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Thermal Waste Processing Project

Environmental Impact Statement - SSD_15_7396

Prepared for Weston Aluminium Pty Ltd
26 August 2016

Environmental Impact Statement

Thermal Waste Processing Project SSD_15_7396

Weston Aluminium Pty Ltd

Client: Weston Aluminium Pty Ltd

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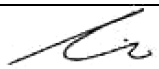
0	26-Aug-2016	Final	Simon Murphy Project Manager	

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Glossary of Terms

Term	Definition
Aboriginal cultural heritage	The tangible (objects) and intangible (dreaming stories, songlines, places) cultural practices and traditions associated with past and present day Aboriginal communities.
Annual recurrence interval (ARI)	Used to describe the frequency or probability of floods occurring (e.g. a 100 year ARI flood is a flood that occurs or is exceeded on average once every 100 years).
Aquifer	Geologic formation, group of formations, or part of a formation capable of transmitting and yielding quantities of water.
Archaeology	The scientific study of human history, particularly the relics and cultural remains of the distant past.
Arterial roads	The main or trunk roads of the State road network.
Assessment Background Level	The Assessment Background Level (ABL), as defined by the NSW Industrial Noise Policy 2000, is a measure of the background level for noise, representing discrete assessment periods (i.e. day, evening or night) for each day. It is determined by calculating the 10th percentile (lowest 10%) background noise level over a 90 minute period (LA90).
Background noise level	The NSW Industrial Noise Policy 2000 defines the background noise level as the ambient sound-pressure noise level in the absence of the sound under investigation exceeded for 90% of the measurement period. Normally equated to the average minimum A-weighted sound pressure level.
Catchment	The area from which a surface watercourse or a groundwater system derives its water.
Carbon dioxide equivalents (CO_{2e})	Carbon dioxide equivalents. Used as a standard measurement of the level of effect of various gases on the atmosphere, particularly greenhouse gases.
Clearing	The removal of vegetation or other obstacles at or above ground level.
Critical habitat	A critical habitat as defined under the *Threatened Species Conservation Act 1995* includes, the whole or any part or parts of the area or areas of land comprising the habitat of an endangered species, population or ecological community or critically endangered species or ecological community, that is critical to the survival of the species, population or ecological community.
Cumulative impacts	Combination of individual effects of the same kind due to multiple actions from various sources over time.
Decibel	A scale unit used in the comparison of powers and levels of sound energy. Used for measuring noise.
Discharge	A release of water from a particular source.
Drainage	Natural or artificial means for the interception and removal of surface or subsurface water.
Earthworks	Operations involved in loosening, excavating, placing, shaping and compacting soil or rock.
Ecology	The study of the relationship between living things and the environment.
Ecologically sustainable development	As defined by the *Protection of the Environment Administration Act 1991*, requires the effective integration of economic and environmental considerations in decision making processes including: - The precautionary principle; - Inter-generational equity; - Conservation of biological diversity and ecological integrity; and - Improved valuation, pricing and incentive mechanisms (includes polluter pays, full life cycle costs, cost effective pursuit of environmental goals).
Ecosystem	As defined in the *Environment Protection and Biodiversity Conservation Act 1999*, an ecosystem is a 'dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.'
Emission	The discharge of a substance into the environment.

Term	Definition
Environmental Management Plan	A plan used to manage environmental impacts during each phase of Project development. It is a synthesis of proposed mitigation, management and monitoring actions, set to a timeline with defined responsibilities and follow up actions.
Environmental management system (EMS)	A quality system that enables an organisation to identify, monitor and control its environmental aspects. An EMS is part of an overall management system, which includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.
Environment	As defined within the *Environmental Planning & Assessment Act, 1979*, all aspects of the surroundings of humans, whether affecting any human as an individual or in his or her social groupings.
Environment Protection Licence (EPL)	EPLs are issued by Environment Protection Authority under the *Protection of the Environment Operations Act 1997*. EPLs with respect to scheduled development work or scheduled activities or non-scheduled activities may regulate all forms of pollution (including water pollution) resulting from that work or those activities. EPLs authorising or controlling an activity carried on at any premises may also regulate pollution resulting from any other activity carried on at the premises to which the licence applies.
Greenhouse gases	Gases with the potential to cause climate change (e.g. methane, carbon dioxide and others listed in the *National Greenhouse and Energy Reporting Act 2007*). Expressed in terms of carbon dioxide equivalent.
Green waste	Organic waste resulting from the trimming, pruning, lopping, cutting or felling of any form of vegetation, for example grass, trees or shrubs.
Groundwater	Water located within an aquifer: i.e., held in the rocks and soil beneath the earth's surface.
Habitat	The place where a species, population or ecological community lives (whether permanently, periodically or occasionally).
Hydrocarbon	Any organic compound — gaseous, liquid or solid — consisting only of carbon and hydrogen.
Hydrology	The study of rainfall and surface water runoff processes.
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment.
Intrusive noise	Intrusive noise, as defined in the NSW Industrial Noise Policy, refers to noise that intrudes above the background level by more than five decibels.
Local road	A council controlled road which provides for local circulation and access.
Non-Aboriginal heritage	Heritage items which are deemed to not be a tangible or intangible result of Aboriginal culture. In New South Wales, this term is synonymous with the term 'European heritage.'
Pollutant	Any matter that is not naturally present in the environment.
Project	The Project involves the following elements: - Expanding the Weston Aluminium Site's ability to receive from offsite and thermally treat onsite a variety of general, hazardous and other types of wastes (such as restricted solid wastes, liquid wastes and special wastes) as defined in the *Protection of the Environment Operations Act 1997*; - Construction and operation of a dedicated waste thermal treatment plant 24 hours a day, seven days per week at the existing Weston Aluminium Site in Kurri Kurri; and - Associated infrastructure and safety management control upgrades at the existing Weston Aluminium Site.
Rating Background Level (RBL)	The RBL, as defined in the NSW Industrial Noise Policy, is the overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period (as opposed to over each 24-hr period used for the assessment background level).
Riparian	Relating to the banks of a natural waterway.
Run-off	The portion of water that drains away as surface flow.

Term	Definition
Section 90 permit	An Aboriginal impact heritage permit issued by the Office of Environment and Heritage under section 90 of the *National Parks and Wildlife Act 1974*.
Sensitive receiver	A location where a person works or resides, including residential, hospitals, hotels, shopping centres, play grounds, recreational centres or similar.
Surface water	Water flowing or held in streams, rivers and other wetlands in the landscape.
Tributary	A river or stream flowing into a larger river or lake.
Waterways	Any flowing stream of water, whether natural or artificially regulated (not necessarily permanent).

Acronyms / Abbreviations

Acronym	Term/ Definition
ABS	Australian Bureau of Statistics
ADG Code	*Australian Code for the Transport of Dangerous Goods by Road and Rail Edition 7.4* (Commonwealth of Australia, December 2015)
AEP	Average exceedance probability
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AQIA	Air Quality Impact Assessment
AVTG	*NSW Environment Protection Authority Assessing vibration: a technical guideline, Department of Environment and Conservation, NSW* (DEC 2006)
BOM	Bureau of Meteorology
BRF	Battery Recycling Facility
CEMP	Construction Environmental Management Plan
CH_4	Methane
CIV	Capital Investment Vale
CO	Carbon monoxide
CO_2	Carbon dioxide
CoPC	Contaminants of Potential Concern
CSM	Conceptual Site Model
CWSS	*Cessnock City Wider Settlement Strategy 2010*
dB(A)	Decibels using the A-weighted scale measured according to the frequencies perceptible to the human ear.
DP&E	Department of Planning and Environment
DPI	Department of Primary Industry
EIS	Environmental Impact Statement
EMS	Environmental Management Systems
EPA	NSW Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	Environmental Planning and Assessment Regulation 2000 (NSW)
EPBC Act	*Environment Protection and Biodiversity Act 1999* (Cth)
EPC	Exposure Point Concentration
EPL	Environment Protection Licence
FBA	*Framework for Biodiversity Assessment – NSW Biodiversity Offsets Policy for Major Projects* (OEH, 2014)
FM Act	*Fisheries Management Act 1994* (NSW)
GDE	Groundwater Dependent Ecosystem
GHG	Greenhouse gas

Acronym	Term/ Definition
ha	Hectare/s
HHRA	Human Health Risk Assessment
HI	Hazard Index
ICNG	*Interim construction Noise Guidelines* (OEH, 2009)
INP	Industrial Noise Policy
L_{A90}	Nosie level which is the level exceeded for the 90% of the time under consideration
L_{Aeq}	The equivalent continuous sound level over a given time.
LEP	Local Environment Plan
LEP 2011	*Cessnock Local Environmental Plan 2011*
LGA	Local Government Area
LHRS	Lower Hunter Regional Strategy 2006
mg/L	Milligrams per litre
$\mu g/m^3$	microgram per square meter
micron	One millionth of a metre (abbreviation µ)
mL	Millilitre
N_20	Nitrous oxide
NCA	Noise Catchment Area
NEPM	National Environmental Protection Measures
NES	Matters of National environmental significance (from the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*).
NO	Nitrogen monoxide
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NOW	NSW Office of Water
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
O_3	Ozone
OEH	Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
pH	A measure of acidity or alkalinity of a solution. The potential of hydrogen.
PHA	Preliminary hazard assessment
PM	Particulate matter
$PM_{2.5}$	Particulate matter less than 2.5 microns in diameter.
PM_{10}	Particulate matter less than 10 microns in diameter.
RMS	Roads and Maritime Authority
RNP	*NSW Environment Protection Authority NSW Road Noise Policy* (DECCW 2011)

Acronym	Term/ Definition
SRD SEPP	*State Environmental Planning Policy (State and Regional Development) 2011*
SSD	State Significant Development
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SEPP 33	*State Environmental Planning Policy No 33 – Hazardous and Offensive Development*
SEPP 44	*State Environmental Planning Policy No. 44 – Koala Habitat Protection*
SEPP 55	*State Environmental Planning Policy No. 55 – Remediation of Land*
SO_2	Sulfur dioxide
SPL	Spent pot lining
SPR linkage	'Source-pathway-receiver' linkage
TEC	Threatened Ecological Community
TDI	Tolerable Daily Intake
The Plan	*NSW 2021: A Plan to make NSW Number One*
TSC Act	*Threatened Species Conservation Act 1995* (NSW)
WA	Weston Aluminium
WARR Act	*Waste Avoidance and Resource Recovery Act 2001* (NSW)
WARR Strategy	*Waste Avoidance and Resource Recovery Strategy* (NSW EPA, 2014)
WHS Regulation	Work Health and Safety Regulation 2011 (NSW)

Declaration under Part 3, Schedule 2 of the Environmental Planning and Assessment Regulation 2000

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	Master of Urban and Regional Planning

Address of the Land to which this EIS Applies

The land subject to this Environmental Impact Statement is located on 129 Mitchell Avenue, Kurri Kurri NSW, Lot 796 DP 39877.

Description of the Project to which this EIS Applies

Construction and operation of a thermal waste processing facility by Weston Aluminium, to receive from offsite and thermally treat onsite, a variety of general, hazardous and other types of wastes (such as restricted solid wastes, liquid wastes and special wastes) as defined in the *Protection of the Environment Operations Act 1997*. In total the Project is expected to process up to 8,000 tonnes of wastes per annum. Residual ash from processing would be removed for disposal to landfill.

Assessment of the Environmental Impact of the Project

An assessment of the environmental impact of the Project is contained within this Environmental Impact Statement.

Declaration

Pursuant to clause 6(f), Part 3, Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*, I declare that this Environmental Impact Statement:

a. Has been prepared in accordance with the requirements of the *Environmental Planning and Assessment Act 1979* and *the Environmental Planning and Assessment Regulation 2000*;
b. Contains all available information that is relevant to the environmental assessment of the Project to which this Environmental Impact Statement relates; and
c. Contains information that is neither false nor misleading.

Simon Murphy

26 August 2016

Catherine Brady

26 August 2016

Executive Summary

Introduction

Weston Aluminium Pty Ltd (WA) owns and operates a waste processing facility between the townships of Weston and Kurri Kurri in the NSW Hunter Valley (the WA Site). The existing WA Site primarily remelts aluminium scrap for the production of deoxidant products for the steelmaking sector, and processes aluminium dross and spent pot lining (SPL) that is generated by the aluminium smelting industry as a by-product of the smelting process. WA also currently thermally treats quantities of illicit drugs and pharmaceutical wastes.

Having demonstrated the facility's capability to thermally process aluminium smelter wastes and treat drugs and pharmaceutical wastes, WA is seeking to expand its service portfolio to receive and thermally treat a variety of general, hazardous and other types of wastes (such as restricted solid wastes, liquid wastes and special wastes) as defined in the *Protection of the Environment Operations Act 1997*. To achieve this, it is proposed that a dedicated waste thermal treatment plant be constructed and operated at the existing WA Site in Kurri Kurri (the Project).

Regional and Local Context

The Project would sit within the existing WA Site, which lies within the Lower Hunter Region, and whose economic landscape is typified by this mix of industries and it is this diversification which provides a sound based of a stable regional economy.

The suburb of Kurri Kurri is situated within the Cessnock Local Government Area. Coal mining dominated the Cessnock Local Government Area for much of the 19th and 20th century. However as mining progressed west-ward through the Hunter Valley in search of more accessible coal resources over recent decades, mining in the region has been in steady decline. This is paralleled by growth in the viticulture and associated tourism industries. Light and heavy industry has also been a feature of Cessnock's recent economic development, in particular aluminium production at the now closed Hydro Aluminium plant. Following the formal closure of Hydro Aluminium in 2014, processing of secondary aluminium production waste materials (SPL and dross) has continued at WA at a reduced scale.

Site Location and History

The Project area comprises a single parcel of land known as Lot 796 DP39877 at 129 Mitchell Avenue, Kurri Kurri. This parcel of land is owned by WA. Approximately 50 percent of the WA Site has been developed for the existing operation with the remainder being either grassed and partially treed or used for stormwater storage and drainage. The existing WA Site includes an administration building, two large industrial buildings for the scrap remelt, dross and SPL processing, a truck loading bay, workshop and other ancillary structure such as bag houses and bulk materials storage bunds.

The WA Site commenced operations in 1998. The current WA Site recovers aluminium from dross, a by-product of the aluminium smelting process, sourced from aluminium smelters across Australia and New Zealand. The WA Site is approved to process up to 40,000 tonnes as a combination of dross aluminium and SPL wastes, and to process up to 35,000 tonnes of scrap aluminium metal per year. Since 2011, WA has been progressively diversifying the activities that the WA Site can support in order to maintain an economically viable operation.

Objectives and Project Need

The overall objective of the Project is to obtain development approval for the construction and operation of a thermal waste treatment plant to be operated as part of the existing WA operation. The thermal waste treatment plant would provide a disposal option for a variety of wastes that cannot be disposed of via other means and required destruction for environmental and community health reasons.

The need for the Project is defined by the need for a variety of general, hazardous and other types of wastes (such as restricted solid wastes, liquid wastes and special wastes) to be disposed of in a manner which neutralises their potential to impact on the community and environment. With the increasing quantity of waste generation, appropriate means of disposal are required. Thermal treatment facilities within NSW are greatly limited. Few other suitable management options are available for some of these wastes (e.g. biomedical or quarantine).

Alternatives

Thermal treatment is the accepted, and often the only, method for the disposal of medical and various other wastes within NSW. Although various technologies exist, the design of the Project has been tailored to the site and anticipated throughput as well as benefitting from lessons learnt from other existing thermal waste treatment facilities in Australia. The choice of this site over alternative locations has been made as the Project Area meets these preferred site characteristics being:

- Currently in the ownership of the proponent;
- Able to provide synergies in the operation of the WA existing operation and infrastructure;
- Therefore requiring minimal additional construction and related environmental disturbance; and
- Located favourably in relation to key transport routes including the Hunter Expressway.

The 'do nothing' alternative is also deemed unacceptable as it would not provide feasible economic alternatives to the NSW waste management sector for medical and other wastes, nor would support the economic diversification of the WA Site, thereby not securing the ongoing viability of the site, its employment and positive economic feedback to the local community.

Project Description

Expanding the WA Site's service portfolio to receive and thermally treat a variety of general, hazardous and other types of wastes (such as restricted solid wastes, liquid wastes and special wastes) as defined in the *Protection of the Environment Operations Act 1997*. Such wastes are likely to include:

- Clinical and related wastes;
- Pathogenic substances;
- Wastes from the use of pharmaceutical products;
- Cytotoxic substances;
- Waste from the production, preparation and use of pharmaceutical products;
- Waste chemical substances arising from research and development or teaching activities, including new or unidentified substances with unknown human health or environmental effects;
- Solvents and Paints;
- Pitch sludge residues;
- Oily rags;
- Documents and hard drives;
- Quarantine wastes, usually received from international ports;
- Security wastes, including confidential documents;
- Illicit materials, including drugs; and
- Miscellaneous scheduled wastes, including obsolete materials.

Construction and operation of a dedicated waste thermal treatment plant 24 hours a day, seven days per week at the existing Weston Aluminium Site in Kurri Kurri, including the following components:

- Solid Waste Loader and Bin Tippler;
- Primary Combustion Chamber;
- Ash discharge system;
- Secondary Combustion Chamber;
- By-pass stack;
- Waste Bin Washing Machine; and

- Associated infrastructure and safety management control upgrades at the existing Weston Aluminium Site to support the Project.

Residual ash from processing would be removed for disposal to landfill. In total the Project is expected to process up to 8,000 tonnes of wastes per annum.

Statutory Controls and Approvals

The Project meets the requirements for State Significant Development set out in Schedule 1, Clause 23(4) of the *State Environment Planning Policy (State and Regional Development) 2011* being development for the purpose of waste management which proposed the thermal treatment of more than 1,000 tonnes of waste per year. The Project is declared to be State Significant Development for the purposes of the *Environmental Planning and Assessment Act 1979* and the Minister for Planning or their delegate is the approval authority.

This EIS is required to support the application for development consent and addresses the Secretary's Environmental Assessment Requirements for State Significant Development application 15_7396 in relation to the Project, which were issued on 16 December 2015 under section 78A(8A) of the *Environmental Planning and Assessment Act 1979*.

This EIS supports the application for development consent made by WA, and has been prepared in accordance with Division 4.1, Part 4 of the *Environmental Planning and Assessment Act 1979* and the corresponding requirements in the Environmental Planning and Assessment Regulation 2000, as well as according to the SEARs issued on the 16 December 2015.

Identification and Prioritisation of Issues

The key environmental and social issues associated with the Project were identified and a risk screening matrix was applied to rank issues in terms of their relevance and importance to the assessment of the potential impacts of the Project. The results of the risk screening exercise are reflected in the level of assessment of each of the key issues within this EIS. This screening allowed for general prioritisation of environmental assessment issues based on their potential significance, and did not take into account the application of mitigation measures to minimise and manage potential impacts. These issues are assessed in the EIS and a summary of their assessment is provided below.

Key environmental assessment issues identified for the Project include:

- Waste;
- Air quality, odour and greenhouse gas emissions;
- Traffic and transport;
- Noise and vibration;
- Soils and water;
- Hazards; and
- Human Health.

Other environmental assessment issues identified for the Project include:

- Biodiversity;
- Heritage;
- Visual amenity;
- Social; and
- Economic.

Key findings from the environmental and social impact assessments are discussed below.

Environmental Impact Assessment

Waste

A desktop assessment of waste impacts related to the Project is contained in **Section 11.0**.

The WA Site already produces a variety of wastes. The construction and operation of the Project would result in a small increase in certain types of wastes being generated. Operational wastes generated at the Project Area are expected to be minimal, and would include:

- Residue ash and moisture resulting from the thermal treatment process;
- Waste water discharged under Trade Waste Agreement;
- Packaging wastes from dangerous goods transport, storage and labelling;
- Used spill kit materials (including potentially contaminated absorbents);
- Administrative wastes (office wastes such as paper, ink cartridges, etc.); and
- Additional sewage, general and putrescible wastes resulting from the predicted workforce increase.

By providing an alternative place for certain offsite wastes to be processed and eventually disposed of to an offsite landfill, the Project meets the principles of the *Waste Avoidance and Resource Recovery Strategy* (NSW EPA, 2014).

Overall the Project is considered to have positive implications for waste management, by providing an alternative means of processing a variety of wastes whilst itself producing only minimal additional wastes.

Air Quality, Odour and Greenhouse Gas

A Level 2 Air Quality Impact Assessment was conducted in accordance with the *NSW Approved Methods for Modelling and Assessment OF Air Pollutants in NSW* (DEC 2005). The report provides an assessment of the potential ground level air quality impacts from the proposed thermal waste processing plant. Dispersion modelling was undertaken for the AQIA using the Lagrangian model CALPUFF. The following scenarios were assessed:

- Modelling of normal operating emissions at maximum capacity (Scenario 1);
- Modelling of emissions if they were at concentrations equal to the expected Environmental Protection Licence (EPL) limits (Scenario 2);
- A cumulative scenario incorporating the proposed neighbouring battery recycling facility (Scenario 3); and
- An emergency scenario should the bypass stack be activated (Scenario 4).

Background air quality was also examined from the nearest OEH monitoring station in Beresfield to assess the cumulative impacts associated with the project.

Results of the modelling showed no exceedances of the relevant air quality criteria for all examined pollutants of concern under each of the scenarios modelled. This includes under a theoretical ‘emissions limits’ scenario examined to provide a theoretical worst case emissions scenarios. Furthermore estimates for the normal operational scenario are also considered conservative as the thermal treatment plant was assessed as operating continuously, instead of intermittently in conjunction with reverb furnace operations and at the maximum operational capacity of 800kg/h. Assessment was also undertaken of a potential cumulative scenario giving consideration to the proposed, but not yet built or operating, battery recycling facility, that will potential be built on a neighbouring site. Again it was identified that cumulatively no criterion for pollutants of consent would be exceeded.

The results of the assessment indicate there would be no substantial air quality impacts from the operation of the proposed thermal processing plant at WA, and the proposed emission concentrations associated with operation of the plant are unlikely to result in any additional exceedances of local air quality for all pollutants examined.

Traffic and Transport

A Traffic Impact Assessment was prepared for the Project, to examine the potential construction, operational and cumulative traffic impacts that may result from the Project.

There are currently 28 full time staff and two contractors working at the WA Site per day. On average, 10 heavy vehicles move in and out the WA Site every day. The operating hours for existing truck movements are from 7am-10pm. All heavy vehicles access the site from the Hunter Expressway, Hart Road, Government Road and Mitchell Avenue. There are no heavy vehicle movements through the Kurri Kurri or Weston town centres. Various parking options are currently available on the WA Site. Heavy vehicles typically move through the weighbridge or to the relevant park of the operation depending on their transport task.

The assessment considered the following impacts of the Project:

- Two trucks and Ten light vehicles per day being generated during the construction phase;
- The proposed operating hours would be 24 hours per day, seven days per week;
- Approximately three heavy vehicles in and out of the WA Site in both AM and PM peak hour during the future operational phase. In accordance with Condition L5.1 of Environment Protection Licence 6423, heavy vehicle deliveries would be restricted to between the hours of 7am and 10pm;
- An estimated 10 additional light vehicles accessing the site per day during operations; and
- All light and heavy vehicles would access the WA Site using the Hunter Expressway, Government Road, Hart Road and Mitchell Avenue. No heavy movements would travel through the Kurri Kurri town centre.

Based on these small increases, impacts to the surrounding road network are expected to be minimal. It is unlikely that any road infrastructure upgrades would be required for the construction or operation of the Project. A Construction Traffic Management Plan as well as updates to the WA Site's existing Operational Environmental Management Plan would be used to manage any remaining impacts to the surrounding road network. There are sufficient existing parking spaces at the WA Site to accommodate both existing, construction and future operational staff numbers.

Noise and Vibration

An Acoustic Impact Assessment was prepared for the Project. Relevant noise management levels were established for sensitive residential receivers, as well as for nearby industrial and commercial premises with reference to the *Interim construction Noise Guidelines* (OEH, 2009). Construction works are proposed to occur during standard construction hours: i.e. 7am to 6pm Monday-Friday, 8am to 1pm on Saturdays, with no works occurring on Sundays or public holidays. The predicted noise levels that would be generated during the construction of the Project are below the relevant noise management levels for standard construction hours.

Noise levels expected to be experienced by sensitive receivers as a result of the operation of the Project were modelled based on worst case operational and meteorological conditions. Under the conditions modelled, the operation of the Project would generally be in compliance with the relevant noise criteria. Some small exceedances of up to 3 dB(A) have the potential to occur at one residential receiver on industrially zoned land. However, these exceedances are expected to have only a minor impact for this receiver. The relevant sleep disturbance criteria would also not be exceeded.

The construction and operation of the Project are anticipated to result in an increase in road noise of no less than 1 dB(A), which would be considered acceptable under the *NSW Environment Protection Authority NSW Road Noise Policy* (DECCW, 2011).

The relevant safe working distances to prevent vibration impacts at nearby receivers would be complied with during vibration intensive construction works. Furthermore, due to the offset distances between the Project and the nearest neighbouring building or structure, there is not expected to be any operational vibration impact associated with the Project in regards to either cosmetic damage or human comfort.

General mitigation measures have been recommended, and are considered sufficient to control noise levels to within reasonable levels at nearby sensitive receivers.

Soil and Water

An assessment of the site's existing soils and water (surface and groundwater) environments was undertaken to determine the suitability of the site for the Project and to recommend measures that should be incorporated during construction and operational phases to management potential impacts.

Existing site conditions indicate that due to the majority of the footprint being within an existing hardstand area that has previously been filled, there would be minimal impact to natural ground. No acid sulfate soils have been identified in the vicinity of the WA Site.

Surface water would be managed through the site's existing water runoff and management systems. Groundwater may be encountered during excavations for building footings but due to the short nature of interception impacts would be minor and no significant dewatering is expected. An assessment of the potential for the site to experience flooding indicated that the Project Area is above the 100 Annual Reoccurrence Interval (ARI) year flood level.

The operation of the Project would utilise connection to the Hunter Water potable water and wastewater networks therefore no extraction for use, or disposal of waste water, would occur to or from the environment as a result of the Project.

Standard sediment and erosion control measures would be applied during construction works to manage potential impacts. Operationally the WA Sites existing stormwater runoff and detention network would be utilised to manage runoff. Measures would also be included in construction and operational management plans to manage impacts of events such as spills (e.g. hydrocarbons).

Hazards

A Preliminary Hazard Analysis was undertaken for the Project. The Project was identified as a potentially hazardous and potentially offensive industry and subjected to the assessment requirements of *State Environmental Planning Policy No 33 – Hazardous and Offensive Development*. For a potentially hazardous development, the requirements include an assessment of the PHA submitted with the EIS. The assessment of the PHA finds the proposal would meet the relevant risk criteria as set out in *Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Planning* (DP&E, 2011c). Some further safety assessments would be required for the Project:

- Fire Safety Study;
- Final Hazard Analysis;
- Traffic Risk Assessment and a detailed Route Selection study for dangerous goods transport activities; and
- Safety in Design Reviews in accordance with Work Health and Safety Regulation 2011 and *Code of Practice – Safe Design of Structures* (Safe Work Australia, July 2012).

With all locational, technical, operational and organisational safeguards are employed the Project is not considered to pose a significant hazard risk.

Human Health

Human Health Risk Assessment (HHRA) was undertaken for the Project. The objective of the HHRA is to assess potential future human health risks to surrounding residents, commercial workers and recreational users resultant from exposure to Site-derived environmental hazards resultant from the proposed thermal processing facility. This included consideration of air quality (i.e. vapour and particulates), noise and vibration, odour and soil and water.

The contaminants of potential concern considered as part of this HHRA were sourced from the Site's EPL, *AP 42 Compilation of Air pollutant Emission Factors* (US EPA 1995) and those measured from a similar facility (i.e. the SteriHealth facility at Silverwater). Similarly the scenarios assessed in the Project Air Quality Impact Assessment were also assessed in the HHRA. All air quality data used in the HHRA were derived from dispersion modelling provided in the Air Quality Assessment prepared to support the application for development consent.

The following human receptors were considered in this HHRA based on the surrounding land uses:

- Off-site low-density residents;
- Off-site commercial workers; and
- Off-site recreational users of open space.

Pathways that have been considered to be complete for the Project and therefore were assessed in the HHRA include:

- Inhalation Pathway Assessment:
    - Inhalation of vapours and particulates in indoor and outdoor air (acute and chronic assessments).
- Multiple Pathway Assessment:
    - Inhalation of vapours and particulates in indoor and outdoor air (acute and chronic assessments);
    - Inhalation of surficial soil-derived dust in indoor and outdoor air (chronic assessment);
    - Direct contact (i.e. incidental ingestion and dermal contact) with deposited dust (chronic assessment);
    - Ingestion of home-grown fruit and vegetables grown on the deposited dust (chronic assessment);
    - Ingestion of eggs and chickens from home-grown chickens residing on the deposited dust (chronic assessment); and

- Ingestion of breast milk by infants based on mother's intake and maternal transfer (chronic assessment).

Acute Health Assessment

The scenarios that assessed 1-hour maximum concentration of contaminants of potential concern were reported below the adopted acute criteria and therefore, no contaminants of potential concern required further assessment with regard to acute inhalation exposures.

Chronic Health Assessment

The 24-hour maximum concentration of criteria pollutants (i.e. PM_{10}, $PM_{2.5}$, CO, SO_2, H_2SO_4, NO_2, HCl and HF) were below selected chronic Tier 1 screening criteria at each off-site receptor excluding PM_{10} and $PM_{2.5}$ at all off-site receptors. On further assessment, the site-derived 24-hour maximum concentrations of particulate matter were below the criteria at each off-site receptor while the 24-hour background concentrations were above the criteria at each off-site receptor. Additionally, a significant portion (approximately 99%) of the total particulate matter concentrations is attributed to background. Therefore, particulate matter emissions from the Site were considered to be low and acceptable.

The 24-hour maximum concentration of specific air pollutants (metals and dioxins and furans) were below selected chronic Tier 1 screening criteria, excluding chromium. However, given the bioaccumulative and persistent nature of a number of the specific air pollutants (i.e. As, Cd, Cr, Pb, Hg, Se and dioxins and furans), a Tier 2 risk assessment was required. For all bioaccumulative and persistent specific air pollutants, the hazard indices for the multiple exposure pathway assessment by off-site residents, recreational users and commercial workers were below the adopted acceptable hazard index of 1.0.

Based on the modelled concentration of lead in air (0.00119 µg/m^3) and soil (0.0014 mg/kg) and the adopted exposure parameters for off-site child residents, blood lead concentrations were reported to range from 0.7 µg/dL (5 to 7 year old) and 1.5 µg/dL (0.5 to 1 year old). Therefore, blood lead concentrations were below the adopted baseline blood lead concentration (5 µg/dL) for children. Therefore, the Site is not considered to present a risk to the off-site child residential receptors.

While risk estimates were based on a number of assumptions, these were conservative in nature and likely to overestimate actual risk to receptors, as such; it is generally not considered necessary to further refine the assumptions given that the risk estimates were below adopted acceptable levels.

Overall the estimated health risks to off-site residents (including an adult, child and infant), recreational users (adult and child) and commercial workers (adult) from all exposure pathways were considered low and acceptable.

Biodiversity

Desktop searches and a supporting site visit on 24 February 2016 were undertaken to ascertain the potential biodiversity impacts of the Project.

The thermal waste treatment building pad would be partly contained within an existing hard stand area, and partly onto the undeveloped adjoining grassed area. Some vegetation, mainly groundcover, clearance would be required to facilitate these works (approximately 0.1 ha). This additional undeveloped land currently forms part of WA's bushfire hazard reduction area and has been previously cleared of most native vegetation and subject to regular management. It consists of artificial grassland and a mix of native and weed flora species. Some native woody vegetation also occurs along the fence line that would need to be removed (including two Thin-leaved Stringybark (*Eucalyptus eugenoides*) specimens (one juvenile and one large senescing tree) and several Cherry Ballart (*Exocarpos cupressiformis*) shrubs). The potential impacts of these works were assessed in accordance with the *Framework for Biodiversity Assessment – NSW Biodiversity Offsets Policy for Major Projects* (OEH, 2014). In addition, a general biodiversity impact assessment was undertaken.

It was confirmed that:

- No native vegetation communities, riparian vegetation or threatened flora species are present at the Project Area; and
- No threatened fauna species are present at the Project Area.

Given these results, the Project does not require any further impact assessment to be undertaken (such as 7-part tests of significance, Species Impact Statements, or referrals under the *Environment Protection and Biodiversity*

Conservation Act 1999). The mitigation measures outlined in **Section 18.5** are considered adequate to minimise any such impacts to an acceptable level.

Heritage

A desktop assessment of potential impacts to Aboriginal cultural heritage and non-Aboriginal heritage is provided in **Section 19.0**. A review was conducted of relevant heritage databases, as well as previous environmental assessments for the WA Site, to confirm the presence of any known items of Aboriginal cultural heritage or non-Aboriginal heritage.

No known Aboriginal cultural heritage items were found to be recorded in the vicinity of the Project Area. The nearest known recorded non-Aboriginal heritage item is the South Maitland Railway System around 150 metres south-east of the WA Site, and listed in the *Cessnock Local Environmental Plan 2011*. No impacts are expected to occur to this item.

Construction of the Project would require earthworks, partially within an area not previously subject to significant modifications. While there is therefore some residual potential for the Project to impact on unknown Aboriginal cultural heritage and non-Aboriginal heritage items in this area, these risks are considered low. Relevant mitigation measures are proposed in **Section 19.5** to manage the instance where previously unknown heritage items are discovered during construction works. The operation of the Project would not impact on any known Aboriginal cultural heritage or non-Aboriginal heritage items in the vicinity of the Project Area.

Visual

A desktop visual assessment of the Project is contained in **Section 20.0**.

The existing WA Site is located in an industrial zoned area which is which is typified by a mix of industrial land uses and undeveloped site with varying levels of vegetation cover. The Project Area and area immediately surrounding is topographically flat with few distinguishing topographical features.

The Project proposes to constructs a building of approximate height 10m at the rear of the WA Site. The visibility of the new building would be restricted to view through the front entrance of the WA Site from Mitchell Avenue. The proposed building would be predominantly shielded from external view by the WA Site's existing buildings and vegetation. Green Colourbond cladding, and downward facing lighting (consistent with existing structures) would further minimise the visual impacts of the operation of the Project.

Overall due to the relatively isolated location of the proposed building relative to sensitive receivers and the lack of visibility to the WA Site afforded by the facilities existing buildings and buffer vegetation visual impacts from the Project would be negligible.

Other Environmental Aspects

Social

The Project is located within an established industrial area. The assessments undertaken have indicated that the Project would have a minimal impact on surrounding areas, therefore it is considered unlikely that the Project would have a measurable impact on local communities, as well as negligible impacts to heritage. In particular, assessments found that the Project is unlikely to pose a risk to the health or wellbeing of the community. By providing an appropriate means for the disposal of wastes that are potential health hazards to the community the Project would have a positive benefit on health and wellbeing. The Project is proposed fully within land owned by the proponent and requires no additional land holdings or acquisitions. The Project Area is located within an established industrial area with appropriate offsets to sensitive (residential) land uses, meaning the Project is unlikely to have a significant impact on the community.

Economic

The Project represents a new and diversified economic activity that would be operated from the WA Site. Due to the reduced investment and closure of the aluminium smelting industry in Australia typical sources of material to process have been in steady decline. It also represents an opportunity to diversify the plant to introduce a new income stream independent of the aluminium industry in which it typically operates, thereby providing further incomes streams to help secure its ongoing employment and operational viability.

Cumulative Impacts

As the impacts of the individual factors of the Project are minimal, no significant cumulative impact is anticipated for the Project provided the measures presented in **Section 25.0** are implemented. This EIS has considered the

potential cumulative impact of the Project and the proposed battery recycling facility to be located on land to the east of the site. These assessments concluded that there would be no significant cumulative impacts.

A review of Cessnock City Council and the Department of Planning and Environment databases did not identify any other projects with the potential to cause significant cumulative impacts on the environment or community.

Residual Risk Analysis

A residual risk analysis was undertaken to determine the outstanding levels of risk associated with the Project proceeding, subject to the recommended management and mitigation measures being implemented. The residual risk assessment concluded that there would generally be a low level of risk associated with the Project proceeding.

Environmental Management and Monitoring

The WA Site currently operates an Environmental Management and Monitoring Program to meet the various regulatory requirements of the existing Project Approval and EPL. This Environmental Management and Monitoring Program would continue to be operated during the Project and would be updated to include the relevant management measures recommended in this EIS. This would include provision for:

- A Construction Environment Management Plan;
- And Operational Environmental Management Plan;
- Emergency Response plans and procedures;
- Environmental reporting; and
- Environmental audits.

Project Justification

Pursuant to Schedule 2, Clause 7(f) of the Environmental Planning and Assessment Regulation (2000), the Project is justified in terms of biophysical, economic and social considerations, as well as according to the principles of ecologically sustainable development as follows:

- The Project would be undertaken in a manner which affords due consideration to the biophysical, economic and social environment within which the Project would operate, at local, regional and national scales;
- This EIS has appropriately considered and implemented the precautionary principal during planning to minimise and avoid where possible impacts on the environment and community;
- This EIS has demonstrated that the Project is highly unlikely to result in inequalities between generations as a result of undue environmental impact, short term economic gain or a lack of appropriate management measures to prevent or minimise environmental impacts;
- The Project would not be undertaken in a manner that would result in impacts to biodiversity or ecology that would be significant or lead to a loss of integrity to flora or fauna such that significant impacts may occur;
- The Project would not be undertaken in a manner that degrades the pricing or valuation of resources by present day pricing, for example through the extensive use of certain resources or the impacts to access resources, or knowingly increases the costs of resources in the future; and
- The Project does not represent a significant contributor to global greenhouse gas emissions such that it could significantly impact the processes of climate change or the greenhouse effect.

Based on these findings the Project is considered to represent ecologically sustainable development that would not result in inequalities between present and future generations.

Conclusion

This EIS describes the proposed Project, its possible alternatives, and provides a review of the potential environmental impacts from construction and operation. Where potential impacts have been identified, management measures have been recommended to minimise impacts to acceptable levels. This EIS has also demonstrated that the Project is both permissible and would have a range of benefits that, when considered relative to potential impacts, justify the Project proceeding.

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Part A – Project Background

This part provides an overview to the background of the Project and its setting, the Proponent and the environmental impact assessment process that has been followed in the preparation of this Environmental Impact Statement.

1.0 Introduction

Section 1.0 provides an introduction to the Proponent, the proposed thermal waste processing Project, the approval process for the Project, and the purpose and content of this Environmental Impact Statement (EIS).

1.1 Overview

1.1.1 Background to the Project

Weston Aluminium Pty Ltd (WA) owns and operates a waste processing facility between the townships of Weston and Kurri Kurri in the NSW Hunter Valley (the WA Site). The existing WA Site primarily remelts aluminium scrap for the production of deoxidant products for the steelmaking sector, and processes aluminium dross and spent pot lining (SPL) that is generated by the aluminium smelting industry as a by-product of the smelting process. WA also currently thermally treats small quantities of illicit drugs and pharmaceutical.

Having demonstrated the facility's capability to thermally process aluminium smelter wastes and treat drugs and pharmaceutical wastes, WA is seeking to expand its service portfolio to thermally treat a variety of general, hazardous and other types of wastes (such as restricted solid wastes, liquid wastes and special wastes) as defined in the *Protection of the Environment Operations Act 1997 (POEO Act)*. To meet this objective, it is proposed that a dedicated waste thermal treatment plant be constructed at the existing WA Site in Kurri Kurri (i.e. the Project). The Project is a response to the increasing need to dispose of certain waste streams (particularly those resulting from the medical and pharmaceutical industries, and illicit drug wastes seized during law enforcement and quarantine operations). In many instances, thermal processing is considered the best way to remove potential threats that such wastes pose to human and environmental health. The Project would allow WA to increase both the quantities and types of wastes that could be received and treated at the WA Site.

In addition to providing a means for the disposal of various types of general, hazardous and other wastes, the Project would also improve the diversification of economic activities undertaken at the WA Site. Due to volatility in the aluminium smelting industry as evidenced by the recent (2014) closure of the neighbouring Hydro smelter, and contractions within the serviced steelmaking sector (closure of Bluescope Steel's Blast Furnace 6 and the possible closure of the Whyalla Steelworks), WA is looking to maintain its current workforce through diversifying into alternative waste treatment processes.

1.1.2 Existing Operations

WA operates an aluminium refining and recycling facility located at 129 Mitchell Avenue, Kurri Kurri, New South Wales (NSW), approximately 130 kilometres north of Sydney. The location of the existing WA Site is shown in **Figure 1-1**.

WA currently undertakes several resource recovery processes at the existing WA Site:

- Reprocessing of aluminium dross generated during primary and secondary aluminium smelting, and recovery of aluminium units;
- Recovery of aluminium units from the re-melting of scrap aluminium for the production of deoxidant products for the steelmaking sector; and
- Processing of SPL to enable its reuse as a raw material substitute in industrial and manufacturing processes.

In addition to aluminium and metal recycling activities, WA expanded its capability to process various waste streams by obtaining a modification to its consents for the trial processing of illicit and pharmaceutical wastes.

1.1.3 Development Consent

The existing WA Site operates under two separate Development Consents. The two primary consents are:

- Land and Environment Court Consent (LEC 10397). The Land and Environment Court granted approval on 30 August 1996 for the construction and operation of the aluminium dross recycling plant by Alumino Australia (now known as Weston Aluminium). The facility commenced operations in 1998, with the capacity to process up to 40,000 tonnes of aluminium dross per annum; and
- Minister for Planning Development Consent (DA−86−04−01). On 20 September 2001, the Minister granted development consent for the construction and operation of additional processing and storage areas that increased the operational efficiency of the existing development and allowed for the production of alloyed and molten aluminium.

Over the life of the operation of WA, a range of modifications have been made to these consents. Approved modifications and additions to the WA Site, include:

- The receipt and reprocessing of scrap aluminium material;
- The production of solid alloyed aluminium and molten aluminium;
- An increase in the annual production of ALDEX, and the construction of three ALDEX storage buildings.
- Additions to the Dross Recycling Facility;
- Spent Pot Lining Processing trial, mixed SPL trial and subsequent extension of the trials;
- The addition of a briquetting facility; and
- Illicit Drug and Pharmaceutical Waste Processing Trial.

WA's approvals history reflects on the company's ongoing desire to continually explore ways to improve its waste resource recovery portfolio, improve materials recycling and provide appropriate waste management techniques for unique waste streams such as illicit drugs and pharmaceutical waste. The Project forms a logical extension of this site history.

1.2 Project Outline

WA is proposing to construct and operate a dedicated thermal waste processing facility on its Kurri Kurri site. This would allow the Project to receive from offsite and thermally treat onsite a variety of general, hazardous and other types of wastes such as restricted solid wastes, liquid wastes and special wastes.

Wastes would likely originate from across NSW and potentially from interstate. They would be transported to the Project Area by road - from the Hunter Expressway via Hart and Government Roads, and Mitchell Avenue – and delivered directly to the treatment plant. Once delivered to the Project Area, waste would either be identified for immediate processing, or stored onsite in dedicated waste storage receptacles designed in accordance with the relevant Australian Standards, until they can be processed.

When ready for treatment, waste would be transferred into a waste hopper which would then feed wastes into a primary combustion chamber comprised of a rotary kiln. Once treated in the primary chamber, residual ash material would then be removed by mechanical means to separate storage for subsequent landfill disposal. Combustion gases would pass through a secondary combustion chamber which would then provide further thermal treatment to ensure complete combustion of gases prior to cooling and further pollution reduction treatment, then release to atmosphere. In total the Project is expected to process up to 8,000 tonnes per year.

As part of the processing, an air quality control system would be operated to capture all emissions from the combustion process. Emissions would be directed through various treatment devices to remove pollutants and particulate matter, prior to being released to atmosphere by an existing stack operated in association with the WA Site's existing Reverberatory furnace.

1.3 Location and Setting

The Project would be wholly contained within the existing WA Site on Mitchell Avenue, Kurri Kurri, NSW within the Cessnock City Council local government area (LGA).

The WA Site is located in an existing industrial area to the north of Kurri Kurri and the east of Weston (refer **Figure 1-2** and **Figure 1-3**). The Project Area and surrounding land are topographically flat with few distinguishing features. Swamp Creek, a tributary of the Hunter River via Wallis Creek, runs along the rear (northern) boundary of the Project Area.

1.4 The Proponent

WA is a services company that provides innovative solutions to the aluminium and steel industries, and more recently has expanded operations into providing waste processing services for a range of illicit drug and pharmaceutical wastes. WA is majority owned by Watou Holdings and the balance by Ashai Seiren who is a major secondary aluminium processor in the Japanese Aluminium industry. Both shareholders have an established track record in the operation of aluminium refining and recycling facilities through the operation of the existing development in Kurri Kurri and a number of facilities in Japan.

The Managing Director, Mr Garbis Simonian, is the founding chairman of the Australasian Industrial Ecology Network (AIEN). The AIEN is a vibrant network of like-minded individuals, companies and institutions with a common interest in sustainable development through the study and practice of industrial ecology, advocating the principles and concepts of industrial ecology in policy formation and business practice. The AIEN actively engages with organisations to facilitate improved performance and environmental benefits.

The Weston Group is also the developer of the first Industrial Ecology Park in Australia - namely The Hunter Industrial Ecology Park (HIEP) - which seeks to integrate education focus within an operational industrial park to increase knowledge around sustainability and zero-waste aspirations.

WA has developed technologies to process all forms of aluminium bearing by-products from the aluminium industry. WA adds value to all its streams by manufacturing de-oxidants from its recovered aluminium metal. The residual non-metallic particles are manufactured into various products including fluxes, desulphurising agents and slag conditioners for the steel industry and raw feed for the cement industry.

WA has an excellent track record, having operated on its existing site for almost 20 years. Over that period, up to 500,000 tonnes of hazardous waste, in the form of dross and SPL, have been processed without incident. At the same time, WA has provided substantial economic benefit to the local Community, and sustainable waste management solutions for industry and the environment through the introduction and promotion of Industrial Ecology and the Circular Economy within Australia.

WA is well placed to deliver the Project given its established:

- History of providing industrial scale recycling and waste disposal activities;
- Environmental performance track record; and
- Working relationship with government agencies and the community.

1.5 Project Need and Benefits

The disposal of certain wastes (e.g. illicit drugs wastes, clinical wastes, hazardous wastes, etc.) is an ongoing issue for industry and the community who generate such waste and require disposal methods minimising risks to human and environmental health in a cost effective manner. Clinical wastes in particular include a heterogeneous mixture of general refuse, laboratory and pharmaceutical chemicals and containers, pathological wastes and cytotoxic materials. All of these components have the potential to be classified as class 6.2 infectious substances under the *Australian Code for the Transport of Dangerous Goods by Road and Rail Edition 7.4* (ADG Code) (Commonwealth of Australia, December 2015) (refer to **Section 7.2.2**). This means they cannot simply be disposed of in landfill, and in NSW, must be either thermally treated or autoclaved[1].

In addition the population of NSW is steadily growing, and therefore the generation in the volume of such ‘problem wastes’ that need to be thermally treated is also growing. Capacity for the responsible receipt and management of these wastes is currently limited in NSW.

Following the implementation of the NSW EPA’s policy of encouraging the development of an increasing number of community ‘drop off’ centres, more and more of these ‘problem wastes’ are now being collected, having traditionally been disposed of to the Municipal Solid Waste stream (i.e. household rubbish bins). The increased tonnage of these wastes is exerting pressure on the limited management capacity available in NSW. Due to capacity constraints, an increasing tonnage of these wastes is being transported interstate to Queensland and Victoria for processing and disposal. This transport of such hazardous wastes interstate poses a risk to the community.

[1] Using temperature and air pressure to sterilise such substances, or otherwise make them inert.

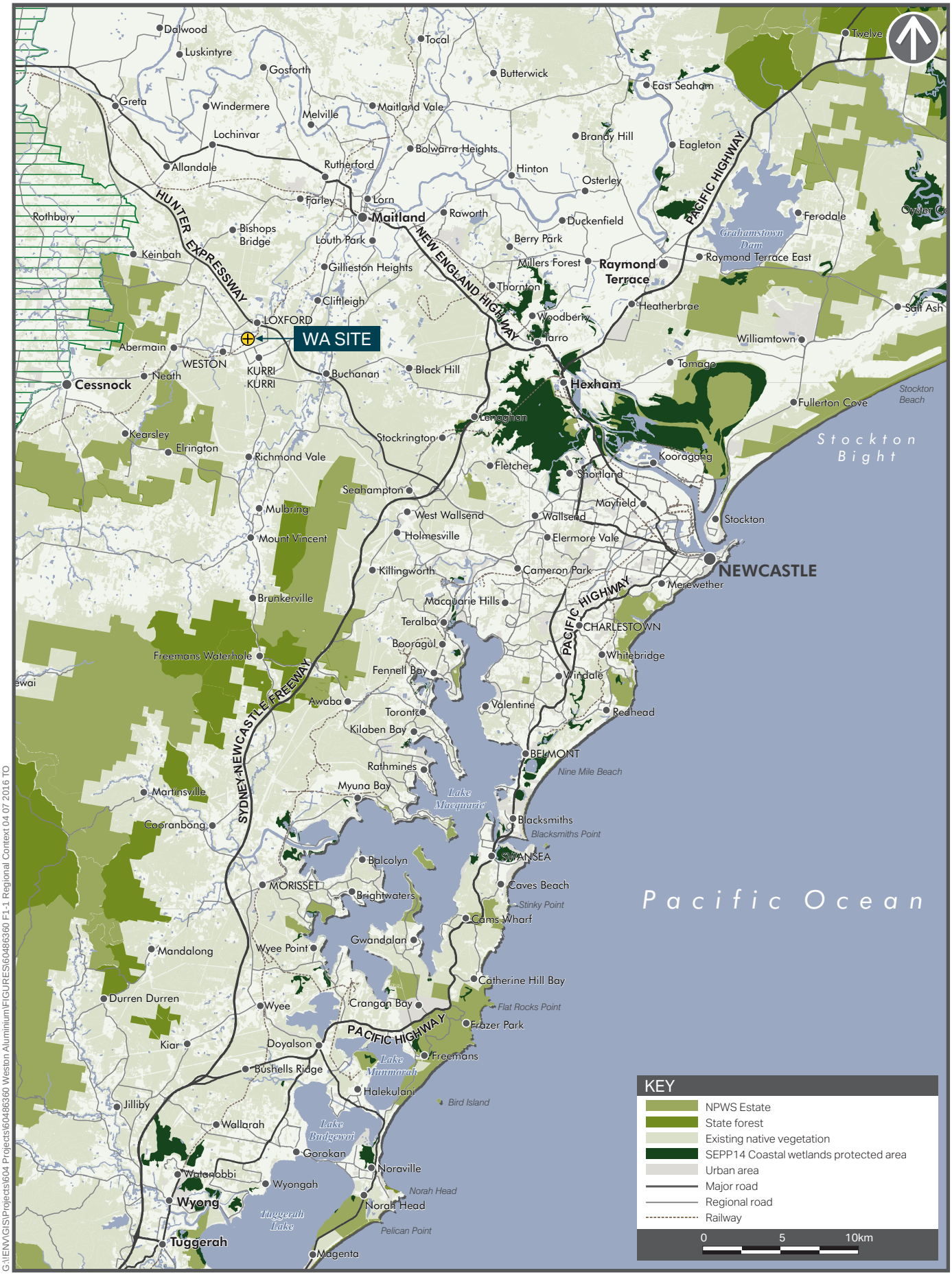
NSW urgently needs treatment capacity to process these wastes locally. WA's proposed Project will incorporate best available proven technology, with automated continuous feeding and state of the art environmental controls. Similar Rotary Kiln-style plants have been successfully operated in Brisbane (Willawong) and Melbourne (Dandenong South) by ACE Waste.

The types of waste being targeted by the Project are generally not suitable for disposal to landfill as there are potential agents of contamination which can lead to human health issues or environment contamination.

