, ammonia, methane, hydrogen and carbon dioxide. Leachate with elevated fluoride levels would be the key product when the Capped Waste Stockpile is exposed to moisture. The dynamic monitoring and the monitoring within machinery housing described in response to **Issue 67b(i)** provides for the detection of potential gas generation, both visible and non visible.

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		The use of the phrase "*opportunistic recycling of spent potlining*" to introduce this point was a typographical error: as the remainder of the point suggests it should have read "*opportunistic **removal** of spent pot lining*" for treatment of any spent pot lining that appears to be reactive prior to its placement in the Containment Cell. However as noted, analysis and investigations of the Capped Waste Stockpile material concluded that the potential, and need for opportunistic removal of reactive spent pot lining, would not be required as visibly reactive material is not expected.
	iii. the existing capping layers from the capped waste stockpile will be removed in stages to minimise the surface area of waste exposed to rainfall. While this is an effective measure for the first stage, it is not clear what measures will be undertaken for the following stages to ensure that rainwater would not fill the underground space in the capped waste stockpile already vacated in the previous stages.	**Appendix 3L** (Constructability Assessment of the Containment Cell) provides details on how the Capped Waste Stockpile capping layer would be removed and managed. It also identifies the proposed handling measures of the Capped Waste Stockpile material, and associated control measures. The capping removal would be managed to maximise diversion of clean rain water that falls on the remaining capping away from the exposed Capped Waste Stockpile material. This would reduce the quantity of leachate requiring management and treatment. Hydro acknowledges, however, that all rainwater would not be excluded from the resulting voids within the Capped Waste Stockpile as material is removed. This is reflected in Section 8.5.2.1 of the EIS, which states "*The Capped Waste Stockpile would be managed so that stormwater and sediment runoff would be contained within the stockpile and collected for treatment at the water treatment plant* (the leachate treatment plant). *As material removal progresses, a temporary basin would be established within the Capped Waste Stockpile footprint to capture this water prior to it being pumped to the treatment plant*". **Appendix 3L** describes how this approach to leachate management within the Capped Waste Stockpile would be undertaken.
c.	The EIS does not confirm if the "pure" SPL currently stored at the facility would be transported off-site prior to commencing this development. If these activities occur simultaneously, then the storage of pure SPL should be considered as an external hazard. The risks arising from the storage and transport of the "pure" SPL should be estimated and appropriate control measures to minimise the risks should be identified.	As discussed in response to **Issue No 2**, the timing of the removal of the stored spent pot lining from the Smelter is to be finalised as Hydro continues to assess potential options and continues commercial and contractual negotiations with prospective receivers. In turn, the potential for the spent pot lining removal to occur concurrently with the Works is subject to when Development Consent for the Project is received. As a result Hydro is unable to confirm the overall program for the demolition and remediation of the Smelter. However, based on advice from potential operators on the ability to treat and/ or consume the spent pot lining, Hydro expects a three to four year timeframe for the removal of the spent pot lining from the Smelter.

Issue No.	Issue	Hydro Response
		The first shipment of spent pot lining commenced transportation to an approved treatment facility in July 2018. This activity occurred, and continues to occur, concurrently with Stage 1 Demolition activities. The ongoing storage and removal of the spent pot lining concurrently with Works activities and Demolition activities has been and is considered a very low to negligible risk. This is due to the following: • The spent pot lining would continue to be stored and managed in accordance with the licence granted by the EPA under the EHC Act and the EPL granted under the POEO Act. This includes storage in structures where it is secure and remains dry. • No demolition of the buildings storing the spent pot lining would occur until all the spent pot lining within that building was removed. Demolition would only commence once independent certification from an appropriately qualified person has confirmed the spent pot lining within the building has been removed. • This commitment from Hydro is reflected in a condition of the Development Consent for Stage 2 Demolition received from Cessnock City Council on 8 May 2018. • Access restrictions would be installed around these buildings as required to further restrict unapproved access to the buildings. • Spent pot lining is likely to be removed from the Smelter in campaigns. During such campaigns vehicular access to the internal roads connecting the buildings to the public road network would be managed. • Transportation of the material on public roads would only be undertaken by licensed operators.

Table 4-2: Senversa Review Technical and Environmental Issues and Hydro Response

Senversa Issue No.	Senversa Issue	Project Team Response
	CWS Material Treatment	
1	The proposed full-scale treatment and placement does not include thorough mixing of gypsum through the CWS materials (rather, the proposed process comprises simple batch addition of gypsum to each truck load).	The EPA issued a letter on 9 July 2018 advising that the proposed gypsum application methodology provides appropriate macro scale mixing of the gypsum with the Capped Waste Stockpile material. As discussed in **Section 8.2.3** the gypsum application and mixing process with the Capped Waste Stockpile material is comprised of the following steps: • Loading of the trucks within the stockpiling and processing area. The loading area would be maintained so that any material spilled during truck loading would be regularly cleaned from the ground. • Materials that could potentially damage liner materials (such as steel bars) would be separated from the other Capped Waste Stockpile material for separate transportation and placement. • Trucks would travel over a wheel wash to remove any contaminants prior to proceeding to the haul road. • Loaded trucks would be driven over a weighbridge to ascertain total weight. • Gypsum would be added to the loaded waste at the pre-determined weight to weight percentage (10%) using a front end loader with an attached weighing system within a specified tolerance. • Trucks would travel along the haul road to the Containment Cell. Trucks transporting Capped Waste Stockpile materials would have priority on the haul road. • Transportation of the material would cease during rain events. **Section 8.2.3** goes on to note that "*The truck would dump the material at the Containment Cell filling face. The waste would be pushed out by bull dozer and compacted in accordance with the Containment Cell filling requirements.*" Subsequent consultation resulted in the EPA issuing a letter on 9 July 2018 advising that the proposed methodology provides appropriate macro scale mixing of the gypsum with the Capped Waste Stockpile material.

Senversa Issue No.	Senversa Issue	Project Team Response
		As discussed in the *CWS Waste Management Option 4 Remediation Design and Proposed Validation of Treatment* in **Appendix 4**, the gypsum application trials showed that applying gypsum at a weight to weight percentage of 5% would result in leachable fluoride levels that would result in the Capped Waste Stockpile being deemed "approved aluminium smelter waste" under the CCO and therefore permitted to be placed in the Containment Cell. However, in recognition of the variable nature of the Capped Waste Stockpile material, it was concluded (in consultation with the EPA) that the application of gypsum at a rate of 10% of the material's weight is the best method for treating the Capped Waste Stockpile material, as it provides an additional factor of safety to account for this variability. The letter from the EPA dated 9 July 2018 also noted that the EPA accepted the proposed gypsum application rate.
2	The proposed full-scale treatment and placement represents long-term internment under which leach conditions may differ or vary (compared to that indicated by the trial leach tests)	The EPA issued a letter on 9 July 2018 advising that the proposed treatment process (including the gypsum application rate) provides appropriate macro scale mixing of the gypsum with the Capped Waste Stockpile material. The EPA also accepted that the proposed gypsum application rate provides a sufficient factor of safety with recognition of the potential variability in the material, and therefore leachate that may be generated. The potential for variability in leachate conditions has been considered at a number of steps through the Project development, and in turn in the proposed Containment Cell design and proposed management: • The Containment Cell design, in particular the cell liner material, has been developed to consider the most likely long term leachate conditions. **Appendix 3C** includes a leachate assessment and **Appendix 3F** includes the Design Basis Report • **Appendix 3E** includes the results of the liner degradation assessment completed by Dr John Scheirs. This testing considered the life of the HDPE liners when they were continuously exposed to leachate • The *CWS Waste Management Option 4 Remediation Design and Proposed Validation of Treatment* presented in **Appendix 4** was prepared in consultation with the EPA.

Senversa Issue No.	Senversa Issue	Project Team Response
		This report was prepared to: assess the most appropriate material to be used in treatment of the Capped Waste Stockpile materials; the most appropriate rate of application of this material; and to consider the potential for by-products of the gypsum treatment process (if water enters the cell and reacts with the gypsum and the Capped Waste Stockpile material) to have an adverse reaction on the cell liners. The EPA confirmed in correspondence on 09 July 2018 that it accepted the proposed treatment and validation process described in this document. This includes acceptance of the proposed gypsum application rate and the proposed leachate management approach both prior to and following capping of the Containment Cell. The EPA also accepted that any by-products of the treatment process would not have an adverse impact on the cell liners • As noted in response to **Senversa Issue No 1**, in recognition of the variable nature of the Capped Waste Stockpile material, it was concluded (in consultation with the EPA) that the application of gypsum at a rate of 10% of the material's weight is the best method for treating the Capped Waste Stockpile material, as it provides an additional factor of safety to account for this variability • As discussed in **Section 7.2** and **Section 8.4**, leachate would be collected for treatment either at an on site facility or at an off site licensed facility. The leachate would be treated to meet the criteria required for discharge from the facility. This facility would be operated with recognition of the potential variability in the leachate quality and quantity. The preliminary design of the leachate treatment process allows for a range of treatment steps to manage the contaminants identified in the capped waste stockpile leachate samples and across a range of conditions. Whilst an on site treatment plant may be proposed for the remediation works and immediate short term post closure period, the post closure volumes of leachate generation are expected to be too small to justify on site treatment. It is expected that long term leachate management will be by off site licensed disposal. Discussions with waste contractors indicate that treatment can be managed for the range of conditions expected.

Senversa Issue No.	Senversa Issue	Project Team Response
		With regards to cell design, liner immersion testing was completed by Dr John Scheirs to validate compatibility of the liner under the range of leachate conditions observed from the Capped Waste Stockpile. Additionally, Dr Scheirs provided a review of the liner performance with the addition of gypsum to the waste and advised that the addition of gypsum will not adversely effect the HDPE liner materials or their stabiliser packages. Several factors of safety are included in cell design to address long term internment risks for the waste materials. These include the landfill siting selection process, a landfill design incorporating a multiple liner system, the minimisation of moisture entrainment during placement and the removal of leachate from the system.
3	There does not appear to be any provision for validation of the full-scale treatment to demonstrate that the proposed approach of addition and mixing of gypsum is successful in reducing the leachable fluoride and cyanide concentrations to below that prescribed under the CCO (EPA, 1986). Validation testing following treatment should be considered.	Agreement was reached with the EPA on 9 July 2018 that the validation testing is by verifying that the required mass of gypsum (10% of the mass of Capped Waste Stockpile material) is added. This is a practical approach for the nature and type of waste.
4	In relation to wastes other than CWS materials, Senversa is uncertain as to:	
4a	the nature of the wastes;	The sources, characteristics and volumes of the other materials to be placed in the Containment Cell are defined in: • Table 5.2 and Table 21.2 of the EIS • Section 3.6 of the Detailed Design Report • The Smelter Remedial Action Plan (**Appendix 7**)
4b	whether they are suitable for containment in the cell (e.g. will not impact cell integrity);	The soils and waste materials other than the Capped Waste Stockpile to be placed within the Containment Cell have the same characteristics as those materials within the Capped Waste Stockpile (apart from the spent pot lining). As such they are suitable to be placed in the Containment Cell.

Senversa Issue No.	Senversa Issue	Project Team Response
4c	whether the wastes are subject to regulation under the CCO;	The majority of other materials to be placed in the Containment Cell are not aluminium smelter wastes as defined by the CCO. In the event that any aluminium smelter wastes potentially subject to the CCO are to be placed in the Containment Cell, they would be subject to the testing required by the CCO and specific treatment developed and implemented if required.
4d	whether the treatment with gypsum will be effective in meeting the CCO; and	As noted above, any additional material potentially subject to the CCO would be subject to the testing required by the CCO and specific treatment developed and implemented if required. We are already following this process and have not identified any materials that do require treatment.
4e	what effects these wastes may have on the solubility of fluoride, cyanide, other chemical substances in the waste and liner materials, or gas generation.	Not applicable as all wastes are consistent with the material in the Capped Waste Stockpile.
	Containment cell – design and construction	
5	The stated design requirement for the cell was for 100 years – while the cell design is considered robust and appropriate, and many components of the cell will likely have a lifespan far greater than 100 years, Senversa considers it likely that the contaminants are such that they will likely require containment in perpetuity.	The containment design comprises a primary and secondary multi-layered soil/geosynthetic barrier with leak detection. The primary high density geomembrane alone demonstrated a service life based on continuous incubated immersion ranging from 181-223 years. It should be noted that no statistically significant reduction in HP- OIT results over the six months incubation program occurred. The Arrhenius lifetime extrapolation technique requires clear/measurable decreases in HP-OIT values with increasing test temperature and with increasing test time. Our small negligible reduction in HP-OIT values are a testament to the products being assessed and would indicate that they are very stable in this environment with regard to long-term thermal stability, indicating a service life well in excess of the calculated estimate. One must also consider that the project will involve construction, deposition and capping in one seamless period, (approximately five years) with continuous extraction of leachate. The result will be a 'dry entombment' of waste in a very short period, thus

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		removing one of the main contributors to oxidation of liner. This will increase the life of the primary lining product again out beyond above estimate. In addition, immersion testing requires the product to be fully immersed in the leachate during incubation. In reality the side of the HDPE product in contact with leachate will be in 'intimate contact' with a protection geotextile (under pressure) which reduces the rate of the oxidation process further by hindering mechanisms of additive loss in HDPE due to leaching by chemicals and volatilization. When considering a primary / secondary system with leak detection system, full leachate removal and soil/geosynthetic capping system into account, one can expect this design to provide secure containment indefinitely.
6	Principally, there is a concern with the stability of the final landform, both considering slope stability and veneer stability of the designed geosynthetic and soil capping profile. This may influence the long-term stability of the final capping profile under potential future adverse conditions, which increases the likelihood of requiring maintenance and/or consequence (i.e. major repairs of the cap) in the event of failure.	Factor of Safety Calculations have been undertaken for slope stability. These are included in **Appendix 3G.**
7	No slope stability modelling has been presented in the information reviewed and there is a concern with the factor of safety of the 1V:4H side slopes under adverse conditions and the proposed soil layers overlying the geosynthetics. It is recommended, if it has not already been completed, that the factor of safety is estimated for the final capping profile under seismic loading conditions considering a suitable design event, the static long-term condition and the condition where the overlying soils become saturated after a rainfall event.	Factor of Safety Calculations have been undertaken for slope stability. These are included in **Appendix 3G.** It should be noted that there would be no seepage because there is a drainage layer included in the Containment Cell Detailed Design, however, it would still work if the soil was saturated. The lowest Factor of Safety is calculated at 2.2, when the typical aim is around 1.5.

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	Where required, shear strength requirements may be required on the capping soils to achieve an appropriate factor of safety or alterations to the capping profile or surface drainage design may be required.	
8	Further to the slope stability, and if not already completed, an assessment of the veneer stability of the capping profile is assessed considering the interface friction of all materials (in particular the smooth LLDPE geomembrane and protection geotextile) and considering potential hydrostatic pressure build-up in the overlying soils in the event of heavy rainfall. This assessment would further inform the minimum specification interface shear strengths required and may necessitate laboratory testing of candidate materials for use in the cap. During this assessment, calculation of the tensile forces within the geosynthetic layers should also be determined and, where required, minimum values included in the Technical Specification appended to GHD (2018).	Refer to the Factor of Safety Calculations for slope stability calculations in **Appendix 3G**. Tensile requirements are not required as the system has been designed such that the stability is not dependent on tensile strength. It should be noted that the capping system utilises a double-sided texture LLDPE. The smooth LLDPE referenced in the technical specification relates to a sacrificial layer placed on the cell slopes to provide temporary protection prior to waste placement. This material is then removed on an ongoing basis in line with waste placement.
9	Considering a 100-year design life for the cell (and need for containment in perpetuity), it is recommended that further assessment and specification of the geosynthetic materials is considered by the designer to prevent excessive damage to the lining system due to stress cracking or degradation due to chemical attack or excessive strains in the primary liner.	Refer above

Senversa Issue No.	Senversa Issue	Project Team Response
10	The cell design does not specify cap vegetation requirements. These are proposed to be developed in a Landscape Management Plan, which Senversa considered should be considered as part of the Site Audit.	Agreed.
11	The selection of the protection geotextile in the Technical Specification specifies hydrostatic puncture testing to be undertaken to confirm the protection geotextile is suitable – the nominated strain limit of 6% is considered likely to be excessive for the HDPE geomembrane types selected (double sided textured) in accordance with upper strain limits of 4% suggested by others (VIC EPA, 2015; Peggs, 2003).	Amended to 4% will increase the protection capabilities of the geotextile i.e. require an increased grade.
12	When considering the material specification of the geosynthetics presented in the Technical Specification, there are some inconsistencies between what is discussed in the design in terms of:	
12a	HPOIT/S-OIT of the HDPE Geomembrane (basal and sidewall), where the key parameters of materials tested for leachate compatibility don't match those in the Technical Specification (>800 minutes specified, materials tested were >1000 minutes for HPOIT; and >160 minutes specified, materials tested were >195 minutes). Senversa suggest the specification should match that of geomembranes tested.	Noted. The Technical specification will be updated.

Senversa Issue No.	Senversa Issue	Project Team Response
12b	Interface friction testing of the proposed materials is not identified as part of the Technical Specification for the capping geosynthetics – Senversa consider that it should be.	Interface strength testing not deemed necessary as a sensitivity analysis using lower end values resulted in suitable factors of safety.
13	A brief review of the Technical Specification presented in GHD (2018) also suggests that the document is incomplete in some aspects, in particular the specification for independent testing of the materials used in the construction of the Containment Cell. It is recommended that this document and accompanying documents are reviewed and completed to limit: • Issues during construction leading to variations or variation from the design intent. • Quality issues during construction with materials and practices. These issues can potentially lead to longer term issues due to poor design implementation, materials and construction quality issues and deficiencies, impacting the design life and performance of the cell.	Refer to the Construction Quality Assurance Plan in **Appendix 3I**. A detailed system of CQA requirements is included.

Senversa Issue No.	Senversa Issue	Project Team Response
14	The cell design has considered the nature of treated CWS materials to be contained but has not considered the suitability for containment of other waste/contaminated materials. In particular, the nature of 'process wastes' and materials within 'landfills'. While Senversa consider that the proposed cell performance will have a low sensitivity to the anticipated nature (e.g. soils) of the proposed materials to be contained, it would be prudent to assess the suitability of these materials prior to placement in the cell. The material characteristics have the potential to impact on cell life and leachate management.	The site specific leachate used in the laboratory assessments was generated from the onsite mixed smelter wastes which comprises over 80% of the waste mass. It is therefore deemed to be representative.
15	There is also uncertainty in the volume of materials to be contained, with further assessment of PAEC required following demolition works. However, GHD (2018) have included redundancy in the design in case additional contaminated material volumes require containment, which is considered an appropriate mitigation.	Noted
16	GHD (2018) modelled leachate generation across the life of the cell, considering infiltration through the cap. The modelling considered the various cell staging and mean (50% AEP) and wet (10% AEP) rainfall conditions. While the predictions are plausible, the model did not account for uncertainty (e.g. in cap performance, duration of cell construction) and a sensitivity analysis could help inform key variables.	The leachate flows adopted as the design basis for this options study are based on a range of assumptions and are highly dependent on rainfall, which can be variable. One of the option evaluation criteria considered the cost impact of the total leachate volume being 50% higher than allowed for in the design basis. While the cost sensitivity due to this increase in leachate volume has been considered in scoring the options, changes in the total leachate volume will directly affect the overall cost of leachate management. Variation in leachate volume may be associated with prolonged construction of the cell, cap performance or climatic conditions. All options involve balancing storage of leachate for treatment or contractor removal. Balancing storage volumes allowed for are based on peak leachate flows for 10% AEP rainfall years and assume conservatively that up to 1.3ML of leachate storage will be available in the Containment Cell to assist in managing

Senversa Issue No.	Senversa Issue	Project Team Response
		peak wet weather periods, supplementing the two 1ML above ground leachate buffer storage ponds (one at the new cell and one at the Capped Waste Stockpile). Leachate can be pumped directly from the containment cell sump or from the leachate buffer storage pond. A sensitivity analysis was conducted to asses a range of other scenarios including variations in criteria weightings, scoring and waste contractor removal rates. As discussed in **Section 7.2** and shown in **Appendix 25** an additional leachate storage pond would also be constructed near the Capped Waste Stockpile for the duration of the Containment Cell construction and material placement.
	Long Term Management Plan	
17	The LTMP is draft and, to Senversa's knowledge, has not been subject to review by the Site Auditor or Regulator. The final LTMP should be subject to independent review, including by a Site Auditor – and ultimately form a condition of the site audit report and statement.	The Auditor has reviewed and accepted the draft LTMP. A copy of the Auditor review is provided in **Appendix 12** with the draft LTMP.
18	Some aspects of the LTMP have been superseded (or may become superseded by the time of cell completion) – e.g. report references and the LTMP includes both on-site treatment and off-site disposal of leachate. If an on-site treatment plant is proposed, there may be additional requirements (e.g. design, regulation/licensing).	Agreed. As noted by Senversa the draft LTMP has been prepared as a draft and would be finalised to capture various elements, including: the final design and operational procedures, as well as any applicable Development Consent conditions that need to be addressed. It should be noted that on site leachate treatment is only a potential option during the construction of the Containment Cell and placement of material within: it is considered an unlikely option for the long term management of the Containment Cell. This will be clarified in the final LTMP.

Senversa Issue No.	Senversa Issue	Project Team Response
19	Specific monitoring and operating procedures have not yet been developed. The final LTMP should include detailed inspection and monitoring procedures for each cell component (e.g. cap, leachate system, gas venting system).	Agreed. Such specific procedures would form part of the final LTMP.
20	It is reasonable that the LTMP is finalised on completion of the cell construction and validation.	Agreed.
21	The LTMP should include a requirement for the cell owner (or delegate) to prepare and implement a health, safety and environment management plan for implementation of the LTMP.	Agreed.
22	It would be prudent to assess leachate quality, at least during an initial period, as well as leachate levels.	Leachate would be collected for off site treatment at a licensed waste management facility. This facility would manage the treated leachate in accordance with its Environment Protection Licence. Hydro does not believe that there is an environmental benefit from in-situ monitoring of leachate quality.
23	It would be prudent to assess groundwater quality in the 'groundwater diversion system' for key CoPC as well as general water quality parameters.	Table 4-1 of the draft LTMP (**Appendix 12**) includes a "Groundwater Leak Monitoring" task that would be undertaken in accordance with a procedure that would be developed and included in the final LTMP.
24	A method to assess potential clogging of the leachate collection system should be included.	The risk of 'excessive clogging' is deemed to be very low. The project involves construction, deposition and capping in one seamless period, (ca. 5 years) with continuous extraction of leachate. The result will be a 'dry entombment' of waste in a very short period of time. In addition, the leachate conveyance system, incudes: • Pipe spacing factor of safety of 2 • Pipe perforation (assuming 50% blockage) factor of safety of > 50

Senversa Issue No.	Senversa Issue	Project Team Response
25	Consider developing actions specific for each leachate collection layer – e.g. be proactive and identify possible issues at the first layer.	Clarification from Senversa as to the intent of this comment is required.
26	Inspections of perimeter drains, bunding and sediment basins should be included.	Agreed. This will be included in final LTMP for perimeter drain and bunding. The sediment basins would only be in place during the construction of the Containment Cell and placement of material. They would be decommissioned following completion of capping, and therefore do not form part of the long term management.
27	The quality (e.g. sediment, general water quality parameters) of surface runoff from the sediment basins should be assessed, at least during an initial period, consistent with the site's EPL.	The sediment basins would only be in place during the construction of the Containment Cell and placement of material. They would be decommissioned following completion of capping, and therefore do not form part of the long term management.
28	Cell inspections and monitoring should be conducted by a person who is suitably qualified and experienced.	Section 4.2 of the draft LTMP states that "*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)*".
29	Cap landscaping management requirements should be included – e.g. suitable species, maintenance, weeding, irrigation. Senversa also note that irrigation may be required (as was evident at the CWS) to sustain the vegetation – this does not appear to have been included.	The Containment Cell specification identifies the that shallow rooted native grasses would be used. Hydro does not believe it is necessary to identify specific species that meet this criterion. The Containment Cell Contract will have a vegetation establishment period of 52 weeks, after which there is not requirements for watering. Table 4-1 of the draft LTMP describes the vegetation cover monitoring that is required to be undertaken. Table 4-2 of the draft LTMP (**Appendix 12**) identifies the potential issues that could arise and the contingency response to such issues. It should be noted that sprinklers at the Capped Waste Stockpile were only used during initial establishment of grass on the stockpile. They have not been used since and are now disconnected.

Senversa Issue No.	Senversa Issue	Project Team Response
30	Requirements for repair of cell systems (e.g. cap, leachate piping) should be included – this could outline the general process and refer to appropriate standards and specifications (or GHD (2018) if appropriate)	Any repairs would need to be undertaken to comply with the Containment Cell construction specification. This requirement will be reflected in the final LTMP.
31	Some identified issues and contingency actions are arguably not contingencies - i,e. they could reasonably be expected to occur over the cell lifetime and should be planned for as such. These include leachate extraction and treatment/disposal, maintenance and repairs to cap, and maintenance of leachate collection system. Nevertheless, additional requirements that should be included in the LTMP are considered to include:	Agreed. Table 4-2 (Containment Cell Contingency Response) of the draft LTMP does include some actions that could be considered almost certain to occur (such as leachate collection) but expected to be rare events. As such specific management controls (rather than identifying that they are subject to a "Contingency Process" have been identified in Table 4-2 (**Appendix 12**).
31a	Develop contingency actions specific to each system – e.g. increasing leachate in the primary collection system may just trigger increased monitoring/inspection, whereas increasing leachate in the secondary system may require additional investigations.	Table 4-2 of the draft LTMP (**Appendix 12**) identifies either the actual "Management Controls" to be implemented where an event is likely to occur, or "Possible Strategy/ Strategies" where "Contingency Process" is identified as the Management Control. Hydro believes that requiring the Contingency Response process described in Section 4.3 of the draft LTMP, with consideration of the possible strategies described in Table 4-2 of the draft LTMP are sufficiently prescriptive.
31b	Describe the operation of the leachate collection system – e.g. trigger levels; is leachate extracted to the basin and stored until a practicable volume is reached (which may not be appropriate due to potential exposure to receptors) or direct for off-site disposal?	The final system will be described in the final LTMP. However it would be managed so that leachate would be stored within the leachate sump, with a monitoring program that would trigger responses when levels are approaching the maximum level.

Senversa Issue No.	Senversa Issue	Project Team Response
31c	Contingency actions in case of identified or potential leakage of leachate should consider the need for groundwater monitoring downgradient of the cell to verify fate and transport modelling and risk assessment (though Senversa considers this a very low likelihood based on the multiple liner system and leachate estimations).	Table 4-1 of the draft LTMP includes groundwater leak monitoring within the groundwater sump. As shown in the *Fate and Transport of Leachate: Proposed Hydro Containment Cell* (Ramboll, 2017) presented in **Appendix 17** due to: the likely low volume of any leak; multiple liner system; and the physical and chemical characteristics of the natural clays, any groundwater wells established in response to detection of leachate in the groundwater sump is unlikely to record any leachate. As such, the data from such wells would not provide useful data.
31d	Include a requirement to assess risks to human health and the environment as well as containment cell performance when leachate is detected in the secondary containment system or cap integrity is compromised, and that the risk assessment should be conducted by a suitably qualified and experienced professional (or equivalent).	"*Assess risk to human health and the environment as well as containment cell performance*" is identified as a possible strategy when monitoring identifies leachate has entered the groundwater sump. The final LTMP will be updated to require this assessment to be undertaken by a suitably qualified person.
31e	Document approval or licensing requirements (or a process to determine the requirements) if gas or leachate treatment on-site is required.	It is noted that such requirements may apply to a number of the possible strategies in Table 4-2 of the draft LTMP (**Appendix 12**), or other strategies that may be required. Section 4.3 of the draft LTMP will be amended to include a requirement that the need for any approvals or licences is to be considered by a suitably qualified person.
32	The LTMP should include a requirement for an independent review or audit of implementation of, or if there are significant changes to, the LTMP.	This will be included in the final LTMP.

