

Kurri Kurri Integrated Resource Recovery Centre

Response to Submissions Report

Prepared for Central Waste Plant Pty Ltd

March 2026



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March 2026

Version	Date	Prepared by	Reviewed by	Comments
V1	20 March 2026	Alexandra Bishop	Katie Ward	Final

Approved by



Katie Ward

Senior Associate Environmental Scientist

20 March 2026

Level 3 175 Scott Street

Newcastle NSW 2300

ABN: 28 141 736 558

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Executive summary

ES1 Project overview

The project relates to the expansion of an approved Resource Recovery Facility (RRF) at 8 Styles Street, Kurri Kurri (Cessnock Local Government Area), extending to 1, 8 and 10 Styles Street and 145, 147 Mitchell Avenue.

The existing facility is approved to process 90,000 tonnes per annum (tpa) of general solid waste (non-putrescible).

The proposed project seeks to:

- increase throughput to 450,000 tpa
- allow on-site storage of up to 40,000 tonnes
- permit 24-hour, seven-day operations (with crushing limited to daytime periods)
- construct supporting infrastructure including offices, weighbridges, covered storage areas and a residual waste recovery plant
- reconfigure site layout, vehicle access and internal traffic management.

ES2 Submissions summary

A total of 17 submissions were received:

- 7 public submissions (6 objections, 1 support)
- 1 council submission
- 9 Government agency submissions.

Key issues raised related to:

- proximity to residential areas
- noise, dust and amenity impacts
- traffic and road network capacity
- physical layout and internal traffic movements
- water management
- operational hours
- community engagement
- draft conditions of consent.

ES3 Response to submissions

All issues raised have been reviewed and addressed. Key outcomes include:

- supplementary technical assessments for noise, internal traffic and water management

- refinement of stormwater infrastructure, reducing predicted overflow frequency
- confirmation of compliance with applicable noise criteria (with one short transitional shoulder exceedance)
- confirmation that no putrescible or hazardous waste (including asbestos) will be accepted
- clarification of operational staging and throughput limits
- strengthened mitigation measures for dust, noise and complaints management
- acceptance or minor refinement of draft conditions of consent.

ES4 Environmental and community outcomes

The project will:

- divert up to 382,500 tpa of waste from landfill
- support NSW waste recovery and circular economy objectives
- reduce regional reliance on landfill
- provide local employment and procurement benefits
- maintain manageable environmental impacts through practical mitigation measures.

Updated modelling confirms that impacts relating to noise, traffic, water quality and amenity are acceptable and can be appropriately managed.

ES5 Strategic justification

The project:

- is consistent with the industrial zoning of the Kurri Kurri Industrial Precinct
- aligns with the NSW Environment Protection Authority *NSW Waste and Circular Infrastructure Plan (2025)*
- supports objectives of the NSW Department of Planning, Industry and Environment *NSW Waste and Sustainable Materials Strategy 2041*
- maximises use of existing approved infrastructure
- responds to demonstrated regional waste infrastructure demand.

ES6 Conclusion

Having regard to the submissions received, supplementary technical assessments and proposed mitigation measures, the project's environmental and social impacts are considered manageable.

The expansion of the facility is justified and in the public interest.

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1 Introduction

1.1 Background

Central Waste Station Pty Ltd (CWS) operates a resource recovery facility (RRF) owned by Central Waste Plant Pty Ltd (CWP) at 8 Styles Street in Kurri Kurri within the Cessnock City Council Local Government Area (LGA). The RRF has development approval to process up to 90,000 tonnes per annum (tpa) of General Solid Waste (non-putrescible). The RRF is capable of a significantly higher throughput than is permitted under the existing development approval, which constrains the company's ability to achieve greater volumes of resource recovery for the region and satisfy the demand for its services.

CWP proposes to expand the RRF operations to allow a material throughput of up to 450,000 tpa; on site storage of up to 40,000 tonnes of material; and operating hours of 24 hours per day, seven days per week. The waste type (General Solid Waste – non-putrescible) accepted at the facility and RRF operational processes will remain generally the same. Changes to the site layout are proposed to optimise the RRF operations and to allow further sorting and processing on site to increase the proportion of waste diverted from landfill. The revised site will occupy 1, 8 and 10 Styles Street and 145 and 147 Mitchell Avenue. The larger site with higher waste throughput is referred to as the Integrated Resource Recovery Centre (IRRC, 'the project').

The IRRC will make a significant contribution to achieving the waste policy targets outlined in the *National Waste Policy Action Plan* (Australian Government 2024) and the *NSW Waste and Sustainable Materials Strategy 2041* (DPIE 2021). A key target of these policies is to achieve an average resource recovery rate of 80% across all waste streams by 2030. By processing up to 450,000 tpa of waste and targeting a recovery rate of 85%, the IRRC would divert up to 382,500 tpa of material from landfill to economically valuable uses, thereby reducing pressure on local government landfill capacity. The project will also continue to provide opportunities in the local area through employment and procurement of goods and services.

An environmental impact statement (EIS) was prepared by EMM Consulting Pty Limited (EMM) on behalf of CWS to accompany the State significant development (SSD) application for the project. The EIS was prepared in accordance with the Secretary's environmental assessment requirements (SEARs) issued for the project on 28 June 2024, and the *State significant development guidelines – preparing an environmental impact statement* (DPIE 2022). The EIS was publicly exhibited for a period of four weeks from Thursday 13 November 2025 to Wednesday 10 December 2025.

During public exhibition of the EIS, 17 submissions were received from government agencies, Cessnock City Council (council) and members of the public. These comprised ten comments, six objections, and one submission in support.

1.2 Project overview

A detailed description of the project is provided in Chapter 3 of the EIS (EMM 2025).

A summary of the project is provided in Table 1.1. An overview of the changes to the existing site are shown in Figure 1.1, while a render depicting the proposed IRRC at completion is provided in Figure 1.2.

Table 1.1 **IRRC project overview**

Aspect	Description
The site	• 1 Styles Street (Lot 1 DP1128108) • 8 Styles Street – the existing RRF (Lot 1 of DP1309128) • 10 Styles Street (Lot 6 DP 1251190) • 147 Mitchell Avenue (Lot 3 DP 586741) • 145 Mitchell Avenue (Lot 4 DP 586741)
Waste throughput	Increase from 90,000 to 450,000 tpa
Waste storage (at any one time)	Increase from 30,000 to 40,000 tonnes
Permitted operating hours	Extension from the current 24 hours per day, 6 days per week (Monday to Saturday), to 24 hours per day, seven days per week ('24/7')
Changes to the site	• Construction of new infrastructure including offices, weighbridges, covered storage bays and a shed for residual waste recovery plant. • Additional car and truck parking. • Demolition of redundant buildings on 8 Styles Street and 147 Mitchell Avenue. • Repurposing the existing workshop for use as a metals processing area. • Upgrading the site access to 147 Mitchell Avenue, and closing off the current site access to 8 Styles Street. • Adjustment to vehicle and pedestrian access and manoeuvring within the site. • Extension of awnings, installation of walls and fences and construction of a footpath and landscaping outside of the site boundary.
Waste sorting and processing	Existing: • Tipping and manual sorting: manual spreading, sorting and extracting of waste and recovered material. • Automated processing: separation using a range of automated equipment (shredders, magnets, trommels, separators, etc.) connected by conveyors, supplemented with hand-picking. • Mobile yard processing: crushing and screening (generally concrete, brick, general solid waste soils) using mobile equipment. New proposed: • Metal processing: Further processing of recovered nonferrous metals by removing incompatible materials such as sockets, insulation and other, lower-value metals. This will be accomplished utilising manual processes, such as hand-held power tools, as well as mechanised processes such as granulators, compactors and balers. • Residual waste recovery: automated processing including shredders, optical sorters, screening, magnets and pelleting plant. The output will be baled.
Staging	• Stage 1 (upon receipt of SSD approval) - increase throughput to 170,000 tpa, utilising existing infrastructure. • Stage 2 (upon receipt of SSD approval and construction certificate) – construction works at 147 Mitchell Avenue and 10 Styles Street, including new weighbridges, offices, car parking, deceleration lane and site access. • Stage 3 (upon completion of Stage 2) – upgrades to the existing RRF on 8 Styles Street (extension to processing shed, new awnings and storage bays, etc.), removal of redundant infrastructure and connection to the new access. <i>Increase permitted throughput to 450,000 tpa upon completion of Stage 3.</i> • Stage 4 (any time following SSD approval) – construct new residual waste recovery plant. • Stage 5 (any time following SSD approval) – upgrade existing workshop on 10 Styles Street to a metal processing plant.

1.3 Purpose of this report

On 11 December 2025, the Department of Planning, Housing and Infrastructure (DPHI) requested that CWP prepare a written response to the issues raised in the submissions received during the public exhibition period. Accordingly, this submissions report has been prepared to respond to those issues. This report has been prepared in accordance with the *State significant development guidelines – preparing a submissions report* (Submissions Report Guidelines) (DPHI 2024). The purpose of this report is to consider and respond to submissions made by agencies, council and the community during the public exhibition of the EIS.

Following lodgement of this submissions report, DPHI will prepare its assessment report, considering the submissions received, and the project's response to these submissions.

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KEY

- Site boundary
- Proposed site feature
- Removal/relocation
- Existing to be retained

Overview of project changes
at the existing site

CWS Kurri Kurri Integrated
Resource Recovery Centre
Response to Submissions
Figure 1.1



Figure 1.2 **Render of the proposed IRRC**

2 Analysis of submissions

2.1 Overview of submissions received

During public exhibition of the EIS, 17 submissions were received. Of these, seven were from members of the public, one was from council and nine were from Government agencies. Submissions are available to view on the NSW Government's Major projects website at: <https://www.planningportal.nsw.gov.au/major-projects/projects/kurri-kurri-integrated-resource-recovery-centre>. A submissions register is provided in Appendix A, which lists all submissions received and their geographical location.

Table 2.1 Summary of submissions received

Submission type	Support	Object	Comment
Public	1	6	-
Council	-	-	1
Government agencies	-	-	9
Total	1	6	10

2.1.1 Council and State Government agency submissions

The following agencies provided advice or comment on the EIS (listed in alphabetical order):

- Ausgrid
- Cessnock City Council (council)
- Department of Climate Change, Energy, the Environment and Water (DCCEEW) – Water Group
- DCCEEW - Heritage NSW
- Department of Planning, Housing and Infrastructure (DPHI)
- Fire and Rescue New South Wales (FRNSW)
- Hunter Water Corporation (Hunter Water)
- NSW Environment Protection Authority (EPA)
- NSW Rural Fire Service (RFS)
- Transport for New South Wales (TfNSW).

2.1.2 Public submissions

Seven submissions were received from individual members of the public. Of these, six objected to the project and were submitted by residents of the local area, specifically the suburb of Weston (postcode 2326), which adjoins Kurri Kurri where the project site is located. One submission in support of the project was received from an individual residing in Chatswood (Sydney).

2.2 Categorisation of issues

Matters raised in the submissions have been classified as one of the following five broad categories in accordance with the Submissions Report Guidelines:

1. The project (such as the site, the physical layout and design, key uses and activities, timing).
2. Procedural matters (such as the level of quality of engagement, compliance with the SEARs, identification of relevant statutory requirements).
3. The environmental, social or economic impacts of the project (such as amenity, air, biodiversity, heritage).
4. The justification and evaluation of the project as a whole (such as consistency of the project with Government plans, policies or guidelines).
5. Issues that are beyond the scope of the project assessment (such as broader policy issues) or not relevant to the project.

Each of these categories have been divided into sub-categories, such as community engagement, air quality, physical layout and design, etc., as outlined below in Section 2.3.

2.3 Summary of matters raised

A list of the matters raised within the submissions and the section of this report in which they have been addressed is provided in Table 2.2.

Table 2.2 List of matters raised in submissions

Category	Sub-category	No. of times raised	Section of report where submission is addressed
The project	Project site/location	3	Section 4.1.1
	Physical layout and design	3	Section 4.1.2
	Operational hours	2	Section 4.1.3
	Hazardous material management	1	Section 4.1.4
	Internal traffic management	1	Section 4.1.5
	Waste processing and storage	1	Section 4.1.6
Procedural matters	EIS content	5	Section 4.2.1
	Utilities connections	1	Section 4.2.2
	Complaints management	2	Section 4.2.3
	Community engagement	4	Section 4.2.4
	Licensing and certification	3	Section 4.2.5
	Draft conditions of consent	6	Section 4.2.6
The economic, environmental and social impacts of the project	Noise	6	Section 4.3.1
	Dust	3	Section 4.3.2
	Odour	1	Section 4.3.3

Category	Sub-category	No. of times raised	Section of report where submission is addressed
	Water quality	3	Section 4.3.4
	Groundwater	1	Section 4.3.5
	Biodiversity	2	Section 4.3.6
	Socio-economic	2	Section 4.3.7
	Increased traffic volumes	3	Section 4.3.8
	Traffic – road infrastructure	3	Section 4.3.9
The justification and evaluation of the project	Support for the project	1	Section 4.4.1
Issues that are beyond the scope of the project or not relevant to the project.	Other projects, not related to this project	2	Section 4.5

3 Actions taken since exhibition

3.1 Additional engagement with community and stakeholders

3.1.1 Community

Nearby community members who had requested ongoing updates were contacted and informed that the EIS was on public exhibition and available for comment.

3.1.2 Agencies

i Hunter Water

Consultation with Hunter Water has continued throughout November and December 2025 and January and February 2026. Key matters raised and addressed during this correspondence are summarised below:

- CWS advised that existing piers near the Hunter Water sewer main were constructed in accordance with a previously approved Development Application.
- Updated structural plans for the proposed development were provided to demonstrate that all new piers are founded below the sewer invert level and outside the sewer zone of influence, consistent with Hunter Water's requirements.
- Hunter Water requested further clarification regarding pier locations in proximity to sewer pipeline bends, including confirmation of the separation distances between the proposed piers and the sewer infrastructure.
- In response, updated design drawings were submitted to clearly illustrate the separation distances.
- On 13 February 2026, Hunter Water confirmed acceptance of the proposed footing design.

The consultation with Hunter Water and the updated design drawings for pier locations is provided in Appendix B.

ii NSW Rural Fire Service

RFS engaged directly with the project bushfire consultant (Cool Burn Pty Ltd) to further discuss emergency vehicle access arrangements, with particular focus on the laneway providing access to 6 Styles Street to the east of the site. Following this engagement, a formal submission was lodged by RFS, which is addressed in Section 4.2.6 of this report.

3.2 Further assessment of the impacts of the project

Following exhibition of the EIS, additional technical investigations and design refinements have been undertaken in response to issues raised in submissions and through ongoing consultation with stakeholders and technical advisors. This work provides greater clarity and specificity around operational scenarios and mitigation measures and further strengthens the environmental management framework for the project. The additional assessment does not change the fundamental nature or scale of the project.

Key areas of further assessment include:

- **Traffic and access** - Further review and interrogation of internal traffic movements has been undertaken to confirm safe and efficient site operation. Mitigation measures have been refined and expanded to provide greater certainty regarding traffic management outcomes.

- **Noise** - The noise model has been updated to reflect more detailed operational scenarios, including the potential for concurrent construction and operational activities, campaign-based crushing and screening, and operation of metals processing equipment. The revised modelling confirms the effectiveness of proposed mitigation and management measures.
- **Surface water** - Additional water quality sampling has been undertaken to better characterise the water treatment basin. The site water balance has been remodelled, and MUSIC modelling has been refined to reassess water quality and quantity performance. This work provides additional confidence in the robustness of the proposed water management strategy.
- **Groundwater** - Additional groundwater level data has been reviewed, and further consideration has been given to engineering design parameters, including excavation depths and potential groundwater interception. This refined assessment strengthens the understanding of groundwater conditions and confirms the suitability of the proposed management measures.

Collectively, this further work responds directly to matters raised during exhibition and demonstrates a continued commitment to impact avoidance, minimisation, and best-practice environmental management.

3.3 Project updates

Building on the further technical assessments undertaken since exhibition of the EIS, and in response to submissions received, minor project updates and design refinements have been implemented:

- **Construction staging** (traffic and access) - The staging has been adjusted slightly so that the existing 8 Styles Street entry/exit will be retained during Stage 3 (up to phase 4 out of 5) as a dedicated construction access, reducing interactions with operational traffic. In the original staging plan, the Styles Street entry/exit would have been closed at the start of Stage 3 (phase 1).
- **Water management** - A portion of clean roof water (approximately 35% of the roof area) will now be diverted to an additional rainwater tank with overflow into Council stormwater drainage, reducing the load on the water management basin and lowering the frequency of potential overflows into Swamp Creek.
- **Water management basin clean-out** – Review of water sampling results identified elevated nutrient levels within the water management basin. These were determined to be attributable to natural conditions and stagnant water rather than operations at the RRF. In response, CWS arranged for the basin to be completely emptied and accumulated sludge removed by an appropriately licensed contractor. This action will improve water quality within the basin and similar maintenance will be undertaken periodically going forward (refer to Section 4.3.4).
- **Pier design** – as identified in Section 3.1.2i, consultation with Hunter Water led to minor updates to the pier design, which are provided in Appendix B.

Further information on the further assessment of impacts and associated design refinements is provided in Section 4.

4 Response to submissions

This section documents the matters raised in submissions and provides responses to those matters. All submissions received have been considered in full. A submissions register is provided in Appendix A, which summarises the issues raised in each submission.

Each matter raised by the public, government agencies and council is summarised in the grey boxes in the sub-sections below, followed by a response to the comment. Responses have been prepared with input from the applicant and relevant technical specialists. The summaries focus on the substantive issues raised and, for clarity and conciseness, may not reproduce all contextual detail. Full copies of all submissions are publicly available on the Major Projects webpage of the DPHI website.

4.1 The project

This section addresses submissions on ‘the project’.

4.1.1 Project site/location

Five public submissions raised that the project site is close to residential areas. It was noted that a more suitable site should be identified to avoid impact to local residents. One submitter commented that concerns have been raised with council over the land zoning of the area being E5 - Heavy Industrial.

As identified in the public submissions, the development footprint of the project is predominantly located within land zoned E5 – Heavy Industrial. One of the objectives of the E5 - Heavy Industrial zone is to ensure the efficient and viable use of land for industrial purposes. Land use zoning is determined by local government, and heavy industrial zoned-land is the most appropriate location for the project.

The project site is within the Kurri Kurri Industrial Precinct, which is described in the *Kurri Kurri District Strategy* (Cessnock City Council 2016) as:

- an important area for industry in the LGA due to its relative size and combination of manufacturing and other related industries which collectively occupy the site
- an area anticipated to play a pivotal role in providing future local employment opportunities.

The precinct benefits from strong connectivity to surrounding centres via several of the Hunter Region’s major road networks. One of the strategic directions of the District Strategy is to support the growth of the Kurri Kurri Industrial Precinct, which the proposed project would directly contribute to achieving.

The nearest residentially zoned land (R2 – Low Density Residential) is located approximately 350 metres (m) to the west of the project site, separated by Government Road. The environmental impact assessment, including quantitative modelling, assessed the potential impacts of the project on nearby residences. This is discussed further in Chapter 6 of the EIS and Section 4.2.6i below.

4.1.2 Physical layout and design

Two public submissions and council commented on the physical layout and design of the project. The concerns raised by the public submissions were largely regarding the existing site and included:

- reference to a 'large wall' (*assumed to be in reference to the boundary wall around 8 Styles Street*)
- reference to the presence of 'an igloo sitting on top of shipping containers'
- storage of skip bins on site and placement of skips in the Styles Street cul-de-sac
- no adequate parking, resulting in parking along the road verges.

In addition, one submission queried how the weight of truck-delivered loads will be determined.

Council noted that internal parking should be considered in accordance with council's Development Control Plan (DCP) 2010, and external roadside parking should not be relied on to comply with these requirements.

Council also noted that the deceleration lane and road works within the public road reserve are supported in principle. However, swept paths for a 19 m semi-trailer should be provided and assessed as adequate prior to any consent being issued.

i Visual character - site infrastructure

Existing infrastructure on the project site is described in Section 2.4.2 of the EIS. The recently acquired lots at 145 and 147 Mitchell Avenue contain infrastructure installed by previous owners, including sheds and a covered area constructed from shipping containers with a temporary awning.

As outlined in Section 3.2 of the EIS, all existing infrastructure on 145 and 147 Mitchell Avenue will be removed as part of the proposed construction works. While the SSD application is under assessment, the lots are being used for interim parking and storage. Following completion of the IRRC, skip bins will generally not be stored on site and will instead be located at an off-site facility.

The 'large wall' referred to in one submission is understood to be the boundary wall surrounding the existing RRF at 8 Styles Street. This wall provides mitigation of noise and dust impacts and screens industrial activities from surrounding areas. The proposal includes extending the boundary wall around the majority of the IRRC perimeter to continue these mitigation benefits.

The proposed development is consistent with the established industrial character of the area and has been designed to complement several of the newly built neighbouring industrial properties. The architectural design responds to the existing streetscape context, rather than adopting the more typical monotone appearance of older industrial development in the locality.

The IRRC incorporates measures to minimise visual impacts, including sage green, dark green and sand-coloured panelling on the processing shed to complement the existing RRF, retention of existing trees, and additional landscaping along Mitchell Avenue and Styles Street. These measures will improve visual amenity and enhance the site's interface with the surrounding natural environment (refer to Figure 1.2).

ii Parking and skip bin placement

It is acknowledged that informal parking currently occurs along the Mitchell Avenue road verge, including adjacent to the frontage of the CWS-owned lots. Vehicles utilising this area are associated with a range of businesses within the surrounding industrial precinct, with only a limited number attributable to CWS employees, noting that on-site parking is available.

As outlined in Section 6.2.3iv of the EIS, the revised project layout includes the following on-site parking and access provisions:

- 46 car parking spaces, including three electric vehicle spaces and one accessible space
- 16 parking spaces for skip trucks up to 6.7 m-long
- two parking lanes with a combined length of 86 m, accommodating up to four 19 m semi-trailers
- one 43-m parking lane accommodating up to three 12.5 m heavy rigid vehicles
- 13 trailer parking spaces
- three motorbike parking spaces and 12 bicycle spaces
- a footpath along the Mitchell Avenue site frontage.

The facility will operate with a maximum of 46 employees per shift. A 15-minute shift changeover period will apply, which will minimise peak parking demand. Many existing employees live locally and typically travel to the site on foot. Accordingly, the provision of 46 on-site car parking spaces is considered sufficient to accommodate parking demand.

The proposed landscaping works and construction of a footpath along Mitchell Avenue will remove the existing grassed verge adjacent to the CWS-owned lots that is currently used for informal parking. CWS will implement operational measures, including directing employees not to park on road verges and installing signage prohibiting the temporary placement of skip bins on public roads, such as Styles Street, noting that such placement has at times occurred by third parties delivering waste to the site.

iii Waste tracking and weighing

The existing site operates one staffed weighbridge, with trucks weighed on entry and exit. As outlined in Section 3.3 of the EIS, the IRRC will include two staffed weighbridges (incoming and outgoing), with inbound and outbound trucks weighed separately to determine the total weight of waste delivered.

iv Deceleration lane

Swept path analysis for a 19-m semi-trailer accessing the proposed deceleration lane was undertaken as part of the EIS and is provided in Attachment B of Appendix I.1 (Traffic impact assessment) of the EIS. Subject to approval, further consultation with council will be undertaken during detailed design to confirm final arrangement.

4.1.3 Operational hours

Two public submissions commented on the operational hours of the project. One submission questioned the hours of operation that would be required to process the proposed additional tonnage. Another submission commented that a 24-hour operation is unacceptable, given the impact this would have on nearby residential areas.

The existing RRF is approved to operate 24 hours per day, six days per week (Monday to Saturday). The proposal does not change the approved 24-hour daily operating hours. Rather, it seeks approval to add a seventh operating day, primarily to accommodate maintenance activities and provide operational flexibility and contingency, without increasing daily operating hours.

It is important to note that approved operating hours define the period during which activities may occur, not that operations will occur continuously 24/7. This flexibility is common for facilities of this nature and is necessary to manage operational contingencies, including delayed deliveries, emergency backlog clearance, maintenance, or infrequent high-demand events (e.g. large-scale government infrastructure projects).

To achieve the proposed maximum throughput of 450,000 tpa, waste processing would generally occur over two 8-hour shifts (typically 6:00 am to 10:00 pm), six days per week. Under the current operation, waste processing is generally one 8-hour shift, five days per week. Sundays would primarily accommodate waste receipt, material dispatch, and maintenance, with waste processing on Sundays occurring only in exceptional circumstances, such as following a major plant breakdown. The majority of truck movements will occur during daytime hours (6:00 am to 6:00 pm).

The EIS included assessment of 24/7 operations, and mitigation measures will be in place to minimise potential impacts on the surrounding community.

4.1.4 Hazardous material management

One public submission expressed concern about the potential processing of asbestos or other hazardous material at the IRRRC.

Section 3.3.2 of the EIS outlines the procedures for waste receipt, inspection and tracking. All incoming loads are inspected within the tipping area, and following unloading to confirm that no prohibited materials are present. Loads identified as containing hazardous materials, including asbestos, are rejected, with details recorded in the rejected loads register in accordance with the *Standards for Managing Construction Waste in NSW* (EPA 2019).

Operations at the site are regulated by the EPA through Environment Protection Licence (EPL) 13013. Compliance with EPL conditions is enforceable under the *Protection of the Environment Operations Act 1997*, with non-compliance subject to regulatory action, including penalties. The EPA undertakes compliance inspections and risk-based regulatory oversight of the RRF, and the facility continues to operate under the requirements of its EPL.

4.1.5 Internal site traffic movements

DPHI requested further information to internal traffic management, specifically to:

- demonstrate that internal traffic movements can be safely and efficiently accommodated at peak throughput (up to approximately 320 heavy vehicle movements per day), including during concurrent inbound, internal transfer and outbound operations
- describe heavy vehicle manoeuvring (including turning and reversing) between site access points, weighbridges, receipt and processing areas, and along Styles Street under concurrent operating conditions
- explain how vehicle flow, queuing and circulation will be managed during peak periods, including the role of any designated waiting or holding areas and coordination of internal material transfer movements (including via Styles Street) with primary waste receipt and dispatch activities
- detail measures to manage interactions between heavy vehicles, light vehicles, pedestrians and mobile plant, including separation, traffic controls and operational procedures
- provide updated site layout plans clearly illustrating internal traffic operations, including:

- truck movement paths between entry/exit points, weighbridges and all receipt and processing buildings, including internal material transfer routes - direction of travel on all internal roads
• describe traffic arrangements during staged development and transitional operations, including access routes, internal circulation and measures to separate construction and operational traffic.

i Predicted traffic volumes and on-site vehicle numbers

The facility is predicted to generate approximately 320 daily vehicle movements (160 trucks entering and exiting), equivalent to 11 to 13 trucks per hour during daytime operations, with a peak of 16 movements per hour.

With an average on-site duration of approximately 15 minutes per truck, typically three to four trucks will be present on site at any one time. This level of activity can be readily accommodated within the site's internal circulation and queuing layout. Figure 4.1 illustrates a scenario with 13 trucks on site simultaneously, demonstrating that adequate space is available for safe vehicle manoeuvring during peak periods.

ii Queuing and delivery management

Deliveries will be staggered to prevent simultaneous arrivals and avoid queuing beyond the site boundary onto Mitchell Avenue. The internal layout provides sufficient queuing capacity to support peak operations without obstructing internal transfer movements between processing areas, including the:

- **inbound weighbridge:** three 19 m semi-trailers can queue (one on the weighbridge, two downstream)
- **RRF entry:** space for semi-trailers to queue at the traffic lights before entering the operational area
- **internal holding area:** nine spaces in the north-west corner where trucks can wait until capacity becomes available
- **inspection area:** one semi-trailer can wait outside the receipt shed while another tips inside
- **loading/unloading bays:** trucks may temporarily hold within the loading/unloading bays while other vehicles or plant complete manoeuvres
- **outbound weighbridge:** space for one semi-trailer to queue prior to exiting.

Overall, the site can accommodate all inbound, internal, and outbound movements at peak throughput without queuing beyond the boundary. An example of 13 trucks on site, including vehicles occupying some of the queuing and waiting locations, is provided in Figure 4.1 to illustrate the available internal capacity.

iii Internal circulation and traffic flow

Internal vehicle movements follow a clockwise circulation pattern, minimising reversing and potential conflict points. Key circulation features include:

- two-way traffic in most site areas
- a one-way clockwise loop within the RRF at 8 Styles Street
- all vehicles pass through the inspection point before proceeding to designated loading/unloading bays

- loading/unloading bays are adjacent to storage areas under awnings, separated from central circulation space used for through traffic, turning, and manoeuvring
- separate inbound and outbound weighbridges facilitate efficient entry and exit while minimising delays.

Swept path analysis confirms that 19 m semi-trailers can safely manoeuvre throughout the site, including all entry/exit points, receipt and processing buildings, and internal material transfer routes (Attachment B, Appendix I.1 of the EIS). Figure 4.1 presents a conservative scenario with 13 trucks on site, demonstrating sufficient manoeuvring space and avoidance of vehicle conflicts.

iv Internal transfer movements

Internal truck movements between processing areas are limited:

- RRF to residual waste recovery plant: approximately 6 to 7 movements per day (60,000 tpa, 30 tonne trucks).
- RRF to metal processing plant: 1 to 2 movements per day (5,000 tpa, 15 tonne trucks).

All internal transfers follow the marked traffic circulation routes shown in Figure 4.1 and Attachment B (Appendix I.1 of the EIS). These movements represent a small fraction of overall traffic and can be scheduled during quieter periods to minimise interaction with primary waste deliveries and dispatch activities.

v Traffic control measures

Operational controls to manage vehicle movements and maintain separation include:

- traffic lights at the entry to the RRF (between 10 and 8 Styles Street) to regulate access
- on-site traffic controllers, deployed as required during operational periods
- clearly numbered bays to guide trucks to loading/unloading areas
- all drivers (CWS and external) must complete a site induction, use UHF radio communication, and maintain full line-of-sight when reversing
- mobile plant, pedestrians, and site personnel will be provided with Radio Frequency Identification vibrating tags to enforce separation; alerts are triggered if minimum clearances are breached
- line markings will clearly define vehicle circulation paths and pedestrian walkways throughout the site.

All measures will be formalised in a Traffic Management Plan.

vi Separation of heavy/light vehicles and pedestrians

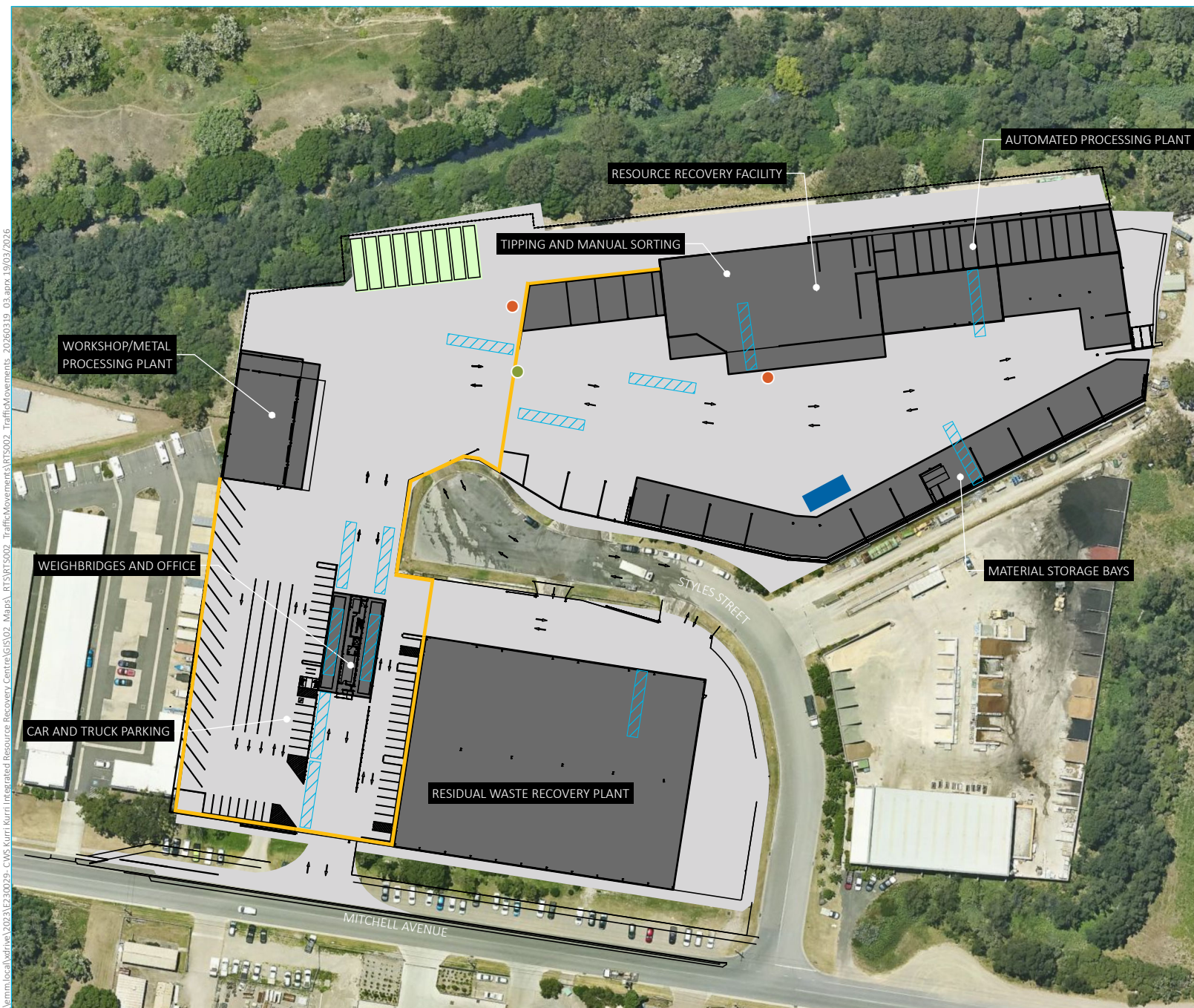
Operational separation will be achieved through the following measures:

- Peak heavy vehicle movements do not coincide with peak arrivals and departures for staff (approximately 40 light vehicles).
- Light vehicles will not pass through the weighbridge.
- Light vehicles will not travel north of the weighbridge, where the majority of heavy vehicle activity will occur.

- Heavy vehicles will have right-of-way, as established in an Operational Traffic Management Plan.

This arrangement will minimise the interaction and potential conflict between heavy and light vehicles within the site.

Pedestrian movements will be managed via clearly marked pathways connecting the staff car park to operational areas. A pedestrian crossing at the RRF entry traffic lights will enable controlled access. A conceptual layout of the pedestrian walkways is shown in Figure 4.1 (subject to detailed design).