The Project would provide benefits to the processing of a variety of general, hazardous and other types of wastes (such as restricted solid wastes, liquid wastes and special wastes) including:

- The ability to process waste including biomedical waste that cannot be safety disposed of via other means;
- Removing potential sources of human and environmental health impacts;
- Provision of a local, NSW-based facility to process certain wastes that would otherwise require transport significant distances to alternative facilities in Victoria or Queensland; and
- Local and regional benefits from capital investment and purchasing carried out through the construction and operational stages of the development.

Importantly, due to the changing nature of the aluminium smelting industry in the Hunter Valley and Australia more generally, the diversification of activities at the WA Site would assist in securing jobs for employees and viability of local Contractors supporting the WA operation.



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AECOM
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REGIONAL CONTEXT

Environmental Impact Statement
Weston Aluminium Recycling Facility

FIGURE 1-1

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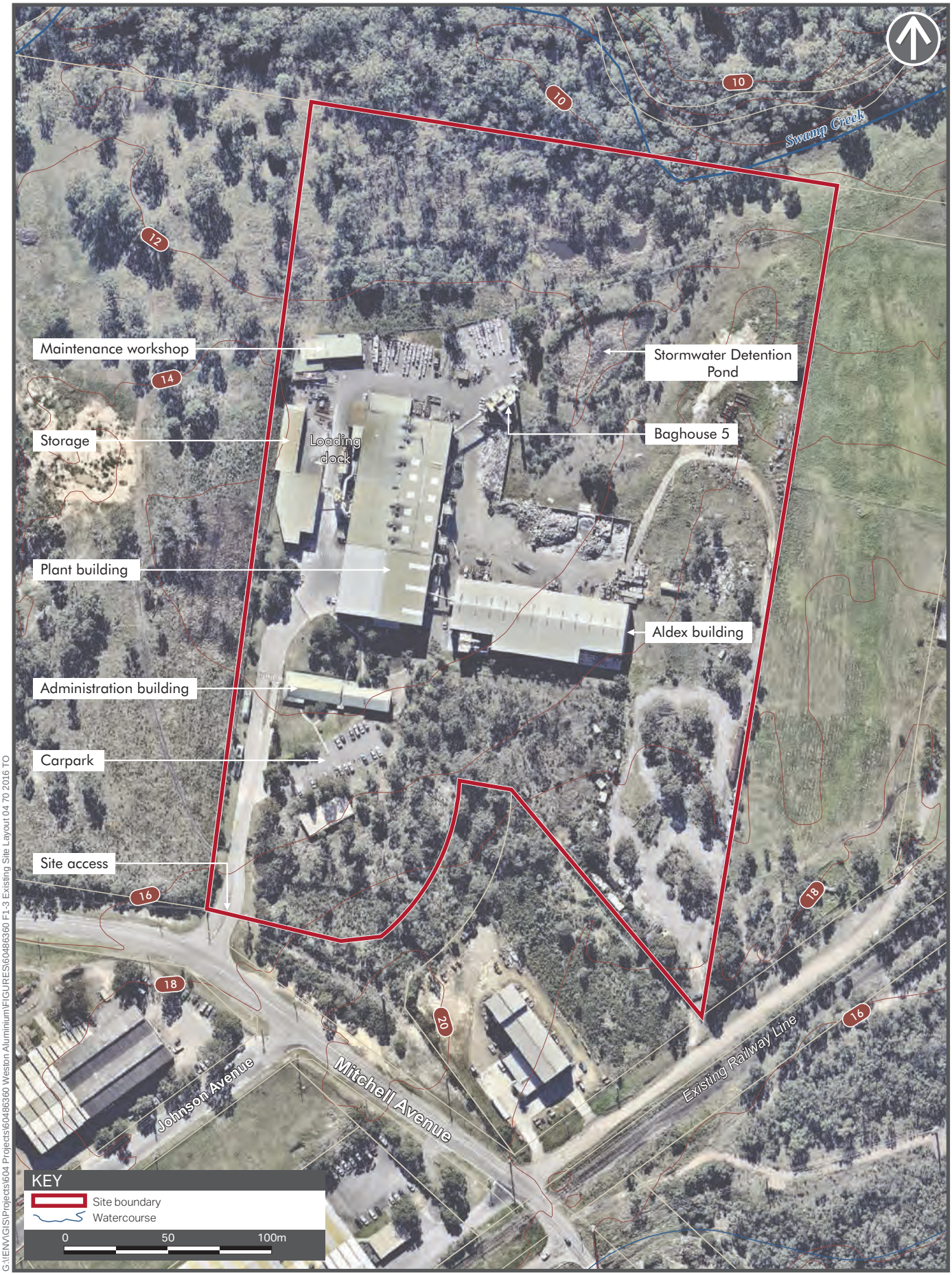
WESTON ALUMINIUM SITE LOCATION

Environmental Impact Statement
Weston Aluminium Recycling Facility

FIGURE 1-2



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EXISTING WESTON ALUMINIUM OPERATION

Environmental Impact Statement
Weston Aluminium Recycling Facility

FIGURE 1-3

1.6 Environmental Impact Assessment Process

The Project is declared to be State Significant Development (SSD) under clause 8 and Schedule 1 of the *State Environment Planning Policy (State and Regional Development) 2011* (SRD SEPP) and is therefore subject to an assessment by the NSW Minister for Planning and Environment (or delegate) under Division 4.1, Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). An EIS is required to support the development application for the Project. Under section 78A(8A) of the EP&A Act and Schedule 2 of the Environmental Planning and Assessment Regulation (EP&A Regulation), the EIS must be prepared in accordance with the environmental assessment requirements issued by the Secretary of DP&E (SEARs).

1.6.1 Request for Secretary's Environmental Assessment Requirements

A request for SEARS was submitted to the Secretary General of DP&E on 23 November 2015 outlining the Project, providing background environmental data and identified key issues for assessment in the EIS.

The Secretary subsequently issued the Project SEARs on 16 December 2015, confirming that the Project would be assessed as SSD. A copy of the SEARS is attached at **Appendix A** and addressed in the EIS as outlined in **Section 9.0**.

1.6.2 Environmental Impact Assessment Requirements

This EIS has been prepared in accordance with Division 4.1, Part 4 of the EP&A Act and the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation). Part 4 of the EP&A Act ensures that the potential environmental effects of a proposal are properly assessed and considered in the decision-making process.

1.6.3 EIS Exhibition

The EIS for the Project would be on exhibition for no less than 30 days to allow for public comment on the Project. Consultation with the community would be ongoing during this period and submissions on the EIS can be made electronically or in hardcopy during this period, following the instructions available on the Project page on the DP&E website: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=7396

1.6.4 Response to Submissions

Following the exhibition period, submissions would be collated by DP&E and provided to the Proponent to allow it to address matters raised in the submissions. A Response to Submissions would then be prepared. Where appropriate, this may include undertaking additional impact assessment work or studies to address outstanding matters and include modifications to the Project or mitigation measures resulting from these further investigations. The Response to Submissions would then be provided to DP&E for consideration during assessment of the Project.

1.6.5 Assessment

This EIS describes the Project and addresses the SEARs as required under section 78(8A) of the EP&A Act and Schedule 2 of the EP&A Regulation. The EIS assesses the possible environmental, social and economic effects of the Project and identifies the measures necessary to manage and mitigate any potentially adverse environmental impacts. The DP&E then assesses the Project in consultation with other relevant agencies and prepares an assessment report for determination by the Minister or delegate.

1.7 Document Structure

This EIS consists of the main EIS document and supporting appendices and is structured as follows:

Part A – Project Background:

- **Section 1.0** provides an introduction to the Project, including information about the Applicant, the Project context, the need and benefits of the Project and the approvals regime.

Part B – Location and Context:

- **Section 2.0** provides the regional and local context and location of the Project; and
- **Section 3.0** describes the Project Area location, history and ownership.

Part C – Project Needs and Alternatives:

- **Section 4.0** describes the objectives and needs for the Project, including project benefits; and

- **Section 5.0** outlines the alternatives considered and preferred option.

Part D – The Project Description:

- **Section 6.0** describes the Project, its construction and operation;
- **Section 7.0** describes the statutory approval pathway for the Project, permitting and licencing requirements; and
- **Section 8.0** describes the environmental management framework within which the Project would operate.

Part E – Issues Identification:

- **Section 9.0** describes the stakeholder consultation process undertaken throughout the EIS process in accordance with the SEARs; and
- **Section 10.0** outlines the key environmental issues identified in the scoping report, risk assessment, stakeholder consultation and SEARs, and their prioritisation.

Part F – Environmental Impact Assessment:

- **Sections 11.0 – 21.0** provide an assessment of the potential impacts of the Project on a range of environmental issues and outlines mitigation and management measures to be implemented as part of the Project;
- **Section 22.0** provides an assessment of the potential cumulative impacts of the Project; and
- **Section 23.0** describes the residual environmental consequences of the Project.

Part G – Environmental Management and Monitoring:

- **Section 24.0** summarises the environmental management and monitoring plan for the Project; and
- **Section 25.0** outlines the mitigation measures to be implemented for the Project.

Part H – Project Justification:

- **Section 26.0** details the justification for the Project with respect to the net project benefits and the principles of Ecological Sustainable Development.

Part I – EIS Findings:

- **Section 27.0** provides a summary of the findings and a conclusion to the EIS.

Part J – References.

Appendix A to Appendix N – Supporting information and specialist studies.

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Part B – Location and Context

This part described the location of the Project and described its relationship with the natural and built environment at a local and regional scale.

2.0 Overview of the Locality

2.1 The Hunter Region

The Hunter Region extends from approximately 120 km to 310 km north of Sydney and covers an area of around 201,111 km^2 from Newcastle in the east to Cassilis in the west, Murrurundi in the north and Wollombi to the south (AEC, 2013). It contains a diverse mix of subregions – including the City of Newcastle, the main coal mining areas in the South West and the Upper Hunter Shire around Aberdeen, Scone and Murrurundi.

The Hunter is NSW's largest coal producing region. Despite being dominated by coalmining, the Hunter is home to a diverse range of industries including significant industry, viticulture and equine industries. Along with coal mining and mining support businesses these industries provide the greatest contribution to the regional economy. The economic landscape of the Hunter Valley is typified by this mix of industries and it is this diversification which provides a sound base for a stable regional economy.

The Lower Hunter is described as the five LGA's of Newcastle, Lake Macquarie, Port Stephens, Maitland and Cessnock. The Lower Hunter is home to the majority of the Hunter Valley's population base, predominantly in the Newcastle and Lake Macquarie LGAs. Refer **Figure 1-1**.

2.2 Cessnock Local Government Area

The Cessnock LGA encompasses 1,970 square kilometres of the lower Hunter Valley in eastern NSW. The City lies approximately 40 km northwest of Newcastle and 120 km north of Sydney. The Cessnock LGA has a population of approximately 23,000 (ABS, 2015).

The township of Cessnock developed from around 1850 as a service centre at the junction of the Great North Road, with branches to Singleton and Maitland. Early settlement was based around agricultural land uses. Coal mining dominated the Cessnock LGA for much of the 19th and 20th century, however as mining progressed westward in search of more easily mined resources in recent decades, mining has been in decline although still forms an important part of the economy and history of Cessnock (CCSS, 2010).

The decline of mining has been paralleled by growth in the viticulture and associated tourism industry. The Hunter Valley wine-growing area in the Cessnock LGA is Australia's oldest wine region and one of the most famous, with around 4,500 acres under vine.

Light and secondary industry has also been a feature of Cessnock's recent economic development, in particular aluminium production and processing, the production of explosives and mining support services now a significant source of employment in the area. Refer **Figure 1-2**.

2.3 Kurri Kurri, Weston

The suburbs of Kurri Kurri and Weston lie approximately 10 km to the east of Cessnock. Kurri Kurri and Weston form a single urban unit separated by the South Maitland Railway and Cessnock Road. Kurri Kurri provides the main commercial area surrounded by low density residential development. Land surrounding Kurri Kurri Weston includes a mix of cleared and forested agricultural land.

In the northern section of the Kurri Kurri Weston area is an industrial area which contains a mix of industrial businesses including the former Hydro Aluminium Smelter which is now closed. Many of the smaller industrial businesses provide support to the mining industry across the Hunter Valley.

The WA Site is located within the northern portion of the industrial area approximately 600 m from the nearest residentially zoned land. The Kurri Kurri wastewater treatment plant is located approximately 800 m to the east of the WA Site and the now closed Hydro Aluminium Smelter is located approximately 1200m to the north-east. Refer **Figure 1-2**.

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3.0 Site Location and History

3.1 Site Location and Description

The WA Site is located at 129 Mitchell Avenue, Kurri Kurri. Although lying within the boundaries of the Kurri Kurri statistical area, in terms of proximity it is more closely aligned with the suburb of Weston. It is approximately 9,200 hectares (ha) in size and lies between 12 and 16 m AHD. The Project Area and surrounding land are topographically flat with few distinguishing topographical features. Swamp Creek the nearest waterway at approximately 50 m from the northern WA Site boundary, is ephemeral generally only flowing during times of rainfall.

Approximately 50 percent of the WA Site has been developed for the existing operation with the remainder being either grassed and partially treed or used for stormwater storage and drainage. The existing WA Site includes an administration building, two large industrial buildings for deoxidant production and dross and SPL processing, a truck loading dock, workshop and other ancillary structure such as bag houses and bulk materials storage bunds. Refer **Figure 1-3**.

The WA Site was strategically located in close proximity to Hydro Aluminium which provided access to aluminium dross and SPL which are by-products of the aluminium smelting process. WA reprocesses these materials to recover aluminium that would otherwise be a waste product. Despite the closure of Hydro, WA still processes dross and SPL material for other sources such as Tomago Aluminium. The industrial estate provides a buffer to urban areas as does bushland to the north.

3.2 Ownership and Legal Description

The Project area comprises a single parcel of land known as Lot 796 DP39877. This parcel of land is owned by WA.

3.3 Site History

The WA Site commenced operations in 1998 with six employees and one rotary furnace and has progressively grown. The current WA Site recovers aluminium from dross, a by-product of the aluminium smelting process, sourced from aluminium smelters across Australia and New Zealand.

Dross is a dry metallic solid typically composed of aluminium, aluminium oxide, other metal oxides, traces of sodium aluminium fluoride (bath) and alloying metals. Dross can contain 30-75 percent metallic aluminium, which represents the aluminium for use in various industries.

The WA Site is approved to process up to 40,000 tonnes as a combination of dross aluminium and SPL wastes, and to process up to 35,000 tonnes of scrap aluminium metal per year.

In 2011, WA installed, commissioned and commenced operation of its Briquetting Plant - designed to further improve the processing outcomes of its various mineral dust streams into a range of formulated briquetted product streams for the steelmaking sector. As a consequence, WA has since achieved a closed-loop, zero-waste position with respect to its core processes.

In response to the contraction in traditional markets, and need for business diversification, WA has conducted various research and development activities relating to the treatment of SPL wastes from the aluminium sector. Approval for commercial-scale processing of 2nd Cut SPL wastes (refractory component) was granted in 2012.WA has also recently concluded trial processing of various Mixed (carbon and refractory component) SPL waste inputs.

Further diversification of WA Site operations has also recently occurred via trial thermal processing of pharmaceutical and illicit drug wastes within existing furnaces. Regulatory Approval for proposed trial activities was obtained in September 2015.

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Part C – Project Needs and Alternatives

This part provides justification for the Project and a description of the potential alternatives to the Project to provide a comparison of how the Project may have been alternatively undertaken.

4.0 Objectives and Project Need

4.1 Project Objectives

The overall objective of the Project is to obtain development approval for the construction and operation of a thermal waste treatment plant to be operated as part of the existing WA Site at Weston, NSW. The thermal waste treatment plant would provide a responsible disposal option for a variety of wastes, commonly known as problems wastes, that cannot be disposed of via other means and require destruction for environmental and community health reasons.

4.1.1 Biophysical Objectives

Biophysical objectives have been developed for the Project within the context of the study area characteristics relevant legislation and policy, and include:

- Minimise impacts to natural areas and systems, in particular minimise impacts to local hydrology, biodiversity and environmental disturbance as a result of air quality and noise impacts;
- Implementing a range of air quality treatment devices (scrubbers and bag house) and other environmental control devices to minimise environmental impacts associated with a new building and processing equipment to be constructed in the Project Area; and
- Safeguard and enhance, wherever possible, the existing environment of the locality.

4.1.2 Socio-Cultural Objectives

Socio-cultural objectives focus on the protection and enhancement of social resources and include:

- To establish a thermal waste processing facility that would allow for the safe disposal of a variety of problem waste types (such as restricted solid wastes, liquid wastes and special wastes) that may pose a risk to human health if not appropriately treated through thermal means;
- To minimise and avoid where possible impacts on residents of the Kurri Kurri Weston areas associated with the operation of the thermal waste processing plant;
- To minimise and manage potential air quality and noise impacts through the use of real time and predictive management strategies; and
- To maximise the net economic benefit of the Project to the local and wider community by:
    - Employing local resources during the construction and operational phases of the Project; and
    - Increasing the diversification of the WA Site thereby providing greater long term security for its operations and employment, in particular given the recent closure of the Hydro Smelter in Kurri Kurri.

4.2 Project Needs

A variety of general, hazardous and other types of wastes (such as restricted solid wastes, liquid wastes and special wastes) require disposal in a manner which neutralises their potential to impact on the community and environment. Few management options are available for some of these wastes (e.g. biomedical or quarantine) and the thermal disposal method represents a tried and tested option for these wastes as evidenced by its use in existing thermal waste treatment facilities in Brisbane, Sydney and Melbourne.

Existing facilities are generally located in metropolitan areas and some existing facilities are aging. The Project represents a new facility in close proximity to established sources of waste that would provide additional capacity to process the growing rate of problem wastes produced in the community.

Thermal waste treatment provides a safe means of disposal for problem wastes that cannot be otherwise disposed of via traditional means such as land fill or composting. It is the only method that can safely neutralise infectious substances or other potential harmful materials such as quarantine waste. The Project would provide additional capacity in NSW for the management and disposal of problems wastes reducing transport costs and

therefore reducing waste management costs overall. The ability to appropriately dispose of problems wastes forms a key part of the NSW *Waste Avoidance and Resource Recovery Strategy* (NSW EPA, 2014) (WARR Strategy)

4.3 Project Benefits

The Project seeks to expand the ability of the existing WA Site to process certain wastes. The key benefits the Project are:

- The Project would assist in meeting the aims and objective of the WARR Strategy through improved management of a variety of wastes with a particular focus on problematic wastes;
- The Project provides an alternative means for the disposal of a variety of general, hazardous and other types of wastes (such as restricted solid wastes, liquid wastes and special wastes) thereby minimising potential threats to community and environmental health;
- The use of a brownfield site which would reduce the environmental footprint, in particular when compared to a greenfield project;
- Local and regional flow-on benefits from Project related capital investment during construction;
- Ongoing employment security for existing employees and additional employment demand to meet Project requirements;
- Positive economic feedbacks from construction capital expenditure and purchasing carried out during operations;
- Provision of additional thermal waste treatment capacity in NSW which would reduce transport costs associated with the use of interstate facilities and ultimately lead to reduced waste management costs for the community; and
- A ripple down effect from expenditure in the local and wider community.

5.0 Alternatives

Section 5.0 describes the possible alternatives of the Project and assesses the feasibility of possible alternative options. The preferred option is described in detail in **Section 6.0**.

5.1 Alternative Sites

A range of options for alternative sites would be available to any proponent seeking to establish a thermal waste processing facility such as that proposed. Review of existing thermal waste processing facilities showed that facilities are generally located in industrial areas in close proximity to key transport routes and with appropriate offset distances to residential areas. As the Project Area meets these preferred site characteristics, it can provide synergies with WA's existing operations and infrastructure, no additional consideration of alternative sites is considered necessary.

5.2 Alternative Waste Disposal Methods

In accordance with the requirements of the WARR Strategy, in the first instance waste should avoid being generated. Where it cannot be avoided, consideration should be given to the reuse or recycling of waste materials. For all other waste, disposal can be considered. As WA would not be a generator of the wastes to be processed by the Project, the onus would be on the generators to undertake strategies to avoid or minimise waste generation. However, the wastes proposed to be treated by the Project are not suitable for reuse or recycling and therefore consideration must be given to appropriate disposal methods.

Given the nature of the some of the wastes to be treated by the Project, traditional types of waste disposal, including disposal to landfill, are not suitable. Clinical wastes in particular have the potential to be classified as class 6.2 infectious substances under the ADG Code (refer to **Section 7.2.2**). This means they cannot simply be disposed of in landfill, and in NSW, must be either thermally treated or autoclaved. Thermal destruction provides sterilisation to remove pathogens and eliminate health and environmental risks, and also achieves a significant reduction in waste quantity – typically in the order of 85 - 90% of the original weight. By comparison, treatment by autoclave typically yields 105% (due to addition of water to the original mass of waste material) of the original weight, which places a significantly greater burden on limited landfilling resources.

A variety of kiln types are available for thermal waste treatment operations. Kilns types can be divided into slagging kilns (kilns that are capable of producing a liquid slag) and ashing kilns (kilns that produce ash). Further consideration of alternative kiln types is provided below.

5.2.1 Kiln Type

Having established the need for disposal of certain waste by thermal treatment, consideration is then required of the available technologies and techniques.

Slagging Kiln

Slag kilns operate at extremely high temperatures so that the resulting ash material left following the combustion process are liquefied and turn into a slag. The higher temperature requires additional fuels to operate a slagging kiln over an equivalent capacity ashing kiln. The higher temperatures of a slagging kiln also require higher grade refractories to protect the inside of the kiln. Consequently, the refractories need replacing more frequently than an ashing kiln, thus increasing waste generation and reducing the overall operating efficiency of the plant. Slagging kilns may also require the addition of additives to melt certain inert waste materials. This in effect adds to the quantity of slag or ash material generated from the combustion process requiring disposal to land fill.

Ashing Kiln

Compared to slagging kilns, ashing kilns operate at lower temperature levels which allows for combustion of material without turning them into a liquid slag. The lower temperature operation also has the benefit of requiring less energy input and reduced maintenance demand. The use of an ashing kiln can prevent the build-up of solidified slag in the system components and the resulting ash can be easier to handle logistically following the completion of combustion. Ash products can be readily disposed of to landfill.

5.2.2 Chamber Type

A wide variety of kiln chamber types are currently operated by facilities across a variety of industrial sectors internationally, including waste disposal. Some of the main types are:

Fixed Grate Kiln

A fixed grate kiln provides a metal grate over an ash pit. As material is loaded onto the grate it is combusted and the ash falls through the grate. This is the simplest type of kiln typically used for small scale and domestic circumstances due to the slower nature of processing and generally lower temperatures required.

Moving Grate Kiln

A moving grate kiln provides a conveyor belt type arrangement whereby a continually moving grate travels across the bottom on the kiln. As waste materials are deposited on the moving grate they are combusted and the moving grate collects residue ash and moves it to an ash collection pit at one end of the kiln. This style of kiln allows for a greater processing quantity than a fixed grate kiln and has been used extensively (outside Australia) for local community scale waste disposal.

Fluidized Bed Kiln

In a fluidized bed kiln, a flow of combustion gas is passed through a bed of particles, usually sand or similar sized particles, such that the solid particles act as a fluid in which waste can mix for more complete combustion. While the sand can be sieved for reuse, the mixing with waste would generate additional waste products. This is not preferred when attempting to reduce the overall quantity of waste required to be disposal to landfill.

Rotary Kiln

Rotary kilns are cylindrical kilns that rotate about the axis of the cylinder. Rotary kilns are usually installed at a horizontal angle from the higher deposition end, to the lower ashing end, to assist the movement of materials through the kiln as it rotates. Rotary kilns can further be divided into:

- Co-current – The combustion gases move through the kiln in the same direction as the wastes that are being treated. This is also known as a parallel flow; and
- Counter current – The waste material and combustion gases move in opposite directions through the kiln.

A co-current design allows for the highest heat combustion air to immediately come into contact with materials entering the kiln and the coolest combustion air to be at the exit point of the kiln meaning lower ash and combustion gas temperature. However, some thermal efficiency may be achieved through use of a counter-current design compared to a co-current design depending on the intended purposes of the kiln. With regards to the Project, a co-current design would achieve the desired thermal processing environment.

5.3 Preferred Option

The preferred option for the Project is to operate a co-current rotary, ashing kiln as detailed in the Project description in **Section 6.0**. Use of this type of kiln to thermally process waste as proposed by the Project, is preferred as:

- The co-current design would allow for a rapid dehydration of waste materials at the entrance to the kiln, allowing for improved kiln performance;
- The rotary kiln enables the mechanical movement of waste materials during the combustion process improving exposure to combustion gases and therefore completeness of combustion; and
- The ashing kiln design requires lower combustion temperature, and therefore lower energy input, than a slagging alternative and the resulting ash is easier to handle following the completion of combustion.

The kiln element of the Project is also referred to as the primary combustion chamber. In addition to the kiln type and its operation, a range of ancillary systems are also required to support the Project, however these would generally be required regardless of the kiln type, for example hydraulic systems and waste loaders. The entire Project, including equipment description, thermal treatment process and interaction with support systems is described in detail in **Section 6.0**.

5.4 'Do Nothing' Scenario

Without the Project proceeding there would not be the opportunity for a technologically modern thermal waste treatment facility to be constructed in NSW. Waste that requires thermal treatment would continue to be processed in either the existing facility located in Sydney, or would be transported interstate for processing, most likely to Victoria or Queensland. This would mean that the potential downward price pressure that may be introduced by the Project would not be realised.

The Project supports the diversification of activities undertaken at the WA Site. Given the changes to the markets in which WA has historically operated, there is now a requirement to diversify operations in order to remain

economically viable. The ‘do nothing’ scenario would not support the economic diversification of the WA Site and therefore would not help in securing the ongoing operation of the site, its employment and positive economic feedback to the local community.

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Part D – The Project and its Management

This part provides a project overview, a description of the key components of the Project, the scope of construction and operation works as well as the approach to environmental management and monitoring.

6.0 Project Description

6.1 Overview

WA is seeking development consent for the construction and operation of a thermal waste treatment facility on its Kurri Kurri site. The Project would accept a range of general, hazardous and other types of wastes (such as restricted solid wastes, liquid wastes and special wastes) for processing at a rate of 800 kg per hour and up to 8,000 tonnes per year. Wastes would be sourced from a range of industries and businesses and would be transported to the Project Area by truck.

The key components of the Project comprise:

- Limited site clearing and earthworks for the establishment of a building pad;
- Construction of a new building of dimensions to accommodate waste material storage and primary combustion chamber inlet plant and equipment;
- Installation and operation of a thermal waste treatment system which is comprised of the following key elements:
    - Waste shredder;
    - Solid wastes ram type loader system;
    - Co-current Rotary Kiln Primary Combustion Chamber complete with loading hood and Ash Burnout Zone;
    - Rotary Kiln dual fuel burner system suitable for both natural gas and liquid auxiliary fuels;
    - Ash handling and Quenching System;
    - Refractory Lined Horizontal Secondary Combustion Chamber;
    - Secondary Combustion Chamber dual fuel burner system suitable for both natural gas and liquid auxiliary fuels;
    - Secondary Chamber Outlet Exhaust Gas Analysers;
    - Refractory lined bypass stack with failsafe bypass stack cap;
    - Refractory lined preliminary heat exchanger complete with fan and ducting to provide preheated combustion air to Secondary Combustion Chamber;
    - Refractory lined forced cooling zone complete with fan;
    - Mild Steel ducting from cooling zone to existing fabric filter;
    - Modification of existing fabric filter ducting with provision of isolation valves and controls to permit operation of either the Project or the existing furnace;
    - Activated Carbon bulk bag feeder and conveying plant;
    - Variable Speed drive to suit existing fabric filter induced draft fan; and
    - All necessary field electrical equipment, instrumentation and controls.

These elements are described in detail in the following sections.

6.2 Site Preparation

The Project would require an extension to the existing hardstand area to the north of the existing operation in order to establish a building pad and allow for the construction of the proposed shed that would store the input waste materials and associated waste handling facilities. Key site preparation task would therefore comprise:

- Establishment of site fencing to prevent unauthorised access;
- Establishment of construction drainage controls and management measures;
- Clearing of vegetation (principally groundcover) in a buffer zone around the future construction area to enable construction activities; and
- Where required, introducing fill and releveling the portion of the WA Site in the immediate area of the proposed shed to establish a building pad.

6.3 Construction

6.3.1 Program of Works

The target start date for the construction of the Project would indicatively be early 2017 subject to approval of the Project. The construction timeframe is anticipated to be just over six months. An indicative program of works for the construction phase is shown in **Table 6-1**.

Table 6-1 Indicative Timeline for Construction Activities

Item	Start[1] (week)	Finish (week)
Civil Works	1	12
Building construction	13	20
Equipment Installation	21	25
Commissioning	26	27

1: monthly sequencing is indicative only, and is subject to alterations due to various matters, including but not limited to weather, construction contractor availability, materials sourcing, and safety requirements.

6.3.2 Construction Equipment

The plant and equipment to be used during the key construction phases of the Project are listed in **Table 6-2**.

Table 6-2 Construction Equipment

Construction Phase	Equipment	Construction Task
Civil Works	Excavators (Large 20 – 30T, Medium 5T – 20T and Small 1T – 5T) Bobcat	Bulk earth moving
		Footing excavations
	Bobcat	Civil works
	Trenchers	Civil works
	Trenching props and wall support	Civil works
	Concrete mixers, vibrators and screeding equipment	Concrete construction activities
	Rollers / Compactors (Large 10T – 25T and Small 1T – 10T)	Rolling of building pad
Building construction	Geotechnical investigation drillers	Drilling for piles and footings (if required)
	Concrete drills	Concrete drilling
Equipment Installation	Trucks, utility vehicles, trailers	Delivery of prefabricated material, plant and equipment
	Boom lifts	Equipment installation

Construction Phase	Equipment	Construction Task
	25T – 50+T mobile crane	Miscellaneous platform and large equipment installation
	15T – 25T Franna	Smaller equipment installation
	3T – 10T Telehandler	Deliveries and site movements
	Forklifts	Deliveries
Commissioning	Small booms and scissor lifts	Lower heights requiring safe access, rigging, etc.
	Trucks, utility vehicles, trailers	Contractor

In addition to the large pieces of construction equipment that would be required during construction, a range of smaller pieces of equipment and hand tools may also be used, including but not limited to:

- Generators;
- Welders, including specialist tank and vertical welders;
- Power distribution Compressors boards;
- Cutting saws and grinders;
- Pumps; and
- Portable lighting.

6.3.3 Proposed Building and Thermal Waste Treatment Plant

The proposed location of the Project infrastructure, including the new shed and key elements of the thermal processing unit are detailed in **Figure 6-1** and **Figure 6-2**.

The proposed shed will be a slab on ground with steel framework and external cladding. The building would be coloured matt green to match the other buildings on the WA site and minimise visual impacts. The building will be approximately 10 metres high. The proposed loading/unloading dock on the southern side of the new building would contain roller doors to allow trucks to unload waste products for storage. Drawings detailing the building layout and indicative elevations are provided in **Appendix I**.

The proposed waste thermal treatment systems would extend from the eastern side of the proposed building. This would be a fully enclosed system with air intake managed through computer controlled ducted intake fans and outputs to atmosphere managed through the air treatment system. A detailed description of the key components of this system and its operation are provided in **Section 6.4**.

Design Standards

There are no applicable Australian Standards specifically developed for the supply or design of the incineration equipment that would be used in the Project. There are however a number of related Australian Standards that would apply to the associated infrastructure, its design and installation. Key standard that would apply to the Project include:

- Australian Standard 1375-2013 Industrial Fuel Fired Appliances;
- Australian Standard 3813-2009 Industrial and Gas Fired Appliances;
- Australian Standard 3000-2007 Wiring Rules;
- Australian Standard 1657-2013 Fixed Platforms, Walkways, Stairways and ladders; and
- Australian Standard 1554-2014 Structural Steel Welding.

Typically incinerators are designed to meet a nominated process throughput whilst operating in accordance with the incinerator combustion efficiency and exhaust stack air emission parameters. For this Project the exhaust emissions parameters are those described in **Section 12.0**, and would be agreed with the EPA.

The proposed design utilises technology that has been proven in many installations throughout the world and is similar to that utilised in incineration facilities now operational in Brisbane, Melbourne and Perth. The Project has

utilised the same design and equipment vendor to capitalise on this knowledge to produce a plant that will be appropriate for Australian conditions and is known to both local customers and regulators.

6.3.4 Construction Traffic and Access Arrangements

All construction traffic would enter the Project Area from the existing WA Site access via Mitchell Avenue. Mitchell Avenue connects to Government Road then Hart Road and the Hunter Expressway providing construction traffic with access to the WA Site without having to traverse through residential areas or the township of Kurri Kurri.

All construction traffic would enter through the security controlled front gate. The area surrounding the proposed shed location is predominantly hardstand which provides a suitable parking and laydown area for construction vehicles and equipment.

At the height of construction activities the following traffic would be generated:

- Up to ten light vehicles per day accessing the Project Area (assuming an occupancy rate of one person per vehicle); and
- Approximately two heavy vehicles (trucks) accessing the Project Area per day. Truck movements are likely to be spread throughout the day as equipment and materials are required onsite.

As detailed in **Section 13.0**, there are existing available parking and laydown areas within the WA site to accommodate construction vehicles.

6.3.5 Fencing, Security and Lighting

The existing WA Site is secured by a chain-link barbed wire topped security fence around its perimeter. All visitors accessing the WA Site are required to sign-in and sign-out at the site office. Construction contractors would be required to register onsite and undertake contractor inductions prior to undertaking works.

During construction, the construction area would be cordoned off with temporary fencing to prevent access to the working area and access would be limited to inducted staff and contractors.

6.3.6 Construction Workforce and Hours

Up to 10 construction staff are estimated to be required onsite during the peak construction period. Actual numbers would vary based on contractors and work methodology. Typically however there would be fewer that this number onsite at any given time due to the sequential nature of the contraction works limiting Project elements that can be constructed simultaneously.

Construction works would be undertaken during standard construction hours where possible. That is:

- Monday to Friday 7am to – 6 pm;
- Saturday 8am – 1pm; and
- No works on Sundays and Public Holidays.

Works outside these hours would only be undertaken where they would be inaudible at residential receivers.

6.3.7 Construction Environmental Management and Monitoring

Prior to construction activities taking place, a Construction Environmental Management Plan (CEMP) would be prepared to address the management of potential environmental impacts associated with construction activities. The CEMP would include as a minimum, management measures to address a range of environmental aspects as determined by this EIS.

6.4 Operation

6.4.1 Types and Sources of Wastes

The Project proposed to process a wide variety of wastes which are generally considered problematic due to their potential to cause harm to human or environmental health. These wastes are detailed in **Table 6-3**.

Table 6-3 Types of Waste

Waste Type	Waste Code*	Sources
Clinical and related wastes	R100	Public and private research institutions and the medial sector.
Pathogenic substances	R110	Public and private research institutions and the medial sector.
Wastes from the use of pharmaceutical products NOS	R120	Public and private research institutions and the medial sector.
Cytotoxic substances	R130	Public and private research institutions and the medial sector.
Waste from the production, preparation and use of pharmaceutical products	R140	Public and private research institutions and the medial sector.
Quarantine waste	R150	NSW-based international shipping and airline sectors.
Waste chemical substances arising from research and development or teaching activities, which are new or unidentified substances with unknown human health or environmental effects	T100	Educational establishments, public and private research institutions and the medial sector.
Solvents and Paints	F100, F110, G110 – G160	Light and heavy industry.
Pitch sludge residues	J120, J160	Light and heavy industry.
Oily rags	NA	Light and heavy industry.
Documents and hard drives	NA	Businesses and government agencies.

*Waste codes are derived from the National Environmental Pollution Measures for controlled waste.

Of the waste types listed in **Table 6-3** a breakdown of the indicative volume of each waste by weight that would be processed by the Project in a given year is detailed in **Table 6-4**. These volumes have been based on known generation rates and disposal requirements from industry, however the actual ratio of waste types processed by the Project would be subject to generation demand and market factors.

Table 6-4 Waste Type Volumes

Waste Type	Volume by Weight (%)*
Medical Wastes	75
Quarantine Wastes	15
Other	10

*Volumes of each waste type are indicative only.

It is proposed that the Project would process up to 8,000 tonnes of waste per year which could comprise a varying ratio of any of the wastes listed in **Table 6-3**. Based on this amount and the processing capacity of the processing plant at 800 kg per hour, the maximum throughputs for the processing plant are detailed in **Table 6-5**.

Table 6-5 Maximum Waste Throughputs

Period	Amount (kg)
Day	19,200*
Week	134,400*
Year	8,000,000

*Theoretical maximum based on non-stop processing across the period.

6.4.2 Waste Transport to Site

Each type of waste would be produced at its source industry and packaged in accordance with the storage packaging and labelling requirements of the relevant codes and guidelines (e.g. the NSW Environment Protection

Authority's (EPA's) guidance notes, ADG Code and relevant Australian Standards including AS/NZS 3816:1998). The tracking of the waste during transportation would also be undertaken in accordance with the requirements of the NSW EPA.

All waste would be transported to the Project Area by road. Depending on the type of waste, it source location, business/industry and the transport contractor being used, the size and type of vehicle being used to transport waste to the WA Site may vary. It is anticipated that the average loads of waste being delivered to the Project Area would be approximately 8 tonne. A proposed annual waste processing volume of 8,000 tonnes per year equates to 1000 truckloads per year or approximately three loads per day delivered to the Project Area.

Vehicles accessing the Project Area would principally originate from within NSW, with the majority of vehicle expected to come from the Newcastle and Sydney metropolitan regions. Vehicles would enter the Project Area through the existing access off Mitchell Avenue. Access to and from the site would be from Mitchell Avenue to Government Road, then Hart Road which connects directly to the Hunter Expressway at the Loxford Interchange. The Loxford Interchange is a half interchange which only provides an exit for westbound traffic on the Hunter Expressway and entry to the Expressway for eastbound traffic. With the majority of traffic coming from the Sydney and Newcastle metropolitan area via the M1 Expressway, this interchange would provide ease of access to Hart Road and therefore the Project.

In accordance with the requirements of the WA Site's existing Environment Protection Licence (EPL 6423) condition L5.1, truck deliveries to and from the Project Area would be between the hours of 7am and 10pm.

Further discussion on the potential traffic and transport impact of the Project are discussed in **Section 13.0**.

6.4.3 Receipt of Waste Products

Upon delivery to the Project Area, trucks or vehicles carrying waste would proceed through the site's weighbridge to recording and then to the waste drop off zone and loading bay located on the southern side of the proposed waste processing building (Refer **Figure 6-2**).Trucks would back up to the loading bay and waste bins would be unloaded. Depending on the nature of the waste being delivered and the type of delivery vehicle, waste may be unloaded by:

- Forklift, for large deliveries; or
- Hand wheeled waste bins up to 660L or receptacles for smaller waste deliveries.

Prior to receiving or unloading wastes at the Project Area, each load of waste would be individually screened by the facility operators to confirm that the type and quantity of wastes scheduled for delivery is correct. Screening includes a visual inspection of the load, documentation (origin, waste description, grading/classification, storage/processing fate and photographic record) and the use of devices such as Geiger Counters to ensure medical waste do not contain radioactive materials. In the event that a non-conforming waste delivery is identified, the entire waste load would be quarantined and redirected back its point of origin for actioning by the generator. In accordance with existing Quality Management System protocols, WA would subsequently inform the transport contractor company and the waste originator of the non-conformance. WA would keep a record of any non-conforming wastes to allow its tracking. WA may also inform the EPA in accordance with waste tracking requirements.

Where wastes are not scheduled for immediate processing they would then be moved to a dedicated waste storage location within the proposed building that is fully bunded and sealed from the outside environment.

6.4.4 Storage of Waste Products

Where possible, waste materials would be processed as soon as practicable following their delivery to site. This would minimise storage requirements as well as the need for additional controls to segregate different types of wastes. No wastes would be stored external to any building, nor would any waste be stored internal to a building without being within an appropriately sealed container designed for the containment of the relevant waste stream. There would be no freestanding waste stockpiles or waste stores in the open air. All waste storage areas would be appropriately signposted to inform personnel, including emergency personnel, of their content.

Once delivered to the Project Area, waste materials that are not scheduled for immediate processing would be stored in accordance with the requirements of the appropriate guidelines for that waste type. Waste storage would generally be one of the following two methods.

Stored in Delivery Bins

The majority of waste types delivered to the Project Area would arrive in bins of a variety of sizes up to 660 L. These bins would be placed in a secure internal storage allocation area. The secure waste storage areas would have a capacity of 200m^3.

Refrigerated Storage Area

For some waste products, when immediate processing is not achievable, the refrigerated storage area of 450m^3 would be used to stabilise organic materials.

Whilst waste would be stored in sealed bins until ready for processing, both storage areas would be fully bunded and drain to sumps to collect any spilled liquids. Storage areas have been designed to be assessable by for the largest bin size proposed (660L).

The waste storage areas are shown on **Figure 6-2**.

6.4.5 Waste Preparation/ Shredding

Prior to waste being placed into the waste hopper it would be put through a mechanical shredder. This would macerate or shred the waste material to break it down into a smaller particle size prior to processing. This has the benefit of increasing the surface area of the waste product to ensure a more efficient and quicker thermal reduction.

6.4.6 Thermal Processing System

The proposed thermal processing system would require the following major equipment:

- Bin Tippler and Solid Waste Loader;
- Primary Combustion Chamber (Rotary kiln);
- Ash Discharge System;
- Secondary Combustion Chamber; and
- By-pass Stack.

Each of these elements is detailed in **Figure 6-2**. All except the bin tippler and solid waste loader are located outside the building. Photos illustrating the key components as discussed below are included in **Appendix B**.

In its entirety the thermal processing system would have the capacity to process up to 800kg of waste per hour with a proposed annual throughput of 8,000 tonnes per year.

Bin Tippler and Solid Waste Loading Hopper

The bin tippler and solid waste loading hopper would be located in the Waste processing Area of the building and enable the transfer of waste materials into the primary combustion chamber (rotary kiln) located outside of the building as shown in **Figure 6-2**. The bin tippler and solid waste loading hopper are discussed below.

Bin Tippler

The thermal processing plant would be equipped with a hydraulic powered bin tippler which is capable of lifting a variety of bin and container types for the purposes of tipping the contents directly into the loading hopper. Typically this would be either a single 660 L bin or two 240 L bins.

The tippler would be capable of both automatic and manual control. The operation of the tippler would be through the thermal processing plant Programmable Logic Controller system. The waste loader tippler system would be equipped with an automated waste weighing and data logging system. 'Limit switches' would monitor the operation of the tippler to prevent the over travel or other movement that may lead to spillage of waste material or damage to the tippler system. In the unlikely event of spillage any waste would be collected by hand and returned to the bin for placement back in the tippler.

Solid Waste Loading Hopper

The bin tippler would empty waste materials into the waste hopper which would then control the flow of waste materials into the primary combustion chamber. The waste loading hopper would act as the interface between the loader and the primary combustion chamber to control the deposition of waste into the combustion chamber. The following key components of the waste loading hopper include:

- Conventional Hydraulically Operated Loading Ram – to control waste entry to the primary combustion chamber, prevent jamming and avoid the need for operators to work in close proximity to the primary combustion chamber;

- Conventional Refractory Lined Fire Door – to minimise air entry into the primary chamber during loading and prevent fugitive emissions escaping during processing cycles;
- Air Cooled Steel Seal Door – this provides a secondary door between material in the hopper and the refractory lined fire door. The refractory lined fire door can become hot during operation and this secondary door prevents material in the hopper coming into contact with the hot door of the primary chamber. This prevents the potential combustion of material in the hopper;
- Waste Loader Hopper Lid – To minimise air exchange between the open air environment and hopper and subsequently the primary combustion chamber. This in effect creates an air lock to prevent rapid increases in air entering the primary chamber during loading which could result in rapid temperature increases; and
- Exhaust Gas Extraction from Loader Area – an exhaust gas extraction system would be installed to collect and remove residual gases from the loading hopper for treatment prior to release.

As the loader is at the point at which gas exchange can occur between the primary combustion chamber and the open air environment, the sealed door, sealed hopper lid and gas exhaust system are essential to prevent uncontrolled ingress of gases into the primary combustion chamber. Controlling gas exchange provides the operators the ability to control the combustion environment of the primary combustion chamber thereby preventing temperature fluctuations. This also prevents combustion gases escaping.

Primary Combustion Chamber

The primary combustion chamber for the Project would be in the form of a rotary kiln. The advantage of the rotary kiln for thermal processing purposes is that the rotary motion provides greater contact between the wastes being processed and the combustion air, compared to other kiln types thus providing a more complete combustion process in a shorter period. The inclined rotary action of the kiln acts to move material from the feed (high) end, to the ash discharge (low) end.

The proposed rotary kiln primary chamber is an ashing (produces ash), co-current (waste materials and combustion gases travel in the same or co-current direction) operation. Waste materials being processed are loaded into the primary combustion chamber where initial combustion takes place. Natural gas would be used to initiate combustion of waste materials and maintain the required kiln temperatures. An air injection system (see details of combustion air fans in **Section 6.4.7**) would manage oxygen levels in the kiln during combustion to maintain a steady burn state.

Following combustion the resultant ash material is then discharged from the kiln and are maintained on a stationary burnout hearth for a period of up to eight hours to ensure complete burnout of all carbonaceous matter. The burnout hearth is equipped with an ash pusher which gradually pushes the waste ashes across the hearth into the ash pit (refer **Figure 6-2**).

The advantages of the co-current rotary kiln ashing kiln are:

- The Rotary Kiln can be operated under oxidizing or reducing conditions;
- The use of an ashing kiln, as opposed to a slagging kiln, as typically used in hazardous waste applications, would greatly reduce auxiliary fuel costs and minimize refractory repair and maintenance costs. The ashing kiln would also permit the WA Site significantly more flexibility in terms of scheduled and non-scheduled maintenance shutdowns of the plant; and
- The final burnout hearth and ash pusher provides virtually complete combustion of all carbonaceous matter in the waste ashes. Some other types of plants simply convert the putrescible wastes to carbonaceous wastes.

The rotary kiln primary combustion chamber is supported by an Ash Discharge system to remove ash as discussed below.

Ash Discharge System

The rotary kiln burnout zone is equipped with a hydraulically operated ash pusher. The ash pusher is operated in sequence at the start of every load cycle and is used to transfer waste ash materials from the burnout hearth directly into the ash trough for removal.

Ash would then be moved through the sealed trough by a drag type ash conveyor. This conveyor would be equipped with a heavy loose-link drag conveyor chain. A series of steel flights are attached to the chain at regular intervals and the chain is supported on sprockets. As the chain moves along the steel flights move the ash through the trough. At the end of the trough the ash would fall into bulk bags or sealed bins which when full would

be sealed and removed from site by truck for disposal of the ash to landfill. Truck out loading of ash would occur from the loading bay with the use of a forklift (refer to **Figure 6-2**).

Secondary Combustion Chamber

The function of the secondary chamber is to ensure complete breakdown of all combustible gases generated in the thermal processing plant's primary chamber. The secondary chamber is therefore used to complete the combustion of gases generated from the primary combustion chamber. The secondary chamber provides better gas mixing and the addition of oxygen (airflow) to allow increased gas combustion and therefore reduced pollutant generation. This is achieved by maintaining the secondary chamber at a temperature of 1,100^{0}C whilst ensuring an adequate supply of combustion air. An efficient secondary chamber is essential to minimise emissions of dioxins and other products of incomplete combustion.

The critical parameters when determining the efficiency of a secondary chamber are the combustion temperature, the chamber combustion time or retention time and the turbulence. These parameters assume that sufficient combustion air is available to complete the combustion process. The secondary chamber is designed to provide a secondary chamber retention time of 2.0 seconds at a temperature of 1100^{o}C. The secondary chamber is of circular cross section and is fabricated from 6 mm thick welded mild steel plate and lined with high temperature refractory tiles.

The secondary chamber would be equipped with auxiliary duel fuel burners and separate pilot burners. The primary fuel source would be natural gas. Burner flame viewing ports would be provided in this chamber. The burners shall be configured to operate using natural gas as a fuel and can be readily utilised to burn any other pumpable liquid fuel such as waste oils. Provision shall be made to the process controls for the utilisation of such waste oils once the secondary chamber has achieved its specified operating temperature.

Using these burners the combustible products from the primary chamber are mixed with air and ignited raising their temperature to over 1,100°C. Additional combustion air is mechanically induced under high pressure through a series of ducts located along the chamber. This high velocity combustion air is used to provide counter-rotation mixing of the high temperature gas stream. After the high temperature gas stream is thoroughly mixed, the gases enter the combustion chamber retention zone, where the gases are held for a minimum time period of two seconds at a temperature of 1,100^{o}C. In order to minimize the use of auxiliary fuel the plant shall utilise combustion air which has been preheated by passage through a preliminary heat exchanger located following the secondary chamber. Hot air is returned to the combustion process to reduce overall heat and therefore energy loss.

By-pass Stack

To make provision for the bypassing of hot combustion gases directly from the plant to atmosphere during incidents such as a power failure or other emergency situations, a by-pass stack would be installed as part of the Project.

The by-pass stack would be a separate stack to that used during normal operations for gas emissions. The by-pass stack would be of a height sufficient to ensure that the dispersion of emissions of pollutants during an emergency situation does not exceed acceptable levels. The bypass stack would be equipped with a fail-safe pneumatically assisted and counterweighted refractory lined stack cap. During normal operation this stack cap is fully closed allowing the combustion products to pass through to the air pollution control plant. In the case of power or equipment failure this stack cap opens allowing the plant's exhaust gases to discharge directly from the plant to atmosphere. The air quality impacts assessment provided in **Section 12.0** includes consideration of a potential by-pass stack release.

In the event of an emergency, automated plant systems would shut down other elements of the Project such that the combustion and emission of gases from the by-pass stack would largely be limited to those in the system at the time of shutdown (i.e. there would not be ongoing operation of the Project with the by-pass stack open).

6.4.7 Air Treatment and Cooling

The Project would use a combination of new and existing emissions control systems at the WA Site to management the emission of potential air pollutants.

WA's existing Baghouse No. 5 is located adjacent to the eastern end of the proposed Project shed location. Baghouse No. 5 is currently equipped with fabric filter bags with lime injection. Such a combination is considered suitable for the removal of dioxins, particulate matter and heavy metal emissions.

Prior to entering the baghouse, air emissions must be conditioned so they can be suitably treated by the baghouse. This primarily relates to reducing air temperatures as follows:

- Exhaust gases would be discharged from the secondary combustion chamber and directed through a heat exchanger. The heat exchanger is used to heat fresh air that then enters the primary combustion chamber thus reducing energy requirements;
- Air leaving the heat exchanger is reduced in temperature by several hundred degrees and is then injected with ambient air until it reached temperature of approximately 160^{o}C; and
- The air is then moved to the baghouse where it is injected with activated carbon to absorb pollutants and lime to neutralise acids. It then passes through the baghouse where pollutants are removed and is discharged to atmosphere from the baghouse via the existing baghouse stack.

6.4.8 Auxiliary Systems

A number of auxiliary systems and pieces of equipment would be required to enable the thermal processing to be undertaken. These are described below:

Burner Systems

The secondary combustion chamber burner system would be equipped with two natural gas fired burners. These burners would operate at full capacity during the initial preheat prior to the introduction of wastes. Once operating at full capacity under stable conditions, these burners would automatically modulate to maintain the required chamber operating temperature. The natural gas would be sourced from the existing gas ring main currently installed at the WA Site.

To ensure satisfactory combustion of both waste materials and auxiliary fuels, the oxygen concentration at the outlet of the secondary chamber would be monitored and used to automatically control the addition of secondary combustion air. Carbon monoxide and carbon dioxide concentrations would also be monitored and used to give a continuous indication and recording of combustion efficiency.

Hydraulic Systems

Hydraulics would be used to operate the following systems or Project elements:

- Bin Tippler and Loader Hopper Lid;
- Waste loading ram;
- Primary combustion chamber door;
- Secondary combustion chamber door;
- Burnout Zone Ash Pusher; and
- Burnout Zone Air Hole Cleaning Rods.

A multi pump hydraulic power unit would be installed to ensure that key elements of the process can be operated independently of each other. This would provide added redundancy in the event of a hydraulic pump shut down as the entire plant would not be dependent on a single hydraulic system.