Senversa Issue No.	Senversa Issue	Project Team Response
33	The LTMP should include a requirement to assess risks to human health and the environment as well as containment cell performance when leachate is detected in the secondary containment system or cap integrity is compromised, and that the risk assessment should be conducted by a suitably qualified and experienced professional (or equivalent).	As noted in response to Senversa Issue No. 31a, Table 4-2 of the draft LTMP (**Appendix 12**) identifies either the actual "Management Controls" to be implemented where an event is likely to occur, or "Possible Strategy/ Strategies" where "Contingency Process" is identified as the Management Control. "*Assess risk to human health and the environment as well as containment cell performance*" has been identified as a possible strategy where considered appropriate. The final LTMP will be updated to require this assessment to be undertaken by a suitably qualified person. Hydro believes that requiring the Contingency Response process described in Section 4.3 of the draft LTMP, with consideration of the possible strategies described in Table 4-2 of the draft LTMP are sufficiently prescriptive.
	Information Gaps	
34	There are several geotechnical and geosynthetic design information gaps that have been identified in the supplied information presented in the GHD (2018) report – which have been identified and discussed in this report and include:	
34a	Slope stability and veneer stability modelling of the final capped landform, for both long-term static and adverse conditions, such as seismic loading or saturated soils.	Refer to response to **Senversa Issue No. 6** and **Senversa Issue No. 8**
34b	Interface friction testing of the geosynthetics proposed in the cap and the subsequent veneer stability of the batters.	Refer to response to **Senversa Issue No. 8**

Senversa Issue No.	Senversa Issue	Project Team Response
35	Climate change does not appear to have been specifically considered, though design aspects that would most likely change (e.g. rainfall depth, rainfall intensity, increased temperature) has been considered indirectly via flooding, material durability assessment or LTMP (subject to the above comment).	As noted by Senversa the key environmental aspects that would primarily be influenced by climate change have been considered. The key findings in respect of those issues are: • The location of the Containment Cell has considered both the 1% Annual Exceedence Probability (AEP) flood level and the Probable Maximum Flood (PMF) level • The EIS and the Response to Submissions both discuss the need to manage potential bushfire risks, while the draft LTMP includes monitoring requirements in the event of bushfire and contingencies in the event of vegetation and infrastructure damage due to bushfire
36	Senversa note that GHD (2018) does not appear to specifically consider the potential impacts from mining activities – e.g. whether there are any nearby mining activities that could impact on cell integrity (e.g. subsidence) or hydrogeology (e.g. suppression of groundwater elevations) – though, on the basis of discussion with Ramboll/Hydro during the site walkover, appears unlikely due to no significant mining near the site.	Section 5.3.6 of the EIS does identify the site characteristics that make it suitable for a Containment Cell. One characteristic that was not addressed in this section is the lack of mine workings in the immediate area: while there are known shallow coal mine workings in the north of the Hydro landholdings, the Containment Cell site is more than four kilometres to the nearest former mine workings (the former Glen Ayr Colliery).
37	Vegetation of the cap, including function (e.g. cap stability, drought resistant, native) and limitations (e.g. root depth) of suitable species.	Section 8.8.3 of the EIS states "*As noted the vegetation cover is to be comprised of shallow rooted native grasses. The shallow roots are required to minimise potential for adverse impacts to the capping layers, and the use of native grass species is to provide ecological benefits (by avoiding the use of potentially invasive grass species, and use of native species). The species to be used would be dependent on seed availability and compatibility with the detailed design*". Section 4.7 pf the Detailed Design Report (**Appendix 3**) is consistent with this, stating "*The flora species will be selected to not compromise the integrity of the final cover system, will minimise the post closure maintenance requirements and will not negatively impact on the neighbouring flora and fauna*."

Senversa Issue No.	Senversa Issue	Project Team Response
38a	While gypsum treatment has been assessed and endorsed by NSW EPA in their letter dated 9 June 2018, there is considered uncertainty in whether the performance of gypsum treatment in the CWS material treatability assessments is representative of the proposed application approach – e.g. the treatability testing is in accordance with the stated 1986 procedure for sampling and analysis of smelter wastes, which involves relatively small sample volumes that are sieved and crushed with homogenous mixing, whereas the proposed application involves gypsum dosing by placement on top of each 40 tonne truck load of waste.	Refer to response to **Senversa Issue No 1**.
38b	While Ramboll (2018d) and GHD (2018) considered the approach of gypsum application via placement in each truck would result in adequate mixing on a macro scale, even though Senversa considers this is a likely practical approach, and would mitigate the potential for generation of asbestos fibres (relative to complete mixing process), it would be prudent to simulate this application approach in the treatment 'validation' testing proposed in Ramboll Environ (2017d).	The laboratory trial was designed to meet the specific requirement of the CCO and was agreed in consultation with the EPA prior to commencement. The method of addition gypsum by truck load and mixing through dumping and placement is to provide adequate mixing on a macro scale. A factor of safety was then added to allow for incomplete mixing.

Senversa Issue No.	Senversa Issue	Project Team Response
38c	Senversa considers that this primarily relates to compliance with the CCO (rather than cell performance), and it is reasonable that the NSW EPA provide approval for the treatment and validation in this regard. However, better treatment efficacy will result in reduced risk from the contained material and (most likely) costs associated with leachate disposal/treatment.	Refer to response to **Senversa Issue No 1**
39	The nature of materials (other than from the CWS and contaminated soils in AEC) proposed to be contained have not been described in the RAP or cell design documentation; or will be subject to further assessment (e.g. contaminated soils in PAEC, emerging contaminants). In particular, this includes 'process wastes', the nature of the materials from the Anode Waste Pile and landfill materials. While the cell design is considered to be robust and its integrity is not likely sensitive to the nature of these materials, it is considered prudent to assess the suitability of these materials for containment – e.g. the potential to generate landfill gas or impact durability of geomembranes.	Refer to response to **Senversa Issue No 4** (and sub-issues) with regards to the nature of the materials to be placed in the Containment Cell (other than the Capped Waste Stockpile and the contaminated soils). The responses note that these materials: are consistent with materials present within the Capped Waste Stockpile; and would be subject to testing prior to placement in the Containment Cell to determine if they require treatment to be deemed approved aluminium smelter waste under the CCO

Senversa Issue No.	Senversa Issue	Project Team Response
40	Ramboll considered that the future generation of hazardous gases from the CWS was low. However, the CWS materials still emit ammonia, H2S and CO at elevated and variable concentrations (though low flow) – given the nature of containment at the cell will be different, there is the possibility that the nature of gas generation is different and not known until the cell is constructed. While the cell design and proposed monitoring is considered adequate, and further assessment at this stage is not considered necessary, this uncertainty increases the risk for gas emission mitigation requirements in the LTMP.	Noted. These potential issues are acknowledged, therefore the Table 4-1 of the draft LTMP (**Appendix 12**) includes a gas monitoring program. Section 5.2 identifies the performance auditing process that would apply to the gas monitoring.
41	Consideration should also be given to whether materials (other than from the CWS) proposed to be placed in the containment cell are subject to regulation under the CCO. This could mean further approvals and treatment is required as part of remediation.	Refer to previous response.
42	The RAP states that a Validation Report documenting the validation of remediation will be prepared, however, the RAP does not appear to include a requirement for documentation of cell validation – Senversa considers that the Validation Report should document cell validation.	Section 9 of the Smelter RAP (**Appendix 7**) is titled "Validation Plan", which includes Section 9.1 "Containment Cell Validation". This notes that "*Validation requirements for the construction of the Containment Cell will form part of the detailed Cell Design. Validation requirements will be described in a standalone validation specification that will form part of the technical specification for the Containment Cell Contractor. The Validation Specification will be review by the Site Auditor to ensure that the final validation report is sufficiently comprehensive to allow Site Auditor provision of a Part A Site Audit Statement*."

Senversa Issue No.	Senversa Issue	Project Team Response
43	The SAR (AECOM, 2018) considers site suitability and states that a separate Site Audit will be conducted on the cell design – Senversa considers this appropriate, and that the Site Audit should also consider cell validation and long-term management.	Agreed.
44	LTMP requires various aspects to be detailed which cannot reasonably be done so until finalisation of cell design, cell regulation/licensing and funding arrangements. Since the exact scope required and procedure have not yet been defined, there is increased uncertainty in the associated funding required.	While it is acknowledged that there are some aspects that remain unknown regarding the Containment Cell, Hydro believes that with completion of the Containment Cell detailed design and preparation of the LTMP (including identification of contingencies) the unknown elements are limited. The Containment Cell regulation and licensing, along with the funding arrangements, are the subject of ongoing negotiations with the Department and the EPA. These agencies acknowledge that the long term management activities and associated costs would be finalised following an initial period (proposed to be five years) following completion of the Containment Cell and its performance can be assessed. However a conservative costs estimate has been developed which would form the basis of the initial funding requirements. Following the performance assessment, the LTMP would be adjusted (if required) and finalised, along with the associated funding requirements.
45	The cell design documentation tested the market for leachate treatment options, with two vendors identified. The certainty of vendor availability if emerging contaminants are present in leachate is unclear	A comprehensive suite of analysis was undertaken by GHD for the leachate generated onsite from the CWS which comprise > 80% of the actual waste mass and no PFAS/PFOS compounds were detected in the leachate. In addition to the vendors undertaking their own analysis (Toxfree tested their sample for PFAS/PFOS which were not detected). The Cleanaway liquid waste treatment facility at Homebush has confirmed it is licenced to receive and treat leachate containing PFAS/PFOS if those contaminants presented themselves. Homebush then discharges treated effluent to sewer under a Trade Waste Agreement with Sydney Water which includes specific limits for PFAS/PFOS.

Senversa Issue No.	Senversa Issue	Project Team Response
46	The enforcement mechanisms / regulation of the cell has not yet been agreed.	Based on a number of discussions with the EPA and the Department since 2015, a range of regulatory options were presented in Section 9.4 of the EIS. The final structure of the regulation of the Containment Cell is expected to be based on the options provided in the EIS and is the subject of continuing negotiations with the Department and the EPA.
47	The funding allocation to cover the costs of cell management have not yet been agreed	As noted **Section 7.4**, negotiations between the Department and Hydro concluded that the preferred approach for the regulation of the long term management of the Containment Cell is a Voluntary Planning Agreement (VPA) between Hydro and the Minister for Planning and Public Spaces. The VPA would include the following in relation to funding the costs of cell management: • The total and timing of payment of a monetary contribution and the timing of a land contribution from Hydro required for the ongoing implementation of the Long Term Management Plan by a NSW government entity • The form and value of financial security to be implemented during construction of the Containment Cell.
48	As discussed in Section 3.7.2, while the principal of maintaining insurance is reasonable, Senversa has not reviewed the insurance policy and the nature of covered events. The insurance is stated to cover replacement of the cap following a 'catastrophic event' - Senversa note that this may not cover cap replacement or repairs that could occur following an event that does not meet this description (e.g. minor repairs).	On completion insurance will fall under Hydro's Global Property Damage Insurance Policy under which the site is currently insured. Hydro assumes that the 'catastrophic event' reference comes from the Muller report, which details the cap replacement cost. The purpose of this was to ensure Hydro was adequately insured in terms of value in case of full cap replacement. The intent of this insurance was to not limit the extent of a claim to a catastrophic event only, but for the policy to respond to any insured event resulting in either partial or full cap replacement and ensure that the policy value is adequate.

Senversa Issue No.	Senversa Issue	Project Team Response
49	Senversa has assumed that the insurance would cover replacement of the cap if a 'catastrophic event' occurs. However, the inclusions and limitations of the insurance policy is a key area of uncertainty – e.g. definition of a 'catastrophic event'; potential for disagreement over the cause of an event (e.g. design/construction flaw versus external factor).	Noted and refer to response for **Senversa Issue No. 48**.

Table 4-3: Senversa Financial and Administrative Issues and Hydro Responses

Aspect	Liability	Possible risk mitigation / management scope	Preliminary Estimate ($per annum)	Project Team Response
Cell lifetime	Degradation of geomembranes and other components of liner and cap – geomembrane has been assessed as having a life between 180 and 223 years; the lifespan of other components (e.g. GCL, piping, leachate pumps, basins) have not been stated but are considered less critical or can be replaced relatively easily.	Repair and replacement of cell components – see under specific aspects below.	see below	
	Capping damage not covered by insurance – e.g. repairs due to soil erosion, burrowing animals, subsidence, instability (veneer or landslide), degradation past the design life.	An allowance for minor or larger scale repairs to cap. Replace as required – the actual requirement is highly uncertain, but most likely will occur in periodic events (e.g. following bushfire, major rainfall event, earthquake).	Assume progressive replacement of 25% of the cap (4.7 ha) every 100 years and a rate of $\$218/m^2$, per Muller (2018) price estimate. This equates to approximately $25,000 per annum	Based on experience with the existing Capped Waste Stockpile (noting that its cap was not designed to the same standard as that proposed for the Containment Cell), there has been no wear and tear. One repair event occurred as a consequent of a storm (locally a 0.5% Annual Exceedence Probability event) and was an insurable event. However, in recognition of some uncertainty, an amount of 25% cap replacement every 200 years, equating to $12,500 per annum, has been included.

Aspect	Liability	Possible risk mitigation / management scope	Preliminary Estimate ($per annum)	Project Team Response
Cap	Irrigation and re-vegetation costs due to bush fire, drought, life span of species. Separate to the 'slashing' costs included.	Irrigation, weeding, re-planting per Landscape Management Plan. No cost for irrigation water considered.	Nominal allowance of $5,500 per annum on average – based on four events, each with one day labour and disbursements ($1,500).	Agree and included in the revised report in **Appendix 16**.
	Damage and degradation of gas venting infrastructure.	Replace as required – most likely will occur in periodic events (e.g. following bushfire, major rainfall event, earthquake).	Scope is highly uncertain - nominal allowance of $10,000 every 20 years.	Agree and included in the revised report in **Appendix 16**.
	Contingency for gas treatment	The proposed financial assurance did not include an allowance for gas treatment/mitigation, if required as a contingency. This has been considered a low likelihood, and it is reasonable that this could be assessed during cell validation.	As this is considered a low likelihood, this could reasonably be reviewed during the initial period of cell operation.	Agree

Aspect	Liability	Possible risk mitigation / management scope	Preliminary Estimate ($per annum)	Project Team Response
	Clogging of the leachate collection and extraction system (e.g. from biofouling, precipitation due to gypsum). This was considered by GHD (2018) but has not been considered in the financial assurance assessment.	Back flushing with water or acidic solutions to dissolve precipitates and remove these from the system. All leachate extracted following cell closure, is taken off site for treatment by a waste contractor.	The frequency and scope is highly uncertain, but assume work is required every 20 years and a nominal allowance of $60,000 every 20 years is suggested – based on assumptions of five days contractor equipment/labour ($2,500/day), engineer/consultant ($1,500/day), material cost ($15,000), waste disposal ($20,000), administrative costs ($5,000).	The cell design incorporates orders of magnitude safety factors in all elements of the leachate collection. As this is considered a low likelihood, this could reasonably be reviewed during the initial period of cell operation. Hydro is funding for leachate removal for the first five years. The funding will be adjusted at the end of the five years to account for actual leachate generated.
	Replacement of pumps, piping, leachate basin due to damage or degradation.	Replace as required.	Nominal allowance of $3,000 per annum – based on one day labour ($1,500) and equipment ($1,500).	There would be no pumps as part of the Containment Cell (any pumps would be mobile plant). The leachate basin and sediment basins would be removed prior to commencement of the long term management. Therefore no cost allowance is required for this item.

Aspect	Liability	Possible risk mitigation / management scope	Preliminary Estimate ($per annum)	Project Team Response
Leachate management	Higher leachate volumes than predicted due to, for example: • Higher retained moisture due to rainfall on CWS or open cell area during construction. • Higher infiltration than predicted due to poor cap performance. • Waste materials that produce water over time. • Accumulation or storage in the open 'leachate dam' that requires treatment.	Contingency for increased leachate extraction and off-site disposal/treatment. It is also likely that the person who undertakes cell inspections/ monitoring would be required to attend site during these events. A sensitivity analysis of seepage calculations and monitoring during initial cell operation may better inform this allowance.	Nominal allowance of an additional $3,500 per annum – based on an assumption of an ongoing rate per Year 3 of operation in Muller (2018) – this could be reviewed during the initial period of cell operation. An additional contingency is suggested for additional inspections following significant rainfall events (as required under the LTMP) or oversight by a consultant/engineer ($1,500/event per year)	The leachate dam would be removed prior to the long term management phase. The design (and subsequent operational costs) has allowed for moisture in the material placed within the Containment Cell and for variability in rainfall during cell filling. The cap surface water drainage system would minimise infiltration. As this is considered a low likelihood to be outside of what is current included, this could reasonably be reviewed during the initial period of cell operation. Furthermore, Hydro is funding leachate removal for the first five years. The funding will be adjusted at the end of the five years based on observed leachate generation and revised predicted future leachate generation.

Aspect	Liability	Possible risk mitigation / management scope	Preliminary Estimate ($per annum)	Project Team Response
	Leachate sample analysis (in addition to monitoring of general water quality parameters included in the LTMP) of leachate and groundwater	Allowance for analytical cost (assumes sampling is conducted during site inspections and reported in annual report)	Assume 5% of stated leachate monitoring cost – e.g. $1,828 in Year 1 reducing to $610 per annum after – this could be reviewed during the initial period of cell operation	Not required: refer to response to **Senversa Issue No. 22**.
	Presence of emerging contaminants (e.g. PFAS) in leachate may cause: • Additional disposal costs. • Market limitations (i.e. fewer disposal vendors).	Assess during remediation and revise leachate disposal/treatment costs accordingly	TBC This could be assessed via obtaining vendor quotations or reviewed following further site investigations and during the initial period of cell operation	Not required: refer to response to **Senversa Issue No. 45**.
Administrative	Administrative management	Senversa are unclear why administration would cease after five years as presumably there would still be coordination, reporting and management functions – assume a reduced rate of 50%	$10,000 per annum after Year 5.	Hydro agrees with the Department and Senversa that funding needs to be included from Year 6 onwards and the costs have been included in the revised report in **Appendix 16**.

Aspect	Liability	Possible risk mitigation / management scope	Preliminary Estimate ($per annum)	Project Team Response
	Independent review and auditing	Include an allowance for periodic review/auditing – assume once per 5 years.	Nominal allowance of $10,000 in Year 1 to Year 5, then reduced frequency to every 5 years thereafter.	This is agreed, and the costs included in in the revised report in **Appendix 16**.
Other	General wear and tear (from vehicle use and erosion) on cell access roads, drainage swales etc	General civil maintenance tasks, repair access roads, remove sediments from swales.	Nominal allowance of $2,500 per annum.	Roads will be infrequently used, with traffic primarily limited to Containment Cell monitoring and maintenance vehicles. The costs to replace the road surface every 100 years ($75000), and patch minor areas every five years ($2500). This equates to a nominal value of $1250 per annum and this has been included in the revised report in **Appendix 16**.
	Sedimentation of surface runoff basins.	Remove sediment (assume no off-site disposal required).	Nominal allowance of $2,500 per annum.	As previously noted, the sediment basins would be removed following completion of the Containment Cell capping. As such they do not form part of the long term management, and funding is not required
	Risk assessment per LTMP contingency actions	Include a contingency allowance to undertake a risk assessment (timing unknown).	Nominal allowance of $100,000 (event).	Agree and have nominated one event every 50 years (equating to $2,000 per annum). However, this is considered to be conservative.

5. RESPONSE TO OTHER GOVERNMENT AGENCIES' SUBMISSION ISSUES

5.1 Introduction

The key issues raised in the government agencies' submissions, and Hydro's responses, are presented in this section. The key issues are grouped based on the environmental aspect or Project element.

Section 5.2 to **Section 5.19** address the raised in response to the EIS exhibition. Table 5-4 in **Section 5.20** addresses comments received in response to agency review of the draft RtS.

The former Office of Environment and Heritage (OEH) is now part of the Biodiversity Conservation Directorate of DPIE (ecology) and Heritage Division of DPIE (Aboriginal heritage). At the time of the EIS exhibition, however, OEH was the responsible agency, and made a submission. As such OEH is referred to as the agency that raised the issue.

5.2 Aboriginal Heritage

5.2.1 Protection of known and potential Aboriginal heritage

Stakeholders: OEH

5.2.1.1 Issue summary

Archaeological testing of the area of high archaeological sensitivity in accordance with the 'Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW' will be a requirement of this area prior to any future project related activities that may propose a disturbance to this area. OEH additionally requested that this identified potential archaeological deposit (described in the Aboriginal Cultural Heritage Assessment (Appendix 9 of the EIS) as an area of high archaeological sensitivity) be registered on the OEH Aboriginal Heritage Information System (AHIMS).

5.2.1.2 Issue response

As described within Table 16.2 of the EIS "*Where possible, avoid the need to stockpile material in the area of high archaeological sensitivity. In the event that stockpiling in this area is required, geo-matting would be placed on the surface of the area prior to stockpiling*."

The area of high archaeological significance has been registered on the AHIMS as "Hydro PAD 1" with a Site ID of 37-6-3872.

5.3 Air Quality

5.3.1 Dust monitoring network

Stakeholders: CCC

5.3.1.1 Issue summary

Consider the adequacy of the proposed dust monitoring network which comprises four depositional dust monitoring locations. Should more monitors be installed at various distances from the Works.

5.3.1.2 Issue response

An Air Quality Impact Assessment (AQIA) was completed by Ramboll for the Project and is presented in Appendix 6 of the EIS. The predicted air quality impacts resulting from the Works (including demolition) are presented within Section 11.3.3 of the EIS and indicate that predicted incremental and cumulative concentrations and deposition rates are below the applicable NSW EPA assessment criteria (DEC 2005) and NEPM advisory reporting goals (NEPC 2003).

The dust monitoring network has been developed to confirm consistency with the dust impacts predicted within the AQIA resulting from the Works. The locations of the five depositional dust monitors (a fifth location was established) were determined in consideration of the prevailing wind direction, private receiver locations and location of the Works. For this reason, the monitoring network is considered adequate. **Appendix 19** provides the locations for the five depositional dust monitors and the monitoring results.

The dust monitoring network was documented in the Air Quality Management Plan (AQMP) which forms part of the Environmental Management Plan for Stage 1 Demolition, which was approved by Cessnock City Council in March 2016. Hydro believes that continuation of this network would be adequate for the Project, ongoing demolition and other activities at the Smelter. The Air Quality Management Plan would be updated accordingly (as part of the Remediation Works EMP described in **Section 9.3**) to address the Works activities.

Hydro commenced operation of the monitoring network in December 2016, to obtain background air quality data prior to the commencement of Stage 1 Demolition.

5.3.2 Exceedance of health based guidelines
Stakeholders: HNE Health

5.3.2.1 Issue summary
Concern regarding exceedance of health based air quality guidelines for chromium, fluoride and PAHs at a residential property was raised. A recommendation that all dust mitigation and particulate control measures including monitoring as identified in the AQIA, should be undertaken during construction, demolition and remediation to limit human health impacts was made. Specifically, for demolition by explosives, the measures stated in the AQIA should be carefully adhered to.

Where buildings contain elevated concentrations of metals and PAHs these materials will need to be contained and managed to ensure there are not significant releases in to the environment of these pollutants.

The Human Health Risk Assessment (HHRA) recommends that off-site residential receptors should utilise the guidelines provided by enHealth for potential contaminants (chromium, fluoride, PAH's and metals).

HNE Health recommends that Hydro notify off-site receptors identified in the HHRA of the potential for dust and particulate matter deposition and recommend that rainwater is not used as a potable source during the Works activities.

5.3.2.2 Issue response
The dust mitigation and particulate control mitigation measures described in the AQIA would be detailed in an updated AQMP that would form part of the Works Environmental Management Plan (EMP). This would include the air quality monitoring network described in **Section 5.3.1.2**.

As noted in Section 1.3 of the HHRA, it was not only prepared in accordance with the SEARs, but also consistent with the following:

National Environmental Protection Council (NEPC) (2013) *National Environment Protection (Assessment of Site Contamination) Amendment Measure* (NEPM) 2013 (No. 1). Schedule B4, Guideline on Site-Specific Risk Assessment Methodology.
enHealth (2012) *Environmental Health Risk Assessment, Guidelines for assessing human health risks from environmental hazards*. Commonwealth of Australia.

Section 5.4 of the HHRA noted that due to dust deposition modelling undertaken at the nearest residential property (6 Dawes Avenue) the human health risks presented by chromium, fluoride and PAHs to nearby residents would be assessed in more detail. Section 6 of the HHRA then predicted the concentrations of chromium, fluoride and benzo(a)pyrene. Based on this modelling and predicted concentrations Section 8.6 of the HHRA found that the "*increase in dust deposition is below the NSW Department of Environment and Conservation (NSW DEC) (2005) Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales for allowable dust deposition, and is considered to be negligible. Therefore any potential health risks to users of rainwater tanks in the vicinity of the Project Site are also considered to be negligible*." This is combined with the fact that residences within the vicinity of the Project Site are serviced by a potable water supply.

Hydro acknowledges the HNE Health recommendation to advise all the off-site receptors identified in the HHRA of the potential for dust and particulate matter deposition and recommend that rainwater is not used as a potable water source during the Works activities.

As part of its regular communication with local residents and the wider community, Hydro would provide information on the potential for dust generation during the Works (demolition, the main potential source of dust, no longer forms part of the Project and is largely completed) and other major activities. Hydro would also advise residents to continue using the reticulated water supply as the potable water source.

5.3.3 Methodology for estimation of emission of trace metals
Stakeholders: EPA

5.3.3.1 Issue summary
Justification of the assumption that all trace metals will be in the PM_{10} fraction of the particulate matter and this assumption is required.

5.3.3.2 Issue response
Particle size analysis of the collected trace metals samples was not available. Air quality impacts associated with trace metals are related primarily to the inhalation of suspended particles (i.e. the less than 10 micron fraction). To conservatively assess the risk of inhalation impacts from trace metal emissions, the AQIA assumed that 100% of the trace metals that could be emitted were in the PM_{10} fraction. In reality the trace metals would range in size, including greater than 10 microns in diameter, however larger particles would deposit closer to the point of emission generation.

5.3.4 Toxic air pollutant predictions
Stakeholders: EPA

5.3.4.1 Issue summary
Estimation of maximum concentration of toxic pollutants at the boundary of the premises should be included as required under the Approved Methods.

5.3.4.2 Issue response
In accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (DEC, 2005) (the Approved Methods), the maximum 99.9th percentile 1-hour average concentrations at site boundary for individual air toxins were presented in Table 18 of the AQIA (Appendix 6 of the EIS).

5.3.5 Meteorological Data
Stakeholders: EPA

5.3.5.1 Issue summary
Information is required justifying the choice of calendar year 2014 to represent meteorology.

5.3.5.2 Issue response
In accordance with the Approved Methods, five years (2010 to 2014) of meteorological data recorded onsite was analysed and discussed in Section 3 of the AQIA (Appendix 6 of the EIS). The meteorological data for all five years of data was largely consistent. Therefore as 2014 was the most recent available data and was consistent with the other data years, it was determined to be appropriately representative of the Project Site's meteorological conditions.

5.3.6 Odour Management
Stakeholders: EPA

5.3.6.1 Issue summary
Discussion is required on the potential for the emission of odorous compounds, volatile compounds and semi-volatile compounds from the Capped Waste Stockpile and the proposed mitigation and management measures.

5.3.6.2 Issue response
As stated in Section 4.2.3 of the AQIA (Appendix 6 of the EIS), onsite soil surveys of the Capped Waste Stockpile detected minimal volatile contaminants or odorous compounds. Consequently, it is considered that the potential for the emission of individual toxic and odorous compounds during the excavation of the Capped Waste Stockpile is minimal. This has been confirmed by gas

monitoring that was undertaken at the Capped Waste Stockpile in 2016 and 2017. The results of this monitoring are presented in **Appendix 21**.