- KEY**
- Development footprint
 - Traffic controller
 - Traffic lights
 - Project infrastructure
 - Approximate pedestrian walkway and crossing location
 - Example mobile plant location (crushing and screening)
 - Truck waiting area
 - Illustrative locations of 13 semi-trailers (indicative only)
 - Building design
 - Roofed area

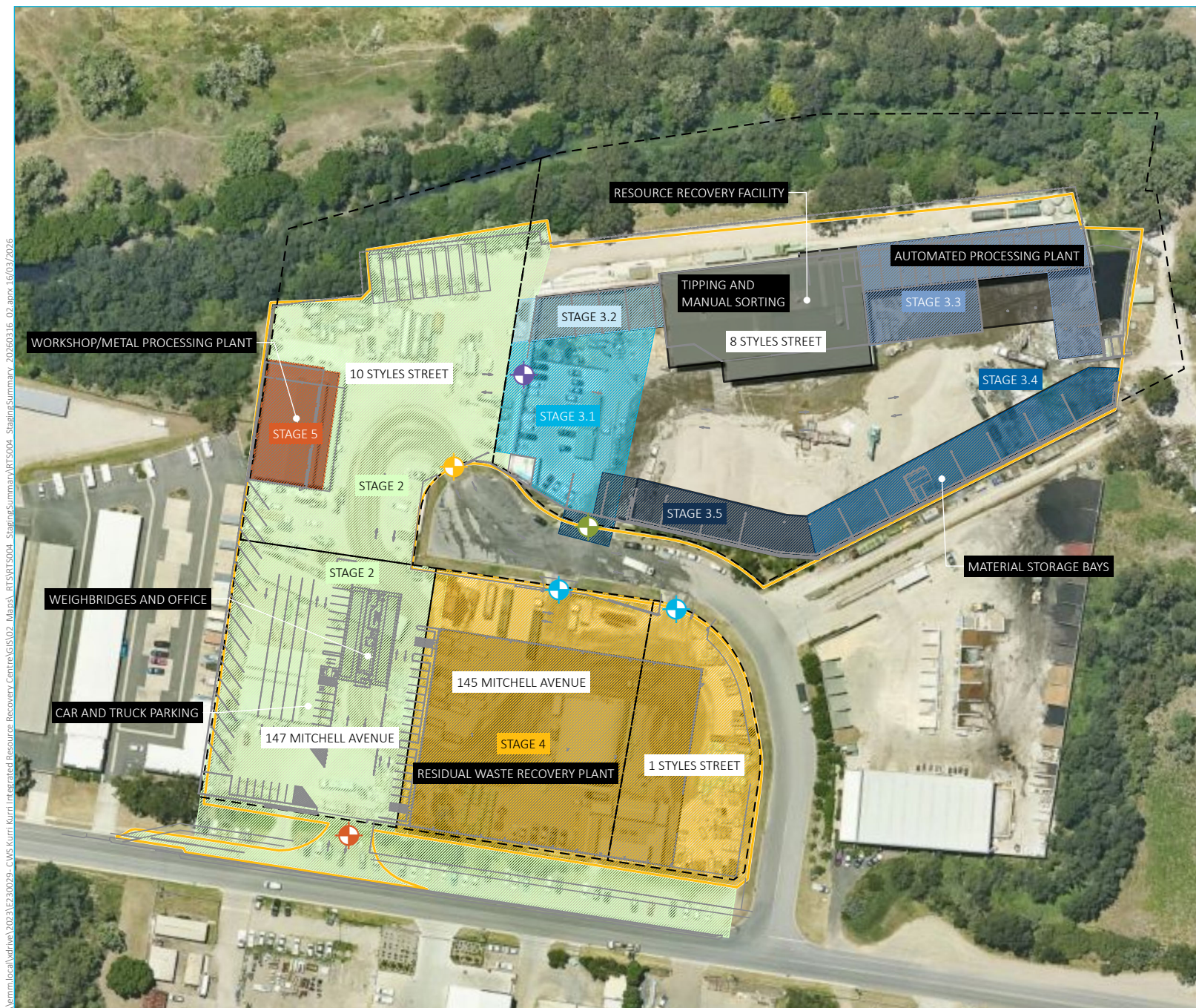
Example internal site traffic movements during concurrent operating conditions

CWS Kurri Kurri Integrated Resource Recovery Centre Response to Submissions
Figure 4.1

The proposed works will span five lots, with only 8 Styles Street currently active. Stages 1, 2, 4, and 5 will be undertaken in isolation, avoiding interaction between construction and operational traffic. The traffic management and isolation measures for each stage will comprise:

- **Stage 1 – increase throughput (no construction):** operations and access will continue as they currently are, with throughput increased to 170,000 tpa.
- **Stage 2 – construction of ancillary facilities (147 Mitchell Avenue and 10 Styles Street):** construction will be isolated to these lots, with separate access via Mitchell Avenue. The existing RRF will continue to operate in its current configuration, using the 8 Styles Street entry/exit. There will be no interaction between construction and operational traffic.
- **Stage 3 – upgrades to the existing RRF (8 Styles Street):** this will be the only stage where construction and operational vehicles will operate within the same general area. The new entry at 147 Mitchell Avenue and the access between 8 and 10 Styles Street will be opened at the commencement of this stage, with operational traffic directed through these accesses. The existing entry/exit at 8 Styles Street will be maintained throughout Stages 3.1 to 3.4 to provide a dedicated construction access. Additional measures, such as progressive separation and use of pre-cast concrete elements, will minimise construction duration and interaction. Short operational shutdowns of approximately one week may occur during this stage.
- **Stage 4 – RWRP construction (145 Mitchell Avenue and 1 Styles Street):** RRF operational traffic will continue via 147 Mitchell Avenue, while construction on 145 Mitchell Avenue and 1 Styles Street will be isolated, with access via Styles Street. No conflict with internal transfer movements between facilities via Styles Street (not occurring until the RWRP is constructed).
- **Stage 5 – metal processing plant upgrade:** the works will be largely internal and will not require significant construction vehicles or machinery.

The proposed staging will maintain safe and efficient vehicle circulation throughout construction and operational phases, with minimal interaction between construction and operational traffic. The staging and site accesses are illustrated in Figure 4.2.



KEY

- Project area
- Development footprint
- Project infrastructure

Building feature

- Roofed area

Stage

Stage 1- increase throughput to 170,000tpa, utilising existing infrastructure

Stage 2- construction of ancillary infrastructure, including weighbridges, offices, car parks and site access

Stage 2

Stage 3- upgrades to the existing RRF (extension of shed, new awnings, storage bays), removal of redundant infrastructure, connection to the new access (increase permitted throughput to 450,000 tpa upon completion of stage 3)

Stage 3.1

Stage 3.2

Stage 3.3

Stage 3.4

Stage 3.5

Stage 4- new residual waste recovery plant

Stage 4

Stage 5- upgrade existing workshop to a metal processing plant

Stage 5

Site access type

- Construction access during stage 2, operational access during stages 3, 4 and 5 and on completion
- Construction access during stage 4, operational access once completed
- Operational access during stages 1 and 2, construction access stages 3.1-3.4, closed from stage 3.5 onwards
- Internal transfer route following completion of stage 4, construction access option during stage 5
- Internal access opened at completion of stage 2

Staging summary

CWS Kurri Kurri Integrated
Resource Recovery Centre
Environmental Impact Statement
Figure 4.2



4.1.6 Waste processing and storage

DPHI requested clarification on waste storage and handling activities at the IRRC, including:

- justification that the proposed size and capacity of the RWRP are proportionate to the anticipated volume of residual waste generated by the automated processing plant after achieving the stated 85% resource recovery target
- confirmation of whether the RWRP is intended to process only residual waste generated on site or whether it would also accept residual waste from external sources
- clarification of how residual waste and recoverable metal materials will be stored, managed and/or processed during the interim period prior to commissioning of the RWRP and metal processing plant (Stages 4 and 5), given the proposed increase in throughput to 450,000 tpa by Stage 3
- identification of the locations and storage capacities available for residual waste and recoverable metal materials during this interim stage, and describe how these materials will be managed safely and efficiently at increased throughput levels.

i Size and capacity of the RWRP

As noted in Section 6.1.2(ii) of the EIS, the existing automated processing plant has a capacity of 75 tonnes per hour, while the RWRP would have a capacity of approximately 13 tonnes per hour.

The RWRP is designed to undertake more refined processing than the existing automated processing plant. Accordingly, its size and building footprint are not directly proportional to throughput when compared with the automated processing plant. The building dimensions are driven by specific operational requirements, including the use of long, relatively flat conveyors and the incorporation of dedicated pelletisation and baling plant.

Once the IRRC is fully operational, the RWRP may also receive pre-sorted residual waste from other facilities for further processing. The proportion of waste processed through each of the five processing streams at the IRRC (manual sorting, automated processing, mobile yard processing, metal processing and the RWRP) would vary depending on the source, composition and characteristics of incoming waste at a given time.

The total waste throughput at the IRRC, including any residual waste received from third-party facilities, would not exceed 450,000 tpa.

ii Staging

The IRRC has been staged to provide operational flexibility. By completion of Stage 3, all infrastructure required to receive, process, store and dispatch the maximum anticipated throughput of 450,000 tpa will be in place.

The existing automated processing plant has a capacity of 75 tonnes per hour, equating to approximately 336,000 tpa when operated for 16-hours per day, six days per week, over 50 weeks per year. When combined with manual pre-sorting and mobile yard processing, the IRRC is capable of achieving the maximum proposed throughput of 450,000 tpa without Stages 4 and 5 (refer to Figure 4.3).

Stages 4 and 5, comprising the RWRP and metals processing facilities, provide higher-value processing that improves product quality and marketability. However, these stages are not required to achieve either the maximum throughput or the facility's recovery targets.

The proportion of waste processed through each of the five processing types, and the balance of recovered and residual material, will vary depending on the composition of incoming waste. The IRRC is designed to target an average recovery rate of approximately 85% across the operation as a whole. Figure 4.3 and Figure 4.4 demonstrate how both the proposed throughput and recovery rate can be achieved at Stage 3 and Stage 5, respectively.

Accordingly, construction is proposed up to Stage 3 in the first instance, at which point the IRRC would be fully capable of safely and efficiently operating at the maximum proposed throughput, with all essential infrastructure in place. The timing of Stages 4 and 5 may occur subsequently, subject to operational and market considerations, noting that these stages are value-adding enhancements rather than prerequisites for compliant operation.

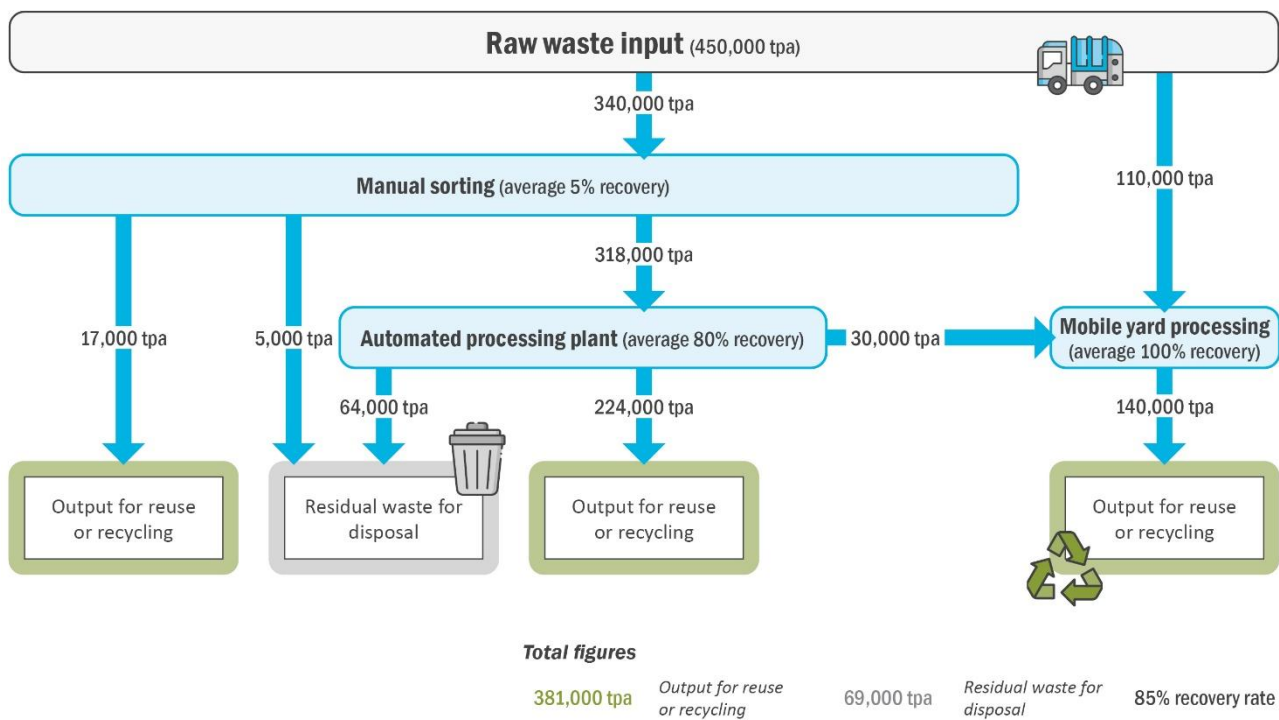


Figure 4.3 Example waste processing throughput and recovery rate at Stage 3 (without RWPR or metals processing)

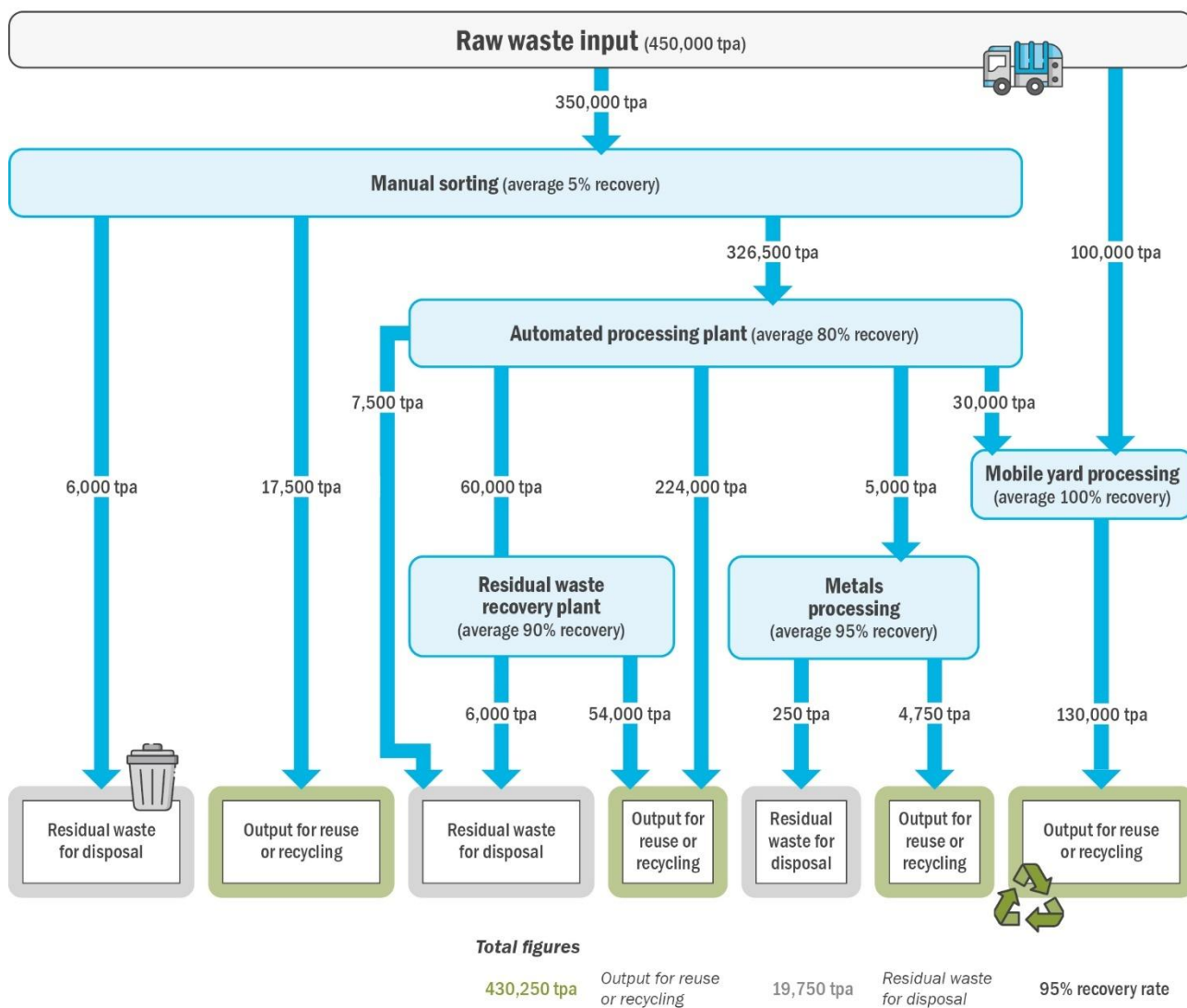


Figure 4.4 Example waste processing throughput and recovery rate at Stage 5 (with RWPR and metals processing)

iii Storage

No interim storage would occur for the purpose of awaiting the commissioning of Stages 4 and 5. Materials would instead be dispatched in their existing form, noting that a lower level of on-site processing would occur during this period, while still targeting 85% recovery. For example, metals would be dispatched to appropriately licensed third-party facilities for further processing, and residual waste would be disposed of at landfill.

Management of on-site storage capacity at increased throughput is described in Sections 2.2.2 and 6.1.2(iii) of the EIS. At the maximum proposed throughput of 450,000 tpa, the facility would receive and dispatch an average of approximately 1,500 tonnes per day, based on 300 operational days per year. Materials would continue to be received and dispatched in broadly balanced quantities, minimising the accumulation of stockpiles, while allowing for temporary stockpiling to support efficient processing, scheduling and dispatch.

Storage requirements are therefore driven by operational and logistical considerations rather than total annual throughput and do not increase on a proportional basis. The proposed increase in the permitted storage limit provides operational flexibility to manage short-term contingencies, such as planned maintenance or temporary equipment downtime, without disrupting waste receipt, which could otherwise have downstream impacts on customers, including local councils.

The maximum quantity of material permitted to be stored on site is proposed to increase from 30,000 tonnes to 40,000 tonnes. Under existing operations, approximately 10,000 tonnes of waste and recovered materials is typically stored on site at any one time. The additional storage capacity would be achieved through the construction of new storage bays and expansion of existing bays, enabling materials to be managed safely and efficiently at increased throughput levels. Stockpiles would remain within approved size limits and be managed in accordance with fire-mitigation guidelines, as outlined in Section 6.7.1 of the EIS (refer to mitigation measures in Appendix D).

4.2 Procedural matters

4.2.1 EIS content/methodology

Submissions relating to the content and methodology of the EIS were received from two community members and three government agencies.

Council advised that the traffic and water impact assessments are supported and raised no issues. Heritage NSW agreed with the proposed management measures and recommendations of the Aboriginal Cultural Heritage Report.

One community member raised concerns that certain matters were not addressed in the EIS, including traffic, noise, risk and bushfire impacts.

In relation to noise, DPHI requested further information, including:

- clarification of how metal processing equipment and associated activities were represented in the operational noise model, including whether any additional mitigation measures are required to minimise impacts to nearby sensitive receivers
- confirmation that combined construction and operational noise scenarios have been assessed, and whether any additional mitigation is required where these activities overlap.

One community member also raised concerns that the noise impacts associated with the rock crushing plant were not included in the assessment.

Concurrence from council and Heritage NSW in relation to the traffic, water and heritage assessments is acknowledged.

In response to the community submission stating that traffic, noise, bushfire, hazards and risk impacts were not addressed in the EIS, it is noted that detailed technical assessments for each of these matters were prepared and included as appendices to the EIS, with summaries provided in Chapter 6 of the EIS. The traffic, noise, bushfire and fire safety assessments were prepared by suitably qualified specialists (including accredited practitioners) and, where relevant, are supported by quantitative modelling.

In response to the request for further information on the noise modelling, a technical memorandum has been prepared. This memorandum provides additional analysis of metal processing equipment, concurrent construction and operational noise scenarios, and the mobile crushing and screening plant. It is provided in Appendix C and confirms that the key outcomes of the EIS remain unchanged. As a precautionary measure to further improve environmental outcomes, the following additional mitigation measures have been proposed and are included in Appendix D:

- The campaign mobile crushing and screening plant will:
 - be operated within the eastern portion of the site yard to maximise acoustic shielding provided by the existing receivals shed to sensitive receivers located to the north-west of the site

- be planned and scheduled with consideration of prevailing and forecast meteorological conditions (including wind speed, wind direction and atmospheric stability), with activities deferred, shortened, rescheduled or modified where unfavourable conditions are predicted
- only operate during standard daytime hours (7:00 am to 6:00 pm Monday to Saturday; and 8:00 am to 6:00 pm Sundays and public holidays).
- During the Saturday daytime out-of-hours period (1:00 pm to 6:00 pm), construction activities will be restricted to low-noise or ancillary works only (e.g. material deliveries and minor works not involving high-noise plant or equipment), to minimise potential noise impacts at surrounding sensitive receivers.

4.2.2 Utilities connections

One agency, Ausgrid, provided a submission regarding the project's electricity connection and the management of existing overhead and underground electricity assets, substation infrastructure, and easement conditions. Key points raised included the need for the electricity contractor to consult Ausgrid on connection design, potential additional conduits in the footway, protection of vegetation near power lines and cables, and compliance with minimum separation distances for substation ventilation and structures. Ausgrid also outlined conditions for any works within electricity easements, including maintaining 24-hour access, preventing damage or encroachments, and managing vegetation, fencing, and bulk storage.

A letter prepared by Impact Project Management is included in Appendix E, which documents Ausgrid's comments in full and provides detailed responses. Key points are summarised below.

CWS has engaged with Ausgrid regarding the project's electricity connection, network capacity, and easement requirements. The project's electrical design has been optimised with feedback from this engagement and will comply with relevant Ausgrid standards, including any additional conduits in the public footway. Vegetation under power lines or above cables will be managed in line with guidelines, and all construction and excavation will follow the Safework NSW code of practice. A new Ausgrid kiosk substation will be provided on-site, constructed to Ausgrid specifications and in an approved location. CWS will ensure full compliance with all easement and access conditions, supporting safe construction and ongoing operation.

4.2.3 Complaints management

Two public submissions raised matters relating to complaints management, including uncertainty over which agency to report incidents to and concerns that previous complaints regarding the existing site were not addressed.

Noise-related concerns regarding skip bin handling and vehicle reversing alarms were raised by nearby residents during EIS engagement in December 2024. CWS acknowledges these comments and considers community feedback an important input to ongoing site management.

In response, CWS has implemented operational changes at the site, including:

- replacement of tonal 'beeper' reversing alarms with broadband 'squawker' alarms with reduced propagation range
- requirement for all third-party vehicles accessing the site to use 'squawker' alarms
- implementation of quieter methods for skip bin stacking.

These measures will be maintained for the duration of IRRC operations. In addition, a formal complaints management procedure will be established, including a 24-hour point of contact and publicly available contact details, ensuring complaints are directed to the appropriate management staff and addressed promptly (refer to SOC1 mitigation measure in the EIS).

4.2.4 Community engagement

Four public submissions raised concerns regarding the project's community engagement, including limited notification of the EIS, insufficient time to lodge submissions, and challenges for some residents in accessing or submitting feedback due to limited computer or internet access. Submissions also noted a perceived lack of direct engagement, including the absence of community meetings, newsletters, or letterbox notifications.

CWS has undertaken community consultation in accordance with the *Undertaking Engagement Guidelines for State Significant Projects* (DPHI 2024b) and the project SEARs. Chapter 5 of the EIS (Section 5.3.2) details engagement activities, which included:

- email correspondence with nearby residents from June 2024
- letterbox drop to nearby residences and businesses in November 2024, including an information sheet, photomontages, 3D renders, and feedback contacts
- project phone line, email, and online feedback form for ongoing submissions
- newspaper advertisement inviting the regional community to a community open day
- community open day and follow-up site visit for residents unable to attend
- interviews with local residents, businesses, and existing CWS employees
- Aboriginal cultural heritage surveys with Registered Aboriginal Parties
- targeted correspondence to residents identified in technical assessments (e.g. noise assessment) to communicate specific findings.

CWS acknowledges that some community members may have limited access to computers or the internet. To ensure broad participation, a range of complementary engagement methods were used, including direct mail, newspaper advertising, in-person meetings, and telephone access to project staff.

These activities demonstrate a proactive engagement program, providing multiple opportunities to stakeholders to participate. The EIS was publicly exhibited on the Major Projects Planning Portal for the standard four-week period (13 November to 10 December 2025), as required by DPHI guidelines, and this Response to Submissions addresses all feedback received.

4.2.5 Licensing and certification

Submissions relating to licensing and certification were received from one community member, council and the EPA.

Council noted that the existing and proposed facility would continue to be regulated by the EPA and therefore raised no comments.

The EPA advised that, should the proposal be approved, CWS would be required to apply to vary its existing Environment Protection Licence (EPL) to authorise the proposed activities and increased waste throughput. As part of this process, licence conditions would be reviewed to ensure appropriate environmental controls are applied and remain consistent with the development consent. The EPA also advised that financial assurance would be required, with the amount and form to be agreed post-approval, and that a policy of insurance covering environmental incidents may be required in accordance with section 72 of the *Protection of the Environment Operations Act 1997*.

One community member raised concerns regarding the need for CWS to reapply for ISO certification in light of the proposed changes to the facility and questioned whether the EPA was aware of the proposed development.

As outlined in Section 1.1 of the EIS, should the proposal be approved, CWS will apply to vary the existing EPL to reflect the proposed changes to site operations, including waste throughput and storage quantities.

As demonstrated through its submission to this process, the EPA is informed of the proposed project. CWS has engaged with the EPA on numerous occasions, including through site meetings and inspections to review site management practices and compliance. This engagement will continue throughout the approval and licensing process, including in relation to financial assurance and any insurance requirements.

In relation to ISO certification, any certification requirements are managed through CWS's internal management systems and relevant certification bodies and do not form part of the statutory planning approval process. Notwithstanding this, CWS will continue to maintain appropriate management systems to support regulatory compliance and environmental performance.

4.2.6 Draft conditions of consent

Five agencies and council provided draft conditions of consent for the project. Table 4.1 summarises the draft conditions of consent, together with the proponent's response.

Table 4.1 Draft conditions of consent

Agency	Summary of recommended conditions	Response
Council	Council is supportive of the approach outlined in the EIS, noting that contributions will be made in accordance with the Cessnock City S7.12 Infrastructure Contributions Plan and that the monetary contribution is to be paid prior to the issue of a Construction Certificate.	CWS acknowledges council's support of the proposed approach and confirms it will continue to engage with council on this matter. CWS accepts that the monetary contribution will be paid prior to the issue of the Construction Certificate.

Agency	Summary of recommended conditions	Response
EPA	Dust - Maintain premises and activities to minimise dust; cover trucks carrying loads except during loading/unloading. Waste management - Characterise and document all incoming waste; store and segregate incompatible wastes; manage unacceptable or unexpected wastes; classify all waste leaving site; prevent cross-contamination; do not blend wastes to meet disposal or recovery criteria. Stormwater / water management - Comply with POEO Act s120; implement and maintain Stormwater Management Plan and Spill Management Procedure for stormwater, spills, firewater, and other runoff. Bunding and fuel storage - Store all chemicals, fuels, and oils in banded areas in accordance with Australian Standards and EPA guidance. Fire and emergency response - Contain all contaminated fire water on-site; ensure procedures for legal disposal at approved facilities.	CWS acknowledges and accepts the suggested conditions outlined by the EPA for dust, waste management, stormwater/water management, bunding and fuel storage and fire and emergency response.
	Noise - Ensure noise does not exceed prescribed limits at defined times and locations.	The prescribed noise limits are generally accepted. As a minor adjustment, it is requested that a morning shoulder period (6:00 am to 7:00 am) noise criterion be applied for 18 Hart Road, Loxford, at LAeq,15 min 44 dB.
Heritage NSW	Heritage NSW has provided recommendations in relation to conditions of consent. These include reasonable steps to avoid harm, modification or other impact to Aboriginal objects, the inclusion of Aboriginal heritage management procedures in the Construction Environmental Management Plan (CEMP) and consultation with registered Aboriginal parties throughout the SSD process.	CWS acknowledges and accepts the suggested conditions.
FRNSW	Prepare a Fire Safety Study (FSS) prior to construction in accordance with Hazardous Industry Planning Advisory Paper (HIPAP) No.22 and submit to FRNSW; develop an Emergency Plan (EP) prior to occupation/commissioning in accordance with HIPAP No.1; prepare an Emergency Services Information Package prior to occupation/commissioning in line with FRNSW guidelines.	CWS acknowledges and accepts the suggested conditions.
Hunter Water	Section 50 Certificate - Evidence must be submitted to Council that the registered proprietors of the land on whose behalf the application was made have complied with the requirements of Section 50 of the <i>Hunter Water Act 1991</i> for the supply of water and sewer infrastructure for this development. Such evidence must be submitted to Council prior to the release of the Construction Certificate.	CWS has continued and will continue to engage with Hunter Water regarding the impacts to the sewer main located on the site (refer to Section 3.1.2). CWS acknowledges and accepts the suggested condition.

Agency	Summary of recommended conditions	Response
RFS	The proposal is supported subject to compliance with the Bush Fire Report (Cool Burn Pty Ltd, 12 February 2025, Version 1.1), as modified by additional conditions requiring: • Ongoing management of the site as an Inner Protection Area (IPA) in accordance with Planning for Bush Fire Protection 2019, including vegetation maintenance and canopy separation. • Creation and registration of an Asset Protection Zone (APZ) under s88B of the Conveyancing Act 1919, managed in perpetuity and prohibiting construction within the APZ. • Registration on title, prior to building works, of an off-site Right of Way and compliant vehicle turning head over the existing access handle servicing Lot 12 in DP 1234688 (along the south-eastern boundary), to enable fire tankers to access the site for fire-fighting and drenching purposes. • Use of non-combustible materials for awnings and shed additions, and ember protection upgrades to office structures. • Compliance of water, electricity and gas infrastructure with bush fire protection and relevant Australian Standards requirements.	The recommended conditions provided by RFS are generally acceptable, with the exception of: • Item 1 - reference to a distance of 16 metres for the inner protection area • Item 2 - reference to the 'restriction B' area in relation to an APZ • Item 3 - the requirement for the creation of a right of way on an adjoining lot. These items are discussed further under Section 4.2.6i (below) and Appendix F.

i RFS conditions

RFS provided comments on the bushfire assessment submitted with the EIS. The Bushfire Assessment Report for the EIS (Appendix I.6) was prepared by Cool Burn Pty Ltd. Cool Burn has reviewed the RFS advice and prepared a response, provided in Appendix F. A summary of the responses to Items 1 to 3 of the RFS submission is provided below.

Items 1 – inner protection area

CWS is open to the inclusion of an APZ to be managed as an Inner Protection Area (IPA), within which the requirements outlined in Item 1 of the RFS submission would apply. However, achieving a 16-m separation to the north of the RRF building is not considered practicable, as it would extend into dense swamp creek riparian vegetation. CWS seeks to avoid impacts to this native riparian vegetation.

Following on-site measurements along the northern perimeter and consultation with the bushfire consultant (Cool Burn), CWS considers that a 12-m IPA is both practicable to manage and appropriate from a bushfire management perspective. In all other directions, the entire site would function as an APZ extending to the site boundary.

A figure illustrating the proposed APZ arrangement is provided in Figure 4.5. The mitigation measure for bushfire has been updated to reflect this update.

Item 2 – APZ

It is noted that “Restriction B” shown on the plans prepared by Thomas and Associates reflects a restriction carried through from the surveyor’s information, related to drainage easements. These are not related to APZ. Cool Burn, an appropriately qualified bushfire consultant, has assessed the proposed IRRC and confirmed that an APZ of 12 m is appropriate along the northern boundary of the site.

Item 3 – Right of way

The original Bushfire Assessment Report identified a turning area extending onto the adjoining property to the east. This arrangement is no longer available. However, updated advice from the bushfire consultant (refer to Appendix F) confirms that a turning area in this location is not required to achieve appropriate emergency access to the site.

The site provides continuous internal access along the northern boundary, through the centre of the site, and to the southern portion of the site. This circulation allows firefighting vehicles to access all areas of the development. On this basis, firefighting access and operational capability are not compromised by the removal of the eastern turning point.

It is also noted that the road segment and access handle serving Lot 12 in DP 1234688 is not under the control of CWS. Responsibility for providing and maintaining compliant access, including any required turning areas for firefighting vehicles, rests with the owner of Lot 12 in accordance with the access provisions of Planning for Bush Fire Protection 2019. As this access handle provides the sole access to Lot 12, it must be maintained clear to enable emergency services to safely access the property and undertake firefighting and property protection activities.



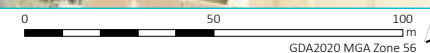
- KEY
- Project infrastructure
 - Building design
 - Roofed area
 - Asset protection zone

Asset protection zone

CWS Kurri Kurri Integrated
Resource Recovery Centre
Environmental Impact Statement
Figure 4.5



Source: EMM (2026); CWS (2025); DCSSS (2025); GA (2009); MetroMap (2026)



4.3 The economic, environmental and social impacts of the project

4.3.1 Noise

Six public submissions raised concerns regarding potential noise impacts from the proposal, including those associated with vehicle movements, skip bin handling and reversing alarms, general yard processing activities, and night-time operations.

As outlined in Section 4.2.3, operational changes have been implemented to address previous feedback received during consultation associated with skip bin handling and vehicle reversing alarms. This includes replacement of reversing alarms and adoption of quieter skip bin placement practices. These measures will remain in place for the duration of IRRC operations. A formal Complaints Management Procedure will also be implemented, including a 24-hour contact point and publicly available contact details, to ensure complaints are managed promptly.

Yard processing activities, including crushing and screening, will occur on a campaign basis only and will be limited to daytime hours (7:00 am to 6:00 pm). No campaign processing will occur during evening or night-time periods. The noise modelling has been updated to include daytime crushing and screening (Section 4.2.1), with results confirming compliance with the applicable operational noise criteria. An additional measure has been incorporated (refer Appendix D) requiring campaign activities to be scheduled with consideration of plant location, timing and meteorological conditions, including wind direction, to further reduce potential impacts at nearby residences.

Operational noise was assessed for daytime, evening and night-time periods, as well as traffic associated with IRRC operations. Road traffic noise impacts are predicted to be negligible at surrounding residential receivers. Predicted maximum night-time noise levels comply with the sleep disturbance screening criteria at all locations.

One receiver is predicted to experience a 4 dB exceedance of the criterion during the morning shoulder period (6:00 am to 7:00 am). This exceedance is limited to a short transitional period between night-time and daytime operations and does not represent ongoing night-time non-compliance. Outside this one-hour period, the receiver complies with the relevant criteria.

Operational noise limits will be imposed as conditions of consent (refer Section 4.2.6), and compliance will be verified through annual noise monitoring in accordance with the EPL requirements for the IRRC.

4.3.2 Dust

Three public submissions raised concerns regarding dust impacts associated with existing RRF operations, including dust from truck movements, plumes extending beyond site boundaries, and materials transported in uncovered trucks.

The surrounding environment is industrial in nature, with multiple potential dust sources, including vehicle movements on public roads, wind-blown dust from exposed areas, and other nearby industrial activities, as well as naturally occurring sources such as household wood burning, dust storms, and bushfires. As a result, dust observed in the area may arise from a combination of these sources rather than solely from RRF operations.

Air quality impacts of the proposed development are detailed in Section 6.4 and Appendix I.3 of the EIS. Modelling and assessment in accordance with EPA guidelines concluded that no significant air quality impacts are predicted, with all pollutant levels meeting relevant criteria. While impacts are expected to be minor, mitigation measures are in place to manage potential off-site dust emissions, including:

- applying water sprays to mobile yard equipment and stockpiles prior to crushing and screening
- using misting sprays and dust extraction in processing sheds

- storing waste and recovered materials in bunkers with three-sided walls
- minimising material drop heights during unloading and loading
- covering all loads for incoming and outgoing trucks and restricting on-site vehicle speeds to 10 kilometres per hour (km/h).

These measures will be further enhanced as part of the IRRC, with additional awnings and walls installed so that all stockpiles are covered.

4.3.3 Odour

One public submission raised concerns regarding potential odour impacts associated with the project, based on perceived odours from existing operations, particularly during rain or high humidity.

The majority of material received at the site is inert construction, demolition, commercial and industrial waste. A limited quantity of green waste (such as tree branches, vegetation or garden waste) is occasionally received; however, this material is transferred on the same day of receipt to the neighbouring ANL Weston facility for processing. No green waste stockpiling or composting occurs on site. The site does not accept odour-generating materials, such as putrescible wastes, and will not in the future.

Based on the nature of materials handled at the site, odour generation from site operations is not anticipated. Odours perceived during or following rainfall events may be attributable to alternative sources, noting that rainfall and high humidity can temporarily intensify odours through mechanisms such as the disturbance or flushing of stagnant water in nearby waterways or stormwater drainage systems, as well as reduced atmospheric dispersion.

4.3.4 Water quality

Two public submissions and a submission from the EPA raised water quality matters. The public submissions noted potential effects of dust on the creek along the site boundary.

The EPA noted that there will be no controlled discharges from the facility, with surface water expected to overflow into Swamp Creek during major rainfall events (likely 3 to 4 times per year). The EPA also indicated that the current onsite controls and proposed water management upgrades may not fully prevent stormwater containing contaminants from entering the creek and requested further information to:

- demonstrate that all reasonable measures to prevent, control, abate, or mitigate pollution have been considered, including storage capacity and diversion of clean stormwater
- provide estimates of treated water quality for key pollutants.

The EPA noted that, if the proposal is approved, sampling of overflows may also be required as a licence condition.

Following the EPA's request for further information on potential stormwater impacts, additional investigations and design refinements have been undertaken to manage both the quantity and quality of water entering Swamp Creek.

A technical memorandum, including updated water balance modelling, water sample results, and the revised stormwater design, is provided in Appendix G and is summarised below.

1. Reduction in overflows

The stormwater system has been refined to reduce potential overflows from the onsite water management basin. Approximately 35% of the total roof area (0.26 hectare (ha) of the 0.76 ha total roof area, comprising the southern building roof) will now drain to an additional rainwater tank. Water from this tank will be used for operational purposes, and any overflow will discharge directly to the street stormwater system rather than surcharging through the water management basin. By diverting this portion of clean roof water, the expected overflows to Swamp Creek are reduced from approximately 3 to 4 events per year to 1 to 2 events per year, occurring only during intense rainfall or prolonged wet periods. This refinement demonstrates that all reasonable measures to control and mitigate stormwater flows have been incorporated.

2. Water quality assessment and management

Under existing conditions, the RRF at 8 Styles Street is serviced by a water management basin incorporating an oil–water separator, sedimentation tanks and a water treatment plant. CWS is currently in the design and procurement phase for an upgraded water treatment system, which includes a pre-treatment system with additional chemical adjustment, coagulation, clarification, filtration and disinfection processes. The upgraded system will be operational prior to the IRRC expansion and will be designed to achieve treated water quality consistent with applicable guidelines and the receiving environment. The final treatment specification will be confirmed through pilot testing during implementation.