Combustion Air and Fan System

An air intake system would be installed to control air flow into the process. The combustion air necessary to thermally treat the waste materials would be introduced into the primary chamber kiln by two independent fans. The first combustion air fan is used to supply combustion air to the kiln inlet hood and the second combustion air fan is used to supply air to the burnout zone. Air or gases are then captured and directed to the secondary combustion chamber.

All combustion fans would be equipped with a flow proving device and either variable speed drives or fully modulating control dampers to allow the optimal amount of air to be provided to the process.

Waste Bin Washing

A waste bin washing system would be installed in a designated bin wash area in the building to clear out the tippler bin and other storage bins of residual wastes following the completion of processing activities. Water would be provided from the existing reticulated water supply. The waste water from the bin wash would be treated by removing of any remaining large debris through a Gross Pollutant Trap (GPT) and subsequent sediment trap prior to being discharged into the sewer system. This would require a trade waste agreement with Hunter Water (refer to **Section 15.4.4**).

Computer Monitoring System

The thermal processing facility would be equipped with conventional Programmable Logic Controller controls supervising and controlling all aspects of the plant's operation. A Programmable Logic Controller system is a digital computer control system commonly used in the automation of industrial mechanical processes.

In addition, the thermal processing plant would also be equipped with a custom designed graphical monitoring Supervisory Control and Data Acquisition system. This monitoring system would simplify the operation of the Project and can be configured to provide real time monitoring, alarm monitoring and recording, data logging and detailed plant troubleshooting.

Combustion Gas Monitoring

The thermal processing plant is to be equipped with an extractive emission monitoring system consisting of Oxygen, Carbon Monoxide and Carbon Dioxide analysers. Analogue signals from these analysers would be used for monitoring, combustion efficiency calculations and control, and alarm generation.

6.4.9 Thermal Processing Waste (Ash) Management

The only waste product remaining at the end of processing would be ash materials which would represent only a small fraction of the input weight and volume of the waste material processed through the Project Area. The amount of ash produced as a result of the process is dependent on the amount of non-combustible material in the waste being processed. Thermal treatment of Municipal Solid Waste (MSW) for example is known to produce ash that is approximately 5 – 10% the volume of the feed waste[2].

Based on a total annual throughput of 8,000 tonnes per year and factoring a waste to ash conversion ratio of 10% waste to ash, it is expected that there would be approximately 800 tonnes of ash produced per year.

6.4.10 Water Management

Water Supply

All water used by the facility would be from the town water supply as is currently connected to the WA site and its operations. The primary source of water use form the Project would be for bin washing. It is expected that approximately 10 litres of water per bin may be required for wash out.

Staff would utilise the existing amenities at the WA facility. Due to the relatively small increase in staff proposed, additional water use through these amenities would be minor.

Waste Water

The primary source of waste water generated by the Project would be from bin washing activities. As previously described, this waste water would then be disposed of to the sewer system connected to the WA Site. This would require a trade waste agreement with Hunter Water (refer to **Section 15.4.4**). Bin washing would use up to 250 litres per hour during peak processing times. There would be no disposal of any wash water to the stormwater network.

Similar to water usage, additional employees resulting from the Project would also generate a small amount of waste water from the use of the existing site amenities. Again this increase is expected to be minor.

Stormwater Management

The location of the building proposed as part of the Project is currently a concrete sealed hardstand area which drains via the sites existing pipe and pit network to the stormwater detention pond location approximately 50m to the east of the Project area and within the WA site boundary.

It is proposed to drain the proposed building to the existing pipe and pit system. Given the location of the proposed building over an area that already drains to the established detention basin there is expected to be a minor change in the impermeable surface draining to the system. Therefore any change is runoff quantity would also be minor.

As all waste materials would be managed internally to the building and within thermal processing systems there would be no contact of waste materials with stormwater. All waste would be stored in sealed bins in bunded waste storage areas which, as described above, would connect to the sewerage system in the event of a release of liquid. Runoff quality it therefore not expected to differ from the existing situation.

[2] World Bank Technical Guidance Report, Municipal Solis Waste Incineration. 1999

6.4.11 Safety and Hazard Management

Given the nature of some of the materials that would pass through the Project Area for processing, there is potential for a variety of potentially hazardous materials to be present at the Project Area.

The WA Site currently operates in accordance with the requirements of the Weston Aluminium Safety Management System Manual that was developed in accordance with *Hazardous Industry Planning Advisory Paper No. 9 Safety Management* (DP&E, 2011e). The Weston Aluminium Safety Management System Manual forms the basis for the whole of site safety management and risk minimisation system and includes a range of safety and environmental sub policies and procedures (refer to **Section 24.1.4**).

A full review of the site fire safety systems would be undertaken in accordance with the requirements of NSW Fire and Rescue.

Management of incidents or emergency situations is governed by the Emergency Response Plan which details the procedures to be following during an incident or emergency situation.

The operation of the Project would be undertaken in accordance with WA's safety and emergency management system. This system and related procedures would be updated to incorporate the specific safety and hazard management requirements associated with the thermal waste processing unit.

6.4.12 Site Security

The existing site security measures established at the WA Site would be extended to the new processing building and associated plant and equipment, including boundary security fencing, 24-hr site manning, attended security patrols, back-to-base security monitoring and supported by a network of Closed Circuit Television (CCTV) recording. All access to the WA Site is restricted to staff/employees and approved visitors and contractors who have undergone the appropriate inductions and are accompanied by staff as required.

Further access restrictions would be placed on the waste processing shed such that only approved employees who are necessary for the management and operation of the processing facility are allowed access. Similarly, only delivery drivers delivering waste to the waste processing facility would be allowed access. All personnel accessing the processing facility would undertake additional inductions specific to the operations and hazards of the waste processing facility.

WA has a proven track record in providing a high level of security and materials accountability having undertaken destruction of illicit materials including drugs and narcotics in its existing operation, in cooperation with the NSW Police.

6.4.13 Operational Workforce and Hours

Under the existing development consents, the existing WA Site is approved for operations 24 hours per day seven days a week. Approval is being sought for the proposed thermal waste treatment plant to also operate 24 hours per day, seven days per week.

As stated in **Section 6.4.2**, in accordance with EPL 6423, deliveries by truck would only occur between the hours of 7am and 10pm.

The Project would generate an additional six shift worker positions, full time equivalent. Two maintenance staff would also be required on a part time basis and contactors would be engaged on an as-needed basis to undertaken various tasks.

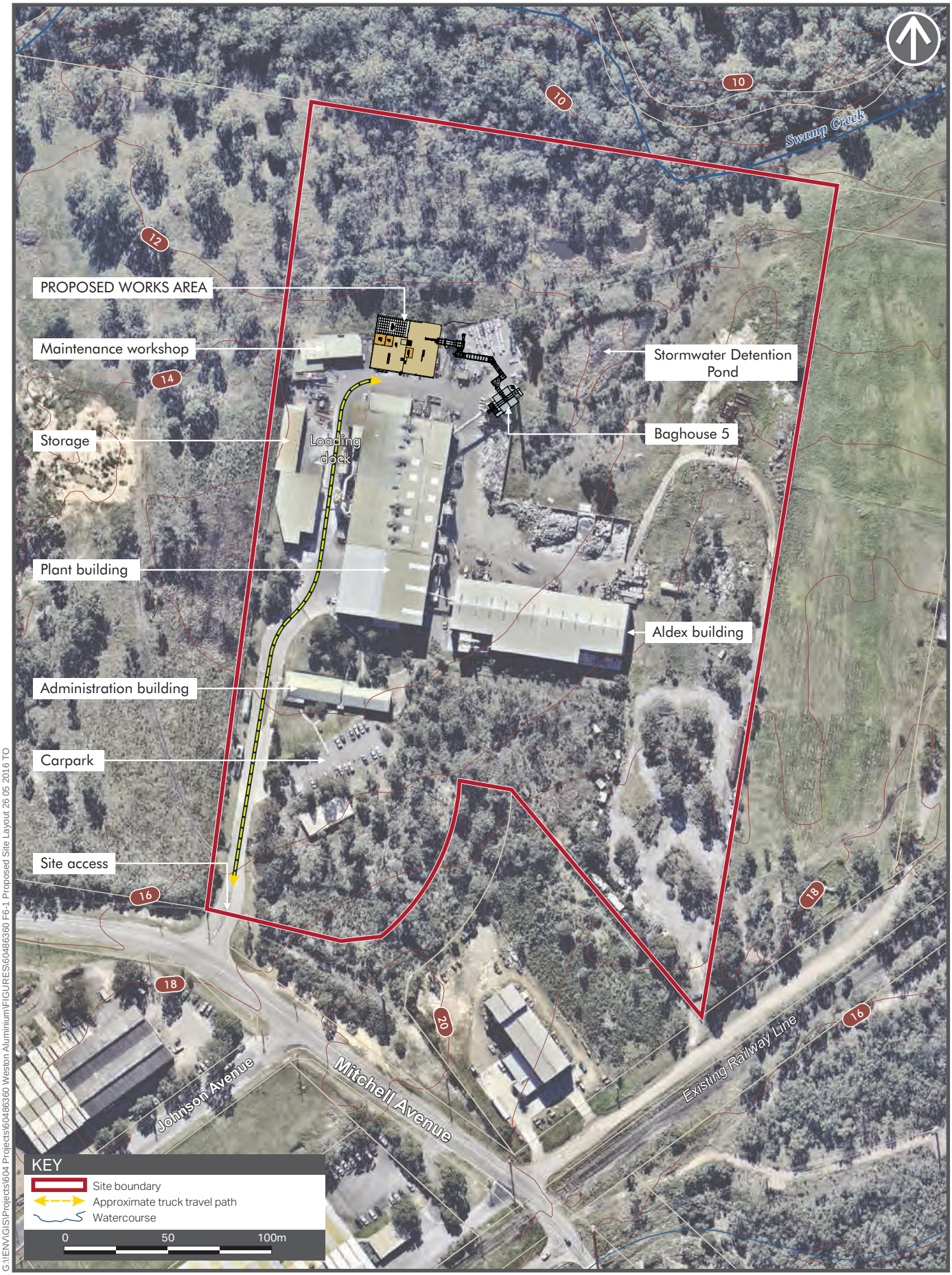
6.4.14 Operational Environmental Management

WA operates the existing WA Site in accordance with an Operational Environmental Management Plan (OEMP) that was prepared in accordance with the requirement of the WA Site's existing development consent requirements. This OEMP was prepared in consultation with key stakeholders and reviewed and approved by DP&E prior to implementation. The OEMP has proved to be easy to implement and management measures function well as evidenced in the high level of environmental performance of the existing operation.

As part of the Project, WA is committed to undertaking a complete review of all the relevant site systems and management plans and updating them as necessary to incorporate the requirements of the Project. This includes incorporating the required operational management and mitigation measures as identified in **Part F** of this EIS. It is expected that this review and update of the WA Site's OEMP would be made conditional in the Project approval if issued, and would be undertaken in consultation with relevant stakeholders and approved by DP&E prior to the operation of the Project.

6.4.15 Capital Investment

It is anticipated that a Capital Investment Vale (CIV) of approximate AU $5,693,000.00 would be required for the Project. A CIV statement from a Quantity Surveyor is attached at **Appendix C** as discussed in **Section 21.2**.



G:\ENVGIS\Projects\604 Projects\60486360 Weston Aluminium\FIGURES\60486360 F6-1 Proposed Site Layout 26 05 2016 TO

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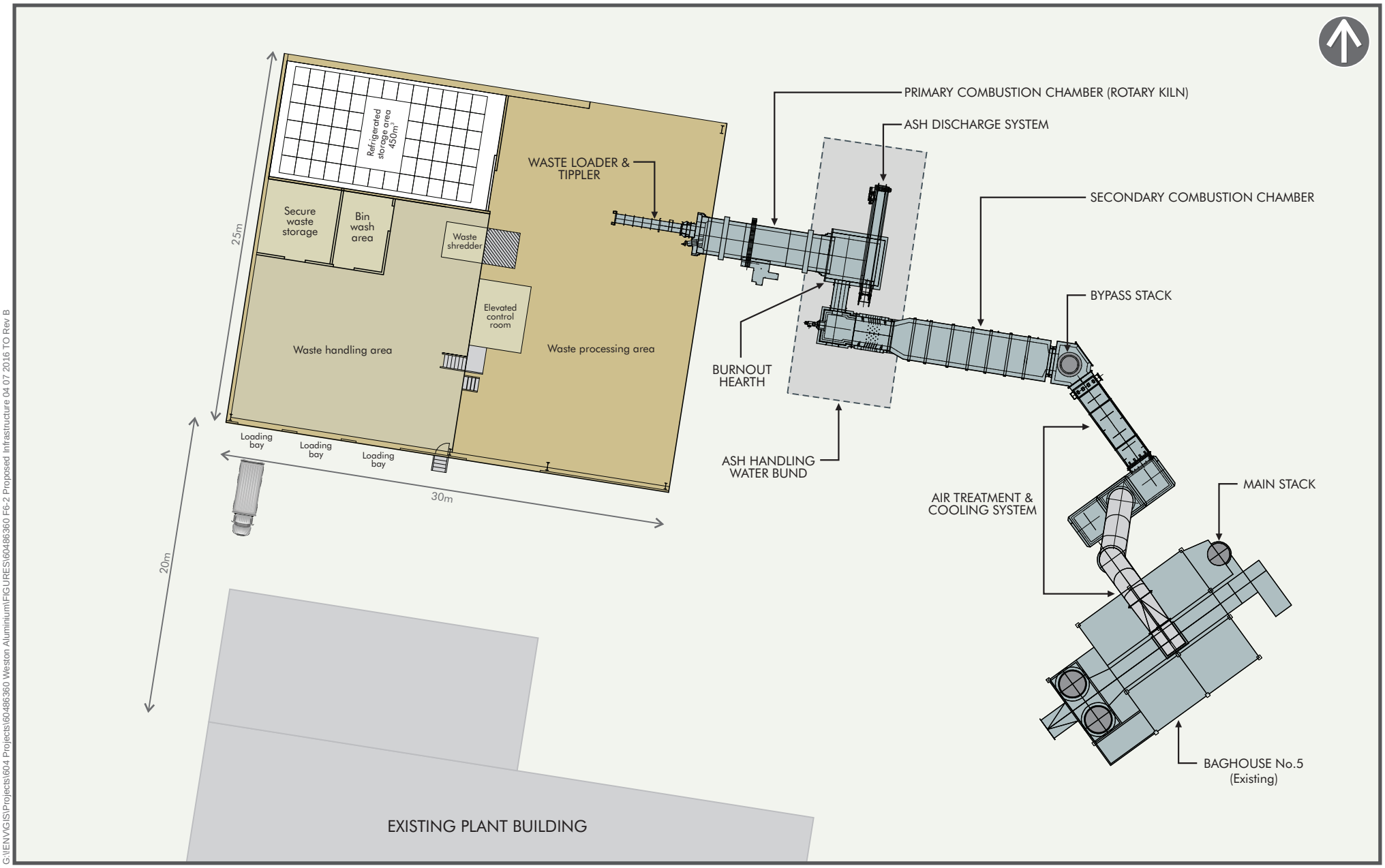
SITE LAYOUT OF PROPOSED PROJECT AREA

Environmental Impact Statement
Weston Aluminium Recycling Facility

FIGURE 6-1



G:\ENVGIS\Projects\604 Projects\60486360 Weston Aluminium\FIGURES\60486360 F6-2 Proposed Infrastructure 04 07 2016 TO Rev B

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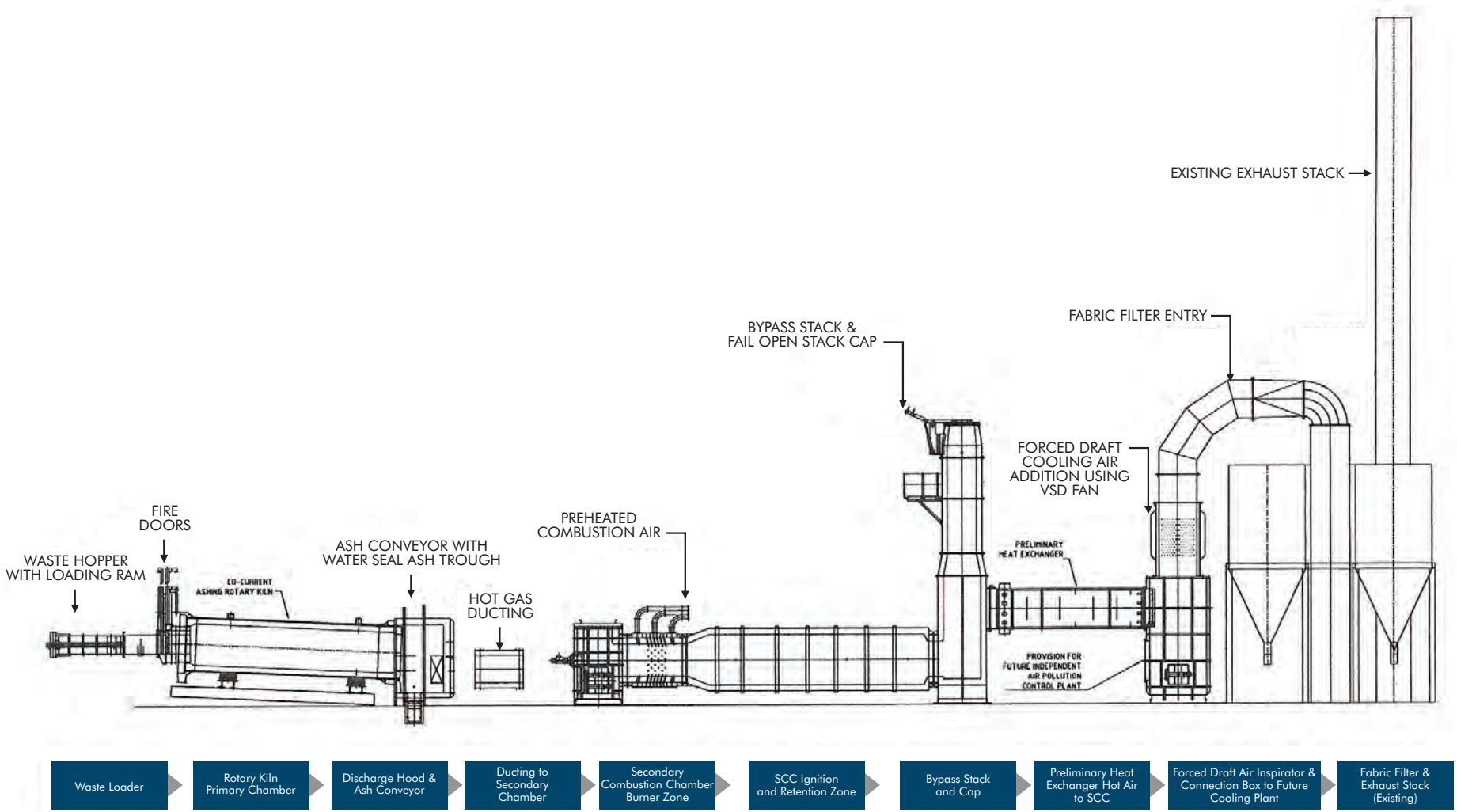
PROPOSED THERMAL PROCESSING SHED INTERNAL LAYOUT

Environmental Impact Statement
Weston Aluminium Recycling Facility

FIGURE 6-2



Source: Advanced Combustion Engineering Pty Ltd (Feb, 2015)

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PROPOSED THERMAL PROCESSING FLOW SCHEMATIC

Environmental Impact Statement
Weston Aluminium Recycling Facility

FIGURE 6-3

7.0 Statutory Controls and Approvals

This **Section 7.0** presents the assessment and approval framework for the Project.

7.1 Commonwealth Matters

7.1.1 Environment Protection and Biodiversity Conservation Act 1999

Actions that may significantly affect matters of National Environmental Significance (NES) require assessment and/or approval from the Commonwealth Department of the Environment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The EPBC Act lists nine matters of NES that must be addressed when assessing the environmental impacts of a proposal. Actions likely to impact on matters of NES require approval from the Commonwealth Minister under Part 6 of the EPBC Act.

A Protected Matters Search of NES Matters within a 10 km radius of the Project Area was undertaken on 14 August 2015 to determine what NES features may be present. The results of the search are contained in **Appendix D** and summarised in **Table 7-1**.

Table 7-1 Consideration of Matters of National Environmental Significance

***Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**	
NES Matters	**Comment**
Australia's World Heritage properties	There are no World Heritage properties within 10 km of the Project Area.
National Heritage Places	There are no National Heritage Places within 10 km of the Project Area.
Ramsar wetlands of international importance	No Ramsar wetlands are located within 10 km of the Project Area. The nearest Ramsar wetlands are in the Hunter River National Park located around 20 km to the southeast of the Project Area.
Nationally threatened species and ecological communities	It is unlikely that there would be any impact on Commonwealth-listed threatened species or ecological communities.
Migratory species listed under the EPBC Act	It is unlikely that there would be any impact on Commonwealth listed migratory species or migratory species protected under international agreements.
Commonwealth marine areas	The Project is not located within or adjacent to a Commonwealth marine area. There would be no direct or indirect impact upon a Commonwealth marine area.
Great Barrier Reef Marine Park	The Project is not located within or adjacent to the Great Barrier Reef Marine Park. There would be no direct or indirect impact upon the Great Barrier Reef Marine Park.
Nuclear actions, including uranium mining	The Project would not involve a nuclear action.
Water resources impacted on by a coal seam gas or large coal mining development	The Project would not involve coal seam gas or coal mining.

7.1.2 Quarantine Act 1908

Where it is proposed to process quarantine waste, consideration of the requirements of the *Quarantine Act 1908* (QA Act) are required. The QA Act has been replaced by the *Biosecurity Act 2015* which is set to commence mid-2016. As the Project would require assessment, approval, construction and commissioning activities it is not anticipated to become operational until late 2017 or early 2018. It is therefore considered that the Project would not be operational while the QA Act is in force.

7.1.3 Biosecurity Act 2015

The Biosecurity Act 2015 commenced on 16 June 2016, 12 months after its royal assent and will replace the *Quarantine Act 1908* upon its commencement. Just as with the Quarantine Act, the Biosecurity Act will be co-administered by the Ministers responsible for Agriculture and Water Resources and Health.

The Biosecurity Act will put in place requirements for the management of materials and facilities which are exposed to, or manage quarantined materials or materials or items which may pose a quarantine risk to Australia. WA has already held discussions with Department of Agriculture and Water Resources (Cth) regarding the Project and have provided them the opportunity to inspect the facility. WA understands the management, administration, plant and equipment requirements of the D Department of Agriculture and Water Resources (Cth)

Prior to accepting or processing any quarantined material at the Project Area, WA would further consult with the Department of Agriculture and Water Resources (Cth) as necessary prior to the acceptance or processing of any quarantine waste. In addition as part of process management, WA would ensure that it is only accepting quarantine wastes from persons approved to manage such waste under this Act.

7.1.4 National Waste Policy

The National Waste Policy was agreed to by all Australian environment ministers in November 2009 to provide a nationally consistent approach to environmentally responsible waste management across Australia. The National Waste Policy provides direction for the management of waste to allow Australia to meet its obligations under international agreements. The National Waste Policy provide a strategic Commonwealth level of direction for the management of waste and in turn drives further State and Territory specific waste strategies such as the NSW WARR Strategy as discussed further in **Section 7.2.13**.

7.2 State Matters

7.2.1 Environmental Planning and Assessment Act 1979

The overarching environmental planning approval framework in NSW is provided by the EP&A Act. Supporting this primary piece of legislation is the EP&A Regulation and environmental planning instruments, including State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs). A development may be declared to be SSD under Division 4.1 of the EP&A Act, if it is declared to be SSD under any State Environmental Planning Policy (SEPP).

The Project meets the requirements for SSD set out in Schedule 1, Clause 23(4) of *State Environmental Planning Policy – State and Regional Development* (SRD SEPP) being development for the purpose of waste management which proposes the thermal treatment of more than 1,000 tonnes of waste per year. The Project is declared to be SSD for the purposes of the EP&A Act and the Minister for Planning is the approval authority.

The Project would be subject to an assessment by the Minister for Planning (or delegate) under Division 4.1, Part 4 of the EP&A Act. This EIS is required to support the application for development consent and addresses the SEARs for SSD in relation to the Project which were issued on 16 December 2015 under section 78A(8A) of the EP&A Act.

7.2.2 Protection of the Environment Operations Act 1997

POEO Waste Classifications

The Project would allow WA to thermally treat various types of wastes. This may include those wastes meeting the following definitions under the POEO Act:

- Clinical and related waste, which means:
    - Clinical waste[3] – wastes resulting from medical, nursing, dental, pharmaceutical, skin penetration or other related clinical activity, having potential to cause injury, infection or offence, and including waste containing any of the following:
        - Human tissue (other than hair, teeth and nails);
        - Bulk body fluids or blood;
        - Visibly blood-stained body fluids, materials or equipment;
        - Laboratory specimens or cultures; and
        - Animal tissue, carcases or other wastes from animals used for medical research.

[3] As identified in AS/NZS 3816:1998 Management of clinical and related wastes, some clinical wastes may also meet the definition of Class 6.2 infectious substances under the ADG Code as: substances which are known or are reasonably expected to contain pathogens. Pathogens are defined as micro-organisms (including bacteria, viruses, rickettsiae, parasites, fungi) and other agents such as prions, which can cause disease in humans or animals.

- Cytotoxic waste – those substances contaminated with residues/preparations containing materials that are toxic to cells principally through their action on cell reproduction;
- Pharmaceutical, drug or medicine waste – substances generated by business/commercial purposes, and which are specified in the Poisons List under section 8 of the *Poisons and Therapeutic Goods Act 1966* (NSW Health, 2015); and
- Sharps waste – (unless already treated on the site where generated) is that waste collected from sharps waste containers, and resulting from the use of sharps for:
  - Human health care;
  - Medical research or work on cadavers;
  - Veterinary care or veterinary research; or
  - Skin penetration or the injection of drugs or other substances.

- Hazardous waste – generally meaning those wastes which are Class 1, 2, 4 or 8 of the ADG Code, or which fall under Divisions 4.1, 4.2, 4.3 or 6.1 of the ADG Code, or which are containers having previously contained the same. Coal tar/pitch waste, some lead-acid or nickel-cadmium batteries and lead paint wastes can also constitute hazardous waste; and
- Liquid wastes – having an angle of repose < 5 degrees above the horizontal, becoming free flowing ≤ 60^{o}C or when transported, or not capable of being picked up by a spade or shovel.

It is relevant to note that where WA proposes to allow for the thermal treatment of illicit drugs (where those drugs have been seized by Police NSW or otherwise held by them for evidentiary purposes), those illicit drugs would not meet the definition of clinical and related waste under the POEO Act (as they are not drugs generated for legitimate business or commercial purposes). Limited types of illicit drugs wastes may meet the definition of hazardous wastes under class 6.1 toxic substances or class 6.2 infectious substances of the ADG Code (i.e. as substances liable either to cause death or serious injury or to harm human health if swallowed or inhaled or by skin contact; or, substances known/reasonably expected to contain pathogens). Illicit material would be disposed of via WA's existing development approvals.

Waste Tracking Requirements

Part 3, Division 1 of the Protection of the Environment Operations (Waste) Regulation 2014, sets out the information provision and record keeping requirements for waste facilities scheduled under the POEO Act. These include requirements to record the following information:

- In relation to each delivery of waste or other material received at the facility:
  - Amount of waste delivered, its waste type and stream;
  - Amount of any other material delivered and a description of its nature;
  - Amount of waste delivered which is spoil from dredging;
  - Additional information if the waste is collected as part of a community service or activity, or from a biological outbreak or natural disaster and therefore exempted by the EPA from calculation of waste payable requirements:
    - Date and code/number of EPA approval;
    - Amount of waste; and
    - Particulars of the service, activity, outbreak or disaster.
  - Delivery date and time;
  - Registration number of delivery vehicle;
  - Where waste is transported to the facility from another waste facility:
    - Name, address, code or EPL number of other facility; and
  - Particulars required to be maintained to be able to make any contributions required under section 88 of the POEO Act.

Similar requirements apply where waste is being transported offsite to another waste facility.

Where vehicles enter a waste facility site, the following information must also be retained:

- Date and time vehicle enters and leaves the facility, including purpose of entry; and
- Vehicle registration number and weight.

WA adheres to NSW EPA Waste Tracking requirements applicable to existing operations (e.g. receipt of aluminium dross, SPL and pharmaceutical waste), and therefore has a working knowledge and familiarity with record keeping and document maintenance requirements. In accordance with EPA requirements, WA would retain any waste sampling and classification results that it obtains for the life of the Project.

EPL Licensing

The POEO Act provides the NSW EPA with mechanisms to regulate certain activities (Scheduled Activities) which by their nature have the potential to cause harm to the environment. Schedule 1 of the POEO Act lists these Scheduled Activities. The existing WA operation currently operates in accordance with EPL 6423 for the following Scheduled Activities:

- Metallurgical activities;
- Resource recovery; and
- Waste storage.

In addition to these the Project would introduce a new Scheduled Activity to the WA Site pursuant to Clause 40, Schedule 1 of the POEO Act, being:

- Waste disposal (thermal treatment). This scheduled activity may relate to both the thermal treatment of general wastes, as well as the thermal treatment of hazardous and other wastes. The definition of this scheduled activity is therefore sufficiently broad to encompass the various wastes proposed to be processed at the Project Area.

Subject to the approval of the Project, WA would apply for EPL 6423 to be varied to include the addition of the Waste Disposal (thermal Treatment) Scheduled Activity. This EIS includes a review of the potential impact of the Project on the existing pollution limits set by EPL 6423, in particular limits for air quality pollutants. As detailed in **Section 12.0** the Project has been designed so that only minor changes are required to the emissions limits for Point 13 (Stack 5) would be required by the Project. These changes only relate to the Project with remaining emissions limits continuing to apply to all other existing emissions points.

Under Part 5.7A of the POEO Act, holders of an EPL must prepare and implement a Pollution Incident Response Management Plan (PIRMP). The WA Site's existing PIRMP would be updated to take into account the additional operations at the Project Area.

7.2.3 Waste Avoidance and Resource Recovery Act 2001

The *Waste Avoidance and Resource Recovery Act 2001* (WARR Act) sets out measures to reduce waste generation, identify means to encourage recycling and reuse of waste materials and reduce waste disposal. To achieve this, the WARR Act makes provisions for the integration of waste resource management planning, the delivery of related programs, and identifies aspects of waste management relevant to both industry and the community. The WARR Act also seeks to assist the achievement of the objectives of the POEO Act as they relate to waste management.

Whilst the Project itself would not be a generator of waste but rather be a processer of hazardous and other types of wastes (such as restricted solid wastes, liquid wastes and special wastes), the waste reduction elements of the WARR Act do not necessarily apply. The Project does however assist in NSW meeting certain key objectives of the WARR Strategy. Further detail regarding how the Project assists in meeting the requirements of the WARR Strategy is provided in **Section 7.2.13**.

7.2.4 Water Management Act 2000

The *Water Management Act 2000* sets out the water management principles and water sharing provisions relative to water sources across NSW. Water sources are currently managed in accordance with water sharing plans established under the *Water Management Act 2000* which are being progressively developed and enacted across NSW. Water sharing plans establish annual limits on water extraction, set water allocations through the issuing of water licences and determine trading rules surrounding water licences. The following Water Sharing Plan applies to the Project Area: *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009*.

The Project would not require the taking of surface water from Swamp Creek or any other water sources. Any construction water requirements and all process water requirements during operations would be met by the reticulated water supply system provided by Hunter Water.

The Project would not require the extraction of groundwater for its operation. During construction excavations for footing may be required to depths of approximately 5m. While there is potential for groundwater ingress into excavations no significant dewatering is expected to be required due to the short duration the excavations would be open. Following construction no other groundwater interception would be undertaken. Therefore no approvals are required under the *Water Management Act 2000*.

Given that the Project would not require the taking or extraction of surface water or groundwater, a water balance is not required to be prepared for the Project Area.

7.2.5 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) governs the establishment, preservation and management of national parks, historic sites and certain other areas, and the protection of certain fauna, native plants and Aboriginal cultural heritage relics. Section 86 of the NPW Act identifies offences relating to knowingly harming or desecrating Aboriginal cultural heritage objects. Section 87(1) of the NPW Act requires a permit to be obtained to remove any artefacts, while section 90 of the Act requires consent from the Secretary of OEH to knowingly destroy, deface or damage an Aboriginal cultural heritage place or item.

No artefacts or places of indigenous heritage significance have been identified as being potentially impacted by the Project. Therefore under section 89J of the EP&A Act, an Aboriginal Heritage Impact Permit under section 90 of the NPW Act is not required. Despite this, a range of measures have been recommended to manage impacts to Aboriginal cultural heritage artefacts if uncovered during construction as described in **Section 19.0**.

7.2.6 Heritage Act 1977

The *Heritage Act 1977* aims to protect and conserve non-Aboriginal cultural heritage, including scheduled heritage items, sites and relics. The Heritage Act is administered by the Heritage Council of NSW. The Heritage Act makes provision for a place, building, work, relic, moveable object, precinct, or land to be listed on the State Heritage Register. If an item is the subject of an interim listing, or is listed on the State Heritage Register, a person must obtain approval under section 58 of the Heritage Act for works or activities that may impact on these items.

An assessment was undertaken of the potential for the Project to impact on any listed heritage items in or around the Project area. It found that owing to the lack of listed heritage items in the immediate vicinity of the Project it is unlikely that the Project would have any impacts on any listed heritage item. Despite this a range of measures have been recommended to manage impacts to heritage items if uncovered during construction as described in **Section 19.0**.

7.2.7 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) provides for the conservation of threatened species, populations, and ecological communities of animals and plants. This conservation is achieved, in part, by protecting critical habitat of threatened species, populations and ecological communities, and eliminating or managing certain processes that threaten the survival or evolutionary development of threatened species, populations and ecological communities. The TSC Act also provides a framework to ensure that the impact of any action affecting threatened species is assessed.

An ecological assessment undertaken for the Project concluded that it would be unlikely to cause significant impacts on any listed species, population or ecological community as a result of Project activities. Full consideration of the provisions of the TSC Act in relation to the Project is provided in **Section 18.0**.

7.2.8 Roads Act 1993

One of the key objectives of the *Roads Act 1993* is to regulate the carrying out of various activities on public roads. The Project would not involve any activities that would impact road infrastructure therefore no further approvals under the roads act are required. Further details regarding the transport and traffic impact of the Project are provided in **Section 13.0**.

7.2.9 Dangerous Goods (Road and Rail) Transport Act 2008

Part 2 of the *Dangerous Goods (Road and Rail) Transport Act 2008* sets out the licensing and safety obligations for those transporting dangerous goods by road or rail within NSW. Section 7 of the Act makes it an offence to allow another person to drive a vehicle transporting dangerous goods where that vehicle or person is required by the regulations to be licensed but is in fact unlicensed. Section 8 also makes it an offence to arrange for the

transportation of goods that are too dangerous to be transported on the vehicle proposed to be used for that transport. Section 9 makes it a further offence to be involved in the transport of dangerous goods without ensuring that those goods are transported safely. The supporting Dangerous Goods (Road and Rail Transport) Regulation 2014 gives effect to the ADG Code as if it were legislation. WA would ensure that it and any of its transport contractors comply with the Act, Regulation, and ADG Code when arranging for the transport of any materials covered by the ADG Code (refer to **Section 16.5**).

7.2.10 Work Health and Safety Act 2011

The *Work Health and Safety Act 2011* and the supporting *Work Health and Safety Regulation 2011* (WHS Regulation) set out further requirements for storage and handling of dangerous goods, including licensing and notification requirements with SafeWork NSW. While the Project is unlikely to meet the threshold for immediate major hazard facility classification under the WHS Regulation, WA would nevertheless notify Work Cover NSW where any Schedule 15 chemicals are likely to exceed 10 percent of the threshold quantity. It would also prepare any placards, manifests and emergency plans as required for chemicals exceeding the Schedule 11 placard or manifest quantities, update its onsite dangerous goods register and Safety Data Sheet register, as well as provide updated dangerous goods notifications to SafeWork NSW as required (refer to **Section 16.5**).

7.2.11 Poisons and Therapeutic Goods Act 1966

The *Poisons and Therapeutic Goods Act 1966* and the *supporting Poisons and* Therapeutic Goods Regulation 2008 manage the regulation, control and prohibition of the supply and use of poisons, restricted substances and drugs of addition, as well as some dangerous drugs and therapeutic goods within NSW.

Clause 125 of the Therapeutic Goods Regulation 2008 makes it an offence to destroy drugs of addiction, except under the direct supervision of a police officer, inspector other authorised person or analyst, or other person in charge of a laboratory. Exceptions also apply where persons have been legally supplied such substances.

Clauses 126-128 of the Therapeutic Goods Regulation 2008 set out the requirements for destroying drugs of addiction within public hospitals, private health facilities and nursing homes.

There is a need within NSW to create an additional place for Police NSW and the medical profession to destroy drugs of addiction while meeting these requirements set out in the Therapeutic Goods Regulation 2008. The Project would allow the Project Area to create such a space where Police NSW and others within the medical profession could organise for drugs of addiction to be thermally treated whilst meeting the requirements under clause 125. To this end, thermal treatment of drugs of addiction at the Project Area would only be done with a relevant, authorised person present.

It should be noted that WA have existing approvals in place for the destruction of such materials and have a demonstrated track record in the safe handling and processing of such materials through the site's existing furnaces. These activities are undertaken in cooperation with NSW Police.

7.2.12 State Environmental Planning Policies

State Environmental Planning Policies are all legal documents enacted under Part 3 of the EP&A Act that regulate land use and development.

The following State Environmental Planning Policies enacted under Part 3 of the EP&A Act are considered relevant to the Project:

- *State Environment Planning Policy (State and Regional Development) 2011;*
- *State Environmental Planning Policy No 33—Hazardous and Offensive Development*;
- *State Environmental Planning Policy No. 44 – Koala Habitat Protection*; and
- *State Environmental Planning Policy No. 55 – Remediation of Land*.

State Environmental Planning Policy (State and Regional Development) 2011

SRD SEPP defines development that is considered SSD for the purposes of assessment under Division 4.1, Part 4 of the EP&A Act. Pursuant to clauses 23(4) and (5), Schedule 1 of the SRD SEPP, development for the purposes of:

- Waste incineration that handles more than 1,000 tonnes per year of waste; and
- Hazardous waste facilities that dispose of solid or liquid waste classified in the ADG Code, or medical, cytotoxic or quarantine waste that handles more than 1,000 tonnes per year of waste.

In light of its declaration as SSD, the Project would be subject to assessment and determination by the Minister for Planning and Environment (or delegate) under Division 4.1, Part 4 of the EP&A Act. This EIS supports the application for development consent made by the Proponent, and has been prepared in accordance with Division 4.1, Part 4 of the EP&A Act and the EP&A Regulation, as well as in accordance with the SEARs issued on the 16 December 2015.

State Environmental Planning Policy 33 – Hazardous and Offensive Development

State Environmental Planning Policy No 33 – Hazardous and Offensive Development (SEPP 33) requires a consent authority to consider whether a development may constitute a hazardous or offensive industry as defined by SEPP 33. The instrument dictates that proposed mitigation measures are to be taken into account when determining whether a development is a hazardous or offensive industry, and that the consent authority must have sufficient information to make its determination and impose conditions to minimise impacts. A review was conducted in accordance with *Hazardous and Offensive Development Guidelines: Applying SEPP 33* (DP&E, 2011h) (Applying SEPP), which determined that the Project is classified as potentially hazardous for the purposes of SEPP 33 (refer to **Section 16.4.1**). It is noted that the existing operation is also classified as potentially hazardous. Regardless, a PHA has been prepared for the Project.

The PHA also considered that, while the Project could be considered potentially offensive under SEPP 33, Compliance with DP&E consent conditions and any amendments to EPL 6423 made for the operation of the Project would be sufficient to demonstrate the Project is not an 'offensive industry' as per SEPP 33 (refer to **Section 16.4.1**.

State Environmental Planning Policy 44 – Koala Habitat Protection

State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44) requires a consent authority to consider whether land subject to a development application is classified as potential koala habitat and/ or core koala habitat. Before development consent can be granted on land defined as core koala habitat, a plan of management must be prepared for that land. Schedule 1 of SEPP 44 indicated that the SEPP applies to the Cessnock LGA.

An assessment undertaken to determine the potential of the Project to impact on biodiversity concluded that the Project is unlikely to impact on any koala feed tree species or habitat. No Koala Plan of Management is considered necessary for the Project Area or the Project itself (refer **Section 18.0**).

State Environmental Planning Policy 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) requires a consent authority, when assessing and determining a development application, to consider whether the land subject to the development is contaminated and if so, whether the land requires remediation before the intended land use can proceed.

A Phase 1 contamination assessment was undertaken for the Project Area with a focus on the immediate area of disturbance generated by the Project. It concluded that there are no known major contaminated sites in the vicinity of the Project Area and contaminated land is not expected to be a significant constraint. However, in order to meet the requirements of SEPP 55, the EIS has considered the potential for contaminated land to be encountered based on historical land use and appropriate mitigation measures have been identified where required (refer to **Section 16.0**).

7.2.13 Strategic Policy Initiatives

NSW 2021: A Plan to make NSW Number One

NSW 2021: A Plan to make NSW Number One (The Plan) was prepared by the NSW Government in 2011 to provide a 10 year plan including goals and targets aimed at improving the competitiveness of the NSW economy and community. The Plan replaced the document known as the State Plan.

The Plan has at its core 32 goals which fall under the five primary strategies of:

- Rebuilding the economy;
- Providing quality services to NSW;
- Renovating infrastructure;
- Strengthening local environments and communities; and
- Restoring accountability to government.

Under each of which there are several targets which are aimed at meeting respective strategies. The Project provides support, particularly for the primary strategy of rebuilding the economy. In particular, the Project would contribute toward the following goals relevant to 'rebuilding NSW's economy':

- Drive economic growth in regional NSW (Goal 3), by investing in the flexibility and resilience of an existing industrial facility in a regional area;
- Increase the competitiveness of doing business in NSW (Goal 4), by equipping a facility to process hazardous and other types of wastes that would otherwise be required to be transported a significant distance (i.e. to Sydney, or elsewhere within Victoria or Queensland); and
- Strengthen the NSW skill base (Goal 6), by assisting to secure employment for workers previously engaged in secondary aluminium processing at the WA Site, and providing those workers with an additional set of skills.

NSW Waste Avoidance and Resource Recovery Strategy

As part of the priorities set by the NSW Government in *NSW 2012: A Plan to Make NSW Number One*, sets strategic goals for the state of NSW. In regards to waste management the WARR Strategy builds on the State Plan goals to provide specific objectives in regards to waste. The WARR Strategy is based on long-term targets across the six objective areas as detailed in **Table 7-2**.

Table 7-2 NSW Waste Avoidance and Resource Recovery Strategy Objectives and Targets

Objectives	Target
Avoid and reduce waste generation	By 2021–22, reduce the rate of waste generation per capital.
Increase recycling	By 2021–22, increase recycling rates for: - Municipal solid waste from 52% (in 2010–11) to 70%. - Commercial and industrial waste from 57% (in 2010–11) to 70%. - Construction and demolition waste from 75% (in 2010–11) to 80%.
Divert more waste from landfill	By 2021–22, increase the waste diverted from landfill from 63% (in 2010–11) to 75%.
Manage problem wastes better	By 2021–22, establish or upgrade 86 drop-off facilities or services for managing household problem wastes State-wide.
Reduce litter	By 2016–17, reduce the number of litter items by 40% compared with 2011–12 levels and then continue to reduce litter items to 2021–22.
Reduce illegal dumping	From 2013–14, implement the NSW Illegal Dumping Strategy 2014–16 to reduce the incidence of illegal dumping State-wide. As part of this strategy, by 2016–17: - Reduce the incidence of illegal dumping in Sydney and the Illawarra, Hunter and Central Coast regions by 30% compared with 2010–11. - Establish baseline data to allow target-setting in other parts of the State.

These key result areas are largely driven by the implementation of the waste hierarchy which identifies the preferential order of waste treatment and management options available. The waste hierarchy in the WARR Strategy is illustrated in **Plate 1**.

Plate 1 Waste Hierarchy

In relation to the types of waste that the Project proposes to treat (e.g. medical wastes, illicit drugs, quarantine waste) there are no viable options for their reuse, recycling or for resources recovery from these wastes. Due to their nature they require destruction in order to remove the hazard they potential pose to the environment and community.

Section 3 of the WARR Strategy recognises that certain wastes require disposal or destruction in order to minimise their potential environmental or health impacts. Key Result area 4 of the WARR Strategy points to the management of hazardous and other types of wastes which are labelled as such due to their potential to harm human and environmental health. Key result area 4 of the WARR Strategy encourages stewardship of waste by the industries that generate it to ensure it is appropriately managed.

The Project represents a key component of the approximate management of potentially hazardous and other types of wastes which cannot otherwise be avoided, reused or recycled. WA is working closely with the government and industry generators of waste that the Project would process and in doing so supports the aim and objectives of the WARR strategy by appropriately disposing of waste which has the potential to cause human health and environmental harm.

Lower Hunter Regional Strategy 2006

The Lower Hunter Regional Strategy 2006 (LHRS) provides the long term strategic direction for the future growth and development of the Lower Hunter Region. The LHRS aims to ensure that there is adequate land supply for the anticipated demands for residential and employment land uses within the Lower Hunter across the life of the strategy. The LHRS also aims to make adequate allowances for conservation of natural systems as well as identify infrastructure and services requirements necessary to achieve intended outcomes.

The Project would be consistent with the aims and objectives of the LHRS as it would utilise existing zoned industrial land and would not conflict with any existing residential or identified future residential growth areas.

Draft Hunter Regional Plan

The Draft Hunter Regional Plan was recently released by DP&E for public comment. The Draft Hunter Regional Plan would be the successor to the LHRS when it comes into operation. Key differences between the Draft Hunter Regional Plan and the LHRS are the inclusion of a single strategic planning document which encompasses both the lower and upper Hunter. The Draft Hunter Regional Plan also introduces the concept of the Hunter City which incorporates the greater Newcastle, Lake Macquarie, Maitland and Raymond Terrace urban areas. The subject Project Area is not located in the proposed Hunter City metropolitan area.

The Project represents an industrial development on a site within an existing industrially zoned area and in associated with an existing industrial operation. The Project is therefore considered consistent with the Draft Hunter Regional Plan.

A companion plan to the Draft Hunter Regional Plan is the Draft Plan for Growing Hunter City. The area boundaries to which this document relates does not currently include the WA Site. Therefore no further consideration of the Draft Plan for Growing Hunter City is considered necessary.

7.3 Local Matters

While it is noted that under the SSD provisions of the EP&A Act, LEPs and Development Control Plans do not apply, local statutory and strategic environmental plans are considered below as they may otherwise be applicable to the Project.

7.3.1 Cessnock Local Environmental Plan 2011

The *Cessnock Local Environmental Plan 2011* (LEP 2011) applies to the Cessnock LGA. Under LEP 2011, the Project Area is on land zoned as IN3 Heavy Industrial. Development for the purpose of a waste management facility is permissible with consent in the IN3 Heavy Industrial zone.

7.3.2 Cessnock City Wide Settlement Strategy 2010

The *Cessnock City Wider Settlement Strategy 2010* (CWSS) identifies how growth and change are anticipated to occur within the Cessnock LGA. The CWSS also provides land use planning objectives and strategies to guide this growth and change and recognises the infrastructure required to meet those demands.

Section 3, Part 10 of the CWSS relates to the provision of employment lands and recognises the need to provide employment lands which are not constrained by their proximity to incompatible land uses. Figure 10.2 of the CWSS identifies land in the vicinity of Kurri Kurri and Weston that is currently zoned and deemed suitable for further industrial development including the Project Area.

In additional to land allocations for industrial development the CWSS also recognises the role the Hunter Expressway will have in continuing to improve access to zoned industrial land in the Cessnock LGA. The Project would capitalise on its proximity to the Hunter Expressway and thereby minimise traffic movement on local roads.

The Project is considered consistent with the aims and objectives of the CWSS given its proposed use of land zoned for heavy industrial purposes which is offset from residentially areas and with access to key transport routes.

7.4 Licencing and Other NSW Environmental Approvals

Under sections 89J and 89K of the EP&A Act, other NSW environmental approvals:

- Would not be required for the Project (section 89J); or
- Would be required to be issued consistent with the development consent for the Project (section 89K).

Each of these separate approvals is considered in **Table 7-3**. Other environmental approvals may be required in addition to those referred to under section 89J and 89K of the EP&A Act. These would be considered and outlined where relevant in the assessment of the Project in **Part F** of this EIS.

Environmental approvals that do not apply to, or in respect of SSD but which have been considered in the preparation of this EIS are in **Table 7-3**.

Table 7-3 Relevant Approvals not Required under Section 89J

Approval	Comment
Concurrence under Part 3 of the *Coastal Protection Act 1979*	The Project is not located within the coastal zone and therefore concurrence under Part 3 of the *Coastal Protection Act 1979* is not a relevant consideration for the Project.
A permit under section 201of the *Fisheries Management Act 1994*	The Project would not involve dredging or reclamation works.
A permit under section 205 of the *Fisheries Management Act 1994*	The Project would not harm marine vegetation and as such, a permit under section 201 of the *Fisheries Management Act 1994* would not be required.
A permit under section 219 of the *Fisheries Management Act 1994*	The Project is unlikely to result in the blockage of fish passage.
An approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977*	No impacts are expected to occur to any listed heritage item as a result of the Project.

Approval	Comment
An Aboriginal heritage impact permit under section 90 of the *National Parks and Wildlife Act 1974*	No impacts to Aboriginal cultural heritage items are expected to occur as a result of the Project. Therefore no section 90 permit is required.
An authorisation referred to in section 12 of the *Native Vegetation Act 2003* (or under any Act repealed by that Act) to clear native vegetation or State protected land	Pursuant to Schedule 1 of the *Native Vegetation Act 2003*, this legislation does not apply in the IN3 Heavy Industrial Zone.
A bushfire safety authority under section 100B of the *Rural Fires Act 1997*	Although the Project is located adjacent to bushfire prone vegetation and is in a bushfire buffer area, it does not constitute a development that requires a bushfire safety authority.
A water use approval (section 89), a water management work approval (section 90) or an activity approval (other than an aquifer interference approval) (section 91) of the *Water Management Act 2000*	The Project would not require a water use approval or activity approval. The Project Area falls under the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009*. Therefore, the provisions of the Water Act 1912 do not apply to the Project Area. Section 91A of the *Water Management Act 2000* provides that it is an offence to use water from a water source governed by the *Water Management Act 2000* without holding a relevant water use approval. In the event that proposed construction works would intercept groundwater, WA would liaise with NOW regarding the issue of an aquifer interference approval, as well as any shares which may be required under the *Hunter Unregulated and Alluvial Water Sources 2009* to dewater any groundwater that is intercepted.

Table 7-4 discusses each of the approvals required under section 89K of the EP&A Act and its applicability to the Project.

Table 7-4 Approvals Required to be Issued Consistently under Section 89K

Approval	Comment
An aquaculture permit under section 144 of the *Fisheries Management Act 1994*	The Project would not involve aquaculture therefore no aquaculture permit would be required.
An approval under section 15 of the *Mine Subsidence Compensation Act 1961*	The Project is not located within a mine subsidence district.
A mining lease under the *Mining Act 1992*	The Project does not involve mining.
A production lease under the *Petroleum (Onshore) Act 1991*	The Project would not involve petroleum production.
An EPL under Chapter 3 of the *Protection of the Environment Operations Act 1997* (for any of the purposes referred to in section 43 of that Act)	Waste disposal through thermal treatment is a scheduled activity under clause 40, Schedule 1 of the *POEO Act 1997.* WA's existing operation comprises activities that are defined as scheduled activities including metallurgical activities, resource recovery and waste storage. It is envisaged that WA's existing EPL 6423 would be varied to include the new scheduled activities for the thermal disposal of waste.