Despite these results, the HHRA (Appendix 12 of the EIS and summarised in Section 22 of the EIS) assessed the generation of gases from the opened Capped Waste Stockpile as a potential human health risk to employees working in close proximity to the material, particularly a person working within a trench (which has a low likelihood of occurring). Section 22.4 of the EIS identifies the management measures that would be implemented to protect workers from gases.

5.4 Biodiversity

5.4.1 Cumulative impacts

Stakeholders: OEH

5.4.1.1 Issue summary

Cumulative impacts to biodiversity of the Project have not been adequately assessed, with little consideration given to the cumulative impact associated with the rezoning proposal that is being developed for the remainder of the Hydro owned lands.

5.4.1.2 Issue response

The EIS has been prepared to assess the environmental impacts of the Project as described within Section 8 of the EIS. The key element of the Project relating to vegetation clearance is the Containment Cell construction.

As detailed in Section 18.3 of the EIS and further described within Appendix 10 of the EIS, the Project would result in the clearance of 2.5 hectares of native vegetation which is made up of 1.35 hectares of Kurri Sand Swamp Woodland in the Sydney Basin Bioregion and 1.15 hectares of Lower Hunter Spotted Gum-Ironbark Forest in the Sydney Basin Bioregion. Both vegetation communities are listed as Endangered Ecological Communities (EEC) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Table 5-1 compares the area of these EEC proposed to be cleared against that recorded within the Hydro Land, and the indicative area for clearing (and the subject of a proposed Bio-Certification Agreement with OEH) considered in the Planning Proposal for the Hydro Land.

As acknowledged by OEH in its submission, the EEC clearance proposed for the Project forms part of the indicative area of vegetation clearance proposed to be offset through the conservation of EEC via the proposed Bio-Certification Agreement with OEH. By directly relating the vegetation clearance proposed for the Project with the proposed Bio-Certification Agreement for the Hydro Land (and the indicative areas of EEC to be cleared and conserved as part of that agreement) the Project does consider the cumulative impact of the Project with the Planning Proposal. The vegetation proposed for clearance as part of the Project forms part of the clearing addressed by the Planning Proposal, not in addition to it.

Table 5-1: Area of EEC Proposed for Clearance and Present in the Hydro Land

EEC	Approximate Area of EEC mapped (ha) in Hydro Land	Indicative Area of EEC clearing in the Planning Proposal (ha) (including Project)	Area of EEC proposed to be cleared for Project (ha)	Indicative Area of EEC Offsetting in the Planning Proposal
Kurri Sand Swamp Woodland in the Sydney Basin Bioregion	370	80	1.35	290
Lower Hunter Spotted Gum - Ironbark Forest in the Sydney Basin Bioregion	460	50	1.15	410

As noted in **Table 5-1** the Project would contribute only 2.5 hectares of EEC clearing of the indicative 130 hectares clearance of the same EEC presented in the Planning Proposal (and subject of the proposed Bio-Certification Agreement). This equates to two percent of the indicative total clearance within the Hydro Land for the two affected EECs.

Under the current proposed Bio-Certification Agreement approximately 160 hectares would be cleared, which would be offset by the protection of approximately 800 hectares of EEC. Under the Planning Proposal currently under consideration, approximately 400 hectares of additional native vegetation would also be within land proposed to be zoned E2 Environment Conservation under the Cessnock Local Environmental Plan 2011.

5.4.2 Fauna survey effort
Stakeholders: CCC

5.4.2.1 Issue summary
Further detail and/ or survey effort is required with regards to terrestrial or arboreal mammal trapping, bat trapping and diurnal fauna. Additionally, further clarification of the survey completed for hollow bearing trees is required.

5.4.2.2 Issue response
Section 4.3 of the Ecological Assessment (Appendix 10 of the EIS) describes the fauna survey effort completed for the Project Site, on top of the literature review.

Section 4.2 of the Ecological Assessment also notes that within the biometric plots, a number of characteristics were noted, including the number of hollow-bearing trees. While specific locations of hollow-bearing trees were not presented in the Ecological Assessment, the report notes in several locations that "*Due to a history of timber removal, few hollow bearing trees are present in the Project Site*."

Section 8.1 of the Ecological Assessment (and reflected in Section 18 of the EIS) states that a Flora and Fauna Management Plan would be prepared and include the following:

Pre-clearing surveys and supervision during vegetation clearing (this would include identification of hollow-bearing trees).
Nest box installation and monitoring strategy to compensate for hollow bearing tree loss.

Section 8.2.2 of the EIS also describes the key steps that would be developed and implemented as part of a Vegetation Clearing Protocol. This includes measures to be implemented prior to and during the felling of hollow bearing trees.

5.4.3 Fauna survey effort
Stakeholders: CCC

5.4.3.1 Issue summary
The Likelihood of Occurrence Table is missing consideration of several species.

5.4.3.2 Issue response
The likelihood of occurrence assessment information was inadvertently omitted from Appendix C of Appendix 10 of the EIS. The Likelihood of Occurrence Table has been updated to include the omitted data and it is reproduced within the revised Ecological Assessment presented in **Appendix 22**. This omission has resulted in no change to the outcomes of the Ecological Assessment.

5.4.4 Retirement of Biobanking credits
Stakeholders: OEH

5.4.4.1 Issue summary
The Biodiversity Certification process does not generate tradable credits, therefore, none of the credits generated within the Biodiversity Certification Assessment Area (BCAA) as part of the potential Biodiversity Certification are able to be utilised for this proposal. BioBank sites may be established outside of the BCAA and are likely to occur concurrently with the Biodiversity Certification. However, based on the above, the retirement of credits should not be contingent on the Biodiversity Certification in regards to the timing or as a source of credits.

OEH therefore recommended that conditions of consent should ensure that the appropriate credits are retired and that there is a time limit on how long the retirement of credits can be deferred.

5.4.4.2 Issue response

Hydro has been working with OEH on the proposed Bio-Certification Agreement for the Hydro Land (including the Project Site) since 2014, and will continue to work with OEH to deliver the native vegetation conservation outcomes that is proposed for the Hydro Land under the Planning Proposal. As discussed in **Section 5.4.1** the 2.5 hectares of EEC to be cleared for the Project is part of the 160 hectares proposed to be cleared as part of the Planning Proposal offset by the conservation of 805.49 hectares of native vegetation under the Bio-Certification Agreement.

As Hydro is committed to offsetting EEC clearing on Hydro Land, Hydro would be supportive of consent conditions that reinforce the requirement for retirement of credits, and include a reasonable time limit on how long retirement can be deferred (with recognition of the Bio-Certification Agreement process to which OEH is a key party).

5.5 Bushfire

5.5.1 Bushfire Hazard Assessment

Stakeholders: RFS

5.5.1.1 Issue summary

A Bushfire Hazard Assessment should be prepared from suitably qualified consultants and submitted as part of the final EIS, which considers the bushfire risk to and from the site to surrounding vegetated areas during any demolition, remediation or construction works and which provides appropriate bush fire protection measures to address the type and level of risk.

5.5.1.2 Issue response

Whilst a formal Bushfire Hazard Assessment is not a requirement for an SSD and this type of development is not considered within the NSW RFS *Planning for Bushfire Protection 2006*, consideration of bushfire risk from and to the Project, and the management of such risks, has been given in the EIS and during Project planning.

Section 8.1.1.1 of the EIS describes the existing and proposed fire management measures for the Project Site and Containment Cell. Fire risks include: risks to Hydro Land from onsite and surrounding vegetation; and from fire occurring within the Project Site (as a result of machinery malfunction, incorrect handling of waste materials, incorrect implementation of demolition procedures, or illegal disposal of cigarettes from on-site personnel).

Mitigation and management measures include the maintenance of fire breaks and access for fire fighting vehicles (including Crown Roads). These breaks and accesses were maintained throughout the operation of the Smelter, and maintenance has continued since its closure. These fire breaks and accesses would be maintained throughout the Works.

The vegetation clearance required for construction of the Containment Cell includes allowance for construction of a service road and construction access around the Containment Cell. This would provide a sufficient buffer between the Containment Cell construction (with a minimum of 15m between the Containment Cell and the nearest retained native vegetation), as well as access for fire fighting vehicles if required. As noted in response to Issue No. 62, **Appendix 3J** includes the design for the access road to the Containment Cell (5m width), and the Containment Cell perimeter road (4.6m width plus a 1m shoulder on either side). This complies with the RMS minimum width standard for heavy vehicle access (http://www.rms.nsw.gov.au/business-industry/heavy-vehicles/road-access/general-access-vehicles.html).

The Smelter Access Plan (refer to section 15.4 of the EIS) would include provision for safe egress within and from the Project Site (particularly the Containment Cell) in the event that bushfire presents a risk to the Works site and personnel. It would also include provision for emergency vehicle access to the Project Site.

The risk of fire generation within the Project Site would be addressed through: implementation of the Remediation Works EMP and the Works WHSMP; works being undertaken by appropriately

qualified and experienced personnel; machinery being maintained and operated in accordance with manufacturer requirements; and restrictions on where smoking and cigarette disposal can occur.

5.6 Capped Waste Stockpile

5.6.1 Capped Waste Stockpile material sorting, recycling and treating
Stakeholders: EPA

5.6.1.1 Issue summary

That the waste material in the Capped Waste Stockpile be sorted to remove any materials that can be recycled such as spent pot lining or steel.

That non-recyclables with levels of leachable fluoride and cyanide above the CCO threshold be treated to reduce the levels below the threshold (eg. with calcium carbonate/ lime and cement).

5.6.1.2 Issue response

In response to this issue Hydro prepared the *Capped Waste Stockpile Management Options Evaluation Study* in consultation with the EPA. The findings of the study (addressing these issues) are discussed in **Section 7.1** and is provided in **Appendix 1** and **Appendix 2**.

5.6.2 Regulation Issues
Stakeholders: EPA

5.6.2.1 Issue summary

In its submission the EPA concluded that while macro-encapsulation of any smelter wastes with levels of leachable fluoride and cyanide above the CCO threshold would be permissible under the POEO Act and the POEO Waste Regulation, it would not be permitted under the EHC Act.

The submission also noted that an immobilised contaminants approval granted under the *Protection of the Environment Operations (Waste) Regulation 2014* would not be required (note: this was reiterated in correspondence received from the EPA on 6 December 2017).

5.6.2.2 Issue response

As discussed in **Section 1.5.2**, following extensive investigations and ongoing consultation with the EPA and the Department, Hydro concluded that the Capped Waste Stockpile material would be subject to gypsum application prior to placement within the Containment Cell. This would result in the material complying with the CCO. Further details on the gypsum application process are provided in **Section 7.1.**

Hydro acknowledges the advice regarding the immobilised contaminants approval and as such ceased preparation of an application and associated negotiations with the EPA.

5.7 Containment Cell Design and Construction

5.7.1 Clay base design expectations
Stakeholders: MCC, CCC

5.7.1.1 Issue summary

Further information is required to support design expectations regarding the proposed clay base of the Containment Cell.

5.7.1.2 Issue response

Section 5.3.6 of the EIS states that the geological features of the Containment Cell location are preferable as it is located within an area underlain by suitable soils comprising low permeability residual clays and bedrock, avoiding alluvial soils. The bedrock was found to be massive (cannot be dug with an excavator) with minimal defects and fractures. Further details on the geotechnical features of this location are provided in **Appendix 3D** and **Appendix 15**.

Hydro has undertaken extensive investigations since 2013 to reach these conclusions and determine that the proposed Containment Cell is the preferred location. These investigations also concluded that the clay in this location is of suitable quality (including impermeability) and quantity for use in construction of the Containment Cell base.

The use of clay in the base (along with the other materials) is consistent with the EPA *Environmental Guidelines: Solid waste landfills* (2016). The natural clay is highly impermeable (permeability of 1 x 10^{-9} m/s).

Section 8.4.3 of the EIS described the Containment Cell base (including clay). The Containment Cell Detailed Design Report presented in **Appendix 3J** includes detail on the base design (including clay layers), and the investigations undertaken to finalise the Detailed Design.

5.7.2 Management of wet containment wastes
Stakeholders: MCC

5.7.2.1 Issue summary

Provide detail for management of wet weather and wet containment wastes in regards to the Containment Cell.

5.7.2.2 Issue response

The EIS describes a number of measures to be implemented during wet weather, to minimise wastes becoming wet, and to manage wastes if they become wet:

- Section 8.5.3 of the EIS notes that the cap of the Capped Waste Stockpile would be gradually removed and small sections of the stockpile would be opened and removed to minimise the area exposed at one time.
- Section 8.5.4 of the EIS notes that removal of waste materials would cease in rain events and the exposed stockpile materials covered. The exposed area would be covered either with the stockpiled wet weather cover material or an alternative cover (such as plastic sheeting).
- Section 8.5.5 of the EIS notes that transportation of the material would cease during rain events.
  Implementation of these measures would mitigate the amount of wet or moist material from the Capped Waste Stockpile that would be placed in the Containment Cell.
- Section 8.8.1 of the EIS notes that the following measures would be implemented at the Containment Cell to mitigate wet weather impacts:
  - The area of material being placed and exposed at one time would be minimised to reduce the areas requiring coverage during wet weather and minimise the area susceptible to dust generation.
  - Upon completion of placement of a sector of material, it would be covered with clean soil prior to commencing construction of the Containment Cell cap.
  - In the event of predicted rainfall, temporary wet weather material (such as plastic sheeting or similar) would be placed over uncapped placed material.
- Section 8.4.4 of the EIS describes the leachate management system that would be installed and operated to collect and treat leachate generated during the placement of material in the Containment Cell.

Appendix 3L provides additional information on how the Containment Cell and the Capped Waste Stockpile would be managed during wet weather.

5.8 Containment Cell Management and Monitoring

5.8.1 Long term management and monitoring activities at the Containment Cell
Stakeholders: MCC, DPI, CCC

5.8.1.1 Issue summary

Further detail is required on the management and monitoring of the Containment Cell including:

- Existing and proposed contaminant monitoring program within and surrounding (including below) the Containment Cell and leachate sump.
- How impacts between the quarterly cap inspections would be identified and managed.

Additionally, the Containment Cell Environmental Management Plan should:

1. Stipulate an automated pump system with float switches to be installed in the leachate sump of the Containment Cell. The leachate level should not rely on a visual inspection on a pre-determined basis or in the case of extreme events, for example major storms, earthquakes.

2. Ensure unsuitable vegetation does not propagate on the clay capping which could result in the failure of the capping and subsequent ingress of stormwater into the Containment Cell.
3. Stipulate regular and frequent checking and testing for the emission of hazardous gases from the Containment Cell.
4. Stipulate regular and frequent checking of the Containment Cell to ensure the integrity of the cell is intact and not in danger of failure.
5. The dam water should be tested and checked for hazardous materials or heavy metals. Containment dam water should be disposed of at an approved waste disposal facility.

5.8.1.2 Issue response

Section 9 of the EIS details the proposed monitoring and management activities at the Containment Cell. Regarding the issues raised in the submissions:

- No monitoring is currently undertaken at the proposed Containment Cell location. Investigations have been undertaken, as previously discussed in **Section 5.7.1.2**, to confirm that it is the most suitable location on Hydro Land for the Containment Cell.
- The Containment Cell LTMP in **Appendix 12** describes the monitoring and inspection program to be implemented at the completed Containment Cell.
- Section 9.1.2.2 of the EIS notes the reasons why the potential for an incident to occur at the Containment Cell is low. Based on these reasons, Hydro concluded that the proposed scheduled inspections included in the Containment Cell LTMP would be sufficient to identify potential issues.

With regard to the recommendations for the Containment Cell Environmental Management Plan (which Hydro has titled the Containment Cell LTMP and presented in **Appendix 12**):

1. Hydro does not believe that an automated pump system with float switches to be installed in the leachate sump is the best long term solution. Given the expected low level of leachate generation (the system is designed not to generate leachate) the proposed scheduled and responsive visual monitoring schedule allows for the leachate level to be directly inspected. **Appendix 3D** includes the results of the modelling of leachate generation within the Containment Cell, which is predicted to be less than 400 L per year once the cap has been in place for five years.
   The Containment Cell Manager could then see if leachate has been generated and, if so, it would be pumped out to be transported to an off-site licensed waste facility. The request for an automated pump system assumes that there would be large quantities of leachate generated, requiring immediate removal and treatment. As previously discussed the Containment Cell is designed to avoid leachate generation.
2. The LTMP describes the vegetation inspection program and how unsuitable vegetation would be removed.
3. The LTMP commits to scheduled monitoring from the gas vent for ammonia and methane.
4. The LTMP outlines the proposed cap inspection schedule, both scheduled inspections and in response to significant storm events and major seismic activity.
5. In relation to the operation of the Containment Cell (which this comment related to) there would be no dam to collect and store water or leachate from the Containment Cell (there would be a sediment basin to capture sediment from the surface area of, and surrounding, the Containment Cell). As shown in the Containment Cell Detailed Design Report in **Appendix 3J** any leachate would collect within a sump located within the Containment Cell, with pipework connecting the sump to valves at the surface. A water level probe would be used to determine if leachate was present and, if present, measure the level (and therefore the quantity) of leachate present.

5.8.2 Gas emissions

Stakeholders: CCC

5.8.2.1 Issue summary

Provide detail on detection, treatment, prevention and safety protocols of gas emissions (apart from breathing apparatus for workers) on offer for affected persons.

5.8.2.2 Issue response

As described in Section 8.8.3 of the EIS the Containment Cell capping would include the placement of a sand gas collection layer, with a gas vent installed from this layer and through to the surface. It also notes that due to the nature of the material to be placed in the Containment Cell and the cell design the potential for the generation of gases in sufficient quantities to cause odour impacts is low.

Gas well monitoring at the existing Capped Waste Stockpile has shown that gas generation has significantly reduced since the cap was installed, and there are no odour issues associated with the Capped Waste Stockpile. As such the gas collection layer and gas vent are a contingency rather than an inherent part of the Containment Cell. The Containment Cell Detailed Design in **Appendix 3J** includes the ventilation stack design.

The LTMP presented in **Appendix 12** notes that gas monitoring would initially be undertaken at the Containment Cell on a quarterly basis, monitoring for ammonia and methane. It is expected that the sampling procedure would be consistent with the gas sampling procedure currently implemented at the Capped Waste Stockpile, which includes:

- Personnel wear half face respirator masks with a methane filter.
- Provision of meters that provide warning on methane and ammonia levels within the surrounding air.

The LTMP identifies the situation that would trigger the contingency response. The LTMP includes a process where the regularity of this gas monitoring could reduce and potentially cease based on results indicating that gas generation is not an issue.

5.8.3 Environmental liabilities

Stakeholder: EPA

5.8.3.1 Issue summary

The EPA may require the following:

- Provision of a financial assurance for the site. The amount and form of the assurance would be determined by the EPA and required as a condition of the licence. It may be linked to licence conditions requiring works or programs related to environmental performance.
- The taking out and maintaining of a policy of insurance consistent with Section 72 of the POEO Act.
- The entering into or arranging for a positive covenant under Section 88E of the *Conveyancing Act 1919*.

5.8.3.2 Issue response

Section 9.4 of the EIS acknowledges the potential for the EPA to implement such requirements through the EPL. It is expected that any requirements would reflect the management measures described in the LTMP (refer to **Appendix 12**) and the results of the independent costing for implementation of the LTMP (refer to **Appendix 16**).

Hydro will continue to negotiate with the EPA and the Department about the implementation of these measures.

5.8.4 Ownership of the Containment Cell in the future
Stakeholder: MCC

5.8.4.1 Issue summary

Further detail on the process for the future transfer of ownership of the Containment Cell is required.

5.8.4.2 Issue response

Section 7.4 notes that negotiations between the Department and Hydro concluded that the preferred approach for regulation of the long term management of the Containment Cell is a Voluntary Planning Agreement (VPA) between Hydro and the Minister. The VPA would describe the requirements for the future transfer of ownership of the land subject to the VPA (that land housing the Containment Cell).

5.9 Contamination

5.9.1 Contaminated waste management
Stakeholders: CCC

5.9.1.1 Issue summary

Potential escape of contaminated waste from recycled materials or transportation of hazardous materials from the site must be managed appropriately.

5.9.1.2 Issue response

Hydro acknowledges this comment, and has addressed it (with regards to the transportation of recyclable metals from the Smelter) in the Stage 2 Demolition EIS which was submitted with a DA to Cessnock City Council, which Council approved on 8 May 2018. As discussed in **Section 1.4**, Stage 2 Demolition was removed from the SSD application and is the subject of this separate DA.

Other wastes managed separately to the Project have been or will continue to be transported from the Smelter for reuse. Only vehicle operators with the required licences for the transportation of such material will be commissioned by Hydro to transport the material. Where required for the type of waste, the EPA waste tracking requirements will also be implemented.

5.9.2 Contaminated water management
Stakeholders: CCC

5.9.2.1 Issue summary

The safe re-use, treatment and storage of potentially contaminated stormwater and runoff water, along with the volume and nature of truck movements and truck washing should be considered further by the NSW Environment Protection Authority.

5.9.2.2 Issue response

The EIS describes the water and wastewater system that would be implemented during the Works. This includes:

- Section 8.2.1.2 of the EIS outlines the soil and water management controls to be established at the commencement of the Works, including installation of erosion and sediment controls, and surface water diversion drains.
- Section 8.2.1.5 of the EIS discusses the role of the existing Smelter water management system, and the potential for modifications as a result of demolition activities.
- Section 8.2.7.4 of the EIS discusses the wastewater sources during the Works and the proposed management measures.
- Section 8.4.4 of the EIS discusses how wastewater generated during Containment Cell construction and material emplacement would be captured and treated.
- Section 8.5.2 of the EIS discusses how wastewater generated during excavation of the Capped Waste Stockpile would be captured and treated.
- Section 8.11 describes how leachate and contaminated groundwater within the footprint of the Capped Waste Stockpile would be managed.

Additional water management measures are presented in Section 13.4 of the EIS.

The controls described in these sections would be documented in a Soil and Water Management Plan (SWMP), which would be a sub-plan of the Remediation Works EMP. The SWMP would include continued revision of the controls to reflect the varying stages of the Works.

The current EPL includes a licensed discharge point from the Smelter water management system. As noted in Section 8.2.7.1 of the EIS Hydro proposes to utilise water collected in the Smelter water management system for dust suppression. This water is suitable to be discharged in accordance with the EPL and is therefore considered suitable for dust suppression within the Smelter.

Appendix 3C includes the results of the modelling of leachate generation at the Containment Cell and the Capped Waste Stockpile. **Appendix 3L** includes further details on how leachate would be managed, and how clean water would be diverted where possible to avoid it being contaminated by leachate and contaminated materials.

Section 8.4 notes that the preferred management approach for leachate and contaminated stormwater is to collect it for transportation to a licensed off site treatment facility.

Section 7.2 provides details on the leachate treatment plant that could treat the collected leachate and contaminated stormwater, collected within the Capped Waste Stockpile and the Containment Cell, including details on its capacity and the contaminants it would be capable of treating.

Both off site treatment and on site treatment during removal of material from the Capped Waste Stockpile and placement within the Containment Cell may occur. It is expected that only off site leachate treatment would occur following completion of Containment Cell capping.

With regards to truck movements, Section 15.3 of the EIS discusses the number of trucks that are predicted to be travelling on public roads (assessing the impact of a peak of 57 truck movements per day). As described in **Section 8.4** and assessed in **Section 9.1.4**, a peak of two truck movements per day would be generated during the Works when leachate was collected for off site treatment and management. **Section 9.2** and the review of the EIS Traffic Impact Assessment (EIS TIA review) presented in **Appendix 28** concluded this would have minimal to no impact on local traffic when considered with other Project traffic.

These trucks could only be operated by contractors licensed by the EPA to transport and manage the leachate. Leachate collection points and haulage routes through the Project Site would be constructed and managed so the trucks would not drive through potentially contaminated soils, thereby avoiding the accumulation of contaminated material on these trucks and requiring washdown prior to leaving the Project Site.

5.9.3 Mapping and management of contaminated soil stockpiles
Stakeholders: DPI

5.9.3.1 Issue summary
Provide mapping of temporary contaminated soils stockpile areas and the management measures to be implemented.

5.9.3.2 Issue response
Figure 8-1 of the EIS shows the proposed Project Site Establishment area, including the "Stockpile Area" in the west of the Smelter. This area would be used for the temporary stockpiling (where required) of various demolition and remediation materials prior to them being transported to their processing, recycling or disposal location.

This may include contaminated soils. However, it is expected that the majority of contaminated soils and materials would be transported directly to the Containment Cell. This would be a more time and cost-effective strategy, and minimises the potential environmental risks of double handling the material. The SWMP would describe the appropriate control measures to be implemented in the event that contaminated soil did need to be temporarily stockpiled prior to placement in the Containment Cell.

As noted in Section 8.6.1.1 of the EIS, some contaminated soils derived from Category 2 remediation works within the Hydro Land are stockpiled at the Smelter (within the proposed "Stockpile Area"). These are soils predominantly contaminated with asbestos. These soils have been managed to avoid the potential for generation of air borne emissions, as well as contaminated runoff. The location of these stockpiled contaminated soils is presented in **Appendix 23**.

5.9.4 Remediation
Stakeholders: HNE Health, CCC

5.9.4.1 Issue summary
Provide further detail on the Areas of Environmental Concern and Potential Areas of Environmental Concern and the methodology for their identification.

5.9.4.2 Issue response
The revised RAP (refer to **Appendix 7**) includes the Areas of Environmental Concern (AEC) and Potential Areas of Environmental Concern (PAEC) that have been identified as a result of investigations undertaken at the Smelter since 2012.

Section 4 of the RAP describes the Smelter history, with a focus on those facilities and activities that have the potential to cause contamination of soil and/or groundwater.

Section 5 of the RAP provides a detailed summary the various investigations and subsequent reports that have been prepared on behalf of Hydro since 2012. This describes the preliminary investigations to identify the PAEC, the methodology and results of field investigations, and the final analysis undertaken to determine the extent and degree of contamination at the AEC.

The investigations that informed the RAP are provided in **Appendix 9** and **Appendix 10**.

5.9.5 Water Quality in Wentworth Swamp
Stakeholders: MCC

5.9.5.1 Issue summary
Following wet weather conditions contaminants within Wentworth Swamp are elevated which was raised as a concern in the rezoning process. Downstream impacts of the Smelter to Wentworth Swamp should have been addressed within the EIS.

5.9.5.2 Issue response
Hydro undertakes monthly water quality testing in Wentworth Swamp and Swamp Creek, which is made publicly available in the Annual Environmental Management Review. Surface water samples are routinely analysed for pH, electrical conductivity and fluoride. Biannually, the samples are also analysed for free cyanide.

Hydro is unaware of monitoring results that indicate elevated contaminants levels in Wentworth Swamp following wet weather.

5.10 Flooding and Hydrology

5.10.1 Flooding Assessment
Stakeholders: OEH

5.10.1.1 Issue summary
Additional information is required on flooding information for the Project Site, particularly the unnamed watercourse between the Smelter and the Containment Cell. This includes a review of the 1% AEP level.

Information should be provided on how water in the unnamed watercourse may be diverted during construction of the crossing.

5.10.1.2 Issue response
Pulver Cooper and Blackley (PCB) was commissioned by Hydro to prepare a Flooding and Stormwater Impact Assessment of the Smelter and Hydro Land to support a Planning Proposal. This report included the 1% AEP level of 9.7m Australian Height Datum (AHD) that was presented in the EIS. A 1% AEP level of 9.7m AHD was calculated based on the results of recent

flood studies commissioned by Cessnock and Maitland City Councils. The EIS presented the 1% AEP level of 9.7m AHD based on this report.

PCB was subsequently commissioned to undertake a review of the flood modelling and stormwater management for the Smelter and the surrounding land. This included a review of water flows and flood levels in the unnamed watercourse that passes between the Smelter and the proposed Containment Cell location. This was undertaken in response to major storm events over the past two years (in particular April 2015 and January 2016), so that Hydro had a better understanding of flooding and hydrology in and surrounding the Smelter.