To inform baseline conditions, three additional sampling rounds were undertaken in 2026 at the on-site basin (inflows and end of basin) and Swamp Creek (upstream and downstream). Initial results indicated that, while many parameters were within expected ranges, some exceedances were recorded, primarily associated with metals, nutrients, hydrocarbons and sediment. Nutrients are not considered typical of non-putrescible waste handling activities and were attributed to factors such as stagnation, sediment accumulation within the basin, and the influence of local fauna.

Following the first two sampling rounds, CWS undertook a full clean-out of the basin and installed an aerator to improve water circulation to address these influences on water quality. Results from the third sampling round indicated a marked improvement. While some exceedances remained, these were substantially reduced and generally within the range of concentrations observed in the upstream and downstream receiving environment.

Additional mitigation measures are proposed as a result of the water quality assessment and are incorporated into Appendix D, comprising:

- a commissioning report demonstrating the performance of the upgraded water treatment system will be provided to the EPA for consultation
- an aerator will be operated within the water treatment basin for water circulation
- annual cleaning and maintenance will be undertaken for the water treatment system, water management basin, and associated oil and grease separator.

4.3.5 Groundwater

The DCCEEW Water Group requested clarification of excavation depths and locations, and the potential for groundwater interception, including the maximum annual volume if intercepted, to support advice on impacts and water licensing.

To address the DCCEEW Water Group's query, further assessment of excavation and potential groundwater impacts has been undertaken.

A geotechnical investigation by Hunter Civilab (2023), not available at the time of EIS preparation, has now been reviewed (Appendix H). Four boreholes across the site identified groundwater at depths between 2 and 3 metres below ground level (mbgl) within alluvial sands. For the purposes of a conservative assessment, a design groundwater level of 1.5 mbgl has been adopted, based on the shallowest recorded groundwater level (2 mbgl) with an additional 0.5 m allowance for seasonal variability.

Detailed review of the proposed construction works confirms that excavations will not exceed 1.4 mbgl. These include:

- elevator shaft (1.35 mbgl)
- inground weighbridge (0.3 mbgl)
- temporary trenching for services (up to 1.4 mbgl)
- minor earthworks for utilities and hardstand areas.

All works will be located at least 20 m from the top of the creek bank. Structural piling may extend deeper in isolated instances but is not expected to require groundwater dewatering.

As the maximum excavation depth (1.4 mbgl) remains above the conservative design groundwater level (1.5 mbgl), groundwater interception and water take are not expected. A minimum 0.1 m design separation is maintained relative to the conservative groundwater level, and approximately 0.6 m relative to observed groundwater levels.

In the unlikely event groundwater is encountered above predicted levels, a dewatering management plan will be prepared by a suitably qualified consultant in consultation with DCCEEW. All excavations are temporary and would not involve ongoing groundwater take.

Mitigation measure WAT06 has been updated in Appendix D to reflect the confirmed maximum excavation depth of 1.4 mbgl and to include contingency management procedures should groundwater be intercepted.

4.3.6 Biodiversity

Two members of the public raised concerns about the biodiversity impacts of the project, primarily relating to the Regent Honeyeater. The comments highlighted the endangered status of the species and questioned the impact of increased dust from the project on the species.

During the preparation of the EIS, it was deemed unlikely that the project would have an impact on biodiversity values given the industrial nature of the site and the fact that no vegetation removal is required. Therefore, a waiver for the requirement to prepare a Biodiversity Development Assessment Report (BDAR) was sought.

In response, the Biodiversity and Conservation Division of DCCEEW noted that the proposed demolition works could remove potential roosting habitat for microbats and that adjacent Threatened Ecological Communities (TECs) and Important Habitat Mapping (IHM) for the Swift Parrot and Regent Honeyeater occur immediately next to the development footprint. EMM ecologists assessed the site for microbat presence and roosting habitat potential, and evaluated the likelihood of indirect impacts on the adjacent TECs and associated IHM. The assessment confirmed that no vegetation clearing or encroachment onto the TECs or IHM is required. Given the site's existing heavy industrial land use, surrounding species are already exposed to noise, light, dust, and general disturbance; the project will not introduce new indirect impacts beyond those already present. Management measures included in the EIS and to be implemented through the CEMP (covering light, noise, dust, and runoff) are expected to further ensure that any residual impacts are avoided.

On this basis, it was concluded that the project is not expected to result in any residual direct or indirect impacts on microbats, the adjacent TECs, or important habitat for Swift Parrots and Regent Honeyeaters, and Biodiversity and Conservation Division of DCCEEW reviewed and endorsed the assessment, formally granting the BDAR waiver.

4.3.7 Socio-economic

Two public submissions raised concerns about potential socio-economic impacts of the project, including:

- possible effects on residents' physical and mental health from increased noise and dust, including disruption to sleep
- potential impacts on local property values.

CWS understands that residents are concerned about the potential for the development to affect their health and wellbeing, including the quality and continuity of sleep, and takes these concerns seriously. Operational noise and dust have been assessed in the EIS in accordance with relevant guidelines, with mitigation measures proposed to minimise off-site impacts. Waste processing activities, including crushing and screening operations, will generally occur during daytime hours (6:00 am to 10:00 pm), and noise modelling confirms that there are no exceedances of sleep disturbance criteria during night-time periods. Dust levels are predicted to remain within regulatory criteria and will be further managed through the enhanced mitigation measures proposed as part of the IRRC, including sheds, awnings, and enclosure of stockpiles.

The site is located within an established industrial precinct in Kurri Kurri, which has historically accommodated a mix of industrial development and residential areas. The proposed project represents an expansion of an existing resource recovery facility and is consistent with the heavy industrial zoning of surrounding land. It is also noted that additional industrial development is occurring within the broader precinct, reflecting the planned and ongoing industrial function of the locality.

A wide range of factors influence property values over time, including characteristics of individual properties, local and regional conditions, and broader economic factors. CWS has invested heavily in environmental controls for the facility and will continue to do so. The proposed works include additional mitigation measures, such as sheds, awnings, landscaping, and use of natural colours in building cladding, which are expected to result in negligible to minor positive visual impacts. On this basis, the project is not expected to materially affect property values.

4.3.8 Increased traffic volumes

Two public submissions and a submission from TfNSW related to increased traffic volumes.

The public submissions expressed concern that the increased tonnage to be processed at the IRRC would result in additional truck movements and exacerbate existing congestion, particularly at the Mitchell Avenue/Government Road intersection.

TfNSW considers that there will be no significant impact on the nearby classified road network as a result of the project.

A detailed Traffic Impact Assessment (Appendix I.1) was undertaken and is summarised in Section 6.2.3 of the EIS. While overall waste throughput will increase, the transport model for the IRRC involves a shift from smaller skip trucks (average load of approximately 3 tonnes) to larger trucks (average load of approximately 27.5 tonnes). As a result, the proportional increase in heavy vehicle movements is substantially less than the proportional increase in tonnage processed.

At peak operation, the project would result in up to approximately 80 additional inbound and 80 outbound heavy vehicle movements per day (160 inbound and 160 outbound in total). Importantly, this remains below the heavy vehicle movements previously assessed and approved for the existing RRF, reflecting the efficiency of bulk haulage in larger trucks.

The assessment concluded that key intersections, including Mitchell Avenue/Government Road, will continue to operate at a high Level of Service. While there will be minor increases in traffic volumes on public roads, the modelling indicates these changes would not materially affect traffic flow or be noticeable to other road users.

Accordingly, the project is not anticipated to result in any material adverse traffic impacts on the surrounding road network, consistent with the advice provided by TfNSW.

4.3.9 Traffic – road infrastructure

Two public submissions commented on the road infrastructure.

One submission commented that the project could cause additional wear and tear of the road surface and questioned if CWS would be contributing to road maintenance. The second submission noted that the Gingers Lane/Hart Road/Government Road roundabout is undersized, raising concerns that larger trucks may not be able to navigate this safely.

As outlined in Section 4.2.6, CWS will make monetary contributions in accordance with the Cessnock City S7.12 Infrastructure Contributions Plan. This plan is council's mechanism for funding the delivery and upgrade of local transport and community infrastructure to support development. CWS has engaged with council on this matter, and council has confirmed its support for the proposed approach, including payment of the required contribution.

The Traffic Impact Assessment (Appendix I.1 of the EIS) notes that the 2021 upgrade of the Gingers Lane/Hart Road/Government Road roundabout incorporated a mountable apron designed to accommodate heavy vehicle movements. A review of available crash history data for the haulage route did not identify any discernible pattern of crashes that would indicate an existing safety concern associated with heavy vehicle access to the site.

No increase in truck size is proposed as part of the project, with 19 m semi-trailers remaining the largest vehicles accessing the site.

4.4 The justification and evaluation of the project

4.4.1 Support for the project

One member of the public expressed their support of the project.

Noted.

4.5 Issues that are beyond the scope of the project

Two members of the public commented on issues that are beyond the scope of the project.

One submission referred to air quality and health impacts from the Snowy Hydro diesel power station in a different area. The submitter suggested that lessons from that project should be considered to avoid adverse outcomes.

The second submission related to a separate proposed residential development in the locality and questioned whether that proponent is aware of the proposed IRRC expansion.

In relation to the Snowy Hydro power station, CWS notes that the IRRC is a distinct facility located in a separate area and has been designed and assessed in accordance with applicable environmental and planning requirements. The project includes appropriate mitigation measures to manage air quality, noise, and other environmental impacts, ensuring compliance with all relevant standards.

Regarding the proposed residential development, the IRRC assessment focuses on the environmental and operational impacts of the IRRC expansion. Information about the project, including the EIS, is publicly available, providing transparency to other developers and stakeholders.

5 Updated project justification

The project is consistent with relevant State, regional, and local strategic plans and policies, including the *NSW Waste and Circular Infrastructure Plan* (EPA 2025) and the *NSW Waste and Sustainable Materials Strategy 2041* (DPIE 2021). These strategies highlight the current waste and recycling challenges in NSW and the urgent need for additional infrastructure to reduce residual waste and avoid landfill shortages.

Following a detailed review of all public and agency submissions, a minor design change has been incorporated into the project. This has been supported by further quantitative assessments of noise and water impacts, with responses provided for other technical matters including air quality, traffic, and biodiversity. Enhanced or additional mitigation measures have also been introduced to manage potential environmental and social impacts. These updates ensure the project is robustly assessed and responsive to stakeholder feedback, while the overall justification outlined in Section 2 of the EIS remains unchanged.

If the project did not proceed, the benefits—including contributing to the State’s 2030 target of 80% recovery across all waste streams and supporting the growth of the circular economy—would not be realised. The project is located in a highly suitable area, making use of existing infrastructure, and its environmental and social impacts can be effectively managed through practical mitigation measures.

In conclusion, the project is considered justified and in the public interest.

References

DPHI 2024a, *State significant development guidelines – preparing a submissions report*, NSW Department of Planning, Housing and Infrastructure, accessed 16 December 2025 from <https://www.planning.nsw.gov.au/sites/default/files/2023-03/ssd-guidelines-preparing-a-submissions-report.pdf>.

DPHI 2024b, *Undertaking engagement guidelines for State significant projects*, NSW Department of Planning, Housing and Infrastructure, accessed 13 January 2026 from <https://www.planning.nsw.gov.au/sites/default/files/2023-03/undertaking-engagement-guidelines-for-ssp.pdf>.

DPIE 2022, *State significant development guidelines – preparing an environmental impact statement*, NSW Department of Planning, Infrastructure and Environment, accessed 16 December 2025 from <https://www.planning.nsw.gov.au/sites/default/files/2023-03/ssd-guidelines-preparing-an-environmental-impact-statement.pdf>.

EMM 2025, *Kurri Kurri integrated resource recovery centre: Environmental impact statement*, EMM Consulting Pty Limited, accessed 16 December 2025 from <https://www.planningportal.nsw.gov.au/major-projects/projects/kurri-kurri-integrated-resource-recovery-centre>.

Appendix A

Submissions register

Table A.1 Submissions register

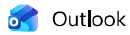
Name	Location	Section/s where comments are addressed in report
State Government agencies		
Ausgrid	-	4.2.2
DCCEEW – Water Group	-	4.3.5
Heritage NSW	-	4.2.1, 4.2.6
DPHI	-	4.1.5, 4.1.6, 4.2.1
FRNSW	-	4.2.6
Hunter Water	-	4.2.6
EPA	-	4.3.4, 4.2.6, 4.2.5
TfNSW	-	4.3.8, 4.3.9
RFS	-	4.2.6
Council		
Cessnock City Council	-	4.2.1, 4.1.2, 4.2.6, 4.2.5
Public		
Scott Wilson (SE-100360207)	Weston	4.3.1, 4.3.3, 4.3.7, 4.2.3, 4.1.1
Anonymous (SE-101707711)	Weston	4.3.1, 4.2.1, 4.2.4, 4.5
Rachel McGee (SE-101744959)	Weston	4.1.1, 4.3.1, 4.3.2, 4.2.4
Daniel Mendes (SE-99327960)	Chatswood	4.4.1
Louise Oakley (SE-101437457)	Weston	4.2.4, 4.1.2, 4.3.9, 4.3.1, 4.5, 4.1.3, 4.2.5, 4.3.2, 4.3.6, 4.1.1, 4.3.7
Anonymous (SE-101730708)	Weston	4.3.8, 4.1.1, 4.2.1, 4.3.9, 4.3.4, 4.3.1, 4.1.3, 4.2.4
Anonymous (SE-101732957)	Weston	4.1.1, 4.3.1, 4.2.3, 4.3.2, 4.3.8, 4.1.2, 4.1.4, 4.3.7, 4.3.6

Appendix B

Engagement with Hunter Water

3/10/26, 2:20 PM

RE: HW Ref: HW2017-1215/18/64 - SSD-71547218 - Central Waste - 8 to 10 Styles Street Kurri Kurri - Relocation of DN450 Sewer...



RE: HW Ref: HW2017-1215/18/64 - SSD-71547218 - Central Waste - 8 to 10 Styles Street Kurri Kurri - Relocation of DN450 Sewermain

From Barry Calderwood <barry.calderwood@hunterwater.com.au>

Date Fri 2/13/2026 1:12 PM

To Luke Griffiths <luke@impactpm.com.au>; Johnny Landman <johnny.landman@hunterwater.com.au>

Cc Kylie Haley <kylie@impactpm.com.au>; Katie Ward <kwat@emmconsulting.com.au>; Kevin Daly <kevin.daly@rcg.com.au>; Ray Nielsen <ray.nielsen@rcg.com.au>; Adam Davies <adam.davies@tgthomas.com.au>

Hi Luke

Hunter Water accepts the footing design as shown on Thomas Engineering Plan Underpinning Pier Plan, Notes & Drawing Certification (Issue E; dated 11/02/2026.

Regards

Barry Calderwood

Account Manager Major Development | Hunter Water Corporation
36 Honeysuckle Drive Newcastle NSW 2300 | PO BOX 5171 HRMC NSW 2310
T 02 4907 7446 | Twitter: [@hunterwater](#)
barry.calderwood@hunterwater.com.au | hunterwater.com.au

I work flexibly. I'm sending this message now because it's a good time for me, but I don't expect that you will read, respond or action it outside of your own regular hours

From: Luke Griffiths <luke@impactpm.com.au>

Sent: Wednesday, 11 February 2026 6:55 PM

To: Barry Calderwood <barry.calderwood@hunterwater.com.au>; Johnny Landman <johnny.landman@hunterwater.com.au>; Wesley Jones <wesley.jones@hunterwater.com.au>; James Kennedy <James.Kennedy@hunterwater.com.au>

Cc: Kylie Haley <Kylie@impactpm.com.au>; kward@emmconsulting.com.au; kevin.daly@rcg.com.au; ray.nielsen@rcg.com.au; adam.davies@tgthomas.com.au

Subject: Re: HW Ref: HW2017-1215/18/64 - SSD-71547218 - Central Waste - 8 to 10 Styles Street Kurri Kurri - Relocation of DN450 Sewermain

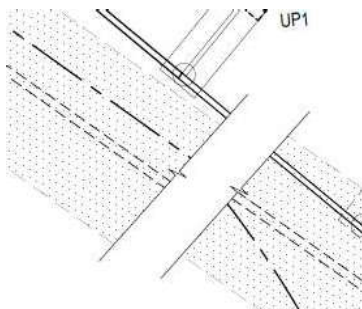
Importance: High

Good Afternoon Barry,

Thanks again for your continued engagement.

As discussed please see attached updated design for Hunter Water review and consideration.

I note the snip below outlines a "break line" in the design which identifies the new SF1 footings proposed for installation on/or near the existing entrance to the existing weigh station on Styles Street. I note that Section C&D on PDF pg. 4&5 respectively, should give you the answers you need.



I trust this update satisfies your queries. Should you have any questions or concerns please don't hesitate to reach out.

Kind regards,



Luke Griffiths
Director

+61 402 686 306
luke@impactpm.com.au
Unit 1/10 Bishopgate St, Wickham NSW 2293
impactpm.com.au
25 679 034 256

Impact Project Management Pty Ltd

From: Luke Griffiths <luke@impactpm.com.au>

Sent: Wednesday, February 4, 2026 1:34 PM

To: Barry Calderwood <barry.calderwood@hunterwater.com.au>; Johnny Landman <johnny.landman@hunterwater.com.au>; Wesley Jones <wesley.jones@hunterwater.com.au>; James Kennedy <James.Kennedy@hunterwater.com.au>

Cc: Kylie Haley <Kylie@impactpm.com.au>; kward@emmconsulting.com.au <kward@emmconsulting.com.au>; kevin.daly@rcg.com.au

<kevin.daly@rcg.com.au>; ray.nielsen@rcg.com.au <ray.nielsen@rcg.com.au>; adam.davies@tgthomas.com.au <adam.davies@tgthomas.com.au>
Subject: Re: HW Ref: HW2017-1215/18/64 - SSD-71547218 - Central Waste - 8 to 10 Styles Street Kurri Kurri - Relocation of DN450 Sewermain

Afternoon Barry,

No worries, mate, I hope you had a great break and managed to spend some quality time with family and friends. (back to the grind)

Thank for your response, I'll run this to ground with the Engineers and come back to you ASAP.

Thanks again and kind regards,



From: Barry Calderwood <barry.calderwood@hunterwater.com.au>
Sent: Wednesday, February 4, 2026 1:28 PM
To: Luke Griffiths <luke@impactpm.com.au>; Johnny Landman <johnny.landman@hunterwater.com.au>; Wesley Jones <wesley.jones@hunterwater.com.au>; James Kennedy <James.Kennedy@hunterwater.com.au>
Cc: Kylie Haley <Kylie@impactpm.com.au>; kward@emmconsulting.com.au <kward@emmconsulting.com.au>; kevin.daly@rcg.com.au <kevin.daly@rcg.com.au>; ray.nielsen@rcg.com.au <ray.nielsen@rcg.com.au>; adam.davies@tgthomas.com.au <adam.davies@tgthomas.com.au>
Subject: RE: HW Ref: HW2017-1215/18/64 - SSD-71547218 - Central Waste - 8 to 10 Styles Street Kurri Kurri - Relocation of DN450 Sewermain

Hi Luke

Sorry been meaning to get back to you and only returned from leave last week, there was just one outstanding matter.

There appears to be 2x new longer SF 1 that is near the pipeline bends with no details (on the left side of the plan view drawings), have the designers confirmed the distance of piers to the sewer pipeline although it is not over the sewermain? And will it be the similar design as provided on their cross section. The cross sections only show the existing and new piers with pipeline in the middle.

Regards

Barry Calderwood

Account Manager Major Development | Hunter Water Corporation
36 Honeysuckle Drive Newcastle NSW 2300 | PO BOX 5171 HRMC NSW 2310
T 02 4907 7446 | Twitter: @hunterwater
barry.calderwood@hunterwater.com.au | hunterwater.com.au

I work flexibly. I'm sending this message now because it's a good time for me, but I don't expect that you will read, respond or action it outside of your own regular hours

From: Luke Griffiths <luke@impactpm.com.au>
Sent: Wednesday, 4 February 2026 12:30 PM
To: Barry Calderwood <barry.calderwood@hunterwater.com.au>; Johnny Landman <johnny.landman@hunterwater.com.au>; Wesley Jones <wesley.jones@hunterwater.com.au>; James Kennedy <James.Kennedy@hunterwater.com.au>
Cc: Kylie Haley <Kylie@impactpm.com.au>; kward@emmconsulting.com.au; kevin.daly@rcg.com.au; ray.nielsen@rcg.com.au; adam.davies@tgthomas.com.au
Subject: Re: HW Ref: HW2017-1215/18/64 - SSD-71547218 - Central Waste - 8 to 10 Styles Street Kurri Kurri - Relocation of DN450 Sewermain

Good Afternoon Barry,

I hope this message finds you well. I wanted to follow up on the status of the request outlined in our previous thread. Could you please confirm if Hunter Water is satisfied with the updated plans?

If there are any further requirements or if additional information is needed, please let me know.

Thank you for your attention to this matter.

Kind regards,



From: Luke Griffiths <luke@impactpm.com.au>

Sent: Monday, January 12, 2026 12:23 PM

To: Barry Calderwood <barry.calderwood@hunterwater.com.au>; Johnny Landman <johnny.landman@hunterwater.com.au>; Wesley Jones <wesley.jones@hunterwater.com.au>; James Kennedy <James.Kennedy@hunterwater.com.au>

Cc: Kyie Haley <Kyie@impactpm.com.au>; kward@emmconsulting.com.au <kward@emmconsulting.com.au>; kevin.daly@rcg.com.au <kevin.daly@rcg.com.au>; ray.nielsen@rcg.com.au <ray.nielsen@rcg.com.au>; adam.davies@tgthomas.com.au <adam.davies@tgthomas.com.au>

Subject: Re: HW Ref: HW2017-1215/18/64 - SSD-71547218 - Central Waste - 8 to 10 Styles Street Kurri Kurri - Relocation of DN450 Sewermain

Happy New Year Barry and team,

I hope you had a great break.

Thank you for your email.

We have reviewed this matter with the project structural engineer, with consideration to the context of the previously approved DA/CC and completed.

To confirm:

- The existing piers have been constructed in accordance with a previously approved DA, and therefore reflect the footing depths that were assessed and accepted at the time of approval.
- The attached updated structural plans for the new footings now clearly demonstrate that all new/proposed piers are founded below the sewer invert level/Zone of influence, consistent with Hunter Water's request/requirements.

On this basis, the project team considers the matter to be appropriately addressed, with no requirement for further retrospective amendment to the existing approved works.

Could you please confirm that Hunter Water is satisfied with the attached updated plans and the position outlined above so this item can be formally closed out?

If Hunter Water considers that any specific additional information is still required, could you please identify in return email.

Should you have any concerns, please don't hesitate in reaching out.

Kind regards,



From: Barry Calderwood <barry.calderwood@hunterwater.com.au>

Sent: Wednesday, December 17, 2025 3:16 PM

To: Luke Griffiths <luke@impactpm.com.au>; Johnny Landman <johnny.landman@hunterwater.com.au>; Wesley Jones

3/10/26, 2:20 PM

RE: HW Ref: HW2017-1215/18/64 - SSD-71547218 - Central Waste - 8 to 10 Styles Street Kurri Kurri - Relocation of DN450 Sewer...

<wesley.jones@hunterwater.com.au>; James Kennedy <James.Kennedy@hunterwater.com.au>

Cc: Kylie Haley <Kylie@impactpm.com.au>; kward@emmconsulting.com.au <kward@emmconsulting.com.au>; kevin.daly@rcg.com.au <kevin.daly@rcg.com.au>; ray.nielsen@rcg.com.au <ray.nielsen@rcg.com.au>

Subject: RE: HW Ref: HW2017-1215/18/64 - SSD-71547218 - Central Waste - 8 to 10 Styles Street Kurri Kurri - Relocation of DN450 Sewermain

Hi Luke

Still not see the footings/piers below the invert level of the sewermain.

Regards

Barry Calderwood

Account Manager Major Development | Hunter Water Corporation

36 Honeysuckle Drive Newcastle NSW 2300 | PO BOX 5171 HRMC NSW 2310

T 02 4907 7446 | Twitter: [@hunterwater](#)

barry.calderwood@hunterwater.com.au | hunterwater.com.au

I work flexibly. I'm sending this message now because it's a good time for me, but I don't expect that you will read, respond or action it outside of your own regular hours

From: Luke Griffiths <luke@impactpm.com.au>

Sent: Thursday, 11 December 2025 11:14 AM

To: Barry Calderwood <barry.calderwood@hunterwater.com.au>; Johnny Landman <johnny.landman@hunterwater.com.au>; Wesley Jones <wesley.jones@hunterwater.com.au>; James Kennedy <James.Kennedy@hunterwater.com.au>

Cc: Kylie Haley <Kylie@impactpm.com.au>; kward@emmconsulting.com.au; kevin.daly@rcg.com.au; ray.nielsen@rcg.com.au

Subject: Re: HW Ref: HW2017-1215/18/64 - SSD-71547218 - Central Waste - 8 to 10 Styles Street Kurri Kurri - Relocation of DN450 Sewermain

Morning Barry,

Apologies for the delay.

Please see attached as requested.

Please don't hesitate in reaching out should you have any questions or concerns.

Kind regards,



Luke Griffiths
Director

Impact Project Management Pty Ltd

+61 402 686 306

luke@impactpm.com.au

Unit 1/10 Bishopgate St, Wickham NSW 2293

impactpm.com.au

25 679 034 256



From: Barry Calderwood <barry.calderwood@hunterwater.com.au>

Sent: Wednesday, November 19, 2025 12:02 PM

To: Luke Griffiths <luke@impactpm.com.au>; Johnny Landman <johnny.landman@hunterwater.com.au>; Wesley Jones <wesley.jones@hunterwater.com.au>; James Kennedy <James.Kennedy@hunterwater.com.au>

Cc: Kylie Haley <Kylie@impactpm.com.au>; kward@emmconsulting.com.au <kward@emmconsulting.com.au>; kevin.daly@rcg.com.au <kevin.daly@rcg.com.au>; ray.nielsen@rcg.com.au <ray.nielsen@rcg.com.au>

Subject: RE: HW Ref: HW2017-1215/18/64 - SSD-71547218 - Central Waste - 8 to 10 Styles Street Kurri Kurri - Relocation of DN450 Sewermain

Hi Luke

As indicated in the Meeting Minutes, Hunter Water required the footings/piers below the invert level of the sewermain but this is not shown on the design.

Can you please submit a revised design for our review.

- **Proposed Structural Solutions**

- The developer proposes to improve the footings by extending them laterally and vertically, including piling below the invert of the pipe to bridge the sewer main and reduce load impact. The awning will be supported independently to avoid additional ground pressure on the sewer main. This approach aims to mitigate the existing risk without worsening the situation.

Regards

Barry Calderwood

Account Manager Major Development | Hunter Water Corporation

36 Honeysuckle Drive Newcastle NSW 2300 | PO BOX 5171 HRMC NSW 2310

T 02 4907 7446 | Twitter: [@hunterwater](#)

barry.calderwood@hunterwater.com.au | hunterwater.com.au

I work flexibly. I'm sending this message now because it's a good time for me, but I don't expect that you will read, respond or action it outside of your own regular hours

From: Luke Griffiths <luke@impactpm.com.au>

Sent: Thursday, 30 October 2025 3:27 PM

To: Barry Calderwood <barry.calderwood@hunterwater.com.au>; Johnny Landman <johnny.landman@hunterwater.com.au>; Wesley Jones <wesley.jones@hunterwater.com.au>; James Kennedy <James.Kennedy@hunterwater.com.au>

Cc: Kylie Haley <kylie@impactpm.com.au>; kward@emmconsulting.com.au; kevin.daly@rcg.com.au; ray.nielsen@rcg.com.au

Subject: Re: HW Ref: HW2017-1215/18/64 - SSD-71547218 - Central Waste - 8 to 10 Styles Street Kurri Kurri - Relocation of DN450 Sewermain

Good Afternoon, Hunter Water Team,

Apologies for the delay in response to the below, the project team has sought and received the attached design from Thomas and Associates (structural engineers) for Hunter Water's review and consideration.

In addition, and for HW's convenience ahead of DPHI notification, I have attached the Existing and Proposed Site Plans (attachment 2).

Attachment 3 has the meeting minutes from our meeting as a re-fresh as to the meeting and actions.

Please don't hesitate to reach out should you have any questions or concerns.

Kind regards,



Impact Project Management Pty Ltd

Luke Griffiths
Director

+61 402 686 306

luke@impactpm.com.au

Unit 1/10 Bishopgate St, Wickham NSW 2293

impactpm.com.au

25 679 034 256

in

From: Barry Calderwood
Sent: Tuesday, August 5, 2025 1:17 PM
To: Barry Calderwood <barry.calderwood@hunterwater.com.au>; kward@emmconsulting.com.au <kward@emmconsulting.com.au>; ray.nielsen@rcg.com.au <ray.nielsen@rcg.com.au>; Kyie Haley <Kyie@impactpm.com.au>; Luke Griffiths <luke@impactpm.com.au>; Johnny Landman <johnny.landman@hunterwater.com.au>; Wesley Jones <wesley.jones@hunterwater.com.au>; James Kennedy <James.Kennedy@hunterwater.com.au>
Cc: Varun Agashe <varun.agashe@hunterwater.com.au>; Cass Sharman <Cass.Sharman@hunterwater.com.au>
Subject: HW Ref: HW2017-1215/18/64 - SSD-71547218 - Central Waste - 8 to 10 Styles Street Kurri Kurri - Relocation of DN450 Sewermain
When: Tuesday, August 19, 2025 12:00 PM-1:00 PM.
Where: Microsoft Teams Meeting

Good afternoon Barry,

I trust you have been well mate.

I'm reaching out to reignite the request on behalf of my client (Central Waste Plant Pty Ltd) to meet with your team (Hunter Water) ahead of the Section 49 application to guide our planning parameters. To discuss the SSD (71547218) and the 450mm trunk sewer main located on Lot 1 / 8 Styles Street, Kurri Kurri, as outlined in the attached letter from Hunter Water, dated 18 June 2024.

Please don't hesitate in reaching out should you have any questions or concerns with the above request.

Thanks again and kind regards,



Luke Griffiths Director
P: +61 402 686 306

E: luke@impactpm.com.au
W: impactpm.com.au

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We care for our environment - please keep on screen.

From: Luke Griffiths <luke@impactpm.com.au>
Sent: Wednesday, January 22, 2025 3:07 PM
To: barry.calderwood@hunterwater.com.au <barry.calderwood@hunterwater.com.au>
Cc: kward@emmconsulting.com.au <kward@emmconsulting.com.au>; ray@centralwaste.com.au <ray@centralwaste.com.au>; kevin.daly@recyclecentral.com.au <kevin.daly@recyclecentral.com.au>
Subject: HW Ref: HW2017-1215/18/64 - SSD-71547218 - Central Waste - 8 to 10 Styles Street Kurri Kurri

Good afternoon Barry,

I trust you are well mate and had an enjoyable break.

I reach out on behalf of my client (Central Waste Plant Pty Ltd) in reference to the abovementioned SSD application, our team is seeking an opportunity to meet with Hunter Water to discuss the SSD and associated works, in conjunction with the 450mm trunk sewermain, as outlined in the attached letter from Hunter Water, dated 18 June 2024.

We request this opportunity ahead of the Section 49 application to guide our planning parameters.

We are moving towards the application as soon as possible, your attention to this matter is appreciated.

Please don't hesitate in reaching out should you have any questions or concerns with the above request.

Kind regards,



Luke Griffiths Director
P: +61 402 686 306

E: luke@impactpm.com.au
W: impactpm.com.au

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Microsoft Teams [Need help?](#)

[Join the meeting now](#)

Meeting ID: 493 878 622 449 4

Passcode: 7bf2Ca6t

Dial in by phone

[+61 2 7208 4885,604711039#](tel:+61272084885604711039) Australia, Sydney

[Find a local number](#)

Phone conference ID: 604 711 039#

For organizers: [Meeting options](#) | [Reset dial-in PIN](#)



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3/10/26, 2:20 PM

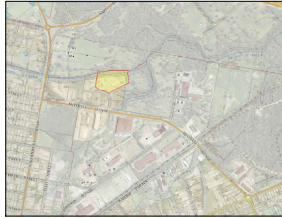
RE: HW Ref: HW2017-1215/18/64 - SSD-71547218 - Central Waste - 8 to 10 Styles Street Kurri Kurri - Relocation of DN450 Sewer...

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SITE LOCATION MAP
COURTESY OF BAY MAPS

CONSTRUCTION STAGE INSPECTIONS

- ENGINEERS INSPECTIONS ARE TO BE ARRANGED BY THE BUILDER FOR THE FOLLOWING STRUCTURAL ELEMENTS AND AS REQUIRED BY THE CERTIFYING AUTHORITY:

STRUCTURAL ELEMENT	HOLD POINT	INSPECTING AUTHORITY
FOOTINGS	PRIOR TO CONCRETE POUR	ENGINEER & CERTIFIER
- ENGINEERS INSPECTION REPORTS SHALL BE PROVIDED VERIFIED CONSTRUCTION IN ACCORDANCE WITH THE ENGINEERING DESIGN FOR THE SPECIFIC ELEMENT OF THE WORK, AND SHALL NOT ASSUME THE REQUIREMENT FOR AN INDEPENDENT INSPECTION BY THE CERTIFYING AUTHORITY, UNLESS PRIOR PERMISSION IS OBTAINED FROM THEM BY THE BUILDER.
- ENGINEERS INSPECTION REPORTS PROVIDED BY THOMAS & ASSOCIATES CONSULTING DO NOT CONSTITUTE CERTIFICATION UNDER THE BUILDING DEVELOPMENT CERTIFICATES ACT 2016, THE ENVIRONMENTAL PLANNING & ASSESSMENT (EPAL) ACT 2017.
- MINIMUM 48 HOURS REQUIRED FOR BOOKING INSPECTIONS: **INSPECTION LINE 421 48371182**
- NO INSPECTION CERTIFICATES WILL BE PROVIDED BY THIS OFFICE FOR WORKS OR STRUCTURAL ELEMENTS UNLESS INSPECTED BY THIS OFFICE: **NO INSPECTION - NO CERTIFICATE**

DESIGN STATEMENT AND DRAWING CERTIFICATION

WE, THOMAS & ASSOCIATES CONSULTING (TAC), BEING PROFESSIONAL ENGINEERS AS DEFINED BY THE NATIONAL CONSTRUCTION CODE OF AUSTRALIA, HEREBY CONFIRM THAT WE HAVE UNDERTAKEN THE STRUCTURAL ENGINEERING DESIGN FOR THE PROPOSED DEVELOPMENT AT:

STYLES STREET, KURRI KURRI, NSW, 2327

FOR: CENTRAL WASTE STATION

AS SHOWN IN THOMAS & ASSOCIATES CONSULTING (TAC) DRAWINGS:

230499 SHEETS 001 TO 004 REVISED 11/03/2025

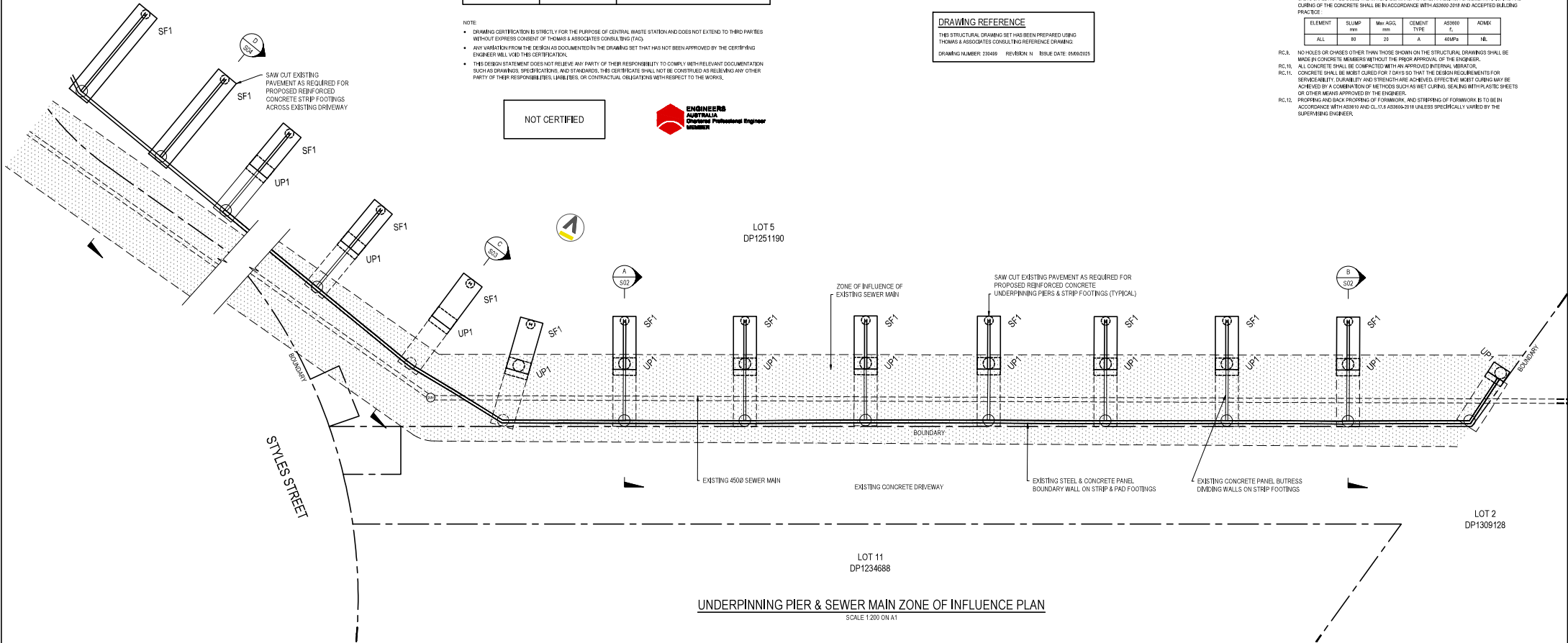
AS SUCH WE WOULD CERTIFY THAT THE STRUCTURAL ENGINEERING DESIGN FOR THE WORKS AS SHOWN IN THIS DRAWING SET HAS BEEN UNDERTAKEN IN ACCORDANCE WITH SOUND ENGINEERING PRACTICES AND GENERALLY IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS AS OUTLINED BELOW:

NCC 2022 Volume 1 - Part B1 - Structural Provisions	Structural Elements (works)	Referenced Australian Standards / Design Manuals
B1P1 Structural Reliability	Design Loads, Permanent, Imposed	AS1170.0:2002 Structural Design Actions Part 0: General Principles AS1170.1:2018 Structural Design Actions Part 1: Permanent, Imposed and other actions
B1P2 Structural Reliability	Foundations, Walls and Footings	AS3600:2018 Concrete Structures

NOTE:

- DRAWING CERTIFICATION IS STRICTLY FOR THE PURPOSE OF CENTRAL WASTE STATION AND DOES NOT EXTEND TO THIRD PARTIES WITHOUT EXPRESS CONSENT OF THOMAS & ASSOCIATES CONSULTING (TAC).
- ANY VARIATION FROM THE DESIGN AS DOCUMENTED IN THE DRAWING SET THAT HAS NOT BEEN APPROVED BY THE CERTIFYING ENGINEER WILL VOID THIS CERTIFICATION.
- THIS DESIGN STATEMENT DOES NOT RELIEVE ANY PARTY OF THEIR RESPONSIBILITY TO COMPLY WITH RELEVANT DOCUMENTATION SUCH AS DRAWINGS, SPECIFICATIONS, AND STANDARDS. THIS CERTIFICATE SHALL NOT BE CONSTRUED AS RELIEVING ANY OTHER PARTY OF THEIR RESPONSIBILITIES, LIABILITIES, OR CONTRACTUAL OBLIGATIONS WITH RESPECT TO THE WORKS.