Approval	Comment
Consent under section 138 of the *Roads Act 1993*	The Project would continue to be accessed from Mitchell Avenue. The Project would not require works in on or over a public road, nor would it require connection of a private road to a classified road.
A licence under the *Pipelines Act 1967*	The Project would not involve the operation of a pipeline that would require a licence under the *Pipelines Act 1967.*

8.0 Environmental Framework

8.1 Environmental Policy Statement

WA operates in accordance with the corporate vision and mission statements:

> *"To be the most innovative Industrial Ecology-Focussed product & services Company in the world"*
>
> *"To provide innovative customer solutions via effective resource recovery, delivering results in a sustainable and profitable manner"*

Part of WA's operational values is the continuous application of technological improvements to minimise environmental emissions and impacts. These values feed into the Environmental Management System (EMS) under which the WA Site operates and which would be extended to the Project Area.

8.2 Environmental Management

8.2.1 Existing Environmental Management System

In accordance with previous conditions of Development Consent, an EMS was developed for the existing WA Site consistent with the *Joint Australia – New Zealand Standard AS/NZ 14000- 14012*. The EMS provides WA with a formal framework for systematically identifying and managing environmental aspects and impacts. The EMS is regularly reviewed and contains:

- An Environmental Policy;
- A register of aspects and impacts;
- A register of environmental legislation and standards which apply to the Plant;
- Objectives and targets;
- Environmental program;
- Training, awareness and competence;
- Communication;
- EMS documentation;
- Document control;
- Operational control;
- Emergency procedures and response;
- Monitoring and measurement;
- Non-conformance and corrective and preventive actions;
- Records;
- EMS Audit; and
- Management Review.

A key component of the EMS is the OEMP under which the WA Site currently operates (refer to **Section 6.4.14**). The OEMP provide specific objectives, management measures and implementation details to minimise the environmental impacts of the Project.

8.2.2 Project Environmental Management System

The EMS would continue to govern environmental management for the duration of the Project. Existing plans and procedures would be updated to reflect the Project and include the recommended management, mitigation and monitoring measures based on the outcomes of the environmental assessment (refer to **Part F**).

All new or amended management plans required as a result of the Project would be prepared in consultation with the relevant agencies and copies provided to DP&E for consideration.

8.2.3 Construction Environmental Management Plan

As part of the construction of the Project, a CEMP would be prepared to manage the potential environmental impacts resulting from construction activities. The CEMP would be prepared in consultation with DP&E prior to the commencement of construction.

The environmental assessment provided in **Part F** of this EIS assesses potential environmental impacts arising from the Project and recommends measures to manage these impacts to acceptable levels. The Proponent is committed to the preparation of a CEMP which would include the relevant management measures as described in **Part F**.

8.3 Approvals and Licences

Current operations at the WA Site are undertaken in accordance with:

- EPL 6423;
- Ministerial Consent DA-86-04-01;
- Land and Environment Court Development Consent DA10397 1995;
- Trade Waste Agreement with Hunter Water; and
- Notification to SafeWork NSW of dangerous goods storage at the WA Site (and possible further notification to SafeWork NSW for any WHS Regulation Schedule 15 chemicals that are likely to exceed 10 percent of the threshold quantity).

The Project would involve the issuing of a new consent under the EP&A Act (in relation to application SSD 15_7396), and as such, no amendments are being sought to DA-86-04-01 and DA10397 1995 as part of this application.

However applications would be made to vary or modify EPL 6423, as well as the Trade Waste Agreement if required, to accommodate the Project. Updated notifications would also be provided to SafeWork NSW in relation to changed dangerous goods storage. No Project elements would proceed until such time as approvals for the modified licences are received.

Part E – Issues Identification

This part addresses the issues raised both during the Government agency and community consultation and provides a ranking of the issues highlighting the key issues for the Project. The approach considered the significance of a particular attribute and the potential for adverse environmental impact. It followed that the more significant the issue, the higher the degree of analysis involved.

9.0 Stakeholder Engagement

9.1 Secretary's Environmental Assessment Requirements

This EIS has been prepared in accordance with Division 4.1, Part 4 of the EP&A Act and the EP&A Regulation. Part 4 ensures that the potential environmental effect of a project is properly assessed and considered in the decision making process. In preparing this EIS, the requirements of the Secretary of the NSW DP&E were sought as required by section 89G(b) of the EP&A Act. A Scoping Report (Airlabs Environmental, 2015) was prepared and supplied to DP&E for the purposes of preparing the SEARs.

Following review of the Scoping Report, DP&E compiled the SEARs for the Project. The key matters raised by the Secretary to be considered in the EIS are outlined in **Table 9-1**, together with the relevant section of the EIS which addresses that matter.

Table 9-1 Director-General's Requirements for the EIS issued 3 March 2014

Description	Reference in EIS
General	
The Environmental Impact Statement (EIS) for the development must meet the form and content requirements in Clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.	Certification page, as well as this EIS in its entirety
In addition, the EIS must include a: - detailed description of the development, including: • need for the proposed development; • justification for the proposed development; • likely staging of the development – including construction and operational stages; • likely interactions between the development and existing, approved and proposed operations at and in the vicinity of the site; and • plans of any proposed building works.	 **Section 6.0** **Section 4.0** **Section 26.0** **Sections 6.3** and **6.4** **Section 22.0** **Appendix B**
- Demonstrate that the site is suitable for the proposed use in accordance with *State Environmental Planning Policy No 55 – Remediation of Land.* - consideration of all relevant environmental planning instruments including identification and justification of any inconsistencies with these instruments; - consideration of issues discussed in Attachment 2 (public authority responses to key issues); - risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment.	**Sections 7.2.12** **Section 7.2.12** **Section 9.2** **Section 10.0**
- detailed assessment of the key issues specified below, and any other significant issues identified in the risk assessment, including: • a description of the existing environment, using sufficient baseline data; • an assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes; and • a description of the measures that would be implemented to avoid, minimise and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/or contingency plans to manage any significant risks to the environment.	 **Sections 11.3** to **20.3** and **Section 21.0** **Sections 11.0** to **21.0** and **Section 21.0** **Sections 11.5** to **20.5,** and **Section 25.0**
- consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS.	**Section 25.0**

Description	Reference in EIS
The EIS must be accompanied by a report from a qualified quantity surveyor providing: - a detailed calculation of the capital investment value (as defined in Clause 3 of the Environmental Planning and Assessment Regulation 2000) of the proposal, including details of all the assumptions and components from which the capital investment value calculation is derived; - a close estimate of the jobs that would be created during the construction and operational phases of the development; and - certification that the information provided is accurate at the date of preparation.	**Appendix C** **Section 21.2**
Waste Management	
- a description of the waste streams that would be accepted at the site including the maximum daily, weekly and annual throughputs and the maximum size for stockpiles; - a description of waste processing operations, including a description of the technology to be installed, resource outputs and the quality control measures that would be implemented; - details of how waste would be stored and handled on site, and transported to and from site including details of how the receipt of non-conforming waste would be dealt with; and - the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the *NSW Waste Avoidance and Resource Recovery Strategy 2014 – 2021.*	**Sections 6.0** and **11.0**
Key Issues - Air Quality	
- a quantitative assessment of potential air quality, dust and odour impacts of the development in accordance with relevant EPA guidelines; - the details of buildings and air handling systems and strong justification for any material handling, processing or stockpiling external to a building; - a greenhouse gas assessment; and - details of proposed mitigation, management and monitoring measures.	**Section 12.0**
Traffic and Transport	
- details of all traffic types and volumes likely to be generated during construction and operation, including a description of haul routes; - as assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts at key intersections using SIDRA or similar traffic model; - details plans of the proposed layout of the internal road network and parking onsite in accordance with the relevant Australian Standards; and - plans of any proposed road upgrades, infrastructure works or new roads required for the development.	**Sections 13.0**
Noise and Vibration	
- a quantitative assessment of potential construction, operational and transport noise and vibration impacts in accordance with relevant EPA guidelines; and - details and justification of the proposed noise mitigation and monitoring measures.	**Sections 14.0**
Soil and Water	
- a quantitative assessment of existing flooding on the site, potential impacts to and as a result of the development and proposed mitigation measures; - an investigation to identify any soil or water contamination on the site and proposed management measures; - a description of water and soil resources, topography, hydrology water courses and riparian lands on or nearby the site; - a detailed site water balance, including identification of water requirements for the life of the project, measures that would be implemented to ensure an adequate and secure water supply is available for the proposal and a detailed	**Sections 15.0**

Description	Reference in EIS
description of the measures to minimise the water use at the site; - details of stormwater/wastewater/leachate/flooding management systems including the capacity of onsite detention system, and measures to treat, reuse or dispose or water; - a description of erosion and sediment controls; - an assessment of potential impacts to soil and water resources topography, drainage lines, watercourses and riparian lands on or nearby to the site; and - consideration of salinity and acid sulfate soils impacts.	
Hazards	
- A preliminary risk screening undertaken in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33) and *Applying SEPP 33* (DP&E, 2011) including consideration of likelihood and consequences of exposure of the facility to flood events and if necessary a Preliminary Hazard Analysis (PHA).	**Section 16.0**
Human Health	
- A human health risk assessment that considers the potential adverse effects from human exposure to project related environmental hazards including noise, air quality and contamination of drinking water conducted in accordance with the enHealth *Environmental Health Risk Assessment: Guidelines for assessing human health risk from environmental hazards (2012).*	**Section 17.0**
Biodiversity	
- An assessment of the proposal under the Framework for Biodiversity Assessment (Oct 2014) if necessary and an assessment of any potential impacts on riparian vegetation and any groundwater dependent ecosystems.	**Section 18.0**
Heritage	
- Including an assessment of Aboriginal cultural heritage.	**Section 19.0**
Visual	
- Including an assessment of the potential visual impacts of the project on the amenity of the surrounding area.	**Section 20.0**
Plans and Documents	
The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Environmental Planning and Assessment Regulation 2000. These documents should be included as part of the EIS rather than as separate documents.	Throughout EIS and Technical Papers in Appendices
Consultation	
During the preparation of the EIS, you must consult with relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with the: - Cessnock City Council; - Environment Protection Authority; - Office of Environment and Heritage; - Hunter New England Local Health District; - Department of Primary Industries; - NSW Roads and Maritime Service; and - Surrounding land owners and occupiers that may be affected by the proposal. The EIS must describe the consultation process and the issues raised and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.	**Section 9.0**

Description	Reference in EIS
Further Consultation	
If you do not lodge a DA and an EIS for the development within 2 years of the issue date of these SEARs, you must consult further with the Secretary in relation to the requirements for lodgement.	Noted
References	
The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, Attachment 1 contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this development.	**Part J**, **Sections 11.0** to **20.0**

9.2 Agency Consultation

In order to determine key agency requirements to be addressed in this EIS beyond those identified in the SEARs, and to make sure a wider range of agencies provided input into the EIS, consultation letters were issued to the agencies listed in **Table 9-2**. The correspondence provided further detail regarding the Project and sought feedback regarding matters to be addressed in the EIS and provided the opportunity for further discussion or briefings to be provided. A summary of the outcomes of this agency consultation is provided in **Table 9-2** along with the sections of the EIS which address matters raised by the agencies.

Table 9-2 Agency Consultation

Comment / Matter Raised	Response
Cessnock City Council	
No response received.	NA. Note that CCC officers attended the information session as detailed in **Section 9.3**.
Environment Protection Authority	
The EPA was consulted by letter. The EPA indicated that they had already provided input into the Project SEARs through the DP&E and had no further comments to provide to that time.	Noted. SEAR's addressed in this EIS.
Office of Environment and Heritage	
No response received.	NA
Hunter New England Local Health District	
No response received.	NA
Department of Primary Industries	
No response received.	NA
NSW Roads and Maritime Service	
No response received.	NA

9.2.1 Environment Protection Authority

In addition to having been consulted as detailed in **Table 9-2**, the EPA were presented with an addition Project briefing and updated regarding the potential environmental impacts of the Project on 3 August 2016. Key discussion point of this meeting related to the findings of this EIS and the resulting need to amend WA's existing EPL. No new issues or matter where raised at this meeting that required additional environmental impact assessment to take place. Detail of the proposed amendments to WA's EPL are provided in **Section 7.2.2**.

9.3 Community and Council Consultation Session

WA undertook a community consultation session on 5 August 2016 with key community group members and officers from the planning and environment departments within Cessnock City Council. This consultation involved providing a Project briefing, opportunity for questions and platform for the community to raise issues that they consider important to the community or that require addressing in the EIS. The consultation session was attended by:

- 2 local residents;
- 2 representatives from Kurri Kurri Landcare.
- 6 officers from Cessnock City Council;
    - 3 environmental officers; and
    - 3 development / planning officers.
- 3 representatives from the Kurri Kurri / Hunter business enterprise centre;
- 1 representative form AECOM; and
- 5 representatives from Weston Aluminium.

A summary of the matters raised by the community during the consultation activities, and feedback regarding where these maters have been addressed in this EIS are detailed in **Table 9-3**.

Table 9-3 Consultation Sessions – Matters Raised

Comment / Matter Raised	Response
Community member raised concerns about increased heavy traffic travelling along Government Rd and First St Weston at very early morning hours (~4 am) and asked what effect this proposal could have on this.	WA representative responded by reiterating WA's weighbridge hours are 7 am to 3 pm and suppliers are given strict instructions for their trucks to not arrive outside those hours and to use the Hunter Expressway in all instances. WA encouraged the community to take license plate details or, if possible, photos of the offending trucks so WA can check against weighbridge records to ensure the traffic is not WA related.
Community member asked what would be the range of fine particulate dispersion resulting from the Project. Raised concerns about a recent increase in black particulate residue found on neighbours roofs.	Reference was made to the Project AQIA which indicate that modelling shows that particular generation from the Project would be negligible. Refer **Section 12.0**.
Community member asked if there were plans to use the rotary kiln for processing dross or other materials.	WA representative indicated that the Rotary Kiln is designed primarily for thermal destruction and there are no plans to process dross or scrap in the medical waste processing facility.
Community member asked what effect increasing gas prices would have on the Project.	WA stated that gas usage is not very high due to the calorific value of the waste being processed. WA is also considering using alternative fuels such as waste oil to limit risk of rising gas prices.
Community member raised concerns with observed emissions from plant on five occasions so far this year and what appeared to be a 'solid waste' residue on the plant roof.	WA indicated that measurements showed ongoing compliance with their environmental emission limits. WA indicated the emissions were likely steam coming from the puck casting cooling area and the discolouration of the roof was due to rust from the same puck cooling steam that condenses on the roof. WA informed the session that roof replacement is an ongoing process for this reason. WA indicated that all stakeholders are welcome to arrange a time with WA for a site visit to alleviate any concerns they may have with the site.

Comment / Matter Raised	Response
Community member asked what measures have been taken for illicit drug storage onsite.	WA indicated that all illicit drug processing occurs as soon it is received under the direct supervision of NSW Police and thus is never stored on the WA site.
Council officer asked if there was any intention to recover waste heat from the process.	WA indicated that the use of a continuous process allowed the potential viability of a waste heat recovery and is being investigated.
Council officer asked where the waste would be sourced from.	WA stated that the majority of the waste would be coming from the Newcastle and Sydney metropolitan areas.
Community member enquired about the processing of 1st cut SPL and the potential for WA to increase its SPL processing capacity as a result of the proposal. Community member expressed concern with levels of Fluoride being emitted from WA stacks being toxic.	This Project does not propose to alter the SPL processing arrangements at WA and this is therefore considered out of scope for this Project. Regardless WA informed the session that WA has been processing a 'Mixed SPL' product for the past 12 months as part of a trial phase which has complied with all environmental limits.

9.4 EIS Exhibition and Opportunity for Public Input

The EIS for the Project would be on exhibition for a period of not less than 30 days in accordance with the requirements of section 89F of the EP&A Act to enable community comment on the Project. Consultation with the community would be ongoing during this period.

Submissions in relation to the Project can be made online via the DP&E Project webpage: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=7396 or by mail addressed to:

Secretary-General
Department of Environment and Planning
GPO Box 39
Sydney NSW 2001

and referencing the Project Application Number: SSD 7396.

10.0 Identification and Prioritisation of Issues

10.1 Introduction

This chapter identifies the key environmental and social issues associated with the Project and applies a risk screening matrix to rank issues in terms of their relevance and importance to the assessment of the potential impacts of the Project. The results of the risk screening exercise are reflected in the level of assessment of each of the key issues within this EIS.

10.2 Approach to Identification of Key Environmental Issues

An initial screening of potential issues for consideration in the EIS was undertaken as part of the *Request for Secretary's Environmental Assessment Requirements (SEARs): Proposal to Install Medical and Other Waste Processing Equipment at Weston Aluminium, Kurri Kurri Facility, NSW* (Airlabs Environmental, 2015). The initial screening process has been re-evaluated in this EIS to include additional information that has been received regarding the key environmental and social issues associated with the Project.

The risk screening process has determined the likely level of assessment required to adequately and appropriately address each issue identified. The risk screening considered the significance of each potential environmental impact (through a preliminary environmental risk screening), and also the likely level of stakeholder interest in each issue. Including stakeholder perception of potential environmental impacts is an important part of determining the level of assessment that should be applied, given that key stakeholder concerns may not necessarily align with a purely technical analysis of environmental risks.

The overall assessment of significance was determined by selecting the highest result from both the environmental assessment screening process and the expected stakeholder interest. The overall environmental assessment score enabled the determination of the sensitivity of each issue for the Project, and whether a detailed specialist investigation or desktop analysis would be appropriate. Where a high level of stakeholder interest is expected, a potential environmental impact has been determined to be a key issue requiring a detailed assessment irrespective of the outcomes of environmental risk screening.

10.2.1 Risk Screening

The preliminary environmental risk screening for the Project was undertaken using an ordinal (comparative measurement) scale to consider the likelihood of an environmental impact occurring and the consequence of that impact should it not be mitigated. The likelihood and consequence of each impact have been combined through the significance screening matrix (refer to **Table 10-1**) to establish the likely significance of the issue for the environmental assessment of the Project.

Table 10-1 Significance Screening Matrix

Likelihood of Effect	**Consequence of Unmitigated Effect**		
	Minor (1)	Moderate (2)	Major (3)
Improbable (1)	Very Low (2)	Low (3)	Medium (4)
Possible (2)	Low (3)	Medium (4)	High (5)
Probable (3)	Medium (4)	High (5)	Very High (6)

The allocation of risk is based upon the following considerations:

Likelihood of Effect:

1. Improbable: imperceptible or short term cumulative impacts;
2. Possible: modest or medium term cumulative impacts; and
3. Probable: serious or long term cumulative impacts.

Consequences of Unmitigated Effect:

1. Minor: minor environmental change;
2. Moderate: moderate adverse environmental change; and
3. Major: important adverse environmental change.

The ranking of issues aims to prioritise the issues for assessment and does not consider the application of mitigation measures to manage the environmental effects. In all cases, appropriate and proven mitigation measures would be used to minimise potential impacts. These mitigation measures are summarised in **Section 25.0** of this EIS.

10.2.2 Review of Expected Stakeholder Interest

As detailed in **Section 9.0**, a range of stakeholder consultation was undertaken with the local community. The expected level of stakeholder interest in each potential environmental issue identified has been considered, based on a broad review of key issues raised in previous meetings that the Proponent has facilitated with the key community groups (refer to **Section 9.0**) and review of key issues raised in submissions in relation to similar SSD projects over the past five years. Potential environmental impacts have been assigned an expected level of stakeholder interest as shown in **Table 10-2**.

Table 10-2 Screening Levels – Expected Stakeholder Interest

Level of Interest	Definition
High level of interest	Issue frequently raised in feedback or meeting minutes of the residents and community groups during consultation for the Project.
Medium level of interest	Issue periodically raised in feedback or meeting minutes of the residents and community groups during consultation for the Project.
Low level of interest	Issue not raised, or rarely raised, in feedback from the residents and community groups during consultation for the Project.

10.3 Screening of Environmental Assessment Significance

The preliminary risk screening process determined the key issues of environmental assessment significance to the Project as shown in **Table 10-3**. This screening allows for general prioritisation of environmental assessment issues based on their potential significance, and does not take into account the application of mitigation measures to minimise and manage potential impacts. Reasonable and feasible mitigation measures would be applied to the Project to minimise potential impacts.

Table 10-3 does not seek to identify every potential environmental impact associated with the Project but rather capture the key considerations which require assessment or have been identified as having a higher level of stakeholder interest.

Table 10-3 Outcomes of Screening of Environment Assessment Significance

Issue	Unmitigated Environmental Risk Screening			Stakeholder Level of Interest	Environmental Assessment Significance
	Likelihood	Consequence	Significance		
Waste					
Potential releases of hazardous and other types of wastes to the environment	Probable	Minor	Medium	High	High
Inappropriate storage and handling of wastes	Probable	Moderate	Medium	High	High
Air Quality and Odour					
Dust and soot (particular matter) generations from combustion	Probable	Moderate	High	High	High
Generation of other pollutants that are potentially toxic or dangerous to health	Probable	Moderate	High	High	High
Traffic and Transport					
Increase in heavy vehicle movements on the local road network	Probable	Minor	Medium	Medium	Medium
Increase in light vehicle movements on the local road network	Probable	Minor	Medium	Medium	Medium
Noise and Vibration					
Noise impacts to nearby receivers	Possible	Moderate	Medium	Medium	Medium
Vibration impacts to nearby receivers	Possible	Minor	Medium	Medium	Medium
Soils and Water					
Increased sedimentation and erosion	Possible	Moderate	Medium	Medium	Medium
Hazards					
Storage and handling of hazardous materials	Possible	Moderate	Medium	Medium	Medium
Interaction of existing hazardous materials at the WA Site with new project related materials	Possible	Moderate	Medium	Medium	Medium
Human Health					
Potential impacts to community health from medical, pathogenic, quarantine waste or other potential infectious or toxic wastes	Possible	Moderate	Medium	High	Medium

Issue	Unmitigated Environmental Risk Screening			Stakeholder Level of Interest	Environmental Assessment Significance
	Likelihood	Consequence	Significance		
Biodiversity					
Impacts to threatened species and habitat	Improbable	Moderate	Low	Low	Low
Heritage					
Potential impacts to indigenous heritage items	Possible	Minor	Low	Low	Low
Potential impacts to cultural heritage items	Possible	Minor	Low	Low	Low
Visual Amenity					
Impacts from the construction of a new building on the Project Area	Possible	Minor	Low	Low	Low
Visual impact of the proposed bypass stack	Possible	Minor	Low	Low	Low
Social					
Impacts to the community as a result of the operation of the Project	Possible	Minor	Low	Low	Low
Economic					
Greenhouse gas emissions during operation	Probable	Minor	Low	Low	Low

10.4 Issues Prioritisation

Based on the risk screening presented in **Table 10-3**, key issues for consideration as part of the environmental impact assessment of the Project have been identified and are summarised in **Table 10-4**. These issues are discussed in further detail in the following sections of this EIS.

Table 10-4 Identification of Key and Other Environmental Assessment Issues

Issue	Environmental Assessment Significance	Key Issues/Other Issue
Waste Management	High	Key issue (refer to **Section 11.0**)
Air Quality and Odour	High	Key issue (refer to **Section 12.0**)
Traffic and Transport	Medium	Key issue (refer to **Section 13.0**)
Noise and Vibration	Medium	Key issue (refer to **Section 14.0**)
Soils and Water	Medium	Key issue (refer to **Section 15.0**)
Hazards	Medium	Key issue (refer to **Section 16.0**)
Human Health	Medium	Key issue (refer to **Section 17.0**)
Biodiversity	Low	Other Issue (refer to **Section 18.0**)
Heritage	Low	Other Issue (refer to **Section 19.0**)
Visual Amenity	Low	Other Issue (refer to **Section 20.0**)
Social	Low	Other Issue (refer to **Section 21.1**)
Economic	Low	Other Issue (refer to **Section 21.2**)

Based on this risk ranking process and the impact assessments carried out for the EIS, a number of reasonable and feasible mitigation measures have been identified for the Project to minimise those risks identified as of high or medium priority. Mitigation measures developed during the assessment process are summarised in **Section 24.0**.

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Part F – Environmental Impact Assessment

This part provides a detailed description of the project in relation to the key environmental aspects which have been identified through the issues prioritisation in Section 10.0. Each environmental aspect is assessed having regard to the existing environment, how the Project may impact the existing environment, relevant guidelines, criteria or statutory requirements that the Project should meet, and the measures they are proposed to meet these requirements. An assessment of the potential cumulative impacts of the Project is also undertaken having regard to cumulative activity impact from both within the Project Area and from adjoining land uses.

11.0 Waste Management

11.1 Secretary's Environmental Assessment Requirements

This **Section 11.0** provides an assessment of the generation and ongoing management of waste and addresses the SEARs shown in **Table 11-1**.

Table 11-1 Secretary's Environmental Assessment Requirements for the Assessment of Waste

Waste SEARs
Waste – including: - a description of the waste streams that would be accepted at the site including the maximum daily, weekly and annual throughputs and the maximum size for stockpiles; - a description of waste processing operations, including a description of the technology to be installed, resource outputs and the quality control measures that would be implemented; - details of how waste would be stored and handled on site, and transported to and from the site including details of how the receipt of non-conforming waste would be dealt with; and - the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the *NSW Waste Avoidance and Resource Recovery Strategy 2014 – 2021.*

11.2 Methodology

A desktop assessment was undertaken to determine the potential waste impacts of the construction and operation of the Project. The desktop assessment involved reviewing the existing and proposed waste streams from the WA site both before and after the initiation of the Project to determine appropriate management measures that would be required to manage new waste streams, or changes in quantities to existing waste streams.

It is noted that a number of the SEARs relating to waste management are addressed in other relevant sections of this EIS including:

- Description of the waste types, quantities and maximum size of stockpiles that could be processed by the Project – Refer to project description in **Section 6.0**;
- Description of waste processing operations, including a description of the technology to be installed, resource outputs and the quality control measures that would be implemented – Refer to project description in **Section 6.0**;
- Details of how waste would be stored and handled on site, and transported to and from site including details of how the receipt of non-conforming waste would be dealt with – Refer to project description in **Section 6.0**; and
- Details of how wastes would be transported to and from the site - – Refer to project description in **Section 6.0** and traffic assessment in **Section 13.0**.

This section of the EIS therefore provides an assessment of the waste streams expected to be generated during construction, and the management of these waste streams as well as operational waste generated as a result of the operation of the thermal waste processing unit, primarily waste ash.

11.3 Existing Environment

The Project seeks to introduce a new Thermal waste processing facility into the WA Site. However, WA currently undertakes a number of activities at the WA Site which result in the production of wastes. The existing site processes include the processing of SPL and dross which are themselves waste products from primary aluminium producers. This processing recovers aluminium from dross which is transported offsite for further manufacturing. SPL is processed into a stable product material that can be used in a variety of industrial or construction settings. The existing operating also undertakes the periodic thermal treatment of pharmaceuticals and illicit drugs from which ash material is the resulting waste.

To provide an indication of existing waste generation types and quantities of waste reported in the 2015 Annual Environmental Management Report (AEMR) are provided in **Table 11-2**.

Table 11-2 Wastes Reported in 2015 AEMR

Waste Description	Activity	DA Limits	EPL Limits	Amount
Combined Non-toxic salts (Aluminium Dross) and second cut SPL	Store and process (non-thermal treatment).	Quantity must not exceed 40,000 tonnes per year and 5,000 tonnes at any time.	-	Annual throughput processed: 14,277 tonnes dross; and 728 tonnes 2nd cut SPL. Maximum quantities stored: 1,465 tonnes dross; and 575 tonnes 2nd cut SPL.
Mixed SPL	Store and process (non-thermal treatment).	No more than 3,000 tonnes to be received onsite and 1,000 tonnes stored at any one time.	-	Received nil tonnes. Maximum stored nil tonnes.
Scrap Aluminium	Scrap metal processing.	Maximum of 35,000 tonnes per year.	-	5,372 tonnes.
-	Waste Storage – Hazardous restricted soils, liquid, clinical and related waste and asbestos waste.		Nil	Nil
-	Recovery of hazardous and other waste.		Nil	Nil

11.4 Assessment of Potential Impacts

11.4.1 Construction Waste

Wastes that would be generated during the construction of the new building would primarily include materials used in the packaging of plant and equipment delivered to the Project Area. The sources of waste and indicative quantities anticipated to be generated during construction works are provided in **Table 11-3**.

Table 11-3 Construction Waste

Source	Estimated Quantity (tonnes)
Surplus construction waste such as: - Scrap metal; - Asphalt; - Timber formwork; - Spent Erosion and Sediment control materials; - Fencing; and - Soil. **Approx Total**	 1 <0.1 <0.1 <0.1 <0.1 <0.2 **<0.7**
Wastes from toilets and bathrooms[1]	145
Office waste such as paper, ink cartridges, toner and cardboard	2
Waste from construction personnel including putrescibles and recyclable wastes	2
Packaging Waste including: - Plastics; - Timber pallets; - Metal wires; and - Cardboard.	5

1. *Projected waste water quantity is based on NSW Department of Health's general allowance of 200 L of water per person per day*

11.4.2 Operational Waste

During the operation of the Project, residual ash from the thermal processing of a range of wastes would be removed for disposal to an offsite landfill which is licensed to accept such waste under the POEO Act. While the Project would process up to 8,000 tonnes of wastes per annum, residual ash would be in the order 800 tonnes of ash produced per year (refer **Section 6.4.9**).

Water would also be used to wash bins after wastes have been removed for processing. Bin washing would be within a fully enclosed and bunded area with all water from this process draining to a central sump. A Gross Pollutant Trap would be used to collect any large debris entering the sump. Waste water discharge from the sump during the operation of the Project may require an update to the WA Site's Trade Waste Agreement with Hunter Water, to accommodate increased volumes or changed water quality parameters. Up to 250 litres per hour may be generated form bin washing during peak processing times.

Any materials removed from the sump during the operation of the Project would be disposed of via the thermal treatment process.

Other additional wastes generated during the operation of the Project would be minimal, including the following:

- Packaging wastes from dangerous goods transport, storage and labelling;
- Used spill kit materials (including potentially contaminated absorbents);
- Administrative wastes (office wastes such as paper, ink cartridges, etc.); and
- Additional sewage, general and putrescible wastes resulting from the predicted workforce increase.

As outlined in **Section 5.2**, WA would not be the generator of the wastes received onsite for thermal treatment. As such, the onus would be on the generator of those wastes to undertake strategies to avoid or minimise waste generation. In addition the wastes proposed to be treated by the Project they would not be suitable for reuse or recycling as per the WARR Strategy. The Project would however fulfil the requirement of the WARR Strategy to provide alternative disposal methods (refer to **Section 7.2.13**).

11.5 Mitigation Measures

- Throughout the construction and operation of the Project, WA would implement the waste hierarchy principals outlined in the WARR Strategy;
- Ash materials resulting from the thermal treatment process would be disposed of at an offsite landfill licensed to receive such wastes as per the POEO Act;

- WA would not accept wastes for onsite processing which are not encompassed in the updated EPL 6423;
- WA would ensure that wastes received onsite have been properly classified by the providers of those wastes, and would fulfil its waste tracking requirements as set out in the Protection of the Environment Operations (Waste) Regulation 2014;
- A screening process would be implemented for all waste arriving at the site. No waste would be allowed to be deposited at the site until approval has been provided by the WA operator. A formal screening and approval procedure would be included in the Project Operational Management Plan regarding the screening process;
- WA would ensure that it and any of its transport contractors comply with the *Dangerous Goods (Road and Rail) Transport Act 2008*, Dangerous Goods (Road and Rail Transport) Regulation 2014, and ADG Code when arranging for the transport of any materials covered by the ADG Code;
- In accordance with EPA requirements, WA would retain any waste sampling and classification results that it obtains for the life of the Project; and
- Waste water would be disposed of to the waste water network in accordance with the Trade Waste Agreement with Hunter Water.

11.6 Summary and Conclusion

Some of the wastes proposed to be treated at the Project Area may not be suitable for reuse or recycling as per the WARR Strategy. The Project would however help fulfil the requirement of the WARR Strategy to provide alternative disposal methods.

The construction and operation of the Project would not generate significant volumes of additional wastes. Construction wastes would primarily be residual waste material from the construction of the Project. These can be appropriately management through standard management measures. The residual ash produced from the thermal processing of a range of wastes would be removed for disposal to an offsite landfill, and waste water discharges would be undertaken as per a Trade Waste Agreement with Hunter Water. WA would also comply with the waste management and tracking requirements set out in the Protection of the Environment Operations (Waste) Regulation 2014.

Overall the Project is considered to have positive benefits for waste management, by providing a local and alternative means of processing a variety of problem wastes whilst itself producing only minimal additional wastes.

12.0 Air Quality and Odour

This **Section 12.0** provides an assessment of the potential impacts of the Project on air quality. This assessment is supported by the Air Quality Impact Assessment (AECOM, 2016), provided in **Appendix E**.

12.1 Secretary's Environmental Assessment Requirements

The assessment of air quality addresses the SEARs as detailed in **Table 12-1**.

Table 12-1 Secretary's Environmental Assessment Requirements for the Assessment of Air Quality

Air Quality SEARs
Air Quality – including: - a quantitative assessment of potential air quality, dust and odour impacts of the development in accordance with relevant EPA guidelines; - the details of buildings and air handling systems and strong justification for any material handling, processing or stockpiling external to a building; - a greenhouse gas assessment; and - details of proposed mitigation, management and monitoring measures.

12.2 Methodology

12.2.1 Assessment Guidelines

The AQIA approach for the Project was prepared and undertaken having regard to the relevant guidelines and supporting documents as required by the NSW EPA:

- Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (DEC, 2005);
- Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into Approved Methods for Modelling and Assessments of Air Pollutants in NSW, Australia (TRC, 2011);
- Technical Framework, Assessment and management of odour from stationary sources in NSW (DEC, 2006); and
- Technical Notes, Assessment and management of odour from stationary sources in NSW (DEC, 2006).

12.2.2 Emissions Factors

In order to determine emissions factors for the Project the following was used:

- AP 42 Compilation of Air pollutant Emission Factors (US EPA 1995); and
- Environmental Protection Licence 6423 emissions limits, including emissions limits from the WA sites existing EPL and limits for additional pollutants.

Air quality emissions from the Project would be from the site's existing Stack No. 5 and may potentially include emissions of the following contaminants of potential concern (CoPC):

- Total Suspended Particulates (TSP)
- Particulates ≤10µm in diameter (PM_{10})
- Particulates ≤2.5µm in diameter ($PM_{2.5}$)
- Carbon Monoxide (CO)
- Sulphur Dioxide (SO_2)
- Sulphur Trioxide (SO_3)
- Sulphuric Acid Mist (H_2SO_4)
- Oxides of Nitrogen (NO_x)
- Hydrogen Chloride (HCl)
- Hydrogen Fluoride (HF)
- Volatile Organic Compounds (VOCs)
- Antimony (Sb)
- Arsenic (As)
- Cadmium (Cd)
- Lead (Pb)
- Mercury (Hg)
- Beryllium (Be)
- Chromium (Cr)
- Cobalt (Co)
- Manganese (Mn)
- Nickel (Ni)
- Selenium (Se)
- Tin (Sn)
- Vanadium (V)
- Copper (Cu)
- Dioxins and Furans

Utilising these emissions factors assessment scenarios were then developed as detailed in **Section 12.2.3**.

12.2.3 Scenario Models

Three modelling scenarios were undertaken for this assessment and are described in **Table 12-2**. Modelling Scenario 1 is representative of typical operating conditions, while Scenario 2 is representative of theoretical worst case impacts using the proposed emission limits. Scenario 3 includes predicted background concentrations from the proposed battery recycling plant.

A fourth operational modelling scenario for the scenarios (Scenario 4) was also assessed to determine the impact of the operation of the emergency bypass stack, should this be activated during the operation of the Project Scenario 4 used the results of Scenarios 1 and 2 and added the bypass stack as an emission source.

Results of Scenario 4 were used to review health implications during upset (emergency) conditions at the plant and are discussed in the Health Risk Assessment report. As upset conditions do not represent long term (or even expected short term) operating conditions, the assessment did not compare the predictions during the bypass with EPA criteria. All scenarios at described in **Table 12-2**.

Table 12-2 Modelled Scenarios

Scenario ID	Scenario Name	Description
Primary Operational Scenario for EPA Impact Assessment Purposes		
1	Normal Operating Conditions	- Proposed thermal processing plant operating continuously at maximum operational capacity of 800kg/h. - All existing point sources modelled using average source emission data.
Theoretical Scenarios		
2	Stack Emission Limits	- Proposed thermal processing plant operating continuously using proposed stack concentration EPL limits. - All existing point sources modelled using average source emission data.
3	Battery Recycling Plant (Cumulative Impacts)	- Modelling of emissions from the proposed adjacent battery recycling facility using design limit emission concentrations, and assumes the battery recycling facility would be operating continuously. - Results of Scenario 3 were then added to the predicted maximum impacts in Scenario 1 and Scenario 2 to determine the cumulative impacts from operation of the WA plant including the thermal processing plant and the battery recycling facility.
4	Emergency Bypass Operations	- This scenario utilises maximum discharge emission concentrations based on design limits for the operation of the emergency bypass stack during upset plant conditions. - The results of this scenario are not discussed in detail within this report but have been presented in **Appendix B**. Assessment of predicted air quality impacts in relation to acute health impacts are discussed in detail in the Health Risk Assessment Report.

12.2.4 Dispersion Modelling

The CALPUFF dispersion model was deemed the most appropriate for use in assessing the potential impacts of the Project. CALPUFF is a non steady-state, threx10-dimensional Gaussian puff model developed for the US Environmental Protection Agency (USEPA) for use in situations where basic Gaussian plume models are not effective.

These situations include areas where stagnation conditions occur, which are characterised by calm or very low wind speeds with variable wind direction. The CALPUFF modelling system (and associated CALMET program) has the ability to model spatially varying winds and turbulence fields that are important in complex terrain, long range transport and near calm conditions. As such, CALPUFF was selected as the appropriate dispersion model for this assessment.

Meteorology

A key input into the dispersion modelling is the assessment of potential impact having regards to local meteorological conditions and how this may impact on pollutant concentrations at ground levels. In order to ascertain the local climatic and meteorological conditions data was collected from the following sources:

- Bureau of Meteorology (BoM) meteorological station located at Cessnock Airport (Station Number 061260) approximately 12.5 km west of the site; and
- The Hydro Aluminium meteorological station, used to validate the Cessnock BoM data.

12.2.5 Cumulative / Background Assessment

In in order to include appropriate background information to assess the potential cumulative impacts of the Project a review of existing and potential future operations in the locality was undertaken to identify potential cumulative emissions sources. This included reviews of:

- The OEH's Hunter Valley air quality monitoring network;
- Cessnock City Council's development application website; and
- NSW Department of Planning and Environments major projects register.

12.3 Existing Environment

12.3.1 Terrain, Land use and Sensitive Receivers

The site lies approximately 17m above Mean Sea Level (MSL) and the immediate terrain surrounding the area is relatively flat. In the wider context the study area lies approximately 30km to the northwest of East Australian coastline and terrain height within the study area range from between 0 and 520 metres AHD with higher elevations to the southwest.

Land use surrounding the WA facility is largely comprised of small to medium industrial premises predominantly to the south of the site and native vegetation. Residences are located approximately 600 metres to the southeast (Kurri Kurri) and west (Weston) of the site. A total of 184 sensitive receptors were included in the dispersion modelling and there location is shown in **Figure 12-1**.

12.3.2 Meteorology

Local Climate

The BoM meteorological station located at Cessnock Airport (Station Number 061260) approximately 12.5 km west of the site records climate data for a range of meteorological parameters including, temperature, humidity, rainfall, wind speed and wind direction. A summary of the long-term data recorded at this station between 1968 and 2016 is provided in Section 3.2 of **Appendix E** and summarised below.

The warmest temperatures occur during the summer months, with the highest average maximum temperature (30.0^{o}C) occurring in January. July is the coldest month, with a recorded average minimum temperature of 4.0^{o}C.

The annual average rainfall for the area is 743 millimetres (mm) over 73 days a year. February is the wettest month, with an average rainfall of 100 mm, while August is driest month with an average rainfall of just 29mm. Humidity follows a diurnal cycle, with higher humidity in the morning compared to the afternoon.

Daytime wind speeds were found to be moderate, with higher wind speeds occurring in the afternoon compared to the morning. The annual average 9am wind speed recorded is 11.6 kilometres per hour (km/h) and the annual average 3pm wind speed was16.9 km/h. Seasonally, wind speeds are higher during the warmer months with the highest average wind speed occurring in September at 19.1 km/h.

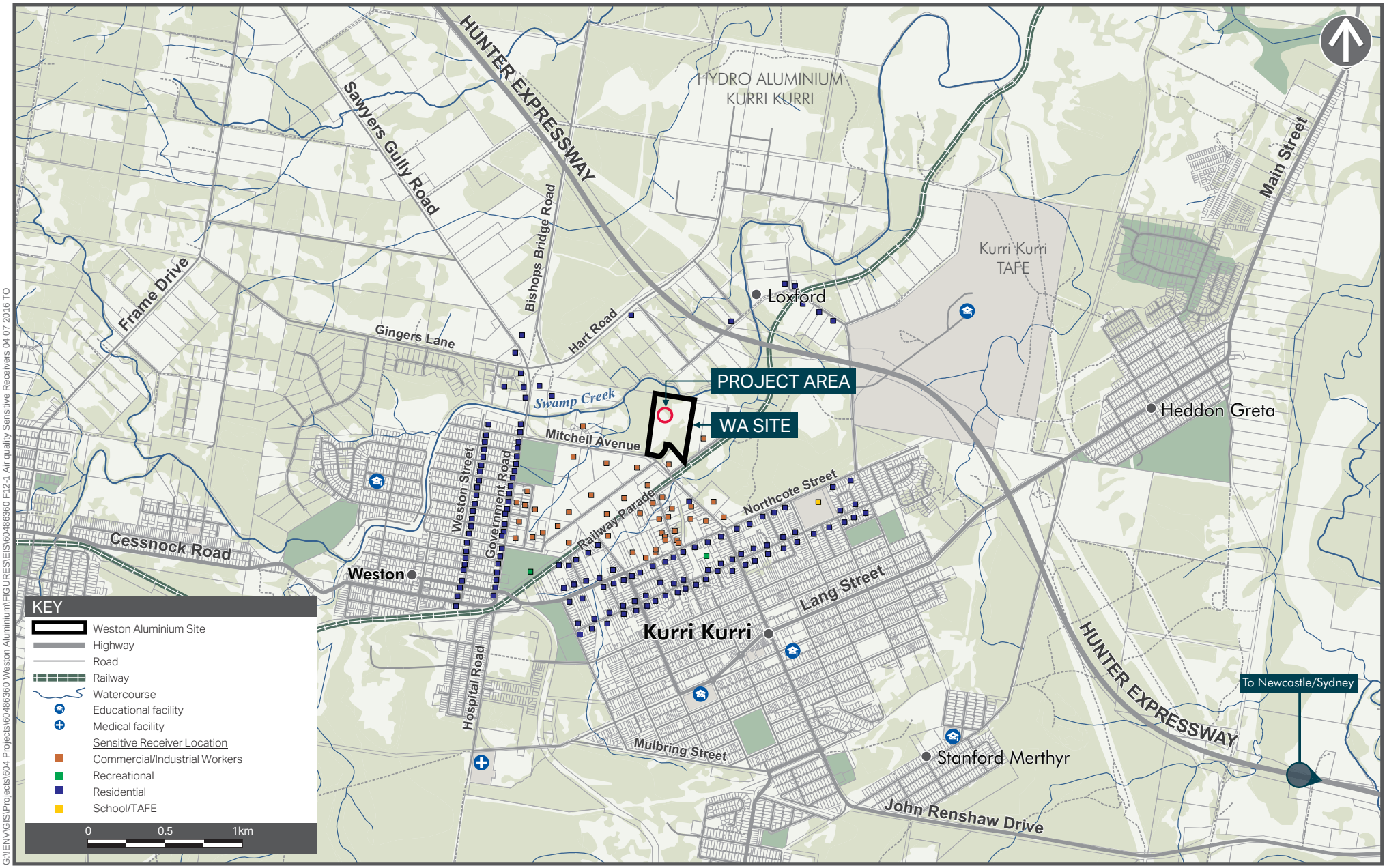
Wind Speed and Direction

Meteorology in the area surrounding the Project site centre is affected by several factors such as terrain and land use. Wind speed and direction are largely affected by topography at the small scale, while factors such as synoptic scale winds affect wind speed and direction on the larger scale. Wind speed and direction are important variables in assessing potential air quality impacts, as they dictate the direction and distance air pollutant plumes travel.

Analysis of meteorological data taken from WA's own metrological monitoring station was analysed to determine the typical wind speed and direction conditions. On an annual basis the dominant wind direction was found to be

from the south west; occurring for 12 percent of the time, with winds also frequenting from the east and west northwest. The annual average wind speed was found to be 2.35 metres per second (m/s) a light to moderate wind speed. Calms (<0.5m/s) were found to occur for just over two percent of the year. The occurrence of easterly winds is frequent from spring through to autumn, while south westerlies are common from autumn through to spring. During the winter months there is also a predominance of west north-westerly winds.

A detailed analysis of the wind speed and direction conditions of the site including wind roses and historical data, is contained in **Appendix E**.



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AIR QUALITY SENSITIVE RECEIVERS
Environmental Impact Statement
Weston Aluminium Recycling Facility

FIGURE 12-1

Atmospheric Stability

In dispersion modelling, atmospheric stability describes the rate at which a plume would disperse, represented by typically six classes; A to F. An assessment of local meteorological conditions allows the anticipated frequency of each stability class condition to occur across a year to be calculated as a percentage. **Table 12-3** shows the frequency of occurrence of the stability categories expected in the area.

Table 12-3 Frequency of Occurrence of Pasquill Stability Categories at Kurri Kurri (2014)

Stability Class	Frequency of Occurrence (%)
A (very unstable)	3
B (unstable)	16
C (slightly unstable)	19
D (neutral)	13
E (slightly stable)	5
F (stable)	44
Total	100

The most common stability class was determined to be F class. This suggests that the dispersion conditions are such that air emissions would disperse slowly for a significant proportion of the time.

12.3.3 Existing Air Quality and Emissions Sources

The EPA operates a number of air quality monitoring stations in the Lower Hunter. The closest monitoring station sites to the proposed development are located at Beresfield (17km east of the site). This station records hourly PM_{10} and $PM_{2.5}$ concentrations using a Tapered Element Oscillating Microbalance (TEOM), NO_2 and SO_2.

No measurements of local TSP ambient air quality concentrations were available. In the absence of existing annual TSP concentration data, the annual PM_{10} concentration can be assumed to be 40% of the annual TSP concentration. This is a conservative approach as data reported by the NSW Minerals Council (2000).

Ground level concentrations for CO are not recorded at the Beresfield EPA monitoring station, however 8-hour averages for CO are recorded at the EPA monitoring station in the more populated area of Newcastle located approximately 31km southeast of the site.

Ambient air quality monitoring data for 2015 (the most recent year available) is presented in **Table 12-4**.

Table 12-4 Ambient Air Monitoring in Beresfield/Newcastle, NSW for 2015 (OEH 2016)

Pollutant	Averaging Period	Concentration (µg/m^3)	EPA Criteria (µg/m^3)
PM_{10}	24 Hour Maximum	**64.9**	50
	Highest 24 hour that meets criterion	43.3**	
	Annual Average	18.7	30
$PM_{2.5}$	24 Hour Maximum	**25.9**	25*
	Highest 24 hour that meets criterion	20.2**	
	Annual Average	7.4	8*
NO_2	1 Hour Maximum	100.5	246
	Annual Average	18.5	62
SO_2	1 Hour Maximum	234.5	570
	24 Hour Maximum	22.9	228
	Annual Average	2.9	60

* NEPM Standard

** Used in the AQIA as background in order to identify additional exceedances as per DEC 2005.

OEH do not currently undertake ambient air quality monitoring for lead or air toxics.

12.4 Assessment of Potential Impacts

12.4.1 Assessment Criteria

Table 12-5 summarises the NSW EPA's impact assessment criteria as detailed in the *NSW Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales* (DEC 2005) for the pollutants included in the assessment. In general, these criteria relate to the total burden of air pollutants in the air and not just the air pollutants from project-specific sources. Therefore, some consideration of background levels needs to be made when using these criteria to assess impacts.

No ambient air quality criterion is administered for heavy metals cobalt, selenium, tin and vanadium under the NSW Approved Methods, NEPM or relevant authorities for other states. As such for the purpose of this assessment, 1 hour short term exposure limits listed by the Texas Commission on Environmental Quality (TCEQ) under the *Effects Screening Level* (ESL) *List* (TCEQ 2015) used in the review of air permitting data has been adopted for the purpose of this assessment.

Table 12-5 NSW EPA Air Quality Impact Assessment Criteria

Pollutant	Averaging Period	Criteria (µg/m^3)	Reference
TSP	Annual Average	90	NSW EPA
PM_{10}	24 Hour Maximum	50	NSW EPA
	Annual Average	30	NSW EPA
$PM_{2.5}$	24 Hour Maximum	8	NEPM
	Annual Average	25	NEPM
CO	1 Hour Maximum	30,000	NSW EPA
	8 hour Maximum	10,000	NSW EPA
SO_2	1 Hour Maximum	570	NSW EPA
	24 Hour Maximum	228	NSW EPA
	Annual Average	60	NSW EPA
H_2SO_4	1 Hour (99.9th Percentile)	18	NSW EPA
NO_2	1 Hour Maximum	246	NSW EPA
	Annual Average	62	NSW EPA
HCl	1 Hour (99.9th Percentile)	140	NSW EPA
HF	90 days	0.25	NSW EPA
	30 days	0.4	NSW EPA
	7 days	0.8	NSW EPA
	24 hours	1.5	NSW EPA
TVOCs (as benzene)[4]	1 Hour (99.9th Percentile)	29	NSW EPA
Sb	1 Hour (99.9th Percentile)	9	NSW EPA
As	1 Hour (99.9th Percentile)	0.09	NSW EPA
Cd	1 Hour (99.9th Percentile)	0.018	NSW EPA
Pb	Annual Average	0.5	NSW EPA

[4] Under the Approved Methods (DEC 2005) there is no ambient air quality criteria for TVOCs as such the EPA criterion for benzene has been adopted for this assessment.

Pollutant	Averaging Period	Criteria (µg/m^3)	Reference
Hg (as organic mercury)	1 Hour (99.9th Percentile)	0.18	NSW EPA
Be	1 Hour (99.9th Percentile)	0.004	NSW EPA
Cr (as Chromium VI compounds)	1 Hour (99.9th Percentile)	0.09	NSW EPA
Co	1 Hour maximum	0.2	TCEQ
Mn	1 Hour (99.9th Percentile)	18	NSW EPA
Ni	1 Hour (99.9th Percentile)	0.18	NSW EPA
Se	1 Hour maximum	2	TCEQ
Sn (as organic compounds)	1 Hour maximum	1	TCEQ
V	1 Hour maximum	2	TCEQ
Cu (as copper fumes)	1 Hour (99.9th Percentile)	3.7	NSW EPA
Dioxins and Furans	1 Hour (99.9th Percentile)	2x10^{-9}	NSW EPA

12.4.2 Proposed Operations

The proposed thermal processing plant would be used to thermally treat a mixture of medical wastes including general refuse, laboratory and pharmaceutical chemicals and containers, pathological wastes and cytotoxic materials. The plant would also be used to thermally treat smaller quantities of quarantine and other wastes including; pitch sludge residues, solvents and paints, oily rags and documents and hard drives.

The proposed thermal waste processing plant would operate interchangeably with the operation of the existing reverberatory furnace currently in operation at the WA site. As such emissions from Stack 5 would either be attributed to the thermal waste processing plant or reverberatory furnace at any one time.

The following results are provided for the two assessed scenarios:

- Scenario 1: Normal operations; and
- Scenario 2: Operations at stack emissions limits.

The assessment for Scenario 3 (cumulative assessment incorporating proposed battery plant) is undertaken by adding the expected battery plant emissions to each of Scenarios 1 and 2. Scenario 3 results are therefore incorporated into the results for both Scenarios 1 and 2 and not provided separately.