Following these investigations and ongoing consultation with OEH, and in response to issues raised during the EIS exhibition, PCB undertook additional work on the hydrology of and flooding impacts on the Smelter and surrounding land. This included a review of the 1% AEP flood level.

The review concluded that the 9.7m AHD level presented in the EIS to represent the 1% AEP level is correct. The Stormwater Management Report presented in **Appendix 13** includes a figure displaying the 1% AEP level for: the majority of the Hydro Land; and for more of the land immediately surrounding the Project Site. The Probable Maximum Flood (PMF) level is also displayed.

The review also reconsidered the hydrological and hydraulic assumptions in relation to the unnamed watercourse. This included taking into consideration the contribution of the completed Hunter Expressway, as anecdotal evidence had been provided that it may have resulted in changes to the hydrology of the water course that had not been captured by previous investigations. The Stormwater Management Report concluded that the previous findings in relation to the unnamed watercourse were correct.

As discussed in Section 8.2.6.2 of the EIS a culvert or small bridge is proposed to be constructed at the unnamed watercourse as part of the haul road connecting the Capped Waste Stockpile and the Containment Cell. The structure would be designed and constructed to maintain the existing flows in the watercourse and minimise changes in the downstream 1% AEP flood levels. The detailed design of the unnamed watercourse crossing is included as part of the Containment Cell Detailed Design in **Appendix 3J**.

As noted in the EIS, the unnamed watercourse is an ephemeral watercourse. As such it is expected that for most of the construction period there would be no or minor flows within the watercourse.

Section 8.2.6.2 of the EIS does note that construction would require temporary blockage of the unnamed watercourse, which may require flows to be diverted around the construction works in the event of a rain event. Given the expected size of the proposed structure and the watercourse formation, it is expected that any structure within the watercourse itself would be minor in nature, and that any diversion would remain within the watercourse itself. It is not expected that the watercourse would be completely blocked requiring water to be diverted from the watercourse.

5.10.2 Probable Maximum Flood Level

Stakeholders: OEH, CCC

5.10.2.1 Issue summary

The PMF level, particularly in relation to the Containment Cell, needs to be provided.

5.10.2.2 Issue response

The Flooding and Stormwater Impact Assessment (PCB, 2014) of the Smelter and Hydro Land to support the Planning Proposal for the Hydro Land included a PMF level. The report adopts a PMF level of 12.2m AHD based on the results of previous flood studies for the lower Hunter River and the Swamp Creek/ Fishery Creek catchment. The report acknowledges that older studies had identified a PMF level of 13.4m AHD, but 12.2m AHD was determined based on data from more recent studies.

As discussed in **Section 5.10.1.2** PCB has undertaken additional work on the hydrology of the Smelter and surrounding land, including a review of the PMF level. This additional work took into

consideration three recent large rain and flooding events: 6 June 2007 (determined to be a 2% AEP storm event); 22 April 2015 (a 2% AEP storm event; and 6 January 2016 (determined to be a 10% AEP storm event)). This additional work confirmed that the PMF level for the Project Site is 12.2m AHD. **Appendix 13** includes a figure displaying the PMF level.

The base of the Containment Cell would be 20m AHD, with the perimeter drain and service road above 19m AHD. As such the Containment Cell would be well above both this PMF level (12.2m AHD) and the previously calculated PMF level (13.4m AHD).

The vast majority of the Smelter and the Project Site would be above the PMF level: only the drainage infrastructure in the west of the Smelter is below the PMF level. Hart Road is also above the PMF level.

5.10.3 Hydrological features and water quality
Stakeholders: DPI

5.10.3.1 Issue summary
A map should be provided showing the hydrological features in the vicinity of the site and potentially impacted users of water at all receptor locations.

5.10.3.2 Issue response
Figure 13-1 of the EIS shows the hydrological features in the immediate vicinity of the Project Site, while Figure 13-2 of the EIS shows the existing stormwater and water management system within the Project Site. To place this in context, the figure in **Appendix 14** has been provided to show other key hydrological features in the local area.

A previous review undertaken of licensed groundwater and surface water users indicates there are 11 licenced bores within a 1km radius of the Project Site. The bores are located within the Hydro Land and are only used for monitoring purposes. There are no other licenced bores within 5km of the Project Site.

5.11 Groundwater

5.11.1 Groundwater Dependant Ecosystems
Stakeholders: DPI

5.11.1.1 Issue summary
The EIS should identify and map the nearby groundwater dependant ecosystems (GDEs) and describe the relevant hydrology.

5.11.1.2 Issue response
There are no GDEs within the Project Site. A review of the vegetation mapping and topography indicated that the only GDE in the vicinity of the Project Site would be the vegetation associated with the sand lens that contains the leachate contaminated groundwater. Previous monitoring has noted adverse impacts on vegetation within this area.

One of the key objectives of the Project is to remove the Capped Waste Stockpile, which has historically been a key source of groundwater contamination. The removal of the Capped Waste Stockpile would result in groundwater quality improvements which, in turn, would provide benefits to the downstream GDE.

5.11.2 Hydrogeological mapping and monitoring
Stakeholders: DPI, MCC

5.11.2.1 Issue summary
Hydrogeological and hydrological detail should be improved, including provision of modelling assumptions for fluoride plume.

5.11.2.2 Issue response
Hydro has undertaken extensive investigations, including fate and transport modelling, to determine the characteristics of the leachate plume from the Capped Waste Stockpile. The fate and transport model for the Capped Waste Stockpile groundwater plume is presented in **Appendix 9**.

One of the key elements of the Project, the relocation of the Capped Waste Stockpile, is the key task to managing the leachate plume: removal of the source of the contaminated leachate would in turn assist in remediating the plume. Section 8.7 of the RAP describes the additional actions to be undertaken prior to and following removal of the Capped Waste Stockpile that would further assist in remediation of the plume.

5.11.3 Groundwater investigations and conditions
Stakeholders: DPI

5.11.3.1 Issue summary
Further information is required, specifically in regards to groundwater bore logs and construction details, pumping tests completed, groundwater contour maps for shallow and deep aquifers and groundwater modelling and independent review.

The report should enable an understanding of the three-dimensional conceptual geology and hydrogeology of the site and its vicinity including at all receptor locations.

5.11.3.2 Issue response
Groundwater bore logs and construction details, groundwater contour maps for shallow and deep aquifers and groundwater modelling are provided in the following reports, which are provided in **Appendix 24** of this report:

- *Plume Delineation Report, Capped Waste Stockpile*, (Ramboll Environ, 2016a).
- *Hydro Aluminium Kurri Kurri Smelter, Capped Waste Stockpile, 12 Month Summary Groundwater Monitoring Report* (Ramboll Environ, 2016b).

An independent review of these reports was completed by the Site Auditor, Ross McFarland, who has provided a Site Audit Statement in relation to the Smelter Site (refer to **Appendix 6**).

5.11.4 Groundwater Monitoring Program
Stakeholders: CCC

5.11.4.1 Issue summary
A groundwater monitoring program should be considered as an ongoing management action.

5.11.4.2 Issue response
The management and monitoring associated with the Containment Cell would be conducted in accordance with the LTMP presented in **Appendix 12**. This includes monitoring of leachate collected within the Containment Cell leachate collection system.

Hydro maintains that an ongoing groundwater monitoring program for the Containment Cell would not provide an environmental benefit due to the following:

- The leachate monitoring within the leachate sump would determine if leachate is being generated from the waste material, and at quantities requiring management.
- A Fate and Transport Model included in **Appendix 17** was undertaken to model what would happen in the unlikely event that the Containment Cell leaked. The response to **Issue No. 40** in **Table 4-1** describes how the model found that contaminants would only move at low concentrations over a very small distance from any breach, over a significant timeframe.

Due to the time that it would take for contaminants to move through the groundwater, monitoring would not provide a good or immediate indicator of a leak in the Containment Cell. Further, in the unlikely event that contaminants from such a leak did enter the unnamed watercourse, the key contaminant, fluoride, is predicted to be at levels below those prescribed by the ANZECC (2000) guideline for the protection of 95% of fresh water species (1.5 mg/L).

5.11.5 Groundwater remediation validation criteria
Stakeholders: EPA

5.11.5.1 Issue summary
Groundwater remediation validation criteria are not considered to be adequate. The project groundwater remediation criteria should be refined to include other key analytes with high exceedance of the aquatic ecosystem protection criteria.

5.11.5.2 Issue response

Risk assessment of key contaminants in the area of impacted groundwater expression (the vegetation impact area) has been completed. This investigation concluded that there was no change in environmental value as the surface receptor was found to be unaffected by the discharge of leachate impacted groundwater to the surface water system. On this basis it was considered that lower concentrations would similarly result in insignificant risk. Groundwater sampling is proposed to be completed in comparison to the site criteria and an associated risk assessment.

5.12 Human Health

5.12.1 Management of potential health and safety impacts resulting from demolition

Stakeholders: CCC

5.12.1.1 Issue summary

The explosive demolition of structures on the site (including exhaust/chimney stacks and the water tower), including any resulting dust, noise, vibration and flying debris should be managed in accordance with the strict requirements of Safework NSW and the EPA. Council would like to see that the community would be safely protected and that suitable notification and consultation measures are employed to ensure adjoining landowners and the community is aware of proposed actions.

5.12.1.2 Issue response

Hydro acknowledges this comment, and has appropriately addressed it in the Stage 2 Demolition EIS, which was submitted with a DA to Cessnock City Council and approved on 8 May 2018. As discussed in **Section 1.4** Stage 2 Demolition has been removed from the SSD application and is the subject of this separate DA. As required by the development consent from Council, the Demolition Environmental Management Plan was reviewed and approved by Council prior to commencement of demolition activities.

Most demolition (Stage 1 and Stage 2) at the Smelter has been successfully completed, including the demolition of the three stacks and the water tower that required the use of explosives. Environmental management has been successfully implemented during these demolition activities and will continue to do so for the remaining demolition. Hydro continues its consultation with neighbouring landowners and community stakeholders to keep them informed of the status of activities at the Smelter.

5.12.2 Asbestos

Stakeholders: HNE Health

5.12.2.1 Issue summary

Air Quality monitoring for the presence of respirable asbestos fibres should take place prior to any activity to assess (background) levels; during demolition, construction and remediation works (exposure and control); following the works (clearance) and action taken on elevated findings.

5.12.2.2 Issue response

As noted in Section 3.4.2.1 of the EIS Hydro has initiated a hazardous materials (including asbestos) removal program at the Smelter, so that accessible asbestos has been removed from buildings prior to the commencement of demolition. During these removal activities asbestos air monitoring was undertaken around the vicinity of the asbestos removal work area. Hydro is committed to continuing this procedure throughout this removal program.

As has been noted in several sections of the EIS, asbestos is known to be in the Capped Waste Stockpile. In addition to the provision of appropriate personal protective equipment, Hydro has committed to providing continuous asbestos air monitoring at several locations around the Capped Waste Stockpile. The number and location of the monitors would be dependent on the location and scale of activity at the stockpile. This would be determined by an appropriately qualified specialist. These measures will be included within the updated AQMP.

Hydro does not propose to undertake background asbestos air monitoring, as the presence or absence of asbestos fibres during activities that could potentially disturb asbestos is the key

concern. However, monitoring would be ongoing during the excavation of materials from the Capped Waste Stockpile, and during the placement of asbestos-containing wastes at the Containment Cell.

The asbestos air monitoring would be continuous. As such, if sample analysis confirms the presence of asbestos, Hydro would be able to undertake an immediate review and identify the cause of the presence of asbestos, and implement an appropriate response, including protection of personnel and potentially alteration of work procedures. This process would be described in the updated AQMP.

5.13 Noise and Vibration

5.13.1 Management of noise impacts
Stakeholders: HNE Health

5.13.1.1 Issue summary

Work activities should not occur during standard night time hours (10pm to 6am), Saturday afternoon and evening, Sunday and Public Holidays. Work should be minimised during standard evening hours (6-10pm).

Compliance noise monitoring should occur at the localities identified in the EIS to indicate exceedances.

Noise mitigation measures as stated in the EIS should be implemented.

5.13.1.2 Issue response

Work Hours

Section 8.12 of the EIS notes that most of the Works would occur during standard construction hours. However, this section also listed benefits to the Project, the environment and surrounding community presented by the ability to undertake such activities outside standard hours.

There are a number of activities that may need to be undertaken outside of standard construction hours, including (but not limited to):

- The welding of Containment Cell lining. Due to the time to undertake the welding, and the climatic conditions required for the welding to be undertaken correctly, this may require welding to occur (and operation of associated equipment, such as generators and mobile lighting) beyond standard construction hours.
- The operation of leachate pumps to remove leachate from the Containment Cell and the Capped Waste Stockpile. In the event that a rain event has occurred and leachate is generated within the emplaced material within the Containment Cell, or within the exposed Capped Waste Stockpile material, there may be a requirement to pump leachate from these areas to the leachate storage outside of standard construction hours.
- The operation of pumps to remove clean water from unfilled areas of the Containment Cell. Clean water would collect within the unfilled sections of the Containment Cell. There may be sufficient water collected as to require the pumping out of this water.
- The transportation of leachate for off site treatment. Leachate transportation outside of standard construction hours may be required prior to, during or following large storm events during the Containment Cell construction. This would allow the management of the additional leachate that may be generated as a result of the storm event, and maintain the on site leachate storage capacity.
- If required, the on site leachate treatment plant (and associated equipment, such as generators and mobile lighting) may be required to continue operating beyond standard construction hours prior to, during or following large storm events during the Containment Cell construction. This would allow the management of the additional leachate that may be generated as a result of the storm event, and maintain the on site leachate storage capacity.
- The transportation of gypsum to the Project Site. Delivery of the gypsum outside of standard construction hours would allow the delivery trucks to take the gypsum through the Project Site to the storage shed when remediation and demolition activities are not occurring.
- Installation, management and maintenance of environmental controls. In the event that a storm event that was not forecast occurred, or was larger than predicted, the Remediation

Contractor may need to: install additional, or manage the existing, environmental controls; or undertake environmental management activities. Depending on the time of day of the storm event this may require activities outside the standard construction hours.

- Prolonged wet weather would limit the Remediation Contractor's ability to remove material from the Capped Waste Stockpile, and transport it for placement in the Containment Cell. Delays in the material removal program present potential a number of environmental, human health and commercial risks. The ability to remove and relocate the material outside of standard construction hours would assist in mitigating these potential risks.

Noise modelling was undertaken as part of the Noise and Vibration Impact Assessment (NVIA) (Appendix 7 of the EIS). As part of this, modelling was undertaken to determine the number and types of machinery and equipment that could be operated concurrently outside standard construction hours in compliance with the EPA *Interim Construction Noise Guideline* (ICNG) and not exceed sleep disturbance criteria at any sensitive receivers.

Table 7.5 of the NVIA breaks down the types of equipment and machinery that could be operated for the key Works activities and scenarios during day, evening and night time periods outside of standard construction hours. Table 7.5 of the Noise and Vibration Impact Assessment shows that a number of machinery could be operated concurrently outside of standard construction hours in compliance with the ICNG. Table 7.9 of the NVIA also showed that the limited activities defined in Table 7.5 of the of the NVIA would not exceed sleep disturbance criteria at any sensitive receivers.

These tables indicate that activities listed above, and a number of activities, could be undertaken in compliance with the ICNG and not exceed sleep disturbance criteria at any sensitive receivers.

As noted in Section 8.12 of the EIS, the Noise and Vibration Management Plan (NVMP) which would form part of the Remediation Works EMP (refer to **Section 9.3**) would include a procedure for determining if activities proposed to occur outside of standard construction hours (different to those identified in Table 7.5 of the NVIA) would comply with the ICNG and not exceed sleep disturbance criteria at any sensitive receivers. It would also allow for the development of mitigation and management measures if required.

Such an approach would be consistent with Condition No. 6 of the Development Consent from Cessnock City Council for Stage 2 Demolition (DA 8/2018/46/1) which states "*Other proposed works may be permitted outside the nominated work hours with restricted equipment as detailed in the Environmental Management Plan to be reviewed and authorised by Council prior to the commencement of works*".

Compliance Noise Monitoring

Section 12.4 of the EIS describes the process to be implemented following receiving a noise complaint regarding Works activities. This includes monitoring in response to a substantiated noise complaint.

In addition, attended monitoring would be undertaken every three months to assess compliance with the relevant noise limits.

Hydro believes this combination of monitoring in response to a complaint and regular attended compliance monitoring would assist in compliance with the noise criteria.

Mitigation Measures

Hydro is committed to implement the mitigation measures described in the EIS through the implementation of a NVMP, which would form part of the Remediation Works EMP (refer to **Section 9.3**).

5.13.2 Blasting methodology and design

Stakeholders: EPA

5.13.2.1 Issue summary

Hydro should ensure that blast demolition methodologies and designs are fully considered and documented to minimise blast over pressure and ground vibration on the community from the explosive detonations.

5.13.2.2 Issue response

Hydro acknowledges this comment, and has appropriately addressed it in the Stage 2 Demolition EIS, which was submitted with a DA to Cessnock City Council and approved on 8 May 2018. As discussed in **Section 1.4** Stage 2 Demolition has been removed from the SSD application and is the subject of this separate DA.

5.14 Non-Aboriginal Heritage

5.14.1 Assessment of non-Aboriginal heritage significance

Stakeholders: CCC

5.14.1.1 Issue summary

An assessment of the heritage significance of the site should have been undertaken to determine what, if any, industrial heritage should be preserved on site.

5.14.1.2 Issue response

Hydro acknowledges this comment, and has appropriately addressed it in the Stage 2 Demolition EIS, which was submitted with a DA to Cessnock City Council and approved on 8 May 2018. As discussed in **Section 1.4** Stage 2 Demolition has been removed from the SSD application and is the subject of this separate DA.

5.14.2 Cultural heritage assessment

Stakeholders: CCC

5.14.2.1 Issue summary

A cultural heritage assessment should be prepared by a heritage consultant and include photographs (from construction, operation and demolition) and be made available to interested historical groups.

5.14.2.2 Issue response

Hydro acknowledges this comment, and has appropriately addressed it in the Stage 2 Demolition EIS, which was submitted with a DA to Cessnock City Council and approved on 8 May 2018. As discussed in **Section 1.4** Stage 2 Demolition has been removed from the SSD application and is the subject of this separate DA.

5.15 Social Impacts

5.15.1 Communication and engagement plan

Stakeholders: HNE Health, CCC

5.15.1.1 Issue summary

Hydro should develop a plan to facilitate community engagement. The plan should detail the community consultation in relation to the development of the Containment Cell and notification processes to ensure relevant community are adequately informed when Works which may result in offsite noise, vibration, air, visual or traffic impacts is to be conducted. Further, a 24 hour complaints hotline and complaints handling procedure should be established to manage community concern.

5.15.1.2 Issue response

As described within Section 8.1.4 of the EIS, Hydro would build on the stakeholder consultation undertaken to date (as described in Section 4.2 of the EIS) through amendment to and continued implementation of the existing Stakeholder Engagement Plan.

The Stakeholder Engagement Plan would be amended as described in Section 8.1.4 of the EIS to specifically reference the Works (and other concurrent Smelter activities), plus addressing the mitigation commitment from Table 12.10 of the EIS to maintain a 24-hour telephone number for complaints, issues or general enquiries regarding the Project for the duration of the Works.

5.16 Spent Pot Lining Management

5.16.1 Stockpiled spent pot lining
Stakeholders: MCC, HNE Health

5.16.1.1 Issue summary
Further detail is required on what is being done to manage, remove and treat the stored spent pot lining.

5.16.1.2 Issue response
As discussed in Section 1.2 of the EIS, the transportation of the stored spent pot lining to an off-site licensed facility does not require Development Consent. As such it does not form part of the Project.

The response to **Issue No. 2** in **Table 4-1** addresses Hydro's management strategy for the stored spent pot lining.

5.17 Traffic and Transport

5.17.1 Road safety
Stakeholders: CCC

5.17.1.1 Issue summary
It is suggested that the traffic and transport assessment traffic volume predictions are incorrect due to incorrect assumptions.

Clarification of the timing of the AM and PM peak periods is required.

5.17.1.2 Issue response
Council raised concerns about the accuracy of the traffic counts due to access restrictions in February 2015 and subsequent closure of the Frame Drive Bridge in April 2015, and the impacts of the reopening of this bridge (which has since occurred). Council advised that it is the shortest and preferred route from Cessnock to the Hunter Expressway.

As part of the review of the EIS TIA review presented in **Appendix 28**, SECA Solution undertook additional traffic counts to consider changes in traffic numbers. The counts found that peak traffic volumes had increased by 30 to 50%. However despite this increase in existing traffic, the review of the Traffic Impact Assessment concluded that the Project traffic (including the additional traffic generated by the Project changes described in **Section 8**) would have a minimal and acceptable impact upon the surrounding road network.

The AM and PM peak periods assessed are 7:30am to 8:30am for the AM peak, and 3:45pm to 4:45pm for the PM peak.

5.17.2 Traffic safety concerns
Stakeholders: CCC

5.17.2.1 Issue summary
There are road safety concerns around interactions between trucks and motorists utilising the Hart Road Interchange with both trucks turning right to access the site from the Expressway on Hart Road and with trucks accelerating to merge with traffic when joining the Expressway.

5.17.2.2 Issue response
As noted in Section 15.3 of the EIS, the Works are projected to generate between two and 57 truck movements (the total in both directions) per day. Section 3.7 of the Traffic Impact Assessment notes that this equates to a maximum of six truck movements (three inbound and three outbound) in the AM peak, and the same for the PM peak, or one truck every twenty minutes in each direction during the peaks.

Given the predicted Level of Service of the Hart Road interchange remains at A in both directions for AM and PM peak (except where it has a Level of Service of B for the Off Ramp in the PM peak) and the minor change in the average delay (the maximum being an extra 2.7 seconds for the Off Ramp in the PM peak), the Traffic Impact Assessment indicates that there is unlikely to be any increased risk of conflicts due to trucks turning.

Similarly, the Traffic Impact Assessment shows that one heavy vehicle movement every twenty minutes during the AM and PM peak would not increase the traffic safety risk, particularly for vehicles entering the Hunter Expressway from the Hart Road interchange off ramp. The modelling results show that there is no change in the average delay and the Level of Service remains at A.

The EIS TIA review presented in **Appendix 28** concluded that the Hart Road Interchange operates to a high standard and has sufficient capacity to accommodate the Project traffic (including the additional traffic generated by the Project changes described in **Section 8**).

5.17.3 Traffic Management Plan
Stakeholders: RMS

5.17.3.1 Issue summary
RMS had no objections to the Project provided that a Construction Traffic Management Plan (TMP), that includes a Vehicle Movement Plan and Traffic Control Plan, is prepared and submitted to RMS and Cessnock City Council for acceptance prior to the commencement of the Works.

The TMP shall specifically address the movement of oversize loads to and from the site, the management of construction traffic, any restrictions to the hours of heavy vehicle movements to avoid road use conflicts and the transport of construction waste materials.

RMS also reserves the right to review the TMP at any stage and make changes in the interests of maintaining road safety and network efficiency on the classified road network. Hydro would also be responsible for any costs associated with implementing the plan.

5.17.3.2 Issue response
Section 15.4 of the EIS commits to the preparation of a TMP (incorporating the Vehicle Movement Plan and Traffic Control Plan) as part of the Remediation Works EMP prior to the commencement of the Project. Section 15.4 of the EIS outlines measures to be included and detailed in the TMP.

The TMP would be submitted to the Department for approval as part of the Remediation Works EMP and would be developed in consultation with RMS and Cessnock City Council.

5.18 Water Management

5.18.1 Water treatment plant
Stakeholders: MCC, EPA

5.18.1.1 Issue summary
1. Detail required on the operation, performance criteria (including pollutants to be treated), intended design performance standard and responsibility for operation of the water treatment plant.
2. Cyanide levels in the North Dam are not provided in Section 13.2.2 of the EIS.
3. It should also be noted that the irrigation area is in the flood liable area.
4. The EPA noted that the WTP water quality criteria for all potential contaminants should be provided. The target criteria should be based on allowing short term irrigation to the existing reuse area.
5. Clarify that all WTP discharges are to be directed to North Dam.

5.18.1.2 Issue response
1. **Section 7.2** provides details on the leachate treatment plant that could treat the collected leachate and contaminated stormwater collected within the Capped Waste Stockpile and the Containment Cell, including details on its capacity and the contaminants it would be capable of treating.
   Section 8.4 notes however, that it is now the preferred approach for leachate and contaminated stormwater to be collected for transportation to a licensed off site treatment facility. However both options could still be used.
2. Cyanide levels in the North Dams measured in 2017 (and previous years) were <0.005 mg/ L (the detection limit) and below the ANZECC (2000) guidelines. There is no mechanism for cyanide to enter the dams.
3. It is acknowledged that the irrigation area is partially located below the 1% AEP flood level.

Hydro currently operates the irrigation area in accordance with EPL 1548 issued by the EPA. The EPL includes the following condition:
O4.4 The quantity of effluent/solids applied to the utilisation area must not exceed the capacity of the area to effectively utilise the effluent/solids.

For the purpose of this condition, 'effectively utilise' include the use of the effluent/solids for pasture or crop production, as well as the ability of the soil to absorb the nutrient, salt, hydraulic load and organic material.

Hydro only discharges from the licensed discharge point when: the soils in this area have the capacity to receive the irrigation water; water is of sufficient quality; and discharge from the North Dam is required due to reduced remaining storage capacity. To comply with its EPL Hydro inspects the irrigation area so that irrigation ceases if there is an indication (such as pooling water) soils have reached their capacity.

4. **Section 7.2** provides details on the on site leachate treatment plant that could treat the collected leachate and contaminated stormwater collected within the Capped Waste Stockpile and the Containment Cell. The outputs of the leachate treatment plant would be consistent with the water that is currently permitted to be discharged under the current EPL.
   An on site leachate treatment plant would only operate during relocation of material from the Capped Waste Stockpile to the Containment Cell. Any leachate generated following completion of the Containment Cell would be collected for off site treatment.
5. In the event that an on site leachate treatment plant is used, any discharges would be directed to the Smelter water management system, and therefore would end up in the North Dam. As noted in response to Issue 4, this would only occur during relocation of material from the Capped Waste Stockpile to the Containment Cell; any leachate generated following completion of the Containment Cell would be collected for off site treatment.

5.18.2 Site water balance

Stakeholders: DPI, MCC

5.18.2.1 Issue summary

Further information should be provided about quantity and quality of water to be used.

Analysis should be performed to estimate volumes of rainfall runoff, evapotranspiration and infiltration recharge and to understand whether there is any risk of overflows from the dams during the works to Wentworth Swamp.

5.18.2.2 Issue response

Water Supply

As discussed in Section 8.2.7 of the EIS Hydro proposes two water supply sources:

The Smelter is currently connected to the Hunter Water Corporation potable water supply system. Hydro proposes to maintain connection to the system for as long as possible during the Works.
Water from the North Dam would be used (where required) for dust suppression.

North Dam Water Quality

Table 5-2 presents the monitoring data for the two North Dams for 2019. Cyanide concentrations in North Dam 1 and North Dam 2 remained less than the laboratory detection limit of 0.005 mg/L during 2019 and therefore are not presented in this table.

Table 5-2: T 2019 Monitoring Data for North Dam 1 and North Dam 2

Month	pH		Conductivity (µs/cm)		Fluoride (mg/L)	
	North Nam 1	North Dam 2	North Nam 1	North Dam 2	North Nam 1	North Dam 2
January	7.4	7.5	710	680	22	21
February	7.7	8	820	740	7.7	8.0
March	8.2	8.0	1000	810	26	24
April	7.7	7.9	660	710	15	19
May	7.2	7.8	720	710	17	22
June	7.6	7.9	830	730	17	21
July	7.5	7.8	870	730	17	16
August	7.6	7.9	870	750	14	18
September	7.8	7.7	820	720	16	20
October	7.9	8.1	660	650	12	15
November	8.2	8.4	820	790	20	26
December	7.7	8.2	1000	1000	17	28

Downgradient Water Quality

Hydro undertakes surface water monitoring at three locations downgradient of the licensed discharge: two immediately downgradient of the licensed discharge within Swamp Creek and one further downgradient within Wentworth Swamp.