NOT CERTIFIED



GENERAL NOTES

- THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ARCHITECT, BUILDING DESIGNER AND OTHER RELEVANT CONSULTANTS DRAWINGS AND SPECIFICATIONS, AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE REQUIRED DURING THE COURSE OF CONSTRUCTION/DEVELOPMENT.
- ALL DIMENSIONS ARE IN MILLIMETRES & LEVELS ARE IN METRES UNLESS STATED OTHERWISE. ONLY REQUIRED DIMENSIONS SHALL BE USED. DIMENSIONS SHALL NOT BE OBTAINED BY SCALING THE DRAWINGS.
- ALL DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT OR BUILDING DESIGNER AND DIMENSIONS RELEVANT TO THE SET-OUT SHALL BE VERIFIED BY THE BUILDER, CONTRACTOR OR PROJECT MANAGER PRIOR TO THE COMMENCEMENT OF CONSTRUCTION OR FABRICATION.
- DURING CONSTRUCTION IT IS THE RESPONSIBILITY OF THE BUILDER, CONTRACTOR OR PROJECT MANAGER TO MAINTAIN THE STRUCTURE AND ALL STRUCTURAL ELEMENTS IN A STABLE CONDITION. STRUCTURAL ELEMENTS SHALL NOT BE OVERSTRESSED DURING CONSTRUCTION.
- WORKMANSHIP AND MATERIALS TO BE IN ACCORDANCE WITH ALL RELEVANT STANDARDS, THE BUILDING CODE OF AUSTRALIA AND LOCAL STATUTORY AUTHORITIES. REFERENCES TO AUSTRALIAN STANDARDS REFER TO THE CURRENT EDITION UNLESS SPECIFICALLY NOTED OTHERWISE.
- THOMAS & ASSOCIATES CONSULTING PTY LTD TAKE NO RESPONSIBILITY FOR DETERMINING THE LOCATION OF EXISTING SERVICES OR EASEMENTS.
- THE APPROVAL OF A SUBSTITUTION OF MATERIAL OR MEMBER SIZE SHALL BE SOUGHT FROM AN ENGINEER BUT IS NOT AN AUTHORIZATION FOR AN AMENDMENT TO THE DRAWING SET. ANY AMENDMENT TO THE ENGINEERS DRAWING SET WILL REQUIRE AUTHORIZATION OR AMENDED PLANS FROM THE ARCHITECT OR BUILDING DESIGNER PRIOR TO COMMENCING WORK.
- THE INFORMATION PROVIDED IN THIS DRAWING SET IS SPECIFICALLY FOR THE USE OF THE 'CLIENT' AND AT THE 'ADDRESS' AS SHOWN IN THE TITLE BLOCK ON THIS DRAWING SET.
- CLIENT TO READ & COMPLY WITH THE RECOMMENDATIONS OF THE CONSULTANT FOUNDATION MAINTENANCE & FOOTING PERFORMANCE.
- GENERAL CAUTION IS HEREBY GIVEN TO ANY PERSON EXCAVATING ON SITE. SERVICE ENQUIRIES TO BAIL BEFORE YOU DIG SHOULD BE MADE PRIOR TO EXCAVATION. NO LIABILITY FOR DISRUPTION OR INTERFERENCE WITH ANY EXISTING SERVICES DUE TO THE ACTION OF OTHERS EXISTS THROUGH THE MAKING OF THIS PLAN.

DRAWING REFERENCE

THIS STRUCTURAL DRAWING SET HAS BEEN PREPARED USING THOMAS & ASSOCIATES CONSULTING REFERENCE DRAWING:
DRAWING NUMBER: 230499 REVISION: N ISSUE DATE: 04/03/2025

REINFORCED CONCRETE NOTES

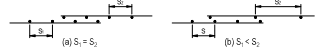
- RC.1. ALL WORKMANSHIP AND MATERIALS TO BE IN ACCORDANCE WITH AS3600:2018 EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
- RC.2. EXPOSURE CLASSIFICATION AND CONCRETE STRENGTH GRADATIONS IN ACCORDANCE WITH TABLE 4.3 AS3600:2018

EXPOSURE CLASSIFICATION	CONCRETE STRENGTH GRADE
B1	20MPa

- RC.3. MINIMUM CONCRETE COVER TO REINFORCEMENT SHALL COMPLY WITH TABLE 4.10.3.2 AS3600:2018:

EXPOSURE CLASSIFICATION	REQUIRED COVER (mm)				
	20MPa	25MPa	30MPa	40MPa	55MPa
A1	20	20	20	20	20
A2	(50)	20	20	20	20
B1	-	(50)	40	30	20
B2	-	-	(50)	40	20
C1	-	-	-	(70)	50
C2	-	-	-	-	65

- RC.4. REINFORCEMENT SHALL BE ON CHAIRS TO ENSURE THE REQUIRED COVER TO REINFORCEMENTS MAINTAINED.
- RC.5. MINIMUM BAR SPLICES OF 450mm FOR M12, 600mm FOR M16, 750mm FOR M20 AND 900mm FOR M24. ALLOWED SPACE FOR WELDED MESH IN TENSION SHALL BE MADE SO THAT THE TWO OUTERMOST CROSS BARS ARE SPACED AT NOT LESS THAN 150mm, OR 50mm APART FOR PLAIN OR DEFORMED BARS. FOR SHEETS OF MESH OVERLAP THE TWO OUTERMOST CROSS BARS OF THE SHEET BEING LAPPED AS SHOWN IN FIGURE BELOW. THE MINIMUM LENGTH OF THE OVERLAP SHALL EQUAL 1000mm.



- RC.7. ALL TIE WIRES SHALL BE BENT 90 DEGREE TO NOT INTERFERE WITH THE COVER ZONE.
- RC.8. ADMIXTURES AND CONCRETE MATERIAL CONTAINING CALCIUM CHLORIDE OR OTHER CHLORIDE SALTS SHALL NOT BE USED. THE MATERIALS MANUFACTURE, HANDLING, PLACEMENT, FINISHING AND CURING OF THE CONCRETE SHALL BE IN ACCORDANCE WITH AS3600:2018 AND ACCEPTED BUILDING PRACTICE.

ELEMENT	SUMP mm	Max AGG mm	CEMENT TYPE	AS3600 f _c	ADMX
ALL	50	20	A	40MPa	NIL

- RC.9. NO HOLES OR CHASES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.
- RC.10. ALL CONCRETE SHALL BE COMPACTED WITH AN APPROVED INTERNAL VIBRATOR.
- RC.11. CONCRETE SHALL BE MOST CURED FOR 7 DAYS SO THAT THE DESIGN REQUIREMENTS FOR SERVICEABILITY, DURABILITY AND STRENGTH ARE ACHIEVED. EFFECTIVE MOST CURING MAY BE ACHIEVED BY A COMBINATION OF METHODS SUCH AS NET CURING, SEALING WITH PASTIC SHEETS OR OTHER MEANS APPROVED BY THE ENGINEER.
- RC.12. PROPPING AND JACK PROPPING OF FORMWORK, AND STRIPPING OF FORMWORK IS TO BE IN ACCORDANCE WITH AS3600 AND CLT.14 AS3600:2018 UNLESS SPECIFICALLY VARIED BY THE SUPERVISING ENGINEER.



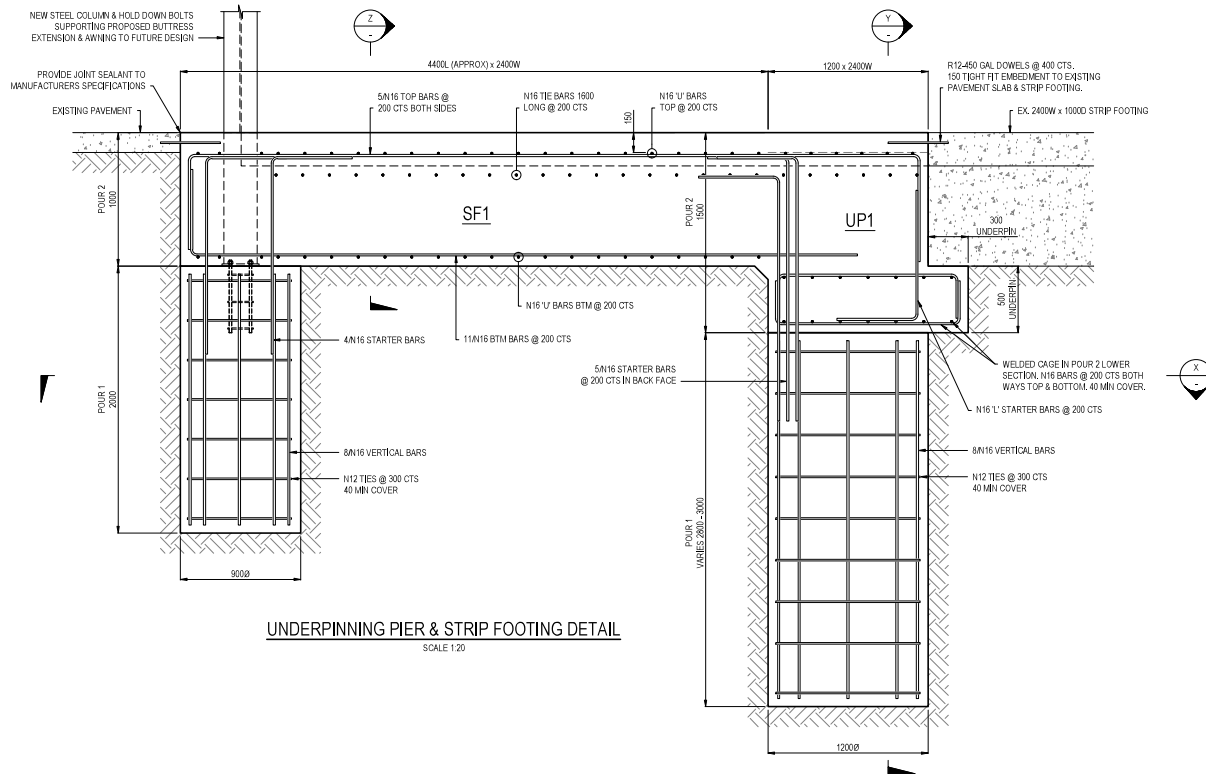
CLIENT	PROJECT	DESIGNED	DRAWN	CHECKED	SHEET SIZE
CENTRAL WASTE STATION	LOT 5, DP1251190, 8 STYLES STREET, KURRI KURRI, NSW, 2327	JN	JN	AD	A1
ADDRESS	UNDERPINNING PIER PLAN, NOTES & DRAWING CERTIFICATION				
JOB #	SHEET #	DESIGNED	DRAWN	CHECKED	SHEET SIZE
230499	001	JN	JN	AD	A1

REVISE	DESCRIPTION	DRAWN	CHECKED	DATE
B	REVISED FOR CONSTRUCTION	JN	AD	19/12/2023
C	REVISED FOR HUNTER WATER REQUIREMENTS	JN	AD	22/12/2023
D	REVISED FOR HUNTER WATER REQUIREMENTS	JN	AD	04/02/2024
E	REVISED FOR HUNTER WATER REQUIREMENTS	JN	AD	11/02/2024

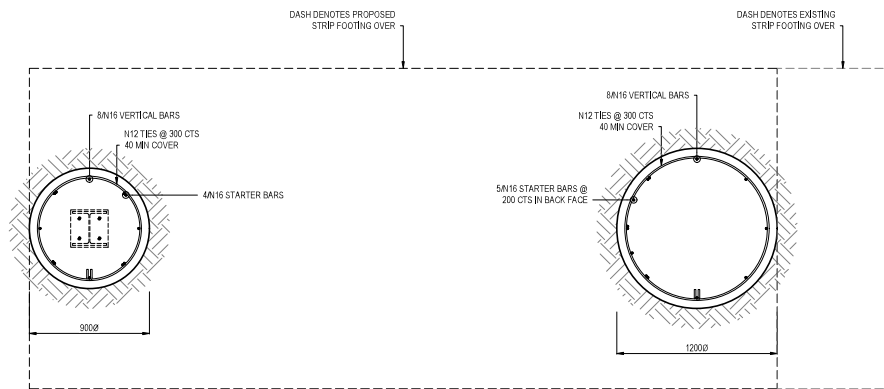
THIS DRAWING IS NOT TO BE USED WITHOUT CERTIFICATION - REFER TO SHEET 000 FOR DRAWING CERTIFICATION



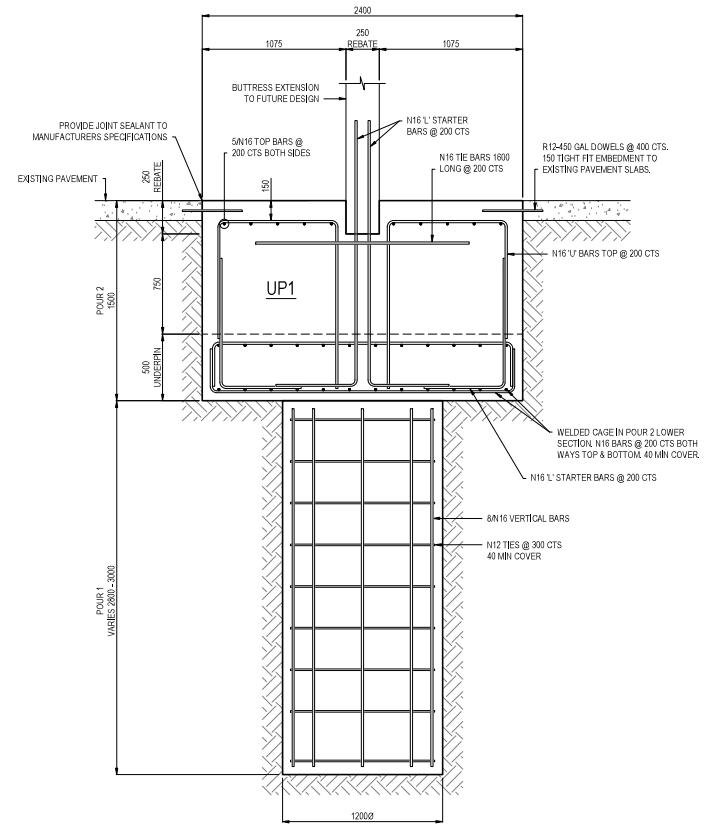
GENERAL CAUTION IS HEREBY GIVEN TO ANY PERSON EXCAVATING ON SITE. SERVICE ENQUIRIES TO BAIL BEFORE YOU DIG SHOULD BE UNDERTAKEN PRIOR TO SUCH EXCAVATION. NO LIABILITY FOR DISRUPTION OR INTERFERENCE WITH ANY EXISTING SERVICES DUE TO THE ACTION OF OTHERS EXISTS THROUGH THE MAKING OF THIS PLAN.



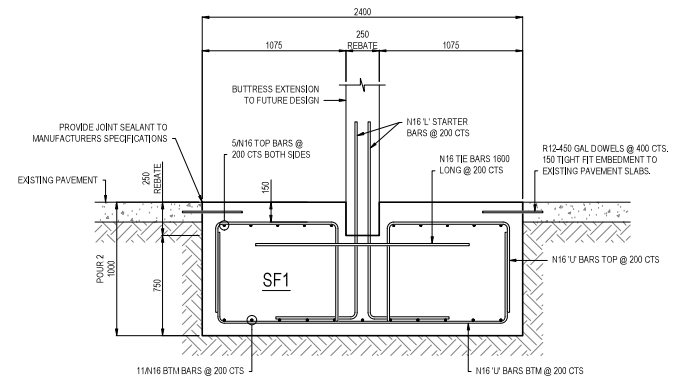
UNDERPINNING PIER & STRIP FOOTING DETAIL
SCALE 1:20



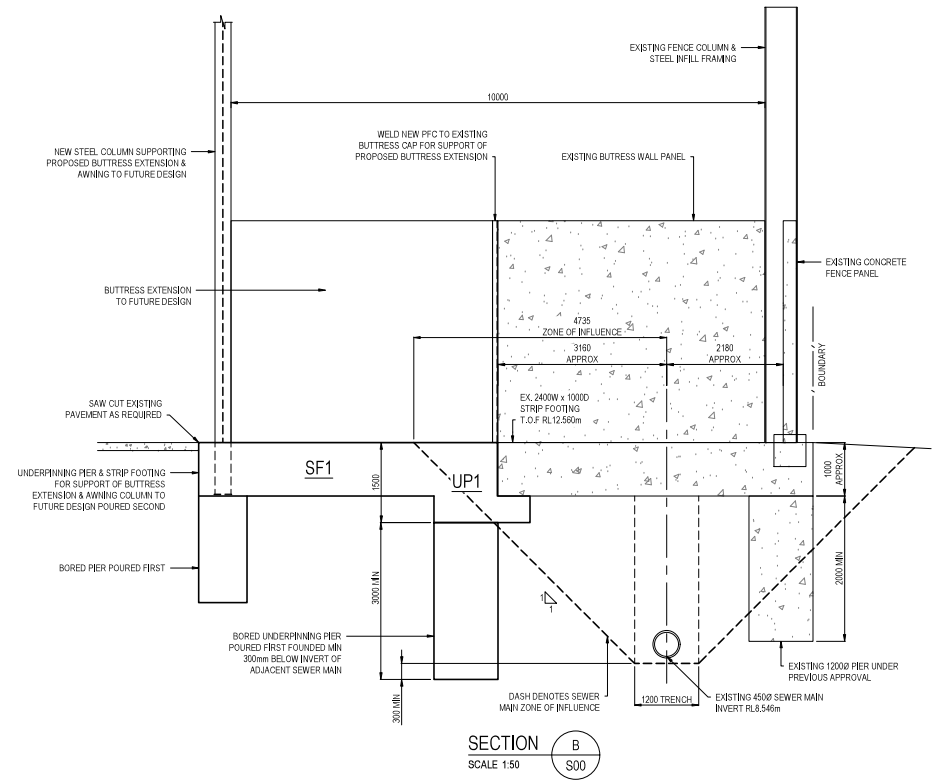
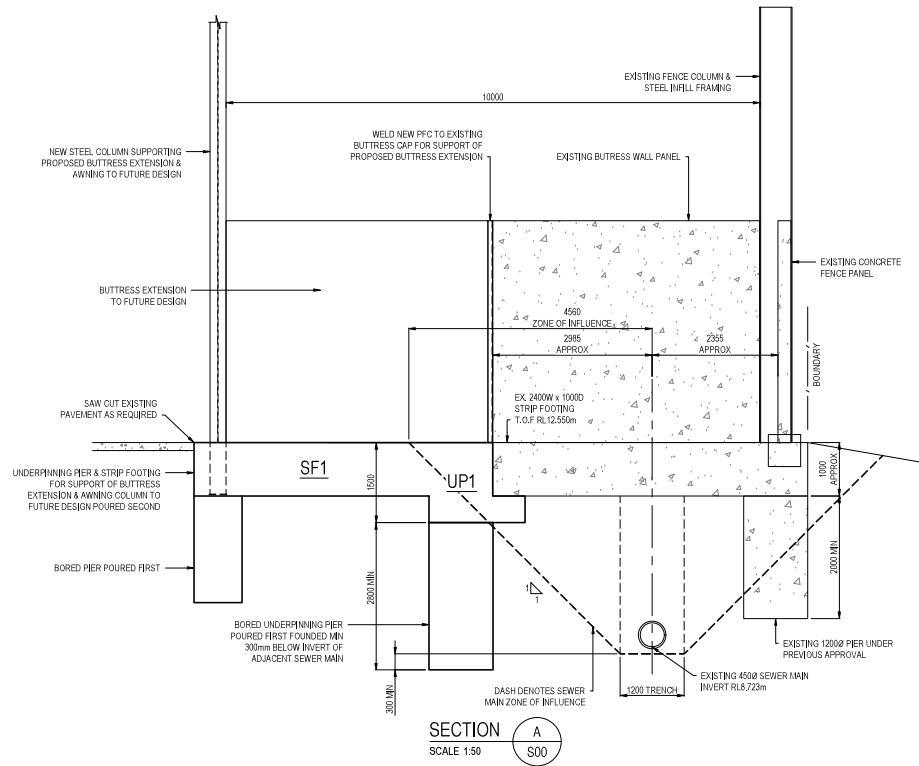
SECTION X-X
SCALE 1:20

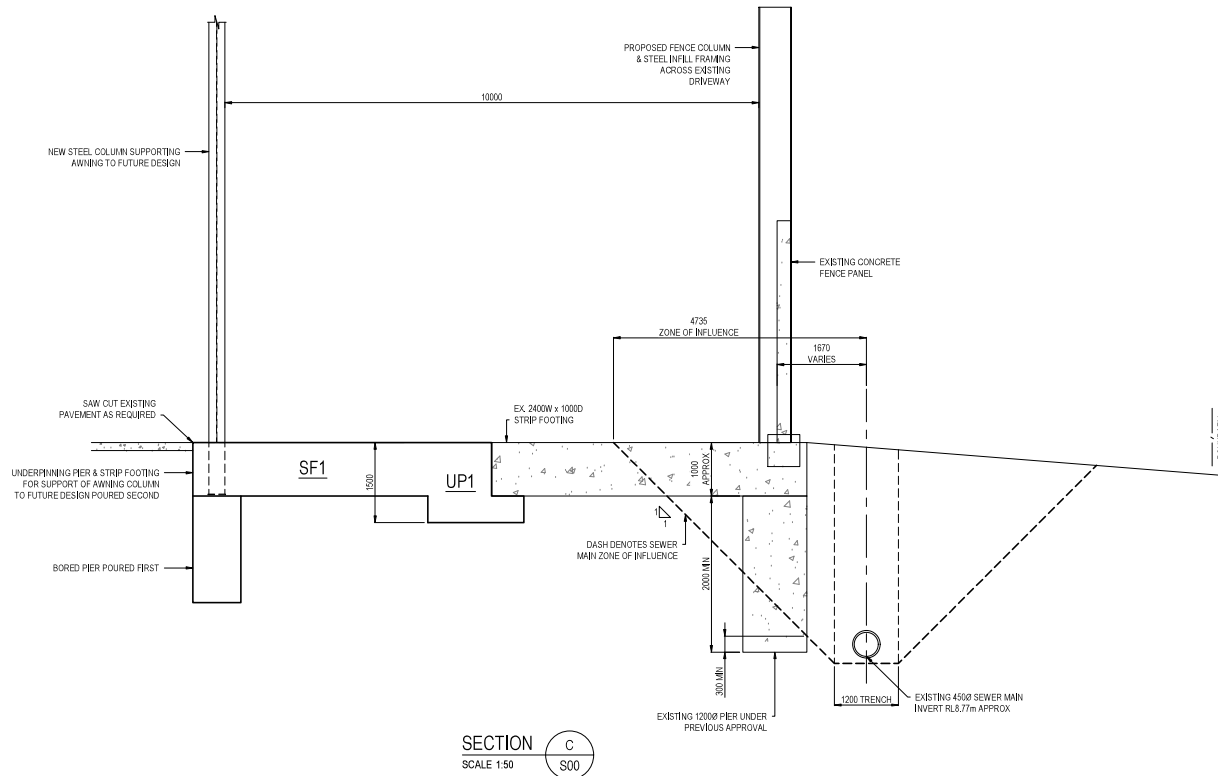


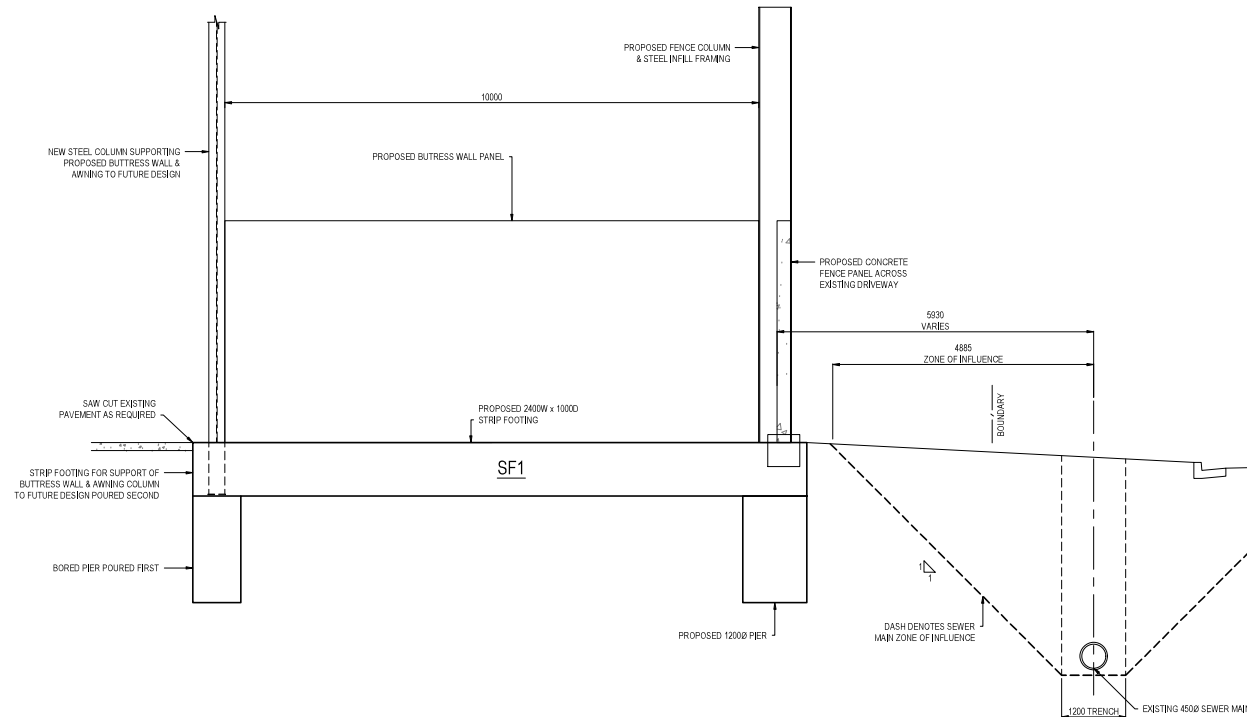
SECTION Y-Y
SCALE 1:20



SECTION Z-Z
SCALE 1:20







SECTION D
SCALE 1:50
S00

Appendix C

Technical response memorandum – noise

16 February 2026

Joanna Bakopanos
A/Director - Industry Assessments
Department of Planning, Housing and Infrastructure
Locked Bag 5022
Parramatta NSW 2124

Re: Kurri Kurri Integrated Resource Recovery Centre Noise Response to Submissions

Dear Joanna,

Please find below our response to DPHI's comments related to noise on the Kurri Kurri Integrated Resource Recovery Centre (SSD-71547218).

1 Response to DPHI comments

1.1 Metal Processing Operations

i DPHI Comment

5. The proposal includes expanded metal processing operations located toward the western portion of the IRRRC, closer to identified sensitive receivers. Further clarification is required for the following:

i. further details on how metal processing equipment and associated activities have been represented in the operational noise model

ii. whether additional mitigation or management measures have been considered to minimise noise impacts to nearby sensitive land uses.

ii Response

Details on the equipment proposed for the metal processing operations and associated activities have been incorporated into the amended noise modelling presented below. These operations were not included in the original noise modelling, as the associated equipment is expected to generate relatively low noise levels in comparison to other site activities and is afforded substantial attenuation from the construction and orientation of the processing shed. The updated modelling reflects these sources in the overall assessment of operational and cumulative noise impacts.

The primary noise sources associated with metal processing comprise a shredder, granulator, and ancillary equipment, all of which will operate within the metal processing shed. The shed is fitted with speed-operated roller doors that are normally closed and only open intermittently to facilitate vehicle ingress and egress.

In addition, the shed has been designed so that all openings are oriented away from the nearest noise-sensitive receivers, and the metal processing operations will utilise contemporary low-noise equipment consistent with Best Available Technology Economically Achievable (BATEA) principles.

1.2 Cumulative Construction and Operational Noise

i DPHI Comment

6. The noise impact assessment (NIA) considers construction and operational scenarios separately. Although the EIS acknowledges that construction activities will be staged and overlap with operations, it does not clearly demonstrate that combined construction and operational noise have been assessed under worst-case conditions. Additional information is required to confirm the following:

- i. whether combined construction and operational noise scenarios have been assessed
- ii. whether any additional mitigation measures are required when construction and operations overlap.

ii Response

An updated assessment of cumulative construction and operational noise has been completed. To assess cumulative impacts of concurrent construction and operational noise, the results of each assessment have been combined and assessed against the relevant Interim Construction Noise Guideline (ICNG) Noise Management Levels (NMLs) as outlined in the NVIA.

The cumulative construction and operational noise scenario has been assessed on a worst-case basis. Project staging has not been incorporated due to its complexity; accordingly, the assessment assumes full operational noise in combination with all construction activities occurring simultaneously.

2 Noise modelling update

2.1 Noise criteria

The relevant operational (NPfI project noise trigger levels) and construction (ICNG noise management levels) noise criteria remain consistent with those outlined in the original NVIA.

2.2 Method overview

Quantitative modelling of operational and construction noise was completed using DMGR iNoise noise prediction software in line with the methodologies outlined in the NVIA.

The operational and construction noise sources and associated sound power levels used in the noise model are summarised in Table 2.1. The equipment items and quantities are based on information provided by the client and are representative of the proposed expansion. Most of the sound power data were obtained from noise measurements of existing activities at the site. Where this was not possible, sound power data has been obtained from an EMM database of similar plant and equipment.

No modifying factor corrections, as per Fact sheet C of the Noise Policy for Industry (NPfI) (EPA 2017), are applicable to any of the site's operational noise emissions given the quantity and nature of the proposed equipment as outlined in the NVIA.

Table 2.1 Operational noise source sound power levels

Type	Area	Noise source	L _{Aeq} sound power level per unit, dB	Quantity operating (within any 15-minute period)				Utilisation ⁴
				Day	Eve	Night	MS	
Operations	Primary Processing Shed	Receival shed ^{1, 3}	109	1	1	1	1	100%
		Picking and sorting plant ¹	107	1	1	0	1	100%
	Residual Processing Shed	Main shredder	108	1	1	0	1	100%
		Secondary shredder	108	1	1	0	1	100%
		Baler	88	1	1	0	1	100%
		Screen waste/flip flop	88	1	1	0	1	100%
		Windshifter	93	1	1	0	1	100%
	Metal Processing Shed	Shredder	107	1	1	1	1	100%
		Granulator	103	1	1	1	1	100%
	Yard	Front end loader (FEL) ²	105	3	3	1	3	100%
		Forklift/bobcat ²	85	1	1	1	1	100%
		Excavator ²	107	2	2	1	2	100%
		Mobile crusher	118	1	0	0	0	100%
		Screen	109	1	0	0	0	100%
	Deliveries	Heavy vehicles (driving) ²	103	8	5	1	8	15%
	Residual Processing Traffic	Heavy vehicles (driving) ²	103	1	1	1	1	15%
	Metal Processing Traffic	Heavy vehicles (driving) ²	103	1	1	1	1	15%
	Car Park	Light vehicles ²	76	15	5	5	15	15%
Construction	Relevant construction areas	Delivery truck	105	2	0	0	0	100%
		Light vehicle	76	2	0	0	0	100%
		Concrete truck	113	1	0	0	0	100%
		Crane	106	1	0	0	0	100%
		Bobcat	100	1	0	0	0	100%
		Excavator	107	1	0	0	0	100%
		Hand Tools	97	2	0	0	0	100%

Notes: see over

1. Measured during site visit.
2. Sourced from the EMM sound power level database for similar equipment.
3. The throughput of the receival shed during the night-time period is expected to be significantly reduced. As such, the sound power level emitted from this source has been reduced by 3 dB during the night period.
4. Utilisation is the percentage of a 15-minute assessment period during which a specific item of plant or equipment is actively operating.

2.3 Operating assumptions

In addition to the sound power levels, quantities and utilisation assumptions provided in Table 2.1, operating assumptions adopted for the purpose of modelling noise emissions are as follows:

- Due to the relatively short distances that operational traffic is expected to travel on-site, all traffic is assumed to be driving on site for 2.5 minutes in any 15-minute period and idling for 12.5 minutes in any 15-minute period.
- All onsite vehicle movements are 10 kilometres per hour (km/hr) or less.
- The roller doors of the metal and residual processing sheds are speed operated and will be automatically closed. Given this it is assumed that a single door would be opened for approximately 1.5 minutes in any 15-minute period to allow for vehicle ingress/egress.

The existing facility has a range of controls already in place to minimise and manage noise generation from site as outlined in the NVIA. These will be continued and expanded as part of the IRRC. Additional mitigation measures adopted/formalised as part of the RtS include:

- The mobile crusher and screen (which operate on a campaign basis) will continue to be operated in the eastern portion of the yard to maximise shielding effects provided by the existing receivals shed to sensitive receivers located to the north-west of site.

2.4 Operational noise modelling results

Predicted operational noise levels for the day period (following inclusion of the metal processing equipment) are provided in Table 2.3. The levels presented represent the energy-average noise level over a 15-minute period and assumes all listed plant operating concurrently.