12.4.3 Scenario 1: Normal Operations

Results of the dispersion modelling for Scenario 1 (normal operations) are presented in **Table 12-6** for particulates, CO, SO_2, NO_2, HF and Pb in **Table 12-7** for air toxics. Values in **Table 12-6** are maximum concentrations reported at sensitive receptor locations in accordance with the Approved Methods (DEC 2005). Maximum predicted concentrations from the WA facility have been added to the maximum predicted concentrations at each receptor location for the proposed BRF to determine the combined impact from the two proposals. This has then been added to the existing background concentration to determine the cumulative impacts.

Table 12-6 Scenario 1 Normal Operations Modelling Results for Predicted TSP, PM_{10}, $PM_{2.5}$, CO, SO_2,, NO_2, HF and Pb Ground Level Concentrations

Pollutant	Averaging Period	Concentration (µg/m^3)				Criteria (µg/m^3)
		WA Incremental Impact	WA + BRF Impact[2]	Background	Cumulative	
TSP	Annual Average	0.1	0.3	46.8	47.1	**90**
PM_{10}	24 Hour Maximum	0.5	2.5	43.3[1]	45.8	**50**
	Annual Average	0.04	0.20	18.7	18.9	**30**
$PM_{2.5}$	24 Hour Maximum	0.0019	2.02	20.2[1]	22.2	**25**
	Annual Average	0.00017	0.16	7.4	7.6	**8**
CO	1 Hour Maximum	5.3	NA	-	5.3	**30,000**
	8 hour Maximum	1.4	NA	1,900	1,901	**10,000**
SO_2	1 Hour Maximum	23.1	94.0	234.5	328.5	**570**
	24 Hour Maximum	1.5	14.3	22.9	37.2	**228**
	Annual Average	0.1	1.1	2.9	4.0	**60**
NO_2[3]	1 Hour Maximum	15.7	15.7	100.5	116.2	**246**
	Annual Average	0.3	0.3	18.5	18.8	**62**
HF	90 days	0.05	NA	0.11	0.16	**0.25**
	30 days	0.07	NA	0.16	0.23	**0.4**
	7 days	0.1	NA	0.20	0.31	**0.8**
	24 hours	0.3	NA	-	0.3	**1.5**
Pb	Annual Average	0.00011	0.16	-	0.16	**0.5**

1 Applied the highest background value that met the criterion in order to identify any additional exceedances.
2 The WA and BRF data could not be presented in separate columns as the maximum receptor may be different for each. Presenting the maximum for both in columns may lead to readers inadvertently adding the two and over predicting the actual cumulative value.
3 Conservatively assumed total conversion of NOx to NO_2

The air dispersion modelling predicts that all assessed pollutants would meet their respective EPA criterion for all average periods both incrementally (WA alone) and cumulatively (WA+BRF+background). A summary of the modelling results for Scenario 1 and the findings of a comparison with EPA criteria are as follows:

- The predicted annual average TSP incremental and cumulative concentrations were below the EPA criteria (90µg/m^3) with a maximum cumulative annual average concentration of 47.1 µg/m^3 at nearby sensitive receptors;
- Predicted maximum 24-hour (0.5µg/m^3) and annual average (0.04µg/m^3) PM_{10} concentrations attributed to WA were found to be relatively small when compared to the maximum 24 hour criterion of 50µg/m^3 and annual average criterion of 30µg/m^3. When accounting for the proposed BRF and background concentrations:

- Combined maximum 24 hour incremental contribution from WA and the BRF were low, at approximately 2.5µg/m^3.
- The PM_{10} 24 hour data predicts that there are no additional exceedances of the criteria, beyond those already identified in the background data, once the potential impacts from both the WA and BRF sites are cumulatively assessed with the background.
- The combined predicted annual average from the WA and proposed BRF facilities were found to be 0.2µg/m^3 and when added to the annual background concentration of 18.7 µg/m^3 resulted in a cumulative concentration of 18.9µg/m^3 which is below the annual average criterion of 30µg/m^3.
- Predicted incremental contribution from both the WA and the BRF are conservative based on continuous operations at maximum capacity and at proposed design limits respectively and thus while not considered significant are likely to be lower than reported.

- Predicted maximum 24-hour (0.0019µg/m^3) and annual average (0.00017µg/m^3) $PM_{2.5}$ concentrations attributed to WA were found to be negligible compared to the maximum 24 hour (25µg/m^3) and annual average (8µg/m^3) criteria. When accounting for the proposed BRF and background concentrations:
  - Combined maximum 24 hour incremental contribution from WA and the BRF were low, at approximately 2µg/m^3.
  - The $PM_{2.5}$ 24 hour data predicts that there are no additional exceedances of the criteria, beyond those already identified in the background data, once the potential impacts from both the WA and BRF sites are cumulatively assessed with the background.
  - The combined predicted annual average from the WA and proposed BRF was relatively small at 0.16µg/m^3 and when added to the background concentration of 7.4µg/m^3 was below the EPA criteria of 8 µg/m^3.

    Predicted incremental contributions from both the WA and the BRF are conservative based on continuous operations at maximum capacity and at proposed design limits respectively and thus while not considered significant are likely to be lower than reported.
- Predicted maximum 1-hour and 8-hour CO contribution from the WA plant are well below the criterion. Cumulative impacts for the maximum 8-hour CO concentration at nearby sensitive receptors were also found to be well below the criterion. No data on the 1-hour CO background was available however based on the low 8-hour background concentration recorded at Beresfield, cumulative 1-hour CO impacts are also likely to be relatively low;
- Modelled incremental SO_2 concentrations under normal operations for all averaging periods were well below the relevant EPA criterion. When added to the predicted incremental impacts of the adjacent BRF and recorded background concentrations, cumulative maximum 1 hour, 24 hour and annual average concentrations at nearby sensitive receptors were still well below the criteria;
- As a conservative assumption, all NOx emissions were assumed to be NO_2. The predicted maximum 1-hour and annual average incremental impacts and cumulative impacts inclusive of both the background concentration and predicted impacts from the BRF were well below the EPA criteria;
- Predicted incremental contributions from HF from WA were relatively small when compared to existing background concentrations. Cumulative impacts for 30, 70 and 90 day averaging periods were below the criteria. No background concentration was available to cumulatively assess maximum 24-hour concentrations, however the incremental impacts from the facility were found to be only 20 percent of the EPA criterion; and
- Predicted incremental annual average lead impacts from WA were found to be negligible at 1.1x10-4µg/m^3 when compared to the EPA criterion of 0.5µg/m3 (<1% of criterion). When added to the maximum incremental impact from the BRF, the cumulative impact equated to 0.16µg/m^3 or, 32 percent of the EPA criterion.

Predicted modelled impacts for air toxics in **Table 12-7** are reported 99.9th percentile concentrations reported at the highest point at or beyond the site boundary in accordance with the Approved Methods.

Table 12-7 Scenario 1 Normal Operations Modelling Results for Air Toxic 1 hour (99.9th percentile) Ground Level Concentrations (µg.m^3).

Pollutant	Predicted Incremental Impact (µg/m^3)	Criteria (µg/m^3)
H_2SO_4	3.2	**18**
HCl	0.5	**140**
Sb	0.00019	**9**
As	0.00023	**0.09**
Cd	0.000079	**0.018**
Hg (as organic mercury)	0.0066	**0.18**
Be	0.000017	**0.004**
Cr (as Chromium VI compounds)	0.0010	**0.09**
Mn	0.0043	**18**
Ni	0.00099	**0.18**
Cu (as copper fumes)	0.0011	**3.7**
Dioxins and Furans	$1.6x10^{-9}$	**$2x10^{-9}$**

The air dispersion modelling predicts that all assessed pollutants would meet their respective EPA criterion. A summary of the modelling results in **Table 12-7** is as follows:

- Predicted 1-hour 99.9th percentile incremental impacts for H_2SO_4 were below EPA criterion at 3.2µg/m^3 equating to 17.8 percent of the criteria of 18µg/m^3;
- Predicted 1-hour 99.9th percentile incremental impacts for HCl were below EPA criterion at 0.5µg/m^3 equating to less than one percent of the criteria of 140µg/m^3;
- Predicted 1-hour 99.9th percentile incremental impacts for all modelled Type 1 and Type 2 heavy metals were below the relevant EPA criterion; with predicted impacts generally less than one percent of the EPA criterion with the exception to Hg and Cr which were found to be only 3.6 and 1.1 percent of the criteria;
- Predicted 1-hour 99.9th percentile incremental impacts for Cu was found to be less than one percent of the EPA criterion of 3.7µg/m^3; and
- The predicted 99.9th percentile 1-hour offsite concentration for dioxins and furans was $1.6x10^{-9}$µg/m^3, which equates to 78.4 percent of the EPA criterion of $2.0x10^{-9}$µg/m^3. Predicted offsite 99.9th percentile 1-hour offsite concentrations for dioxins and furans at nearby sensitive receptors was found to be lower, with a predicted 1 hour 99th percentile of $1.6x10^{-9}$µg/m^3 occurring at the worst effected sensitive receptor.

12.4.4 Scenario 2: Worst Case Operating at Emission Limits

Results of the dispersion modelling for Scenario 2 for pollutants equal to a proposed emission limit are presented in **Table 12-8** for particulates, CO, NO_2, and Pb. **Table 12-9** presents results for air toxics. Results in this section are based on continuous operation of the WA plant with emissions from the thermal treatment plant equal to the proposed emission limit, thus Scenario 2 model findings are considered worst case and not representative of normal operating conditions. Results for this Scenario are provided to demonstrate that even under a theoretical worst case assessment exceedance of the relevant criteria for the identified pollutants of concern are unlikely.

Results in **Table 12-8** are reported maximum concentrations reported at the nearest sensitive receptor. Similarly to Scenario 1, the maximum predicted concentrations from the WA facility for Scenario 2 have been added to the maximum predicted concentrations at each receptor location for the proposed Kurri Kurri BRF to assess the combined impact from the two proposals. This has then been added to the existing background concentration to determine the worst case cumulative impacts.

Table 12-8 shows results only for pollutants with a proposed EPL limit with exception to PM_{10} and $PM_{2.5}$ concentrations. Results for SO_2 and HF reported in **Table 12-6** for Scenario 1 should be considered worst case under normal operating conditions should the thermal operating plant be operating at maximum capacity and continuously, not alternatively with the reverb furnace.

Table 12-8 Scenario 2 Worst Case Modelling Results for Predicted TSP, PM_{10}, $PM_{2.5}$, CO, NO_2, and Pb Ground Level Concentrations ($\mu g.m^3$).

Pollutant	Averaging Period	Concentration ($\mu g/m^3$)				Criteria ($\mu g/m^3$)
		WA Incremental Impact	Cumulative Assessment			
			WA + BRF Impact[2]	Background	Cumulative	
TSP	Annual Average	0.2	0.3	46.8	47.2	**90**
PM_{10}	24 Hour Maximum	1.0	3.1	43.3[1]	46.4	**50**
	Annual Average	0.11	0.26	18.7	19.0	**30**
$PM_{2.5}$	24 Hour Maximum	0.1	2.1	20.2[1]	22.3	**25**
	Annual Average	0.0093	0.17	7.4	7.6	**8**
CO	1 Hour Maximum	46.0	NA	-	-	**30,000**
	8 hour Maximum	10.7	NA	1,900	1,911	**10,000**
NO_2	1 Hour Maximum	74.6	74.6	100.5	175.1	**246**
	Annual Average	1.1	1.1	18.5	19.6	**62**
Pb	Annual Average	0.00045	0.16	-	-	**0.5**

1 Applied the highest background value that met the criterion in order to identify any additional exceedances.
2 The WA and BRF data could not be presented in separate columns as the maximum receptor may be different for each. Presenting the maximum for both in columns may lead to readers inadvertently adding the two and over predicting the actual cumulative value.
3 Conservatively assumed total conversion of NOx to NO_2.

The air dispersion modelling predicts that all assessed pollutants would meet their respective EPA criterion for all average periods both incrementally (WA alone) and cumulatively (WA+BRF+background). A summary of the modelling results in **Table 12-8** is as follows:

- The predicted TSP annual average incremental and cumulative concentrations were below the EPA criteria ($90\mu g/m^3$). Due to the small incremental impact associated with WA and the BRF a maximum cumulative annual average concentration of 47.1 $\mu g/m^3$ at nearby sensitive receptors is similar to Scenario 1;
- Predicted PM_{10} incremental impacts for WA for maximum 24-hour ($1.0\mu g/m^3$) and annual average ($0.11\mu g/m^3$) concentrations were found to be relatively small when compared to the maximum 24 hour criterion of $50\mu g/m^3$ and annual average criterion, of $30\mu g/m^3$. When accounting for the proposed BRF and background concentrations:
    - Combined maximum 24 hour incremental contributions from WA and the BRF were low, at approximately $3.1\mu g/m^3$;
    - The PM_{10} 24 hour data predicts that there are no additional exceedances of the criteria, beyond those already identified in the background data, once the potential impacts from both the WA and BRF sites are cumulatively assessed with the background;
    - The combined predicted annual average from the WA and proposed BRF were found to be $0.26\mu g/m^3$ and when added to the annual background concentration of 18.7 $\mu g/m^3$, resulted in a cumulative concentration of $19.0\mu g/m^3$ which is below the annual average criterion of $30\mu g/m^3$; and

  - Predicted incremental contribution from both the WA and the BRF are conservative based on continuous operations at maximum capacity and at proposed design limits respectively and thus while not considered significant are likely to be lower than reported.

- Predicted $PM_{2.5}$ maximum 24-hour (0.1µg/m^3) and annual average ($9.3x10^{-3}$µg/m^3) concentrations attributed to WA were found to be negligible compared to the maximum 24 hour (25µg/m^3) and annual average (8µg/m^3) criteria. When accounting for the proposed BRF and background concentrations:
  - Combined maximum 24 hour incremental contributions from WA and the BRF were low, at approximately 2.1µg/m^3;
  - The $PM_{2.5}$ 24 hour data predicts that there are no additional exceedances of the criteria, beyond those already identified in the background data, once the potential impacts from both the WA and BRF sites are cumulatively assessed with the background;
  - The combined predicted annual average from the WA and proposed BRF was relatively small at 0.17µg/m^3 and when added to the background concentration of 7.4µg/m^3 resulted in a predicted cumulative concentration of 7.6µg/m^3, which is below the annual average criterion; and
  - Predicted incremental contribution from both the WA and the BRF are conservative based on continuous operations at maximum capacity and at proposed design limits respectively and thus while not considered significant are likely to be lower than reported.
- Predicted maximum 1-hour and 8-hour CO contributions from the WA plant are well below the criterion. Cumulative impacts for the maximum 8-hour CO concentration at sensitive receptors were also found to be below the criterion. No data on the 1-hour CO background was available, however based on the low 8-hour background concentration recorded at the Beresfield monitoring station, cumulative, 1-hour CO impacts are also likely to be relatively low;
- As a conservative assumption, all NOx emissions were assumed to be NO_2. The predicted maximum 1-hour and annual average incremental impacts and cumulative impacts inclusive of both the background concentration and predicted impacts from the BRF were well below the EPA criteria; and
- Predicted incremental annual average lead impacts from WA were found to be very small at $4.5x10^{-4}$µg/m^3 when compared to the EPA criterion of 0.5µg/m^3 (<1% of criterion). When added to the maximum incremental impact from the BRF, the cumulative impact equated to 0.16µg/m^3 which equates to 32 percent of the EPA criterion.

Predicted offsite modelled impacts for air toxics in **Table 12-9** are reported 99.9^{th} percentile concentrations in accordance with the Approved Methods. In exception to this are concentrations for Co, Se, Sn and V which do not have a ground level concentration criteria set by the EPA and are reported as the maximum 1-hour concentration offsite in accordance with the TCEQ 2015.

Table 12-9 shows results only for pollutants with a proposed EPL limit and results for Cu reported in **Table 12-6** for Scenario 1 should be considered worst case under normal operating conditions should the thermal processing plant be operating at maximum capacity and continuously not alternatively with the reverb furnace. **Table 12-9** also includes predicted pollutant concentrations for VOCs, Co, Se, Sn and V, not reported in Scenario 1 due to data limitations, and predicted ground level concentrations for these pollutants are assumed to be lower than reported under normal operating conditions.

Table 12-9 Scenario 2 Worst Case Modelling Results for Air Toxic 1 hour (99.9th percentile) Ground Level Concentrations (µg.m^3).

Pollutant	Predicted Incremental Impact (µg/m^3)	Criteria (µg/m^3)
H_2SO_4	16.5	**18**
HCl	10.4	**140**
TVOCs (as benzene)[#]	6.9	**29**
Sb	0.012	**9**
As	0.027	**0.09**
Cd	0.013	**0.018**
Hg (as organic mercury)	0.012	**0.18**
Be	0.00399	**0.004**
Cr (as Chromium VI compounds)	0.013	**0.09**
Co*	0.027	**0.2**
Mn	0.016	**18**
Ni	0.013	**0.18**
Se*	0.027	**2**
Sn (as organic compounds)*	0.027	**1**
V*	0.027	**2**
Dioxins and Furans	2.0 x10^{-9}	**2x10^{-9}**

[#] EPA criterion for benzene has been adopted for this assessment for TVOCs
[*] Predicted 1 hour maximum concentration based on 1 hour TCEQ short term exposure limits

A summary of the modelling results in **Table 12-9** is as follows:

- Predicted 1-hour 99.9th percentile incremental impacts for H_2SO_4 are notably higher than predicted in Scenario 1 at 16.5µg/m^3, but still below the EPA criteria of 18µg/m^3;
- Predicted 1-hour 99.9th percentile incremental impacts for HCl were below the EPA criterion at 10.4µg/m^3, equating to seven percent of the criteria of 140µg/m^3;
- The modelled 1-hour 99.9th percentile incremental total VOC concentration was found to be 6.9 µg/m^3 which is well below the most stringent VOC criterion of benzene at 29 µg/m^3. As such, all VOC species would be below the applicable ground level concentration criteria under the proposed EPL limit;
- Emission rates for Type 1 and Type 2 heavy metals derived from the proposed EPL limit (in accordance with Schedule 4 of the POEO (Clear Air) Regulation 2010) are notably higher than those predicted under normal operating conditions. As such, predicted ground level concentrations for heavy metals were found to be notably higher than in Scenario 1. However all pollutants were found to have a ground level concentration below the relevant EPA criterion, with exception to beryllium which was equal to the ground level criteria which was set with a lower emission rate to limit offsite impacts[5]; and
- The maximum dioxin and furan stack concentration under Schedule 4 of the POEO (Clear Air) Regulation 2010 would have resulted in predicted ground level exceedances for Scenario 2.As such, a lower EPL limit was set at a level to equal the maximum allowable offsite ground level concentration without exceeding the

[5] The emission rate for Scenario 2 has been based on the emission rate and associated predicted ground level concentration in Scenario 1; whereby the emission rate for Scenario 1 has been scaled up to result in the maximum emission rate possible without causing an exceedance of the EPA ground level criteria for Beryllium (see **Section 2.4.4** of AQIA.)

EPA criterion. As such the highest predicted 1-hour 99th percentile concentration was predicted to be equal to the EPA criteria of 2.0x10^{-9}µg/m^3. Predicted offsite 99.9th percentile 1-hour offsite concentrations for dioxins and furans at nearby sensitive receptors was found to be lower, with a predicted 1 hour 99th percentile of 1.8x10^{-9}µg/m^{3}occurring at the worst effected sensitive receptor. It is noted that this emission level is conservatively high, and not representative of the proposed operation.

12.4.5 Greenhouse Gas Emissions

Greenhouse gases (GHGs) are gases found in the atmosphere that absorb outgoing heat reflected from the sun. The primary GHG is carbon dioxide (CO_2). Different GHGs have different heat absorbing capacities. In order to achieve a basic unit of measurement, each GHG is compared to the absorptive capacity of CO_2, and measurements and estimates of GHG levels are reported in terms of CO_2 equivalent emissions (CO_2-e).

The National Greenhouse Accounts (NGA) Factors provide three types of categories for GHG equivalent emissions:

- Scope 1, which covers direct emissions from sources within the boundary of an organisation, such as fuel combustion and manufacturing processes;
- Scope 2, which covers indirect emissions from the consumption of purchased electricity, steam or heat produced by another organisation; and
- Scope 3, which includes all other indirect emissions that are a consequence of an organisation's activities but are not from sources owned or controlled by the organisation; that is, emissions associated with the production of fuels, and emissions associated with the transmission and distribution of purchased electricity.

Key ways in which the operation of the Project would generate GHGs are as follows:

- Using electricity and natural gas to run plant operations (Scopes 2 and 3);
- Delivering and distributing waste and ash materials by road (Scope 3); and
- Using passenger vehicles to transport staff to and from the Site (Scope 3).

Due to the nature of the facility, it would be operated on an as-needed basis, as waste are generated and bought to site. The amount of GHG generated is therefore directly related to the amount of waste being processed. As the Project is not increasing the total amount of waste being processed but rather displacing processing operations from other (more distant) facilities, it is considered that the majority of the GHG sources would be generated regardless of the Project. Therefore the Project would have a minimal impact on GHG generation.

In addition it is noted that the existing WA facility was approved based on an assumed continuous operation of the reverberator furnace. As the reverberatory furnace will only be able to operate when the water processing facility is not being used the combined operation would likely have a similar GHG emission to the facility as already approved.

12.4.6 Odour

The modelled 1-hour 99.9th percentile incremental total VOC concentration was found to be well below the most stringent VOC criterion of benzene at 29µg/m^3. As such all VOC emissions would be below the applicable ground level concentration criteria under the proposed EPL limit. NSW EPA criteria for individual toxic air pollutants are based on EPA Victoria design criteria (Victorian Government Gazette 2001). These criteria are set at the lower of their toxicity and odour impact levels and as such compliance with the criteria infers compliance from both a toxicity and odour perspective. On this basis odour impacts are not expected to be a cause for concern from the facility.

12.5 Mitigation Measures

The WA facility already includes a number of existing safeguards to manage air quality impacts, including the existing fabric filter and lime injection system, which would service both the proposed Project and the existing reverb furnace process emissions. Additionally, the Project would include real time monitoring and activated carbon injection.

The Project would be equipped with an extractive emission monitoring system comprised of oxygen, carbon monoxide and carbon dioxide analysers. Analogue signals from these analysers would be used for monitoring combustion efficiency calculations and alarm generation.

Exhaust gases from the secondary chamber, once cooled, would receive an injection of both activated carbon and lime into the fabric filter exhaust inlet duct. Here, exhaust gases would undergo filtration with activated carbon and lime for particulate, acid gas, heavy metals and dioxin control within the plant's existing fabric filter. Treated exhaust gases would then be discharged to the atmosphere from the existing stack.

The facility would also include the provision of a bypass stack in which hot combustion gases may be vented directly to the atmosphere during emergency situations or power failure. The proposed bypass stack would be equipped with a fail-safe pneumatically assisted and counterweighted insulated stack cap. During normal operations this cap would be closed allowing combustion products to pass through the air pollution control plant.

12.6 Summary and Conclusion

A Level 2 Air Quality Impact Assessment was conducted in accordance with the *NSW Approved Methods for Modelling and Assessment OF Air Pollutants in NSW* (DEC 2005). The report provides an assessment of the potential ground level air quality impacts from the proposed thermal waste processing plant.

Dispersion modelling was undertaken for the AQIA using the Lagrangian model CALPUFF. Two modelling scenarios were assessed as part of the modelling to consider the normal operating emissions at maximum capacity (scenario 1) and a worst case, conservative assessment of the emissions assuming that the process emission point was emitting at concentrations equal to the expected EPL licence limits for 100% of the time (Scenario 2).

Additionally, a third modelling scenario was undertaken to account for the air quality impacts associated with the proposed BRF (potentially constructed and operated concurrently with the WA Project), and these results were added to the predicted incremental impacts associated with WA. Background air quality was also examined from the nearest OEH monitoring station in Beresfield to assess the cumulative impacts associated with the Project.

Results of the modelling showed no exceedances of the relevant air quality criteria for all examined pollutants under Scenario 1 and Scenario 2, with the exception to cumulative impacts associated with predicted PM_{10} and $PM_{2.5}$ for both modelled scenarios. This was attributed to elevated background concentration of fine particulates, whereby the maximum 24-hour and annual averages exceed the EPA criteria in isolation. The Project contribution from WA was found to be relatively small in all cases, and similarly contributions from the adjacent BRF were also considered small. Furthermore, estimates were considered conservative under 'normal operating conditions' with the thermal treatment plant operating continuously, instead of intermittently in conjunction with reverb furnace operations and at the maximum operational capacity of 800kg/h.

In addition to the above mentioned exceedances, it should be noted that Scenario 2 has been used to determine upper emission rate limits for beryllium and dioxins and furans where using the maximum stack concentrations described in Schedule 4 of the POEO (Clear Air) Regulation 2010 would result in exceedances of the ground level concentration criteria. Here, offsite impacts for beryllium and dioxins and furans have been modelled to result in the maximum offsite $99^{.9th}$ percentile concentrations equivalent to the ambient air quality criteria and lower concentrations observed at nearby sensitive receptors.

The results of the assessment indicate there would be no substantial air quality impacts from the operation of the proposed thermal processing plant at WA, and the proposed emission concentrations associated with operation of the plant are unlikely to result in any additional exceedances of local air quality for all pollutants examined.

13.0 Traffic and Transport

This **Section 13.0** provides an assessment of the Project's potential impacts on the traffic and transport systems and infrastructure of the region. This assessment is supported by a Traffic Impact Assessment which is provided in **Appendix F**.

13.1 Secretary's Environmental Assessment Requirements

The assessment of traffic and transport impacts addresses the SEARs as detailed in **Table 13-1**.

Table 13-1 Secretary's Environmental Assessment Requirements for the Assessment of Traffic and Transport

Traffic and Transport SEARs
Traffic and Transport – including: - details of all traffic types and volumes likely to be generated during construction and operation, including a description of haul routes; - as assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts at key intersections using SIDRA or similar traffic model; - detailed plans of the proposed layout of the internal road network and parking onsite in accordance with the relevant Australian Standards; and - plans of any proposed road upgrades, infrastructure works or new roads required for the development.

13.2 Methodology

As the predicted traffic volumes for both construction and future operations are relatively low (refer below), SIDRA modelling is not considered an appropriate tool to reflect the construction and operational traffic impact as the traffic impacts would be minimal. Rather, a qualitative analysis was undertaken to assess the construction and operational traffic impacts on Mitchell Avenue and the surrounding road network. SIDRA modelling to determine intersection performance was not considered necessary in this instance.

The traffic impact assessment was prepared having regard for the following criteria and guideline documents:

- Roads and Maritime Service's (RMS) Guide to Traffic Generating Developments 2002; and
- Australian /New Zealand *Parking Facilities Standard* 2009.

In order to examine the existing traffic situation of the WA Site and surrounding road network, the following information sources were reviewed:

Database Searches

Background database searches were conducted by exploring RMS Average Daily Traffic Volumes and Historical Traffic crash data around the WA Site. The following observations were made:

- No relevant traffic survey locations were available from the RMS Average Daily Traffic Volume database; and
- Traffic crash data was collected on Mitchell Avenue and the surrounding road network from 2010-2014. The crash data includes total crash number, crash location, crash time, crash type and crash movement.

Review of Surrounding Developments

A review of RMS planned projects in the Kurri Kurri area indicates that there are no planned major road or infrastructure upgrades in the vicinity of the Project Area.

Review of Previous Studies

A search was undertaken for previous traffic studies conducted in the vicinity of the Project Area. No transport studies were identified for adjoining or sites in the vicinity which would be of relevance to this Project.

Assumptions

The following assumptions were used in the traffic and transport impact assessment:

- Two heavy vehicles and ten light vehicles per day would be generated per day during the construction phase;

- Up to three heavy vehicles in and out of the Project Area in both morning (AM) and afternoon (PM) peak hour during the future operational phase;
- An estimated 10 additional light vehicles accessing the WA site per day as a result of the Project; and
- All the light and heavy vehicles would access the Project Area using the Hunter Expressway, Government Road, Hart Road and Mitchell Avenue.

13.3 Existing Environment

13.3.1 Existing Road Network

The existing transport environment in the vicinity of the Project Area is shown on **Figure 13-1**.

Hunter Expressway

The Hunter Expressway at Kurri Kurri is generally a two-lane divided road. It links the New England Highway to the north and the Pacific Motorway to the south. It has a posted 110 km/h speed limit and is an approved B-double route.

Hart Road

Hart Road is a two lane, two way local road intersecting with the Hunter Expressway, and connecting to Government Road to the west. It has a posted 70 km/hr speed limit. The Hunter Expressway interchange with Hart Road (Loxford interchange) has east-facing on and off-ramps only which provide access to and from Newcastle and Sydney.

Government Road

Government Road is a two lane two way regional road. It links Hart Road to the north and Mitchell Avenue to the south. It has a posted 60 km/hr speed limit.

Mitchell Avenue

Mitchell Avenue is a two lane, two way regional road that provides access to local industrial areas. It connects Government Road to the west and Northcote Street to the east. The Project Area has a direct driveway connection to Mitchell Avenue. Where there is no posted speed limit in urban areas in NSW, such as Mitchell Avenue, the default speed limit is 50 km/hr.

13.3.2 Walking and Cycling

There are no existing footpaths or cycleways provided along Hart Road or Government Road. There are a few sections of footpath provided along Mitchell Avenue outside particular factories, but these are sporadic and not continuous.

The shoulder lanes in both directions on the Hunter Expressway and on the off-ramp at the Loxford interchange are marked for cyclists.

13.3.3 Public Transport

Train

The South Maitland Railway crosses Mitchell Avenue at a level crossing approximately 200m to the southeast of the Project site. There are no regular users of this privately-owned railway. It is occasionally used by the remaining coal operations in the South Maitland Coalfields on an irregular basis. There are no regular commercial or passenger train services on this line. Regardless, trucks accessing the WA Site as part of the Project would not traverse this level crossing to access the WA Site.

Bus

There are three bus services (route 160, 163 and 164) on Northcote Street providing services from Cessnock to Kurri Kurri and Cessnock to Newcastle. All the buses provide regular services from Monday to Friday. Route 160 does not operate on Sundays or public holidays. However, there are no bus stops in the vicinity of Northcote Street.

13.3.4 Existing Operational Traffic

There are currently 28 full time staff and typically two contractors working at the Project Area per day. On average, 10 heavy vehicles move in and out the Project Area every day. The operating hours for existing truck

movements are from 7am-10pm as per the requirements of the EPL. All light and heavy vehicles access the Project Area from the Hunter Expressway, Hart Road, Government Road and Mitchell Avenue. There are no heavy vehicle movements through the Kurri Kurri town centre.

There is a range of vehicle parking options currently available on the WA Site. Staff and visitor light vehicles typically park in the designated parking area at the front of the WA Site. Heavy vehicle typically move through the weighbridge or to the relevant park of the operation depending on their transport task. All parking areas and trafficable areas on site have been subject to previously design and approvals and have demonstrated the ability to manage vehicles of a size anticipated by the Project.

13.3.5 Existing Crash Data Analysis

There were 16 crashes in total between January 2010 and December 2014 on Mitchell Avenue and the immediately surrounding road network. Of the 16 crashes, six occurred on Mitchell Avenue. Of the six crashes, there were no fatal crashes, four injury crashes, and two non-casualty crashes (as shown in **Table 13-2**).

Table 13-2 Crash Data Summary on Mitchell Avenue (1 January 2010 – 31 December 2014)

Road	Section from	Section to	Section Length	Total	Fatal	Injury	Non-casualty
Mitchell Avenue	Government Rd	Northcote St	1.47km	6	0	4 (2 in 2011, 2012,2014)	2 (2011, 2014)

Of the six crashes on Mitchell Avenue:

- Three took place in 2011, one in 2012 and two in 2014; and
- Three involved truck movements, of which two were due to truck movements in and out of industrial sites.

This indicates that while there does not appear to be a worsening crash situation on Mitchell Avenue. Regardless the potential impact of the proposed increase in vehicle movements from the Project needs to be considered.

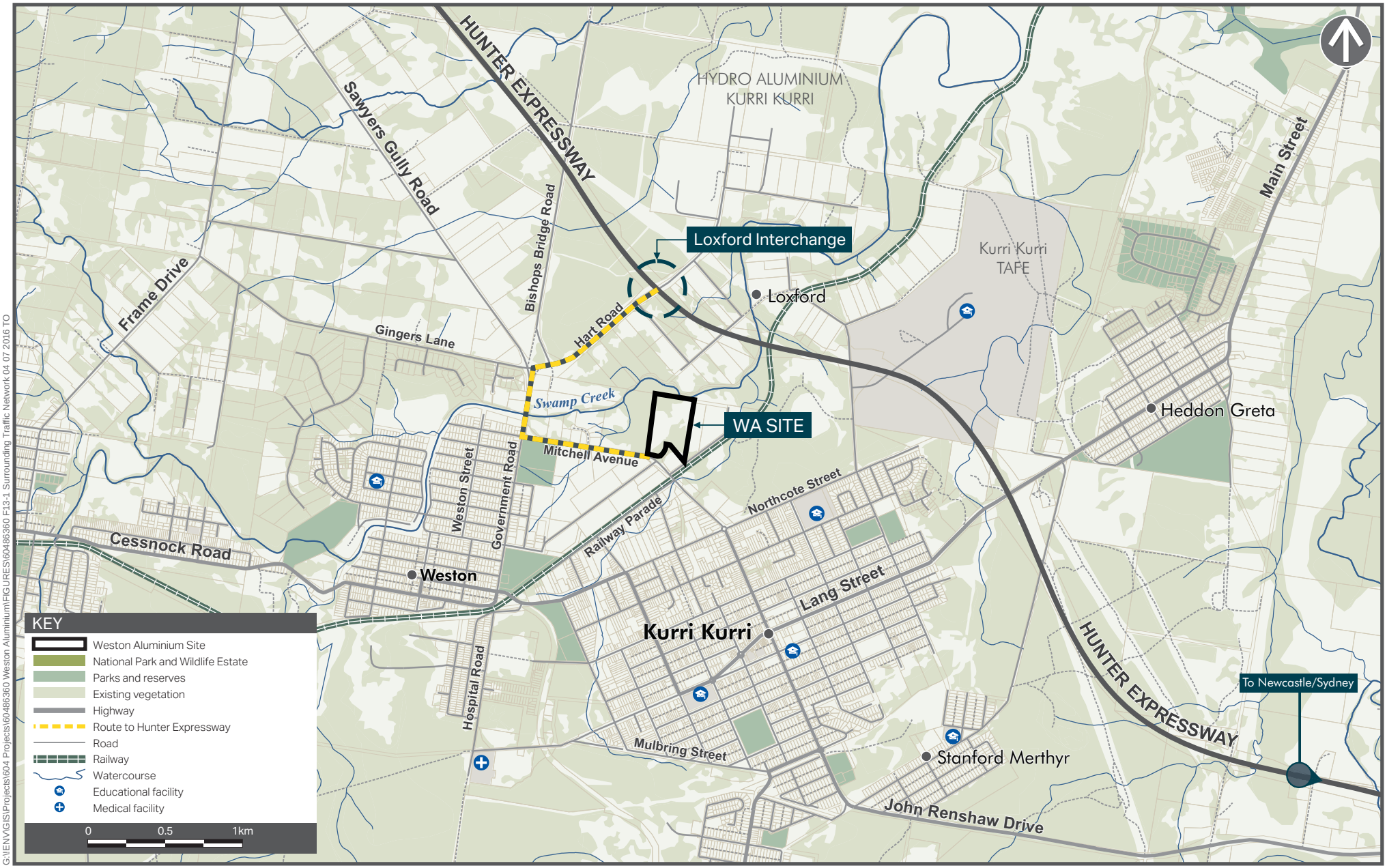

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FIGURE 13-1

13.4 Assessment of Potential Impacts

13.4.1 Construction Impact Assessment

Construction traffic as part of the installation of the new process equipment includes light vehicle and heavy vehicle movements. Up to ten light vehicles (assuming an occupancy rate of one person per vehicle) and two heavy vehicles would access the WA Site per day during the construction phase. In the context of construction heavy vehicles could include vehicles in between Classes 3 – 12 in accordance with the AUSTROADS vehicle classification system.

All the construction vehicles, that are not light vehicles, would access the Project Area from the Hunter Expressway, Hart Road, Government Road and then Mitchell Avenue. As the Project would generate relatively low traffic volumes, it is likely to have a minimal impact on Mitchell Avenue and the surrounding road network. No infrastructure upgrades would be required during the construction phase.

There are sufficient existing parking spaces on site to accommodate construction staff numbers.

13.4.2 Operational Impact Assessment

The Project would generate an additional ten light vehicle movements each way from six shift workers and two maintenance staff. Vehicles would typically access the Project Area from the Hunter Expressway, Hart Road, Government Road and then Mitchell Avenue. No heavy vehicle movements would travel through the Kurri Kurri town centre.

Light vehicles would access the WA Site at the start and end of shifts which would not generally correspond with the morning and afternoon peak periods on the surrounding road network. Workers generally arrive before the morning peak and leave prior to the afternoon peak. The surrounding road network and Hunter Expressway linkages have adequate capacity to absorb the additional traffic generated during operations.

In addition, three extra truck deliveries would be generated on a typical weekday. A single truck may be required to remove resulting waste ash every one to two weeks. In the context of the operation of the Project, trucks would potentially be up to Classes 3 – 5 in accordance with the AUSTROADS vehicle classification system. Due to the nature of the materials and quantities being delivered to site vehicles sizes are anticipated to be approximately 5.5m in length. A turning path demonstrating a typical vehicle can access the proposed delivery area is included in **Appendix I**.

The anticipated operating hours would be 24 hours per day, 7 days per week. All the truck movements would be made between 7am and 3pm, from Monday to Friday. Despite being operational during these times in accordance with the existing EPL condition L5.1, heavy vehicle deliveries would be restricted to between the hours of 7am and 10pm. Given the low volumes of heavy vehicles per day, it is anticipated there would be minimal impact on the surrounding road network.

The future operational traffic impact on the surrounding road network is expected to be minimal. The Project would not trigger the need for any upgrades to the external road network, and would not require the construction of additional internal roads. Furthermore, there are sufficient existing parking spaces on site to accommodate existing and future operational staff numbers.

13.4.3 Assessment of Parking and Internal Site Access

The existing formal sealed car parking area located at the front of the WA site contains 38 car parking spaces, including a disabled parking space, and two visitor parking spaces. The available light vehicle parking would be sufficient to accommodate the relativity small amount of light vehicles expected onsite during both construction and operational phases.

Trucks and large vehicles accessing the site travel past the site office and through a gated weighbridge area to the required site location. During construction, trucks would laydown materials in proximity to the construction footprint prior to leaving site. During operations, trucks would deliver to the loading bay of the proposed building, unload wastes or load ash, and immediately move from the site. Therefore, no truck parking would be required.

13.4.4 Potential Cumulative Impacts

The proponents of the proposed battery recycling facility (SSD 16_7520) were consulted to determine that likely traffic loading that may be generated by the battery recycling facility, should it proceed. The truck movements are detailed in **Table 13-3**.

It should be noted that the BRF construction traffic, as advised by the BRF proponent, is anticipated to be 6 heavy vehicle and 10 light vehicles per day with construction works to be undertaken during standard hours for a period

of approximately 18 months. As construction traffic is much lower than operational traffic, only operational traffic impacts are assessed below; construction traffic impacts are considered to be negligible.

Table 13-3 Battery Recycling Facility Truck Movements

VEHICLE MOVEMENTS	B-Double	Semi-Trailer	Standard Truck	Pick-up Trucks	Tipper Truck	Chemical Tanker	Fuel Tanker
Batteries	140	1500	900	125			
Anthracite Coal		778	194				
Soda Ash		53	123				
Iron Grits			30		3		
Hydrogen Peroxide			6				
Sodium Hydroxide						9	
Diesel							55
Pb ingots	126	1000	30				
Slags					132		
Heavy plastics					150		
Anydrous Na_2SO_4		75	281	19			
Polypropylene		123	53	9			
Employees/Visitors							
Sub-total:	**265**	**3528**	**1617**	**153**	**285**	**9**	**55**
Total	**5,912**						

As detailed in **Table 13-3** approximately 5,912 trucks movement per year would be accessing the battery recycling facility, equating to approximately 17 trucks movements per day. In relation to light vehicle movements from staff and visitors, the BRF proponent has indicated they anticipate approximately 60 movements per day.

When combined with the three additional trucks per day accessing the local road network for the WA Project, this is considered to have a minimal impact on local road capacity. Furthermore, cumulative impacts are considered minor for the following reasons:

- The Battery Recycling Facility would access the wider arterial network via Mitchell Avenue, Government Road and Hart Road then onto the Hunter Expressway. This would avoid truck movements through the centre of Kurri Kurri;
- The Project and the Battery Recycling Facility would have its own dedicated driveway access to Mitchell Avenue located approximately 50m to the east of the Project site access, preventing potential for trucks be queuing to enter the same access point; and
- Both facilities would have appropriate traffic management plans in place, including driver inductions to make sure that site specific and local road network traffic requirements are considered at all time.

Overall, the potential for significant cumulative traffic impacts to result from both Projects is considered minor.

13.5 Mitigation Measures

Based on the potential level of impacts associated with the Project, it has been concluded that no road upgrades or changes to traffic or transport infrastructure would be required. Similarly, internal access ways and parking facilities are considered adequate, and no upgrades are required.

A Construction Traffic Management Plan should be prepared and implemented prior to the construction phase of the Project as part of the CEMP. This would include the guidelines, general requirements and principles of traffic management to be implemented during the construction phase to minimise the potential for traffic impacts on Mitchell Avenue. Specifically, no construction traffic would be allowed to park or idle on the surrounding road network.

The WA Site's existing Operational Environmental Management Plan would be updated to incorporate consideration of the Project's operational traffic requirements. Measures that would be implemented to manage operational traffic include:

- An induction process for drivers;
- Time of day travel restrictions in accordance with the EPL; and
- The requirement to follow approved operational access and egress routes from the Hunter Expressway.

13.6 Summary and Conclusion

The assessment of potential Project related traffic impacts during the construction and future operational phases was undertaken. Based on the small volumes of both construction and operational traffic, it is expected that the traffic impact on the surrounding road network would be minimal. The existing parking space provision and existing internal access ways would be sufficient for existing, construction and future operational traffic.

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14.0 Noise and Vibration

This **Section 14.0** provides an assessment of the potential noise, vibration and blasting impacts of the Project. This assessment is supported by the Noise and Vibration Impact Assessment provided in **Appendix G**.

14.1 Secretary's Environmental Assessment Requirements

The assessment of noise, vibration and blasting addresses the SEARs as detailed in **Table 14-1**.

Table 14-1 Secretary's Environmental Assessment Requirements for the Noise, Vibration and Blasting

Noise and Vibration SEARs
Noise and Vibration – including: - a quantitative assessment of potential construction, operational and transport noise and vibration impacts in accordance with relevant EPA guidelines; and - details and justification of the proposed noise mitigation and monitoring measures.

14.2 Methodology

The assessment of both construction and operational noise and vibration was undertaken in accordance with the following guidelines:

- *Interim construction Noise Guidelines* (ICNG) (OEH, 2009);
- *NSW industrial Noise Policy* (INP) (EPA, 2000);
- *NSW Environment Protection Authority Assessing vibration: a technical guideline, Department of Environment and Conservation, NSW* (AVTG, DEC 2006);
- *DIN Standard 4150 – Part 3 – Structural Vibration in Buildings – Effects on Structures*;
- *British Standard 7385: Part 2 1993 Evaluation and Measurement of Vibration in Buildings*;
- *NSW Environment Protection Authority NSW Road Noise Policy*, Department of Climate Change, Environment and Water, NSW (RNP) (DECCW 2011); and
- *NSW Environment Protection Authority Application notes – NSW industrial noise policy* (EPA, 2013).

Reference was also made to the WA Site's existing EPL 6423 and development consent conditions relevant to noise management.

14.3 Existing Environment

14.3.1 Surrounding receivers

Due to the location of the Project Area, two main groups of sensitive noise receivers have been identified in residential area to the west (Weston) and south east (Kurri Kurri) of the Project Area. Residential receivers have been grouped together into Noise Catchment Areas (NCAs), whereby the NCAs are used to cluster residential receivers with common noise environments. The NCAs and the representative receivers are detailed in **Table 14-2**. These NCAs represent the closest residential receivers to the Project Area.

Table 14-2 Noise Catchment Areas

Designation	Representative receiver	Approximate distance from site boundary (m)
NCA 1	84 Government Road, Weston	850
	67 Government Road, Weston	770
	72 Hart Road, Loxford	600
NCA 2	122 Mitchell Avenue, Kurri Kurri	330
	68 Northcote Street, Kurri Kurri	640

Demonstration of compliance at any of the residential receivers within the NCAs and surrounding industrial receivers is deemed sufficient to indicate compliance at any other. The NCAs are detailed in **Figure 14-1**.

14.3.2 Existing Noise Environment

In order to understand the existing noise environment of the Project Area, including noise generated by existing WA operations, attended and unattended noise monitoring was undertaken.

Unattended Noise Monitoring

Ambient noise monitoring was conducted by AECOM at Tenth Street, Weston and Northcote Street, Kurri Kurri in accordance with the INP requirements in order to establish the existing noise environment at locations representative of the NCA's as detailed in **Table 14-2**. For full details of this methodology and the relevant results, refer to Sections 2.2 and 2.4 of **Appendix G**.

The results of the noise monitoring have been processed in accordance with the procedures contained in the INP, and were used to establish assessment background levels at the two monitored receiver locations.

Attended Noise Monitoring

Attended noise measurements were undertaken on 3 March 2016 at the WA Site. This monitoring identified industrial noise as a feature of the area. For full details of this methodology and the relevant results, refer to Sections 2.3 and 2.4 of **Appendix G**.

EPL Noise Monitoring

Noise compliance monitoring of the existing WA Site was conducted on 14 May 2015 by Spectrum Acoustics as per the requirements of EPL 6423. A summary of these results are provided in Section 2.5 of **Appendix G**. Generally, these results found compliance with the relevant noise limits in EPL 6423 (refer Table 6 in **Appendix G**).

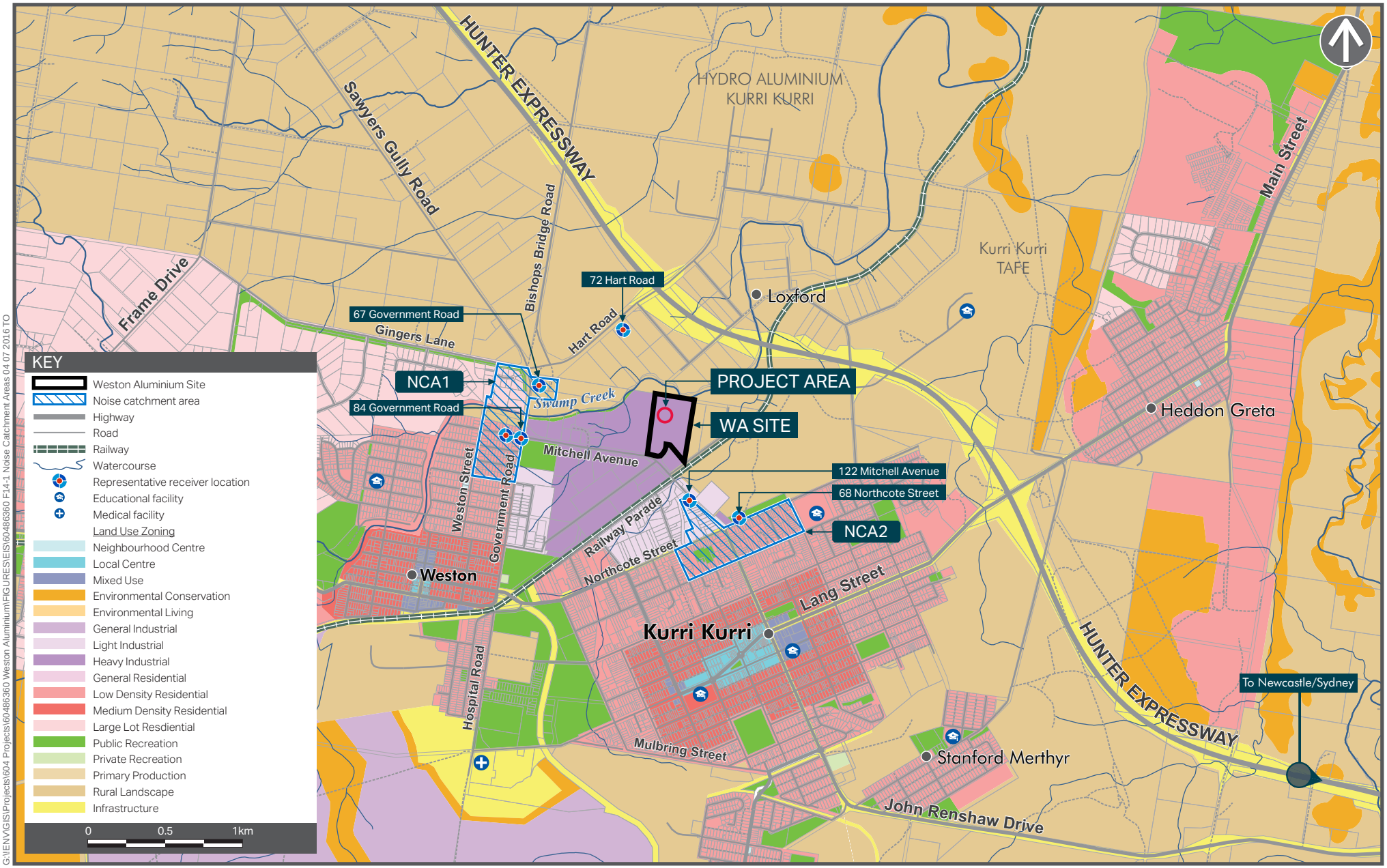

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FIGURE 14-1

14.4 Acoustic Criteria

14.4.1 Construction Noise and Vibration Criteria

Construction Noise Management Levels

The EPA's Interim Construction Noise Guidelines (ICNG) provides the basis for construction noise assessments in NSW. This document replaces the previous publication, the Environmental Noise Control Manual, and is used as the basis for establishing construction noise management levels.

Under the ICNG guideline a construction noise management plan is required to be compiled by the Contractor, prior to construction commencing. Noise Management Levels (NMLs) must be set for the standard working hours periods, and must be complied with where feasible and reasonable. Work that is proposed outside of standard working hours, as defined in the *ICNG*, generally requires strong justification.

Predicted noise levels at nearby sensitive receivers (e.g. residential, sensitive commercial premises) are compared to the levels provided in Section 4 of the ICNG (refer to Section 3.1.1 of **Appendix G**). Where an exceedance of the noise management levels is predicted, the ICNG advises that the proponent should apply all feasible and reasonable work practises to minimise the noise impact.

Relevant background noise levels for the nearest residential receivers based on the results of the monitoring referred to in **Section 14.3.2**, as well as specific noise management levels calculated with reference to the ICNG are set out in **Table 14-3**. Utilising the background monitoring results and the Project specific Rating Background Levels (RBL) for the Project were derived in accordance with the methodology set out in the ICNG. From the RBL's the Project Noise Management Levels were calculated, again in accordance with the methodology described in the ICNG. Specific details regarding the calculation of these levels is described in **Appendix G**.

Table 14-3 Background Noise Levels and Specific Noise Management Levels

NCA	Rating background levels L_{A90}, dB(A)			Noise management levels L_{Aeq}, dB(A)			
	Day	Evening	Night	Day SH	Day OOH	Evening	Night
1	44	39	37	54	49	44	42
2	47	44	38	57	47	49	43

SH = Standard Hours, and OOH = Out of Hours, L_{A90} = Noise level exceeded for 90% of the time, L_{Aeq} = Equivalent continuous level.

NML – Day=RBL +10 dB(A), Evening = RBL +5 dB(A), Night = RBL +5 dB(A).

The construction works are scheduled to occur during standard construction hours as defined in **Table 14-4**.

Table 14-4 Construction Time Periods

Works period	Time period		
	Monday – Friday	Saturday	Sunday or Public Holiday
Standard	7 am – 6 pm	8 am – 1 pm	Nil
Out of Hours Works 1	6 pm – 10 pm	1 pm – 10 pm	8 am – 6 pm
Out of Hours Works 2	10 pm – 7 am	10 pm – 8 am	6 pm – 7 am

Criteria for industrial and commercial premises are:

- Industrial premises: external $L_{Aeq\ (15min)}$ 75 dB(A); and
- Commercial (e.g. offices, retail outlets): external $L_{Aeq\ (15min)}$ 70 dB(A).