Table 5-3 shows the results of one sampling location immediately upstream of the licensed discharge (Sampling Point B) and the two sampling locations in Swamp Creek immediately downgradient of the licensed discharge (Sampling Points D and E). Cyanide concentrations were assessed at Sampling Point B and 2019 results were less than the laboratory detection limit of 0.005 mg/L and therefore are not presented in this table.

Table 5-3: 2019 Monitoring Data for Downgradient of the Licensed Discharge

Month	pH			Conductivity (µs/cm)			Fluoride (mg/L)		
	B	D	E	B	D	E	B	D	E
Jan	6.8	7.0	7.2	720	740	700	0.9	1.0	0.8
Feb	8.0	8.0	7.9	630	660	680	0.8	0.8	0.9
Mar	7.8	7.8	7.9	640	650	670	1.1	1.2	1.2
Apr	7.4	7.2	7.2	770	700	380	0.6	0.6	<0.5
May	7.5	7.4	7.7	730	710	700	0.8	2.4	1.1
June	7.6	7.5	7.9	750	700	740	0.7	0.9	0.9
July	7.8	7.8	7.8	690	690	780	0.7	0.7	0.7
Aug	7.9	7.7	8.1	720	700	720	0.8	0.8	0.7
Sept	7.6	7.4	7.1	600	540	390	0.6	0.6	0.6
Oct	8.3	7.9	8.0	790	780	580	0.7	0.7	0.7
Nov	8.0	8.4	8.2	640	700	760	0.9	0.9	0.9
Dec	7.7	7.7	7.9	620	630	740	0.7	0.7	0.7

The monitoring results indicate that pH and electrical conductivity within the North Dams and at Swamp Creek are consistent with a fresh water stream.

Fluoride concentrations in Swamp Creek were generally below the irrigation water criterion of 1 mg/L and the drinking water criterion of 1.5 mg/L, and below the stock watering criterion of 2 mg/L. The Kurri Kurri Wastewater Treatment Plant is located upgradient of the Smelter (on the southern side of the Hunter Expressway). Treated discharges from the plant to Swamp Creek are a contributor to fluoride within Swamp Creek.

Fluoride concentrations within the North Dams are generally higher, (refer to **Table 5-2**). Surface water collecting in the North Dams is evaporated or discharged via the licensed discharge point. The monitoring results within the downgradient receptors of the North Dam show low fluoride concentrations.

Water Balance

Appendix 13 includes the water balance completed for the Project Site. Further information on the key findings are presented in **Section 7.3**.

5.18.3 Water monitoring and management

Stakeholders: HNE Health, DPI, CCC

5.18.3.1 Issue summary

Further hydrological and hydrogeological monitoring and management detail is required, specifically:

1. Management of leachate and contaminated groundwater, existing and proposed monitoring regime and parameters.
2. Identification of Trigger Action Response Plans (TARPs) for exceedances in treated water discharge into North Dam.
3. Management of stormwater runoff.
4. Management of water entering Containment Cell during construction.

5.18.3.2 Issue response

1. Section 8.11 of the EIS describes how leachate and contaminated groundwater within the footprint of the Capped Waste Stockpile would be managed (**Section 8.4** notes that this could either be treated on site or removed for off site treatment). It also notes that the existing groundwater monitoring network adjacent to the Capped Waste Stockpile would continue to be monitored during the Works and for a period following completion of remediation of the Capped Waste Stockpile. The groundwater and leachate management and monitoring would cease when monitoring indicates compliance with the site remediation criteria outlined in the RAP (refer to **Appendix 7**).
2. The North Dam would continue to be managed as it has been to maintain capacity and minimise the requirement for discharges. Activities such as the use of water for dust suppression, the use of evaporation sprays in the North Dam and managed discharges from the licensed discharge would help maintain storage capacity and minimise the potential for overflows from the Smelter water management system.
3. The management of stormwater runoff during the Project is discussed in a number of locations in the EIS:
   - Section 8.2.1.2 of the EIS discusses how the existing Smelter water management system would continue to operate, with the installation of additional initial and long term soil and water management controls during site establishment activities.
   - Section 8.2.7 of the EIS further discusses the water management measures to be implemented at the commencement of the Project.
   - Section 8.4.4 of the EIS describes the wastewater and stormwater management at the Containment Cell during construction.
   - Section 8.5.2 of the EIS describes the wastewater and stormwater management at the Capped Waste Stockpile during material removal.
4. Section 8.4.4 of the EIS describes the wastewater and stormwater management at the Containment Cell during construction. This includes the collection and treatment of rain water entering the Containment Cell. The EIS also notes that a diversion drain would be constructed around the Containment Cell to divert clean stormwater away from and around the Containment Cell.

5.19 Zoning

5.19.1 Proposed Land Use Zoning

Stakeholders: CCC

5.19.1.1 Issue summary

It is noted that the subject area of the EIS corresponds to the industrial areas (IN1 General Industrial and IN3 Heavy Industrial) identified in the Planning Proposal currently under consideration by Council.

One of the main considerations of the Planning Proposal in this area (and a significant feature of the EIS) is the construction and ongoing management of the Containment Cell. The Gateway issued by the Department on 23 March 2016 notes that the zoning of the Containment Cell will be resolved through the demolition and remediation of the former Hydro Aluminium Smelter.

At this stage it is proposed to rezone this area SP2 Special Purpose Infrastructure, noting that the Gateway seeks to have a final zone determined post EIS either pre or post exhibition of the Planning Proposal.

5.19.1.2 Issue response

Noted.

5.20 Response to Draft RtS Review Comments

Table 5-4 collates the issues raised from agencies' review of the draft RtS and Hydro's response.

Table 5-4: Agencies' Comments on the Draft RtS

Agency Comment	Hydro Response
Cessnock City Council	
Cessnock City Council (CCC) has reviewed the information in the RTS, in order to provide a timely response. CCC has provided this response with a view to minimising overlapping comments between government bodies. This response has been prepared with a reliance on other government authorities conducting their reviews on their areas of speciality. CCC, whilst taking into account all the information has essentially focused on areas where CCC has expressed concern before, these consist of 5.3 air quality, 5.4 ecology, 5.7 containment cell design, 5.8 containment cell management and monitoring, 5.10 flooding, 5.11 groundwater monitoring, 5.12 human health, 5.14 non-aboriginal heritage, 5.15 social impacts, 5.17 traffic and transport, 5.18 water management and 5.19 zoning.	Noted.
CCC recognises that some of its concerns have been addressed, most notably, matters initially raised in respect to non-aboriginal heritage, social impacts and zoning, these concerns no longer apply.	Noted
CCC urges that the assessment of the application pays particular attention to: the likely impact of the development on the human health of the local surrounding population, the impact on the environment and risk minimisation.	Appendix 12 of the EIS is a Human Health Risk Assessment, which assessed the potential impacts to both those working at the Project Site during and following the Project, but also to the surrounding local population. The findings of the assessment are presented in Section 22 of the EIS. The RtS includes an addendum to this assessment, giving consideration to the Project changes described in the RtS. Section 22 of the EIS identified measures that would be implemented to protect human health, in addition to those inherent to the Project as described in Section 8 and Section 9 of the EIS.

Agency Comment	Hydro Response
	Part C of the EIS (and associated specialist studies included as appendices) assess the potential impacts on the environment from the Project. Part C of the EIS, along with Section 8 and Section 9 of the EIS, identify measures that would be implemented to mitigate potential environmental risks. **Section 8** identifies measures that would be implemented to address any additional potential environmental risks associated with Project changes.
CCC recognises that there are significant risks associated with the proposed method of remediation but also with other alternatives and that provided that the development is suitably controlled that it is an acceptable proposal, particularly when compared to the alternative of retaining the capped waste stockpile in situ. CCC would prefer that the best environmental outcome be applied, that is, the on-site treatment of waste (to minimise contaminated waste transportation), in order to create inert waste in order for it be suitably reused. It is however recognised that this option may not be economically viable	**Appendix 1** and **Appendix 2** present the Capped Waste Stockpile Remedial Options Study. This included a detailed and quantitative assessment of the potential environmental, human health, worker safety and greenhouse risks (and excluded consideration of economic factors) associated with options for manging the Capped Waste Stockpile: this included treating the waste. The study concluded that the treatment of waste to create reusable material presented significantly greater environmental, worker safety and human health risks compared to the approach described in the EIS and the RtS. The Study concluded that containment of the waste within an on site containment cell presented the best overall outcome.
CCC considers it important that the proposed containment cell be design in a manner to withstand all forms of natural disaster and that there be adequate measures to protect the local community and surrounding environment in perpetuity. In this respect, the PMF should be applied in preference to the 1:100 AEP	This is a key consideration for Hydro and any future Containment Cell Manager. The Containment Cell Long Term Management Plan presented in Appendix 12 of the RtS describes the monitoring, management and maintenance activities to be implemented in perpetuity to ensure the ongoing integrity of the containment cell and thus protect the local community and the surrounding environment. As noted in **Section 5.10.2.2** and shown in **Appendix 13**, the base of the Containment Cell would be approximately 7.8m above the Probable Maximum Flood (PMF) level.

Agency Comment	Hydro Response
Particular consideration should be given to the handling, disposal leachate and contaminated liquid waste and the disposal methods should be the best option available at the time of disposal, noting that there may be other options available in the future.	**Section 8.4** describes the preferred method for leachate disposal (off site treatment) and how it would be handled prior to collection for disposal. **Section 7.2** discusses the on site leachate treatment plant that may be constructed and operated during the Containment Cell construction and material placement. Therefore Hydro has addressed the two key options currently available for leachate and contaminated water management.
Environment Protection Authority	
The RtS satisfactorily addresses the issues raised in the EPA submission dated 4 January 2017 not related to the Capped Waste Stockpile and the containment cell.	Noted.
The RtS addresses many of the EPA's concerns in respect of the containment cell design and methods and procedures for managing the waste however the long term management and maintenance of the containment cell itself and, in particular, the funding and security arrangements, require further assessment.	Hydro has been in discussions with the EPA and the Department since 2015 with regards to the regulation and funding of the ongoing management and maintenance of the Containment Cell. These discussions have developed the preferred regulation approach (including funding) described in **Section 7.4** that incorporates the independent cost estimate presented in **Appendix 16**. .
The EPA recommends that any consent contain provisions to allow the Department's Secretary to require a positive covenant under Section 88E of the *Conveyancing Act 1919* from the proponent to secure in-perpetuity funding to maintain the proposed containment cell and its leachate collection and disposal systems.	This proposed regulatory mechanism was identified in the EIS as one of the mechanisms available to regulate the Containment Cell in perpetuity. However, as noted **Section 7.4**, negotiations between the Department and Hydro concluded that the preferred approach for the regulation of the long term management of the containment cell is a Voluntary Planning Agreement (VPA) between Hydro and the Minister for Planning and Public Spaces.
The EPA recommends that the Long Term Management and Maintenance Plan (the Containment Cell Long Term Management Plan) include an overarching statement as part of the Inspection and Monitoring Program, and in particular, Table 4-1, that reads words to the effect of "or as otherwise directed by the appropriate regulatory authority".	Hydro proposes (that the Containment Cell Long Term Management Plan (including the inspection and monitoring activities) would be finalised in consultation with the EPA and the Department. It is expected that the Plan would reflect the requirements of an Environment Protection Licence (EPL) that would apply to the remediation activities and the capping of the Containment Cell.

Agency Comment	Hydro Response
	Hydro proposes that a statement would be added to the Containment Cell Long Term Management Plan that reads words to the effect of "or as otherwise directed by the appropriate regulatory authority as required under the Environment Protection Licence and/or the *Protection of the Environment Operations Act 1997*".
Hunter New England Health	
The RTS has been reviewed and all issues that were raised by our office in relation to the EIS have been satisfactorily addressed. We have no further comments.	Noted.
Maitland City Council	
Groundwater contamination:	
Provides the 2015 fate and transport modelling report, which does not consider the site auditor's response in 2018 which raises some question on whether the removal of the source will render the site cleared of contamination and that further assessment following this will be required.	Section 28.2 (*Site Auditor's Opinion on Comments relating to the 2018 RAP*) of the Site Audit Statement refers to comments in the Remedial Action Plan (RAP) (Ramboll, 2018), which concluded that the remedial approach should result in a site that does not pose any unacceptable risk to human health and the environment, but notes an uncertainty in the potential groundwater risk following "source removal". The RAP concludes that a final risk assessment would be warranted to confirm that no unacceptable risk remained. In response to this conclusion in the RAP, the Site Audit Statement agrees with this approach, including the comment "*That a final risk assessment will be performed at the completion of the remedial works and monitoring that is currently proposed, to ensure that human health and environmental risks have been adequately addressed*." The Site Audit Statement confirms that the auditor is in agreement with the approach adopted to manage uncertainty relating to potentially residual groundwater contamination. Further consideration of the site audit statement is not required in a fate and transport model at this time, however it is noted that a future risk assessment would include a revised fate and transport model as this is an integral part of a risk assessment of this nature.

Agency Comment	Hydro Response
The question of the impacts that have already occurred downstream has not been addressed, and reference to the results from the rezoning that irrigation water is not acceptable at certain times has only resulted in the response that Hydro are unaware of the rezoning results.	Hydro is unaware of any downstream impacts that Council is alluding to. Sampling of Wentworth Swamp indicated a minor exceedance of a screening level for long term irrigation. However, the EPA concluded in 2013 that the Project Site, including the existing Capped Waste Stockpile, did not pose a significant risk of harm to human health or the environment as defined by the *Contaminated Land Management Act 1997*. This conclusion was based following review of a human health risk assessment, and an ecological risk assessment. The ecological risk assessment found that water bodies (such as dams and lagoons) downstream of the Smelter showed similar ecological characteristics to "control" locations not affected by stormwater runoff from the Smelter. This investigation was completed to confirm that downstream effects were not occurring. In any event, beside the actual closure of the Smelter, the removal of the potential source of any downstream contamination risk (through the removal of the Capped Waste Stockpile and placement in the Containment Cell) is a primary outcome of the Project. The response to the following issue describes water quality downstream of the Smelter, as well as soil quality within the Irrigation Area.

Agency Comment	Hydro Response
The question of the irrigation area being in the flood liable area is not addressed, except recognising that it partially is. This may not be an issue if the water treatment plant is not on site and the leachate is removed to an external facility. The report recognises that the irrigation area is managed in accordance with the environment licence, however the environment licence does not require any chemical monitoring to be undertaken of the water prior to discharge nor sampling of the soil to investigate accumulation overtime.	The response to **Issue No. 23** in **Table 4-1** states "*Soil sampling of the Irrigation Area was completed as part of investigations for the 2012 Phase 2 Environmental Site Assessment, which is presented in Appendix 10. Six samples of topsoil were collected and analysed for aluminium, fluoride, heavy metals and total petroleum hydrocarbons (TPH). One of these samples was also analysed for polycyclic aromatic hydrocarbons (PAHs).* *Results for aluminium, TPH, heavy metals, benzo(a)pyrene TEQ and total PAHs were below site criteria and consistent with soil concentrations outside of the Irrigation Area. Total fluoride concentrations ranged from 200mg/kg to 510mg/kg. Soluble fluoride is the portion of the fluoride that is available in the environment. Based on laboratory analytical results for soluble fluoride completed by Ramboll, soluble fluoride results are approximately 200 times lower than total fluoride results.*" This is acceptable for the proposed land use, and will be supported with a Site Audit Statement from the EPA accredited Auditor. **Section 5.18.2.2** also presents and discusses data on the water quality within the North Dam (from which water is pumped for application in the Irrigation Area) and monitoring locations downgradient of the Irrigation Area. Hydro is unclear on Council's issue regarding part of the Irrigation Area being within flood liable land. Based on the soil and water quality results presented in the RtS, in the event that this area was flooded, there would not be an adverse impact to water quality.
There is no intention on undertaking groundwater monitoring in the case of a leak from the containment cell, as it is deemed to not be likely to show impacts in any meaningful time.	Noted.

Agency Comment	Hydro Response
Water balance: Suggests that water should be managed on site through use in dust suppression and storage up to a 20% AEP storm event. There is no explanation on contingency for greater storm events.	The *Hydro Aluminium Kurri Kurri Stormwater Management Report - Flood Modelling and Hydrology Review* (PCB, 2018) presented in **Appendix 13** considered the impacts that three large storm events since 2007 had on the Smelter. In the event that an event greater than a 20% AEP (1 in 5 year) storm event did occur, potential water quality impacts would be ameliorated by the following: • A significant amount of rain water would be collected within the Project site, diluting any pollutants. • In the event that this diluted water exited the Project site, it would enter receiving waters containing significant quantities of water. Any pollutants would be further diluted. Stored leachate would be regularly treated (either via following transportation to a licensed off site facility or an on site facility) to manage the amount of leachate at the Project Site at any one time.
Water treatment plant: The preferred process is now removing leachate from the site and treating off site at a licensed premise. However, Hydro still wants to retain the option to build an onsite treatment plant in the approval. This is not deemed appropriate as approval conditions will need to be set for either the appropriate process of removal of leachate or appropriate process of treatment on site.	Hydro proposes that the transportation of leachate for off site treatment is the management approach that would initially form part of the approved Project. In the event that Hydro (and its remediation contractor) determine that on site treatment (either by itself or to complement the off site treatment) is preferable, a modification application would be submitted to the Department. This would provide sufficient detail on the proposed treatment plant to allow the Department and other government agencies to: adequately assess the application; and have confidence that the plant would be operated with minimal environmental impacts.

Agency Comment	Hydro Response
The water treatment plant proposed in the project treats through filtering and treatment columns to remove key contaminants which does not include cyanide.	As noted in response to **Issue No 16** in **Table 4-1** "*The site guideline for free cyanide was the ANZECC (2000) guideline for the protection of 95% of fresh water species of 7µg/L. The free cyanide concentrations on site either equalled (in one sample) or were below the site guideline*." Section 5.18.1.2 of the RtS notes that "*Cyanide levels in the North Dams measured in 2017 (and previous years) were <0.005 mg/ L (the detection limit) and below the ANZECC (2000) guidelines*". Appendix 4 of the RtS (*CWS Waste Management: Option 4 Remediation Design and Proposed Validation of Treatment*, Ramboll 2018) presented leachable cyanide results from treated and untreated Capped Waste Stockpile material. The untreated Capped Waste Stockpile material had leachable cyanide levels already below the Chemical Control Order limits. As noted above, in the event that Hydro did propose to construct and operate an on site leachate treatment plant, a modification application would be submitted to the Department.
Containment cell:	
The question of who will ultimately own and therefore have maintenance of the containment cell is addressed by referring back to the EIS that a number of options are available, however no definitive answer to the ownership is provided at this stage.	**Section 7.4** describes the proposed Containment Cell ownership structure. The draft LTMP (**Appendix 12**) describes the maintenance activities that the owner would be responsible for implementing.
The quarterly inspection of the containment cell was questioned if animals were to dig into the cap following inspection and this allowed an avenue of infiltration into the cell. This was not addressed.	As noted in Table 4-1 of the Containment Cell Long Term Management Plan, the Containment Cell would be inspected monthly for the first 12 months and quarterly for the following two years, to determine if grazing animals have damaged the Containment Cell vegetation cover. Such inspections would also identify evidence of burrowing. In the event that an animal does dig into the Containment Cell cap immediately following a scheduled quarterly inspection, the following contingencies are in place:

Agency Comment	Hydro Response
	• As described in the Containment Cell Detailed Design in Appendix 3 of the RtS, the capping system is comprised of a 1700mm deep revegetation layer, comprised of 100mm topsoil, 1300mm subsoil and 300mm of drainage aggregate. In the event that an animal burrows through the 1400mm of soils, it is expected it would not burrow through the drainage aggregate and to the underlying layers. Any water infiltration would be captured by the infiltration drainage layer. • The Containment Cell vegetation would be limited to shallow rooted native grasses. This would reduce the incentive (deep roots for food or habitat) for animals to bury deep into the topsoil. • In the event that an animal did burrow into the cap, it would require a significant event for this burrowing to potentially cause an issue prior to the next inspection. The Containment Cell Long Term Management Plan notes that the Containment Cell capping would be inspected immediately after: a 5% Annual Exceedance Probability or greater storm event; an earthquake event of a magnitude of ≥ 5 recorded within a 20km radius; or a report of potential damage. The cap (and liner if applicable) would be repaired. Any leachate generated by rain entering the hole would eventually (after filtering through the Containment Cell material including gypsum) be collected by the Containment Cell leachate collection system and be removed for off site treatment in accordance with the LTMP.
NSW Rural Fire Service	
A Bushfire Hazard Assessment which was requested by the NSW RFS in an earlier submission in response to the EIS (dated 16 September 2016) was not prepared as part of the Response to Submissions. However based upon an assessment of the documentation submitted and reviewed, the NSW Rural Fire Service raises no concerns in relation to the proposed remediation activities.	Noted.

Agency Comment	Hydro Response
Office of Environment and Heritage	
OEH recommends that the requirement to retire biodiversity credits for this remediation project is included as a consent condition for the project and that the credits are to be delivered in a given timeframe	Agreed.
OEH is satisfied with the assessment of Aboriginal cultural heritage and no further assessment is required.	Noted.
OEH recommends that the proponent carry out an assessment to determine the risks to the site and local environment if the western surge pond is inundated by local catchment flooding.	The *Stormwater Management Report - Flood Modelling and Hydrology Review* (PCB, 2018) presented in Appendix 13 of the RtS concluded that the west surge pond would have capacity to handle a 20% Annual Exceedence Probability (AEP) event. In the event that a greater than 20% AEP event occurred and the pond overflowed, or it was inundated by local catchment flooding, potential water quality impacts would be ameliorated by the following: • Regular water quality monitoring in the western surge pond indicates that concentrations of key parameters (fluorides and suspended solids) are generally consistent with the other dams within the Smelter, including the North Dam • A significant amount of rain water would be collected in the western surge pond, initially diluting any pollutants • In the event that this diluted water exited the Project site (via overflow or inundation), it would enter the unnamed watercourse that would have significant water flows, further diluting any pollutants. It should be noted that the western surge pond was inundated by the April 2015 storm event, which was determined to be a 2% AEP event. This event was prior to the completion of augmentation works at the western surge pond that raised the pond weir by 600mm.
OEH is satisfied that the containment cell will not cause adverse flood impacts and no further assessment the potential flooding impact of the containment cell is required.	Noted.

6. RESPONSE TO NON-GOVERNMENT SUBMISSION ISSUES

6.1 Introduction

The key issues raised in the non-government submissions, and Hydro's responses, are presented below. The key issues are grouped based on the environmental aspect or Project element.

6.2 Air Quality

6.2.1 Management of offsite air quality impacts

Stakeholders: Mary Bourke, Sarah Clibborn, Ben Clibborn

6.2.1.1 Issue summary

Concern was raised surrounding the offsite dust and airborne contaminants impacts resulting from the Project.

Support was given for the commitment that blasting will only be carried out when the wind speed is less than 8m/s and the wind is blowing from a SSE direction.

It was raised that the air quality assessment does not include suspending or modifying works during adverse weather, such as high winds and/or unfavourable wind direction (when wind is blowing towards sensitive receivers).

6.2.1.2 Issue response

Hydro acknowledges that the potential for dust generation and airborne contaminants is a key issue for the Works, particularly during demolition activities. Dust control and management of contaminated material is a key element of the Works. The measures to be implemented are described throughout Section 8 of the EIS, with additional air quality and dust control measures described in Section 11.4 of the EIS.

Section 8.7.4 of the EIS does note that activities (particularly demolition activities, which are subject of two development consents granted by Cessnock City Council) that have the potential to generate significant dust that could have adverse impacts on sensitive receivers could be ceased. The Works Project Manager would consider the existing and forecast climatic conditions (such as wind speed and direction), the nature of the activities and availability of other suitable management measures or alternative procedures when making such a decision.

The proposed dust control techniques and management measures would be documented within an update of the existing AQMP, which would form part of the Remediation Works EMP (refer to **Section 9.3**).

6.3 Containment Cell Design and Construction

6.3.1 Management of contaminated materials and machinery following closure of the Containment Cell

Stakeholders: Kurri Autos

6.3.1.1 Issue summary

Detail required on management of contaminated materials and machinery following closure of the Containment Cell including clarification on the management of contaminated stormwater from machinery wash down.

6.3.1.2 Issue response

Hydro would place all possible contaminated materials within the Containment Cell. However, it is acknowledged that water from the washdown of machinery following the placement of the final material would be generated. There is also potential that a small amount of contaminated materials may not be able to be placed in the Containment Cell.

With regard to the water generated from machinery washdown, this would be of similar quality to leachate and contaminated water and therefore would be managed as described in either **Section 7.2** (on site treatment) or **Section 8.4** (off site treatment).

In the event that any contaminated materials are generated or identified following closure of the Containment Cell (such as material removed from water at an on site leachate treatment plant, if operated), they would be transported to an appropriately licensed waste management facility.

6.3.2 Contaminated waste materials
Stakeholders: CGSE

6.3.2.1 Issue summary
The only literature available on the effects of spent pot liner leachate on clay liners (Kang et al., 2011) indicates that it "*enhances the leachability of ferrocyanide and fluoride from SPL landfill sites*." Studies on clay minerals in the presence of fluoride and saline water also indicated an increase in the movement of contaminants through the Containment Cell wall.

The effect of organics and any other unknown chemicals in the "mixed waste" from Mount Alcan (**note**: this is a former name for the Capped Waste Stockpile) increases the probability of destruction of the plastic (high density polyethylene (HDPE)) membrane liner.

6.3.2.2 Issue response
A Fate and Transport Model included in **Appendix 17** was undertaken to predict what would happen in the unlikely event that the Containment Cell leaked. As noted in the response to **Issue No. 40** in **Table 4-1** the model concluded that contaminants would only move at low concentrations over a very small distance from any breach, over a significant timeframe. The key contributor to the limitation on movement of fluoride was due to the physical and chemical characteristics of the existing clays within the proposed Containment Cell location.

Studies of the effects of leachate on liner and residual clay performance have been completed. This has incorporated testing of both HDPE and residual clays using leachate won from the Capped Waste Stockpile. The Liner Degradation Assessment presented in **Appendix 3E** includes the results of analysis undertaken on the proposed HDPE liner material using leachate collected from the Capped Waste Stockpile. The analysis demonstrated that there was no effect on HDPE performance when immersed in the leachate under extreme conditions. The analysis has allowed Hydro to prepare a Detailed Design based on the known characteristics of the leachate and the liner material.

Appendix 15 includes laboratory testing of site won clays using either distilled water or leachate. The results are similar for both permeates with hydraulic conductivities of between 1E-10 m/s to 1E-12 m/s determined. These results are expected and consistent with the extensive study of the behaviour of fluoride and sodium on clay permeability completed for the Wallaroo Landfill and reported in **Appendix 17**. This study found a decrease in permeability of almost an order of magnitude, which was interpreted to result from sodium interactions with the clay and an overall reduction in pore space.

6.3.3 Lack of detailed information on the Containment Cell
Stakeholders: Kurri Autos

6.3.3.1 Issue summary
There is a lack of detailed information on issues such as visual impact and quantity of material to be placed in the Containment Cell.

6.3.3.2 Issue response
Section 19 of the EIS assesses the existing visual environment and Section 19.3 of the EIS discusses what visual impact the Project would have.

Section 8.8.1 of the EIS includes a breakdown on the current estimate of the quantities of materials to be placed in the Containment Cell. Updated information is provided in the Containment Cell Detailed Design in **Appendix 3F**.