Table 2.2 Predicted operational noise levels

Location	Predicted operational noise level $L_{Aeq,15minute}$, dB				Project noise trigger level (PNTL), $L_{Aeq,15minute}$, dB				Exceedance, dB			
	Day	Eve	Night	MS	Day	Eve	Night	MS	Day	Eve	Night	MS
R1	<35	<30	<30	<30	49	48	43	43	Nil	Nil	Nil	Nil
R2	<35	<30	<30	<30	49	48	43	43	Nil	Nil	Nil	Nil
R3	<35	<30	<30	<30	46	44	40	42	Nil	Nil	Nil	Nil
R4	<35	31	<30	31	40	40	40	40	Nil	Nil	Nil	Nil
R5	<35	<30	<30	<30	53	53	53	53	Nil	Nil	Nil	Nil
R6	35	34	31	34	46	44	40	42	Nil	Nil	Nil	Nil
R7	<35	<30	<30	<30	40	40	40	50	Nil	Nil	Nil	Nil
R8	<35	30	<30	30	43	43	43	43	Nil	Nil	Nil	Nil

Location	Predicted operational noise level L _{Aeq,15minute} , dB				Project noise trigger level (PNTL), L _{Aeq,15minute} , dB				Exceedance, dB			
	Day	Eve	Night	MS	Day	Eve	Night	MS	Day	Eve	Night	MS
R9	<35	<30	<30	<30	63	63	63	63	Nil	Nil	Nil	Nil
R10	<35	32	<30	32	53	53	53	53	Nil	Nil	Nil	Nil
R11	36	32	<30	32	46	44	40	42	Nil	Nil	Nil	Nil
R12	<35	<30	<30	<30	45	45	45	45	Nil	Nil	Nil	Nil
R13	41	38	35	38	68	68	68	68	Nil	Nil	Nil	Nil
R14	41	38	35	38	68	68	68	68	Nil	Nil	Nil	Nil
R15	<35	31	<30	31	53	53	53	53	Nil	Nil	Nil	Nil
R16	<35	<30	<30	<30	45	45	45	45	Nil	Nil	Nil	Nil
R17	37	32	<30	32	53	53	53	53	Nil	Nil	Nil	Nil
R18	43	41	39	41	68	68	68	68	Nil	Nil	Nil	Nil
R19	37	35	31	35	40	40	40	40	Nil	Nil	Nil	Nil
R20	38	35	31	35	48	45	41	43	Nil	Nil	Nil	Nil
R21	46	42	38	42	68	68	68	68	Nil	Nil	Nil	Nil
R22	40	37	34	37	48	45	41	43	Nil	Nil	Nil	Nil
R23	48	46	41	44	48	47	43	43	Nil	Nil	Nil	1 dB
R24	46	45	42	45	68	68	68	68	Nil	Nil	Nil	Nil
R25	37	37	34	37	49	48	43	43	Nil	Nil	Nil	Nil
R26	49	47	41	47	68	68	68	68	Nil	Nil	Nil	Nil
R32	47	43	39	43	68	68	68	68	Nil	Nil	Nil	Nil
R33	45	43	37	43	68	68	68	68	Nil	Nil	Nil	Nil
R34	55	54	50	53	68	68	68	68	Nil	Nil	Nil	Nil
R35	47	45	39	43	48	47	43	43	Nil	Nil	Nil	Nil
R36	42	37	32	37	48	47	43	43	Nil	Nil	Nil	Nil
R37	45	44	41	43	48	45	41	43	Nil	Nil	Nil	Nil
R38	45	44	41	43	48	45	41	43	Nil	Nil	Nil	Nil
R39	48	43	38	41	48	45	41	43	Nil	Nil	Nil	Nil

Notes: 1. Day: 7:00 am to 6:00 pm Monday to Saturday; 8:00 am to 6:00 pm Sundays and public holidays.

The operational noise levels are predicted to be below the relevant NPfI noise trigger levels at most assessment locations during all periods under noise enhancing meteorological conditions, with the exception of assessment location R23 which was predicted to be 1 dB above the relevant PNTL during the morning shoulder period (6:00 am-7:00 am) only.

It is of note that these outcomes are consistent with the original NVIA and the inclusion of the metal processing operations did not meaningfully change any outcomes. Accordingly, the assessment of the feasibility and reasonableness of the committed and additional noise mitigation measures presented in that document remains applicable.

2.5 Cumulative noise modelling results

Predicted cumulative noise levels for the day period are provided in Table 2.3. The levels presented represent the energy-average noise level over a 15-minute period and assumes all listed plant operating concurrently.

Proposed construction hours are 7:00 am to 6:00 pm Monday to Friday and 8:00 am to 6:00 pm on Saturdays, however, only low-noise/ancillary construction works (i.e. deliveries, etc.) are proposed during the daytime out-of-hours period on Saturdays (1:00 pm to 6:00 pm) and the proponent is committed to meeting any relevant noise criteria in this regard. Given this, no cumulative noise impacts are anticipated to occur during this period and it has not been assessed further.

Predicted construction noise levels have been assessed against the relevant criteria for standard construction hours (7:00 am and 6:00 pm Monday to Friday and 8:00 am to 1:00 pm Saturday).

Table 2.3 Predicted cumulative noise levels

Location	Predicted operational noise level	Predicted construction noise level	Predicted cumulative noise level	Noise management level (NML)	Exceedance, dB
	$L_{Aeq,15minute}$, dB	$L_{Aeq,15minute}$, dB	$L_{Aeq,15minute}$, dB	$L_{Aeq,15minute}$, dB	
	Day	Day	Day	Standard hours	Standard hours
R1	<35	<35	<35	54	Nil
R2	<35	<35	<35	54	Nil
R3	<35	<35	<35	51	Nil
R4	<35	<35	<35	55	Nil
R5	<35	<35	<35	55	Nil
R6	35	<35	36	51	Nil
R7	<35	<35	<35	55	Nil
R8	<35	<35	<35	55	Nil
R9	<35	<35	<35	70	Nil
R10	<35	<35	35	55	Nil
R11	36	<35	37	51	Nil
R12	<35	<35	<35	55	Nil
R13	41	<35	42	75	Nil
R14	41	<35	42	75	Nil
R15	<35	<35	36	55	Nil
R16	<35	<35	<35	55	Nil
R17	37	<35	38	55	Nil
R18	43	37	44	75	Nil

Location	Predicted operational noise level	Predicted construction noise level	Predicted cumulative noise level	Noise management level (NML)	Exceedance, dB
	L _{Aeq,15minute} , dB	L _{Aeq,15minute} , dB	L _{Aeq,15minute} , dB	L _{Aeq,15minute} , dB	
	Day	Day	Day	Standard hours	Standard hours
R19	37	<35	38	55	Nil
R20	38	38	41	53	Nil
R21	46	42	47	75	Nil
R22	40	<35	41	53	Nil
R23	48	48	51	53	Nil
R24	46	36	46	75	Nil
R25	37	<35	39	54	Nil
R26	49	47	51	75	Nil
R32	47	50	52	75	Nil
R33	45	51	52	75	Nil
R34	55	55	58	75	Nil
R35	47	45	49	53	Nil
R36	42	40	44	53	Nil
R37	45	42	47	53	Nil
R38	45	42	47	53	Nil
R39	48	41	49	53	Nil

Notes: 1. Day: 7:00 am to 6:00 pm Monday to Saturday; 8:00 am to 6:00 pm Sundays and public holidays.
2. Standard hours: 7:00 am to 6:00 pm Monday to Friday; 8:00 am to 1:00 pm Saturdays; Outside of hours (OOH): 1:00 pm to 6:00 pm Saturdays

Cumulative noise levels are predicted to satisfy the relevant NMLs at all residential assessment locations during standard construction hours and under noise enhancing meteorological conditions.

Given that these cumulative noise predictions assume the concurrent peak operating and construction scenarios, it is likely that actual cumulative noise levels would be less than those predicted for the majority of the time.

3 Additional noise mitigation measures

This section outlines the additional mitigation measures proposed to manage operational and construction noise emissions.

3.1 Campaign mobile crushing and screening (operation)

The campaign mobile crushing and screening plant will be operated in accordance with the following:

- be operated within the eastern portion of the site yard to maximise acoustic shielding provided by the existing receivals shed to sensitive receivers located to the north-west of the site;

- be planned and scheduled with consideration of prevailing and forecast meteorological conditions (including wind speed, wind direction and atmospheric stability), with activities deferred, shortened, rescheduled or modified where unfavourable conditions are predicted; and
- only operate during standard daytime hours (7:00 am to 6:00 pm Monday to Saturday; and 8:00 am to 6:00 pm Sundays and public holidays).

3.2 Construction activities

During the Saturday daytime out-of-hours period (1:00 pm to 6:00 pm), construction activities will be restricted to low-noise or ancillary works only (e.g. material deliveries and minor works not involving high-noise plant or equipment), to minimise potential noise impacts at surrounding sensitive receivers.

4 Conclusion

EMM has responded to a request for additional information from DPHI relating to the Kurri Kurri Integrated Resource Recovery Centre (SSD-71547218).

Details on the equipment proposed for the metal processing operations and associated activities have been incorporated into the amended noise modelling.

The operational noise levels are predicted to be below the relevant NPfI noise trigger levels at most assessment locations during all periods under noise enhancing meteorological conditions, with the exception of assessment location R23 which was predicted to be 1 dB above the relevant PNTL during the morning shoulder period (6:00 am-7:00 am) only.

It is of note that these outcomes are consistent with the original NVIA and the inclusion of the metal processing operations did not meaningfully change any outcomes. Accordingly, the assessment of the feasibility and reasonableness of the committed and additional noise mitigation measures presented in that document remains applicable.

An updated assessment of cumulative construction and operational noise has been completed. To assess cumulative impacts of concurrent construction and operational noise, the results of each assessment have been combined and assessed against the relevant Interim Construction Noise Guideline (ICNG) Noise Management Levels (NMLs) as outlined in the NVIA.

Cumulative noise levels are predicted to satisfy the relevant NMLs at all residential assessment locations during standard construction hours and under noise enhancing meteorological conditions.

Given that these cumulative noise predictions assume the concurrent peak operating and construction scenarios, it is likely that actual cumulative noise levels would be less than those predicted for the majority of the time.

If you have any questions or require any further information, please do not hesitate to contact me on 02 4907 4800 or email.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'L. Adamson' with a stylized flourish at the end.

Lucas Adamson

Associate Acoustics Consultant

ladamson@emmconsulting.com.au

Review: Robert Kirwan (16 February 2026)

Appendix D

Revised mitigation measures

The mitigation measures identified in the EIS have been reviewed following consideration of submissions. Where appropriate, measures have been refined and additional measures included. The updated mitigation measures table is presented in Table D.1. Amendments to the original EIS mitigation measures are highlighted in blue for ease of reference, with changed or added wording shown as underlined text.

Table D.1 Mitigation measures table

ID	Mitigation measure
Waste management	
Management of waste that is received and processed through the IRRC	
WAS1	All waste will be managed in accordance with the requirements of the NSW <i>Protection of the Environment Operations Act 1997</i> , the NSW <i>Waste Avoidance and Resource Recovery Act 2001</i> , the <i>Standards for Managing Construction Waste in NSW</i> (EPA 2018) and relevant resource recovery orders and exemptions. This includes a two-stage inspection process to identify and reject any prohibited items.
WAS2	All wastes will be classified, stored and handled in accordance with the <i>Waste classification guidelines – part 1: classifying waste</i> (EPA 2014). Waste that is not classified as general solid waste (non-putrescible) will be rejected.
Management of waste that is produced by CWS employees and operations	
WAS3	Waste produced by CWS will be managed in accordance with the waste hierarchy, in order of preference: • reduce waste production • recover resources • dispose of waste appropriately. Construction waste produced as part of the IRRC construction will be recovered through the RRF to recover as much waste as possible.
WAS4	Designated bins will be provided for general waste produced by employees, to be disposed of via a third-party appropriately licenced waste collection service.
WAS5	Any small quantities of hazardous waste produced as part of CWS operations (for example oil) will be stored according to best practice, in clearly designated areas with appropriate secondary containment. Timely removal and disposal of these waste materials will be arranged through an appropriately licensed waste contractor.
General site management	
WAS6	Management staff will carry out regular inspections and informal checks to maintain overall site cleanliness and prevent the accumulation of rubbish and loose materials.
WAS7	All uncovered hardstand areas will be cleaned using a street sweeper twice weekly, reducing the potential for fines and debris to accumulate and enter the stormwater system.
Traffic and transport	
TRA01	A traffic management and traffic control plan will be prepared and implemented to address concurrent construction and operations, to ensure smooth operation of the site and workers safety.

ID	Mitigation measure
TRA02	An operational traffic management plan will be prepared, which will include: - the implementation of a driver code of conduct to ensure that truck drivers adhere to the designated transport routes and implement safe driving practices, particularly when travelling on the residential section of Government Road <u>the implementation of marked pedestrian walkways, traffic lights and on-site traffic controller(s)</u> <u>the requirement for all drivers accessing site to complete an induction, use UHF radio and comply with line-of-sight requirements prior to reversing</u> - requirements that all vehicles loaded with material have effective load coverings for the duration of the trip to/from the site - measures to optimise traffic movements and minimise queuing - a complaint management system. A framework for the traffic management plan is provided in Chapter 7 of the traffic impact assessment (Appendix I.1 of the EIS).
Water and flooding	
Detailed design	
WAT01	Concrete hardstand will be established for all storage, equipment areas, processing and handling areas, to reduce suspended solids generation in stormwater runoff and prevent infiltration to soils and groundwater.
WAT02	The detailed design will allow for rainfall from roof areas (clean stormwater) of the RRF to bypass the pre-treatment section of the water management basin and treatment plant to maximise effectiveness of the treatment plant as far as possible.
WAT03	As a minimum, oil and grease separators will be sized to treat first flush flows of all trafficable areas of the IRRRC, prior to discharge to the council drainage system.
WAT04	To minimise the potential for offsite flooding impacts up to and including 1% AEP event, the following will be incorporated into the detailed design: - finished ground levels at-grade and not materially higher than existing levels, in particular along the north-eastern corner of the IRRRC at 10 Styles Street - retain permeable boundaries to the north and west of the IRRRC (refer to site plan for locations), by using mesh-wire or chain-link fencing - maintain existing riparian corridor setbacks along watercourses.
WAT05	Install manual flood protection barriers at the entrance and exit of the RRF facility to a minimum of the 0.2% AEP event or approximately 13 metres Australian Height Datum (mAHD).
Construction	
WAT06	Limit excavation depths to less than 1.4-m below ground level to avoid interception of the groundwater table. If groundwater is unexpectedly intercepted, a dewatering management plan will be prepared by an appropriately qualified consultant for implementation.
WAT07	Implement the following erosion and sediment controls: - Construction activities within 8 Styles Street (the existing RRF) will be conducted within the catchment of the existing water management basin so that all water is directed to, and treated in the basin. - Prepare and implement an erosion and sediment control plan in accordance with <i>Managing Urban Stormwater: Soils and Construction – Volume 1</i> (Landcom 2004) for all construction work outside of the water management basin catchment.
Operation	
WAT08	With the exception of 8 Styles Street (where all water reports to the water management basin), all waste storage and handling will be within covered areas, to minimise contact with rainfall/runoff.
WAT09	All uncovered hardstand areas will be cleaned using a street sweeper twice weekly, reducing the potential for fines and debris to accumulate and enter the stormwater system.

ID	Mitigation measure
WAT10	Visual inspections and necessary maintenance of RRF water management basin, water treatment plant and stormwater quality controls will be undertaken at least monthly.
WAT11	Fuel and any hazardous chemicals required to support site operations will be stored and used in accordance with relevant Australian Standards and NSW Government guidelines for best practice storage, handling and spill management procedures for liquid chemicals: • Liquid Chemical Storage, Handling and Spill Management: Review of Best Practice Regulation (DEC 2005) • Storing and Handling Liquids: Environmental Protection: Participant's Manual (DECC 2007).
WAT12	Water use will be reduced by: • preferentially reusing treated runoff from the RRF yard area rather than rainwater, to enable the drawdown of the RRF water management basin and improve attenuation of flows during significant or prolonged rainfall events • utilising microbial disinfection and stockpile misters within the RRF yard to maximise water reuse • minimising potable water use as much as possible.
WAT13	Develop and document flood emergency management protocols and procedures in a Flood Management Plan (FMP) (or equivalent), including: • site management and protocols in the event of flood events that could impact construction and operational activities • suitable early warning/prediction measures and communication protocols • site preparedness activities and procedures • triggers for closure, evacuation and recovery • emergency response and support.
WAT14	The IRRC will be connected to the regional potable water and sewer systems. No trade waste will be discharged to the sewer system, only wastewater produced from the site amenities.
<u>WAT15</u>	<u>A commissioning report demonstrating the performance of the upgraded water treatment system will be provided to the EPA for consultation.</u>
<u>WAT16</u>	<u>An aerator will be operated within the water treatment basin for water circulation.</u>
<u>WAT17</u>	<u>Annual cleaning and maintenance will be undertaken for the water treatment system, water management basin, and associated oil and grease separator.</u>
Air quality and greenhouse gas	
AQ1	Implementation of best practice air quality mitigation measures will be continued for the IRRC, including: • applying water sprays to the mobile yard equipment during crushing and screening • dampening concrete stockpiles prior to crushing commencing • using misting sprays and dust extraction in the processing sheds • utilising dust suppressants (e.g. light water spray/sprinklers) on stockpiles • storing waste and recovered material in designated bunkers with three-sided walls • regular cleaning/sweeping of paved surfaces • minimising material drop heights during truck unloading and loading operations • covering all loads for incoming and outgoing trucks • restricting vehicle speed on site to 10 km/h.
AQ2	The following measures will be implemented to manage diesel combustion emissions: • consider and prioritise low emissions as part of procurement of new plant and equipment • all plant and equipment will be regularly serviced and maintained to meet manufacturers emissions specifications • idling of trucks, plant and equipment onsite will be minimised wherever practicable.

ID	Mitigation measure
Noise and vibration	
NV1	Good practice noise and vibration mitigation and management will be implemented throughout construction and operation activities, as follows: - regularly reinforcing (such as at toolbox talks) the need to minimise noise and vibration - regularly identifying noisy activities and adopting improvement techniques - avoiding the use of portable radios, public address systems or other methods of site communication that may unnecessarily impact upon nearby residents - developing routes for the delivery of materials and parking of vehicles to minimise noise - where possible, avoiding the use of equipment that generates impulsive noise - minimising the movement of materials and plant and unnecessary metal-on-metal contact - minimising truck movements - scheduling respite periods during intensive construction works as determined through consultation with potentially affected neighbours (e.g. a daily respite period for a minimum of one hour at midday) - choosing quieter plant and equipment based on the optimal power and size to most efficiently perform the required tasks - using temporary noise barriers (in the form of plywood hoarding or similar) to shield intensive construction noise activities from residences - operating plant and equipment in the quietest and most efficient manner - regularly inspecting and maintaining plant and equipment to minimise noise and vibration level increases, to ensure that all noise and vibration reduction devices are operating effectively - scheduling activities to minimise impacts by undertaking all possible work during hours that will least adversely affect sensitive receivers and by avoiding conflicts with other scheduled events - scheduling work to coincide with non-sensitive periods - scheduling noisy activities to coincide with high levels of neighbourhood noise so that noise from the activities is partially masked and not as intrusive - optimising the number of deliveries to the site by amalgamating loads where possible and scheduling arrivals within designated hours - including contract conditions that include penalties for non-compliance with reasonable instructions by the principal to minimise noise or arrange suitable scheduling.
NV2	Noise monitoring will be undertaken at locations representative of the nearest residential receivers on at least an annual basis to determine compliance with the relevant operational noise limits or in response to noise complaints.
NV3	Safe-working distances outlined in Transport Infrastructure Development Corporation's <i>Construction Noise Strategy (Rail Projects)</i> (TIDC 2007) will be followed to manage potential for vibration impacts. If construction activities are to be conducted within the relevant safe working distances outlined, vibration monitoring will be conducted to validate vibration predictions and ensure levels from individual plant and equipment are not excessive at nearby structures. Monitoring will include the measurement of peak particle velocity (PPV) across three orthogonal axes using a vibration monitor equipped with a tri-axial geophone. The geophone will be positioned either at the base of the structure of concern or along the primary transmission path between the construction activity and the structure.
NV4	<u>The campaign mobile crushing and screening plant will:</u> <u>be operated within the eastern portion of the site yard to maximise acoustic shielding provided by the existing receivals shed to sensitive receivers located to the north-west of the site</u> <u>be planned and scheduled with consideration of prevailing and forecast meteorological conditions (including wind speed, wind direction and atmospheric stability), with activities deferred, shorted, rescheduled or modified where unfavourable conditions are predicted</u> <u>only operate during standard daytime hours (7:00 am to 6:00 pm Monday to Saturday; and 8:00 am to 6:00 pm Sundays and public holidays).</u>
NV5	<u>During the Saturday daytime out-of-hours period (1:00 pm to 6:00 pm), construction activities will be restricted to low-noise or ancillary works only (e.g. material deliveries and minor works not involving high-noise plant or equipment), to minimise potential noise impacts at surrounding sensitive receivers.</u>

ID	Mitigation measure
Contamination and soils	
CON1	Characterisation sampling of the recycled aggregate will be conducted prior to commencement of ground disturbing works to assess whether there is a risk of exposure to asbestos for construction workers during site improvement works or potential future intrusive maintenance workers.
CON2	The presence of fill material will be assessed in areas of excavation (for example for stormwater and fire safety infrastructure) prior to commencement of ground disturbing work. If identified, sampling and analysis will be undertaken to assess whether there is potential risk of exposure to contamination for construction workers during site improvement works or potential future instructive maintenances works.
CON3	If contamination is identified, a contamination management plan will be prepared for implementation during construction. In the event that residual contamination is present at the completion of the works, a long-term environmental management plan may be required.
CON4	Surplus soil requiring off-site disposal will be assessed, classified and appropriately disposed to an EPA-approved facility.
SOIL1	Prior to commencement of construction, a primary Erosion and Sediment Control Plan (ESCP) will be developed in consultation with the construction contractors to manage soil disturbance, prevent erosion, and control sediment runoff. The ESCP will include relevant plans (drawings) and will be prepared in accordance with the <i>Protection of the Environment Operations Act 1997</i> and best practice guidance, including the Blue Book (<i>Managing Urban Stormwater: Soils and Construction – Volume 1</i>, Landcom 2004) and IECA Best Practice Erosion and Sediment Control Guidelines (2008). Key principals of the plan will include: • Minimise Disturbance: Construction activities such as excavation will be staged to limit the area and duration of exposed soils. Exposed surfaces will be promptly stabilised using temporary covers, mulch, or geotextiles. • Manage Stormwater: ‘Clean’ runoff from undisturbed areas will be diverted around construction zones where possible, while ‘dirty’ runoff will be directed through sediment control structures. • Sediment Controls: On-site sediment controls, including silt fences (specifically along the north of the project site to prevent runoff into the creek) and sandbags will be established close to disturbance sources to prevent off-site sedimentation. Where necessary, water captured on site will be treated (e.g. via gypsum flocculation) before discharge or reuse for dust suppression. • Stockpile and Access Management: Construction stockpiles will be located away from watercourses and removed/material reused as quickly as possible. • Dust and Air Quality: Water carts and load covers will be used to suppress dust and minimise air-borne soil loss during dry or windy periods. • Monitoring and Maintenance: Controls will be inspected daily and after rainfall events. Any failures will be repaired immediately, and the plan will be updated as site conditions evolve. • Training and Awareness: All site personnel will receive induction and task-specific training on erosion and sedimentation risks, control measures, and incident response procedures.
Fire and incident management	
F01	The Operation & Management Plan, which identifies methods of combustible waste material management and storage, will be updated to incorporate the IRRC expansion. The plan will be reviewed annually or upon material changes to the storage and handling of combustible material. Stockpiles will be managed in accordance with <i>Fire Safety in Waste Facilities Guidelines</i> (Fire & Rescue NSW 2020). Stockpile height will be limited to 4 m for combustible materials and 6 m for non-combustible materials. The maximum internal stockpiles size of combustible material will be 1,000 m³.
F02	Fire management and containment measures will be expanded for the IRRC and will meet the requirements of the <i>Fire Safety in Waste Facilities Guidelines</i> (Fire & Rescue NSW 2020) – including fire hydrants, automatic fire sprinklers, fire detection and alarm, smoke hazard management, fire water run-off containment and firefighting intervention measures.

ID	Mitigation measure
F03	A fire safety procedure will be prepared and implemented for the IRRC. This will include: - the provision of an Emergency Services information package in accordance with guidelines, which will be stored at the site office - an Annual Fire Safety Statement will be prepared that details the statutory fire safety measures in accordance with the <i>Environmental Planning and Assessment Regulation 2021</i> - fire drills at appropriate intervals, to be coordinated with the fire service where applicable - training of key personnel at a registered training organization, including first response firefighting.
F04	Pollution control equipment including spill kits and booms will be kept on site and readily accessible.
Hazardous or offensive development	
HOD1	The type and quantity of hazardous materials stored on site will not exceed the threshold in <i>Hazardous and Offensive Development Application Guidelines – Applying SEPP 33</i> (Applying SEPP 33) (Department of Planning 2011a) for dangerous goods. If storage quantities increase, a preliminary hazard assessment will be conducted by an appropriately qualified consultant.
Bushfire	
B1	Asset protection zones (APZ): <u>The property will be managed as an APZ, for 12 m from existing buildings to the north and up to the property boundary in all other directions (refer to Figure 4.5 of this RtS report).</u> - The APZs will be maintained while the site continues to be used as a waste management facility. <u>Management within the APZ will include:</u> <u>tree canopy cover will be less than 15% at maturity</u> <u>trees at maturity will not touch or overhang the building</u> <u>lower limbs will be removed up to a height of 2 m above the ground</u> <u>tree canopies will be separated by 2 to 5 m</u> <u>preference will be given to smooth barked and evergreen trees</u> <u>large discontinuities or gaps in vegetation will be provided to slow down or break the progress of fire towards buildings</u> <u>shrubs will not be located under trees</u> <u>shrubs will not form more than 10% ground cover</u> <u>clumps of shrubs will be separated from exposed windows and doors by a distance of at least twice the height of the vegetation</u> <u>grass will be kept mown (as a guide grass should be kept to no more than 100 millimetres (mm) in height)</u> <u>leaves and vegetation debris will be removed.</u>
B2	Construction materials: - Any fencing and gates installed for the project will be made of non-combustible material only. - Where fitted, screens will be made of corrosion-resistant steel, bronze or aluminium. The frame will be made from metal with metal fixings. - All above-ground water service pipes external to the building will be metal, including and up to any taps.
B3	Access: - Safe access will be provided to the northern bushland interface that supports capacity for fully loaded (23-tonne) firefighting vehicles. - A turning point will be established for firefighting vehicles accessing the northern boundary in accordance with Appendix 3 of PBP 2019. - Turning points/heads will be kept clear of obstruction. - Traffic management devices (sliding gates) at entry points will not impede firefighting vehicles.
B4	The Bushfire Emergency Management and Evacuation Plan will be implemented for construction and operational activities and will be reviewed at least annually.

ID	Mitigation measure
Aboriginal cultural heritage	
AH1	In the event that unexpected Aboriginal objects, sites or places (or potential Aboriginal objects, sites or places) are discovered during construction, all works in the vicinity of the find will cease and contact with a heritage professional undertaken to inform next steps.
AH2	If human skeletal material is discovered, the <i>NSW Coroners Act 2009</i> requires that all works cease, and the NSW Police and the NSW Coroner's Office be contacted. For Aboriginal finds, the current DECCW guidelines for managing the unexpected discovery of Aboriginal objects, sites and/or human remains will be implemented.
AH3	CWS will develop an Aboriginal employment scheme or participation plan as guided and informed by the RAPs to facilitate employment opportunities and engagement with the local Aboriginal community.
Historical heritage	
HH1	In the event that unexpected historical relics (or potential historical relics) are discovered during construction, all works in the vicinity will cease and the proponent will determine the subsequent course of action in consultation with a heritage professional and/or the relevant State government agency as appropriate.
Social	
SOC1	A complaints management procedure will be implemented throughout construction and operation, to provide a 24-hour point of contact for the community.
SOC2	A procurement policy to maintain the positive social impact in the local and regional area will be followed. A draft procurement policy is provided in Attachment C of the social impact assessment (Appendix I.8 of the EIS), which includes clear prioritisation of local suppliers and providers.
SOC3	An employment plan will be prepared and implement an employment plan, which will include measures to: • provide clear information about employment opportunities available during construction and operation • upskill workers and provide opportunities for long-term unemployed or underemployed workers • develop an Aboriginal employment scheme or participation plan.
SOC4	• Consider and integrate the <i>Crime Prevention Through Environmental Design</i> (Cessnock Council 2010) principles in detailed design, such as security signage, CCTV systems and security lighting.
Visual	
V01	Lighting will be directed inwards and downwards within the site.
V02	Landscaped areas will be planted and maintained in accordance with the landscape plan (Appendix I.9 of the EIS).
V03	The proposed new processing shed will be clad in sage green, dark green and sand randomised paneling to match the existing RRF exterior.

Appendix E

Response to Ausgrid advice

16 December 2025

Jeffrey Lyons
Engineering Officer
Ausgrid
570 George Street
Sydney NSW 2000

RE: SSD-71547218 - KURRI KURRI IRRC - AUSGRID ADVICE

Dear Jeffery Lyons,

Thank We refer to Ausgrid's advice dated 4 December 2025 regarding the Environmental Impact Statement (EIS) for the proposed Kurri Kurri Integrated Resource Recovery Centre (SSD-71547218). In accordance with your request and in support of the EIS prepared by EMM Consulting, we provide the following response addressing the considerations raised.

1. Method of Electricity Connection

Ausgrid: "The method of connection will be in line with Ausgrid's Electrical Standard (ES)1 – 'Premise Connection Requirements.'"

Response: The project's electrical connection will adhere to Ausgrid's ES1 Premises Connection Requirements, ensuring a compliant interface with the network. An Accredited Service Provider Level 3 (ASP3) designer (Direct Engineering, Will Walsh) has been engaged to develop the contestable connection design in accordance with Ausgrid standards. A Preliminary Enquiry was lodged with Ausgrid early in the design phase, as recommended, to determine the appropriate connection method and network capacity for the development. Ausgrid's feedback from this enquiry (and subsequent ones) has directly informed the connection strategy, confirming that an extension of the 11 kV network and a new on-site substation are required. The proponent will lodge a formal Connection Application and undertake the works via accredited contractors (ASP1) following Ausgrid's contestable works process. This approach ensures the method of connection complies with all relevant Ausgrid policies and service rules.

2. Supply of Electricity (Network Capacity & Substation Needs)

Ausgrid Advice: “It is recommended for the electrical consultant/contractor to submit a preliminary enquiry... An assessment will determine whether: (i) the existing network can support the expected load, (ii) a substation is required on-site (pad mount kiosk or chamber), and (iii) site conditions may impact the method of supply.”

Response: Multiple preliminary enquiries have been undertaken with Ausgrid to ascertain network capacity and requirements for this development. Ausgrid’s February 2023 responses (Annexure F of the EIS) provided the initial guidance: one enquiry (Ausgrid Ref. 700008251) confirmed that approximately 1200 A of low-voltage load could be supported by the existing 11 kV network if a new “KL” kiosk substation is installed. In contrast, a second enquiry for a higher load (Ausgrid Ref. 700008252, 4 MVA requested) indicated the local network could not directly accommodate that demand; Ausgrid advised that a high-voltage customer substation (e.g. a chamber-type “HVC” substation) and feeder augmentation would be necessary for a 4 MVA supply. In light of this feedback, the project’s electrical design was optimised to reduce the maximum demand per connection and avoid triggering an HVC/chamber substation requirement.

In September 2025, an updated preliminary enquiry for the consolidated development (Ausgrid Ref. 700010496) confirmed the feasibility of the revised approach. Ausgrid’s response indicated that while a proposed 3 MVA total load exceeds what the existing network can supply at one LV point, the installation of multiple kiosk substations and extension of the 11 kV network will provide the required capacity. Crucially, Ausgrid noted that no augmentation of the upstream 11 kV feeders is required under this plan. Instead, the development will be serviced by two Ausgrid-approved 1.5 MVA (1500 kVA) kiosk substations, dividing the load into two zones. This strategy aligns with Ausgrid’s network capabilities and negates the need for a chamber substation.

Additionally, Ausgrid’s latest advice imposes conditions for lot consolidation and supply arrangement. Since the project involves amalgamating multiple lots, the existing points of supply will be retained as separate connections to Ausgrid’s network.

3. Timing of Geotechnical Investigation (Pre- or Post-EIS)

The geotechnical investigation report (attached to this response letter - Hunter Civilab, Report P20247-R-001 Rev0, Geotechnical Site Classification, 8 Styles Street, Kurri Kurri) was completed prior to the finalisation of the EIS. The geotechnical findings were available to inform the project's preliminary design development and environmental assessment. In summary, the geotechnical drilling and analysis were undertaken well before the EIS was submitted, and thus do not represent new post-EIS information, but rather part of the project's foundational data. The 2020 geotechnical report has now been provided (attached) for completeness and to give the Department better visibility of site subsurface conditions.

4. Conduit Installation (Footway Provisions)

Ausgrid Advice: *"The need for additional electricity conduits in the footway adjacent to the development will be assessed and documented in Ausgrid's Design Information, used to prepare the connection project design."*

Response: The project will accommodate any additional conduit installations in the public footway as required by Ausgrid's design process. The contestable design will include provisions for installing conduits to Ausgrid specifications wherever new cables are needed along the site frontage. In fact, the concept design already identifies the need to install new underground 11 kV cabling in conduit to loop in the proposed kiosk substation to Ausgrid's network. All such conduit and cable works in Styles Street and Mitchell Avenue will be designed and constructed in accordance with Ausgrid's standards (e.g. minimum cover, routing, material) and will be finalised upon Ausgrid's issuance of Design Information during the Connection Application stage. The proponent acknowledges that any required conduit works in the road reserve are part of the contestable scope and will be implemented at the developer's cost as part of the approved electrical design.

5. Vegetation Near Power Lines

Ausgrid Advice: *“All proposed vegetation underneath overhead power lines and above underground cables must comply with ISSC 3 Guideline for Managing Vegetation Near Power Lines.”*

Response: The landscape design for the development will strictly comply with ISSC 3 – Industry Safety Steering Committee Guideline No.3, Managing Vegetation Near Power Lines. No tall-growing trees or vegetation that could infringe clearance requirements will be planted under or adjacent to Ausgrid’s overhead lines along Mitchell Avenue. Likewise, root-intensive species will be avoided above underground cable routes to prevent damage to buried electricity assets. All planting within the site and along the frontage will be reviewed against the ISSC 3 guidelines to ensure safe clearances are maintained both during construction and in the long term. Ongoing maintenance will also be carried out to trim or remove any regrowth that could violate the clearance envelope around power lines, in line with Ausgrid’s requirements.

6. Proximity to Existing Network Assets

Ausgrid has identified several existing network assets in proximity to the site, including overhead lines in Mitchell Avenue and underground cables in Styles Street. The project has been designed and will be constructed with careful attention to these assets to ensure safety and compliance with Ausgrid standards.

Overhead Power lines (Mitchell Avenue):

There are existing overhead 33 kV lines running along Mitchell Avenue adjacent to the development. All activities will maintain the statutory safety clearances to these conductors in accordance with the SafeWork NSW “Work Near Overhead Power lines” Code of Practice. During construction, particular care will be taken with the placement and operation of cranes, elevated work platforms, and scaffolding to ensure the minimum approach distances are always upheld. The design also considers the “as-constructed” clearances of the lines to any new structures, building heights and setbacks have been checked against Ausgrid’s Network Standard NS220 to avoid encroachment into required clearances.

Importantly, the new site entry at 147 Mitchell Avenue (for heavy vehicle access) is flagged as a potential risk to safety and Ausgrid assets due to overhead line clearances to trucks. To eliminate any risk of conflict, the project proposes to underground a section of the existing overhead 33 kV distribution line along the Mitchell Avenue frontage. By converting this span to underground (as illustrated in the concept electrical plan), the development ensures safe and unobstructed entry for tall vehicles without compromising line safety. Any such relocation or underground of Ausgrid's assets will be carried out in full consultation with Ausgrid and in accordance with Ausgrid's standards. It is noted that Ausgrid prefers to keep the existing 33 kV sub-transmission line overhead. Should any additional adjustments or temporary line relocations be required during construction, they will be completed at the developer's expense and with Ausgrid approval.

Underground Cables (Styles Street):

Ausgrid has underground 11 kV distribution cables running beneath Styles Street, adjacent to the site. All work in the vicinity of existing underground cables will be undertaken with extreme care to prevent any damage or service disruption. Before any excavation or road crossing construction on Styles Street, the project will locate and mark the position and depth of all known underground services. Dial-Before-You-Dig plans have been obtained, and non-destructive digging (potholing) will be used to verify cable locations prior to trenching. The construction team will be contracted to follow the SafeWork NSW Excavation Code of Practice and Ausgrid's Network Standard NS156 (Working Around Underground Cables), which outline the minimum requirements and safe methods for excavation near live cables. Protective measures such as physical exclusion zones, spotter supervision, and hand digging near cables will be implemented. The existing 11 kV cables in Styles Street are also being incorporated into the design of the new supply: the ASP1 contractor will be making new connections (straight-through joints) to these cables to loop in the new kiosk.

7. Substation Requirements (On-Site Kiosk and Safety Clearances)

Ausgrid Advice: *“there are existing electricity substation assets within the development area”* and advises on requirements for any substation, including ventilation, fire safety, and EMF considerations.

Response: The project includes the provision of a new Ausgrid 1500 kVA pad-mounted kiosk substation on site, as already determined through the preliminary design process. This substation will be constructed to Ausgrid’s standard K-type kiosk specifications and in a location approved by Ausgrid. The Concept ASP3 Electrical Design Drawing (Appendix B, of the Services Delivery Plan) has been completed by the ASP3 and reviewed by Ausgrid.

The siting and layout of the kiosk substation are being carefully coordinated to satisfy all clearance and safety criteria, including:

- The kiosk’s ventilation louver panels and any underground cable ducts will be positioned such that no building openings or air intakes are within 6 meters. This exceeds the minimum separation mandated by the Building Code and AS 1668.2 for ventilation design and aligns with Ausgrid’s specific requirement for a 6 m buffer to prevent exhaust or fumes mixing.
- The design will comply with Ausgrid’s fire safety segregation rules as outlined in Network Standard NS141. Any building elements within 3 meters of the kiosk will be constructed of non-combustible materials and rated to FRL 120/120/120 in accordance with the BCA and Ausgrid’s requirements.
- The electrical design will adhere to the ICNIRP 2010 guidelines for limiting exposure to electromagnetic fields. All new electrical infrastructure, including the kiosk transformer and 11 kV cables, will be built to Ausgrid’s standards which incorporate prudent avoidance measures for EMF. An EMF assessment can be provided if required but based on Ausgrid’s standard designs the field levels at 1 m from a 1500 kVA kiosk fall within acceptable limits. The development therefore meets the precautionary requirements for EMF, and this will be documented as part of the compliance strategy.