Construction Traffic Noise Criteria

In assessing feasible and reasonable mitigation measures under the RNP, an increase of up to 2 dB(A) represents a minor impact that is considered barely perceptible to the average person. The relevant noise goal

applied to traffic movements on public roads generated during the construction phase of the Project would be an increase in existing road traffic noise levels of no more than 2 dB(A).

Construction Vibration Objectives

The effects of vibration in buildings can be divided into two main categories: those in which the occupants or users of the building are inconvenienced or possibly disturbed; and those where the building structure may be affected.

Guidance in relation to acceptable vibration levels for human comfort are provided in the AVTG. This document is based on the guidelines contained in BS 6472-1992. Further details are provided in Section 3.1.2.1 of **Appendix G**.

Vibration levels at sensitive receiver locations must also be controlled so as to avoid the risk of damage to buildings and other structures. The German Standard *DIN 4150-Part 3 (1999) 'Structural vibration in buildings – Effects on Structures'* provides recommended maximum levels for short-term vibration (refer to Section 3.1.2.2 of **Appendix G**).

The British Standard *BS 7385-2:1993 'Evaluation and measurement for vibration in buildings'* also provides structural damage criteria. This relates to transient vibrations such as vehicle or train pass-bys (refer to Section 3.1.2.2 of **Appendix G**). The Transport Construction Authority publication the Construction Noise Strategy recommends safe working distances to minimise disturbance to occupants of nearby buildings and is based on the British Standards *BS 6472 'Evaluation of human exposure to vibration in buildings'* and *BS 7385 'Evaluation and measurement for vibration in buildings'* (refer to Table 12 of **Appendix G**).

14.4.2 Operational Noise and Vibration Criteria

Environment Protection Licence 6423 Noise Limits

Condition 5 of EPL 6423 currently provides for the following noise limits:

- L5.1 To restrict noise impacts, truck movements to and from the premise must be limited to between the hours of 7 am and 10 pm; and
- L5.2 Noise from the premises must not exceed the noise limits presented in **Table 14-5**.

Note: Where amenity noise levels are lower than intrusive noise levels, both levels are in the licence condition in order to ensure that intrusive noise impacts are controlled at all times.

Table 14-5 EPL 6423 Noise Limits

Location	Daytime	Evening	Night time
Residences at the corner of Government and 10th Streets	$L_{Aeq(15\ minute)}$ 48 dB(A)	$L_{Aeq(15\ minute)}$ 48 dB(A), $L_{Aeq(evening)}$ 40 dB(A)	$L_{Aeq(15\ minute)}$ 47 dB(A), $L_{Aeq(night)}$ 35 dB(A), $L_{Aeq(1\ minute)}$ 57 dB(A)
Residences on Northcote Street	$L_{Aeq(15\ minute)}$ 44 dB(A)	$L_{Aeq(15\ minute)}$ 44 dB(A)	$L_{Aeq(15\ minute)}$ 44 dB(A), $L_{Aeq(night)}$ 40 dB(A), $L_{Aeq(\ 1\ minute)}$ 57 dB(A)
Residences in the Light Industrial Zone on Mitchell Avenue and Railway Avenue	$L_{Aeq(15\ minute)}$ 43 dB(A)	$L_{Aeq(15\ minute)}$ 43 dB(A)	$L_{Aeq(15\ minute)}$ 43 dB(A), $L_{Aeq(night)}$ 41 dB(A), $L_{Aeq(1\ minute)}$ 55 dB(A)

Industrial Noise Policy

The INP states that the noise from any single source should not intrude greatly above the prevailing background noise level. Industrial noises are generally considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (L_{Aeq}), measured over a 15 minute period, does not exceed the background noise level measured in the absence of the source by more than 5 dB. This is termed the Intrusiveness Criterion. The rating background level (RBL) is the background noise level to be used for assessment purposes and is determined by the methods given in Section 3.1 of the INP. Adjustments are to be applied to the level of noise produced if the noise at the receiver contains annoying characteristics such as tonality or impulsiveness.

Protecting Noise Amenity

To limit continuing increases in noise levels, the maximum ambient noise level resulting from industrial noise sources should not normally exceed the acceptable noise levels specified in *Table 2.1* of the INP. That is, the background noise level should not exceed the level appropriate for the particular locality and land use. This is termed the Amenity criterion.

Residential receivers in this study have been classified as 'Suburban'. For residential receivers, the amenity criteria are shown in **Table 14-6** Amenity criteria for other nearby receiver types are also presented in **Table 14-6**.

Table 14-6 Recommended LAeq Noise Levels from Industrial Nosie Sources

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended L_{Aeq} Noise Level dB(A)	
			Acceptable	Recommended Maximum
Residence	Suburban	Day	55	60
		Evening	45	50
		Night	40	45
Industrial premises	All	When in use	70	75
Commercial Premises	All	When in use	65	70

Provided below in **Table 14-7** is the established criteria for each of the assessment locations.

Where there are high levels of existing industrial or transportation noise then noise from the new source must be controlled to preserve the amenity of the area. Modification factors for areas with existing high levels of industrial or transportation noise are provided in Table 2.2 of the INP and detailed in **Appendix G**.

The Facility is required to meet both the intrusive and amenity criteria in accordance with the INP. The Project Specific Noise Levels (PSNL) for the various assessment periods, at the nearby residences are shown with shading in **Table 14-7**. For relatively constant noise emissions during the various assessment periods, the PSNL becomes the lower of either the intrusiveness or amenity criterion, this represents a conservative approach.

Table 14-7 Operational Noise Criteria

Location	Assessment period	Measured L_{Aeq} noise level, dB(A)	RBL (L_{A90}), dB(A)	Intrusive criteria[4]	Amenity criteria[5]
Residences (NCA 1)	Day[1]	51	39	44	55
	Evening[2]	50	34	39	43
	Night[3]	44	32	37	37
Residences (NCA 2)	Day	62	42	47	55
	Evening	59	39	44	49
	Night	55	33	38	45
Industrial Premises	When in use	-	-	-	70
Commercial Premises	When in use	-	-	-	65

Notes:

1. Day is defined as 7:00 am to 6:00 pm, Monday to Saturday and 8:00 am to 6:00 pm Sundays & Public Holidays.
2. Evening is defined as 6:00 pm to 10:00 pm, Monday to Sunday & Public Holidays.
3. Night is defined as 10:00 pm to 7:00 am, Monday to Saturday and 10:00 pm to 8:00 am Sundays & Public Holidays.
4. Intrusiveness RBL +5dB(A).
5. The amenity criteria have been adjusted in accordance with Table 2.2 of the INP. The dominant noise level in the vicinity of residences in NCA 1 and 2 is traffic noise and industrial noise from the surrounding industrial premises (refer Table 16 in Appendix G).

Based on the measured background noise levels during the night, the sleep disturbance criteria were calculated in accordance with the requirements of the INP for the nearest noise sensitive residential receivers. These criteria are presented in **Table 14-8**.

To minimise the risk of sleep disturbance as a result of industrial type operations during the night-time period, the INP application notes recommend that, the $L_{A1(1\ minute)}$ noise level outside a bedroom window should not exceed the L_{A90} background noise level by more than 15 dB(A) during the night-time period (10.00 pm to 7.00 am).

The INP application notes reference the RNP for some guidance in assessing the potential for sleep disturbance. The RNP contains a review of research into sleep disturbance which represents NSW EPA advice on the subject of sleep disturbance due to noise events. It concludes that having considered the results of research to date that, *'Maximum internal noise levels below 50-55 dB(A) are unlikely to cause awakening reactions'*. Therefore, given that an open window provides 10 dB(A) noise attenuation from outside to inside, external noise levels of 60-65 dB(A) are unlikely to result in awakening reactions.

Table 14-8 Night-time Sleep Disturbance Criteria

Location	Measured night-time RBL, $L_{A90,\ 15\ mins}$ dB(A)	Sleep disturbance criteria $L_{A1\ (1\ minute)}$ dB(A)	
		Screening Level[1]	Awakening Reaction[2]
NCA 1	32	47	65
NCA 2	33	48	65

$L_{A90,\ 15\ mins}$ = Average noise level over 90% of the time during a 15min monitoring period

$L_{A1\ (1\ minute)}$ = The noise level exceeded for 1% of 1min.

1. INP= RBL +15dB(A)
2. RNP maximum 65 dB(A)

Road Traffic Noise Criteria

The main roads providing access to the proposed development are Government Road and Mitchell Avenue. These roads are considered sub-arterial roads. **Table 14-9** presents the road traffic noise criteria from the RNP for land use developments with a potential to create additional traffic on sub-arterial and local roads. The external noise criteria are applied 1 m from the external facade of the affected building.

Table 14-9 Road traffic noise criteria – Freeways / Arterial / Sub-arterial roads

Period	Parameter	Criterion
Sub-Arterial Roads		
Day (7:00 am – 10:00 pm)	$L_{Aeq\ (15hr)}$	60 dB(A)
Night (10:00 pm – 7:00 am)	$L_{Aeq\ (9hr)}$	55 dB(A)

Operational Vibration Objectives

Unlike the criteria applicable to noise emissions, vibration criteria for operational activities are the same as those recommended for construction works (refer to **Section 14.4.1**). Therefore, operational vibration levels at sensitive receiver locations must be controlled so as to prevent discomfort and regenerated noise, and in some extreme cases, structural damage.

14.5 Construction Noise and Vibration Assessment

Construction noise has been assessed in accordance with ICNG guidelines. The works are scheduled to occur over a period of 6-8 weeks and there are no residential receivers within 600 m of the Project Area. The assessment of the construction noise is based on the noise generated by the proposed construction equipment. **Table 14-10** presents the:

- Sound power levels of the construction equipment planned to be utilised on this development;
- Distance to the nearest receivers; and

- Predicted construction noise levels at the nearest residential and commercial receivers.

The predicted noise levels only take into consideration hemispherical distance propagation, ground and air absorption and shielding from any intervening structures have not been considered. Therefore, the predicted construction noise levels at nearby receivers are considered to be conservative. It is also important to note that a number of the proposed construction activities would be conducted inside the existing building, which would further attenuate construction noise levels.

Table 14-10 Construction Equipment Noise Emission Levels

Equipment	Equipment sound power level[1] – dB(A)	Distance to nearest receiver (m)		Predicted sound pressure level, L_{Aeq} - dB(A)	
		Residential	Industrial	Residential	Industrial
Concrete agitator	106	600	300	42	48
Concrete vibrator	97	600	300	33	39
Breakers	112	600	300	48	54
Pneumatic hand tools	108	600	300	44	50
Truck (Rigid or Articulated)	98 – 108	600	300	34-44	40-50
Excavator	99	600	300	35	41
Crane	104	600	300	40	46
Forklifts	104	600	300	40	46
Tele-handlers	104	600	300	40	46

Notes:

1. The above sound power levels are based upon the Australian Standard AS2436-1981, "*Guide to Noise control on construction, maintenance and demolition sites,*" the UK Department for Environment, Food and Rural Affairs' and AECOM's database.

The predicted noise levels presented in **Table 14-10** indicate that the maximum construction noise levels at nearby residential receivers would range from 33 – 48 dB(A). These are below the noise management levels during standard construction hours.

In addition to the identified residential receivers in NCA 1 and 2 there are industrial receivers (i.e. 125 Mitchell Avenue, Kurri Kurri) immediately adjacent to the WA site. The assessment found that the nearest industrial receivers would experience construction noise ranging from 39 – 54 dB(A). These are below the noise management levels during standard construction hours.

General mitigation measures listed in **Section 14.7** should be sufficient to control noise levels to within reasonable levels at nearby sensitive receivers.

14.5.1 Construction Traffic Noise

During the proposed construction works, up to ten light vehicles and two heavy vehicles would access the Project Area each day. Construction vehicles would access the Project Area via Mitchell Avenue.

This marginal increase in construction vehicles would give rise to an increase in construction traffic noise considered to be inconsequential (less than 1dB(A)) on Mitchell Avenue.

14.5.2 Construction Vibration

Vibration intensive works are proposed to occur during concrete breaking and the minor widening of vehicle entrances.

The safe working distances that relate to cosmetic/structural damage and human discomfort for the proposed works are presented in Section 3.1.2.3 of **Appendix G**. Breakers are the only vibration intensive equipment proposed to be used during the construction works. The safe working distances for structural damage and human response would be complied with when using breakers due to the large (over 300 m) offset distances to neighbouring structures.

14.5.3 Cumulative Construction Noise and Vibration

Construction of the Project could potentially overlap with the construction of an adjacent battery recycling facility. It is understood that similar construction plant to those listed in **Table 14-10** will be used to construct the battery recycling facility. If both construction works were to overlap the predicted construction noise may increase by up to 3 dB from those predicted in **Table 14-10**. In this case compliance with the construction noise management levels would still be expected.

14.6 Operational Noise and Vibration Assessment

14.6.1 Operational Noise Impacts

The operational noise levels of the Project were predicted at the nearest sensitive receivers. The operation of the Project was modelled using the worst case scenario of all equipment operating simultaneously and continuously over a full 15 minute period. The model assessed neutral conditions, worst case wind conditions (3 m/s wind source to receiver) and F Class temperature inversions.

The predicted environmental noise emission levels from the operation of the Project at the nearest sensitive receivers, including an assessment against the relevant INP criteria are presented in **Table 14-11**.

As the existing and future noise emissions from the Project Site would be dominated by relatively constant building services noise, the $L_{Aeq,\ period}$ has been assumed to be equal to the assessed $L_{Aeq,\ 15\ min}$ for the worst case operational scenario. This represents a conservative assumption.

The Project Specific Noise Levels (PSNL) for the day and night assessment periods, at the nearby residences are shown in **Table 14-11**. For relatively constant noise emissions during the various assessment periods, the PSNL becomes the lower of either the intrusiveness or amenity criterion, this represents a conservative approach. A noise contour plot for the future operational scenario is presented in **Appendix D** of **Appendix G**.

Table 14-11 Predicted Environmental Noise Emission Levels and Summary of Compliance

Location	Criterion, L_{Aeq}, dB(A)[1]		Sound pressure level, L_{Aeq}, dB(A)[2]				
			Day		Night		
	Day	Night	Neutral	Wind	Neutral	Wind	F Class Inv[3]
Existing operations (i.e. excluding the Project)							
84 Government Road, Weston	44	37	32	36	29	33	33
67 Government Road, Weston	44	37	34	38	31	35	35
72 Hart Road, Loxford	44	37	37	41	34	37	37
122 Mitchell Avenue, Kurri Kurri	47	38	39	41	38	41 Exceeds INP[4]	41 Exceeds INP[4]
68 Northcote Street, Kurri Kurri	47	38	34	38	34	38	38
Future operations (i.e. including the Project)							
84 Government Road, Weston	44	37	32	36	29	34	34
67 Government Road, Weston	44	37	35	39	31	35	35
72 Hart Road, Loxford	44	37	37	41	34	37	37
122 Mitchell Avenue, Kurri Kurri	47	38	39	42	39 Marginally Exceeds INP[5]	41 Exceeds INP[4]	41 Exceeds INP[4]
68 Northcote Street, Kurri Kurri	47	38	34	38	34	38	38

Note:

1. Refer to Table 14-7 for criteria.
2. The predicted noise levels at the residential receivers have been assessed against the night-time criterion. This is the most stringent criterion. Compliance with the night-time noise limits would ensure compliance with the day and evening noise limits.
3. F-class temperature inversions are considered to be 'moderate inversions' as per Appendix A of the INP: http://www.epa.nsw.gov.au/resources/noise/ind_noise_app.pdf.
4. Other INP exceedance are a maximum of 3dB(A) over criteria which is at the lower end of what human hearing can distinguish.
5. A *marginal* exceedance equated to 1dB(A) which is generally not perceptible to the human hearing.

As shown in **Table 14-11** the Project would generally be in compliance with the Project specific criteria. Some small exceedances (up to 3dB(A)) have been modelled to potentially occur at the receiver at 122 Mitchell Avenue however for the following reasons these exceedances are expected to have a minor impact on this receiver:

- The exceedances are only predicted to occur at night and during noise enhancing meteorological conditions including an F-Class temperature inversion which generally only occur during winter when receivers have dwellings sealed;
- The assessment criteria have been derived from the lower of the amenity and intrusiveness criteria to provide a conservative assessment;
- The assessment assumes a constant operation of Project equipment for the duration of the assessment period providing further conservativeness; and
- The predicted noise level are only up to 1dB(A) over existing plant noise levels meaning there would be a negligible change in overall impacts as a result of the Project. As evidenced by the lack of noise complaints received by the proponent existing noise levels are not problematic for local receivers.

For these reasons operation noise impacts as a result of the Project are anticipated to be minor. Furthermore it should also be noted that the receiver at which the potential for a small exceedance to occur is identified as being located on industrial zoned land with commercial and industrial neighbours. The noise environment in this area is consistent with the land zoning and not out of character.

14.6.2 Sleep Disturbance

Predicted noise emissions from the Project are not expected to exceed 60 dB(A) at the nearest residential receivers due to the more than 400 metre separation. Therefore, the assessment indicates compliance with the sleep disturbance screening criteria set out in the *NSW Environment Protection Authority Application notes – NSW industrial noise policy* (EPA, 2013).

14.6.3 Additional Road Traffic

Trucks would enter and exit the Project Area from Mitchell Avenue. Truck movements would be limited to the daytime only and are expected to increase by up to three heavy vehicles per day.

Due to the small number of additional vehicles the increase in noise as a result of traffic generated by the development would be inconsequential (less than 1 dB(A)) on Mitchell Avenue. Therefore, the issue of impacts caused by operational traffic need not be considered any further.

14.6.4 Operational Vibration

Due to the offset distances between the Project and the nearest neighbouring building or structure, there is not expected to be any operational vibration impact associated with the Project with regard to either cosmetic damage or human comfort.

14.6.5 Future Cumulative Noise Impact

Information was sought form the proponent of the proposed battery recycling facility that might be built on land to the east of the Project Area. The list of equipment detailed in **Table 14-12** was identified.

Table 14-12 Battery Recycling Facility Noise Producing Plant and Sound Power Levels

Equipment	Sound power level, L_{Aeq} dB(A)	Location
Vibrating feeder	90	indoor
Agitators	90	indoor
Hammer mills with sound proof enclosure	98	indoor
Scrubber fan	90	outdoor
Crystallizer area:	88	indoor
Foundry area (furnace)	88	indoor
Outside fans (U720-U820-U421)	90	outdoor
Cooling tower pump	88	outdoor
Oxygen Plant	90	indoor
PP Recovery Facility	93	indoor
Delivery Trucks	98[1]	outdoor

Notes:

1. Time weighted to a 15 minute period.

An assessment of potential cumulative noise was undertaken as detailed in Section 5.5 of **Appendix G**. This assessment found that the Project would generally be in compliance with the Project specific criteria. Some marginal exceedances have been predicted to potentially occur at the receiver at 122 Mitchell Avenue (up to 4 dB) and 72 Hart Road, Loxford (up to 1 dB). The cumulative noise levels are generally predicted to be 1-2 dB above the noise levels predicted for the future Weston Aluminium site on its own. In addition the residence at 122 Mitchell Avenue is surrounded by commercial and industrial neighbours, therefore cumulative noise impacts are expected to be minor. In addition the cumulative noise levels are predicted to be 1-2 dB above noise levels from the existing WA facility. A difference of 2 dB is considered to be barely perceptible to the average person.

Cumulative noise is considered to be minor. Due to the nature of the proposed battery recycling operation and larger list of potential noise sources (equipment) the Project would have a smaller impact on the cumulative noise environment.

14.7 Mitigation Measures

14.7.1 Construction Noise and Vibration Mitigation Measures

The ICNG accepts that construction often results in excessive noise, albeit on a temporary basis, and where physical mitigation options are limited, stresses the importance of community engagement in a frank and upfront manner.

The ICNG recommends that the contractor demonstrate best practicable means of controlling noise and include noise mitigation measures in the construction management plan to minimise the noise impact at sensitive receivers. This may include the work practices described below:

Construction Hours

Limit construction work to standard construction hours.

Standard Mitigation Measures

All construction activities associated with the development of the Project would be subject to the standard noise and vibration mitigation measures described below:

The contractor would, where reasonable and feasible, apply best practice noise mitigation measures including:

- Maximising the offset distance between noisy plant items and nearby noise sensitive receivers;
- Avoiding incidents of noisy plants working simultaneously close together and adjacent to sensitive receivers, where practicable;
- Orientating where possible, equipment with directional noise emissions away from sensitive receivers;

- Locating noisy plant away from potentially noise affected neighbours or behind barriers, such as sheds or walls;
- Loading and unloading would be carried out away from sensitive receivers, where practicable;
- Carrying out maintenance work on construction plants with the potential to generate noise impacts away from noise sensitive receivers and confined to standard daytime construction hours, where possible;
- Relocating any vibration generating plant and equipment away from noise and vibration sensitive receivers in order to minimise any potential vibration impacts;
- Turning off plant that is not being used;
- Ensuring plant is regularly maintained, and repairing or replacing equipment that becomes noisy; and
- Arranging the construction work site to minimise the use of movement alarms on vehicles and mobile plant.

Local Road Traffic – Heavy Vehicles Noise Mitigation

The following mitigation measures are proposed in order to minimise the impact of from heavy vehicles on local roads:

- All trucks would be fitted with mufflers and any other noise control equipment in good working order.
- As far as practical and safety consideration, truck drivers would avoid:
    - Heavy acceleration and braking;
    - Compression braking;
    - Reversing as far as practicable;
    - High speeds;
    - Pick-ups and deliveries outside standard construction hours; and
    - Idling outside noise sensitive receivers;
- Truck routes to and from the construction work site would be via the routes detailed in **Section 13.0**.

Reversing Alarms

The potential noise impact associated with reversing alarms would be managed and minimised via a combination of proactive driver/operator training and operational procedures. The following mitigation strategies would be undertaken, taking into account that SafeWork NSW Work Health and Safety requirements would need to be satisfied with respect to safety surrounding construction vehicles.

- The primary means for minimising reversing alarm noise would be through a dedicated effort on the part of all construction equipment drivers to minimise, wherever feasible, the amount of reversing of their vehicles;
- Wherever feasible, turning circles would be created at the end points of vehicle work legs, which would allow trucks to turn and avoid the need for reversing; and
- Emphasis would be placed during driver training and site induction sessions on the potential adverse impact of reversing alarms and the need to minimise their use.

14.7.2 Operational Noise and Vibration Mitigation Measures

The proposed facility would generally comply with the noise requirements discussed in Section 3.0 of **Appendix G**. 1-3 dB exceedances of the established INP criteria are conservatively predicted at 122 Mitchell Avenue, Kurri Kurri, however compliance with the existing EPL noise limits is predicted at this location. In addition, noise levels are not expected to increase significantly (less than 1 dB) when comparing the existing and future operational scenarios.

It is considered that additional noise controls are not required for the Project for the following reasons:

- Compliance with the EPL noise limits is predicted;
- Compliance with the INP noise requirements is predicted with the exception of 122 Mitchell Avenue where a 1-3 dB exceedance is predicted under conservative, worst case conditions; and

- Noise levels are not predicted to increase significantly (less than 1 dB) when comparing the existing WA Site and the future Project, and this exceedance would only occur during noise enhancing meteorological conditions. Therefore overall operational impacts would be minor.

14.8 Summary and Conclusion

The Acoustic Impact Assessment (refer to **Appendix G**) addressed the SEARs relating to noise by considering the impact of noise and vibration on nearby noise sensitive receivers during the construction and operational phase of the Project. In summary the assessment found that:

- Construction noise and vibration – compliance is indicated with the ICNG and AVTG noise and vibration management levels at the nearest residential and commercial receivers;
- Construction road traffic noise – compliance is indicated with the RNP acoustic criteria;
- Operational noise and vibration – compliance at all assessment locations during the daytime periods and a minor exceedance during night-time period under conservative, worst-case modelled conditions where noise enhancing meteorology occurs. Due to the conservative nature of the modelling this impact is expected to have a negligible impact on the receiver.
- Sleep disturbance – compliance at all assessment locations with sleep disturbance criteria is indicated during the nigh-time period;
- Operational road traffic noise – compliance is indicated with the RNP acoustic criteria; and
- Cumulative noise – the Project was found to have a minor impact on the cumulative noise when considering noise from the proposed battery recycling facility.

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15.0 Soil and Water

This **Section 15.0** provides an assessment of the potential impacts of the Project on soils and water. This assessment is supported by the Phase 1 Contamination Assessment provides at **Appendix H**.

15.1 Secretary's Environmental Assessment Requirements

The assessment of soil and water addressed the SEARs as detailed in **Table 15-1**.

Table 15-1 Secretary's Environmental Assessment Requirements for the Assessment of Soil and Water

Soil and Water SEARs
Soil and Water – including: - a quantitative assessment of existing flooding on the site, potential impacts to and as a result of the development and proposed mitigation measures; - an investigation to identify any soil or water contamination on the site and proposed management measures; - a description of water and soil resources, topography, hydrology waters courses and riparian lands on or nearby the site; - a detailed site water balance, including identification of water requirements for the life of the project, measures that would be implemented to ensure an adequate and secure water supply is available for the proposal and a detailed description of the measures to minimise the water use at the site; - details of stormwater/wastewater/leachate/flooding management systems including the capacity of onsite detention system, and measures to treat, reuse or dispose or water; - a description of erosion and sediment controls; - an assessment of potential impacts to soil and water resources topography, drainage lines, watercourses and riparian lands on or nearby to the site; and - consideration of salinity and acid sulfate soils impacts.

15.2 Methodology

In order to assess the potential soil and water impacts of the Project, the following investigations were undertaken for the Project Area:

Soils:

- A Phase One Environmental Site Assessment, which included a review of available desktop information, as well as a site inspection and onsite interviews conducted by AECOM on 8 March 2016 (refer to **Appendix H**). This confirmed the conditions of the Project Area and its immediate surrounds (to approximately 500 m from the Project Area); and
- A review of available soils and geological mapping information to characterise the site soils including review of the OEH eSPADE website.

Surface and groundwater:

- A review of online databases of existing surface and groundwater information; and
- A desktop flooding assessment based on existing floodway information, in particular the *Swamp/Fishery Creek Floodplain Risk Management Study* (Worley Parsons, 2013).

Water and Wastewater:

- Design water use requirements derived from Advanced Combustion Engineering Pty Ltd based on the site specific design.

15.3 Existing Environment

15.3.1 Geology and Soils

Information obtained from the Department of Mineral Resources – Hunter Coalfield Regional Geology sheet (1:100 000) indicates that the Project Area is underlain by Palaeozoic, Early Permian sandstone, which makes up the Dalwood Group, Farley/Rutherford/Allandale/Lochinvar Formation. It is primarily compromised of basalt, silty sandstone, siltstone, minor sandstone and marl, and conglomerate, lithic sandstone.

On the understanding that the Project Area comprises a small amount of cut and fill materials to achieve the required site levels, the shallow subsurface is likely to comprise fill materials. Information obtained from the Soil

Conservation Service of NSW – Singleton Soil Landscape Series Sheet SI 56-1 (1:250 000) (Kovac, M. and Lawrie, J.L., 1991), indicates that the area comprises of grey solodic soils in poorly drained areas with yellow solodic soils on better drained slopes.

A review of the Australian Soil Resource Information System found that the Project Area has an extremely low probability for the occurrence of acid sulfate soils (ASRIS, 2016). This is reinforced by the Cessnock LEP mapping which indicates the site does not contain with any Class of Acid Sulfate Soils.

15.3.2 Contamination

The Phase One Environmental Site Assessment found:

- The Project Area and its immediate surrounds are not currently subject to management under the *Contaminated Land Management Act 1997*;
- There was no evidence of landfilling (for waste), major spills or other significantly contaminating activities identified in the historical aerial photographs reviewed as part of the Phase One Environmental Site Assessment;
- Historical certificates of title identified potentially contaminating historical activities at the WA Site since 1990 when Australian Ultra Concrete Floor Pty Ltd commenced ownership. However, based on the aerial photographs, the potential for contaminating activities is unlikely to have occurred prior to the WA Site first being development (between 1998 and in 2006);
- A SafeWork NSW Dangerous Goods Search showed the following licensed dangerous goods as being listed at the WA Site:
    - Aluminium smelting by-products stored in Roofed Store; and
    - Diesel stored in Aboveground Storage Tank (10,000 L).
- Interviews with WA Site staff did not identify any known sources of contamination at the Project Area.

15.3.3 Groundwater

A search was conducted on 29 March 2016, through the NSW Department of Primary Industries Office of Water (DPI-Water) website, for registered groundwater bores within the vicinity of the Project Area. There were no bores located within 500 m of the Project Area. The nearest neighbouring bores, approximately 2 km north north-east of the Project Area, displayed no groundwater standing water levels.

Due to the lack of groundwater data for the area, the groundwater depth could not be estimated. Furthermore, the hydraulic gradient of groundwater at the Project Area and its immediate surrounds is not yet confirmed, however groundwater at the Project Area is likely to be in continuity with the nearest down gradient surface water receptor (Swamp Creek approx. 100 m north of the WA Site boundary). There is also the potential for shallow perched water to be present within fill and shallow soils.

As outlined in **Section 18.3.2**, no high priority Groundwater Dependent Ecosystems (GDEs) are present at the Project Area. Groundwater within the Project Area is likewise not currently extracted for use by WA. There are no known groundwater users in the vicinity of the Project and groundwater is unlikely to be used for any anthropogenic beneficial purposes in the vicinity of the Project Area. The most sensitive identified beneficial user of groundwater in the vicinity of the Project Area would be existing terrestrial vegetation that has a moderate potential for groundwater interaction, as well as nearby riparian vegetation (refer to **Section 18.3.2**).

15.3.4 Surface Water

Information obtained from the NSW Government Cessnock Topographic Map (1:25 000) shows that the Project Area is elevated to at least 11 - 13 m AHD. The Project Area and its surrounds are relatively flat. The highest point in the Project Area appears to be along the boundary fence, with surface runoff to the north towards Swamp Creek and south away from the fence line. Onsite stormwater is collected in stormwater drains and diverted to onsite wetland area to the east of the Project Area. Underground drainage pipes run from the wetland area to an irrigation area in the west and water is then irrigated back to vegetated areas on the WA Site. The WA Site itself slopes down gently to the north towards Swamp Creek at grades of less than two percent. There are some smaller steeper sections in the north east of the property with grades reaching seven to nine percent. However, these sections are not extensive and are away from the Project Area.

The WA Site is located in the Hunter River catchment and lies 100 metres south of Swamp Creek. There is some 7,600 Ha of the Swamp Creek catchment upstream of the WA Site. Downstream of the WA Site, the creek flows

approximately 6.4 kilometres to Wentworth Swamp. From its outlet at Wentworth Swamp, Swamp Creek flows a further 7 km to its confluence with Wallis Creek. Wallis Creek flows a further 6.7 kilometres before joining the Hunter River between East Maitland and Maitland. A plan showing major waterways in the vicinity of the WA Site as well as the upstream catchment is presented in **Figure 1-2**.

Water quality in Swamp Creek would be affected by the land uses upstream of the WA Site. The catchment features extensive uncleared areas including sections of State Forest and National Park. Water quality from these vegetated areas is expected to be relatively good, however this would be offset by poorer quality urban runoff from sections of Cessnock, Neath, Weston and Kurri Kurri, including mining operations and areas cleared for agriculture and grazing. For the purposes of water quality and river flow objectives, Swamp Creek in the vicinity of the proposal site has been classified by the NSW OEH as an *uncontrolled stream.*

Condition P1.3 of EPL 6423 currently requires the WA Site to conduct stormwater quality monitoring. Condition U1.1 of EPL 6423 requires that all mixed SPL material (in relation to the Mixed Spent Pot Lining Trial) be appropriately bunded and covered to prevent the emission of SPL dust, flammable gases and the contamination of stormwater. Condition E2.2 (in relation to the trial destruction of illicit drugs and pharmaceutical waste) requires all pharmaceutical waste to be stored in an enclosed, appropriately bunded and covered area, to prevent the contamination of stormwater. These conditions are all current met by WA to prevent impacts to surface water runoff quality.

Surface water within the vicinity of the Project Area is not currently extracted for use by WA. Beneficial users of surface water in the vicinity of the Project Area are likely to be ecological and agricultural users of surface water from the Swamp Creek and greater Hunter River catchment.

As outlined in **Section 7.2.4**, the Project would not require any shares to be obtained for surface water extraction under the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009*.

15.3.5 Flooding

The WA Site and its surrounds are relatively flat and lie between 11 and 13 m AHD in elevation. A large portion of the WA Site is sealed hardstand, and the majority of the Project Area lies on existing hardstand. Approximately half of the WA Site has been developed for the existing operation with the remainder being either grassed and partially treed or used for stormwater storage and drainage.

As outlined in Section **18.3.2**, Swamp Creek, around 150 m the north of the WA Site, currently supports a riparian corridor, considered an important component of floodplain management. This riparian corridor is not within the footprint of the current Project.

The *Swamp/Fishery Creek Floodplain Risk Management Study* (SFCFRMS) (Worley Parsons, July 2013) has been prepared by Cessnock City Council although the SFCFRMS has been placed on public exhibition some time ago it is yet to be finalised by Cessnock City Council. Despite this the SFCFRMS provide a detailed analysis of flood behaviours in Swamp Creek in the vicinity of the WA site.

The SFCFRMS assessed a range of flooding scenarios at a number of different probability levels. In regards to the Project the appropriate flood planning level is the 100 year reoccurrence (1% Annual Exceedance Probability (AEP). **Figure 15-1** has been taken from the SFCFRMS and shows that the Project Area in relation to the modelled 1% AEP flood level. It is noted that the Project Area may partially fall within the low hazard zone under the 1% AEP flood event. The site is not located within an area of high hydraulic capacity or flood velocity nor does the site, or any buildings on it, act as barriers to flow.

One of the key drivers for the preparation of the SFCFRMS was the June 2007 floods which resulted in significant flood damage in a number of suburbs in the Swamp Creek catchment, including Weston. WA staff provided anecdotal evidence that indicated the WA site was not impacted during this flood event.

In summary, while the northern section of the WA property may be subject to stream overtopping and shallow inundation from Swamp Creek during a 1% AEP event, the developed portions of the site, including the Project Area, would not be impacted during a flooding event of this size.

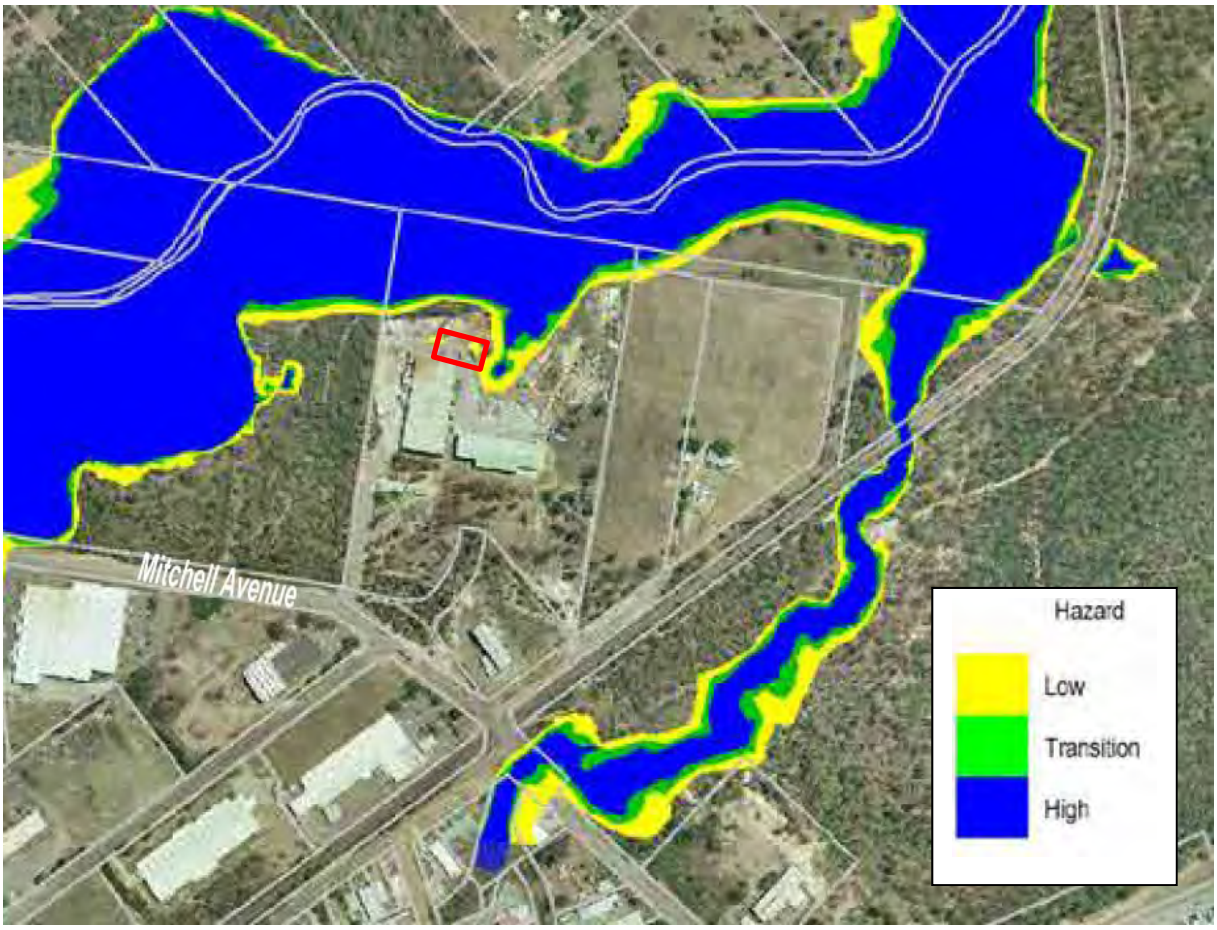

Figure 15-1 True Flood Hazard for the 1% AEP Flood. (Extract from Figure 6.6, courtesy of Worley Parsons, July 2013)

15.3.6 Water Use and Wastewater

Water is supplied to the existing site operations via the Hunter Water potable water network. Similarly, waste water is also disposed of via Hunter Water's wastewater network. No extraction of surface or groundwater, for use onsite is currently undertaken. Similarly no waste water is currently disposed of onsite.

15.4 Assessment of Potential Impacts

15.4.1 Geology and Soils

Construction excavations for footings may be required to depths of up to 5 m. As such, these footings may penetrate the shallow subsurface of fill materials and the underlying layers of solodic soils (refer to **Section 15.3.1**). It is unlikely that works would encounter Acid Sulfate Soils during excavations works. Construction works would result in exposed soils during civil works which have the potential to lead to sediment dispersal in stormwater and erosion of soils. Standard sediment and erosion control measures as described in the Blue Book would be employed to manage potential construction impacts. Soil salinity is not expected to have an impact on the Project.

15.4.2 Contamination

The Phase One Contamination Assessment did not confirm the presence of subsurface contamination. Despite this, as construction works have the potential to intercept soils and/or groundwater, appropriate management measures would be applied during construction activities directing that works stop if potential contaminants are identified and further investigations would be undertaken to confirm the presence of contaminates.

Construction works also have to potential to cause contamination of soils due to leaks or spills, for example a leak from a broken hydraulic hose or hydrocarbon spill during refuelling activities. Standard mitigation measures would be employed during construction works including regular vehicle maintenance and refuelling of machinery in dedicated refuelling bunds to minimise potential impact. The CEMP would include measures to manage potential

contamination at the Project Area in the event that it is encountered during construction works (refer to **Section 15.5**).

Operational activities would focus on the processing of waste products through the kiln. Prior to entering the kiln any waste products that need to be stored on site would be stored in dedicated bunded storage area. These storage areas would be contained in a fully sealed waste storage building. As waste materials would be held in enclosed bins in sealed areas there would be no opportunity for waste materials to be released to the environment. The waste storage building would be internally bunded to drain to sumps for removal of any water or liquids to the site's existing connection to the town sewage network.

15.4.3 Groundwater

Although unlikely, leaching of mobile contaminants from the soil level down into the groundwater is possible as a result of construction activities. While exact groundwater depth beneath the Project Area is unknown (refer to **Section 15.3.2**), construction excavations for footings may be required to depths of around 5 m therefore groundwater may also be intercepted during excavations.

As the proposed civil works would take place over a relatively short period (approximately four weeks), no significant dewatering is expected to be required therefore any direct impact to groundwater would be unlikely. However, the Project is unlikely to result in groundwater drawdown beyond the immediate area of excavations, should ground water be encountered. The CEMP would include measures to manage groundwater contamination at the Project Area in the event that it is encountered during construction works (refer to **Section 15.5**).

The operation of the Project would not require the interception or extraction of groundwater, and operational activities would occur on bunded hardstand areas. With the proposed operational design and standard mitigation measures in place (refer to **Section 15.5**), it is considered unlikely that the Project would result in contaminants entering the groundwater through an uncontrolled spill on a non-hardstand area, leading to the subsequent migration of contaminants into the groundwater.

15.4.4 Surface Water

During construction works, there is potential for uncontrolled spoil to enter the onsite stormwater system and potentially Swamp Creek. Standard erosion and sediment control measures as referenced in **Section 15.5** would be sufficient to manage potential impacts occurring during construction works.

As the Project would take place on an existing hardstand portion of the WA Site, there would be a minor change to the impermeable surface areas draining to the WA sites existing stormwater management system. Therefore, no upgrades to the existing WA Site stormwater management system are considered necessary.

Surface water in the vicinity of the Project Area would not be taken during construction works or future operational uses at the Project Area. Stormwater quality monitoring, however, would continue where required by EPL 6423. WA would also continue to comply with EPL 6423 requirements regarding the protection of surface waters, such as storing Dross, SPL material and pharmaceutical wastes in appropriately enclosed, bunded and covered areas to prevent stormwater contamination.

15.4.5 Flooding

As discussed in **Section 15.3.5,** the Project area is located above the 1% AEP flood level determined in the SFCFRMS. The Project is therefore unlikely to be impacted by flooding. The final floor level of the waste handling area would be at approximately 13.0m AHD providing approximately 1.5m additional freeboard during a 1% AEP flood event. Due to the low sensitivity of the Project to flooding and the ready egress from site for any workers during a flood event, flooding impacts are considered minor. It is recommended that the existing facilities emergency management plans are updated to include measures for the safe evacuation of staff during a flood event. Although inundation of the new building is only likely to occur during a Probable Maximum Flood, flood management planning should include sealing of secured waste storage areas during a flood event to prevent the mobilisation of stored waste.

In summary, flooding is not expected to have a significant impact on the Project, and it is not expected that the Project would have a significant impact on flooding, for the following reasons:

- The final floor level of the Project building will be above the 1% AEP level and 500mm freeboard. Proposed floor levels are detailed in **Appendix I**;
- Due to the industrial nature of the Project it is not sensitive to flooding impacts i.e. there are no habitable dwelling proposed;

- The Project is not located such that it would cause changes to overland flow such that it would exasperate flooding on neighbouring properties;
- There are well established escape routes from the WA site that are unaffected by flooding; and
- Despite the minor risk of flooding to a small portion of the site, management measures would be in place in the Operational Environmental Management Plan to appropriately manage risks to the site and employees in the event of a flood.

15.4.6 Water Use and Waste water

The primary source of wastewater from the Project would be from the bin wash area. It is expected that up to 10 litres per bin for a large 660 litre bin may be required. This waste water would be collected in a dedicated bund for discharge to the sewer system. Under section 31 of the *Hunter Water Act 1991*, it is an offence to discharge water into a system owned by Hunter Water, except with the written agreement of Hunter Water. WA would liaise with Hunter Water to determine whether an update to the Trade Waste Agreement with Hunter Water is required. No waste water would be stored, treated or disposed of onsite.

In additional to bin wash water, cooling water would be used in the thermal treatment process, primarily in the ash discharge pit. As ash is mechanically moved from the burnout hearth it is moved through a water filled pit or trough which cools that ash, prior to it being moved into a storage bin for removal from site. This is expected to use approximately 950 litres of water per hour during peak processing. The majority of this water would be evaporated as a result of the cooling process and would not require disposal to the waste water system. Residual water would be disposed of with the ash material.

In total, up to 1,200 litres per hour may be required during peak processing times. This equates to approximately 7,200 kilolitres per year. Other sources of water use and waste water generation include the increased use of staff amenities although due to the number of additional workers the Project would require, this is expected to be a negligible amount of water use and of waste water generation. Water for firefighting systems would also be required in emergency situations. Fire water is supplied to the existing WA site through a dedicated main. Two hydrants are located on the north of the site, and would expect to be adequate for fire response for the Project.

15.5 Mitigation Measures

Management of soils during construction, including sediment and erosion controls, would be detailed in the CEMP, and would include the following:

- Where excess spoil is excavated at the Project Area, it would be subject to sampling and classification according to the *Waste Classification Guidelines Part 1: Classifying Waste* (EPA, 2014a) prior to being transported offsite to an authorised receiver;
- Erosion and sediment control practices would be incorporated into the CEMP for the Project, in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004) to prevent construction site runoff entering the WA Site stormwater system, or the nearby Swamp Creek;
- To minimise the potential for contamination to occur during construction works the following measures would be employed during construction works:
    - Excavated spoil would be stored so as to prevent its uncontrolled release;
    - Groundwater interception would be avoided where possible;
    - Construction works and laydown areas would be confined to hardstand areas where reasonable and practicable to do so;
    - Spill kits would be available at the construction site;
    - Liquids would be stored at the Project Area in a manner that provides for both primary and secondary containment, and where any spills may be diverted away from the stormwater drainage system and non-hardstand areas, following the general guidance outlined in Storing and Handling Liquids: Environmental Protection Participant's Manual (DECC, 2007); and
    - Refuelling activities would be undertaken in existing dedicated refuelling bunds.

The existing OEMP prepared for the Facility provides a framework to effectively manage the potential pollution of soils and water during the operation of the Project. The OEMP would be updated where relevant to incorporate the Project in consultation with DP&E. The site Surface Water Management Plan would also be updated to incorporate the relevant compliance requirements of the Project.

During operations WA would continue to comply with any water quality management measures set out in EPL 6423. This may include stormwater monitoring (such as that currently undertaken at the WA Site), as well as the appropriate storage, enclosing, bunding and covering of SPL material and pharmaceutical wastes.

Prior to operations WA would liaise with Hunter Water to ensure the operational phase of the Project is included in a Trade Waste Agreement with Hunter Water.

15.6 Summary and Conclusion

The WA Site is located within an existing industrial area which has been used for industrial purposes for a number of decades. The construction and operation impacts of the Project can be managed through the implementation of recommended management measures. The project would be unlikely be impacted by flooding up to and including the 1 in 100 year ARI event. Groundwater impacts during construction would be minimal and would be unlikely during operational activities.

All water used and disposed of during the operation of the Project would be through reticulated Hunter Water systems. No water would be sourced onsite for use in operational activities, and similarly no waste water would be disposed on onsite. Impacts from water use would therefore be minimal.

While disturbance of site soils will be required during the construction phase these would be temporary and generally restricted to existing hardstand on fill. Soil impacts are unlikely to occur as a result of operations.

A range of management measures have been recommended to minimise potential impacts to soils and water. With these measures in place the Project would not have significant impacts on soil or water resources.

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16.0 Hazards

This **Section 16.0** provides an assessment of the potential hazards and risks associated with the operation of the Project. A Preliminary Hazard Analysis is provided in **Appendix J**.

16.1 Secretary's Environmental Assessment Requirements

The assessment of hazards and risks addresses the SEARs as detailed in **Table 16-1**.

Table 16-1 Secretary's Environmental Assessment Requirements for the Assessment of Hazards

Hazards SEARs
Hazards – including: - A preliminary risk screening undertaken in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33) and *Applying SEPP 33* (DoP, 2011) including consideration of likelihood and consequences of exposure of the facility to flood events and if necessary a Preliminary Hazard Analysis (PHA).

16.2 Methodology

The hazard and risk assessment was undertaken having regard to the following statutory regulations and guidelines:

- *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33);
- Applying SEPP 33 Guideline;
- *Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis* (DoP, 2011);
- *Planning for Bushfire Protection (*Rural Fire Service *2006)*;
- *Hazardous Industry Planning Advisory Paper No 11 Route Selection* (DoP, 2011);
- *Assessment Guideline: Multi-Level Risk Assessment* (DoP, 2011);
- *Hazardous Industry Planning Advisory Paper No. 3 – Risk Assessment* (DoP, 2011);
- *Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Planning* (DoP, 2011); and
- *Hazardous Industry Planning Advisory Paper No. 6 – Hazard Analysis* (DoP, 2011).

As the Project would include the receipt and processing of Class 6.2 infectious substances under the ADG Code (refer to **Section 16.4.1**), Applying SEPP 33 requires consultation over the PHA methodology to be undertaken with DP&E (refer to Section 16.3 of **Appendix J**). A Level 1 Qualitative Analysis based on hazard identification and qualitative risk assessment of consequences, frequency and risk was chosen as the appropriate methodology for the Project (refer to Section 16.3 of **Appendix J**).

It is noted that the hazard SEAR's for the Project include consideration of the likelihood and consequences of flooding on the Project. These risks are considered in **Section 15.0** of this report.

16.3 Existing Environment

The WA Site is located on about 22 ha of land within an established industrial area. The footprint of the Hydro Aluminium Smelter, which ceased operation in October 2012 and was officially closed in May 2014, is located approximately 2 km north of the project Area, and its buffer lands extend to the northern boundary of the WA Site.

The Project Area is located in an area zoned IN3 Heavy Industrial under the Cessnock LEP 2011. There are currently three major industrial facilities in the vicinity of the Project Area:

- Two steel fabrication industries more than 200 m from the Project Area; and
- Hydro Aluminium, which is more than 2 km north of the Project Area.

The Battery Recycling Facility is also currently being assessed for development to the immediate east of the WA Site. SEARs have been issued for this proposed development under application numbers SSD 16_7520.

Residential areas in Kurri Kurri and Weston are located to the south east and west of the WA Site, respectively. The closest residential land use to the Project Area is located more than 600 m to the south east. The closest

residence (which is understood by WA to be vacant) is located approximately 270m from the Project Area on industrially zoned land. The closest public place (the footpath passing the property) is at Mitchell Avenue, approximately 150 m from the WA Site.

16.4 Assessment of Potential Impacts

16.4.1 Application of SEPP 33

A Preliminary Hazard Analysis (PHA) was undertaken to determine the applicability of SEPP 33 (refer to Section 3.2 of **Appendix J**. The wastes which are proposed to be processed at the Project Area were categorised into the following classes under the ADG Code:

- Class 3 flammable liquids (e.g. solvents, paints and some pharmaceutical and quarantine wastes);
- Class 6.2 infectious substances (e.g. clinical and cytotoxic wastes);
- Class 6.1 toxic substances (e.g. cytotoxic drugs and some pharmaceutical wastes);
- Class 8 corrosive substances (e.g. some pharmaceutical wastes); and
- Class 9 miscellaneous dangerous substances and articles and environmentally hazardous substances (e.g. some pharmaceutical wastes).

Some further wastes would also be received and processed at the Project Area which do not meet any of the ADG Code categories outlined above. These may include:

- Security Waste (Documents and hard drives);
- Pitch sludge residues transported in flat-top trucks;
- Oily rags (Combustible Materials) transported in flat-top truck and utility vehicles;
- Ash Product material resulting from the thermal treatment process;
- Waste Water from the bin wash down and other storage areas; and
- Baghouse Dust - Product material recovered from the Baghouse.

Potentially Hazardous Development

In accordance with Applying SEPP 33, the Project would meet the threshold requirements for the storage of Class 6.2 and Class 6.1 substances (refer to Section 3.2 of **Appendix J**) which result in the Project being classified as potentially hazardous for the purposes of SEPP 33 (refer to **Section 7.2.12**). Therefore, a PHA has been prepared in accordance with Applying SEPP 33 (refer to **Appendix J**).

Potentially Offensive Development

The key consideration in the assessment of a potentially offensive industry is to ensure that there are adequate safeguards in place to manage risks to acceptable levels. This is to ensure emissions from a facility can be controlled to a level that is not significant.