6.3.4 Conceptual site model for the Containment Cell
Stakeholders: Kurri Autos, Tellus Holdings Ltd

6.3.4.1 Issue summary

Further detail required on soils, subsoils, geology, groundwater and surface water in the vicinity of the Containment Cell, and the potential for leachate to escape the cell and enter the environment.

6.3.4.2 Issue response

Information on the soils, subsoils and geology of the proposed Containment Cell location are provided in the Preliminary Geotechnical Investigation Report in **Appendix 15** and also described in the Containment Cell Detailed Design Report in **Appendix 3D**.

Section 13.2.2.1 of the EIS described the local hydrology, and Figure 13-1 of the EIS shows the location of watercourses within an area immediately adjacent to the Project site. **Appendix 14** presents the watercourses within the Hydro Land and the local region.

Modelling (as presented in **Appendix 17**) was undertaken to model what would happen in the unlikely event that the Containment Cell leaked. As noted in the response to **Issue No. 40** in **Table 4-1** the model concluded that contaminants would only move at low concentrations over a very small distance from any breach, over a significant timeframe.

6.3.5 Independent certification of the Containment Cell construction and material placement
Stakeholders: Ben Clibborn, Toby Thomas

6.3.5.1 Issue summary

There should be an independent auditor appointed to sign off each stage of the Containment Cell construction and to ascertain what can and cannot be transferred from the capped waste heap to the Containment Cell based on whether or not it is practical to recycle or detoxify. The independent certifier should be approved by the Secretary.

6.3.5.2 Issue response

As noted in Section 8.1.3 of the EIS the Principal Contractor responsible for the Containment Cell would be required to develop and implement a Quality Management Plan (QMP). The EIS notes that third party independent quality assurance / control inspections would be undertaken throughout the Containment Cell construction and material placement activities to audit the performance of the contractor against the QMP.

In addition to this a NSW EPA Accredited Site Auditor is overseeing the contamination investigations, remediation planning, remediation activities and the subsequent validation of the entire Hydro Land, including the Project Site. As part of this role the Auditor would be required to review and verify the Containment Cell Detailed Design, but would also oversee the Containment Cell material placement, and removal of material from the Capped Waste Stockpile.

The Options Study presented in **Appendix 1** and **Appendix 2** included evaluation of an option that included the sorting and cleaning of potentially recyclable material within the Containment Cell. The evaluation concluded that this option presented major human health, worker safety and environmental risks. In addition recyclers have advised that they would not receive potentially recyclable material from the Capped Waste Stockpile unless Hydro can verify it is asbestos free and accepts liability for any asbestos that may be encountered. Hydro is unable to accept this liability as the material could not be completely confirmed as asbestos free.

The Options Study concluded that the placement of the Capped Waste Stockpile material into the Containment Cell (without sorting of potentially recyclable material) was the preferred option. This treatment process is described in **Section 8.2**. As discussed in **Section 1.5.2** the Options Study (along with subsequent correspondence and reports) has been reviewed and accepted (following inclusion of treatment of the Capped Waste Stockpile material by gypsum application) by the EPA.

6.3.6 Independent review of the Containment Cell design
Stakeholders: Ben Clibborn

6.3.6.1 Issue summary

There should be a peer review of the risk assessment for Containment Cell design, assessing the adequacy and robustness of controls and worst case outcome of land, groundwater and surface water contamination.

6.3.6.2 Issue response

The Containment Cell Detailed Design (provided in **Appendix 3J**) has been prepared consistent with the EPA *Environmental Guidelines: Solid Waste landfills* (2016).

As noted in **Section 6.3.5.2** a NSW EPA Accredited Site Auditor is overseeing the contamination investigations, remediation planning, remediation activities and the subsequent validation of the entire Hydro Land, including the Project Site. As part of this role the Auditor would be required to review and verify the Containment Cell Detailed Design.

This independent review by a NSW EPA Accredited Site Auditor would be additional to the technical review to be undertaken by the waste management and containment cell design specialists within the EPA, as well as an independent review of this RtS (including the Containment Cell Detailed Design Report presented in **Appendix 3**) commissioned by the Department.

6.3.7 Inadequate assessment
Stakeholders: Kurri Autos

6.3.7.1 Issue summary

The modelling and assessment undertaken for the Project is inadequate.

6.3.7.2 Issue response

Hydro has assumed that this issue is concerned with the modelling and assessment undertaken for the Containment Cell, and the potential for leakages and potential downstream impacts.

The Containment Cell Detailed Design Report presented as part of **Appendix 3** includes a model of the predicted leachate generation within the Containment Cell. This includes a prediction that less than 400L per year would be generated five years after the completion of the Containment Cell capping.

Appendix 17 presents the findings of modelling to predict what would happen in the unlikely event that this leachate within the Containment Cell leaked. As noted in the response to **Issue No. 40** in **Table 4-1** the model concluded that contaminants would only move at low concentrations over a very small distance from any breach, over a significant timeframe.

6.4 Containment Cell Management and Monitoring

6.4.1 Long term management and monitoring at the Containment Cell
Stakeholders: Ben Clibborn, Mary Bourke, AWU, Kurri Autos, Tellus Holdings Ltd

6.4.1.1 Issue summary

Confirmation is required regarding the long term ongoing management and monitoring requirements for the Containment Cell including:

1. Details of the long term groundwater monitoring around the Containment Cell, details of leachate monitoring within the surrounding waterways.
2. TARP for failure of the Containment Cell.
3. Vegetation management to prevent deep rooting plants from establishing and erosion management.

It is also noted that whilst the proposed Containment Cell Design might be adequate for short term containment, it fails to remove the burden of monitoring, management and potentially future remedial works on the site from future generations.

6.4.1.2 Issue response

With regards to the ongoing monitoring and management requirements:

1. The LTMP presented in **Appendix 12** describes the monitoring that Hydro proposes would be implemented following completion of the Containment Cell. This includes leachate monitoring within the Containment Cell leachate collection system.
   Based on the reasons provided in **Section 5.11.4.2** groundwater monitoring around the Containment Cell is not considered necessary.
2. The LTMP presented in **Appendix 12** addresses the requirements of a TARP, as it details the actions to be implemented in the event that damage to the Containment Cell was identified.
3. As discussed in Section 8.8.3 of the EIS, the vegetation cover is to be comprised of shallow rooted native grasses. The shallow roots are required to minimise potential for adverse impacts to the capping layers. As discussed in the LTMP in **Appendix 12**, inspection of the Containment Cell would be undertaken to check that: the vegetation cover is established; that appropriate coverage is maintained; and that inappropriate plants (such as deep rooted tree species) have not propagated on the capping layer and would be removed.

Hydro acknowledges that the ongoing monitoring and management of the Containment Cell would be required. Monitoring and management would also be required if it were left in its current location or disposed off site. As described in Section 5.3.3 of the EIS and confirmed by the Options Study (presented in **Appendix 1** and **Appendix 2**), on site containment poses the best available management option from environmental, human health and worker safety perspectives.

6.4.2 Responsibility, funding and liabilities for the Containment Cell
Stakeholders: AWU, Kurri Autos, CGSE

6.4.2.1 Issue summary

Further information is required regarding the funding of the management of the Containment Cell, the security of this funding into the future, and responsibility for the long term management of the Containment Cell

6.4.2.2 Issue response

Section 7.4 describes the proposed ongoing regulation (including security of funding) of the Containment Cell. The draft LTMP (**Appendix 12**) describes the maintenance activities that the owner would be responsible for implementing. The LTMP identifies the roles and responsibilities for long term management of the Containment Cell.

Hydro commissioned Muller Partnership to undertake an independent calculation of the cost for the implementation of the LTMP (refer to **Appendix 12**). These costs are provided in **Appendix 16**. These costs would form the basis of the proposed VPA as described in **Section 7.4**.

6.5 Contamination

6.5.1 Onsite containment of toxic and demolition waste
Stakeholders: Marcia Maybury

6.5.1.1 Issue summary

The former Smelter site must be remediated, and the Containment Cell does not achieve this.

6.5.1.2 Issue response

Containment of contaminated soils and materials within a containment cell has long been accepted as a remediation strategy for a contaminated site. The Containment Cell would receive contaminated soils and materials from the Smelter and small areas of the surrounding Hydro Land, making more than 1,940 hectares suitable for the proposed future industrial, commercial, residential, rural and conservation land uses.

A relatively small area of the Hydro Land (approximately six hectares) would be managed with use restrictions, while all remaining areas would be suitable for development permitted by the proposing land use zoning.

6.5.2 Transport of contamination within erosion and sediments
Stakeholders: Kurri Autos

6.5.2.1 Issue summary
Clarification is required as to what control measures will be implemented to ensure contaminated material (located in the Containment Cell, stockpile area etc.) is not transported during periods of high rainfall or drought. If stockpiles of contaminated materials are misted to minimise dust generation, sedimentation fences will not contain heavy metal accumulations within sediment runoff.

6.5.2.2 Issue response
Wherever possible, Hydro proposes to directly relocate material from their sources directly to the Containment Cell. This provides an economic and program benefit (by avoiding double handling), as well as the environmental benefits from avoiding temporary stockpiles and the need for associated temporary erosion controls.

The water management measures described throughout Section 8 of the EIS would: minimise the potential for runoff generation; and capture and contain any contaminated runoff. The collected contaminated water and leachate would either be: treated on site before it is discharged from the Smelter water management system (as discussed in **Section 7.2**); or collected and transported for off site treatment (as discussed in **Section 8.4**).

As described in Section 8.5 (Capped Waste Stockpile) and Section 8.8 (Containment Cell) of the EIS, any water (either already within the material or resulting from rain) from the exposed contaminated material uncovered in the Capped Waste Stockpile or placed Containment Cell would be captured within these locations for either on site or off site treatment.

In the event that contaminated soils are stockpiled prior to their placement within the Containment Cell, erosion and sediment control measures would be implemented that are appropriate to the material, the contaminant and the timeframe the material would be stockpiled. As discussed in the RAP (refer to **Appendix 7**) contamination of soils at the Smelter (excluding the Capped Waste Stockpile) is predominantly associated with PAHs, while soils from the Hydro Land are predominantly contaminated with asbestos (due to historical demolition procedures and some illegal dumping).

As described in Section 13.4 of the EIS, erosion and sediment controls would be inspected and maintained as required on a weekly basis and after a rain event. An Erosion and Sediment Control Plan would be developed as part of a SWMP. While Section 8.2.1.2 of the EIS states erosion and sediment controls would be installed at the start of the Project, they would be inspected and maintained as required, and likely to be relocated or added to, reflecting the dynamic nature of the Works at the Project Site.

Heavy metals are only a Contaminant of Concern for the material within the Capped Waste Stockpile. As discussed in Section 8.5.2 and Section 8.8 of the EIS any contaminated runoff and leachate from the Capped Waste Stockpile and the Containment Cell would be contained with these locations before being treated (either on site or off site as previously discussed).

6.5.3 Hazardous nature of spent potlining
Stakeholders: CGSE

6.5.3.1 Issue summary
Spent pot liner waste does not degrade or transform and remains a hazardous solid waste forever.

6.5.3.2 Issue response
Hydro acknowledges the chemical characteristics and the nature of spent pot lining. Hydro is also aware that it is a hazardous waste under the POEO Act, regulated as an "*aluminium smelter waste containing leachable fluoride and/or cyanide*" under the EHC Act, and as a Dangerous Good under Class 4.3 in accordance with the Australian Dangerous Goods Code. Hydro has considered these regulations, and their associated requirements, when assessing the processing and reuse

options for the stored spent pot lining. Following processing or reuse the spent pot lining would be an inert material.

Hydro is also aware of the chemical characteristics of the material currently within the Capped Waste Stockpile (predominantly wastes from the aluminium smelting process, including spent pot lining, as well as asbestos and other contaminated and hazardous material) that required particular consideration in the development of the Containment Cell Detailed Design.

This includes an understanding (as described in the Options Study provided in **Appendix 1** and **Appendix 2**) that:

- There is no potential recycling or reuse option for the majority of the Capped Waste Stockpile material.
- The sorting and processing of potentially recyclable material poses major environmental, human health and worker safety risks.
- The materials to be placed in the Containment Cell are non-putrescible and would not degrade.

The primary purpose of the Containment Cell Detailed Design is to stop the infiltration of water, encapsulating the material and the associated contaminants in the Containment Cell. It also allows for the capture and management of any leachate that could be generated from residual moisture when the material was placed in the Containment Cell. These design elements, along with the gypsum application described in **Section 8.2.3**, would minimise the potential for environmental impacts associated with the contents of the Containment Cell.

As noted in the response to **Issue No. 45** in **Table 4-1**, the EPA concluded in 2013 that the Project Site, including the existing Capped Waste Stockpile, did not pose a significant risk of harm to human health or the environment. It is considered highly unlikely that remediation of the Smelter and the Containment Cell would increase the risk of harm to human health or the environment above existing levels.

6.6 Greenhouse Gas and Climate Change

6.6.1 Climate Change

Stakeholders: Kurri Autos

6.6.1.1 Issue summary

Has climate change been considered when determining the adequacy of the Containment Cell?

6.6.1.2 Issue response

Climate change was considered when assessing:

- The greenhouse gas emissions associated with the Containment Cell (and therefore the contribution to climate change).
- The potential impacts from climate change on the Containment Cell.

As discussed in Table 5.3 of Section 5.3.3 of the EIS the energy usage and greenhouse gas emissions associated with undertaking the waste management option and the ongoing operations of the option were considered for the potential remedial options.

Section 20 and Appendix 11 of the EIS describe the findings of a Greenhouse Gas Assessment for the Project, including the Containment Cell.

The Options Study (in **Appendix 2F**) quantified the greenhouse gas emissions associated with six options for management of the Capped Waste Stockpile material (plus doing nothing). This concluded that on site containment resulted in the lowest greenhouse gas emissions.

The key events associated with climate change that could affect the Hydro Land are: an increase in bushfire events; and an increase in intense storm events.

As discussed in **Section 5.5.1** the potential impact of bushfire on the Containment Cell location, in the short term and long term, has been considered in the EIS. Inspection of the Containment Cell when a bushfire is within 500 metres of the Containment Cell is a requirement of the LTMP (refer to **Appendix 12**).

As discussed in **Section 5.10** the nominated Containment Cell location is well above the PMF level and beyond the area subject to predicted sea level rise impacts. The LTMP requires that the Containment Cell be inspected immediately following a significant storm event (a 5% AEP event or greater), as well as on an annual basis, to confirm the integrity of the capping. The Containment Cell has been designed to minimise the potential for erosion and slippage. However if the cap is damaged by a storm event, maintenance activities (as described in the LTMP) would be undertaken.

6.7 Human Health

6.7.1 Exposure to airborne contaminants

Stakeholders: Kurri Autos

6.7.1.1 Issue summary

Consideration should be given to the exposure of the community to airborne contaminants during viewing of the demolition works noting that some dangerous waste may not be possible to be recovered from buildings / stacks prior to demolition due to safety / access issues.

6.7.1.2 Issue response

Hydro acknowledges this comment, and has addressed it in the Stage 2 Demolition EIS, which has been submitted with a DA to Cessnock City Council and approved on 9 May 2018. As discussed in **Section 1.4** Stage 2 Demolition has been removed from the SSD application and is the subject of this separate DA.

6.7.2 Spent Pot Lining and Flammable Gases

Stakeholders: Kurri Autos

6.7.2.1 Issue summary

The EIS notes that aluminium by products may emit flammable and harmful emissions when coming in contact with water. What controls will be in place to ensure human exposure is prevented and bushfire risk eliminated?

6.7.2.2 Issue response

Spent pot lining that has come into contact with water has the potential to generate gases that can be flammable and harmful to human health. Hydro therefore stores spent pot lining within fully enclosed sheds and has procedures in place so that spent pot lining does not become exposed to water. It also undertakes monitoring in the sheds to assess whether any moisture in the air is reacting with spent pot lining and potentially generating gases. The stored spent pot lining would continue to be managed in this way (as required by the EHC Licence issued and regulated by the EPA) until arrangements are finalised with facilities to take the material for processing, reuse and/or recycling.

One of the reasons that the capping was placed on the Capped Waste Stockpile in 1995 was in response to concerns that it included wastes from the aluminium smelting process (including spent pot lining) that was exposed to water, creating both contaminated runoff and leachate, and potentially generating gases. However, recent testing of the Capped Waste Stockpile material using the OECD Dangerous Goods Class 4.3 testing requirements concluded that for the samples provided, no gas, including flammable gas, was observed to evolve throughout the duration of the test for each sample.

Hydro has continued to monitor the gas vents of the Capped Waste Stockpile for gas generation. Results of this monitoring have shown that ammonia and methane generation has reduced over time. However Hydro is aware that during the excavation of the Capped Waste Stockpile, gas could be emitted that posed a risk to human health; primarily through inhalation but also as a fire risk.

In recognition of the need to minimise the Capped Waste Stockpile material's exposure to water, and the importance to protect human health and safety, the EIS includes the following measures:

- The cap would be gradually removed, and small sections of the stockpile would be opened and removed to minimise the area exposed at one time.

- Removal of waste materials from the Capped Waste Stockpile would cease in rain events and the exposed stockpile materials covered. The exposed area would be covered either with the stockpiled wet weather cover material or an alternative cover (such as plastic sheeting).
- A respirator appropriate for ammonia, methane, hydrogen, hydrogen cyanide and hydrogen sulfide would be available and ready to be used for all workers at the Capped Waste Stockpile.
  These workers would receive training in how to wear and use the respirators, as well as the additional responses required in the event that the need to wear a respirator is triggered.
- Real-time ambient air monitoring would be undertaken at several locations around the Capped Waste Stockpile when waste from the Capped Waste Stockpile is exposed. At a minimum, the ambient air would be monitored for concentrations of ammonia and hydrogen cyanide gases, and airborne asbestos fibres.
- Real-time ambient air monitoring would be undertaken inside machinery (such as excavator) housings, and workers within these housings would also have appropriate respirators available.

Section 8.1.1.1 of the EIS discusses the fire management procedures to be implemented during the Works, including measures to minimise the potential for fire ignition sources as a result of the Works. In the event that flammable gases are generated from the aluminium smelting process wastes in the Capped Waste Stockpile material, the Works would be managed so as to avoid potential ignition sources being exposed to these gases.

6.8 Noise and Vibration

6.8.1 Noise impacts

Stakeholders: Mary Bourke

6.8.1.1 Issue summary

Concern was raised over noise impacts resulting from the Project.

6.8.1.2 Issue response

Hydro acknowledges the concern from the community regarding noise from the Works. As such the Noise and Vibration Impact Assessment was prepared to assess the potential impacts of the Works, identify potential noise and vibration mitigation controls (as described in Section 12.4 of the EIS), and to also identify what restrictions would need to be placed on any activities undertaken outside standard construction hours.

Activities that would generate an audible noise at sensitive receivers would be limited to occur between 7:00 am to 6:00 pm Mondays to Fridays and 7:00 am to 1:00 pm on Saturdays, as regulated by the Council DA.

Section 8.12 of the EIS notes that most of the Works would occur during standard construction hours. However, this section also listed benefits to the Project, the environment and surrounding community presented by the ability to undertake such activities outside standard hours. **Section 5.13.1.2** lists examples of activities that could be undertaken outside standard hours, and the reasons for undertaking them during these hours.

Section 5.13.1.2 discusses the work undertaken in the NVIA to assess the number and types of machinery and equipment that could be operated concurrently outside standard construction hours in compliance with the EPA *Interim Construction Noise Guideline* (ICNG) and not exceed sleep disturbance criteria at any sensitive receivers.

Section 5.13.1.2 identifies a number of activities that could be required to occur outside of standard construction hours, and be undertaken in compliance with the ICNG and not exceed sleep disturbance criteria at any sensitive receivers. **Section 5.13.1.2** also describes how the updated NVMP would assess and manage such activities.

6.9 Project Justification and Alternatives

6.9.1 Future land use restrictions
Stakeholders: Name withheld, Kurri Autos

6.9.1.1 Issue summary

Justification should be provided for the containment of waste onsite resulting in the future restriction of land use and loss of potentially valuable land. This is a prime example of intergenerational inequality.

6.9.1.2 Issue response

The Option Study presented in **Appendix 1** and **Appendix 2** concluded that the on site containment of the Capped Waste Stockpile material presented the best environmental, worker safety and human health management option. The Containment Cell incorporates best practice design, and would include best practice construction and material placements procedures and operational environmental management measures. This would protect future environmental health by minimising the potential for environmental issues associated with the Containment Cell and removing the existing environmental issues associated with the Capped Waste Stockpile and other areas of contaminated soils.

The Containment Cell is proposed to cover approximately six hectares, which would be the only land within the Hydro Land that prohibits development due to contamination. The remediation of the Smelter and small sections of the surrounding Hydro Land would allow greater than six hectares to be developed without any of the previous development restrictions associated with contamination.

Hydro contends that the remediation of the Smelter and Hydro Land to facilitate future employment, residential, rural and biodiversity conservation is an example of intergenerational equality. For over forty years the local community and the Smelter's previous and current owners achieved great economic and social benefits from the Smelter. As the current owner of the Smelter, Hydro has the responsibility to ensure that future generations also benefit from the Hydro Land, and do not have to deal with the remnant environmental legacies from historical activities. The new land uses that the remediation and rezoning would facilitate would provide long-term environmental, social and economic benefits.

6.9.2 Optimal management of hazardous materials and substances
Stakeholders: Colin Baker

6.9.2.1 Issue summary

Further details required on the characteristics of the capped waste stockpile materials and other wastes going in the containment call, and how the design considers these characteristics.

6.9.2.2 Issue response

Section 8.8.1 of the EIS describes the material streams and estimated quantities of the materials being placed in the Containment Cell. This includes the Capped Waste Stockpile.

Ramboll has undertaken sampling and analysis of the Capped Waste Stockpile materials. This sampling involved the collection of waste and leachate samples from within the stockpile. Results are summarised in **Appendix 1(2)**. These results were consistent with the types of material known to have been placed in the stockpile. These are also listed in **Appendix 1(2)**.

These samples also confirmed that the waste materials are heterogeneous, and that asbestos is present within the waste material (it was found in almost half of all the analysed samples).

The Containment Cell Detailed Design (refer to **Appendix 3**) was developed with the key objective of preventing leachate generation, by providing barriers (cap and base) to infiltration by water.

In acknowledgement that some leachate may be generated due to residual moisture that may be present in the placed material prior to capping, the Containment Cell Detailed Design Team has undertaken a number of additional investigations and laboratory testing to select the best materials for the Containment Cell cap and base layers. This includes:

- Leachate testing on the HDPE for optimal design, and physical and chemical characteristics.
- Additional geotechnical and groundwater investigations within the proposed Containment Cell location.
- The results of this testing are provided in the Containment Cell Detailed Design.

The Containment Cell Detailed Design provides the same performance as the Concept Design described in the EIS and is consistent with the recommendations of the EPA E*nvironmental Guidelines: Solid Waste landfills* (2016).

6.9.3 Project alternatives considered and justification of preferred option
Stakeholders: Ben Clibborn, Colin Baker, Name withheld, Kurri Autos, Tellus Holdings Ltd, Weston Aluminium

6.9.3.1 Issue summary
Further information required on the alternatives that were considered and the justification of the preferred option.

6.9.3.2 Issue response
Section 5 of the EIS (Consideration of Alternatives) describes the considerations that Hydro made and the processes followed in identifying and assessing potential options to all aspects of the Project. This includes:

- Future Land Use
- Smelter Buildings and Demolition
- Containment Cell Location
- Remediation, including Waste Management

Following negotiations with the EPA, Hydro undertook more detailed analysis of the management options for the material within the Capped Waste Stockpile (which, in turn, determines the best option for all non-recyclable material). The Options Study presented in **Appendix 1** and **Appendix 2** evaluated seven options against the following criteria:

- Human Health
- Worker Safety
- Ecological Risk
- Greenhouse Gas Emissions

The evaluation considered the construction and operation of each option as designed, as well as the events that could occur if the standard construction methodology and the design failed.

Detail on the key findings of the Options Study are discussed in **Section 7.1** of this report.

6.10 Social Impacts

6.10.1 Community concern
Stakeholders: Ben Clibborn

6.10.1.1 Issue summary
The community holds concern regarding the onsite containment of non-recyclable waste.

6.10.1.2 Issue response
As discussed in Section 5.3.5 of the EIS, containment cells have been, and continue to be, an accepted and successful remediation solution, with many examples in the Hunter Region and NSW.

Section 5.3.3 of the EIS describes the range of management options for the non-recyclable wastes considered by Hydro. Options were considered for each individual waste stream, as well as the integrated management of all waste streams.

Following negotiations with the EPA, Hydro undertook more detailed analysis of the management options for the Capped Waste Stockpile (which forms approximately 67% of the non-recyclable waste at the Smelter) to prepare the Options Study. The Options Study concluded that the on site containment of the non-recyclable waste presented the best overall social, environmental and economic outcome.

Further detail on the methodology and the key findings of the Options Study are provided in **Section 7.1**. The Options Study is presented in **Appendix 1** and **Appendix 2**.

6.10.2 Overall impact to the community

Stakeholders: Mary Bourke

6.10.2.1 Issue summary

The EIS does not adequately, if at all, give consideration of the overall potential impact of the Project on the Kurri Kurri and Weston communities.

6.10.2.2 Issue response

The EIS states that the Project's objectives are to:

Render the Project Site suitable for employment uses
Achieve Hydro's commitment to meeting its corporate environmental and social responsibilities
Allow for the significant social, environmental and economic benefits of the Project to be sustainably achieved

It is Hydro's aim to deliver an overall long term beneficial impact to the Kurri Kurri and Weston communities.

However Hydro acknowledges that the Works required to achieve this include activities that could potentially generate noise, dust and traffic impacts that could adversely impact on the local community.

The Works as described in Section 8 of the EIS includes implementation of environmental management procedures as a key task, and the methodologies to be implemented further minimise the potential for environmental impacts. The Air Quality Impact Assessment (Section 11 and Appendix 6 of the EIS), Noise and Vibration Impact Assessment (Section 12 and Appendix 7 of the EIS), and Traffic Impact Assessment (Section 15 and Appendix 8 of the EIS) assesses the impacts of the Works and describes further measures that would be implemented.

These assessments include modelling to estimate the dust deposition (air quality), noise levels in the area surrounding the Smelter (including the Kurri Kurri and Weston communities), and the potential impact of Works traffic on the local road network. The potential for impacts on the local community is a key factor of these assessments.

The Human Health Risk Assessment (Section 22 and Appendix 12 of the EIS) consider a range of potential issues, including the potential air quality and noise impacts, to assess the potential impacts on the health of both workers at the Project Site but also the local community.

Section 19 of the EIS discusses the visual impact of both the Works (when the Project is underway) and the final landform (with the Smelter demolished and the Containment Cell completed). The EIS acknowledges the areas and directions from which views are available into the Project Site, the potential impacts and how these would be mitigated.

Section 9 of the EIS and the LTMP included in **Appendix 12** describe the environmental management and monitoring procedures to be implemented at the completed Containment Cell. It describes how the Containment Cell would be managed to avoid the contents of the Containment Cell entering the surrounding environment and potentially affecting the local community.

6.11 Spent Pot Lining Management

6.11.1 Quantity of spent pot lining

Stakeholders: AWU

6.11.1.1 Issue summary

Confirmation of the amount of recyclable spent pot lining currently at the Smelter is required.

6.11.1.2 Issue response

As discussed in **Section 1.2** of the EIS, the ongoing storage and transportation of the stored spent pot lining to an off-site licensed facility do not require Development Consent. As such it does not form part of the Project. However, Hydro acknowledges the interest that the local community has with regards to the management of the stored spent pot lining.

As of 29 March 2018, Hydro calculated that it has a total of 80,000 tonnes of spent pot lining stored in purpose built sheds. As discussed in Item No. 2 in **Table 4-1**, as of 30 June 2020 26,600 tonnes (or 33%) of the spent pot lining had been removed from the Smelter and transported to a licensed processing facility.