8. Easement Conditions and Ausgrid Access

Ausgrid Advice: Ausgrid highlights that “*Existing Ausgrid easements, leases and/or rights of way must be maintained at all times to ensure 24 hour access. No temporary or permanent alterations to this property tenure can occur without written approval from Ausgrid*”. The letter further specifies conditions for any activities within or near the electricity easement on site, noting that the easement was acquired for 11 kV distribution assets and must remain clear for Ausgrid’s operational needs.

Response: The project acknowledges the Ausgrid easement and asset access requirements and will ensure full compliance with all conditions. Specifically, the following measures are in place or will be implemented:

- The existing Ausgrid kiosk substation (and the new one to be installed) are, or will be, located within easements or lease areas that guarantee Ausgrid 24/7 access. There will be no fencing or gates that impede direct access from the public road to the substation units. A new easement in favour of Ausgrid will be created over Lot 1 DP1128108 (1 Styles St) to encompass the new kiosk substation site, and Ausgrid will maintain this area as per their standard asset maintenance procedures (ref. Ausgrid’s NW000-S0065 NS212 guidelines). During construction, the easement area will remain accessible, and no temporary works will obstruct Ausgrid’s ability to reach their infrastructure.
- The development has been designed so that no buildings or permanent structures encroach into the Ausgrid easement. All new buildings are outside the easement boundaries. The easement in question runs along the cable route and substation; these areas will be kept clear of any obstructions. This ensures compliance with Condition 6 of Ausgrid’s advice.
- Where the internal road or driveway crosses the underground cable easement, it will be constructed to a standard capable of supporting heavy vehicles (including Ausgrid’s cranes or maintenance trucks) without causing subsidence or damage to the cables beneath. Our civil engineers will ensure the pavement is designed with sufficient depth and reinforcement over the cable corridor.

- No unauthorised excavation will occur within the easement. Any necessary excavation (for installing the new cables or removing redundant ones) will only be done by the appointed ASP1 under Ausgrid-approved plans.
- If perimeter fencing is to be installed near the kiosk substation, the design will incorporate measures to mitigate any earth potential rise (EPR) issues in the event of a fault. In accordance with Ausgrid's advice, sections of fencing in the immediate vicinity of the substation will use non-conductive materials (e.g. a segment of timber or composite fence) or have insulated fence posts to break the metallic continuity
- The operational plans for the site prohibit any storage of bulk materials (soil, sand, gravel, waste piles, etc.) on top of the cable easement (Condition 9). All material stockpiles and bins are located well away from the easement area.
- After completing the electrical installation works, the ground surface within the easement will be restored to equal or better conditions. While Ausgrid has noted they are not responsible for such reinstatement, the developer will ensure that any trenches are backfilled and compacted per; Ausgrid's standards and that the surface is returned to a neat finish. This commitment is part of our civil works plan to leave no lasting disruptions on Ausgrid's easement.

In summary, the project has thoroughly addressed each item raised in Ausgrid's EIS advice letter.

Yours sincerely,



Luke Griffiths
Project Director
Impact Project Management Pty Ltd C/O
Central Waste Station Pty Ltd

Appendix F

Bushfire consultant response to RFS submission



16 March 2026

Katie Ward
EMM Consulting Pty Ltd
Level 3, 175 Scott Street
NEWCASTLE NSW 2300

Cool Burn Ref – J317

**SSD-71547218_ NSW Rural Fire Service Advice on EIS Submission
Waste or resource management facility
8 Styles Street Kurri Kurri NSW 2327, 1//DP1309128**

Cool Burn prepared the Bushfire Assessment Report (dated 12 February 2025, Version 1.1) for the EIS to support the increased capacity SSD-71547218 for the Integrated Resource Recovery Centre, by the proponent Central Waste Services (CWS) Pty Ltd.

The NSW RFS have reviewed the Bushfire Assessment Report and provided recommended conditions, modified and additions of new conditions, listed in the NSW RFS response (**NSW RFS ref: DA20240613002390-EIS** & DA, exhibition 1 dated 29 January 2026).

Cool Burn has undertaken a review of the advice received from the NSW RFS and provide the following statement for the Department of Planning, Housing and Infrastructure (Major Projects) to consider in their development approvals.

Cool Burn Pty Ltd Director (Dan Pedersen) is a suitably qualified and experienced bushfire consultant (BPAD L3).

Dan Pedersen
Director Cool Burn Fire & Ecology
B.Sc., Grad. Dip. (Design for Bushfires)
BPAD 16293
Mob: 0427 337 783





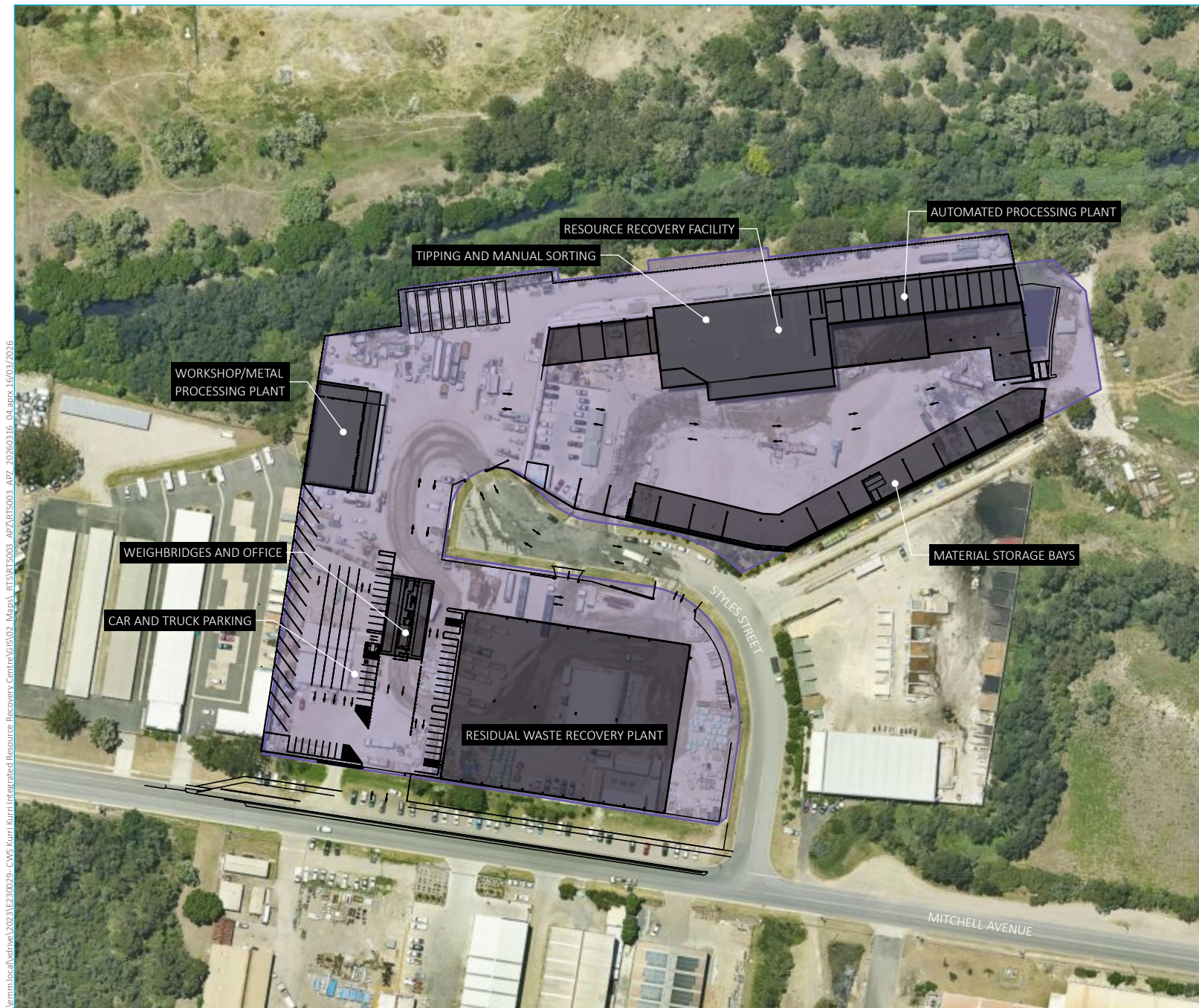
Table 1: NSW RFS recommended conditions, modified and additions of new conditions
(NSW RFS ref: DA20240613002390-EIS & DA, exhibition 1, dated 29 January 2026)

Cond.	Recommended Condition	Site Status	Proposed Solution
#1	From the start of building works, and in perpetuity to ensure ongoing protection from the impact of bush fires, the entire property, must be managed as an inner protection area (IPA) in accordance with the requirements of Appendix 4 of Planning for Bush Fire Protection 2019 as follows: - North for a distance of 16 metres (incorporating the existing gravel access driveway and managed verge); and, - Up to site boundary in all other directions.	The Cool Burn Bushfire Assessment Report recommended a minimum 12m APZ setback along the hazardous vegetation interface to the north and east (see attached Figure). The NSW RFS recommended modification for 16m to the North does not have any supporting information. This 16m IPA recommendation to the north from the building walls could ultimately extend into dense Swamp Creek riparian vegetation. Since the preparation of the Bushfire Assessment Report, there has been a boundary adjustment to the east of the buildings, with the new property identification: 1/-/DP1309128 – 8 Styles Street (subject site) 2/-/DP1309128 - 6 Styles Street, to the east	The proponent (CWS) seeks to avoid impacts to this riparian vegetation, and requests that the recommended 12m APZ (to be maintained to IPA standards) be accepted to the Northern vegetation interface. With consideration of the boundary adjustment (to the eastern boundary of the subject site) the NSW RFS recommendation 'Up to site boundary in all other directions' is an acceptable outcome and should be adopted. The proposed wording could therefore be: <i>From the start of building works, and in perpetuity to ensure ongoing protection from the impact of bush fires, the entire property, must be managed as an inner protection area (IPA) in accordance with the requirements of Appendix 4 of Planning for Bush Fire Protection 2019 as follows:</i> <i>North for a distance of 12 metres (incorporating the existing gravel access driveway and managed verge); and,</i> <i>Up to site boundary in all other directions</i>



Cond.	Recommended Condition	Site Status	Proposed Solution
# 2	Prior to the commencement of building works and in perpetuity, a suitably worded instrument(s) pursuant to Section 88B of the <i>Conveyancing Act</i> 1919, must be within the subject site which creates an Asset Protection Zone (APZ) as shown as 'Restriction B' on proposed Site Plan prepared by Thomas and Associates Consulting Pty Ltd, (dated 09/10/2025, Project Ref: 230499, Dwg No: A103, Issue: G) and prohibit any construction within the proposed APZ (proposed use for fire fighting and drenching purposes). The name of authority empowered to release, vary or modify the instrument shall be the Cessnock City Council. The APZ must be managed as an inner protection area (IPA) in accordance with the requirements of Appendix 4 of <i>Planning for Bush Fire Protection</i> 2019.	The NSW RFS does not provide any supporting information for their recommendation to prepare an instrument(s) pursuant to Section 88B of the <i>Conveyancing Act</i> 1919 to creates an Asset Protection Zone (APZ) as shown as 'Restriction B' on proposed Site Plan prepared by Thomas and Associates Consulting Pty Ltd, (dated 09/10/2025, Project Ref: 230499, Dwg No: A103, Issue: G) The 'Restriction B' is not related to the bushfire assessment (this is relative to Swamp Creek riparian zone boundary). The APZ will be determined based on the existing building footprint and a 12m separation along the northern boundary and to site boundaries in all other directions (noting the recent boundary adjustment).	It is proposed that the <i>Conveyancing Act</i> is not applicable for this SSD application. It is further recommended that this NSW RFS recommended condition be removed or omitted.
#3	Prior to the commencement of building works, the creation of a Right of way (R.O.W), (off site) and compliant vehicle turning head, over the existing access handle, servicing <u>Lot 12 in DP 1234688</u> , and located along the subject lots south eastern site boundary, be registered on Title to permit tankers, to access this space for fire fighting and drenching purposes.	At the time of the bushfire assessment report preparation, the proponent was seeking boundary adjustment and land acquisition of the adjacent property, formerly 12/-/DP1234688. This property to the east is now identified as 2/-/DP1309128 (6 Styles Street).	With provision of the boundary adjustment and IPA managed to the eastern property boundary, the eastern site boundary can be suitably accessed for fire fighting and drenching purposes. The R.O.W. is no longer considered as a requirement. It is recommended that this NSW RFS recommended condition be removed or omitted.

Cond.	Recommended Condition	Site Status	Proposed Solution
		The segment of road and access handle serving 2/-/DP1309128 is not within the control of CWS.	
#4	Proposed construction of the awnings, located over existing storage sheds, new processing shed additions (material bays) and the residual materials processing shed, must be undertaken using non-combustible materials.	This recommendation has been adopted in the project design.	✓
#5	The proposed offices located above the weighbridge, must be upgraded to improve ember protection by enclosing all openings (excluding roof tile spaces) or covering openings with a non-corrosive metal screen mesh with a maximum aperture of 2mm. Where applicable, this includes any sub floor areas, openable windows, vents, weepholes and eaves. External doors are to be fitted with draft excluders.	This recommendation has been adopted in the project design.	✓
#6	Property access roads, must comply with the detailed requirements of Table 7.4a of Planning for Bush Fire Protection 2019	This recommendation has been adopted in the project design.	✓



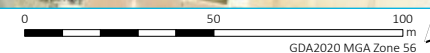
- KEY
- Project infrastructure
 - Building design
 - Roofed area
 - Asset protection zone

Asset protection zone

CWS Kurri Kurri Integrated
Resource Recovery Centre
Environmental Impact Statement
Figure F.1



Source: EMM (2026); CWS (2025); DCSSS (2025); GA (2009); MetroMap (2026)



Appendix G

Technical response memorandum – surface water

Memorandum

19 March 2026

To: Central Waste Station Pty Ltd
From: Lachlan Hammersley
Subject: **Response to Submissions - EPA**

1 Background

The NSW Environment Protection Authority (EPA) has provided a submission on the Central Waste Station Pty Ltd (CWS) Integrated Resource Recovery Centre (IRRC) at Kurri Kurri (SSD 71547218). In their advice dated 10 December 2025, the EPA provided the following recommendations:

The EPA recommends that the proponent provide the following further detail:

- Demonstrate that all reasonable and practical measures to prevent, control, abate or mitigate pollution have been considered to prevent or minimise overflows, including but not limited to storage capacity and diversion of clean stormwater.
- Provide robust expected treated water quality for all major pollutants of concern.

The following information is provided in this Response to Submission (RtS) to address the EPA recommendations:

- The proposed water management system concept has been modified to improve separation of clean water and reduce overflows from the basin (Section 2)
- The water balance presented in the Water Assessment has been updated to reflect the system modifications (Section 2)
- Further sampling has been undertaken to further support the water characterisation for the existing operations (Section 3).

2 Prevention and minimisation of water overflows

2.1 Water management system modifications

The intent of the water management system in the proposal was to:

- Operate as a closed system for both clean and dirty water. This was to maximise the water available for use on-site which would reduce the future reliance on imported potable town water for site demands (including dust suppression, washdown, and other water usages).
- Under the proposed arrangement, under wet weather conditions the water management system would need to overflow to Swamp Creek. A large part of these overflows were due to clean water from new roof areas that were proposed to contribute to the water management basin via rainwater tank overflows.
- The water management basin was split into dirty, treatment and clean cells. Overflows were proposed to occur from the clean/treated water cells.

The following modifications have been made to the proposed water management system (refer to Figure 2.1):

- To reduce the potential for overflows from the proposed water management basin, the system concept was modified to divert a proportion of clean roof water to an additional rainwater tank that, when overflows occur, contributes directly to the street stormwater drainage system rather than surcharging through the water management basin. The site is constrained by space and the opportunity to incorporate rainwater tanks for roof area is limited.
- The total roof area for the project is 0.76 hectares (ha). The southern building roof comprises of 0.26 ha of the total area and is proposed to be conveyed to a 40-kilolitre (kL) tank. Demand from the additional tank for the proposed misters will be proportional to the total roof area from the total demand. The new tank will service 35% of the total roof area equating to being able to meet 5 kL/day of the mister's total demand of 14.4 kL/day.
- In summary the catchment reporting to the IRRC water management system has reduced and the stormwater management area has increased.

The following changes to site discharges will occur due to the modifications:

- Frequency of overflows from the basin will reduce due to the 0.26 ha reduction in the contributing catchment area to the basins.
- Overflows from the new rainwater tank will discharge to the existing drainage in Styles Street, increasing the stormwater flows to this system in certain events. Overall catchment contributing to Styles Street will reduce as a result of the expansion of the IRRC.



Figure 2.1 Additional tank location capturing roof runoff from southern awning (modification to EIS Figure 5.1 highlighted in red)

2.2 Updated modelling

2.2.1 Models prepared

A water balance model and water quality model were developed for the Environmental Impact Statement (EIS) to simulate the functionality of the proposed water management system and estimate site overflow characteristics. The modelling completed and results are described in Section 5 of the Water Assessment (Appendix I.2 of the EIS). The model details are described below:

- Water balance assessment using Goldsim (software version 14) – The model was used to simulate the site water management system’s water cycle including potential overflows to Swamp Creek and any required potable water demands.
- Water quality modelling using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) modelling (software version 6.4) – The program was used to assess the transportation and management of urban water quality pollutants.

2.2.2 Model updates

The changes made to the models include:

- reduced catchment areas contributing to the water management basin
- increased catchment to rainwater tanks
- increased the available rainwater tank storage capacity.

The water management system schematic (as presented in Figure 5.2 in the Water Assessment) was modified and is presented in Figure 2.2.

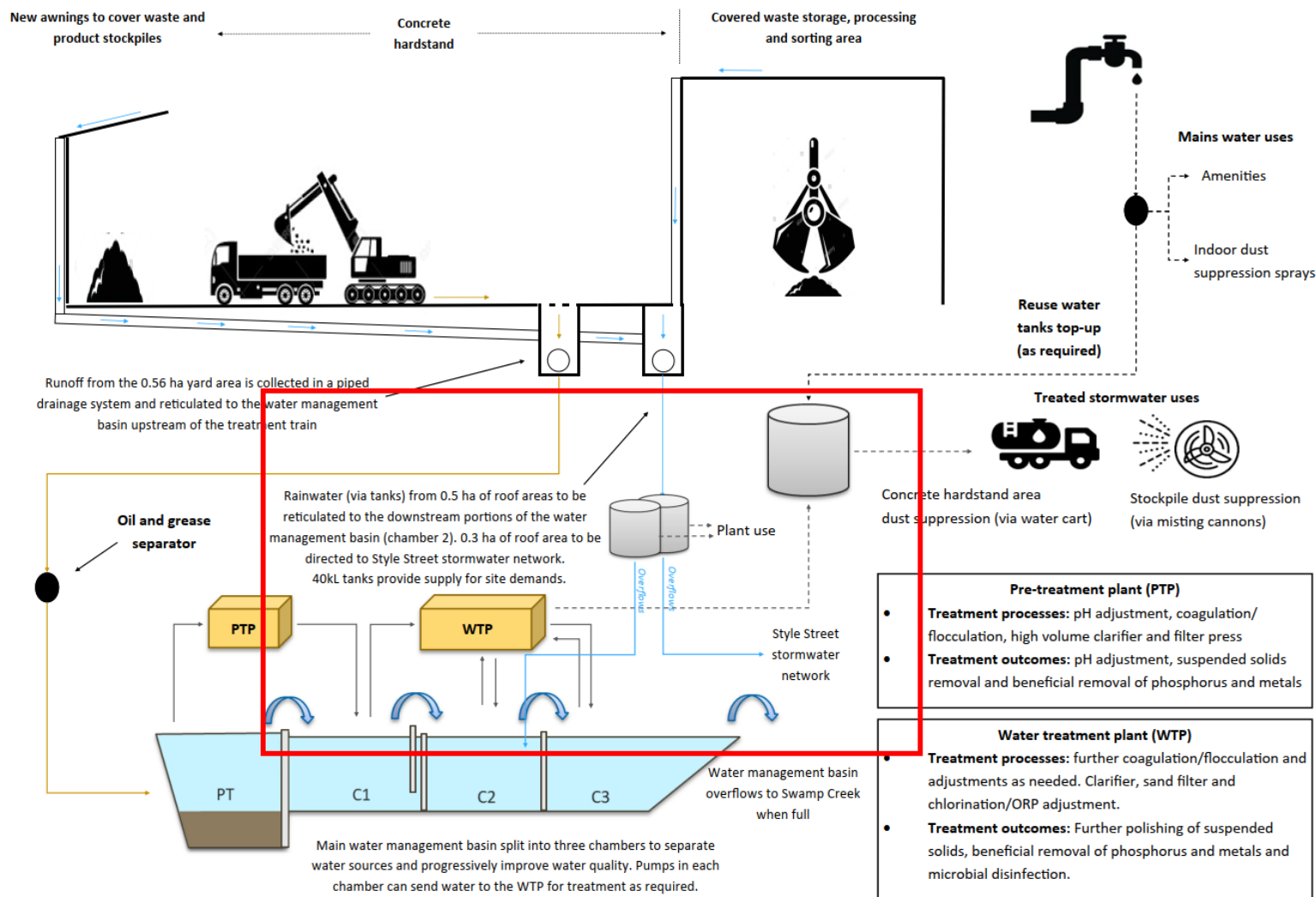


Figure 2.2 Modified water management system schematic (changes highlighted in red box)

2.2.3 Water balance model results

i Overflows

Overflows from the water management system are defined as situations where the system capacity is exceeded due to a single significant rainfall event or prolonged rainfall. The overflows to the receiving environment are proposed to occur from the final polishing cell of the water management basin which will be expanded under the project.

With the modifications to the water management system, the predicted overflows from the water management basin are predicted to reduce due to a diversion of roof catchment to additional rainwater tanks. Table 2.1 summarises the model results between the Water Assessment (Original model - Version 10) and the modified system, proposed as part of this RtS (Revised model - Version 11b). The results show the volumetric reduction in contributing clean water to the water management basin over the dry, median and wet rainfall years.

Table 2.1 Comparison of clean water contribution to the water management basin

Typical rainfall year	Original model - Version 10 (kL/year)	Revised model - Version 11b (kL/year)	Percentage change
Dry	1,984	1,120	44% reduction
Median	3,098	1,857	40% reduction
Wet	5,467	3,316	39% reduction

Table 2.2 presents the volumes predicted to be discharged to the Styles Street drainage system from an additional rainwater tank on the southern building.

Table 2.2 Predicted volumes contributing to street drainage from additional rainwater tank

Typical rainfall year	Revised model - Version 11b (kL/year)	Max daily volume released (kL/day)	Comment
Dry	416.1	53.3	
Median	804.5	181.4	The median year rainfall sequence included several large individual events that are represented in the maximum daily volume to the drainage system.
Wet	1,503	164.8	

The model predicts that the water management system will need to release water to the Styles Street stormwater system (note that Council will be engaged during detailed design to confirm the stormwater network capacity on Styles Street and ensure it is sufficient to receive the new rainwater tank overflows).

As previously indicated the net catchment area contributing to the Styles Street drainage system is likely to be reduced due to the project however the overall catchment response to rainfall may vary.

Through the incorporation of an additional rainwater tank and modifications to the site's water management system, including redirection of overflow to Styles Street, the predicted discharge frequency from the clean water cell of the water management basin has been reduced. Figure 2.3 compares the probability of predicted daily overflow volumes due to modifications compared to what was originally proposed in the Water Assessment.

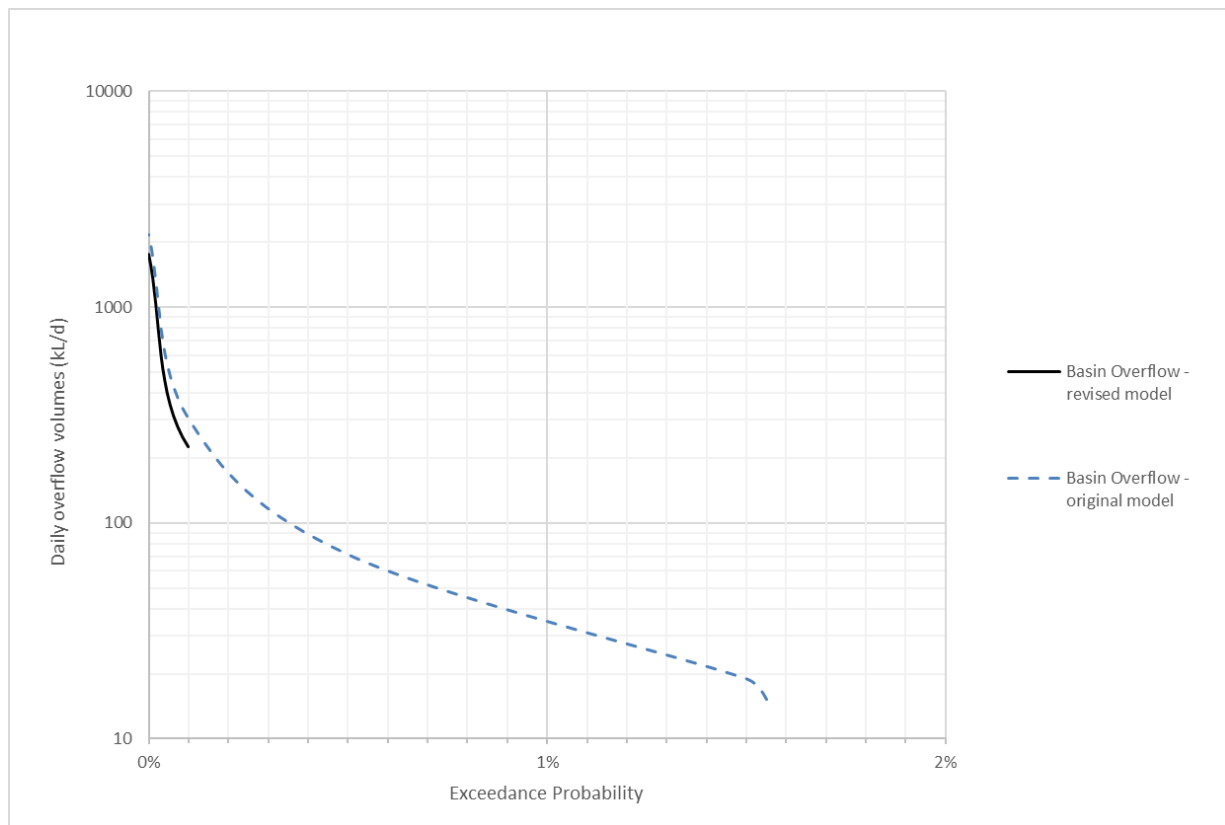


Figure 2.3 Change in probability of overflow volumes due to modified water management system

Based on the modified system, annual discharge events from the water management system are predicted to reduce from three to four times a year down to one to two times a year on average.

ii Potable water demand

The modified system will reduce the availability for on-site reuse with the on-site storages more distributed. The modelling predicts that the demands for potable water will increase. Table 2.3 summarises the predicted change in potable water demands.

Table 2.3 Comparison of potable water demands

Typical rainfall year	Original model - Version 10 (kL/year)	Revised model - Version 11b (kL/year)	Percentage change
Dry	13,298	13,937	5%
Median	12,631	13,039	3%
Wet	8,740	9,668	11%

The modified water management system is predicted to require slightly more potable water to meet operational demands however these are minor increases and potentially do not outweigh the benefit of reduced discharge volumes to Swamp Creek from the water management basin.

2.2.4 Water quality model results

MUSIC was used to simulate the volume and quality of runoff from the project. The existing model was modified to represent the changes in the water management system. Table 2.4 summarises the results of the revised model.

Table 2.4 Comparison of water quality model results due to the modified water management system

	Council reduction target	Original model - Version 10 (kL/year)	Revised model - Version 11b (kL/year)	Target achieved using revised model
Runoff volume (ML/yr)	N/A	35.4%	41.5%	N/A
TSS (kg/yr)	>85%	86.9%	88.0%	Yes
TP (kg/yr)	>45%	56.3%	58.9%	Yes
TN (kg/yr)	>45%	54.9%	59%	Yes

The model predictions of the modified water management system indicated a slight improvement in the capture of pollutant sources compared to the modelling for the system presented in the Water Assessment. This is likely due to an increased storage capacity, at source, and a reduced load on the water management basin in larger rainfall events that are likely to result in overflow events with potentially poorer quality water (represented conservatively within the model).

2.3 Summary

Based on the revised modelling undertaken, the proposed amendments to the water management system are likely to be beneficial to overall system performance. The reliance on the management of dirty water through the water management basin and associated water treatment plant will remain, however with less clean water contributing to this system, there are likely to be less uncontrolled overflows that can surge in large or prolonged rainfall events.

3 Treated water quality

Under existing conditions, the Resource Recovery Facility at 8 Styles Street is serviced by a water management basin incorporating an oil-water separator, sedimentation tanks and a water treatment plant. The existing water treatment plant includes dosing and filtration processes to a limited capacity. CWS is currently implementing an upgraded water treatment system (in design and procurement phase), as outlined in the Water Assessment appended to the EIS. The system will be operational prior to the IRRC expansion and will be designed to achieve treated water quality consistent with applicable guidelines and the characteristics of the receiving environment. The final treatment specification will be confirmed through pilot testing during the implementation phase and is therefore not available at this stage to inform the impact assessment.

As described in the Water Assessment, the proposed treatment process is expected to comprise an upgrade to the storage capacity of the basin with a pre-treatment area including improved chemical adjustment, coagulation, clarification, filtration and disinfection treatment steps.

To inform the baseline water quality at the site, additional sampling has been undertaken as part of the RtS presented below reflect the existing water management regime, which is less effective than the proposed upgraded and expanded treatment system. Notwithstanding this, the data provides a representative indication of current water quality conditions and confirm the performance of the existing treatment approach.

3.1 Additional water quality sampling

EMM conducted three additional rounds of water quality sampling to improve the characterisation of the water quality of the existing treatment system and the receiving environment that were presented in the Water Assessment. The sampling events, results and discussion of the results is provided in the following sub-sections.

3.1.1 Sampling events and conditions

Sampling rounds were conducted on 12 January, 19 January and 13 March 2026. Samples undertaken on these dates were collected from the site and then submitted to ALS Laboratory (ALS) to undergo analytical testing within the same day.

Locations sampled included:

- the water management basin yard inflow (Basin inflows)
- water management basin post treatment (End of Basin)
- Swamp Creek downstream of the IRRS (Creek Downstream)
- Swamp Creek upstream of the IRRS (Creek Upstream – laboratory testing, March only).

The conditions leading up to the sampling rounds on 12 January were dry (there was rainfall following the sampling event). Sampling on 19 January was following weekend rainfall of approximately 35 millimetres (mm). Sampling on 13 March followed a round of maintenance on the water management system which included dewatering and desludging of the water management basin and a general cleaning and emptying of the oil water separator. Rainfall preceding the 13 March round totalled 24 mm in the five days prior. Observations from site staff indicated that there were no overflows from the water management system prior to sampling, during all rounds.

It was not evident that the existing treatment plant was operational during the rounds of sampling hence basin samples were relatively similar in concentrations.

Following receipt of the first two sampling results, elevated concentrations were identified for several parameters indicative of sludge accumulation and water stagnation. In response, CWS engaged a suitably qualified contractor, Veolia, to undertake a full dewatering and clean-out of the basin. In addition, an aeration system was installed to improve water circulation and quality. This intervention is identified in the results presented below. Subsequent site observations in March confirmed that the water management basin was actively being recirculated.

3.1.2 Sampling results

Field parameters were collected for the second and third round of sampling. Field results of note, provided in Table 3.1, show generally low dissolved oxygen within basin inflow and end of basin of the water management basin along with slight elevated electrical conductivity (EC) and total dissolved solids (TDS) with results that exceed default guideline values (DGV) (refer to Table 3.2) highlighted by bold text.

Table 3.1 **Field parameters**

	Site ID	Temp (°C)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)
19 January 2026	Basin inflows	22.9	0.28	992	645	7.03	-184
	End of basin	23	0.24	1,035	673	7.34	-266.8
	Creek Downstream	21.8	1.95	650	425	6.88	-38.7
	Creek Upstream	21.8	3.03	577	375	6.96	-25.8
13 March 2026	Basin Inflows	24.2	0.6	1,108	731	7.42	11.7
	End of Basin	24.3	0.06	1,096	721	7.16	11.4
	Creek Downstream	21.8	1.33	601	416	6.84	18.8
	Creek Upstream	22.1	0.59	1,198	825	6.48	-155.7

Table 3.2 displays results from ALS for all sampling rounds, with results that exceed default guideline values (DGV) highlighted by bold text.

Table 3.2 Additional sampling rounds undertaken in 2026

Parameter	Units	DGVs	Round 1 – 12/1/2026			Round 2 – 19/1/2026			Full basin clean out	Round 3 – 13/3/2026			
			Basin inflows	End of Basin	Creek Downstream	Basin inflows	End of Basin	Creek Downstream		Basin Inflows	End of Basin	Creek Downstream	Creek Upstream
Physicochemical													
TDS	mg/L	-	878	1070	696	606	650	363		722	702	409	421
EC	µS/cm	200–300	1350	1650	1070	932	1000	559		1110	1080	629	648
pH	–	6.5–8.5	7.31	7.64	7.19	7.39	7.36	7.18		7.51	7.42	7.16	7.14
Turbidity	NTU	6–50	47.4	28.9	5.6	44.5	25.1	14.5		8.2	8.7	11	6.6
Total suspended solids (TSS)	mg/L	-	89	80	17	40	40	<5		16	19	16	18
Total alkalinity (as CaCO ₃)	mg/L	-	76	83	98	86	81	59		90	85	64	64
Total hardness (as CaCO ₃)	mg/L	-	647	764	245	413	444	77		557	542	74	83
Nutrients													
Ammonia	mg N/L	0.02*	8.06	12	0.48	1.68	3.85	0.14		0.51	0.48	0.17	0.13
Oxidised nitrogen (NO _x)	mg N/L	0.04	0.26	0.49	0.16	0.08	<0.01	0.16		<0.01	<0.01	0.1	0.1
Total Kjeldahl Nitrogen (TKN)	mg N/L	-	12.2	16.8	1.4	5.5	6.5	0.8		5	5	1.3	0.9
Total Nitrogen (TN)	mg N/L	0.35	12.5	17.3	1.6	5.6	6.5	1		5	5	1.4	1
Filterable Reactive Phosphorus (FRP)	mg P/L	0.02	1.93	1.51	0.02	0.08	0.02	0.02		<0.01	<0.01	0.04	0.03

Parameter	Units	DGVs	Round 1 – 12/1/2026			Round 2 – 19/1/2026			Full basin clean out	Round 3 – 13/3/2026			
			Basin inflows	End of Basin	Creek Downstream	Basin inflows	End of Basin	Creek Downstream		Basin Inflows	End of Basin	Creek Downstream	Creek Upstream
Total Phosphorus (TP)	mg P/L	0.025	2.12	2	0.09	0.48	0.29	0.12		0.14	0.15	0.15	0.12
Inorganics													
Total cyanide	mg/L	0.007	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		<0.004	NR	<0.004	<0.004
Fluoride	mg/L	1.7	0.3	0.2	0.3	0.3	0.2	0.3		0.3	0.3	0.3	0.3
Hydrocarbons													
Total petroleum hydrocarbons (TPHs)	µg/L	73	520	490	<50	930	1190	<50		200	170	<50	<50
Benzene, Toluene, Ethylbenzene, Xylenes, and Naphthalene (BTEXN)	µg/L	varies	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1
Metals (filtered)													
Arsenic (As)	mg/L	0.0133	0.003	0.002	<0.001	0.002	0.001	<0.001		0.003	0.003	<0.001	<0.001
Boron (Bo)	mg/L	0.94	0.26	0.18	0.13	0.18	0.14	0.08		0.13	0.12	0.09	0.08
Cobalt (Co)	mg/L	0.00142	<0.001	<0.001	0.001	<0.001	<0.001	0.002		<0.001	<0.001	<0.001	<0.001
Chromium (Cr)	mg/L	0.0013	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001
Copper (Cu)	mg/L	0.0014	0.001	<0.001	0.001	0.002	0.002	0.003		0.002	<0.001	0.007	0.003
Molybdenum (Mo)	mg/L	0.0342	0.012	0.006	0.001	0.007	0.005	<0.001		0.015	0.015	<0.001	<0.001
Lead (Pb)	mg/L	0.0034	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001

Parameter	Units	DGVs	Round 1 – 12/1/2026			Round 2 – 19/1/2026			Full basin clean out	Round 3 – 13/3/2026			
			Basin inflows	End of Basin	Creek Downstream	Basin inflows	End of Basin	Creek Downstream		Basin Inflows	End of Basin	Creek Downstream	Creek Upstream
Selenium (Se)	mg/L	0.005	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		<0.004	<0.004	<0.004	<0.004
Silver (Ag)	mg/L	0.00005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001
Strontium (Sr)	mg/L	5.3	1.02	1.26	0.321	0.735	0.747	0.121		1.01	0.962	0.085	0.084
Vanadium (Va)	mg/L	0.0062	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Zinc (Zn)	mg/L	0.008	0.010	0.008	0.052	0.010	0.008	0.023		0.009	<0.005	0.013	0.015
Mercury (Hg)	mg/L	0.00006	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001
Iron (Fe)	mg/L	0.3*	<0.05	<0.05	0.12	0.09	0.06	0.66		0.06	0.06	0.31	0.3

Note: NR – no result due to sample issue. * Revisions to default guideline values released in early 2026. Values presented are consistent with Water Assessment (EMM 2025).