The Applying SEPP 33 guideline lists industry types with potential for significant environmental impact including waste processing. As the Project may be regarded as a potentially offensive industry under the Applying SEPP 33 Guideline, an analysis of the potential impacts to neighbouring facilities and land uses is required.

A detailed description of the nature and significance of impacts which could arise during construction and operation of the Project is provided in the following sections of this EIS:

- **Section 11.0** – Waste Management;
- **Section 12.0** - Air Quality and Odour;
- **Appendix E** – Air Quality and Odour Assessment;
- **Section 13.0** – Traffic and Transport;
- **Appendix F** – Traffic and Transport Assessment;
- **Section 14.0** – Noise and Vibration;
- **Appendix G** – Acoustic Impact Assessment;

- **Section 15.0** – Soil and Water;
- **Appendix H** – Phase One Contamination Assessment;
- **Section 17.0** – Human Health; and
- **Appendix K** – Human Health Risk Assessment.

Section 25.0 summarises the safeguards that would be put in place to ensure potential impacts can be controlled to a level which is not significant. Compliance with DP&E consent conditions and any amendments to EPL 6423 to accommodate operation of the Project would ensure that the Project would not be categorised as an 'offensive industry' under SEPP 33.

16.4.2 Transportation Risk

A development is considered potentially hazardous with respect to transportation if there are planned vehicle movements of Class 6.1 substances in quantities greater than 1 tonne (bulk) or 3 tonne in packages per vehicle. It is likely that the load size of deliveries of Class 6.1 materials during the operation of the Project would exceed 1 tonne bulk and 3 tonne in packages per vehicle. Therefore the Project is considered to be potentially hazardous in regards to the transport of Class 6.1 materials (refer to Section 3.3 of **Appendix J**).

According to Applying SEPP 33, DP&E is also required to be consulted to determine whether a route evaluation study in accordance with *Hazardous Industry Planning Advisory Paper No 11 Route Selection* (DP&E, 2011g) is required in relation to the transport of Class 6.2 materials. This is regardless of the number of vehicle movements and load sizes.

16.4.3 Level 1 Qualitative Analysis

Hazard Analysis

A detailed hazard identification was conducted for the clinical and other waste storage and processing facilities proposed during the operation of the Project. Where an incident was identified to have potential offsite impacts, it was recorded in **Table 16-2**. Each of these incidents was then assessed qualitatively in light of proposed safeguards. Where a potential offsite impact was nevertheless identified, the incident was carried forward for further analysis in the PHA (refer to **Appendix J**). Where the PHA determined the proposed safeguards to be adequate to control the hazard, or that its consequences would have no offsite impacts, no further analysis was performed.

Consequence Analysis

For incidents qualitatively identified as having potential offsite impacts, a more detailed consequence analysis was conducted. Where an incident was identified to have an offsite effect and a simple solution was evident (i.e. move the proposed equipment further away from the site boundary), that solution was recommended and no further analysis was performed.

Frequency Analysis

In the event a simple solution for managing consequence impacts was not evident, any incident identified to have potential offsite impact was subjected to a frequency analysis. This considered the initiating event and probability of failure of the safeguards (both hardware and software). The results of the frequency analysis were carried forward to the risk assessment for combining with the consequence analysis results.

Risk Analysis

Where incidents were identified to impact offsite and where a consequence and frequency analysis was conducted, the consequence and frequency analysis for each incident was combined and compared to the risk criteria published in *Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Planning* (DoP, 2011).

If the criteria were exceeded, a review of the major risk contributors would then be performed and recommendations made regarding risk reduction measures.

Table 16-2 Hazard Identification

Hazard ID	Operation or Area	Hazard Cause	Hazard Consequence	Safeguards	Off-site Impact
1	Delivery of materials to/from site	Vehicle accident. Vehicle fire.	Loss of containment of Dangerous Goods. Toxic emissions (contact between incompatible materials).	- Transport of materials in accordance with the ADG Code. - Segregation of incompatible materials during transport. - Experience vehicle operators.	Unlikely
2	Dangerous Goods Storage Area	Major storm event causing building damage and leading to water ingress.	Loss of containment of Dangerous Goods.	- Site stormwater management. - Storage area building is bunded with spill containment capacity sufficient to hold the estimated storm-water ingress without release off-site - Preventative Maintenance program including inspections of building integrity. - Repairs and/or modifications are performed where required	Unlikely
3	Gas Piping	Ignition of leak in gas supply pipeline.	Fire	- Design standards and correct selection of materials of construction. - Remotely operated automatic isolation at process plant. - Pipeline mainly buried. - Unconfined plant limits risk of explosion, increases rate of dispersion. - Follow ExP standards for all electrical equipment to minimise risk of ignition. - Operating and maintenance procedures and practices. - Low pressure distribution piping. - Routine inspection, tuning and maintenance of combustion systems. - A strict smoking ban throughout the entire WA site	Unlikely
4	Dangerous Goods Storage Area	Fire involving Class 3 Flammable materials and Class 6.1 toxic chemicals Static discharge during transfers, equipment	Loss of assets. Emission of toxic combustion products. Emission of parent material that	- No packages accepted that do not conform to ADG code. - Storage to AS standards- separation, segregation etc. - Good housekeeping. - Control of ignition sources (ExP methods, equipment maintenance, procedures, smoking ban).	Unlikely

Hazard ID	Operation or Area	Hazard Cause	Hazard Consequence	Safeguards	Off-site Impact
		malfunction, electrical equipment, other sources of ignition.	survives fire. Risk to site personnel and off-site personnel from radiation, toxic combustion products	- Fire detection and control systems, emergency procedures. - Maximum inventory below threshold for Class 3 DGs for distance to nearest site boundary. - High toxicity materials separate. - Limit inventory of high toxicity materials. - Surrounding land use is not sensitive. - Occupants are likely to be able to avoid toxic emissions prior to exposure through evacuation. - The bag house emissions control system is robust and has proven to effectively mitigate the risk of emissions.	
5	Dangerous Goods Storage Area - Storage, loading, unloading on-site	Class 6.1 or 6.2 solids or liquids escaping from containment due to a crack or hole in a wheelie bin. Other loss of containment due to a crack or hole in the delivery truck waste loader, tippler, kiln, bag house/ complete failure. Poor house keeping	Loss of containment of Dangerous Goods.	- Design standards and correct selection of materials of construction. - Operating and maintenance procedures and practices. - Regular inspection and good housekeeping. - Refrigerated storage and limited retention time. - Toxic (Class 6.1) substances stored and handled as outlined in AS/NZS 4452:1997, The storage and handling of toxic substances. - The storage and handling of infectious (Class 6.2) substances in accordance with AS/NZS 3816:1998, Management of clinical and related wastes.	Unlikely
6	Kiln Processing	Loss of containment of toxic emissions due to leak/hole in equipment or equipment failure resulting in an emergency release	Loss of containment of Dangerous Goods. Emission of toxic combustion products.	- Robust control system. - Safety interlocks proven to effectively mitigate the risk of emissions. - Emergency procedures. - Preventative Maintenance program.	Possible

16.4.4 Hazard Analysis for Toxic and Infectious Substances

A hazard analysis was also conducted for the storage, handling and processing of class 6.1 toxic substances and class 6.2 infectious substances at the Project Area. Similar to the analysis set out in **Section 16.4.3**, those hazards identified to have potential offsite impacts in excess of the criteria published in *Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Planning* (DoP, 2011c) were carried forward for consequence analysis.

The uncontrolled release and dispersion of class 6.1 toxic substances has the potential to adversely affect humans and the biophysical environment. The consequences of such toxic releases may be particularly significant for sensitive areas of the biophysical environment. The greatest potential for far field effects is generally associated with the movement of toxic gases, however toxic concentrations in the atmosphere may also result from other activities (refer to Section 7.1.2 of **Appendix J**). The Air Quality and Odour Assessment and the Human Health Risk Assessment have assessed potential release scenarios for toxic gases and their impacts to human health and the environment (refer to **Sections 12.0** and **17.0**, as well as **Appendix E** and **Appendix K**).

Class 6.2 infectious substances are substances known or reasonably expected to contain pathogens. Pathogens are defined as micro-organisms (including bacteria, viruses, rickettsiae, parasites, and fungi) and other agents such as prions which can cause disease in humans or animals.

The following theoretical hazardous incidents with potential for offsite impacts were identified for class 6.1 toxic substances and class 6.2 infectious substances, in the Project Area:

1. Storm damage to the building resulting in roof damage, water ingress and dissolving of toxic and infectious substances into the stormwater, resulting in the potential for contaminated water to escape offsite, for example of bunded storage areas overflow;
2. Loss of containment of toxic emissions due to leak/hole in equipment or equipment failure. The analysis showed that the baghouse emissions control system is robust and designed to mitigate the risk of emissions; and
3. Fire in the dangerous goods storage area involving toxic substances.

With reference to the first scenario, the storage area building would be bunded and designed with spill containment capacity sufficient to hold the estimated storm-water ingress without release off-site. Furthermore, with regards to the second scenario, the mitigation measures proposed in **Section 16.5** are considered sufficient to warrant no further assessment. With regards to the third scenario, it is recommended that a Fire Safety Study be prepared for the Project to determine appropriate fixed and portable fire protection systems for the Project Area, so as to ensure the consequences of major fire incidents are adequately mitigated (refer to **Section 16.5**).

16.5 Mitigation Measures

The following mitigation measures have been identified for the management of hazard and risk within acceptable levels. It should be noted that a number of the below measures are already in place at WA although they have been included here for completeness and they confirm WA's commitment to implementing these measures for the Project:

- The following practices currently employed at the WA Site would continue during the operation of the Project:
    - Baghouse No. 5 would be fitted with real-time, continuous particulate monitoring systems;
    - All baghouses would be fitted with high differential pressure detection to activate bag switch-over and clogged bag cleaning processes;
    - The existing site EMS would be updated to incorporate the management requirements of the Project;
    - Dangerous Goods would be transported to and from site in accordance with the ADG Code, the Dangerous Goods (Road and Rail Transport) Act 2008 and the *Dangerous Goods (Road and Rail Transport) Regulation 2014*; and
    - A number of further safety studies would be required to be conducted in accordance with:
        - The hazard-related conditions of consent provided by DP&E;
        - The *Work Health and Safety Act 2011*, associated regulations (including the Work Health and Safety Regulation 2011), and codes of practise; and

  - The *Protection of the Environment Operations Act 1997* and associated regulations.

- The following measures would be implemented to control, minimise and manage risks during all phases of the Project:
  - In detailed design, locate product storage areas at separation distances with specific reference to the applicable Australian Standards;
  - Conduct a Fire Safety Study for the Project to determine appropriate fixed and portable fire protection systems for the Project Area;
  - In addition to this PHA, conduct a Final Hazard Analysis prior to construction;
  - Develop a Traffic Risk Assessment and a detailed Route Selection study for the dangerous goods transport activities particularly for the transport of dangerous goods from the Project Area; and
  - Carry out safety in Design Reviews in accordance with Work Health and Safety Regulation 2011 and *Code of Practice – Safe Design of Structures* (Safe Work Australia, July 2012).
- During construction the following measures would be implemented to control, minimise and manage risks:
  - Update the Safety Management System Manual, November 2015 to include the operations and materials associated with the Project prior to the commencement of operation in accordance with the requirements of the Work Health and Safety Regulation 2011;
  - Update the *Emergency Response Plan* (Weston Aluminium Pty Ltd, November 2015) to include specific responses to the hazard scenarios identified in this PHA and any other safety studies conducted for this Project;
  - Develop and implement an appropriate Safety Management Plan. This should include access by workers to a risk register for all construction activities;
  - Review and update the existing Emergency Response Plan, including actions to be taken in the event of an emergency;
  - Ensure a permit to work system is implemented, in particular where workers may be exposed to high risk activities;
  - Undertake audits on construction activities, and address and communicate any findings to the relevant workers;
  - Ensure the workers have appropriate training and the necessary competencies; and
  - Implement actions/risk reduction strategies as identified through Safety in Design reviews.
- During operations, the following measures would be implemented:
  - Update the site Safety Management Plan. This should include access by workers to a risk register for all operational activities;
  - Update the site Emergency Response Plan to ensure a co-ordinated response to the hazard scenarios identified in this assessment;
  - Update the site Operational Environmental Management Plan;
  - Undertake audits on operational activities, and address and communicate any findings to the relevant workers;
  - Ensure workers have appropriate training and necessary competencies;
  - Implement appropriate maintenance programs to minimise potential for equipment failures; and
  - Notify SafeWork NSW of any WHS Regulation Schedule 15 chemicals that are likely to exceed 10 percent of the threshold quantity;
  - Prepare any placards, manifests and emergency plans as required for chemicals exceeding the WHS Regulation Schedule 11 placard or manifest quantities; and
  - Update the onsite dangerous goods register and Safety Data Sheet register, as well as provide updated dangerous goods notifications to SafeWork NSW as required.

- The following safeguards would be implemented to limit the consequences and likelihood of a fire occurring at the Project Area's dangerous goods store:
    - The Project Area would be continuously staffed with appropriate security fencing and other systems to resist malicious attack;
    - The proposed warehouse building would incorporate an electrical system designed to meet relevant explosion protection standards;
    - No equipment would operate in dangerous goods warehouses areas that might generate friction or other sources of heat contributing to the risk of ignition;
    - A strict smoking ban would continue to be enforced on the WA Site;
    - Process areas would contain properly maintained equipment (such as forklifts) suitable for the relevant hazardous area classification;
    - All incompatible dangerous goods classes would be completely segregated with appropriate fire separation distances created and maintained (including use of fire walls etc. where necessary) according to *AS 1940:2004 – The Storage and Handling of Flammable and Combustible Liquids*;
    - All spills would be quickly and completely cleaned up;
    - No dangerous goods would be accepted at the Project Area unless they are packaging complying with the ADG Code and the requirements of the WHS Regulation, with steel drums preferred where possible to limit potential for damage and leakage;
    - Adequate sprinkler or foam systems would be installed if the Fire Safety Study indicates these are required;
    - Fully bunded dangerous goods warehouse sections would be maintained so as to limit the spread of fire and prevent the discharge of contaminated fire-water in the event of such an incident; and
    - Training would be provided for staff in correct equipment operation, accident prevention and emergency response (including firefighting).
- The following additional safeguards would be implemented to limit the consequences and likelihood of a toxic release from class 6.1 dangerous goods:
    - Equipment (such as forklifts) would be properly maintained to minimise the risk of damage to packaging; and
    - No transfer operations of class 6.1 materials destined for thermal processing would occur outside the thermal waste processing plant.
- To control, minimise and manage risks during the post-closure phase of the Project, the following measures would be envisaged:
    - Develop a decommissioning plan. This should include a project risk register that is available to all workers, including any risk items added during the construction and operations phases; and
    - Keep records of all workplace health and safety information relating to the Project post closure phase.
- As a part of the update to the *Safety Management System Manual* (Weston Aluminium Pty Ltd, November 2015), the storage and handling of dangerous goods during the Project would be clarified to be in accordance with the relevant Australian Standard for each class of dangerous goods, including those outlined below:
    - *AS/NZS 3816:1998, Management of clinical and related wastes* relating to the management of class 6.1 pharmaceutical substances;
    - *HB 202-2000, A management system for clinical and related wastes – Guide to the application of AS/NZS 3816-1998, Management of clinical and related wastes*;
    - *AS 1940:2004 – The Storage and Handling of Flammable and Combustible Liquids relating to* the management of paints, solvents, pharmaceutical and quarantine wastes classified as class 3 substances;
    - *AS 3780:2008 – The storage and handling of corrosive substances* - management of class 8 pharmaceutical and quarantine wastes classified as corrosive substances;

- *AS/NZS 4452:1997, The storage and handling of toxic substances* - management of class 6.1 pharmaceutical substances;
- *AS/NZS 4681:2000 – The storage and handling of Class 9 miscellaneous dangerous goods* relating to class 9 pharmaceutical wastes; and
- *AS/NZS 3833:2007 – The Storage and Handling of Mixed Classes of Goods, in Packages and Intermediate Bulk Containers* considered for the management of areas where various classes of goods are stored, such as waste preparation areas.

16.6 Summary and Conclusion

The Project has been identified as a potentially hazardous and potentially offensive industry and has been assessed in accordance with the requirements of SEPP 33.

A PHA prepared for the Project found the proposal meets the relevant risk criteria as set out in *Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Planning* (DP&E, 2011c). However, some further safety assessments would be required before the Project becomes operational.

The PHA found that the hazards associated with the Project would not result in a change to the existing risk profile of the WA Site. The risk criteria published by the NSW DP&E in HIPAP No.4 (Ref.3) would not be exceeded and the facility remains classified as potentially hazardous and not hazardous. It is however considered that with the recommended hazard and risk management measures in place the Project can safety proceed without presenting an undue level of hazard to the community.

17.0 Human Health

This section provides an assessment of the potential impacts and risks of the Project on human health. A Human Health Risk Assessment (HHRA) is contained in **Appendix K**.

17.1 Secretary's Environmental Assessment Requirements

The assessment of human health addresses the SEARs as detailed in **Table 17-1**.

Table 17-1 Secretary's Environmental Assessment Requirements for the Assessment of Hazards

Human Health SEARs
Human Health – including: - A human health risk assessment that considers the potential adverse effects from human exposure to project related environmental hazards including noise, air quality and contamination of drinking water conducted in accordance with the enHealth *Environmental Health Risk Assessment: Guidelines for assessing human health risk from environmental hazards (2012).*

17.2 Methodology

17.2.1 Heath Assessment Framework and Guidelines

The HHRA was undertaken in accordance with relevant nationally adopted guidelines for a health risk assessment, including:

- *Environmental Health Risk Assessment: Guidelines for Assessing Human Health Risks from Environmental Hazards*. Department of Health and Ageing and enHealth Council, Commonwealth of Australia (enHealth, 2012a);
- *Australian Exposure Factor Guidance: Guidelines for Assessing Human Health Risks from Environmental Hazards*. Department of Health and Ageing and enHealth Council, Commonwealth of Australia (enHealth, 2012b); and
- *National Environment Protection (Assessment of Site Contamination) Measure (ASC NEPM) 1999*. National Environment Protection Council (NEPC), as amended and in force on 16 May 2013 (ASC NEPM, 2013).

And the following international guidance:

- Health Effects of Municipal Waste Incineration, Chapter 5 - *2,3,7,8 Tetrachlorodibenzo-p-Dioxin in the Agricultural Food Chain: Potential Impact of MSW Incineration on Human Health, Jeffery B. Stevens*, CRC Press 1991; and
- US EPA (2005) Human Health Risk Assessment Protocol (HHRAP) for Hazardous Waste Combustion Facilities, Final September 2005.

17.2.2 Staged Approach to Human Health Assessment

Utilising the relevant guidelines as listed above, in particular enHealth (2012) and ASC NEPM (2013), the scope of work for the HHRA was undertaken following a staged approach. Each of the five stages are described below:

Stage 1: Issue Identification

The purpose of Stage 1 was to identify the problems that the risk assessment needed to address and to establish the context for the risk assessment. It comprises a number of phases, including:

- Review of existing reports applicable to the HHRA to determine whether further assessment of potential human health risks was required;
- Consideration of the data quality and identification of any significant data gaps;
- Identification of Chemicals of Potential Concern (CoPC) and determination of whether there are any associated human health hazards;
- Identification of potential on-site source, migration pathways and human receptors linkages; and
- Stating why a risk assessment was required, and the scope and objectives of the HHRA.

This stage included the development of a Conceptual Site Model (CSM) for the Site outlining the source-pathway-receptor linkages.

Stage 2: Hazard Identification

During Stage 2, the potential hazards from the CoPC identified in Stage 1, were identified by identifying the potential for adverse health effects from exposure to the CoPC, based on chronic and acute exposures.

This was achieved by undertaking a review of toxicity information published by Australian or international regulatory agencies (e.g. National Health and Medical Research Council, World Health Organization, Agency for Toxic Substances and Disease Registry, United States Environmental Protection Agency. Toxicity data are provided within each of toxicity profiles presented as **Appendix K**.

Stage 3: Dose-Response Assessment

The Stage 3 dose-response assessment examines the quantitative relationships between exposure to the CoPC and the associated health effects. The determination of whether there is a hazard is often dependent on whether a dose-response relationship is present. Relevant toxicity values for the identified CoPC were obtained from sources recognised by Australian regulatory agencies in accordance with the hierarchical approach detailed in Section 5.12 of enHealth (2012).

Incremental impacts and appropriate risk factors were used for compounds where no acceptable “safe” threshold is provided (i.e. carcinogenic compounds). For threshold compounds (i.e. non-carcinogenic compounds), appropriate reference concentrations were used following an adjustment for background exposure.

Background exposure from food, drink, ambient air and consumer products was taken into account for threshold chemicals where levels were established. The consideration of background exposure resulted in the adjustment to the published toxicity data to account for the level which was representative of background exposure.

Stage 4: Exposure Assessment

Stage 4 assessed the exposure magnitude, frequency, extent, character and duration for the identified sensitive receptors and the potential exposure pathways. Appropriate human exposure parameters were selected in accordance with enHealth (2012) and ASC NEPM (2013).

Stage 5: Risk Characterisation

Risk characterisation is the qualitative and/or quantitative estimate outcome of the risk assessment. During this stage the nature and potential incidence of adverse health effects to receptors based on comparison of estimated contaminant intake or exposures to relevant toxicity (dose-response) criteria was characterised. The risk estimate for each individual chemical and exposure pathway was summed to produce the cumulative risk estimate for each exposure scenario.

For non-threshold (carcinogenic) CoPC, the incremental lifetime cancer risk estimates for each receptor was compared to an *acceptable* carcinogenic risk level of 1 in 100,000 (1×10^{-5}) (enHealth, 2012).

For threshold (non-carcinogens) CoPC, potentially *unacceptable* chemical intake/exposure was indicated if the exposure level exceeded the Tolerable Daily Intake (TDI) or Tolerable Concentration (TC) (i.e. if the Hazard Quotant (HQ) is greater than 1.0) (enHealth, 2012).

If the risk acceptability criteria for non-threshold and threshold CoPC were exceeded, a more detailed and critical evaluation of the risk was conducted, or appropriate risk management measures were recommended.

A sensitivity and uncertainty analysis was undertaken that included a discussion of the key uncertainties associated with the HHRA process and the assumptions adopted for the exposure modelling. The risk estimates should be considered in the context of identified uncertainties.

The outcomes of the staged HHRA are detailed in **Section 17.4**.

17.3 Existing Environment

Detailed descriptions of the existing environment including on the Project site and in the Weston and Kurri Kurri area have been provided in this EIS in the following sections:

- Description of the Kurri Kurri, Weston area including current and historical land uses – **Section 2.0**;
- History of industrial development on the Project site – **Section 3.0**;
- Description of the proposed Project – **Section 6.0**;
- Site and regional meteorology – **Section 12.3.2**;
- Existing air quality – **Section 12.0**; and

- Soil and water conditions – **Section 15.0**.

Relevant information from each of these sections was compiled for consideration in the HHRA to establish an understanding of the existing environmental conditions. In addition, when establishing the surrounding site conditions for the HHRA surrounding land uses and use need to be established. A description of the surrounding land uses are provided in **Table 17-2** below.

Table 17-2 Surrounding Land Uses

Direction from Site	Land Use
North	Swamp Creek is located adjacent to the northern boundary of the Site. The former Hydro Aluminium Smelter, which ceased operation in October 2012 (currently in care and maintenance), is located approximately 2 km north of the Site and its buffer lands extend to the northern boundary of the Site. The Hunter Expressway runs between these two sites approximately 500 m to the north of the Site. An residence is located approximately 270 m to the north, within the buffer zone of the former Hydro Aluminium Smelter. It is understood that this residence is currently unoccupied; however it has been assumed that this location could be occupied in the future.
East	Swamp Creek is located approximately 500 m east of the Site. The Kurri Kurri wastewater treatment plant is located approximately 800 m to the east. A battery recycling facility has been proposed and is currently being assessed for development on land adjacent to the Site.
South	A number of industrial businesses are located to the south , including AllightSykes Kurri Kurri to the immediate south, and Alfabs Fibreglass approximately 200 m to the southwest of the Site. The Kurri Kurri residential area is located more than 600 m to the southeast . The Weston Workers Club is located approximately 900 m southwest and Nellie Simm Park is located 600 m south of the Site.
West	The parcel of land to the immediate west of the Site is undeveloped land. A number of industrial businesses including Hunter Valley Tyre and Auto are located approximately 500 m west of the Site. The Weston residential area is located more than 750 m to the west of the Site.

17.4 Assessment of Potential Impacts

The Project has been assessed using the staged approach to HHRA as described in **Section 17.2.2**. Detailed analysis of the impact assessment including information on all guidelines used, inputs, assumptions and modelling outcomes are contained in **Appendix K**.

17.4.1 Stage 1: Issue Identification

HHRA Scenarios

A total of four scenarios were discussed (three modelled) as part of Air Quality Assessment. These scenarios are for future operating conditions and are described in **Table 17-3**.

Table 17-3 Air Quality Assessment Scenarios

Scenario ID	Scenario Name	Description
1	Normal Operating Conditions	- Proposed thermal processing plant operating continuously at maximum operational capacity of 800 kg/h. - All existing point sources modelled using average source emission data. - Scenario 1 is considered to be most representative of the future operating conditions of the proposed thermal processing facility.
2	Stack Emission Limits	- Proposed thermal processing plant operating continuously using proposed stack concentration EPL limits detailed in Table 3 of the Air Quality Assessment. - All existing point sources modelled using average source emission data. - Scenario 2 is representative of theoretical worst-case impacts using the proposed emission limits and is unlikely to ever occur, and if so unlikely to be for long periods of time.
3	Battery Recycling Facility (Cumulative Impacts)	- Modelling of emissions from the proposed adjacent battery recycling facility, using high-level design limit emission concentrations and assumes the battery recycling facility would be operating continuously. - Results of Scenario 3 were then added to the predicted maximum impacts in Scenario 1 to determine the cumulative impacts from operation of the WA plant including the thermal processing plant and the battery recycling facility.
4	Emergency Bypass Operations	- This scenario utilises maximum discharge emission concentrations based on design limits for the operation of the emergency bypass stack during upset plant conditions.

For the assessment of chronic human health risks, AECOM has used air quality data from Scenario 1 as this is considered to represent conservative operating conditions at the Site. For the assessment of acute human health risks, air quality data from Scenario 2 and Scenario 4 were used as these were considered to represent infrequent maximum and upset operating conditions, respectively, which are likely to only occur for a short period of time. Additionally, an assessment of the potential impact of the proposed BRF (Scenario 3) has been undertaken as part of a sensitivity analysis.

Potential human health risks to on-going commercial workers and visitors to the Site should be addressed in accordance with NSW Work Health and Safety (WHS) Regulations and have therefore not been considered further as part of this HHRA.

Construction activities associated with the Project have the potential to generate dust due to exposed soils, and generate emissions from plant, machinery and vehicles. Civil works are expected to take several months and be restricted to a relatively small area within the WA site. Standard construction air quality management measures would provide a suitable level of management and should be incorporated into the Project CEMP. With implementation of these measures, potential construction air quality impacts would be minor. No further consideration of health related impacts from construction is therefore required.

Contamination Sources

The proposed operation of the Project has been described in detail, including emission sources, air emission controls and potential emission concentrations in the AQIA. The stack parameters for each of the eight modelled stacks are described in **Table 17-4**.

Table 17-4 Stack Parameters

Stack ID	Diameter (m)	Flow Rate (Nm^3/s)	Velocity (m/s)	Temp (K)	Height AGL (m)	MGA 56 Coordinates (m)	
						X	Y
Stack 1	1.65	24.4	26.0	349.3	15	357265	6369322
Stack 2	1.265	13.7	22.9	302.4	15	357310	6369262
Stack 3	1.0	8.9	23.9	305.2	15	357310	6369272
Stack 4	1.395	22.7	31.8	312.4	15	357314	6369296
Stack 5	1.49	21.4	18.8	423.2	30	357347	6369347
Stack 6	0.58	1.9	21.9	557.6	18	357302	6369325
Stack 7	1.5	29.5	35.1	301.4	15	357325	6369226
Stack 8	1.1	4.2	19.2	1173.2	12.5	357326	6369358

For the purposes of the HHRA, the emissions associated with each source (i.e. Stack 1 to Stack 7) have been conservatively evaluated as occurring concurrently for 24 hours a day seven days per week.

Chemicals of Potential Concern

Data used in the HHRA was sourced from the Project AQIA (**Appendix E**) which identified both CoPC for the Project and ground level concentrations for each pollutant that may occur from the operation of the Project. Further detail regarding the pollutants of concern and the AQIA methodology and assessment outcomes is provided in **Section 12.0**.

In summary the pollutants considered as part of this HHRA were sourced from the Site's EPL, from *AP 42 Compilation of Air Pollutant Emission Factors* (US EPA 1995) and those measured from a similar facility (i.e. Daniels Health Pty Ltd (formerly SteriHealth Pty Ltd) plant at Silverwater, NSW[6]) and included:

- Total suspended particulates (TSP) (assessed as PM_{10} and $PM_{2.5}$);
- Particulate matter (PM), assumed to be emitted as PM_{10} and $PM_{2.5}$;
- Carbon monoxide (CO);
- Sulfur dioxide (SO_2);
- Sulfuric acid mist and sulfur trioxide (SO_3) (expressed as H_2SO_4);
- Oxides of nitrogen (NO_x) (expressed as nitrogen dioxide (NO_2));
- Chlorine and chlorine compounds (expressed as hydrogen chloride (HCl));
- Fluorine and fluorine compounds (expressed as hydrogen fluoride (HF));
- Total volatile organic compounds (VOCs) (conservatively assumed to only comprise benzene);
- Metals (antimony (Sb), arsenic (As), beryllium (Be), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), lead (Pb), manganese (Mn), mercury (Hg), nickel (Ni), selenium (Se), tin (Sn) and vanadium (V); and
- Semi-volatile organic compounds (dioxins and furans).

Potential Contaminant Transport Pathways

Potential transport mechanisms by which pollutants of concern may migrate off-site are summarised in **Table 17-5** below.

[6] It should be noted that the Daniels Health plant would likely have higher emissions (SteriHealth 2015) than the proposed development attributed to both the size of the plant and control measures employed, which is limited to a wet scrubber installed in 1994 (DoE 2015).

Table 17-5 Potential Contaminant Transport Pathways

Transport Mechanism	Comments	Likelihood or Significance
Release of vapours and particulates to ambient air from the Site	Vapours and particulates may be emitted to the atmosphere via eight stacks.	High as dispersion modelling has indicated that vapour and particulates released from the on-site sources (i.e. stacks) are being reported at off-site receptor locations. This is the case for each future operating scenario (i.e. Scenario 1 to Scenario 4). It has been conservatively assumed that all CoPC are released as a vapour, volatile or not, to assess the cumulative risk associated with emissions.
Deposition of particulates (dust) onto off-site soils	Dust emitted from the Site may settle from the atmosphere onto exposed off-site soils.	High as dispersion modelling has indicated that dust (or non-volatile particulates) is emitted from on-site sources (i.e. stacks). Particulates have been detected in the atmosphere at or around the Site. likely attributed to the Site and background conditions. Low-density residential, recreational and commercial land has been identified nearby the Site where exposed soil may be present.
Uptake of chemicals by home-grown produce (i.e. fruit and vegetables) from off-site soils	Following deposition of dust onto off-site soils, home-grown produce may uptake chemicals present in soil via active adsorption.	Refer to deposition of particulates discussion above. Low-density residential land where home-grown produce could be present has been identified nearby the Site.
Uptake of chemicals by poultry (chickens) from off-site soils and transfer to eggs	Following deposition of dust onto off-site soils, chickens may uptake chemicals present in soil via ingestion.	Refer to deposition of particulates discussion above. Low-density residential land where chickens could be present has been identified nearby the Site.
Uptake of chemicals by grazing flora (i.e. grass) from off-site soils and ingestion by grazing fauna (i.e. sheep and cattle).	Following deposition of dust onto off-site soils, sheep and cattle may uptake chemicals present in grazing flora.	Refer to deposition of particulates discussion above. Low-density residential land where sheep and cattle could be present has been identified nearby the Site.

Other transport mechanisms e.g. leaching from soil to groundwater or surface water, transport of leached contamination within groundwater, volatisation and vapour migration from surface and subsurface media, are not considered in this HHRA. However, these transport mechanisms are unlikely to be significant as the primary on-site sources of contamination are considered to be the stacks i.e. emission of dust and particulates to ambient air.

Offsite Human Receptors

Based on a desktop review of surrounding land use zoning including a review of the Cessnock LEP, 2011, potential off-site human receptors were generally identified to be in one of the following categories:

- Off-site low-density residents;
- Off-site commercial workers; and
- Off-site recreational users of open space.

Exposure Pathways

In order for a human receptor to be exposed to a chemical contaminant derived from a site, a complete exposure pathway must exist. An exposure pathway describes the course a chemical or physical agent takes from the source to the exposed individual and generally includes the following elements (US EPA, 1989):

- A source and mechanism of chemical release;
- A retention or transport medium (or media where chemicals are transferred between media);
- A point of potential human contact with the contaminated media; and
- An exposure route (e.g. inhalation or direct contact) at the point of exposure.

Where one or more of the above elements is missing, the exposure pathway is considered to be incomplete and no further assessment is required (refer **Appendix K**).

Pathways that have been considered to be complete for the Project and therefore were assessed in the HHRA include:

- Inhalation Pathway Assessment:
  - Inhalation of vapours and particulates in indoor and outdoor air (acute and chronic assessments).
- Multiple Pathway Assessment:
  - Inhalation of surficial soil-derived dust in indoor and outdoor air (chronic assessment);
  - Direct contact (i.e. incidental ingestion and dermal contact) with deposited dust (chronic assessment);
  - Ingestion of home-grown fruit and vegetables grown on the deposited dust (chronic assessment);
  - Ingestion of eggs and chickens from home-grown chickens residing on the deposited dust (chronic assessment); and
  - Ingestion of breast milk by infants based on mother's intake and maternal transfer (chronic assessment).

Conceptual Site Model

Information on potential exposure pathways and the identified receivers was used to develop a Conceptual Site Model (CSM) for the Project. The CMS illustrates what is commonly known as a Source-Pathway-Receptor (SPR) linkage. Where one or more elements of the SPR linkage are missing, the exposure pathway is considered to be incomplete and no further assessment is required. The Project CSM is detailed in **Table 17-6**.

Table 17-6 CSM - Potential Exposure Pathways

Exposure Pathway	Off-site Residents	Off-site Recreational User	Off-site Commercial Workers
Vapour and Particulates			
Inhalation of vapour and particulates in indoor and outdoor air	✓	✓	✓
Soil			
Incidental ingestion of surficial soils following dust deposition	✓	✓	✓
Dermal contact with surficial soils following dust deposition	✓	✓	✓
Inhalation of surface soil-derived dust in indoor air	✓	×	✓
Inhalation of surface soil-derived dust in outdoor air	✓	✓	✓
Ingestion of home-grown fruit and vegetables	✓	×	×
Ingestion of home-grown eggs	✓	×	×
Ingestion of breast milk by infant	✓	×	×

Notes: × – incomplete pathway
✓ – complete pathway

Tier 1 Screening Criteria

Potential contamination sources were identified above. The Tier 1 assessment aims to confirm whether emissions from these stacks have the potential to be associated with unacceptable risks by comparison of reported CoPC concentrations in media of concern (i.e. ambient air) at the human receptor against conservative generic screening criteria, termed 'Tier 1' screening criteria which have been derived based on protection of human health.

The Tier 1 assessment reviewed the identified CoPC in regards to inhalation pathway, multi-exposure pathways, and acute exposure, and measures this against the relevant criteria. Where CoPC were found to the be above the relevant screening criteria they have been identified for further quantitative (Tier 2) assessment, as is provided in the following section.

17.4.2 Stage 2: Hazard Identification

The hazard identification process requires a review of existing toxicological information from a variety of appropriate sources to describe the capacity of a specific agent to produce adverse health effects.

Toxicological profiles and associated hazards for the specific pollutants of concern quantitatively assessed in the HHRA are provided in **Appendix K**. The toxicity values adopted in this HHRA are presented in **Table 17-7**.

Table 17-7 Adopted Toxicity Values

CoPC	Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$	Background Adjusted Reference Concentration (RfC) $(\mu g/m^3)$	Oral Cancer Slope Factor (CSF) $(mg/kg/day)^{-1}$	Background Adjusted Oral Reference Dose (RfD) mg/kg/day*
arsenic	-	1	-	0.001
cadmium	-	0.004	-	3.20E-04
Chromium (a)	-	0.1	-	9.00E-04
lead	-	0.5	-	0.0035
mercury	-	0.18	-	3.60E-04
selenium	-	8.4	-	2.40E-03
dioxins and furans (b)	-	8.05E-06	-	9.89E-10

- = No published toxicity value
(a) = Toxicity values for hexavalent chromium (CrVI)
(b) = Toxicity values for 2,3,7,8-tetrachlorodibenzodioxin
* E = Scenitific notation, to the power of.

17.4.3 Stage 3: Dose-Response Assessment

The objective of the dose-response assessment is to identify the toxicity values for each CoPC to be used for the quantification of potential human health risk. The numerical values derived from toxicity dose-response studies are referred to collectively as toxicity values. The toxicity values adopted for the Project are based on two different approaches to the characterisation of dose-response (NHMRC, 1999 and US EPA, 2005):

- For chemicals that have the potential to result in carcinogenic effects that are associated with a genotoxic mechanism, any level of exposure is assumed to result in some incremental lifetime risk. These chemicals are therefore assessed on the basis of a non-threshold dose-response relationship; and
- For other chemicals that may be associated with non-carcinogenic effect or carcinogenic effects that are not genotoxic, a threshold is considered relevant. The threshold level is considered a level whereby exposure below the threshold will not result in any adverse effects. Exceedance of the threshold level does not imply that adverse effects will occur, as there are a number of uncertainties and safety factors incorporated into the threshold value adopted, rather that other factors (e.g. exposure duration) needs to be further evaluated.

The toxicity values adopted for the CoPC in this risk assessment, and the source of the adopted values are presented **Appendix K**.

17.4.4 Stage 4: Exposure Assessment

Exposure Assessment involves the estimation of magnitude, frequency, extent, and duration of exposure to Site-derived contamination (enHealth, 2012b).

"Direct measurement of the exposures of the (potentially) affected population provides the best exposure data but this is not always available or practicable and default exposure factor data is often required." (Langley, AJ (1993). In absence of direct measurement data, environmental sampling and predictive models are commonly used to estimate intakes of CoPC by the exposed populations. The key elements of exposure assessment in the context of contaminated land risk assessment are to:

- Identify input values for contaminant concentrations and pathways;
- Identify input values for exposed populations;
- Estimate exposure concentrations; and
- Estimate chemical intake.

The Air Quality Assessment provides details of the air dispersion modelling methodology and results (i.e. exposure concentrations). A summary of the Air Quality Assessment is also provided in Section 3.2 of **Appendix K**.

A key element of the risk assessment process is estimation of the concentration of Project-derived CoPC in environmental media. This concentration is commonly termed the exposure point concentration (EPC) and should be selected as a conservative estimate of the average chemical concentration in an environmental medium at the point of exposure. EPCs are determined for each site-impacted 'exposure unit', which is defined as the area throughout which a receptor moves and encounters an environmental medium for the duration of exposure. Typically, an individual receptor is assumed to be equally exposed to media within all portions of the exposure unit over the time frame of the risk assessment.

For the Project (Scenario 1) assessment, the adopted EPCs in air and dust deposition rates used to then calculate the concentration of contaminants in soil are presented in **Appendix K**. It should be noted that the 24-hour maximum annual average ground level concentrations (100th percentile) at each receptor were adopted in the HHRA as these were considered to represent off-site human exposure conditions. Dust deposition rates (as mg/m^2/year) for selected CoPC (based on bioaccumulation potential) are based on the anticipated at source concentrations. It is noted that dust deposition rates includes dry deposition of particulates. 24-hour maximum ground level concentrations and dust deposition rates are presented in **Table 17-8**.

Table 17-8 Exposure Point Concentrations used in the Assessment (24-hour Maximum Concentrations)

CoPC	Air (µg/m^3)			Dust Deposition Rate (mg/m^2/year) (a)		
	Off-site resident	Off-site recreational user	Off-site commercial worker	Off-site resident	Off-site recreational user	Off-site commercial worker
arsenic	2.51E-05	8.36E-06	1.94E-05	2.10E-05	2.64E-06	5.78E-06
cadmium	2.99E-04	9.12E-05	2.34E-04	2.47E-04	3.03E-05	6.89E-05
chromium	3.10E-04	9.76E-05	2.42E-04	2.58E-04	3.19E-05	7.15E-05
lead	1.19E-03	3.62E-04	9.31E-04	9.85E-04	1.20E-04	2.75E-04
mercury	2.12E-03	9.55E-04	1.47E-03	1.83E-03	2.34E-04	3.85E-04
dioxins and furans (b)	5.08E-10	2.29E-10	3.51E-10	1.70E-09	5.19E-10	7.13E-10

(a) Those CoPC that were considered to be bioaccumulative and/or persistent are assessed via multiple exposure pathways.
(b) Assessed as 2,3,7,8-tetrachlorodibenzodioxin.

Exposure pathways through which humans may be exposed to any pollutant are identified in **Section 17.4.1**. For each pollutant of concern human behavioural exposure parameters have been derived from the relevant guideline document. Human behavioural exposure parameters represent the period of exposure (hours / days / years) that should be modelled for each pollutants exposure point concentration. A full list of the human behaviour exposure parameters used in the HHRA are detailed in Section 6.0 of **Appendix K**.

17.4.5 Stage 5: Risk Characterisation

Inhalation Pathway Assessment

A summary of the calculated reasonable maximum threshold risks (hazard index) and non-threshold risks (incremental lifetime excess cancer risk) for vapour inhalation is presented in **Table 17-9**.

Table 17-9 Risk Characterisation Summary – Inhalation Exposure Pathway

Receptor and Exposure Pathway	Adult	Child
	Threshold (HI)	Threshold (HI)
Inhalation of vapour and particulates in indoor and outdoor air by an off-site resident	0.09	0.09
Inhalation of vapour and particulates in outdoor air by an off-site recreational user	0.002	0.002
Inhalation of vapour and particulates in indoor and outdoor air by an off-site commercial worker	0.02	NA

NA – not assessed

As presented in **Table 17-9**, the calculated risk estimates for the inhalation of vapour and particulates by off-site residents, recreational users and commercial workers were below the adopted hazard index of 1.0 for threshold compounds.

While these risk estimates were based on a number of assumptions, these were conservative in nature and likely to overestimate actual risk to receptors, as such; it is generally not considered necessary to further refine the assumptions given that the risk estimates were below adopted acceptable levels. Refer to Section 7.0 of **Appendix K**

Overall the estimated health risks to off-site residents, recreational users and commercial workers (i.e all offsite receivers) from vapour and particulates emitted from the Site were considered low and acceptable.

Multiple Exposure Pathway Assessment

In additional in exposure through inhalation, consideration of other pathways of potential exposure is also required. A summary of the calculated reasonable maximum threshold risks (hazard index (HI)) for the multiple exposure pathway assessment is presented in **Table 17-10**.

Table 17-10 Risk Characterisation Summary – Multiple Exposure Pathways

Receptor and Exposure Pathway	Adult	Child (a)
	Threshold (HI)	Threshold (HI)
Off-site Residents		
Inhalation of vapour and particulates in indoor and outdoor air	9.23E-02	9.23E-02
Incidental ingestion of surficial soils	1.9E-06	1.7E-05
Dermal contact with surficial soils	6.8E-06	1.4E-05
Inhalation of surficial soil-derived dust in indoor and outdoor air	2.6E-06	2.6E-06
Incidental ingestion of lead in soil/dust	2.1E-07	Refer to IEUBK Model
Inhalation of lead in indoor and outdoor air	3.3E-07	Refer to IEUBK Model
Ingestion of breast milk by an infant	-	1.55E-01

Receptor and Exposure Pathway	Adult	Child (a)
	Threshold (HI)	Threshold (HI)
Ingestion of home-grown eggs	2.3E-06	6.1E-06
Ingestion of home-grown fruit and vegetables	4.0E-05	2.1E-04
Total Risk Estimates	**0.09**	**0.25**
Off-site Recreational User		
Inhalation of vapour and particulates in outdoor air	2.49E-03	2.49E-03
Incidental ingestion of surficial soils	5.7E-07	5.3E-06
Dermal contact with surficial soils	1.2E-06	2.5E-06
Inhalation of surficial soil-derived dust in outdoor air	1.6E-08	1.6E-08
Incidental ingestion of lead in soil/dust	5.2E-08	Refer to IEUBK Model
Inhalation of lead in dust in outdoor air	2.0E-09	Refer to IEUBK Model
Total Risk Estimates	**0.002**	**0.002**
Off-site Commercial Workers		
Inhalation of vapour and particulates in indoor and outdoor air	1.75E-02	-
Incidental ingestion of surficial soils	9.3E-07	-
Dermal contact with surficial soils	1.1E-06	-
Inhalation of surficial soil-derived dust in indoor and outdoor air	2.8E-07	-
Incidental ingestion of lead in soil/dust	1.2E-07	-
Inhalation of lead in dust in indoor and outdoor air	3.6E-08	-
Total Risk Estimates	**0.018**	**-**

(a) Refer to IEUBK model for child risks associated with lead.

As presented in **Table 17-10**, hazard indices for the multiple exposure pathway assessment by off-site residents, recreational users and commercial workers were below the adopted acceptable hazard index of 1.0. This hazard index has been adopted based on the enHealth (2012) guidelines asn calculated via the methodology described in Section 7.0 of **Appendix K**.

While these risk estimates were based on a number of assumptions, these were conservative in nature and likely to overestimate actual risk to receptors, as such; it is generally not considered necessary to further refine the assumptions given that the risk estimates were below adopted acceptable levels.

Overall the estimated health risks to off-site residents, recreational users and commercial workers from multiple exposure pathways were considered low and acceptable.

Based on the modelled concentration of lead in air (0.00119 µg/m^3) and soil (0.0014 mg/kg) and the adopted exposure parameters for off-site child residents, blood lead concentrations were reported to range from 0.7 µg/dL (5 to 7 year old) and 1.5 µg/dL (0.5 to 1 year old). Blood lead concentrations were below the adopted baseline blood lead concentration (5 µg/dL) for children up to 7 years of age. The Site is not considered to present a risk to the off-site child residential receptors. Detailed results tables are provided in **Appendix K**.

17.4.6 Sensitivity Analysis

As assessed in the Project AQIA a cumulative scenario factored in the potential impact of the proposed BRF. The proposed BRF would recycle approximately 60,000 tonnes per annum of used-lead-acid batteries using an integrated system which uses a combination of hydrometallurgical and pyro metallurgical process for the recovery

of lead and associated by-products. Recycling of batteries would comprise of four main processes: crushing screening and separation; desulphurisation; crystallisation; and lead smelting (EMM, 2016). As a result, the main pollutants of concern from the facility would be particulates, SO_2, NO_x and lead.

Consistent with the approach adopted for criteria pollutants in Scenario 1, PM_{10}, $PM_{2.5}$, SO_2, NO_2, and lead were assessed by screening the 24-hour maximum annual average concentrations at each receptor (i.e. residents, recreational users and commercial workers) against the ambient air goals as presented in NEPC (2003).

The 24-hour maximum concentration of criteria pollutants were below the ambient air goals (NEPC, 2003) at each off-site receptor excluding $PM_{2.5}$ and PM_{10} at all off-site receivers (Note these receivers are the same as those for the AQIA shown in **Figure 12-1**). Exceedances in particulate are due to the existing ambient exceedances in particulate levels with minor incremental impacts occurring from the Project.

17.5 Mitigation Measures

Overall the estimated health risks to off-site residents, recreational users and commercial workers from multiple exposure pathways were considered low and acceptable. These results however are based on the outcomes of the Project AQIA and are based on the assumption that the air control system proposed in **Section 12.0** of this EIS have been fully implemented. Provided the air quality monitoring and management systems is in place and functioning no additional mitigation measures are considered necessary with regards to human health.

17.6 Summary and Conclusion

The objective of the HHRA is to assess potential future human health risks to surrounding residents, commercial workers and recreational users resultant from exposure to Site-derived environmental. This included consideration of air quality (i.e. vapour and particulates), noise and vibration, odour and soil and water.

A total of four future operating scenarios were considered as part of the HHRA: Scenario 1 (Normal Operating Conditions), Scenario 2 (Stack Emission Limits), Scenario 3 (Battery Recycling Facility) and Scenario 4 (Emergency Bypass Operations).

The outcomes of the HHRA can be summarised as:

Acute Health Assessment

The 1-hour maximum concentration of CoPC assessment in Scenario 2 and Scenario 4 were reported below the adopted acute criteria and therefore, no CoPC required further assessment with regard to acute inhalation exposures.

Chronic Health Assessment

The 24-hour maximum concentration of criteria pollutants (i.e. PM_{10}, $PM_{2.5}$, CO, SO_2, H_2SO_4, NO_2, HCl and HF) were below selected chronic Tier 1 screening criteria at each off-site receptor excluding PM_{10} and $PM_{2.5,}$ at all off-site receptors. On further assessment, the site-derived 24-hour maximum concentrations of particulate matter were below the criteria at each off-site receptor while the 24-hour background concentrations were above the criteria at each off-site receptor. Additionally, a significant portion (approximately 99%) of the total particulate matter concentrations is attributed to background. Therefore, particulate matter emissions from the Site were considered to be low and acceptable.

The 24-hour maximum concentration of specific air pollutants (metals and dioxins and furans) were below selected chronic Tier 1 screening criteria, excluding chromium. However, given the bioaccumulative and persistent nature of a number of the specific air pollutants (i.e. As, Cd, Cr, Pb, Hg, Se and dioxins and furans), a Tier 2 risk assessment was required. For all bioaccumulative and persistent specific air pollutants, the hazard indices for the multiple exposure pathway assessment by off-site residents, recreational users and commercial workers were below the adopted acceptable hazard index of 1.0.

Based on the modelled concentration of lead in air (0.00119 µg/m^3) and soil (0.0014 mg/kg) and the adopted exposure parameters for off-site child residents, blood lead concentrations were reported to range from 0.7 µg/dL (5 to 7 year old) and 1.5 µg/dL (0.5 to 1 year old). Blood lead concentrations were below the adopted baseline blood lead concentration (5 µg/dL) for children up to 7 years of age. Therefore, the Site is not considered to present a risk to the off-site child residential receptors.

While risk estimates were based on a number of assumptions, these were conservative in nature and likely to overestimate actual risk to receptors, as such; it is generally not considered necessary to further refine the assumptions given that the risk estimates were below adopted acceptable levels.

Overall the estimated health risks to off-site residents (including an adult, child and infant), recreational users (adult and child) and commercial workers (adult) from all exposure pathways, were considered low and acceptable.

18.0 Biodiversity

This **Section 18.0** provides an assessment of the potential impacts of the Project on biodiversity and is supported by the ecological database search of the EPBC Protected Matters Search tool in **Appendix D**, and the likelihood of occurrence tables provided in **Appendix L**.

18.1 Secretary's Environmental Assessment Requirements

The assessment of biodiversity impacts addresses the SEARs as detailed in **Table 18-1**.

Table 18-1 Secretary's Environmental Assessment Requirements for the Assessment of Biodiversity

Biodiversity SEARs
Biodiversity – including: - An assessment of the proposal under the Framework for Biodiversity Assessment (Oct 2014) if necessary and an assessment of any potential impacts on riparian vegetation and any groundwater dependent ecosystems.

18.2 Methodology

Potential impacts on biodiversity and ecological values were determined through a desktop ecological assessment and supported by a field assessment of the Project area. Utilising the outcomes of this assessment a review of the potential impacts was then made having consideration of the requirements of the *Framework for Biodiversity Assessment – NSW Biodiversity Offsets Policy for Major Projects* (FBA) (OEH, 2014).