6.11.2 Management and removal of the stored spent pot lining

Stakeholders: AWU, Kurri Autos, Colin Barker, Weston Aluminium

6.11.2.1 Issue summary

Concern is raised that the fate of the stored spent pot lining is not dealt with within the EIS and that confirmation over the removal, transportation and final destination and treatment. All recyclable SPL that is currently present at the site is recycled. It should also be clearly expressed that recyclable SPL means all SPL that is not in the existing capped stockpile. It is raised that either the recycling of the spent pot lining is included within the Project or a condition of consent should require that all spent pot lining be recycled at a licenced recycling facility that occurs within Australia.

Further, it is stated that Weston Aluminium has gained regulatory approval for the treatment and recycling of up to 40,000 tonnes per annum of Second Cut spent pot lining wastes. Weston Aluminium is now seeking regulatory approval for the processing and beneficiation of all spent pot lining wastes stockpiled and generated by the domestic primary aluminium sector.

6.11.2.2 Issue response

As discussed in Section 1.2 of the EIS the removal of the spent pot lining from the Smelter does not require Development Consent, does not form part of the Project, and is not dependent on the completion of demolition and remediation of the Smelter. However, Hydro acknowledges the interest that the local community has with regards to the management of the stored spent pot lining.

Spent pot lining is currently stored in ten purpose built storage sheds at the Smelter (as approved by Cessnock City Council in 1995) and part of the former anode baking furnace building, as approved by Cessnock City Council in 2015. These storage buildings comply with the requirements of the Development Consent from Council and the CCO pursuant to the EHC Act. The spent pot lining would continue to be stored in the dedicated buildings until contractual and commercial negotiations are finalised and (if required) the receiving facility/ facilities have all required approvals and licences in place.

As discussed in response to **Issue No. 2** in **Table 4-1**, upon completion of due diligence investigations of spent pot lining treatment and reuse facilities, Hydro identified an operator that can process the spent pot lining stored within buildings at the Smelter. The first shipment of spent pot lining commenced transportation to an approved treatment facility in July 2018.

The response to **Issue No. 2** in **Table 4-1** describes the process Hydro has implemented to identify suitable reuse or processing facilities for the spent pot lining.

6.11.3 Independent audit of stored spent pot lining
Stakeholders: AWU, Toby Thomas

6.11.3.1 Issue summary
An independent audit should be conducted to confirm the quantity of stored spent pot lining on site for recycling and provide certification of the materials being placed within the cell.

6.11.3.2 Issue response
As discussed in **Section 6.11.1.1** Hydro calculated that it has a total of 80,000 tonnes of spent pot lining stored at the Smelter.

The movement of this material is regulated by the POEO Act and the EHC Act.

Under the POEO Act waste tracking would be required to be implemented, which would record the quantity of spent pot lining leaving the Smelter, and the quantity being received at the approved receiving facility.

The CCO issued under the EHC Act, and the EHC Licence No. 5 issued to Hydro, describe a number of management requirements, restrictions and prohibitions relating to the handling of spent pot lining. Under the EHC Licence, Hydro is required to produce an annual report that describes, amongst other things, the quantity of aluminium smelter wastes (including spent pot lining) stored at the Smelter. Hydro has submitted this report to the EPA as required, and EPA has not previously raised concerns about these reports, including the accuracy of the reported quantities.

Hydro believes that through this previous required, and accepted, reporting (which includes the quantity of spent pot lining) an independent audit of the quantity of spent pot lining stored at the Smelter is not required.

Hydro believes that the waste tracking required by the EPA for spent pot lining going off site, along with the internal waste management and recording to be implemented by Hydro (for material going to the Containment Cell, as described in Section 8.5.5 of the EIS) would provide evidence that only suitable and approved material would be placed in the Containment Cell. This information would be made available: for the NSW EPA Accredited Site Auditor as part of their role of overseeing the remediation activities at the Smelter; directly to the EPA as required by the EPL and EHC Licence; and upon EPA request.

6.12 Traffic and Transport

6.12.1 Cumulative traffic impacts
Stakeholders: Sarah Clibborn, Mary Bourke

6.12.1.1 Issue summary
The cumulative impacts of the road and bridge upgrades on feeder roads (namely the upgrade of the bridge on Frame Drive from single lane to double lanes), the current proposal by Weston Aluminium that would utilise Hart Road as its primary route to access the Hunter Expressway and the proposed rezoning of Hydro Land has not been taken into consideration.

The intersection of Hart Road, Sawyers Gully Road, Government Road and Gingers Lane was not addressed in Section 5.2 of the Traffic Impact Assessment (Traffic analysis of major/relevant intersections), and no traffic counts were carried out at this location. This intersection in its current state is dangerous, and already has a number of issues (it is not properly aligned, so visibility of oncoming traffic is difficult, traffic does not stop at stop signs, speed limits are too high close to the intersection and the road is not wide enough to allow safe turning without crossing onto the wrong side of the road) and often struggles with current traffic volumes. Increased traffic volumes from the proposal would only compound these issues.

The transport of toxic waste through Kurri Kurri and Weston with no destination outlined is omitted from the EIS.

6.12.1.2 Issue response

Section 15 and Appendix 8 of the EIS describe the existing road network and usage and provide an assessment of the impacts of the Project on the existing network, taking into consideration the cumulative impacts associated with running concurrently with the Stage 1 Demolition activities. The findings are consistent with the Traffic Impact Assessment, which formed part of the Statement of Environmental Effects that supported the DA for Stage 1 Demolition, which was approved by Council in March 2016.

As presented in Section 15 of the EIS, it is anticipated that the vast majority of traffic would travel via Hart Road and the Hunter Expressway to the southeast. A conservative assumption that 15% of light vehicle traffic is anticipated to travel along Hart Road to its intersection with Government Road/ Sawyers Gully Road and progress to Weston, Kurri Kurri and/ or Cessnock has been utilised. The peak traffic volumes would result in 75 car trips on a typical day. Therefore there is anticipated to be an increase of approximately 12 car movements each day at the intersection of Hart Road and Government Road/ Sawyers Gully Road for a period of approximately 26 weeks.

Hydro acknowledges (as advised by Council) that Frame Drive/ Gingers Lane is the shortest and apparent preferred route from Cessnock to the Hunter Expressway. While Hydro acknowledges that the reopening of the bridge is likely to have led to an increase in vehicles using Frame Drive and Gingers Lane, it is not expected to lead to an increase in the traffic travelling between Cessnock and the Hunter Expressway. With the closure of the Frame Drive Bridge these vehicles were likely to have used Government Road and/ or other local roads as an alternative route to access Hart Road and the Hart Road Interchange. Therefore it is not expected that the bridge reopening would lead to an increase in traffic using the Hart Road Interchange, or adversely affect any of the assumptions and modelling used in the Traffic Impact Assessment.

The reopening of the bridge is likely to result in an increase in traffic entering the Government Road/ Sawyers Gully Road/ Hart Road/ Gingers Lane intersection from Gingers Lane, and a similar reduction in vehicles entering from Government Road. As the Project is anticipated to result in a peak increase of 12 light vehicles per day at this intersection, it is considered a minor contribution to any changes to traffic movements at this intersection.

As part of the EIS TIA review presented in **Appendix 28**, SECA Solution undertook additional traffic counts to consider changes in traffic numbers. The counts found that peak traffic volumes had increased by 30 to 50%. However despite this increase in existing traffic, the review of the Traffic Impact Assessment concluded that the Project traffic (including the additional traffic generated by the Project changes described in **Section 8**) would have a minimal and acceptable impact upon the surrounding road network.

With regards to the potential for cumulative impacts with the current proposals at Weston Aluminium, the following information is currently publicly available:

The Application for Development Consent Modification (DA 86-04-01) Proposed Processing Trial of Quarantine Wastes – Weston Aluminium (2016) notes that '*Additional waste inputs are anticipated in the order of up to 2 light vehicle movements per day*' and that the '*potential impacts on traffic and transportation conditions is expected to be negligible*'.
Environmental Assessment Spent Potlining Processing DA 86-04-01 MOD 10 and DA 10397 MOD 8 (AECOM 2016) notes that '*no additional truck movements beyond those associated with the development would be generated*'.

These recently approved modifications to operations at Weston Aluminium would result in negligible traffic movements beyond that which is currently approved. Therefore the cumulative impacts of the Weston Aluminium plans and the Project would not result in any material impact to the road network.

Only minimal waste associated with the Project would be transported off site. None of this waste would be toxic or hazardous waste. The management of the stored spent pot lining does not form part of the Project. However, as previously discussed Hydro is currently finalising the options to be used for the processing or direct reuse of the spent pot lining. The majority of the options

being considered are outside of the local area, and would result in trucks (operated by drivers with the required licences from the EPA for the transportation of spent pot lining) using the Hart Road Interchange to access the Hunter Expressway to travel to facilities or to ports for export. As such most of this material would not be required to travel through Kurri Kurri and Weston.

In the event that an existing treatment facility in Weston is used to process spent pot lining, trucks would use a route (travelling southwest on Hart Road, then south on Government Road, and then east on Mitchell Avenue before arriving at the facility) that would require trucks to travel predominantly through industrial and uninhabited areas, and would pass nearby to less than eight residences.

6.13 Waste and Recycling

6.13.1 Recycling of Waste

Stakeholders: Total Environment Centre

6.13.1.1 Issue summary

A clear distinction should be made as to what materials are to be recycled and what materials will be placed within the Containment Cell.

A comprehensive and public audit of the currently capped material and an independent review of what can be recycled should be completed.

6.13.1.2 Issue response

Hydro completed an inventory of the aluminium smelter waste and demolition wastes that would be generated during the decommissioning, demolition and remediation of the Smelter. Through this process Hydro identified approximately 168,667 tonnes of solid waste and 530,000 litres of liquid waste (oils) that are potentially recyclable. As of 30 June 2020 Hydro has recycled or sold for recycling approximately 34,023 tonnes of process materials, 75,700 tonnes of scrap and over 793,142 litres (660.5 tonnes) of oil giving a total of 110,383.5 tonnes of material for recycling.

Since the closure of the Smelter in May 2014 Hydro has done extensive work to identify reuse and recycling opportunities for the machinery, equipment and materials at the Smelter. In addition to the recycled materials described above, activities undertaken by Hydro to date include:

- Offering for sale over 2,200 units of electrical goods, machinery, tools and equipment.
- Donations of electrical goods, white goods and office equipment to schools and community organisations.
- Dismantling of sheds and other buildings for sale and off-site reuse.

The majority of the demolition waste (approximately 298,436 tonnes) would either be processed and reused on site (192,736 tonnes of concrete, and 30,000 tonnes of building bricks and refractory bricks have been recycled as at June 2020) or transported off-site for recycling (approximately 75,700 tonnes of metals have been recycled as at June 2020).

Hydro continues to investigate and assess reuse/ recycling options for other wastes at the Smelter:

- As discussed in **Section 6.11.2**, Hydro has commissioned an operator to process the approximately 80,000 tonnes of spent pot lining stored in sheds at the Smelter.
- Hydro was successful in finding a facility that would receive and reuse approximately 228 tonnes of coal tar pitch.
- Over 7,800 tonnes of ahead of schedule anodes were sent to Germany and recycled as fuel in other industries and another 12,912 tonnes were sent for recycling at a concrete plant in NSW, for a total of 20,712 tonnes recycled
- Over 3,468 tonnes of calcined petroleum coke were recycled at other Australian smelters.
- Over 3,399 tonnes of anodes were recycled at a smelter in the Middle East.
- Over 5,245 tonnes of ledge bath (cryolite) were recycled by aluminium smelters in China.

Hydro has recycled over 332,549 tonnes of solid waste and 793,142 litres of liquid waste.

A comprehensive audit of the material that is currently within the Capped Waste Stockpile is not possible. While the types of materials that were placed in the stockpile are known (refer to **Appendix 1(2)**), due to historical waste management techniques accurate records of the materials that were placed in the Capped Waste Stockpile were not retained. In addition, waste was not sorted and stockpiled in discreet areas.

In 2016, Ramboll undertook core sampling of the Capped Waste Stockpile materials. This sampling involved the collection of waste and water samples for analysis. Results are presented in **Appendix 1(2)**.

These samples confirmed that the waste materials are heterogeneous, and that asbestos is present within the waste material (asbestos was present within almost half of all samples, at varying depths and locations).

The Options Study presented in **Appendix 1** and **Appendix 2** included evaluation of an option that included the sorting and cleaning of potentially recyclable material within the Containment Cell. The evaluation concluded that this option presented major human health, worker safety and environmental risks. In addition recyclers have advised that they would not receive potentially recyclable material from the Capped Waste Stockpile unless Hydro can verify it is asbestos free and accepts liability for any asbestos that may be encountered. Hydro is unable to accept this liability as the material could not be completely confirmed as asbestos free.

The Options Study concluded that the placement of the Capped Waste Stockpile material into the Containment Cell (without sorting of potentially recyclable material) was the preferred option. As discussed in **Section 1.5.2** the Options Study (along with subsequent correspondence and reports) has been reviewed and accepted (following inclusion of treatment of the Capped Waste Stockpile material by gypsum application) by the EPA. The gypsum application process is described in **Section 8.2**.

6.14 Water Management

6.14.1 North Dam water management

Stakeholders: Kurri Autos

6.14.1.1 Issue summary

A description of the management and monitoring measures to be implemented to ensure the North Dam does not overflow and discharge into the surrounding environment is required, including confirmation of who is responsible for ensuring the dam does not silt and minimise storage capacity.

6.14.1.2 Issue response

The North Dam has been, and continues to be, a key element of the Smelter water management system. Hydro would retain responsibility for maintenance of the North Dam throughout the Works.

Section 5.18.2 discusses the water quality within the North Dam as well as downstream watercourses.

Section 7.3 discusses the results of the water balance undertaken for the Smelter. With regards to the North Dam the water balance concluded that the Smelter water management system (which included the North Dam) is designed to manage a 20% AEP storm event. Activities such as the use of collected water for dust suppression and the use of evaporation sprays in the North Dam and the licensed discharge from the North Dam would help maintain storage capacity and minimise the potential for overflows from the Smelter water management system.

In the event that the North Dam did overflow:

- The water balance predicts that it would only occur during a storm event that has a greater than 20% AEP. As such it would occur less than once every five years.
- As an overflow would only occur in large rain events, the water both within the North Dam and the receiving waters would be heavily diluted.
- One of the key objectives of the Project, and the demolition and remediation of the Smelter, is to remove many of the potential sources of fluoride and other compounds that could enter

the North Dam. The quality of water entering the North Dam, and discharging from the Dam (either controlled via the licensed discharge point or potentially overflowing as a result of a large storm event) should improve as the Works and other activities (such as demolition) progress.

Therefore the potential impacts associated with an overflow from the North Dam are expected to not have an adverse impact on the surrounding environment.

6.14.2 Water treatment plant

Stakeholders: Kurri Autos

6.14.2.1 Issue summary

Details are provided for the water treatment plant. Who maintains the plant? What method of treatment would the plant offer? Is reverse osmosis considered? Following treatment, where will the brine be disposed of? Have Hydro determined appropriate disposal methods rather than assumed? Will water be pumped to the North Dam for irrigation?

6.14.2.2 Issue response

Section 8.4 notes that the preferred method for leachate and contaminated stormwater is via collection for transportation to a licensed off site treatment facility. This would be during both the relocation of material from the Capped Waste Stockpile to the Containment Cell, and following completion of the Containment Cell.

Section 7.2 provides details on the leachate treatment plant that could treat the collected leachate and contaminated stormwater collected within the Capped Waste Stockpile and the Containment Cell during the relocation of material from the Capped Waste Stockpile to the Containment Cell. This could operate instead of or in conjunction with the off site treatment.

The LTMP identifies the responsibilities for the ongoing management of the Containment Cell. The Containment Cell Manager would be responsible for the management (including either on site or off site treatment) of any leachate that may be generated within the Containment Cell.

6.15 Zoning

6.15.1 Commercial viability of the rezoning of the land

Stakeholders: Kurri Autos

6.15.1.1 Issue summary

The Containment Cell is proposed to be surrounded by industrial land. There is a large amount of industrial land in the Hunter Economic Zone without the environmental liabilities of the Hydro Land that will not be assumed by the purchaser. Who will be responsible if the land is not sold or rezoned?

6.15.1.2 Issue response

Any issues regarding the rezoning or sale of the land do not influence Hydro's commitment to the remediation of the Smelter. The remediation would occur whether the Project Site remains zoned Rural RU2 Rural Landscape (its current zoning under the Cessnock Local Environmental Plan (LEP) 2011), IN3 Heavy Industrial (as proposed by Hydro and Cessnock City Council), or any other zone that is ultimately applied to the Containment Cell. However, the rezoning could not proceed unless the Project Site is remediated.

Hydro is aiming to minimise the environmental liabilities to Hydro, any future owners and developers by undertaking two key activities:

- Completing remediation of the Smelter and surrounding Hydro Land so that any contaminated material is only in one location, removing the need for a future owner and future developers to handle and manage contaminated soils.
- The Bio-Certification Agreement process that Hydro has entered into with the OEH in parallel with the Planning Proposal (rezoning) for the Hydro Land. The Bio-Certification Agreement process provides certainty for a future owner and prospective developers. Rather than individual developments being required to assess the biobanking requirements on their property, this is being undertaken for the proposed land uses

within the entire Hydro Land. This removes a major environmental liability to an owner of Hydro Land and future developers.

It should also be noted that Hydro is proposing a mix of IN3 Heavy Industrial (including the Project Site) and IN1 General Industrial. Hydro believes that given its location, and historical land use as the Smelter, the proposed IN3 zoning is ideally located to service a future heavy industry in the area. This would support heavy industries that would not be permitted in the IN1 General Industrial zone that applies to the Hunter Economic Zone, and is in limited supply elsewhere within the Cessnock Local Government Area. The proposed zoning of the Project Site, and the wider Hydro Land, is supported by Cessnock City Council who endorsed the Planning Proposal.

7. KEY ADDITIONAL INFORMATION

This section of the report provides additional information on the following key issues:

- The identification and assessment of the alternatives that were considered for the management of the material within the Capped Waste Stockpile.
- Details on the on site leachate treatment plant for the treatment of leachate and contaminated water during the Works and the Containment Cell Management.
- A description of the Smelter stormwater management system and a summary of the water balance presented in **Appendix 13**.
- An outline of the proposed Containment Cell funding regulation approach.

7.1 Capped Waste Stockpile Management Options Evaluation

In its submission on the EIS (dated 4 January 2017) the EPA raised several issues. In relation to the Capped Waste Stockpile, the issues are summarised as the following:

The waste material in the Capped Waste Stockpile be sorted to remove any materials that can be recycled such as Spent pot lining or steel.
Non-recyclables with levels of leachable fluoride and cyanide above the CCO threshold be treated to reduce the levels below the threshold (such as with calcium carbonate/ lime and cement). Placement of such materials in the Containment Cell without treatment would not be lawful.

Prior to and following receiving the EPA submission, Hydro and the EPA have had meetings and other communications regarding this issue (refer to **Table 2-1**). From this communication it was concluded that Hydro would prepare the *Capped Waste Stockpile Management Options Evaluation Study*, presented in two parts in this report, in **Appendix 1** and **Appendix 2**. The purpose of the study was to:

Identify potential options for the management of the material within the Capped Waste Stockpile, with particular consideration of the removal of recyclables and the management of leachable fluoride.
Undertake a combination of quantitative and qualitative assessments of six management options (plus Do Nothing – leaving the Capped Waste Stockpile in situ) against four environmental, health and safety (non-economic) criteria:

- Human Health Risk
- Worker Safety
- Ecological Risk
- Greenhouse Gas Generation.

Appendix 1 includes a detailed description of the six evaluated options (plus the "Do Nothing" option, which was retaining the Capped Waste Stockpile in its current location) and the results of the evaluation.

The Study concluded that the placement of the untreated Capped Waste Stockpile material into the Containment Cell presented the preferred option. It was acknowledged that despite this outcome, regulatory change would be required. Treatment of the Capped Waste Stockpile material prior to placement in the Containment Cell was found to be the second-best option.

The study was submitted to the EPA on 30 October 2017 for their review and consideration. In a letter dated 6 December 2017 the EPA advised Hydro that the treatment of the Capped Waste Stockpile material prior to placement in the Containment Cell was the EPA's preferred option as it:

- Provides greater certainty regarding compliance with the CCO.
- Has only a slightly larger impact profile than the study's preferred option due to slightly higher greenhouse gas emissions and safety risks.
- Offers a relatively simple and generally robust means to effectively capture fluoride in leachate generated by the waste, thus potentially reducing leachate treatment and management requirements.

The letter noted that additional information would be required to be provided to the EPA confirming that the treated Capped Waste Stockpile material would comply with the CCO. In a subsequent meeting on 8 December 2017 the EPA advised that Hydro would need to provide the EPA with the following information:

The proposed treatment process, including the type of material used to treat the Capped Waste Stockpile material, the quantity to be applied and how it would be applied to provide the required mixing for treatment.
The proposed sampling, analysis and testing procedures to be implemented for:

- certifying that the aluminium smelter waste is 'approved aluminium smelter waste' for the purposes of the EHC Licence.
- testing whether the aluminium smelter waste contains 'leachable fluoride' or 'leachable cyanide' for the purposes of the CCO.
- Results of laboratory treatability trials.

As discussed in **Section 1.5.2**, following this meeting communication continued between Hydro and the EPA to finalise the gypsum application methodology. On 9 July 2018 the EPA issued a letter advising that it accepted the proposed gypsum application methodology.

7.2 Leachate Treatment Plant Concept Design

Reference is made in several locations in Section 8 of the EIS to the operation of a leachate treatment plant for the treatment of leachate:

- **Section 8.4.4** refers to the installation of the leachate treatment plant for the Containment Cell.
- **Section 8.5.2** refers to the installation of a leachate treatment plant to treat leachate from within and stormwater collected within the Capped Waste Stockpile.
- **Section 8.11** refers to leachate and groundwater from the footprint of the Capped Waste Stockpile being pumped and treated at a leachate treatment plant.

As discussed in **Section 1.5.4** further investigations concluded that off site leachate treatment at a licensed facility would be nominated as an option for leachate management. **Section 8.4** describes the methodology for the collection of leachate for off site treatment at a licensed facility.

However as also discussed in **Section 1.5.4** the potential for constructing and operating an on site leachate treatment plant (instead of or in conjunction with the off site treatment) during the Capped Waste Stockpile material removal and the placement of material in the Containment Cell remains an option that Hydro may implement. If an on site treatment plant was used, it would be decommissioned upon completion of the Containment Cell.

Several submissions requested additional details on the leachate treatment plant, including capacity, treatment technology and discharge quality.

The key elements of the potential leachate treatment plant are:

Location	A conceptual location for the leachate treatment plant and associated leachate storage (in addition to the storage available at the Capped Waste Stockpile and the Containment Cell) is provided in **Appendix 25**.
Capacity	Based on estimates of leachate generation through the Project the leachate treatment plant would require an estimated capacity of 30 kL/day.
Technology	The treatment plant would include pre-treatment, dewatering, filtering and treatment columns to remove key contaminants.
Target contaminants to be treated	Effluent would be treated for suspended solids, pH, fluoride and hydrocarbons.

Treated effluent quality	Effluent would be treated to a level suitable to be discharged to the Smelter water management system, where it could be reused during the Project for dust suppression and discharged (as authorised under the Hydro EPL) from the North Dam.

If Hydro decides to proceed with construction and operation of an on site leachate treatment plant, Hydro would submit a detailed design for review and approval by the Department and the EPA.

7.3 Water Balance

PCB prepared the Stormwater Management Report that is presented in **Appendix 13**. The report includes a water balance that considered all activities occurring at the Smelter (including the Project) and incorporated the following:

- The water supply sources for the Project Site (the dams of the Smelter water management system, and potable water). This incorporated rainfall and evaporation modelling to predict the quantity of water that would be collected within the Smelter water management system and available for reuse from the dams.
- The predicted water demands for dust suppression. Dust suppression (200 m3 per day) would be the most significant water consumer at the Smelter during demolition and remediation activities, and the only one (along with grass cover establishment) that would use water collected in the Smelter water management system.

The water balance concluded that:

- Throughout most of the demolition and remediation activities there would be sufficient water captured and stored within the Smelter water management system to supply dust suppression requirements.
- Based on the rainfall modelling, if a dry period occurred the modelled minimum quantity of stored water would provide for 20 days of dust suppression. Hydro would then access reticulated water for dust suppression.
- The Smelter water management system is designed to manage a 20% AEP storm event. Activities such as the use of water for dust suppression and management of the licensed discharge would help maintain storage capacity and minimise the potential for overflows from the Smelter water management system.

7.4 Containment Cell Regulation and Funding

Section 9.4 of the EIS described the options for regulation of the Containment Cell following its completion. This included how any future owner of the land containing the Containment Cell would be required to continue implementation of the Long Term Management Plan.

Negotiations between the Department and Hydro concluded that the preferred approach for the regulation of the long term management of the containment cell is a Voluntary Planning Agreement (VPA) between Hydro and the Minister for Planning and Public Spaces.

The VPA would (amongst other things) address the following:

- The land (Lot and Deposited Plan) to be subject to the VPA
- The total and timing of payment of a monetary contribution and the timing of a land contribution from Hydro required for the ongoing implementation of the Long Term Management Plan by a NSW government entity.
- The form and value of financial security to be implemented during construction of the Containment Cell.

Hydro has submitted a Letter of Offer to the Department that addresses these items. This Letter of Offer has been accepted by the Department and has been incorporated into a draft VPA that will be finalised once the Project has been granted development consent.

8. PROJECT CHANGES

This section of the report addresses the changes to the Project (from that described in the EIS) that would be the subject of the Project Approval. As discussed in **Section 1.4** the changes to the Project (from that described in the EIS) are:

- The withdrawal of Stage 2 Demolition from the SSD application.
- The application of gypsum to the Capped Waste Stockpile material prior to its placement in the Containment Cell.
- No longer including the removal of potentially recyclable metals (where possible) for cleaning and made available for off site recycling.
- Provision of the option for the collection and off site treatment of leachate during the Works and following completion of the Containment Cell. The option of an on site leachate treatment plant would remain available.

8.1 Withdrawal of Stage 2 Demolition

The activities withdrawn from the Project subject to the SSD application are the following:

- The demolition of the stacks, water towers and other structures as described in Section 8.7.3 and Section 8.7.4 of the EIS.
- The subsurface structure demolition as described in Section 8.7.5 of the EIS.
- The sorting, stockpiling processing and transporting for recycling (as applicable) of the demolition wastes described in Section 8.7.6 of the EIS.

The following activities related to Stage 2 Demolition would remain as part of the Project:

- The placement of the non-recyclable Stage 2 Demolition waste in the Containment Cell.
- The reuse of crushed concrete and bricks at the Smelter.

The removal of Stage 2 Demolition from the SSD application removes a number of potential environmental issues, particularly noise and dust sources. However in recognition that the Stage 2 Demolition would still occur, and could potentially occur concurrently with the remediation activities that remain part of the Project, Hydro does not propose to amend the potential environmental impacts of the Project.

The withdrawal of Stage 2 Demolition from the Project would not change how the remaining activities of the Project would be undertaken. As such there is no change to the Project Description in the EIS (except for the removal of those sections describing the demolition activities).

The use of demolition material (such as crushed concrete) in the construction of the Containment Cell and placement of non-recyclable demolition waste in the Containment Cell remains part of the SSD application.

Appendix 30 includes a plan showing the areas for Stage 1 Demolition and Stage 2 Demolition.

8.2 Capped Waste Stockpile Material Treatment

8.2.1 Outline

As discussed in **Section 1.5.2**, the EPA has agreed that the treatment of the Capped Waste Stockpile material with gypsum would result in the material being deemed "approved aluminium smelter waste" under the CCO and therefore permitted to be placed in the Containment Cell.

Section 8.5 of the EIS describes the method for the removal of material from the Capped Waste Stockpile and its relocation to and placement within the Containment Cell. To facilitate the material treatment the following changes to the described methodology would occur.