3.1.3 Discussion

The following review comments are made with respect to the result of sampling in 2026 compared to the data presented in the Water Assessment (Table 5.7).

- The water management basin presented a neutral pH and elevated total suspended solids over the first two rounds of sampling. Following the round of maintenance on the water management system, sediment and turbidity within the basin improved.
- Results show that electrical conductivity, ammonia and total phosphorus were elevated above DGVs for all sampling locations across all sampling events. Results also showed elevated levels of total nitrogen and filterable reactive phosphorus in basin inflow and end of basin on 12 January and Basin inflow on 19 January. Nutrient levels within the basin significantly improved following the round of maintenance on the water management system. The levels were comparable and elevated both within the water management system on-site, and in the background receiving environment sampling locations (both up and downstream of the project).
- Total petroleum hydrocarbons (TPHs) were above DGVs for all sampling events within the water management basin. TPH concentrations improved significantly following the round of maintenance on the water management system.
- Metal concentrations of copper and zinc were elevated above DGVs within the water management basin, however there were reductions in concentration noted for chromium, when results were compared to historical monitoring presented in the Water Assessment. It is noted that iron, copper and zinc concentrations were higher in Swamp Creek than the water management basin.

Additional water quality sampling for the project has been completed. The data is relatively consistent with the sampling presented within the Water Assessment, indicating that the contaminants of concern for the site are generally consistent with guideline values. Issues were identified through the additional sampling, not typical of the waste handling activities of the operation including elevated nutrients and TPHs within the water management basin. The actions to resolve these issues included:

- The site staff were not aware the effect that local fauna (birds and other animals) and buildup of biological content within the basin were having on the system water quality performance. This prompted a maintenance round to be undertaken during the campaign of additional sampling. The follow-up water quality sampling post-maintenance indicated improved system performance but further improvement is expected with the upgraded system to be implemented as part of the proposed project. The project will, as part of the water management system augmentation, incorporate an aeration step to the water management basin treatment systems, with an annual program of cleaning out and maintaining the oil and grease separator and water management basin to mitigate these issues in the future.
- Flow through from the oil and grease separator is the likely source of the elevated TPH concentrations within the water management basin. Maintenance on the separator was provided as an action for CWS.

3.2 Water treatment expected for the IRRC

The augmented treatment system is expected to improve water treatment performance through the introduction of a pre-treatment system and additional storage capacity, in addition to the current treatment infrastructure.

The augmented treatment system, specifically the pre-treatment steps, will provide improved reduction of suspended solid loads which will also result in a reduction of total metal and TPH concentrations. The introduction of this additional treatment stage will allow further opportunity to reduce water quality concentrations from the site.

Dissolved metal loads are unlikely to be significantly reduced through the treatment system however metal concentrations are generally below guideline values or are commensurate with the concentrations within the receiving environment of Swamp Creek.

Electrical conductivity and hardness water quality characteristics are unlikely to change as part of the treatment system. Nutrient concentrations present within the existing water management system showed significant reductions following maintenance activities and this should be implemented as part of post approval operational commitments for the site. The site activities are not expected to be a source of nutrients.

Additional disinfection treatment steps will assist in mitigating microbial risks in water reuse activities, however, will unlikely assist in any other changes in water chemistry.

Further mitigation measures to be considered in the water treatment system include:

- Preparation of a commission report demonstrating water quality treatment performance following the upgrade to be issued to the EPA for further consultation.
- The treatment systems, water management basin and associated oil and grease separator will be cleaned and maintained on an annual basis. An aerator will be installed in the basin to improve water circulation to improve the potential for nutrient loading over time.

4 Conclusion

In response to the EPA request for further information the following additional assessment has been undertaken:

- The proposed water management system concept has been further modified to increase storage and diversion of rainfall water from the new roof areas via the introduction of an additional rainwater tank on the southern awning. The ability to introduce further rainwater tank storages on site is constrained due to available space. The modification demonstrates reduced overflow events, and volume from the water management basin. This was accompanied by a slight improved water quality outcome for the development.
- Further sampling of the existing water management basin was undertaken to further characterise the pollutants of concern from the development. The additional sampling has highlighted the need to implement ongoing maintenance requirements for the site, but generally results were consistent with the sampling presented within the Water Assessment.

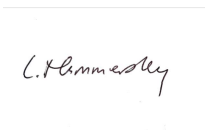
- CWS has proposed to implement an upgraded water treatment solution as part of the project that will achieve a treatment specification consistent with both the water quality guidelines and the receiving environment. The treatment performance has been reviewed in the context of information available from additional rounds of sampling, third party water treatment specialists and studies completed. Further mitigation measures are recommended and include:
 - preparation of a commission report demonstrating water quality treatment performance following the upgrade to be issued to the EPA for further consultation
 - the treatment systems, water management basin and associated oil and grease separator will be cleaned and maintained on an annual basis. An aerator will be installed in the basin to improve water circulation to improve the potential for nutrient loading over time.

The following further works may be required from the change in water management concept:

- Council may require further assessment of the stormwater network to confirm that the new rainwater tank overflows can be catered for within the stormwater drainage system on Styles Street. This will be addressed post-approval as part of the projects detailed design and implementation phase and subject to the construction certificate being issued.

If there any questions regarding the above information, please email at lhammersley@emmconsulting.com.au or call on 0429 231 857.

Yours sincerely



Lachlan Hammersley
Senior Associate Water Resources Engineer
lhammersley@emmconsulting.com.au

Appendix H

Geotechnical investigation report (2023)



Geotechnical Investigation

Proposed Commercial Development 8 Styles Street, Kurri Kurri, NSW

Report Ref: G0350-GI-001-Rev0

Written by: Hein van Vuuren (Senior Engineering Geologist)

Reviewed by: Daniel Barnes (Principal Geotechnical Engineer)

Email: office@huntercivilab.com.au

Client: Central Waste Station Pty Ltd



24 November 2023**Prepared for****Central Waste Station Pty Ltd**

8 Styles Street

Kurri Kurri

NSW

2327

Ph: 0418 387 275

Email: dwayne@centralwaste.com.auWeb: centralwaste.com.au**Prepared by****Hunter Civilab**

ABN 50 103 355 531

3/62 Sandringham Avenue

PO Box 3127

Thornton NSW 2322

Ph: (02) 4966 1844

Email: office@huntercivilab.com.auWeb: huntercivilab.com.au**Project Details**

Site Address:	8 Styles Street, Kurri Kurri, NSW
Project Type:	Commercial Development

Project no	Report type	Report no
G0350	GI	001

Report Register

Revision Number	Reported By	Reviewed By	Date
Rev0	HV	DB	24/11/2023

We confirm that the following report has been produced for Central Waste Station Pty Ltd, based on the described methods and conditions within.

For and on behalf of Hunter Civilab,

**Daniel Barnes**

Principal Geotechnical Engineer

Executive Summary

The following report details the geotechnical investigation undertaken by Hunter Civilab (HCL) under the request of Central Waste Station Pty Ltd. The investigation was undertaken at 8 Styles Street, Kurri Kurri, NSW on the 3rd November 2023 and consisted of a desktop study, a visual site assessment, intrusive excavations and testing.

The desktop study indicated that the site lies within an area of no known occurrences of acid sulfate

The desktop study also indicated that the site does not lie within a mine subsidence district.

The site was located at 8 Styles Street, Kurri Kurri, NSW. The site extents were defined by the two tank locations. The 'western' site was bordered by Styles Street to the south, and an existing industrial development to the west, north and east. The 'eastern' site is bordered by a settling pond to the west and undeveloped land to the north, east and south.

A large steel frame structure and associated concrete pavements was observed to the east of the western site. Details of the settling pond identifying pond depths and structure type were not made available to HCL at the time of preparing this report.

The surface conditions at the two sites comprised gravel hard stands and grass vegetation.

Topographically the site sloped gently to the east at approximately 2°.

Gravel fill was present across the entire site but substantial thicknesses of fill were encountered in the eastern to a depth of approximately 1.5 m. A fill stockpile was observed at the western site.

The subsurface profile generally consisted a variable fill layer overlying SAND / CLAY and Clayey SAND layers to an unknown depth.

The permeant water tank structure may be supported by deep footings. Refer to **Section 7.1** for footing details and recommended allowable bearing capacity.

Recommended retention system parameters are provided in **Section 7.3**.

Earthworks recommendations are provided in **Section 7.4**.

Site soils were assessed as being **Mildly Aggressive** towards Concrete and Non-Aggressive toward steel structures. Refer to **Section 7.7** for the aggressivity of soils to concrete.

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Annex List:

- Annex A** Borehole Location Plan
- Annex B** Borehole & DCP Log Report
- Annex C** External Laboratory Test Reports
- Annex D** BTF 18-2011 – CSIRO – Foundation Maintenance & Footing Performance – A Homeowner's Guide

1 Introduction

At the request of Central Waste Station Pty Ltd, Hunter Civilab (HCL) have carried out a geotechnical investigation at 8 Styles Street, Kurri Kurri, NSW. It is understood that the proposed development is to consist of the construction of two new in-ground water tanks. The investigation works were undertaken in accordance with HCL services agreement Q2201-Rev1, dated the 31 October 2023.

The following documentation, provided by the client, has been considered in this report:

- SDG Engineering Structural Drawings (Drawings 23015-S01 RevB, 23015-S02 RevC, 23015-S03 RevB and 23015-S04 RevB).

A review of the above supplied structural drawings indicates that a sheet pile wall system (to be designed by others) is proposed to provide temporary support for excavations at two sites up to 4.5 m deep in order to allow construction of two new water tanks. The temporary shoring system will act independently from the final storage tank (i.e. a void will be left between the temporary shoring system and water tank side walls).

At the request of the client, HCL have undertaken geotechnical drilling at four locations (BH1 to BH4) up to 7 m deep. The geotechnical drilling was required in order to provide factual information and recommendations on the following at the two tank sites:

- Summary of subsurface conditions to maximum 7 m depth
- Summary of groundwater depths (if encountered during the investigation)
- Geotechnical Parameters for proposed retention system
- Foundation Recommendations for the permanent water tank structures
- Earthworks advice including subgrade improvement, geotechnical suitability of excavated material for reuse as fill and excavatability assessment
- aggressivity of buried steel/concrete structural elements to AS 2159-2009

This report provides details of the investigation, laboratory testing and provides recommendations for the proposed development.

2 Site Description

The site was located at 8 Styles Street, Kurri Kurri, NSW. The location and extents of the two tank sites are shown on the borehole location plan in **Annex A**. The 'western' site was bordered by Styles Street to the south, and an existing industrial development to the west, north and east. The 'eastern' site is bordered by a settling pond to the west and undeveloped land to the north, east and south.

A large steel frame structure and associated concrete pavements was observed to the east of the western site. Details of the settling pond identifying pond depths and structure type were not made available to HCL at the time of preparing this report.

The surface conditions comprised a gravel hard stand at the western site and sporadic grass coverage and gravel access road at the eastern site. A fill stockpile was observed at the western site.

Topographically the site sloped gently to the east at approximately 2°.

Surface water drainage is anticipated to follow existing surface contours. Surface water that does not infiltrate into the ground is anticipated to be ultimately collected in the existing stormwater drainage infrastructure.

Thin fill was present across the entire site but substantial thicknesses of fill were encountered in the east of the site to a depth of approximately 1.5m.

A photograph showing the surface conditions at the two sites is shown below in **Figure 1** and **Figure 2**.



Figure 1 – A photograph of the western site, looking north-east – Taken: 3 November 2023



Figure 2 – A photograph of the eastern, looking north – Taken: 3 November 2023

3 Desktop Review

3.1 Geological & Soil Landscape Setting

Reference to the NSW Seamless Geological Map indicates that the site is underlain by Quaternary Period material of the Alluvial Valley Deposits consisting of silt, clay, sand, gravel.

Reference to the 1:250,000 Singleton Soil Landscape Map indicates that the site is located within the Neath Soil Landscape. The landscape is characterized by gently undulating rises and melaleuca swamps to the east of Cessnock. Undulating low rises and swamps have typical elevations of 40 – 80 m. Local relief is commonly less than 30 m and slopes are up to 3%, with slope lengths up to 2000 m. Drainage lines are common and generally at 500 – 800 m intervals. The main soils are Grey Solodic Soils (Dg4.83) in the poorly drained areas associated with exposed coal seams. There are Yellow Solodic Soils (Dy5.12) on the better drained lower slopes. Severe sheet and rill erosion on cleared areas. The vegetation in the landscape is commonly comprised of wet shrubland and Tussock grass.

3.2 Acid Sulfate Soils Risk Maps

Reference to the NSW Office of Environment and Heritage's online database 'ESPADE' indicates that the site lies in an area of **no known** occurrences of acid sulfate soils.

3.3 Mine Subsidence

Reference to Subsidence Advisory NSW Mine District Maps indicates that the site **does not** lie within a Mine Subsidence District.

4 Fieldwork Methodology

Fieldwork was undertaken on 3 November 2023 and consisted of:

- a visual assessment of the existing surface of the site and surrounding area
- locating borehole locations by approximate measurements from existing site features
- the drilling of 2 x boreholes at the western site (BH1 – BH2) to depths of up to 7.0 m using rotary solid flight auger methods
- the drilling of 2 x boreholes at the eastern site (BH3 – BH4) to depths of up to 7.0 m using rotary solid flight auger methods
- the driving of 4 x Dynamic Cone Penetrometer (DCP) probes at BH locations to depths of up to 5.0 m

Laboratory testing consisted of:

- 4 x Soil Aggressivity tests (two aggressivity tests per site)

The fieldwork was supervised by a geotechnical engineer from HCL who logged the subsurface conditions at bore hole locations in accordance with AS1726-2017 and collected disturbed soil samples for laboratory testing and soil identification purposes.

5 Subsurface Conditions

The subsurface soil conditions encountered at test locations are presented in detail in the borehole logs and have been summarised into the following units:

UNIT 1 – FILL (General):

- Sandy GRAVEL, angular to subangular, fine to coarse sized, fine to coarse grained sand, pale brown / grey, building rubble.
- Sandy SILT, fine grained sand, black, with fine sized gravel.
- Silty SAND, fine grained, pale brown / grey / dark grey / brown, trace fine sized gravel, trace clay.
- Silty to sandy GRAVEL, angular, fine to coarse sized, fine to coarse grained sand, pale grey, recycled DGB.

UNIT 2A – ALLUVIAL (Loose to Medium Dense)

- Silty SAND, fine to medium grained, pale grey / pale brown / brown / dark brown / grey / dark grey.
- SAND, fine grained, pale brown, trace silt.

UNIT 2B – ALLUVIAL (Stiff / Medium Dense to Dense):

- Sandy CLAY, pale grey / brown, fine grained sand.
- Silty SAND, fine grained, pale brown / grey.
- SAND, fine grained, pale brown.
- Clayey SAND, fine grained, pale brown, trace fine sized gravel.

UNIT 2C – ALLUVIAL (Very Stiff to Hard / Very Dense):

- Sandy CLAY, pale brown / red, fine-grained sand.
- Clayey SAND, fine grained, pale grey / brown.

A summary of the soil unit depths encountered in each borehole are presented below in **Table 5.1**.

Table 5.1 - Summary of the soil unit depths encountered

Borehole	Borehole Depth from Surface (m)*	Unit Depth (m)			
		UNIT 1	UNIT 2A	UNIT 2B	UNIT 2C
BH1	7.0	0.0-0.5	-	0.5-3.0	3.0-7.0
BH2	7.0	0.0-0.5	0.5-2.0	2.0-7.0	-
BH3	7.0	0.0-1.5	1.5-6.0	6.0-7.0	-
BH4	7.0	0.0-0.5	0.5-7.0	-	-

* All borehole depths were terminated.

*Borehole Surface RL was not measured.

Groundwater was encountered at the site in boreholes BH1, BH2 and BH3 at a depth of between 2.0m and 3.0m. It is noted that groundwater conditions are dependent on factors such as soil permeability and recent weather conditions and will vary with time.

Surface water was observed in the settling pond located adjacent to the western site.

Refer to **Annex A** for the borehole location plan and **Annex B** for detailed borehole logs.

6 Laboratory Test Results

4 x disturbed samples were recovered from the boreholes for geotechnical laboratory testing. The samples were transported to a NATA accredited soil testing laboratory for analysis.

The laboratory test results are summarised below in **Table 6.1**, below.

Table 6.1 - Summary of Soil aggressivity results

BH	Depth (m)	Soil Description	Chloride (ppm)	Sulphate (ppm)	pH	Conductivity (uS/cm)
BH1	0.5-0.8	Sandy CLAY	15	430	7.8	3.0×10^4
BH2	2.0-2.5	SAND	10	35	7.5	8.1×10^4
BH3	4.0-4.5	Silty SAND	15	145	6.6	5.4×10^4
BH4	1.0-1.5	Silty SAND	10	100	5.6	6.3×10^4

Laboratory test results from the soil samples can be found in **Annex C**.

7 Comments and Recommendations

7.1 Key Geotechnical Risks

The following key geotechnical risks are relevant to the proposed development:

- Presence of shallow ground water within the depth of proposed excavation producing possible base boiling of the exposed subgrade at the base of the excavation. Dewatering by a licensed contractor will likely be required during excavation to lower the groundwater table to below the depth of excavation. A bridging layer constructed using durable free draining rock material may be required to provide sufficient confinement of the saturated sands below the excavation.
- Where dewatering is undertaken, consideration should be given for potential dewatering induced settlements where the water tanks are located adjacent to existing structures.
- Excavations adjacent to existing structures should consider impact of deformations induced by the sheet pile walls. Internal bracing may be required to limit deformations where sheet piling is installed adjacent to existing structures.
- Sheet pile drivability. The sheet pile installation contractor should be consulted for comment on drivability in very dense / hard conditions encountered at the site.

7.2 Footing Recommendations (Permanent Tank Structure)

The site is suitable for the use of deep foundation systems dependant on the development and structural bearing pressure required. Recommended bearing pressures are provided in **Section 7.2.1** below.

7.2.1 Deep Footings

Conventional uncased bored piles would not be suitable at this site due to the presence of groundwater and the likely borehole collapse upon withdrawal of the auger.

Pile types such as continuous flight auger (CFA) piles, steel screw piles or driven timber piles could be used to overcome the problems with collapsing conditions for foundation construction.

Piles founded in stiff / medium dense UNIT 2B material may be proportioned for a preliminary maximum allowable vertical capacity of 200 kPa.

Piles founded in very stiff to hard/ very dense UNIT 2C material may be proportioned for a preliminary maximum allowable vertical capacity of 300 kPa.

The design and construction of the proposed foundations should consider associated risks of vibration during installation which may negatively impact adjacent structures.

All pile types should be suitably protected against decay or corrosion, taking account of the subsurface conditions, water table fluctuations and site-specific conditions (existing chemical concentrations at the site).

Refer to **Section 7.7** for recommendations of suitable sacrificial thicknesses and cover requirements for piles at the site.

7.2.2 Footing Construction

Pile installation should be accompanied by appropriate verification inspections and testing, for example, load test results, pile driving records, grout pressure records, pile integrity testing, in keeping with the requirements of AS 2159-2009.

7.2.3 Ongoing Footing Maintenance

Foundations including effective site drainage are required to be maintained over the life of the development to ensure footing performance. Refer to **Annex D** for the following:

- BTF 18-2011- CSIRO - Foundation Maintenance and Footing Performance – A Homeowner's Guide

7.3 Retaining Walls

The type of suitable excavation support is dependent on several variables including ground condition, dewatering methods, method and staging of construction as well as surrounding structures and services. The design and construction of the proposed sheet pile walls should consider associated risks of vibration during installation which may negatively impact adjacent structures.

Anchors or internal props may be needed for temporary restraint of the retaining structure walls.

Once specific retaining wall options and depths are known, analysis of the proposed retaining wall using WALLAP or similar analysis methods are likely to be required for detailed design.

Recommended site soil parameters for retaining wall design at the site are provided in **Table 7.1** below.

Table 7.1 - Recommended retaining wall design soil parameters

Parameter	Supported material		
	UNIT 2A	UNIT 2B	UNIT 2C
γ (kN/m ³)	17	19	20
Φ' (°)	27	24	25
C' (kPa)	0	2	5
C_u (kPa)	-	75	100
K_a	0.5	0.4	0.4
K_p	2.0	2.3	2.5
K_o	0.6	0.5	0.5

Legend:

γ – unit weight

Φ' – angle of friction

C' – drained cohesion

C_u – undrained cohesion

K_a – coefficient of active earth pressure

K_p – coefficient of passive earth pressure

K_o – coefficient of at rest earth pressure

Parameters shown assume horizontal and free draining granular backfill behind the retaining wall.

The parameters above are unfactored and appropriate factors of safety should be used in design.

The design of retaining walls should account for the separate hydrostatic water pressures behind the walls unless adequate subsurface and surface drainage is provided behind the wall to prevent build-up of water pressure including the provision for maintenance (i.e. flushing points).

The pressure distribution given above assumes that no surcharging of the walls occurs from nearby footings. If the footings behind retaining walls from existing retaining walls, or proposed structures are not taken below the retaining wall zone of influence (which is approximated by a line drawn at 45° above the horizontal from the base of the wall) or to low strength rock or stronger, than additional allowance should be made for the load from the footings.

7.4 Earthworks

Any earthworks conducted at the site should be controlled in accordance with AS3798-2007 and guided by the sections below.

7.4.1 Site Preparation

It is recommended that the following be undertaken where controlled filling is to be undertaken:

- remove all topsoil, root effected zones, material assessed as unsuitable and other deleterious zones (noting the stripped soil is not considered suitable as engineered fill but may be considered for landscaping purposes)
- exposed suitable foundation areas should then be ripped 300mm and re-compacted to 100% standard maximum dry density (SMDD) at $\pm 2\%$ of optimum moisture content (OMC)
- the foundation area should then be proof rolled under the supervision of an experienced geotechnical consultant and any soft spots / heaving areas identified. If identified, these areas should be over excavated under the direction of the geotechnical consultant and replaced with engineered fill.
- A crushed rock working platform may be required where firm / loose sand is encountered at the base of the excavation (in particular where elevated moisture conditions or groundwater is encountered at the base of the excavation) to bridge over weak materials. The thickness of the required working platform should be confirmed by a suitably qualified geotechnical engineer at the time of construction.

7.4.2 Controlled Fill

Any earthworks conducted at the site should be controlled in accordance with AS3798-2007. Based on the soil profile shown above in **Section 5**, visual observations and in-situ Dynamic Cone Penetrometer (DCP) testing, the material encountered at the site is deemed suitable for re-use on site as controlled fill from a geotechnical perspective given the following is considered:

- Topsoil – it is recommended that where topsoil is encountered that is high in organic content, this soil is separated and stockpiled and assessed for potential re-use as topsoil in landscaped areas on site
- Natural soils and weathered rock – the results of the investigation suggest that the natural soils and weathered rock would typically be suitable for re-use as engineered fill, provided sufficient energy is applied during fill placement and compaction to break down oversize rock to a particle size that is no greater than one-third of the uncompacted fill layer thickness
- Where natural soils are encountered with an elevated moisture condition, drying back of the material will be required. It should be taken into account that the time taken to dry back the material will likely be a function of material properties, prevailing weather conditions at the time of earthworks, size and area available to spread out the material and moisture re-conditioning methodology used

If the sub-surface conditions encountered at the site during construction differ from those discussed in **Section 5**, then HCL should be consulted to determine if the material is suitable for controlled fill. Similarly, any won material imported from external sites should consult HCL to determine if the fill is suitable for controlled fill.

7.4.3 Compaction Criteria

Fill material should be compacted in near-horizontal uniform layers with a maximum compacted thickness of 300mm. It is important to ensure layers are placed in such a way that provides adequate drainage and prevent ponding during construction. The thickness of fill placed during construction should take into account the compaction equipment available.

The moisture of the fill material should be controlled within a specified range of OMC in order to achieve the compaction criteria. In general, soils should be compacted within a moisture range of $\pm 2\%$ of OMC.

For commercial developments the following compaction criteria applies:

- cohesive soils – 98% Minimum Density Ratio (standard compactive effort)
- non-cohesive soils – 75% Minimum Density Index

Where fill is placed on sloping ground, any slope wash/deleterious should be removed and the fill should be adequately keyed/benched into the sloping ground profile.

Geotechnical inspections and testing should be performed in accordance with Level 1 procedures with reference to AS3798-2007.

7.4.4 Excavations Conditions

Excavations within the fill, natural soils and extremely low to very low strength rock that was encountered during the investigations is thought to be achievable with conventional earthmoving equipment such excavators, backhoes and dozers.

Excavations should be conducted in accordance with The Safe Work Australia "Excavation Work" Code of Practice October 2018.

<https://www.safeworkaustralia.gov.au/doc/model-codes-practice/model-code-practice-excavation-work>

Excavations can seriously affect the stability of adjacent buildings. Careful consideration must be taken in order to prevent the collapse of partial collapse of adjacent structures.

Construction material and equipment should not be placed within the zone of influence of an excavation unless a suitably qualified geotechnical engineer has designed ground support structures to withstand these loads. The zone of influence is dependent on the material encountered at the site and is the area in which possible failures can occur.

Refer to Council development guidelines before conducting any excavation works.

7.5 Batter Slopes

7.5.1 Temporary Batter Slopes

Temporary excavations in natural material or extremely low to very low strength rock may be near vertical provided that:

- the depth does not exceed 1.5m
- they are open for no more than 24hrs
- no surcharge loading is applied to the surface within 2.5m of the excavation
- no one enters the excavation e.g. workers

All other temporary batter slopes during construction should not exceed 1H:1V in soils and 1H:4V in rock and benched, planned and managed in accordance with Safe Work Australia "Excavation Work" Code of Practice October 2018.

Specific geotechnical assessment will be required where temporary excavations exceed 1.0 m vertical height.

7.5.2 Permanent Batter Slopes

Recommended permanent batter slopes in general are as follows:

- 2H:1V in cohesive soils (e.g. clays) or extremely to very low weathered rock else retained by an engineered retaining wall
- 3H:1V in non-cohesive soils (e.g. sands) else retained by an engineered retaining wall
- 1H:1V in low strength rock or greater (permanent rock batters may be steepened to near vertical – subject to inspection by a qualified geotechnical engineer)

Specific geotechnical assessment will be required where permanent batters exceed 2 m vertical height.

7.6 Site Preparations & Working Platforms

A working platform of granular fill (similar to subbase quality fill with CBR > 50%) will likely be required for trafficability of construction equipment, and may need to be up to about 0.4 m thick.

The exposed surface should not be accessed by wheeled equipment.

The granular fill should be placed over the surface in one 0.4m thick layers and should be rolled by six to eight passes of a minimum 12-ton roller in non-vibration mode.

Specific assessment of working platforms for tracked equipment or plant such as piling rigs or cranes should be undertaken prior to construction, if required.

7.7 Assessment of Soil Aggressivity

Based on the results from the chemical laboratory testing of the soil sample collected on the site, and with reference to Table 6.4.2 (A) & (C) and 6.5.2 (A) & (C) in AS2159-2009, the exposure classification for on structural elements falls into **Mildly-Aggressive towards concrete** and **Non-aggressive towards steel**.

Concrete piles should be designed in accordance with AS 2159-2009 Table 6.2. A minimum concrete strength of 32MPa must be used for concrete piles. The minimum required cover to reinforcement is 20mm for precast piles and 60mm for cast-in-place piles over a 50 year design life (or 25mm for precast piles and 65mm for cast-in-place piles over a 100 year design life).

Exposed steel should be designed in accordance with AS 2159-2009 Table 6.4. A minimum steel uniform corrosive allowance of 0.01-0.02mm/year should be allowed for.

All pile types should be suitably protected against decay or corrosion, possibly by allowing for a sacrificial thickness, reducing working loads accordingly and / or designing for a more severe classification as the aggressiveness may change over time.

It is noted that the effect of some chemicals can be modified in the presence of others. Design should take into account site specific activities that may adversely affect the aggressiveness to concrete and steel structural components.

8 Report Limitations

This report has been prepared by HCL for the specific site and purposes described within this report. HCL will accept no responsibility or liability for the use of this report by any third party, without the express consent of HCL or the Client, or for use at any other site or purpose than that described in this report.

This report and the services provided have been completed in accordance with relevant professional and industry standards of interpretation and analysis. This report must be read in its entirety without separation of pages or sections and without any alterations, other than those provided by HCL.

The scope of the investigation described in this report is based on information and plans provided to HCL by the Client as well as any additional limitations imposed by either the Client and / or site restraints. Such limitations may include but are not limited to budget restraints, the presence of underground services or accessibility issues to a site. Where the report has been prepared for a specific design proposal the information and interpretation may not be relevant if the design proposal is changed. HCL should be consulted if site plans or design proposal is changed as the recommendations and / or opinions presented may not be suitable for the new revisions or variations made.

The conclusions, recommendations and opinions expressed within this report are subject to the specific conditions encountered and the limited geotechnical data gathered at the site during the time of the current investigation. The sub-surface conditions and results presented in this report are indicative of the conditions encountered at the discrete sampling and testing locations within the site at the time of the investigation and within the depths investigated. Variations in ground conditions may exist between the locations that were investigated, and the subsurface profile cannot be inferred or extrapolated from the limited investigation conducted by HCL. For this reason, the report must be regarded as interpretative, rather than a factual document.

Sub-surface conditions are subject to constant change and can vary abruptly as a result of human influences and /or natural geological and / or climatic processes and events. As such, conditions may exist at the site that could not be identified during or may develop after the current investigation has been conducted and as such, may impact the accuracy of this report. HCL should be contacted for further consultation and site re-assessment should sub-surface conditions differ from those conditions identified in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by HCL.

Safety in design assessment is outside the current scope of work of this report. HCL has had no involvement in any design that relies upon the geotechnical advice contained in this report. HCL cannot be held liable for any loss of life or property damage arising from any hazards that arise from the geotechnical advice.

HCL recommends geotechnical reports older than 5 years from the date shown on the report, reports submitted for a previous (unrelated) development application on the site, or sites that have been altered by earthworks be reviewed by a qualified geotechnical consultant to confirm that the scope of the investigation undertaken for the report and the contents of the report are appropriate for the current development being proposed.

We are pleased to present this report and trust that the recommendations provided are sufficient for your present requirements. If you have any further questions about this report, please contact the undersigned.

For and on behalf of

Valley Civilab Pty Ltd, trading as Hunter Civilab

Reported by:

A handwritten signature in black ink, appearing to read "H. van Vuuren", written in a cursive style.

Heir van Vuuren

Senior Engineering Geologist

Bachelor of Science (Hons) Environmental and
Engineering Geology

Master of Science (Engineering Geology)

Reviewed by:

A handwritten signature in black ink, appearing to read "D. Barnes", written in a cursive style.

Daniel Barnes

Principal Geotechnical Engineer

Master of Applied Science (Civil)/
Bachelor of Engineering (Civil)

References

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Annex A

Borehole Location Plan





Annex B



Hunter Civilab

Unit 3, 62 Sandringham Avenue Thornton NSW 2322

Phone: (02) 4966 1844

Geotechnical Log - Borehole

BH1

UTM : 56H
Easting (m) : 0.0
Northing (m) : 0.0
Ground Elevation : Not Surveyed
Total Depth : 7 m BGL

Drill Rig : Trailer Mounted Drill Rig
Driller Supplier : Hunter Civilab
Logged By : JR
Reviewed By : HV
Date : 03/11/2023

Job Number : G0350
Client : Central Waste Station Pty Ltd
Project : Proposed Commercial Development
Location : 8 Styles Road, Kurri Kurri
Loc Comment :

Drilling Method	Water	DCP graph	Samples	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Soil Origin	Remarks
			Disturbed								
Auger Drilling				0.1		GW	FILL: Sandy GRAVEL, angular, fine to coarse sized, fine to medium grained sand, pale brown / grey, building rubble .	D		Fill	
		3				SM	FILL: Sandy SILT, fine grained sand, low plasticity, black, with fine sized gravel.	w < PL		Fill	
		6									
		3									
		2									
		5		0.5		CL-Cl	Sandy CLAY, low to medium plasticity, pale grey / brown, fine grained sand.	w > PL	St	Alluvial	
		5									
		5									
		2									
		2									
		2		1		SM	Silty SAND, fine grained, pale brown / grey.	M	MD	Alluvial	
		3									
		5									
		6									
		7									
		5									
		2									
		3									
		2									
		2									
		2		2		SM	As above, but pale brown.			Alluvial	
		2									
		3									
		2									
		2									
		3									
		3									
		5									
		5									
		5		3		CL-Cl	Sandy CLAY, low to medium plasticity, pale brown / red, fine grained sand.	w > PL	VSt-H	Alluvial	
		5									
		4									
		5									
		5									
		7									
		8									
		12									
		14									
		12									



Hunter Civilab

Unit 3, 62 Sandringham Avenue Thornton NSW 2322

Phone: (02) 4966 1844

Geotechnical Log - Borehole

BH1

UTM : 56H

Easting (m) : 0.0

Northing (m) : 0.0

Ground Elevation : Not Surveyed

Total Depth : 7 m BGL

Drill Rig : Trailer Mounted Drill Rig

Driller Supplier : Hunter Civilab

Logged By : JR

Reviewed By : HV

Date : 03/11/2023

Job Number : G0350

Client : Central Waste Station Pty Ltd

Project : Proposed Commercial Development

Location : 8 Styles Road, Kurri Kurri

Loc Comment :

Drilling Method	Water	DCP graph	Samples	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Soil Origin	Remarks
			Disturbed								
Auger Drilling		10		4.5		CL-Cl	Sandy CLAY, low to medium plasticity, pale brown / red, fine grained sand.	w > PL	VSt-H	Alluvial	
		9									
		10									
		12									
		14									
		15									
		16									
		Terminated									
				5							
				6							
				7							
							BH1 Terminated at 7 m (in above)				



Hunter Civilab

Unit 3, 62 Sandringham Avenue Thornton NSW 2322

Phone: (02) 4966 1844

Geotechnical Log - Borehole

BH2

UTM : 56H

Easting (m) : 0.0

Northing (m) : 0.0

Ground Elevation : Not Surveyed

Total Depth : 7 m BGL

Drill Rig : Trailer Mounted Drill Rig

Driller Supplier : Hunter Civilab

Logged By : JR

Reviewed By : HV

Date : 03/11/2023

Job Number : G0350

Client : Central Waste Station Pty Ltd

Project : Proposed Commercial Development

Location : 8 Styles Road, Kurri Kurri

Loc Comment :

Drilling Method	Water	DCP graph	Samples	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Soil Origin	Remarks
			Disturbed								
Auger Drilling						GW	FILL: Sandy GRAVEL, angular to sub-angular, fine to coarse sized, fine to coarse grained sand, pale brown / grey, building rubble .	D		Fill	
		2		0.2		SM	FILL: Silty SAND, fine grained, pale brown / grey, trace fine sized gravel, trace low plasticity clay.			Fill	
		2									
		5		0.5							
		4				SM	Silty SAND, fine grained, dark brown grey.	M	L-MD	Alluvial	
		3									
		3									
		2									
		2									
		3		1							
		3				SP	SAND, fine grained, pale brown.	W-M	L	Alluvial	
		2									
		2									
		1									
		2									
		1									
		1									
		2									
		3									
		4		2		SP	SAND, fine grained, pale brown.	W	MD	Alluvial	
		4									
		5									
		4									
		8									
		9									
		10									
		6									
		5									
		6									
		6		3		SC	Clayey SAND, fine grained, pale brown, low plasticity clay, trace fine sized gravel.		MD-D	Alluvial	
		6									
		6									
		6									
		6									
		4									
		4									
		4									



Hunter Civilab

Unit 3, 62 Sandringham Avenue Thornton NSW 2322

Phone: (02) 4966 1844

Geotechnical Log - Borehole

BH2

UTM : 56H

Easting (m) : 0.0

Northing (m) : 0.0

Ground Elevation : Not Surveyed

Total Depth : 7 m BGL

Drill Rig : Trailer Mounted Drill Rig

Driller Supplier : Hunter Civilab

Logged By : JR

Reviewed By : HV

Date : 03/11/2023

Job Number : G0350

Client : Central Waste Station Pty Ltd

Project : Proposed Commercial Development

Location : 8 Styles Road, Kurri Kurri

Loc Comment :

Drilling Method	Water	DCP graph	Samples	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Soil Origin	Remarks
			Disturbed								
Auger Drilling		5		5		SC	Clayey SAND, fine grained, pale brown, low plasticity clay, trace fine sized gravel.		MD-D	Alluvial	
		6									
		5									
		5									
		6									
		6									
		6									
		5									
		5									
		6									
		Terminated									
				7			BH2 Terminated at 7 m (in above)				

Loc Comment :

Drilling Method	Water	DCP graph	Samples	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Soil Origin	Remarks	
			Disturbed									
Auger Drilling		3			SM	FILL: Silty SAND, fine grained, pale brown, trace fine sized gravel.	D		Fill			
		7										
		7										
		8										
		8										
		14										
		12										
		12										
		16			0.8	SM	FILL: Silty SAND, fine grained, dark grey / brown, trace fine sized gravel.		Fill			
		16										
		11										
		16										
		16										
		Practical Refusal			1.5	SM	Silty SAND, fine grained, pale grey / brown.		MD-D		Alluvial	
		3			2	SM	Silty SAND, fine grained, dark grey.		W-M		VD	Alluvial
		3										
		2										
		2										
		2										
		3										
		2										
		3										
		3										
		2										
		2										
		2			3	SM	As above, but pale grey / brown.				MD	Alluvial
2												
2												
2												
3												
2												
2												
2												
2												
2												



Hunter Civilab

Unit 3, 62 Sandringham Avenue Thornton NSW 2322

Phone: (02) 4966 1844

Geotechnical Log - Borehole

BH3

UTM : 56H
Easting (m) : 0.0
Northing (m) : 0.0
Ground Elevation : Not Surveyed
Total Depth : 7 m BGL

Drill Rig : Trailer Mounted Drill Rig
Driller Supplier : Hunter Civilab
Logged By : JR
Reviewed By : HV
Date : 03/11/2023

Job Number : G0350
Client : Central Waste Station Pty Ltd
Project : Proposed Commercial Development
Location : 8 Styles Road, Kurri Kurri
Loc Comment :

Drilling Method	Water	DCP graph	Samples	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Soil Origin	Remarks
			Disturbed								
Auger Drilling		3				SM	As above, but pale grey / brown.		MD	Alluvial	
		2									
		Terminated									
				5							
				6							
				6		SC	Clayey SAND, fine to medium grained, dark grey, low plasticity clay.	W		Alluvial	
				7							
							BH3 Terminated at 7 m (in above)				



Hunter Civilab

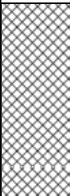
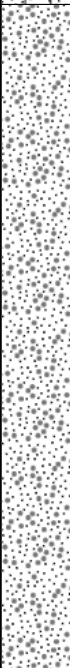
Unit 3, 62 Sandringham Avenue Thornton NSW 2322

Phone: (02) 4966 1844

Geotechnical Log - Borehole

BH4

UTM : 56H Drill Rig : Trailer Mounted Drill Rig Job Number : G0350
Easting (m) : 0.0 Driller Supplier : Hunter Civilab Client : Central Waste Station Pty Ltd
Northing (m) : 0.0 Logged By : JR Project : Proposed Commercial Development
Ground Elevation : Not Surveyed Reviewed By : HV Location : 8 Styles Road, Kurri Kurri
Total Depth : 7 m BGL Date : 03/11/2023 Loc Comment :

Drilling Method	Water	DCP graph	Samples	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Soil Origin	Remarks
			Disturbed								
Auger Drilling						GM	FILL: Silty to sandy GRAVEL, angular, fine to coarse sized, fine to coarse grained sand, pale grey, recycled dgb.	D		Fill	
				0.5		SM	Silty SAND, fine grained, pale brown.		L-MD	Alluvial	
	3										
	2										
	2		1								
	2										
	3										
	2										
	2										
				1.5		SP	SAND, fine grained, pale brown, trace silt	M-D		Alluvial	
	3										
	3										
	2										
	2										
	3										
	2			2							
	2										
	2										
	3										
	3										
	4										
	3										
	2										
	2										
	2										
	2			3							
	2										
	3										
				3.2		SM	Silty SAND, fine to medium grained, dark grey.	W		Alluvial	
	3										
	3										
	3										
	2										
	2										
	2										
	3										
2											



Hunter Civilab

Unit 3, 62 Sandringham Avenue Thornton NSW 2322

Phone: (02) 4966 1844

Geotechnical Log - Borehole

BH4

UTM : 56H Drill Rig : Trailer Mounted Drill Rig Job Number : G0350
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Total Depth : 7 m BGL Date : 03/11/2023 Loc Comment :

Drilling Method	Water	DCP graph	Samples	Depth (m)	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Soil Origin	Remarks
			Disturbed								
Auger Drilling		2		5		SM	Silty SAND, fine to medium grained, dark grey.	W		Alluvial	
		2									
		3									
		3									
		2									
		3									
		2									
		3									
		4									
		Terminated									
				7			BH4 Terminated at 7 m				

1 Introduction

The following notes are provided to be used in conjunction with Hunter Civilab's report to explain the terms and abbreviations used throughout the report.