The material transportation methodology described in Section 8.5.5 of the EIS would be amended as follows (changes in bold):

- *Loading of the trucks within the stockpiling and processing area. The loading area would be maintained so that any material spilled during truck loading would be regularly cleaned from the ground.*

- ***Materials that could potentially damage liner materials (such as steel bars) would be separated from the other Capped Waste Stockpile material for separate transportation and placement.***
- ***Trucks would travel over a wheel wash to remove any contaminants prior to proceeding to the haul road.***
- ***Loaded trucks would be driven over a weighbridge to ascertain total weight.***
- ***Gypsum would be added to the loaded waste at the pre-determined weight to weight percentage (10%) using a front end loader with an attached weighing system within a specified tolerance.***
- *Trucks would travel along the haul road to the Containment Cell. Trucks transporting Capped Waste Stockpile materials would have priority on the haul road.*
- ~~***All truck loads are to be covered.***~~
- *Transportation of the material would cease during rain events.*

Appendix 26 shows the location of the proposed new facilities described above.

The results of the trials using the methodology described in **Appendix 4** concluded that the application of gypsum at a rate of 10% of the material's weight is the best method for treating the Capped Waste Stockpile material.

As discussed in **Section 1.5.2**, subsequent consultation resulted in the EPA issuing a letter on 9 July 2018 advising that it accepted the proposed gypsum application methodology.

The materials emplacement methodology in Section 8.8.1 of the EIS would also be amended as follows:

The material streams would be placed in discreet sections of the Containment Cell. Due to the nature of the materials there is no potential for adverse reactions between materials. As such the material streams do not need to be physically separated during material placement and the Containment Cell Management.

The truck would dump the material at the Containment Cell filling face. The waste would be pushed out by bull dozer and compacted in accordance with the Containment Cell filling requirements.

The materials that could potentially damage liner materials (such as steel bars) which would be separated out at the Capped Waste Stockpile would be placed in a location (on top of materials away from liners) and in a manner so that they cannot damage liners.

8.2.2 Gypsum Delivery and Storage

Using an application rate of 10% Hydro estimates that approximately 36,000 tonnes of gypsum would be required to treat the Capped Waste Stockpile material. Given this large quantity, the time that application would take and the availability of gypsum in the market, Hydro estimates that the gypsum would be regularly delivered over a five month period. This would require 900 truck movements over a five month period, which equates to approximately 41 truck movements per week, or approximately eight deliveries per day.

The gypsum would be stored in one of the existing spent pot lining storage sheds (following removal of all stored spent pot lining and certification of completion of this removal by an occupational hygienist) or another enclosed building. Storage of gypsum within such a building would protect it from water runoff and dust generation. The location of this shed is shown on the figure in **Appendix 26**.

8.2.3 Gypsum Application and Mixing

The existing weighbridge at the southwest gatehouse (refer to **Appendix 26**) would be relocated to a position on the Haul Road west of the Capped Waste Stockpile. Once the truck has passed through the weighbridge and the required quantity of gypsum has been calculated, the truck would then progress to the gypsum application station to the west of the weighbridge.

Subject to weather conditions, a small stockpile of gypsum would be placed within a bunded area at the gypsum application station to supply daily treatment requirements. A front end loader with an attached weighing system within a specified tolerance would then apply the required quantity of gypsum into the truck.

The truck would then travel to the Containment Cell and place the material as described above.

Mixing of the Capped Waste Stockpile material with gypsum would occur throughout the application, dumping and movement process. When considering the waste mass, the Containment Cell would incorporate approximately 20,100 individual 20 tonne truck loads of waste each with the addition of gypsum. Through this method of placement the gypsum addition is considered to be mixed on a macro scale.

8.2.4 Material Transportation

Following gypsum application the Capped Waste Stockpile material would be transported to the Containment Cell as described in Section 8.5.5 of the EIS except that the load would no longer be covered.

The removal of the requirement to cover the load would improve the efficiency of the transportation process: this in turn would reduce the additional time that the Capped Waste Stockpile would need to be uncovered and exposed due to the gypsum application process.

To mitigate the potential for dust to become airborne during the transportation process, the following measures would be implemented:

- The Capped Waste Stockpile material is expected to have inherent moisture. If required due to climatic conditions the material would be subjected to mist spraying to suppress the potential for dust generation.
- Load levels would not exceed the height of the truck, reducing the material's potential wind and draft exposure.
- Trucks transporting the material would travel at reduced speeds, reducing the potential for a draft to generate dust.
- The short distance between the Capped Waste Stockpile and the Containment Cell (less than one kilometre) would require a limited travel time, further reducing the potential for dust generation.

8.2.5 Treatment Validation

The validation process proposed to demonstrate that the waste is 'approved aluminium smelter waste' under the CCO involves:

- Laboratory treatability trials (as described in **Appendix 4**) to demonstrate efficacy of the gypsum application with respect to the CCO.
- Mass based records of the addition of gypsum to the pre-determined weight/ weight percentage.
- Quality control documentation supporting the correct construction of the Containment Cell and the placement of the waste within the Containment Cell.

As part of the remediation and validation requirements for the Containment Cell, a validation report would be prepared for review and sign off by the independent EPA Accredited Site Auditor.

8.3 Omission of Removal of Potentially Recyclable Material from Capped Waste Stockpile

Section 8.5.4 of the EIS notes that "*Potentially recyclable (scrap metals) materials would be removed from materials by excavator (where possible) and transported to the Capped Waste Stockpile recyclable materials storage area. Materials that can be recycled would be stockpiled for cleaning (to the standard agreed with the off-site recycling facility). Cleaned materials would then be transported to the main stockpile area.*"

One of the options investigated by the Options Study (refer to **Appendix 1** and **Appendix 2**) included the removal of recyclable materials from the Capped Waste Stockpile material for cleaning to the standard required by recycling contractors.

The study concluded that there were a number of environmental, health and legal issues associated with this option:

- The sorting and cleaning tasks presented significant worker safety and human health risks, and generated significant greenhouse gas emissions compared to the savings associated with the recycling of the material.
- Asbestos is a significant contaminant within the Capped Waste Stockpile. Even with multiple phases of cleaning with high pressure hosing, there is no certainty that all asbestos would be removed. It also presented human health and worker safety risks.
- Without this certainty, and without Hydro accepting liability for any asbestos that may subsequently be encountered (or any associated health impacts to their employees), recyclers have advised that they would not take the recyclable material. As such this material would still need to be placed in a landfill.
- Due to the sorting and cleaning activities, the time required for the Capped Waste Stockpile to be open and material exposed is significantly increased. This increases the leachate management requirements (with greater potential for exposure to large storm events), and also increases the duration that the asbestos-contaminated material is exposed and increased potential for asbestos fibre liberation.

These factors contributed to the option presenting an unacceptably high net environmental impact score.

Based on the detailed analysis of the risks and impacts associated with sorting and cleaning of recyclable material from the Capped Waste Stockpile, Hydro would no longer remove any potentially recyclable metals for cleaning. All material from the Capped Waste Stockpile material would immediately be placed within a truck for gypsum treatment and then placement within the Containment Cell (as described in **Section 8.2**).

Both the concept design included in the EIS and the Detailed Design presented in **Appendix 3** were prepared on the basis that the potentially recyclable material would be placed in the Containment Cell. This approach was taken for the concept design to ensure that, in the event that the material could not be made suitable for recycling, the contaminated material could be disposed of in the Containment Cell. The Detailed Design continued this approach, confirmed by the conclusions of the Options Study.

Hydro acknowledges the *NSW Waste Avoidance and Resource Recovery Strategy 2014 – 21* (EPA, 2014), which includes "*Increase recycling*" and "*Divert more waste from landfill*" as Key Result Areas.

As discussed in **Section 6.13.1**, wherever safe to do so, Hydro has made materials available for recycling. At the end of the Project, this commitment would result in the recycling of a total of 168,667 tonnes of solid waste and 530,000 litres (approximately 441 tonnes) of liquid waste. In this regard it is helping the state of NSW to achieve the recycling and landfill diversion targets set by the *NSW Waste Avoidance and Resource Recovery Strategy 2014 – 21*.

However, with regards to the potentially recyclable material within the Capped Waste Stockpile, the Options Study concluded that these materials cannot be made suitable for recycling without posing environmental, human health, worker safety and commercial risks to the surrounding environment and community, Hydro personnel and the personnel of potential recyclers. As the material cannot be recycled, Hydro is not diverting potentially recyclable material away from recycling opportunities, and is implementing the approach (placement in a Containment Cell) that is the best option with regards to protecting the environment, human health and work safety.

8.4 Off Site Leachate Treatment

As discussed in **Section 7.2**, a number of references are made within Section 8 of the EIS to the operation of a leachate treatment plant for the treatment of leachate.

Section 9.1.1.2 of the EIS notes that any leachate collected in the completed Containment Cell would also be treated by the on site leachate treatment plant. Section 9.1.1.2 of the EIS also notes that depending on leachate volumes, a periodic pump out of the leachate collection sump by a licensed liquid waste contractor for treatment at a licensed facility may be preferred.

Through development of the Containment Cell Detailed Design and further consideration of environmental and economic factors, it was determined that for the management of leachate at all stages of the Project, regular (during the Works) or periodic (as defined in the LTMP presented in **Appendix 12**) options to pump out the leachate collection sump by a licensed liquid waste contractor for treatment at a licensed facility (as well as retaining the option of the on site leachate treatment plant described in the EIS) should be available.

The leachate would only be pumped out, transported and treated by a liquid waste contractor that holds the required Environment Protection Licence and other applicable approvals. There are several facilities within 100 km of the Project Site that could receive and treat the leachate.

8.4.1 The Works

Modelling of leachate generation during the removal of the Capped Waste Stockpile and placement of material within the Containment Cell (presented in the Detailed Design Report in **Appendix 3C**) calculated that an estimated 12,716 kL of leachate would be generated.

Temporary leachate storage dams would be established at the Containment Cell and the Capped Waste Stockpile. The licensed liquid waste contractor would pump the leachate from these dams at a designated location into their truck.

Based on a leachate removal truck with a capacity of 20 kL, this equated to approximately 636 truck movements by a licensed liquid waste contractor. Over the Works program this would equate to approximately eight truck movements per week, or a maximum of two movements per day.

8.4.2 Containment Cell Long Term Management

Modelling of leachate generation within the capped Containment Cell (presented in the Detailed Design Report in **Appendix 3C**) calculated the following:

- 2,995 kL for the first 12 months
- 528 KL over the subsequent four years
- Following this, less than 400 litres of leachate would be generated per year.

The Containment Cell would include a leachate collection sump. The licensed liquid waste contractor would connect its truck to this sump and then pump the leachate into their truck.

This equated to the following truck movements by a licensed liquid waste contractor:

- 150 truck movements (or an average of approximately three per week) for the first 12 months using a leachate removal truck with a capacity of 20 kL.
- 26 truck movements (or an average of approximately one every eight weeks) for the subsequent four years using a leachate removal truck with a capacity of 20 kL.
- Following this, it could be several years (if required) until there is sufficient quantity of leachate to require removal, even using a leachate removal truck with a capacity of 6 kL.

9. ENVIRONMENTAL ASSESSMENT AND MANAGEMENT

This section assesses the potential environmental impacts associated with the Project changes described in **Section 8** that are additional to those identified, assessed and mitigated in the EIS.

Section 9.1 assesses each of the Project Changes described in **Section 8** and identifies the potential additional environmental impacts. **Section 9.2** addresses these potential additional environmental impacts against the environmental aspects of the EIS and identifies the management measures that would be implemented to mitigate the potential impacts.

9.1 Potential Additional Environmental Impacts

9.1.1 Stage 2 Demolition

As noted in **Section 1.4**, withdrawal of Stage 2 Demolition from the SSD application reduces the level of activity, and the associated potential environmental impacts, of the Project for which Hydro is seeking approval.

However as the Stage 2 Demolition would still occur, and potentially occur concurrently with some of the remediation activities remaining within the Project, the cumulative environmental impact assessment and associated mitigation measures remain unchanged. Hydro acknowledges it is important to address the potential cumulative environmental impacts of the activities remaining within the Project and those of Stage 2 Demolition.

Therefore there would be no change to the potential environmental impacts described in the EIS associated with the removal of Stage 2 Demolition from the SSD application.

9.1.2 Capped Waste Stockpile Material Treatment

9.1.2.1 The Works

As described in **Section 8.2** the addition of gypsum to the Capped Waste Stockpile includes only minor additions to the tasks described in Section 8.5 and Section 8.8.1 of the EIS.

The potential environmental impacts from delivery and storage of gypsum are:

- Potential for dust generation during the transportation, delivery and storage of gypsum.
- Traffic impacts due to the additional truck movements required for gypsum delivery.
- Potential for stormwater to wash stored gypsum into the Smelter water management system.
- Potential health impacts to employees handling the gypsum.
- The potential environmental impacts from the addition of gypsum to the Capped Waste Material are:
- Potential for dust generation during the transportation of the treated material to the Containment Cell.
- Potential for stormwater to wash gypsum from the application station into the Smelter water management system.
- Potential health impacts to employees handling the gypsum.

The dumping, pushing and compaction of the treated material would have been undertaken to the untreated Capped Waste Stockpile material and was considered in the EIS. The potential environmental impacts associated with this activity (primarily dust generation and water management) are assessed in Section 11 and Section 13 of the EIS.

9.1.2.2 Long Term Management

The addition of gypsum to the Capped Waste Stockpile material would not result in any changes to the long term management and monitoring activities described in Section 9 of the EIS or the LTMP (as presented in **Appendix 12**). It would also not significantly mitigate the potential environmental risks identified in Section 9 of the EIS associated with an event that required maintenance or another response.

There would also be no change to the potential environmental impacts associated with the implementation of the management activities from that assessed in the EIS.

9.1.3 Omission of Removal of Potentially Recyclable Material from Capped Waste Stockpile

Section 8.5.4 of the EIS notes that "*Potentially recyclable (scrap metals) materials would be removed from materials by excavator (where possible) and transported to the Capped Waste Stockpile recyclable materials storage area. Materials that can be recycled would be stockpiled for cleaning (to the standard agreed with the off-site recycling facility). Cleaned materials would then be transported to the main stockpile area.*" Removal of potentially recyclable metals from the Capped Waste Stockpile material did not form a key element of the Works: it would have been opportunistic and only undertaken if possible.

As discussed in **Section 8.3** investigations of the potential for the removal and cleaning of potentially recyclable materials undertaken for the Options Study identified a number of environmental, health and legal risks. As such Hydro would not remove and clean any potentially recyclable metals from the Capped Waste Stockpile materials.

As a result, there are no changes to the potential environmental impacts, and the associated environmental management measures, of the Project. Rather, by not undertaking this activity, Hydro has removed the potential for environmental and human health impacts.

9.1.4 Potential Off Site Leachate Treatment

The EIS considered the potential environmental impacts associated with the treatment of leachate at an on site leachate treatment plant. While the potential impacts from the operation of the on site leachate treatment plant were considered to be minor, potential impacts would either be avoided or significantly reduced with the pumping out of leachate by a licensed liquid waste contractor for treatment at an off site licensed facility.

The potential additional environmental impacts associated with the pumping out of leachate by a licensed liquid waste contractor for treatment at an off site licensed facility are:

The additional truck movements required to transport the leachate. This would be in two key phases:

- During the Works: the licensed liquid waste contractor would be required to pump out leachate collected from the opened Capped Waste Stockpile and from the material placed in the Containment Cell.
- Containment Cell Management: the licensed liquid waste contractor would be required to pump out leachate from the Containment Cell leachate sump.

9.2 Potential Additional Impacts and Management Measures

Table 9-1 describes:

The environmental aspects addressed in the EIS.
The potential additional impacts associated with the changes to the Project described in **Section 8**.
The management measures proposed to address these potential impacts.

To inform the applicable sections of **Table 9-1**, reviews were undertaken of the following specialist studies:

The author of the EIS Air Quality Impact Assessment (AQIA) reviewed the potential air quality impacts associated with the Project changes described in **Section 8** against the findings of the AQIA. This review is presented in **Appendix 27.**
Traffic consultants SECA Solution reviewed the potential traffic impacts associated with the Project changes described in **Section 8** against the findings of the EIS Traffic Impact Assessment (TIA). This included undertaking a new traffic survey at the Hart Road interchange to account for changes in traffic numbers since preparation of the EIS TIA. This review is presented in **Appendix 28.**
The author of the EIS Human Health Risk Assessment (the HHRA) reviewed the potential human health risks associated with the Project changes described in **Section 8** against the findings of the HHRA. This review is presented in **Appendix 29.**

Table 9-1: Project Changes: Potential Additional Impacts and Management Measures

Environmental Aspect	Potential Additional Impacts	Management Measures
The Works		
Air Quality	Due to its fine nature, transportation of gypsum has the potential to generate dust along the transport route between the supplier and the Project Site. The AQIA review (refer to **Appendix 27**) concluded that this would result in a negligible change in the air quality impacts described in the EIS AQIA.	All vehicles transporting gypsum on public roads would have covered loads.
	The unloading and storage of gypsum has the potential to generate dust. The AQIA review (refer to **Appendix 27**) concluded that this would result in no change in the air quality impacts described in the AQIA.	The gypsum would be unloaded and stored within an enclosed shed. The shed was originally constructed for the storage of spent pot lining and therefore designed to minimise dust leaving the shed. A small daily quantity would be stockpiled at the gypsum application station. Where required due to weather conditions (such as wind) the amount would be reduced and more regularly transported from the stockpile within the shed.
	The placement of the gypsum on the Capped Waste Stockpile material, and the transportation and placement of the treated material within the Containment Cell, could generate dust. The AQIA review (refer to **Appendix 27**) concluded that this would result in a negligible change in the air quality impacts described in the AQIA.	The Capped Waste Stockpile material is expected to have some inherent moisture. If required due to climatic conditions the material (including the placed gypsum) would be subjected to mist spraying to suppress dust generation. Load levels would not exceed the height of the truck, reducing the material's potential wind and draft exposure. Mist spraying facilities would be available at the Containment Cell if required due to climatic conditions to suppress dust generation.

Environmental Aspect	Potential Additional Impacts	Management Measures
Soil and Water	Stored and temporarily stockpiled gypsum has the potential to enter stormwater runoff.	The bulk gypsum would be unloaded and stored within an enclosed shed and protected from rainfall, and therefore avoiding the potential for erosion. The shed was originally constructed for the storage of spent pot lining and therefore designed to protect the stored material from water. A small daily quantity would be stockpiled at the gypsum application station within a bunded area. The material would be returned to the storage shed in the event of rain. The gypsum application station would be cleaned on a weekly basis. Cleaned material would be placed within a loaded truck for disposal within the Containment Cell. In the event that gypsum does get washed away by stormwater, the water would be collected within the Smelter water management system prior to reuse for dust control or discharged in accordance with the EPL.
Traffic and Access	As discussed in **Section 8.2.2** the delivery of the gypsum would require 900 truck movements over a five month period. Hydro has assumed that loading at the gypsum source location could only occur between 7:00am and 6:00pm Monday to Friday and 8:00am to 1:00pm on Saturday (no loading outside these hours or on public holidays). This would equate to approximately eight deliveries per day. The TIA review (refer to **Appendix 28**) included new traffic modelling to include these additional movements (along with those for off site leachate treatment described below). With this number of truck movements the Level of Service of affected intersections remains at A and traffic on Hart Road would remain below its capacity.	The traffic management measures described in the EIS would apply to these truck movements. No additional traffic management would be required.

Environmental Aspect	Potential Additional Impacts	Management Measures
	The option of off site treatment of leachate collected during the Works would generate approximately eight to nine truck movements per week. This would equate to a maximum of two truck movements per day. The TIA review (refer to **Appendix 28**) included new traffic modelling to include these additional movements (along with those for gypsum delivery described above). With this number of truck movements the Level of Service of affected intersections remains at A and traffic on Hart Road would remain below its capacity.	The traffic management measures described in the EIS would apply to these truck movements. No additional traffic management would be required.
	The option of off site treatment of leachate collected following capping of the Containment Cell would generate approximately one truck movement per week for the first 12 months. After that time it would reduce to one truck movement every several years (if required).	This number of truck movements would not have an adverse impact on local traffic. No additional management measures would be required.
Aboriginal Heritage	There would be no change in the potential impacts to Aboriginal heritage.	NA
Non-Indigenous Heritage	There would be no change in the potential impacts to non-indigenous heritage.	NA
Biodiversity	There would be no change in the potential impacts to biodiversity.	NA
Visual	The addition of gypsum to the Capped Waste Stockpile material would result in an additional 10% of material being placed in the Containment Cell, which could increase its size. The Containment Cell Detailed Design includes a contingency for 10% of additional materials compared to the estimated quantity of wastes. In the event that additional wastes also need to be placed in the Containment Cell minor adjustments could be made to the batter slopes of the cell design without increasing the height or footprint of the Containment Cell.	No additional management measures would be required.

Environmental Aspect	Potential Additional Impacts	Management Measures
Energy Efficiency/ Greenhouse Gas	The *Capped Waste Stockpile Management Options Evaluation Study* estimated that the treatment of the Capped Waste Stockpile material would result in an additional 1931 t CO_2e in greenhouse gas emissions (or 22% higher) compared to placing the material in the Containment Cell untreated (refer to **Appendix 2F**). This is primarily associated with the transportation, and the use, of the gypsum for treating the Capped Waste Stockpile material.	The energy efficiency measures described in the EIS would apply.
Waste	Metals in the Capped Waste Stockpile would not be recycled and would be placed in the Containment Cell. The Containment Cell design was developed on the basis that all material within the Capped Waste Stockpile (including potentially recyclable material) would go into the Containment Cell. As such there would be no potential additional waste management impacts associated with the metals going into the Containment Cell.	No additional waste management measures would be required.
Human Health	Gypsum is considered to have low toxicity and is non-genotoxic; however, it does have the potential to cause irritation through inhalation, ingestion, and eye and skin contact. Works personnel involved in handling of the gypsum would be required to wear the applicable personal protective equipment to prevent exposure via inhalation, ingestion and skin contact. Therefore the HHRA review (refer to **Appendix 29**) concluded that there is no complete source-pathway-receptor linkage for this activity and the EIS HHRA conclusions do not change for Works personnel.	The Air Quality management measures would reduce the potential for gypsum dust generation. Personnel involved in the handling of the gypsum would be required to wear the applicable personal protective equipment.

Environmental Aspect	Potential Additional Impacts	Management Measures
	The additional task of adding gypsum to the Capped Waste Stockpile material would result in additional truck movements to deliver gypsum to the site (and across the site) over an estimated five-month period. The EIS AQIA review considered the additional contribution to air emissions and dust generation due to these additional truck movements, and concluded that there is "*no change*" or "*negligible change*" to the air quality impacts.	No additional management measures would be required.
	Therefore the HHRA review (refer to **Appendix 29**) concluded that the HHRA conclusions regarding low and acceptable health risks to offsite receptors due to inhalation of dust/air emissions still apply.	
	Potentially recyclable materials within the Capped Waste Stockpile material would no longer be removed. This is in response to additional investigations identifying potential environmental, human health and legal risks.	No additional management measures would be required.
	The HHRA review (refer to **Appendix 29**) concluded that the reduced handling of the Capped Waste Stockpile material would reduce the potential for dust generation from the Capped Waste Stockpile, and direct Worker exposure to the material. Therefore, the potential health risks associated with activities in the Capped Waste Stockpile would reduce.	

9.3 Environmental Management

9.3.1 Waste Management and Remediation

Hydro has developed and implemented the *Decommissioning and Demolition Environmental Management Plan* (the Hydro EMP) that outlines the environmental management requirements for the approved activities at the Smelter and Hydro Land. The Hydro EMP has been prepared in accordance with the *Guideline for the Preparation of Environmental Management Plans* (DIPNR, 2004) and applies to activities undertaken by Hydro and contractors.

The Hydro EMP addresses:

- The environmental management objectives for the activities.
- The basis for environmental management (including approval, licence and legislative requirements; and identification of environmental aspects, impacts and risks).
- Environmental management structure (key responsibilities, including subcontractors).
- Environmental management activities (including Project Site induction and training, communications, reporting and incident management).
- Implementation (environmental management measures, including incorporation of environmental management into standard procedures).
- Monitoring and review (how success of the EMP implementation is assessed).

The Hydro EMP would be amended as required to address the potential environmental impacts and associated environmental management measures identified for the Works. This would form the Remediation Works EMP as previously discussed in this RtS (and as described as the Works EMP in the EIS). It would be submitted to the Department and the EPA for review prior to the commencement of the Works.

Prior to commencing activities at the Project Site, the Remediation Contractor would be required to prepare an EMP applicable to their specific activities. These EMPs would be required to comply with the over-arching Remediation Works EMP, the Development Consent and other relevant approvals and licences.

9.3.2 Containment Cell

The monitoring, management and maintenance requirements for the ongoing management of the Containment Cell are presented in the LTMP presented in **Appendix 12**. The LTMP is based on the commitments in Section 9 of the EIS.

10. CONCLUSION

Along with demolition of the Smelter, the Project is a key activity to help Hydro achieve the strategic vision for the Hydro Land: the establishment of significant employment, residential, rural and biodiversity conservation land uses. The Project would:

Facilitate the Hunter Region achieving the economic, employment and environmental objectives identified in the NSW Government *NSW State Plan 2021* and the *Hunter Regional Plan 2036*;
Generate employment opportunities throughout the Works activities.
Render the Project Site suitable for future long term employment uses.
Achieve Hydro's commitment to meeting its corporate environmental and social responsibilities.
Allow for the significant social, environmental and economic benefits of the Project to be sustainably achieved.

The Project would produce some environmental impacts, however planning for the Project has considered minimising potential environmental and social impacts throughout Project planning, from the options assessment process, the location and design of the Containment Cell through to the identification of appropriate and targeted environmental measures for the Works and Containment Cell Management phases. As a result, the potential impacts of the Project have been minimised through appropriate Project design and environmental safeguards which are identified in the EIS and this RtS.

The submissions received from local community members, other interested individuals and organisations, and government agencies raised issues for Hydro to consider in its forward planning for the Project and other activities at the Smelter. Hydro has addressed these issues through the following:

- The informed responses to these issues provided in **Section 4**, **Section 5**, **Section 6** and **Section 7**.
- The Project changes described in **Section 8**.
- The assessment of the potential additional environmental impacts associated with these Project changes, and the identification of any additional environmental management measures, in **Section 9**.

It is considered that the Project has identified and mitigated potential environmental impacts to an acceptable level to allow for the significant benefits of the Project to be sustainably achieved.

The Project is a key component in Hydro managing its environmental and social obligations, and facilitating the proposed future employment, residential, and biodiversity conservation land uses that would provide environmental, social and economic benefits to the local area, the Hunter Region, and the state of NSW.

11. REFERENCES

ANZECC (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

Department of Environment and Conservation (DEC) (2005) *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*.

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State Pollution Control Commission (1986) *Chemical Control Order in relation to aluminium smelter wastes containing fluoride and/ or cyanide*.

12. LIMITATIONS

Ramboll Australia prepared this report in accordance with the scope of work as outlined in our proposal to Hydro Aluminium Kurri Kurri Pty Ltd dated 28 October 2014 and in accordance with our understanding and interpretation of current regulatory standards.

A representative program of sampling and laboratory analyses was undertaken as part of this investigation, based on past and present known uses of the site. While every care has been taken, concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. We cannot therefore preclude the presence of materials that may be hazardous.

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

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

Ramboll Australia did not independently verify all of the written or oral information provided to Ramboll Australia during the course of this investigation. While Ramboll Australia 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 Australia was itself complete and accurate.

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

12.1 User Reliance

This report has been prepared exclusively for Hydro Aluminium Kurri Kurri Pty Ltd and may not be relied upon by any other person or entity without Ramboll Australia's express written permission.

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CAPPED WASTE STOCKPILE MANAGEMENT OPTIONS EVALUATION STUDY, VOLUME 1

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