2 Material Descriptions

Descriptions of soil and rock are generally in accordance with the Unified Soil Classification System and Australian Standard AS1726-2017 – Geotechnical Site Investigations. The descriptions of soil and rock are based on field tests and observations and are independent of any laboratory test results. The data presented throughout this report is as factual as possible. However, some interpretations is unavoidable.

2.1 Unified Soil Classification Group Symbols

Soils are generally assigned one of the following unified soil classification group symbols:

Table 2.1 - Unified Soil Classification Group Symbols

Symbol	Description	Symbol	Description
CH	Organic clays of high plasticity	Pt	Peat and other highly organic soils
OL	Organic silts of low plasticity	CH	Inorganic clays of high plasticity
MH	Inorganic silts of high plasticity	CI	Inorganic clays of low plasticity
ML	Inorganic silts of low plasticity	CL	Inorganic clays of low plasticity
GC	Clayey gravels	SC	Clayey sands
GM	Silty gravels	SM	Silty sands
GP	Poorly graded gravels	SP	Poorly graded sands
GW	Well graded gravels	SW	Well graded sands

2.2 Soil Description

Soils are described in general accordance with AS1726-2017, Section 6.1:

Table 2.2 - Particle Size Definitions (AS1726-2017, Table 1)

Component	Subdivision	Size (mm)
BOULDERS		>200
COBBLES		63 - 200
GRAVEL	Coarse	19 - 63
	Medium	6.7 - 19
	Fine	2.36 - 6.7
SAND	Coarse	0.6 - 2.36
	Medium	0.21 - 0.6
	Fine	0.075 - 0.21
SILT		0.002 - 0.075
CLAY		<0.002

Table 2.3 - Descriptive Terms for Accessory Soil Components (AS1726-2017, Table 2)

Designation of Components	In Coarse Grained Soils				In Fine Grained Soils	
	% Fines	Terminology	% Accessory Coarse Fraction	Terminology	% Sand / Gravel	Terminology
Minor	≤ 5	Add 'trace clay / silt' to description where applicable	≤ 15	Add 'trace sand / gravel' to description where applicable	≤ 15	Add 'trace sand / gravel' to description where applicable
	$> 5, \leq 12$	Add 'with clay / silt' to description where applicable	$> 15, \leq 30$	Add 'with sand / gravel' to description where applicable	$> 15, \leq 30$	Add 'with sand / gravel' to description where applicable
Secondary	> 12	Prefix soil name as 'Silty' or 'Clayey', as applicable	> 30	Prefix soil name as 'Sandy' or 'Gravelly', as applicable	> 30	Prefix soil name as 'Sandy' or 'Gravelly', as applicable

Table 2.4 - Descriptive Terms for Plasticity (AS1726-2017, Table 6)

Descriptive Term	Range of Liquid Limit for SILT	Range of Liquid Limit for CLAY
Non-Plastic	Not applicable	Not applicable
Low Plasticity	≤ 50	≤ 35
Medium Plasticity	Not applicable	> 35 and ≤ 50
High Plasticity	> 50	> 50

Table 2.5 - Moisture Condition (AS1726-2017, Clause 6.1.7 (a))

Material	Term	Abbreviation	Field Description Terms
Coarse Grained Soil	Dry	D	Non-cohesive and free-running
	Moist	M	Soil feels cool, darkened in colour; Soil tends to stick together
	Wet	W	Soil feels cool, darkened in colour; Soil tends to stick together, free water forms when handling
Fine Grained Soil	Moist, dry of plastic limit	$w < PL$	Hard and friable or powdery
	Moist, near plastic limit	$w \approx PL$	Soil can be moulded at a moisture content approximately equal to the plastic limit
	Moist, wet of plastic limit	$w > PL$	Soil usually weakened and free water forms on hands when handling
	Wet, near liquid limit	$w \approx LL$	Near liquid limit
	Wet, wet of liquid limit	$w > LL$	Wet of liquid limit

Explanatory Notes & Abbreviations

Table 2.6 - Consistency Terms for Cohesive Soils (AS1726-2017, Table 11)

Consistency	Abbreviation	Field Guide to Consistency
Very Soft	VS	Exudes between the fingers when squeezed in hand
Soft	S	Can be moulded by light finger pressure
Firm	F	Can be moulded by strong finger pressure
Stiff	St	Cannot be moulded by fingers
Very Stiff	VSt	Can be indented by thumb nail
Hard	H	Can be indented with difficulty by thumb nail
Friable	Fr	Can be easily crumbled or broken into small pieces by hand

Table 2.7 - Relative Density of Non-Cohesive Soils (AS1726-2017, Table 12)

Relative Density	Abbreviation	Density Index (%)
Very Loose	VL	≤ 15
Loose	L	> 15 and ≤ 35
Medium Dense	MD	> 35 and ≤ 65
Dense	D	> 65 and ≤ 85
Very Dense	VD	> 85

Table 2.8 - Soil Origin (AS1726-2017, Clause 6.1.9)

Origin	Description
Residual Soil	Formed directly from in situ weathering of geological formations. These soils no longer retain any visible structure of fabric of the parent soil or rock material.
Extremely weathered material	Formed directly from in situ weathering of geological formations. Although this material is of soil strength, it retains the structure and / or fabric of the parent rock material.
Alluvial soil	Deposited by streams and rivers.
Estuarine soil	Deposited in coastal estuaries, and including sediments carried by inflowing rivers and streams, and tidal currents.
Marine soil	Deposited in a marine environment.
Lacustrine soil	Deposited in freshwater lakes.
Aeolian soil	Carried and deposited by wind.
Colluvial soil	Soil and rock debris transported down slopes by gravity, with or without the assistance of flowing water and generally deposited in gullies or at the base of slopes. Colluvium is often used to refer to thicker deposits such as those formed from landslides, whereas the term 'slopewash' may be used for thinner and more widespread deposits that accumulate gradually over longer geological timeframes.
Topsoil	Surface and / or near surface soils often, but not always, defined by high levels of organic material.
Fill	Material placed by anthropogenic processes.

Explanatory Notes & Abbreviations

2.3 Rock Description

Rocks are described in general accordance with AS1726-2017, Clause 6.2.

Table 2.9 - Rock Material Strength Classification (AS1726-2017, Table 19)

Strength	Abbreviation	Field Assessment
Very Low Strength	VLS	Material crumbles under firm blows with sharp end of pick; Can be peeled with sharp knife; Too hard to cut a triaxial sample by hand; Pieces up to 30mm thick can be broken by finger pressure.
Low Strength	LS	Easily scored with a knife; Indentations 1mm to 3mm show in the specimen with firm blows of the pick point; Has dull sound under the hammer; A piece of core 150mm long by 50mm diameter may be broken by hand; Sharp edges of core may be friable and break during handling.
Medium Strength	MS	Readily scored with a knife; A piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High Strength	HS	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; Rock rings under hammer.
Very High Strength	VH	Hand specimen breaks with pick after more than one blow; Rock rings under hammer.
Extremely High Strength	EH	Specimen required many blows with geological pick to break through intact material; Rock rings under hammer.

Note: Material with strength less than 'Very Low' shall be described using soil characteristics. The presence of an original rock structure, fabric or texture should be noted, if relevant.

Table 2.10 - Classification of Material Weathering (AS1726-2017, Table 20)

Term	Abbreviation	Definition
Residual Soil	RS	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported. The material is described using soil descriptive terms.
Extremely Weathered	XW	Material is weathered to such an extent that it has soil properties. Mass structure and material structure and fabric of original rock are still visible. The material is described using soil descriptive terms.
Highly Weathered	HW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable. Rock strength is significantly changed by weathering.
Moderately Weathered	MW	
Slightly Weathered	SW	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	FR	Rock shows no sign of decomposition of individual minerals or colour changes.

3 Drilling, In Situ Testing & Sampling Methodology

Table 3.1 - Drilling Methods

Abbreviation	Method
HA	Hand Auger
EX	Excavator bucket
AV	Auger drilling with steel 'V' bit
AT	Auger drilling with tungsten carbide bit
AB	Auger for bulk sampling
WB	Wash bore rotary drilling
NMLC	Rock coring using a NMLC core barrel
HQ	Rock coring using a HQ core barrel

Table 3.2 - Field Sampling and In Situ Testing Key

Abbreviation	In Situ Test	Abbreviation	Sample Type
DCP	Dynamic Cone Penetrometer (blows/100mm)	U	Undisturbed Sample (50mm)
PSP	Perth Sand Penetrometer (blow/100mm)	D	Disturbed Sample
SPT	Standard Penetrometer Test	B	Bulk Disturbed Sample
PP	Pocket Penetrometer Measurement (kPa)	ES	Environmental Sample
3,4,5 (example)	SPT blows per 150mm	W	Water Sample
N=9 (example)	STP 'blow count number' over 300mm after initial 150mm seating		
VS	Handheld Shear Vane Measurement (kPa)		
CPT	Cone Penetrometer Test		
IS50 (D) (A)	Point Load Index Value (reported in MPA) (D) = Diametric (A) = Axial		

4 Groundwater Observations

Table 4.1 - Water Comments Key

Water Comment	Symbol
Water Inflow	►
Water / drilling fluid loss	◄
Measurement of standing water level	≡
Water Noted	≡



Annex C

SYDNEY ANALYTICAL LABORATORIES

Page 1 of 3

Office:
PO BOX 48
ERMINGTON NSW 2115

Laboratory:
1/4 ABBOTT ROAD
SEVEN HILLS NSW 2147
Telephone: (02) 9838 8903
Fax: (02) 9838 8919
A.C.N. 003 614 695
A.B.N. 81 829 182 852
NATA No: 1884

ANALYTICAL REPORT for:

HUNTER CIVILAB

UNIT 3/62 SANDRINGHAM AVE
THORNTON 2322

ATTN: JAMES WYATT

JOB NO: SAL28652I
CLIENT ORDER: G0350
DATE RECEIVED: 10/11/23
DATE COMPLETED: 20/11/23
TYPE OF SAMPLES: SOILS
NO OF SAMPLES: 4



.....
Issued on 21/11/23
Lance Smith
(Chief Chemist)

ANALYTICAL REPORT

**JOB NO: SAL28652I
CLIENT ORDER: G0350**

SAMPLES	pH Sat.	Cl mg/kg	SO4 mg/kg	*RESIS. ohm.m
1 BH1/0.5-0.5	7.8	15	430	30
2 BH2/2.0-2.5	7.5	10	35	81
3 BH3/4.0-4.5	6.6	15	145	54
4 BH4/1.0-1.5	5.6	10	100	63
MDL	0.1	5	5	1
Method Code	C23	C24	C6	C21
Preparation	P4	P4	P4	P8

RESULTS ON DRY BASIS

DATE OF COLLECTION: 03/11/23

REFERENCE: 8 STYLES STREET, KURRI KURRI

ANALYTICAL REPORT

JOB NO: SAL28652I
CLIENT ORDER: G0350

METHODS OF PREPARATION AND ANALYSIS

The tests contained in this report have been carried out on the samples as received by the laboratory. In the case where an analyte or group of analytes are received outside of recommended holding times, the analysis will proceed and the report annotated. Analysis is carried out within analyte holding times where possible.

P4	Sample dried, sieved at 9.5mm, split and crushed to -425um
P8	Sample dried and crushed to pass 6.7mm sieve
C23	pH - RMS T123
C24	Water Soluble Chloride - RMS T1010
C6	Water Soluble Sulphate - AS1289.4.2.1 Determined by APHA 4110B
*C21	Electrical Resistivity - RMS T185

*The laboratory's NATA accreditation does not cover performance of this test



Annex D

Foundation Maintenance and Footing Performance: A Homeowner's Guide



PUBLISHING

BTF 18-2011
replaces
Information
Sheet 10/91

Buildings can and often do move. This movement can be up, down, lateral or rotational. The fundamental cause of movement in buildings can usually be related to one or more problems in the foundation soil. It is important for the homeowner to identify the soil type in order to ascertain the measures that should be put in place in order to ensure that problems in the foundation soil can be prevented, thus protecting against building movement.

This Building Technology File is designed to identify causes of soil-related building movement, and to suggest methods of prevention of resultant cracking in buildings.

Soil Types

The types of soils usually present under the topsoil in land zoned for residential buildings can be split into two approximate groups – granular and clay. Quite often, foundation soil is a mixture of both types. The general problems associated with soils having granular content are usually caused by erosion. Clay soils are subject to saturation and swell/shrink problems.

Classifications for a given area can generally be obtained by application to the local authority, but these are sometimes unreliable and if there is doubt, a geotechnical report should be commissioned. As most buildings suffering movement problems are founded on clay soils, there is an emphasis on classification of soils according to the amount of swell and shrinkage they experience with variations of water content. The table below is Table 2.1 from AS 2870-2011, the Residential Slab and Footing Code.

Causes of Movement

Settlement due to construction

There are two types of settlement that occur as a result of construction:

- Immediate settlement occurs when a building is first placed on its foundation soil, as a result of compaction of the soil under the weight of the structure. The cohesive quality of clay soil mitigates against this, but granular (particularly sandy) soil is susceptible.
- Consolidation settlement is a feature of clay soil and may take place because of the expulsion of moisture from the soil or because of the soil's lack of resistance to local compressive or shear stresses. This will usually take place during the first few months after construction, but has been known to take many years in exceptional cases.

These problems are the province of the builder and should be taken into consideration as part of the preparation of the site for construction. Building Technology File 19 (BTF 19) deals with these problems.

Erosion

All soils are prone to erosion, but sandy soil is particularly susceptible to being washed away. Even clay with a sand component of say 10% or more can suffer from erosion.

Saturation

This is particularly a problem in clay soils. Saturation creates a bog-like suspension of the soil that causes it to lose virtually all of its bearing capacity. To a lesser degree, sand is affected by saturation because saturated sand may undergo a reduction in volume, particularly imported sand fill for bedding and blinding layers. However, this usually occurs as immediate settlement and should normally be the province of the builder.

Seasonal swelling and shrinkage of soil

All clays react to the presence of water by slowly absorbing it, making the soil increase in volume (see table below). The degree of increase varies considerably between different clays, as does the degree of decrease during the subsequent drying out caused by fair weather periods. Because of the low absorption and expulsion rate, this phenomenon will not usually be noticeable unless there are prolonged rainy or dry periods, usually of weeks or months, depending on the land and soil characteristics.

The swelling of soil creates an upward force on the footings of the building, and shrinkage creates subsidence that takes away the support needed by the footing to retain equilibrium.

Shear failure

This phenomenon occurs when the foundation soil does not have sufficient strength to support the weight of the footing. There are two major post-construction causes:

- Significant load increase.
- Reduction of lateral support of the soil under the footing due to erosion or excavation.

In clay soil, shear failure can be caused by saturation of the soil adjacent to or under the footing.

GENERAL DEFINITIONS OF SITE CLASSES

Class	Foundation
A	Most sand and rock sites with little or no ground movement from moisture changes
S	Slightly reactive clay sites, which may experience only slight ground movement from moisture changes
M	Moderately reactive clay or silt sites, which may experience moderate ground movement from moisture changes
H1	Highly reactive clay sites, which may experience high ground movement from moisture changes
H2	Highly reactive clay sites, which may experience very high ground movement from moisture changes
E	Extremely reactive sites, which may experience extreme ground movement from moisture changes

Notes

1. Where controlled fill has been used, the site may be classified A to E according to the type of fill used.
2. Filled sites. Class P is used for sites which include soft fills, such as clay or silt or loose sands; landslide; mine subsidence; collapsing soils; soil subject to erosion; reactive sites subject to abnormal moisture conditions or sites which cannot be classified otherwise.
3. Where deep-seated moisture changes exist on sites at depths of 3 m or greater, further classification is needed for Classes M to E (M-D, H1-D, H2-D and E-D).

Tree root growth

Trees and shrubs that are allowed to grow in the vicinity of footings can cause foundation soil movement in two ways:

- Roots that grow under footings may increase in cross-sectional size, exerting upward pressure on footings.
- Roots in the vicinity of footings will absorb much of the moisture in the foundation soil, causing shrinkage or subsidence.

Unevenness of Movement

The types of ground movement described above usually occur unevenly throughout the building's foundation soil. Settlement due to construction tends to be uneven because of:

- Differing compaction of foundation soil prior to construction.
- Differing moisture content of foundation soil prior to construction.

Movement due to non-construction causes is usually more uneven still. Erosion can undermine a footing that traverses the flow or can create the conditions for shear failure by eroding soil adjacent to a footing that runs in the same direction as the flow.

Saturation of clay foundation soil may occur where subfloor walls create a dam that makes water pond. It can also occur wherever there is a source of water near footings in clay soil. This leads to a severe reduction in the strength of the soil which may create local shear failure.

Seasonal swelling and shrinkage of clay soil affects the perimeter of the building first, then gradually spreads to the interior. The swelling process will usually begin at the uphill extreme of the building, or on the weather side where the land is flat. Swelling gradually reaches the interior soil as absorption continues. Shrinkage usually begins where the sun's heat is greatest.

Effects of Uneven Soil Movement on Structures

Erosion and saturation

Erosion removes the support from under footings, tending to create subsidence of the part of the structure under which it occurs. Brickwork walls will resist the stress created by this removal of support by bridging the gap or cantilevering until the bricks or the mortar bedding fail. Older masonry has little resistance. Evidence of failure varies according to circumstances and symptoms may include:

- Step cracking in the mortar beds in the body of the wall or above/below openings such as doors or windows.
- Vertical cracking in the bricks (usually but not necessarily in line with the vertical beds or perpend).

Isolated piers affected by erosion or saturation of foundations will eventually lose contact with the bearers they support and may tilt or fall over. The floors that have lost this support will become bouncy, sometimes rattling ornaments etc.

Seasonal swelling/shrinkage in clay

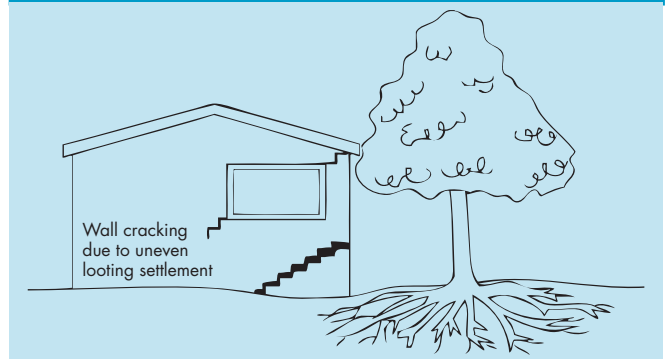
Swelling foundation soil due to rainy periods first lifts the most exposed extremities of the footing system, then the remainder of the perimeter footings while gradually permeating inside the building footprint to lift internal footings. This swelling first tends to create a dish effect, because the external footings are pushed higher than the internal ones.

The first noticeable symptom may be that the floor appears slightly dished. This is often accompanied by some doors binding on the floor or the door head, together with some cracking of cornice mitres. In buildings with timber flooring supported by bearers and joists, the floor can be bouncy. Externally there may be visible dishing of the hip or ridge lines.

As the moisture absorption process completes its journey to the innermost areas of the building, the internal footings will rise. If the spread of moisture is roughly even, it may be that the symptoms will temporarily disappear, but it is more likely that swelling will be uneven, creating a difference rather than a disappearance in symptoms. In buildings with timber flooring supported by bearers and joists, the isolated piers will rise more easily than the strip footings or piers under walls, creating noticeable doming of flooring.

As the weather pattern changes and the soil begins to dry out, the external footings will be first affected, beginning with the locations where the sun's effect is strongest. This has the effect of lowering the

Trees can cause shrinkage and damage



external footings. The doming is accentuated and cracking reduces or disappears where it occurred because of dishing, but other cracks open up. The roof lines may become convex.

Doming and dishing are also affected by weather in other ways. In areas where warm, wet summers and cooler dry winters prevail, water migration tends to be toward the interior and doming will be accentuated, whereas where summers are dry and winters are cold and wet, migration tends to be toward the exterior and the underlying propensity is toward dishing.

Movement caused by tree roots

In general, growing roots will exert an upward pressure on footings, whereas soil subject to drying because of tree or shrub roots will tend to remove support from under footings by inducing shrinkage.

Complications caused by the structure itself

Most forces that the soil causes to be exerted on structures are vertical – i.e. either up or down. However, because these forces are seldom spread evenly around the footings, and because the building resists uneven movement because of its rigidity, forces are exerted from one part of the building to another. The net result of all these forces is usually rotational. This resultant force often complicates the diagnosis because the visible symptoms do not simply reflect the original cause. A common symptom is binding of doors on the vertical member of the frame.

Effects on full masonry structures

Brickwork will resist cracking where it can. It will attempt to span areas that lose support because of subsided foundations or raised points. It is therefore usual to see cracking at weak points, such as openings for windows or doors.

In the event of construction settlement, cracking will usually remain unchanged after the process of settlement has ceased.

With local shear or erosion, cracking will usually continue to develop until the original cause has been remedied, or until the subsidence has completely neutralised the affected portion of footing and the structure has stabilised on other footings that remain effective.

In the case of swell/shrink effects, the brickwork will in some cases return to its original position after completion of a cycle, however it is more likely that the rotational effect will not be exactly reversed, and it is also usual that brickwork will settle in its new position and will resist the forces trying to return it to its original position. This means that in a case where swelling takes place after construction and cracking occurs, the cracking is likely to at least partly remain after the shrink segment of the cycle is complete. Thus, each time the cycle is repeated, the likelihood is that the cracking will become wider until the sections of brickwork become virtually independent.

With repeated cycles, once the cracking is established, if there is no other complication, it is normal for the incidence of cracking to stabilise, as the building has the articulation it needs to cope with the problem. This is by no means always the case, however, and monitoring of cracks in walls and floors should always be treated seriously.

Upheaval caused by growth of tree roots under footings is not a simple vertical shear stress. There is a tendency for the root to also exert lateral forces that attempt to separate sections of brickwork after initial cracking has occurred.

The normal structural arrangement is that the inner leaf of brickwork in the external walls and at least some of the internal walls (depending on the roof type) comprise the load-bearing structure on which any upper floors, ceilings and the roof are supported. In these cases, it is internally visible cracking that should be the main focus of attention, however there are a few examples of dwellings whose external leaf of masonry plays some supporting role, so this should be checked if there is any doubt. In any case, externally visible cracking is important as a guide to stresses on the structure generally, and it should also be remembered that the external walls must be capable of supporting themselves.

Effects on framed structures

Timber or steel framed buildings are less likely to exhibit cracking due to swell/shrink than masonry buildings because of their flexibility. Also, the doming/dishing effects tend to be lower because of the lighter weight of walls. The main risks to framed buildings are encountered because of the isolated pier footings used under walls. Where erosion or saturation causes a footing to fall away, this can double the span which a wall must bridge. This additional stress can create cracking in wall linings, particularly where there is a weak point in the structure caused by a door or window opening. It is, however, unlikely that framed structures will be so stressed as to suffer serious damage without first exhibiting some or all of the above symptoms for a considerable period. The same warning period should apply in the case of upheaval. It should be noted, however, that where framed buildings are supported by strip footings there is only one leaf of brickwork and therefore the externally visible walls are the supporting structure for the building. In this case, the subfloor masonry walls can be expected to behave as full brickwork walls.

Effects on brick veneer structures

Because the load-bearing structure of a brick veneer building is the frame that makes up the interior leaf of the external walls plus perhaps the internal walls, depending on the type of roof, the building can be expected to behave as a framed structure, except that the external masonry will behave in a similar way to the external leaf of a full masonry structure.

Water Service and Drainage

Where a water service pipe, a sewer or stormwater drainage pipe is in the vicinity of a building, a water leak can cause erosion, swelling or saturation of susceptible soil. Even a minuscule leak can be enough to saturate a clay foundation. A leaking tap near a building can have the same effect. In addition, trenches containing pipes can become watercourses even though backfilled, particularly where broken rubble is used as fill. Water that runs along these trenches can be responsible for serious erosion, interstrata seepage into subfloor areas and saturation.

Pipe leakage and trench water flows also encourage tree and shrub roots to the source of water, complicating and exacerbating the problem. Poor roof plumbing can result in large volumes of rainwater being concentrated in a small area of soil:

- Incorrect falls in roof guttering may result in overflows, as may gutters blocked with leaves etc.

- Corroded guttering or downpipes can spill water to ground.
- Downpipes not positively connected to a proper stormwater collection system will direct a concentration of water to soil that is directly adjacent to footings, sometimes causing large-scale problems such as erosion, saturation and migration of water under the building.

Seriousness of Cracking

In general, most cracking found in masonry walls is a cosmetic nuisance only and can be kept in repair or even ignored. The table below is a reproduction of Table C1 of AS 2870-2011.

AS 2870-2011 also publishes figures relating to cracking in concrete floors, however because wall cracking will usually reach the critical point significantly earlier than cracking in slabs, this table is not reproduced here.

Prevention/Cure

Plumbing

Where building movement is caused by water service, roof plumbing, sewer or stormwater failure, the remedy is to repair the problem. It is prudent, however, to consider also rerouting pipes away from the building where possible, and relocating taps to positions where any leakage will not direct water to the building vicinity. Even where gully traps are present, there is sometimes sufficient spill to create erosion or saturation, particularly in modern installations using smaller diameter PVC fixtures. Indeed, some gully traps are not situated directly under the taps that are installed to charge them, with the result that water from the tap may enter the backfilled trench that houses the sewer piping. If the trench has been poorly backfilled, the water will either pond or flow along the bottom of the trench. As these trenches usually run alongside the footings and can be at a similar depth, it is not hard to see how any water that is thus directed into a trench can easily affect the foundation's ability to support footings or even gain entry to the subfloor area.

Ground drainage

In all soils there is the capacity for water to travel on the surface and below it. Surface water flows can be established by inspection during and after heavy or prolonged rain. If necessary, a grated drain system connected to the stormwater collection system is usually an easy solution.

It is, however, sometimes necessary when attempting to prevent water migration that testing be carried out to establish watertable height and subsoil water flows. This subject is referred to in BTF 19 and may properly be regarded as an area for an expert consultant.

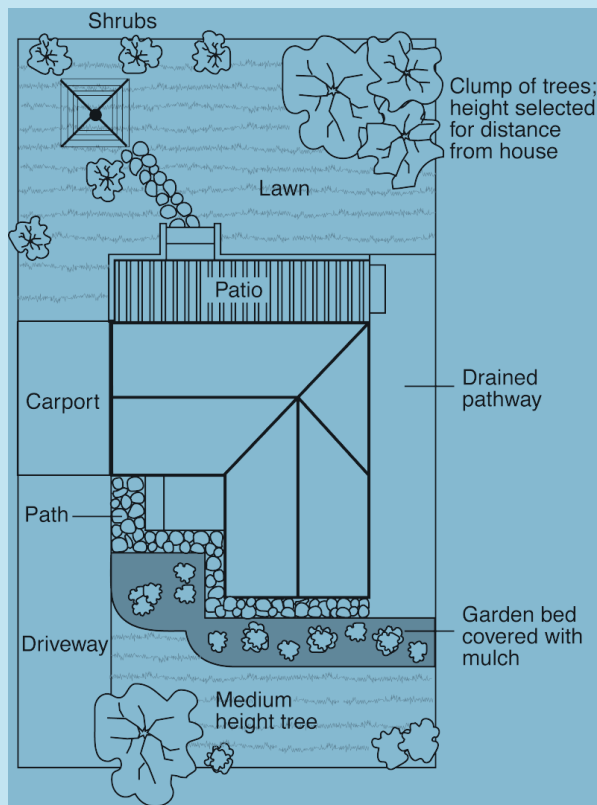
Protection of the building perimeter

It is essential to remember that the soil that affects footings extends well beyond the actual building line. Watering of garden plants, shrubs and trees causes some of the most serious water problems.

For this reason, particularly where problems exist or are likely to occur, it is recommended that an apron of paving be installed around as much of the building perimeter as necessary. This paving should

CLASSIFICATION OF DAMAGE WITH REFERENCE TO WALLS		
Description of typical damage and required repair	Approximate crack width limit (see Note 3)	Damage category
Hairline cracks	<0.1 mm	0
Fine cracks which do not need repair	<1 mm	1
Cracks noticeable but easily filled. Doors and windows stick slightly.	<5 mm	2
Cracks can be repaired and possibly a small amount of wall will need to be replaced. Doors and windows stick. Service pipes can fracture. Weathertightness often impaired.	5–15 mm (or a number of cracks 3 mm or more in one group)	3
Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Window and door frames distort. Walls lean or bulge noticeably, some loss of bearing in beams. Service pipes disrupted.	15–25 mm but also depends on number of cracks	4

Gardens for a reactive site



extend outwards a minimum of 900 mm (more in highly reactive soil) and should have a minimum fall away from the building of 1:60. The finished paving should be no less than 100 mm below brick vent bases.

It is prudent to relocate drainage pipes away from this paving, if possible, to avoid complications from future leakage. If this is not practical, earthenware pipes should be replaced by PVC and backfilling should be of the same soil type as the surrounding soil and compacted to the same density.

Except in areas where freezing of water is an issue, it is wise to remove taps in the building area and relocate them well away from the building – preferably not uphill from it (see BTF 19).

It may be desirable to install a grated drain at the outside edge of the paving on the uphill side of the building. If subsoil drainage is needed this can be installed under the surface drain.

Condensation

In buildings with a subfloor void such as where bearers and joists support flooring, insufficient ventilation creates ideal conditions for condensation, particularly where there is little clearance between the floor and the ground. Condensation adds to the moisture already present in the subfloor and significantly slows the process of drying out. Installation of an adequate subfloor ventilation system, either natural or mechanical, is desirable.

Warning: Although this Building Technology File deals with cracking in buildings, it should be said that subfloor moisture can result in the development of other problems, notably:

- Water that is transmitted into masonry, metal or timber building elements causes damage and/or decay to those elements.
- High subfloor humidity and moisture content create an ideal environment for various pests, including termites and spiders.
- Where high moisture levels are transmitted to the flooring and walls, an increase in the dust mite count can ensue within the living areas. Dust mites, as well as dampness in general, can be a health hazard to inhabitants, particularly those who are abnormally susceptible to respiratory ailments.

The garden

The ideal vegetation layout is to have lawn or plants that require only light watering immediately adjacent to the drainage or paving edge, then more demanding plants, shrubs and trees spread out in that order.

Overwatering due to misuse of automatic watering systems is a common cause of saturation and water migration under footings. If it is necessary to use these systems, it is important to remove garden beds to a completely safe distance from buildings.

Existing trees

Where a tree is causing a problem of soil drying or there is the existence or threat of upheaval of footings, if the offending roots are subsidiary and their removal will not significantly damage the tree, they should be severed and a concrete or metal barrier placed vertically in the soil to prevent future root growth in the direction of the building. If it is not possible to remove the relevant roots without damage to the tree, an application to remove the tree should be made to the local authority. A prudent plan is to transplant likely offenders before they become a problem.

Information on trees, plants and shrubs

State departments overseeing agriculture can give information regarding root patterns, volume of water needed and safe distance from buildings of most species. Botanic gardens are also sources of information. For information on plant roots and drains, see Building Technology File 17.

Excavation

Excavation around footings must be properly engineered. Soil supporting footings can only be safely excavated at an angle that allows the soil under the footing to remain stable. This angle is called the angle of repose (or friction) and varies significantly between soil types and conditions. Removal of soil within the angle of repose will cause subsidence.

Remediation

Where erosion has occurred that has washed away soil adjacent to footings, soil of the same classification should be introduced and compacted to the same density. Where footings have been undermined, augmentation or other specialist work may be required. Remediation of footings and foundations is generally the realm of a specialist consultant.

Where isolated footings rise and fall because of swell/shrink effect, the homeowner may be tempted to alleviate floor bounce by filling the gap that has appeared between the bearer and the pier with blocking. The danger here is that when the next swell segment of the cycle occurs, the extra blocking will push the floor up into an accentuated dome and may also cause local shear failure in the soil. If it is necessary to use blocking, it should be by a pair of fine wedges and monitoring should be carried out fortnightly.

This BTF was prepared by John Lewer FAIB, MIAMA, Partner, Construction Diagnosis.

The information in this and other issues in the series was derived from various sources and was believed to be correct when published.

The information is advisory. It is provided in good faith and not claimed to be an exhaustive treatment of the relevant subject.

Further professional advice needs to be obtained before taking any action based on the information provided.

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Email: publishing.sales@csiro.au

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