18.2.1 Desktop Assessment

Information about potential threatened flora and fauna within a 5-kilometre radius of the Project area was obtained from the following databases:

- DoE (Cwth) Protected Matters Search Tool for matters protected by the EPBC Act (refer to **Appendix D**);
- NSW BioNet – *the database for the Atlas of NSW Wildlife*, Office of Environment and Heritage (OEH, 2016b) (TSC Act). The abundance, distribution and age of records generated were used as supplementary information for the assessment of likelihood of occurrence of those threatened species within the Project Area (refer to **Appendix L**); and
- The Bureau of Metrology groundwater database including information on the presence of Groundwater Dependent Ecosystems (GDEs): http://www.bom.gov.au/water/groundwater/gde/map.shtml.

Other sources of biodiversity information and relevant vegetation mapping included:

- Vegetation Information System (VIS) Mapping through the Spatial Information eXchange (SIX) Vegetation Map Viewer (OEH, 2016c); and
- *Vegetation of the Cessnock-Kurri region, Cessnock LGA, New South Wales: Survey, Classification and Mapping* (Bell & Driscoll 2007).

18.2.2 Field Assessment

A site visit was undertaken on 24 February 2016 by AECOM to contextualise the results of the desktop assessment, record the presence, type and condition of potentially impacted native vegetation, note the presence of weed species, and map the areas of any key ecological constraints. The site inspection also included a fauna habitat assessment giving consideration to important indicators of habitat condition and complexity including the occurrence of microhabitats such as tree hollows, fallen logs, bush rock and/or aquatic habitats.

The main intent of the field assessment was to determine if the project is likely to have a significant impact on biodiversity and ecological values, and what (if any) further impact assessment may be required (such as 7-part tests of significance, Species Impact Statements, or referral under the EPBC Act).

18.3 Existing Environment

18.3.1 Site Condition

The proposed footprint for the waste processing building pad would be partly contained within the existing hard stand area and partly extend beyond the current fence line and onto the undeveloped land to the north of the WA Site, thereby involving some level of groundcover vegetation clearance and disturbance. Although undeveloped, this area of land currently forms part of WA's bushfire hazard reduction area and has been largely cleared of native vegetation. This area is slashed annually for fuel load reduction purposes.

The potential disturbance area consists of a predominantly exotic species grassland with a ground cover dominated by Couch Grass (*Cynodon dactylon*), Weeping Grass (*Microlaena stipoides*), *Panicum* spp., Bracken Fern (*Pteridium esculentum*) and *Lomandra filiformis*. Some emergent juvenile shrubs are also present including Hoary Guinea-flower (*Hibbertia obtusifolia*) and Showy Guinea Flower (*H. linearis*).

Vegetation along the fence line is mostly dominated by Bracken Fern and weeds, with a small patch (~ 5 m x 10 m) of the introduced Rhodes grass (*Chloris Guyana*) occurring on the southern side of the fence. Of the weed species present, most consist of environmental weeds including Lacy Ragweed (*Ambrosia tenuifolia*), Moth vine (*Araujia sericifera*), Cobbler's Peg (*Bidens pilosa*), Purpletop Verbena (*Verbena bonariensis*), Fleabane (*Conyza sp*.) and Summer Grass (*Digitaria sanguinalis*); however the declared Green Cestrum (*Cestrum parqui*) also occurs (one individual). The species is defined as a Class 3 weed under the *Noxious Weeds Act 1993* in the Local Control Authority area of Cessnock City Council, meaning that the plant must be fully and continuously suppressed and destroyed (NSW DPI, 2014).

Some native woody vegetation also occurs along the fence that would need to be removed, including two Thin-leaved Stringybark (*Eucalyptus eugenoides*) specimens (one juvenile and one large mature tree) and several Cherry Ballart (*Exocarpos cupressiformis*) shrubs.

18.3.2 Ecological Communities

Vegetation Communities

For the purposes of this assessment, vegetation communities were considered within a 100 ha area around the Project Area which constitutes the smallest available assessment area prescribed in the Framework for Biodiversity Assessment (OEH, 2014). This is considered given the small scale of the Project and the limited vegetation clearing required.

Broad-scale mapping of the Cessnock LGA (Bell & Driscoll, 2007) identified three vegetation communities as occurring within the 100 ha assessment circle around the Project Area (refer **to Figure 18-1**), however none were mapped as occurring within the Project Area itself. All three communities form part of Threatened Ecological Communities (TEC's) listed under the TSC Act, and include:

- Cabbage Gum Floodplain Woodland, forming part of the *River-Flat Eucalypt Forest on Coastal Floodplains* TEC – this community occurs to the north and to the west of the WA Site;
- Kurri Sands Heath Woodland, forming part of the *Kurri Sands Swamp Woodland* TEC – this community occurs directly adjacent to the WA Site to the south, south-east and south-west; and
- Lower Hunter Spotted Gum – Red Ironbark Forest (main variant), forming part of the Lower Hunter Spotted Gum – Ironbark Forest TEC – this community occurs further to the south-west of the WA Site.

Despite the results of the mapping, due to historical clearing activities and development none of the vegetation occurring within or directly adjoining the Project Area (as presented in **Section 18.3.1**) is considered to conform to any known native vegetation communities, nor to any communities listed under the TSC Act and/or EPBC Act.

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VEGETATION COMMUNITIES IN THE VICINITY OF THE WA SITE

Environmental Impact Statement
Weston Aluminium Recycling Facility

FIGURE 18-1

Riparian Vegetation

Swamp Creek is situated approximately 100 metres north of the Project Area, flowing in an easterly direction. A number of other smaller and unnamed drainage lines and/or tributaries to Swamp creek also occur in the assessment area, the closest of which is located approximately 100 metres northeast of the Project Area (refer to **Figure 18-1**). Swamp Creek within the assessment area is a 4th order stream (Strahler System), whilst all other drainage lines are either 1st or 2nd order streams.

For 4th order streams, the DPI-Water defines a riparian corridor width of 40 metres either side of the creek (plus channel width). Riparian vegetation was therefore mapped within the 100 ha assessment area and is shown in **Figure 18-1**. No riparian vegetation occurs within the Project disturbance area.

Groundwater Dependant Ecosystems (GDEs)

The Project Area is located within the region covered by Water Sharing Plan for the Hunter Regulated River Water Source 2009. No GDEs are identified within the plan as occurring within 5 km of the Project Area. The search results of the Groundwater Dependant Ecosystems Atlas (BoM, 2016) are provided in **Appendix L**, and have been included in **Figure 18-1**.

18.3.3 Threatened Flora

Database searches identified nine species of flora listed as threatened under the EPBC Act and an additional one species listed under the TSC Act which are known or considered likely to occur within a 5 km radius of the Project Area (refer to **Appendix D** and **Appendix L**). None of these identified species have been previously recorded within the Project Area.

An analysis of the likelihood of occurrence within the Project Area for each threatened flora species is provided in **Appendix L**. This assessment concluded that none of threatened flora species known from the locality are likely to occur within the Project Area and a 7-part test of significance, a Species Impact Statements, or referral under the EPBC Act are not required.

18.3.4 Threatened Fauna

Database research identified that 16 fauna species listed as threatened under the EPBC Act and an additional 32 fauna species listed under the TSC Act have been recorded or have the potential to occur within a 5 km radius around the Project Area (refer to database search results in **Appendix D** and **Appendix L**). None of these identified species have been previously recorded within the Project Area.

An analysis of the likelihood of occurrence within the Project Area for each threatened flora species is provided in **Appendix L**. This assessment concluded that none of threatened fauna species known from the locality are likely to occur given the limited potential habitat provided by the Project Area. .

18.4 Assessment of Potential Impacts

The Project would require the removal of two eucalypt trees (one juvenile and one mature senescing tree) and several small Cherry Ballart shrubs along the existing fence line, as well as the clearing of a small area (approximately 0.1 ha) of disturbed grassland vegetation.

None of the vegetation within the proposed Project Area conforms to any TECs listed under the TSC Act and/or EPBC Act; therefore no impacts to TECs are anticipated. Likewise, the Project Area does not occur within the riparian zone of Swamp Creek or any of its local tributaries, and therefore there would be no impact on riparian vegetation. Finally, even though the vegetation of the Project Area is mapped as having a moderate potential for groundwater interaction, there are no known high priority GDEs in the locality. Given the highly disturbed nature of the Project Area it is considered that the Project would not impact on GDEs. Overall, the proposed Project is not considered to result in a significant impact to local ecological communities and no further assessment is required under the *Risk Assessment Guidelines for Groundwater Dependent Ecosystems* (NOW, 2012b), or the *NSW State Groundwater Dependent Ecosystems Policy* (DLWC, 2002).

Therefore, while it is concluded that threatened flora and fauna species that potentially occur within the wider locality are unlikely to occur within the Project Area itself, and that the Project would not impact on threatened species, the proposed Project does however have the potential to result in a number of minor impacts to the local biophysical environment.

Direct removal and modification of vegetation within the Project Area may result in potential indirect impacts including:

- Spread of weeds beyond the Project Area during construction – in particular the listed Green Cestrum;
- Runoff, erosion and sedimentation during construction – with potential impacts to the nearby Swamp Creek catchment;
- Potential pollution and contamination of the local Swamp Creek catchment during construction as a result of chemical spills/plant leaks; and
- Minor loss of habitat features for common fauna including foraging habitat and blossom-producing trees and shrubs.

Due to the scale of the Project, these potential impacts are considered minor and can be suitably managed through the implementation of standard site environmental management measures.

It is anticipated that during the operational phase of the Project, there would be a negligible impact on biodiversity given the location of the Project within a modified industrial area.

18.5 Mitigation Measures

The following measures would be implemented to minimise impacts to biodiversity, including:

- Limit the construction disturbance footprint area of the Project as far as possible through the use of flagging to restrict plant and machinery movements;
- Minimise soil transportation within, or out of the Project footprint to reduce the potential for weed spread;
- Stockpile or store construction materials within the existing hardstand areas of the WA Site; and
- Apply appropriate erosion and sedimentation controls around the Project Area during construction to prevent impacts to downstream riparian habitats.

18.6 Summary and Conclusion

The Project would require the clearing of approximately 0.1 ha of native and exotic vegetation, predominately grassland, including the removal of two native eucalypt trees and a number of Cherry Ballart shrubs located along the existing fence line. The Project was assessed in accordance with the TSC Act and the EPBC Act.

The Project Area beyond the existing fence line is located within the sites existing bushfire hazard reduction area. The area has been largely cleared of native vegetation and is slashed and managed annually for fuel load reduction purposes. As such, the disturbed and modified nature of the Project Area precludes the occurrence of threatened ecological communities, as well as riparian vegetation and GDEs, and of local threatened species of flora and fauna. Despite this, a number of mitigation measures have been recommended to minimise the minor impacts the project may have on local biodiversity values.

Overall, the project is considered unlikely to result in a significant impact to any threatened species, populations or communities listed under the EPBC or TSC Acts. There is therefore no requirement for a referral to the Commonwealth Minister of the Environment, or to prepare a Species Impact Statement.

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19.0 Heritage

This section provides an assessment of the potential impacts of the Project on Aboriginal cultural heritage and non-Aboriginal heritage. Relevant heritage database searches are provided in **Appendix M**.

19.1 Secretary's Environmental Assessment Requirements

The Aboriginal and Cultural Heritage assessment addresses the SEARs as detailed in **Table 19-1**.

Table 19-1 Secretary's Environmental Assessment Requirements for the Assessment of Heritage

Heritage SEARs
Heritage – including: - an assessment of Aboriginal cultural heritage

19.2 Methodology

In order to determine the likelihood of the Project impacting on any previously identified heritage items, searches were undertaken of the following databases to identified heritage items in proximity to the Project area:

- Aboriginal cultural heritage:
  - The NSW Aboriginal Heritage Information Management System (AHIMS) (OEH, 2016);
- Cultural Heritage:
  - The now repealed *Cessnock Local Environmental Plan 1989;*
  - Cessnock LEP 2011;
  - NSW State Heritage Register; and
  - National Heritage List.

A review of previously environmental assessments undertaken for the WA Site was also undertaken to confirm the presence of any previously identified heritage items. The Project footprint was then reviewed in light of any identified heritage items to determine the potential for impacts.

19.3 Existing Environment

19.3.1 Aboriginal Cultural Heritage

The WA Site has been operational for over 25 years and given the industrial nature of the business, the WA Site is heavily disturbed or modified. The Project would require earthworks for the establishment of a building pad and the subsequent construction of the waste processing building to house the thermal waste processing equipment. The building footprint is partially within an area which has not been subject to significant modification but has been subject to continual ground disturbance as a result of vegetation clearing and maintenance particularly for hazard reduction purposes.

A search undertaken of the AHIMS for the Project Area and surrounding land did not identify any archaeological items in close proximity to the Project Area. A copy of the AHIMS search results are attached in **Appendix M**.

19.3.2 Cultural Heritage

The nearest listed heritage item to the WA Site is the South Maitland Railway System, item I212 in the LEP 2011, located approximately 150 m to the south east of the Project Area. The South Maitland Railway has historically provided services the South Maitland and Cessnock Coalfield and continues to do so today, however at a significantly reduced capacity.

Within the townships of Kurri Kurri and Weston there are also a number of locally listed heritage buildings and sites which are all over 500 m from the Project Area.

19.4 Assessment of Potential Impacts

19.4.1 Aboriginal Cultural Heritage

Due to the WA Site history, land disturbance, and the lack of any previously identified archaeological finds in the AHIMS register search, it is considered unlikely that the Project would impact on any items of archaeological heritage.

19.4.2 Cultural Heritage

Given the distances between the Project Area and the listed heritage items, the Project would have a negligible impact on any items of cultural heritage. The historical use of the WA Site for industrial uses and ongoing disturbance preclude potential for any unknown items of cultural heritage significant to be uncovered during earthworks.

19.5 Mitigation Measures

19.5.1 Aboriginal Cultural Heritage

Although no archaeological heritage items have previously been identified within the Project disturbance area or immediate surrounds, should an artefact or item of Aboriginal cultural heritage be discovered during construction works, the following standard procedure should be adopted:

- Cease all works immediately in the area to prevent any further impacts to the site;
- Notify the OEH;
- Engage a suitably qualified archaeologist and Registered Aboriginal Parties (RAP) to determine the nature, extent and significance of the site and provide appropriate management advice. Management action(s) would vary according to the type of evidence identified, its significance (both scientific and cultural) and the nature of potential impacts;
- Prepare and submit an AHIMS site card for the site; and
- In the event that potential human skeletal remains are identified within the Project area at any point during the life of the Project, all work in the vicinity of the remains should cease immediately and OEH should be notified for further instruction.

19.5.2 Cultural Heritage

Should any items of potential cultural heritage significance be uncovered during earthworks, the immediate area of the potential find would be isolated and the heritage officer at Cessnock City Council contacted for advice.

19.6 Summary and Conclusion

Given the Project is located within an area that has a history of disturbance for industrial development and land management, the potential for the Project to encounter any unidentified items of either indigenous or historic heritage are low. With the recommended mitigation measures in place during the construction phase to manage any unexpected finds, the Project is likely to have a negligible impact on heritage.

20.0 Visual Amenity

This section **20.0** provides an assessment of the potential impacts of the Project on the visual amenity of the Project Area and surrounding area.

20.1 Secretary's Environmental Assessment Requirements

The assessment of visual impacts addresses the SEARs as detailed in **Table 20-1**.

Table 20-1 Secretary's Environmental Assessment Requirements for the Assessment of Visual Amenity

Visual SEARs
Visual – including: - an assessment of the potential visual impacts of the project on the amenity of the surrounding area.

20.2 Methodology

A desktop assessment was undertaken to determine the potential visual impacts of the Project.

20.3 Existing Environment

The existing WA Site is situated in an industrial zoned area which is typified by a mix of industrial land uses and undeveloped site with varying levels of vegetation cover. The Project Area and area immediately surrounding is topographically flat with few distinguishing topographical features.

The nearest residential dwellings are located approximately 600 m to the south on the edge of Kurri Kurri. Dwellings at this location are at similar heights above sea level to the WA Site and due to intervening development there are no lines of sight between the nearest residential areas and the Project Area.

Visual access to the WA Site is generally limited to views from vehicles travelling along Mitchell Avenue which have a fleeting and narrow field of view into the WA Site. Parts of the administration building and truck loading gantry can be viewed through buffer vegetation along the boundary of the site from Mitchell Avenue.

20.4 Assessment of Potential Impacts

The Project proposes to construct a waste processing building approximately 10m high at the rear of the WA Site. The proposed building would be predominantly shielded from external view by the WA Site's existing buildings and vegetation.

It is proposed to clad the building with green Colorbond, similar to the existing buildings on site. No reflective materials would be used that are visible at sensitive receiver locations. This colour blends with the surrounding vegetation further reducing its visibility.

Overall due to the relatively isolated location of the proposed building relative to sensitive receivers and the lack of visibility to the WA Site afforded by the existing buildings and buffer vegetation, visual impacts from the Project would be negligible.

The remainder of the proposal would be constructed outside the building at ground level and would comprise an assemblage of thermal waste processing equipment including the as detailed in **Section 6.4** which would be clad in metal and would form industrial elements consistent with the industrial context of the site. These elements would not be observable from Mitchell Avenue. The proposed bypass stack would be 12.5m above existing ground level. Due to the presence of the existing site buildings it is unlikely that the bypass stack would be visible from Mitchell Avenue.

Floodlighting would be required for security and safety purposes. Lighting would be downward facing and designed to minimise spill from the Project Area. All lighting would be designed in accordance with *Australian Standard 4282 – Control of Obtrusive Effects and Outdoor Lighting.* Much of the internal light would be contained within the Project Area owing to shielding from existing buildings and vegetation. Given the offset distances to sensitive receivers any impact of lighting is expected to be negligible.

20.5 Mitigation Measures

The Project would incorporate the following measures to minimise visual impacts:

- The waste processing building would be clad in green Colorbond and the use of reflective materials would be avoided where possible; and
- Exterior lighting would be designed and constructed in accordance with *Australian Standard 4282 – Control of Obtrusive Effects and Outdoor Lighting*.

20.6 Summary and Conclusion

In summary, the scale and nature of the Project would not be out of character with industrial development within the local area. Due to the offset distances to sensitive receivers, the lack of visual access to the Project Area and proposed building and the incorporation of measures to minimise the visibility of the Project, visual impacts are expected to be negligible.

21.0 Other Environmental Aspects

21.1 Social

The International Principles for Social Impact Assessment (Vanclay, 2003) summarises the key elements that should be considered when determining the social potential impacts of an activity or development:

- People's way of life – that is, how they live, work, play and interact with one another on a day-to-day basis;
- Their culture – that is, their shared beliefs, customs, values and language or dialect;
- Their community – its cohesion, stability, character, services and facilities;
- Their political systems – the extent to which people are able to participate in decisions that affect their lives, the level of democratisation that is taking place, and the resources provided for this purpose;
- Their environment – the quality of the air and water people use; the availability and quality of the food they eat; the level of hazard or risk, dust and noise they are exposed to; the adequacy of sanitation, their physical safety, and their access to and control over resources;
- Their health and wellbeing – health is a state of complete physical, mental, social and spiritual wellbeing and not merely the absence of disease or infirmity;
- Their personal and property rights – particularly whether people are economically affected, or experience personal disadvantage which may include a violation of their civil liberties; and
- Their fears and aspirations – their perceptions about their safety, their fears about the future of their community, and their aspirations for their future and the future of their children.

An assessment of each of these elements in relation to the Project is provided in **Table 21-1**.

Table 21-1 Project Social Impact Assessment against IAIA Guidelines

Potential Social Impact Element	Project Impact Assessment
People's way of life	The Project is located within an established industrial area. The assessments undertaken have indicated that the Project would have a minimal impact on surrounding areas, therefore it is considered unlikely that the Project would have a measurable impact on any peoples' way of life.
Culture	An assessment of the potential impacts of the Project on the indigenous and historical culture of the locality is provided in **Section 19.0**. This assessment concludes that the Project would have a negligible impact on heritage values. There are no cultural land uses (religious, community organisations, etc.) in close proximity to the Project Area that would be impacted by the Project.
Community	The Project as designed, after considering all options, would maximise the continued social and economic benefits from the use of the WA Site by diversifying activities that may be undertaken at the WA Site. There would be local and regional flow-on benefits from project related capital investment during construction, ongoing employment and purchasing carried out during operations.
Political systems	The Project would have a negligible impact on political systems at any scale.
Environment	This EIS includes a comprehensive environmental impact assessment aimed at determining the scale and nature of the Project's potential environmental impacts. Refer to **Part F**. Where the potential for impacts to occur has been identified, management actions and mitigation measures have been recommended to maintain impacts to acceptable levels. With these management measures in place, it is considered that the Project would not have a significant environmental impact.
Health and wellbeing	An assessment of potential hazards, risks and human health impacts of the Project provided in **Sections 16.0** and **17.0** respectively. These assessments concluded that the Project is unlikely to pose a risk to the health or wellbeing of the community. Furthermore by providing an appropriate means for the disposal of wastes that are potential health

Potential Social Impact Element	Project Impact Assessment
	hazards to the community, the Project would have a positive benefit on health and wellbeing.
Personal and property rights	The Project is proposed fully within land owned by the proponent and requires no additional land holdings or acquisitions. The Project site is located within an established industrial area with appropriate offsets to sensitive (residential) land uses, meaning the Project is unlikely to have an impact on personal or property rights.
Fears and aspirations	The Project would provide a local, NSW-based facility with the ability to process biomedical wastes, among others which cannot be disposed of through other means, and thus removing potential sources of human and environmental health impacts.

Based on the assessment provided in **Table 21-1**, the Project is not anticipated to have a significant impact on the social fabric of the local community.

21.2 Economic

The Project would have an estimated Capital Investment Value (CIV) of $5,693,000.00. A copy of the Project's proposed costing as estimated by a Quantity Surveyor is provided in **Appendix C**. Notably due to the synergies that can be achieved through the co-location of the Project at the existing WA Site, input costs can be reduced through the use of existing systems and infrastructure such as weighbridges and air quality management systems. These reduced input costs improve the overall economic viability of the Project compared to the construction of a new facility. Albeit small, the reduced requirement for input materials would also have a positive effect on the valuation and pricing of environmental resources. Where relevant, existing management plans will be reviewed to incorporate the new operations, providing a further cost saving.

Up to 10 construction staff members are estimated to be required onsite during the peak construction period. Actual numbers would vary based on contractors and work methodology. Typically however, there would be fewer that this number onsite at any given time due to the sequential nature of the contract works limiting Project elements that can be constructed simultaneously.

The Project would generate an additional six shift worker positions, full time equivalent. Two maintenance staff would also be required on a part time basis and contactors would be engaged on an as-needed basis to undertaken various tasks.

Apart from the direct capital required for the construction, and the additional employment positions created, one of the key economic benefits of the Project is that it would increase the diversification of the WA operation. Due to recent declines in the aluminium smelting industry, particularly the closure of the Hydro Aluminium Smelter (due in part to an increasing production cost rate as a result of rises in input prices, including electricity), WA's core business of reprocessing SPL and dross from the major smelting facilities, and producing de-oxidant products for the steelmaking sector, faces an uncertain future. The Project would help reduce uncertainty regarding the longer term future for WA.

Diversification of WA's operational activities to the processing of new waste streams would provide the company with a supplementary income that would help secure its ongoing operation and viability into the future. This would help secure employment for both the existing and proposed workforces at WA, ensure that an established rate paying industrial facility continues to operate in Cessnock LGA, and that positive economic flow on effects continue within the local and regional economies.

22.0 Cumulative Impacts

22.1 Introduction

Cumulative impacts are the successive, incremental and combined impacts (both positive and negative) of an activity on society, the economy and the environment. Cumulative impacts are most often raised in the context of multiple Projects in areas where numerous developments are proposed.

An assessment regarding the potential cumulative impact of the Project and its interaction with proposed projects and existing land uses and activities in the region has been undertaken. The findings of the cumulative impact assessment in relation to the key environmental issues for the Project are provided below.

22.2 Battery Recycling Facility

Pymore Recyclers International Pty Ltd was issued with SEARs on 18 March 2016 for the proposed Pymore Battery Recycling Facility (SSD 16_7520). The Pymore Battery Recycling Facility would be located at 129 Mitchell Avenue, Kurri Kurri (Lots 796 and 797, DP 39877), to the immediate east of the WA Site. Throughout this assessment, consideration of this facility has been provided in the relevant assessment areas considered to have the greatest potential for cumulative impact including:

- Air quality in **Section 12.0**;
- Traffic and Transport in **Section 13.0**; and
- Noise and Vibration in **Section 14.0**.

These assessments concluded that in each case the cumulative impacts of both projects are unlikely to represent a significant impact such that neither Project could proceed in light of the other. In undertaking these assessments it was also identified that where the Project may have impacts, they would generally only be minor and incremental impacts.

22.3 Other Projects

A search was conducted of the DP&E's Major Project Assessments Register to identify other developments that are currently under assessment, or are planned within the Cessnock LGA and within 15 km of the Project Area. These developments, as well as their potential for cumulative impacts alongside the current Project, are outlined in **Table 21-1**.

Table 22-1 Developments within 15k m of the Project Area

Development	Status	Distance from Project Area	Potential for Cumulative Impacts
Hunter Industrial Ecology Park SSD 12_5448	SEARs issued 03/12/2012	Immediately adjacent	The staged development of an industrial park is proposed at Mitchell Avenue, Weston, in the near vicinity of the Project Area. This staged development is designed to support the development of a waste to energy electricity generation plant, and a materials recovery facility, amongst others, with the overall aim of harnessing the values of industrial ecology by co-locating such premises. While there is potential for cumulative noise, traffic, air quality and human health impacts with the current Project, the intent of collocating these developments is to restrict impacts on land that is suited for these purposes, with an adequate buffer distance from nearby residences (Industrial Ecology Australia, 2012).
Energy from Waste Facility SSD 14_6779	SEARs issued 19/12/2014	Immediately adjacent (135 Mitchell Avenue)	This development would receive residue wastes from landfills before thermally converting them to produce gas and/or electrical power. It is one of the developments that was envisaged by the Hunter Industrial Ecology Park SSD 12_5448

Development	Status	Distance from Project Area	Potential for Cumulative Impacts
			application. As already outlined, while there is potential for cumulative noise, traffic, air quality and human health impacts with the current Project, the intent of these developments being collocated is such that these impacts would occur on land that is suited for these purposes, with an adequate buffer distance from nearby residences (ESS Australia, 2014).
Former Hydro Aluminium Smelter, Kurri Kurri – Demolition and Remediation SSD 14_6666	SEARs issued 17/11/2014	1.2 km north, at McLeod Road, Loxford	This proposed development would demolish and remediate the former Hydro Aluminium smelter at Kurri Kurri. While there would be some noise, traffic, air quality and human health impacts during demolition and remediation activities, these would be unlikely to cause cumulative impacts in conjunction with the current Project.
Avery's Village Scott and Nielson Planning Agreement	Finalising with DP&E	3.8 km east at 6B Avery's Lane, Heddon Greta	This proposal seeks to subdivide and develop residential lots. While there is some potential for cumulative impacts during the construction of residential dwellings (e.g. increased traffic, noise, air quality impacts, etc.) these would be minor, located at some distance and would use separate transport routes.
Tossy Nulkaba Planning Agreement	Public notification period	11 km west at 18 Valley View Place, Nulkaba	This proposal seeks to subdivide and develop residential lots. While there is some potential for cumulative impacts during the construction of residential dwellings (e.g. increased traffic, noise, air quality impacts, etc.) these would be minor, located at considerable distance with intervening urban development.
MP 09_0090 MOD 2 – Modification to Ammonium Nitrate Emulsion Project	Proponent reviewing submissions	8km south, at George Booth Drive Richmond Vale	The proposed modification includes the installation of a heat exchanger and cooling tower within the existing site. By not significantly changing the operations of the existing site, this proposed modification would not create cumulative impacts for the construction and operation of the current Project.

Overall, it is unlikely that any of these proposed developments would result in significant cumulative environmental impacts in conjunction with the current Project. Furthermore, none of the proposed developments outlined in **Table 21-1** have the potential to create an additional demand on local and regional resources so as to cause significant cumulative impacts.

22.4 Conclusion

This EIS has taken into consideration a number of potential sources of cumulative impacts from a range of existing and proposed projects which may occur in the wider Kurri Kurri and Weston area. Based on this assessment it is concluded that there is minimal potential for significant cumulative impacts to occur. Each project would be required to appropriately mitigate impacts to acceptable levels. Additionally with the majority of identified projects being at distances beyond 1 km from the Project Area, the potential for cumulative impacts would be limited. With regard to the proposed Battery Recycling Facility, it was concluded that the Project would only have minor and incremental cumulative impacts.

23.0 Residual Risk Analysis

23.1 Methodology

This risk analysis for the Project is based on a process adapted from the Australian Standard *AS/NZS ISO31000:2009 Risk management – principles and guidelines*. The process is qualitative and residual environmental risk is assessed on the basis of the significance of environmental effects of the Project and the ability to confidently manage those effects to minimise the risk of harm to the environment.

The significance of environmental effects is given a numerical value between one and five, based on:

- The receiving environment (its sensitivity and values);
- The level of understanding of the type and extent of impacts; and
- Likely community response to the environmental consequences of the Project (refer to **Table 23-1**).

The manageability of environmental effects is similarly given a numerical value between one and five based on the complexity of mitigation measures, the known level of performance of the safeguards proposed, and the opportunity for adaptive management (refer to **Table 23-2**).

Table 23-1 Significance of Effects

No	Significance	Receiving Environment
5	Extreme	Undisturbed receiving environment, type or extent of impacts unknown, substantial community concern.
4	High	Sensitive receiving environment, type or extent of impacts not well understood; high level of community concern.
3	Moderate	Resilient receiving environment, type and extent of impacts understood; community interest.
2	Minor	Disturbed receiving environment; type and extent of impacts well understood; some local community interest.
1	Low	Degraded receiving environment; type and extent of impacts fully understood; uncontroversial project.

Table 23-2 Manageability of Effects

No	Significance	Mitigation Measures
5	Complex	Complicated array of mitigation measures required; safeguards or technology are unproven; adaptive management inappropriate.
4	Substantial	Significant mix of mitigation measures required; past performance of safeguards is understood; adaptive management feasible.
3	Straightforward	Straightforward range of mitigation measures required; past performance of safeguards is understood; adaptive management feasible.
2	Standard	Simply suite of mitigation measures required; substantial track record of effectiveness of safeguards; adaptive management unlikely to be required.
1	Minimal	Little or no mitigation measures required; safeguards are standard practice; adaptive management not required.

The chosen numbers are added together to yield a result which provides a ranking of potential residual effects of the Project when the mitigation measures identified in this EIS are implemented (refer to **Table 23-3**).

Table 23-3 Residual Risk Matrix

Significance of Effects	Manageability of Effects				
	5 Complex	4 Substantial	3 Straightforward	2 Standard	1 Minimal
1 Low	6 Medium	5 Low/Medium	4 Low/Medium	**3 Low**	**2 Low**
2 Minor	7 High/Medium	6 Medium	5 Low/Medium	4 Low/Medium	**3 Low**
3 Moderate	8 High/Medium	7 High/Medium	6 Medium	5 Low/Medium	4 Low/Medium
4 High	**9 High**	8 High/Medium	7 High/Medium	6 Medium	5 Low/Medium
5 Extreme	**10 High**	**9 High**	8 High/Medium	7 High/Medium	6 Medium

23.2 Analysis

The analysis of residual environmental risks for issues related to the Project is shown in **Table 23-4**. The analysis included consideration of the potential impacts of the Project with the proposed management and mitigation measures detailed in this EIS in force. A summary of mitigation measures is provided in **Part G**. These measures would need to be in place during the operation of the Project to achieve the residual risk levels detailed in **Table 23-4**.

Table 23-4 Residual Risk Profile

Issue	Initial Risk Rating (No Controls)			Residual Risk Rating (Controls in Place)
	Significance of Effects	Manageability of Effects	Risk Score	Residual Risk
Waste Management	Moderate	Standard	High/Medium	Low
Air Quality and Odour	Moderate	Substantial	High/Medium	Low/Medium
Traffic and Transport	Moderate	Straightforward	Medium	Low
Noise and Vibration	Moderate	Straightforward	Medium	Low
Soil and Water	Moderate	Straightforward	Medium	Low
Hazards	Moderate	Substantial	Medium	Low/Medium
Human Health	Minor	Standard	Low/Medium	Low
Biodiversity	Minor	Standard	Low/Medium	Low
Heritage	Minor	Standard	Low/Medium	Low
Visual Amenity	Minor	Standard	Low/Medium	Low
Social	Moderate	Minimal	Low/Medium	Low
Economic	Minor	Standard	Low/Medium	Low

23.3 Conclusion

The residual risk analysis indicates that the Project, including appropriate mitigation measures as outlined in this EIS, would give rise to predominately a low risk in relation to the identified environmental issues. The application of the management measures outlined in this EIS would suitably manage these remaining risks.

Part G – Environmental Management and Monitoring

This chapter describes the commitments made by WA through the life of the Project to manage potential impacts identified with the EIS. Commitments include management, mitigation and monitoring measures.

24.0 Environmental Management

24.1 Environmental Management and Monitoring Program

24.1.1 Objectives

WA currently operates an Environmental Management and Monitoring Program to meet the various regulatory requirements of the existing Project Approval and EPL. This Environmental Management and Monitoring Program would continue to be operated during the Project and would be updated to include the relevant management measures recommended in this EIS.

WA has identified and commits to the measures outlined in **Section 25.0** of this EIS for all activities associated with the Project. The aim of the Environmental Management and Monitoring Program is to ensure that potential environmental, social and economic impacts resulting from the Project, as identified in this EIS, are managed and monitored to a satisfactory level.

24.1.2 Construction Environment Management Plan

The CEMP for the construction of the Project would include project specific requirements, including those relating to:

- Land management and site clearing;
- Surface and groundwater water quality;
- Flora and fauna;
- Air quality;
- Noise and vibration;
- Sedimentation and erosion control;
- Visual amenity;
- Heritage;
- Traffic management;
- Social;
- Waste;
- Hazards and risks; and
- GHG emissions and energy efficiency.

The CEMP would be implemented by the contractor. It would be implemented and enforced by an appropriate contractor employee with ultimate responsibility lying with the Construction Project Manager.

24.1.3 Operation Environmental Management System

The WA Site currently operates under the EMS discussed in **Section 8.0**. Management plans that form the basis of the EMS have been developed to identify, analyse, evaluate and manage all significant potential and actual risks and impacts of activities and operations on the environment and the community. The EMS would continue to be adopted for the Project but would be updated and augmented where required to incorporate additional environmental management requirements.

24.1.4 Emergency Response

In the event of an emergency at the WA Site more generally, the following are implemented as necessary:

- *Emergency Response Plan* (Weston Aluminium Pty Ltd, November 2015);

- *Pollution Incident Response Management Plan* (Weston Aluminium, August 2015); and
- *Safety Management System Manual* (Weston Aluminium Pty Ltd, November 2015).

The *Emergency Response Plan* (Weston Aluminium Pty Ltd, November 2015) in particular details a range of potential emergency scenarios and corresponding responses. The *Pollution Incident Response Management Plan* (Weston Aluminium, August 2015) provides WA's response and reporting duties under EPL 6423 should a material harm pollution incident occur or have the potential to occur.

The *Safety Management System Manual* (Weston Aluminium Pty Ltd, November 2015) functions as a proactive management plan, guiding the carrying out of potentially hazardous activities at the WA Site.

These plans would be updated as required to accommodate the Project. Specifically the *Emergency Response Plan* (Weston Aluminium Pty Ltd, November 2015) would be updated to include clear responses to the hazard scenarios identified in the PHA and any other safety studies conducted for this Project.

24.1.5 Environmental Reporting

In order to meet its regulatory obligations, WA is required to submit a range of reports to public authorities (i.e. the EPA, DP&E and Cessnock City Council). There is also a requirement to report specific information to the public, which is undertaken through the WA website.

If the Project is approved, its environmental reporting would be updated to satisfy the requirements of the varied EPL and new development consent. These environmental reporting practices would continue to be reviewed and updated regularly in response to changes in regulatory reporting requirements.

24.1.6 Environmental Audit

In accordance with the existing Ministerial Consent DA-86-04-01, an independent comprehensive environmental audit is carried out at the WA Site every third year and submitted to the Secretary of DP&E.

If the Project is approved, an independent environmental audit is likely to be required as part of the conditions of consent. This audit would most likely be timed to occur, in the first instance, within one year of the commencement of the Project, and every three years thereafter. It would be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary of the DP&E and in consultation with relevant agencies. The audit would assess the environmental performance of the Project and assess whether it is complying with the requirements in its consent, EPL, other statutory legislation and any other matters specified in the relevant conditions of consent related to auditing. The current independent environmental audit includes a hazard audit component in accordance with *Hazardous Industry Planning Advisory Paper No. 5 – Hazard Audit Guidelines* (DP&E, 2011d). Again, it is likely that a hazard audit would be included in the new conditions of consent for the Project.

25.0 Summary of Mitigation Measures

The SEAR's requirements for the provision of a consolidated list of the Project proposed mitigation measures are provided in **Table 25-1**.

Table 25-1 Secretary's Environmental Assessment Requirements for the Summary of Mitigation Measures

SEARs requirement for Summary of Mitigation Measures
Consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS

25.1 Mitigation Measures

Management and mitigation measures outlined in this section would be implemented throughout the detailed planning, construction and operational phases of the Project, should it proceed. These safeguards would minimise any potential adverse impacts arising from the Project on the surrounding environment. The management and mitigation measures recommended for the Project are summarised in **Table 25-2**.

Table 25-2 Summary of Management and Mitigation Measures

Ref#	Management and Mitigation Measures	Timing
Waste Management		
1.	Throughout the construction and operation of the Project, WA will implement the waste hierarchy principals outlined in the WARR Strategy.	Construction
2.	Ash materials resulting from the thermal treatment process will be disposed of at an offsite landfill licensed to receive such wastes as per the POEO Act.	Operation
3.	WA will not accept wastes for onsite processing which are not encompassed in the updated EPL 6423.	Operation
4.	WA will ensure that wastes received onsite have been properly classified by the providers of those wastes, and will fulfil its waste tracking requirements as set out in the Protection of the Environment Operations (Waste) Regulation 2014.	Operation
5.	A screening process will be implemented for all waste arriving at the site. No waste will be allowed to be deposited at the site until approval has been provided by the WA operator. A formal screening and approval procedure will be included in the Project Operational Management Plan regarding the screening process.	Operation
6.	WA will ensure that it and any of its transport contractors comply with the Dangerous Goods (Road and Rail) Transport Act 2008, Dangerous Goods (Road and Rail Transport) Regulation 2014, and ADG Code when arranging for the transport of any materials covered by the ADG Code.	Operation
7.	In accordance with EPA requirements, WA will retain any waste sampling and classification results that it obtains for the life of the Project.	Operation
8.	Waste water will be disposed of to the waste water network in accordance with the Trade Waste Agreement with Hunter Water.	Operation
Air Quality and Odour		
9.	Existing safeguards to manage air quality impacts, including the existing fabric filter and lime injection system, which will service both the proposed Project and the existing reverb furnace process emissions.	Operation
10.	Additionally, the Project will include real time monitoring and activated carbon injection. The Project will be equipped with an extractive emission monitoring system comprised of oxygen, carbon monoxide and carbon dioxide analysers.	Operation
11.	Analysers will be used for monitoring combustion efficiency calculations and alarm generation.	Operation
12.	Exhaust gases from the secondary chamber, once cooled, will receive an injection of both activated carbon and lime into the fabric filter exhaust inlet duct. Here, exhaust gases will undergo filtration with activated carbon and lime for particulate, acid gas, heavy metals and dioxin control within the plant's existing fabric filter. Treated exhaust gases will then be discharged to the atmosphere from the existing stack.	Operation

Ref#	Management and Mitigation Measures	Timing
13.	The facility will also include the provision of a bypass stack in which hot combustion gases may be vented directly to the atmosphere during emergency situations or power failure. The proposed bypass stack will be equipped with a fail-safe pneumatically assisted and counterweighted insulated stack cap. During normal operations this cap will be closed allowing combustion products to pass through the air pollution control plant.	Operation
14.	All air quality monitoring, management and pollution control systems will be operated to maintain emissions below proposed emissions limit for Stack 5 or existing emissions limits for all other stacks.	Operation
Traffic and Transport		
15.	A Construction Traffic Management Plan should be prepared and implemented prior to the construction phase of the Project as part of the CEMP. This will include the guidelines, general requirements and principles of traffic management to be implemented during the construction phase to minimise the potential for traffic impacts on Mitchell Avenue. Specifically, no construction traffic will be allowed to park or idle on the surrounding road network.	Construction
16.	The WA Site's existing Operational Environmental Management Plan will be updated to incorporate consideration of the Project's operational traffic requirements. Measures that will be implemented to manage operational traffic include: - An induction process for drivers; - Time of day travel restrictions in accordance with the EPL; and - The requirement to follow approved operational access and egress routes from the Hunter Expressway.	Operation
Noise and Vibration		
17.	Construction Hours – Works will be limited to standard construction hours where possible	Construction
18.	Standard Mitigation Measures: All construction activities associated with the development of the Project will be subject to the standard noise and vibration mitigation measures described below: - The contractor will, where reasonable and feasible, apply best practice noise mitigation measures including: - Maximising the offset distance between noisy plant items and nearby noise sensitive receivers; - Avoiding incidents of noisy plants working simultaneously close together and adjacent to sensitive receivers, where practicable; - Orientating where possible, equipment with directional noise emissions away from sensitive receivers; - Locating noisy plant away from potentially noise affected neighbours or behind barriers, such as sheds or walls; - Loading and unloading will be carried out away from sensitive receivers, where practicable; - Carrying out maintenance work on construction plants with the potential to generate noise impacts away from noise sensitive receivers	Construction

Ref#	Management and Mitigation Measures	Timing
	and confined to standard daytime construction hours, where possible; - Relocating any vibration generating plant and equipment away from noise and vibration sensitive receivers in order to minimise any potential vibration impacts; - Turning off plant that is not being used; - Ensuring plant is regularly maintained, and repairing or replacing equipment that becomes noisy; and - Arranging the construction work site to minimise the use of movement alarms on vehicles and mobile plant.	
19.	Local Road Traffic – Heavy Vehicles Noise Mitigation: - The following mitigation measures are proposed in order to minimise the impact of from heavy vehicles on local roads: • All trucks will be fitted with mufflers and any other noise control equipment in good working order. • As far as practical and safety consideration, truck drivers will avoid: • Heavy acceleration and braking; • Compression braking; • Reversing as far as practicable; • High speeds; • Pick-ups and deliveries outside standard construction hours; and • Idling outside noise sensitive receivers; • Truck routes to and from the construction work site will be via the routes detailed in **Section 13.0**. - Reversing Alarms: • The potential noise impact associated with reversing alarms will be managed and minimised via a combination of proactive driver/operator training and operational procedures. The following mitigation strategies will be undertaken, taking into account that SafeWork NSW Work Health and Safety requirements will need to be satisfied with respect to safety surrounding construction vehicles. • The primary means for minimising reversing alarm noise will be through a dedicated effort on the part of all construction equipment drivers to minimise, wherever feasible, the amount of reversing of their vehicles; • Wherever feasible, turning circles will be created at the end points of vehicle work legs, which will allow trucks to turn and avoid	Construction and Operation

Ref#	Management and Mitigation Measures	Timing
	the need for reversing; and • Emphasis will be placed during driver training and site induction sessions on the potential adverse impact of reversing alarms and the need to minimise their use.	
20.	The existing site Operational Environmental Management Plan will be inforce to manage operational noise.	Operation
Soil and Water		
21.	Where excess spoil is excavated at the Project Area, it will be subject to sampling and classification according to the Waste Classification Guidelines Part 1: Classifying Waste (EPA, 2014a) prior to being transported offsite to an authorised receiver.	Construction
22.	Erosion and sediment control practices will be incorporated into the CEMP for the Project, in accordance with Managing Urban Stormwater: Soils and Construction (Landcom, 2004) to prevent construction site runoff entering the WA Site stormwater system, or the nearby Swamp Creek.	Construction
23.	To minimise the potential for contamination to occur during construction works the following measures will be employed during construction works.	Construction
24.	Excavated spoil will be stored so as to prevent its uncontrolled release.	Construction
25.	Groundwater interception will be avoided where possible.	Construction
26.	Construction works and laydown areas will be confined to hardstand areas where reasonable and practicable to do so.	Construction
27.	Spill kits will be available at the construction site.	Construction and Operation
28.	Liquids will be stored at the Project Area in a manner that provides for both primary and secondary containment, and where any spills may be diverted away from the stormwater drainage system and non-hardstand areas, following the general guidance outlined in Storing and Handling Liquids: Environmental Protection Participant's Manual (DECC, 2007).	Construction and Operation
29.	Refuelling activities will be undertaken in existing dedicated refuelling bunds.	Construction and Operation
30.	The existing OEMP prepared for the Facility provides a framework to effectively manage the potential pollution of soils and water during the operation of the Project. The OEMP will be updated where relevant to incorporate the Project in consultation with DP&E. The site Surface Water Management Plan will also be updated to incorporate the relevant compliance requirements of the Project.	Operation
31.	During operations WA will continue to comply with any water quality management measures set out in EPL 6423. This may include stormwater monitoring (such as that currently undertaken at the WA Site), as well as the appropriate storage, enclosing, bunding and	Operation

Ref#	Management and Mitigation Measures	Timing
	covering of SPL material and pharmaceutical wastes.	
32.	Prior to operations WA will liaise with Hunter Water to ensure the operational phase of the Project is included in a Trade Waste Agreement with Hunter Water.	Operation
Hazards		
33.	The following practices currently employed at the WA Site will continue during the operation of the Project: - Baghouse No. 5 will be fitted with real-time, continuous particulate monitoring systems; - All baghouses will be fitted with high differential pressure detection to activate bag switch-over and clogged bag cleaning processes; - The existing site EMS will be updated to incorporate the management requirements of the Project; - Dangerous Goods will be transported to and from site in accordance with the ADG Code, the Dangerous Goods (Road and Rail Transport) Act 2008 and the Dangerous Goods (Road and Rail Transport) Regulation 2014; and - A number of further safety studies will be required to be conducted in accordance with: - The hazard-related conditions of consent provided by DP&E; - The Work Health and Safety Act 2011, associated regulations (including the Work Health and Safety Regulation 2011), and codes of practise; and - The Protection of the Environment Operations Act 1997 and associated regulations.	Operation
34.	The following measures will be implemented to control, minimise and manage risks during all phases of the Project: - In detailed design, locate product storage areas at separation distances with specific reference to the applicable Australian Standards; - Conduct a Fire Safety Study for the Project to determine appropriate fixed and portable fire protection systems for the Project Area; - In addition to this PHA, conduct a Final Hazard Analysis prior to construction; - Develop a Traffic Risk Assessment and a detailed Route Selection study for the dangerous goods transport activities particularly for the transport of dangerous goods from the Project Area; and - Carry out safety in Design Reviews in accordance with Work Health and Safety Regulation 2011 and Code of Practice – Safe Design of Structures (Safe Work Australia, July 2012).	Construciton and Operation
35.	During construction the following measures will be implemented to control, minimise and manage risks: - Update the Safety Management System Manual, November 2015 to include the operations and materials associated with the Project	Construction

Ref#	Management and Mitigation Measures	Timing
	prior to the commencement of operation in accordance with the requirements of the Work Health and Safety Regulation 2011; - Update the Emergency Response Plan (Weston Aluminium Pty Ltd, November 2015) to include specific responses to the hazard scenarios identified in this PHA and any other safety studies conducted for this Project; - Develop and implement an appropriate Safety Management Plan. This should include access by workers to a risk register for all construction activities; - Review and update the existing Emergency Response Plan, including actions to be taken in the event of an emergency; - Ensure a permit to work system is implemented, in particular where workers may be exposed to high risk activities; - Undertake audits on construction activities, and address and communicate any findings to the relevant workers; - Ensure the workers have appropriate training and the necessary competencies; and - Implement actions/risk reduction strategies as identified through Safety in Design reviews.	
36.	During operations, the following measures will be implemented: - Update the site Safety Management Plan. This should include access by workers to a risk register for all operational activities; - Update the site Emergency Response Plan to ensure a co-ordinated response to the hazard scenarios identified in this assessment; - Update the site Operational Environmental Management Plan; - Undertake audits on operational activities, and address and communicate any findings to the relevant workers; - Ensure workers have appropriate training and necessary competencies; - Implement appropriate maintenance programs to minimise potential for equipment failures; and - Notify SafeWork NSW of any WHS Regulation Schedule 15 chemicals that are likely to exceed 10 percent of the threshold quantity; - Prepare any placards, manifests and emergency plans as required for chemicals exceeding the WHS Regulation Schedule 11 placard or manifest quantities; and - Update the onsite dangerous goods register and Safety Data Sheet register, as well as provide updated dangerous goods notifications to SafeWork NSW as required.	Operation
37.	The following safeguards will be implemented to limit the consequences and likelihood of a fire occurring at the Project Area's dangerous goods store: - The Project Area will be continuously staffed with appropriate security fencing and other systems to resist malicious attack;	Operation

Ref#	Management and Mitigation Measures	Timing
	- The proposed warehouse building will incorporate an electrical system designed to meet relevant explosion protection standards; - No equipment will operate in dangerous goods warehouses areas that might generate friction or other sources of heat contributing to the risk of ignition; - A strict smoking ban will continue to be enforced on the WA Site; - Process areas will contain properly maintained equipment (such as forklifts) suitable for the relevant hazardous area classification; - All incompatible dangerous goods classes will be completely segregated with appropriate fire separation distances created and maintained (including use of fire walls etc. where necessary) according to AS 1940:2004 – The Storage and Handling of Flammable and Combustible Liquids; - All spills will be quickly and completely cleaned up; - No dangerous goods will be accepted at the Project Area unless they are packaging complying with the ADG Code and the requirements of the WHS Regulation, with steel drums preferred where possible to limit potential for damage and leakage; - Adequate sprinkler or foam systems will be installed if the Fire Safety Study indicates these are required; - Fully bunded dangerous goods warehouse sections will be maintained so as to limit the spread of fire and prevent the discharge of contaminated fire-water in the event of such an incident; and - Training will be provided for staff in correct equipment operation, accident prevention and emergency response (including firefighting).	
38.	The following additional safeguards will be implemented to limit the consequences and likelihood of a toxic release from class 6.1 dangerous goods: - Equipment (such as forklifts) will be properly maintained to minimise the risk of damage to packaging; and - No transfer operations of class 6.1 materials destined for thermal processing will occur outside the thermal waste processing plant.	Operation
39.	To control, minimise and manage risks during the post-closure phase of the Project, the following measures will be implemented: - Develop a decommissioning plan. This should include a project risk register that is available to all workers, including any risk items added during the construction and operations phases; and - Keep records of all workplace health and safety information relating to the Project post closure phase. - As a part of the update to the Safety Management System Manual (Weston Aluminium Pty Ltd, November 2015), the storage and handling of dangerous goods during the Project will be clarified to be in accordance with the relevant Australian Standard for each class of dangerous goods, including those outlined below:	Post-Operation

Ref#	Management and Mitigation Measures	Timing
	- AS/NZS 3816:1998, Management of clinical and related wastes relating to the management of class 6.1 pharmaceutical substances; - HB 202-2000, A management system for clinical and related wastes – Guide to the application of AS/NZS 3816-1998, Management of clinical and related wastes; - AS 1940:2004 – The Storage and Handling of Flammable and Combustible Liquids relating to the management of paints, solvents, pharmaceutical and quarantine wastes classified as class 3 substances; - AS 3780:2008 – The storage and handling of corrosive substances - management of class 8 pharmaceutical and quarantine wastes classified as corrosive substances; - AS/NZS 4452:1997, The storage and handling of toxic substances - management of class 6.1 pharmaceutical substances; - AS/NZS 4681:2000 – The storage and handling of Class 9 miscellaneous dangerous goods relating to class 9 pharmaceutical wastes; and - AS/NZS 3833:2007 – The Storage and Handling of Mixed Classes of Goods, in Packages and Intermediate Bulk Containers considered for the management of areas where various classes of goods are stored, such as waste preparation areas.	
Human Health		
40.	All air pollution management, monitoring and pollution prevention systems will be operated to maintain the proposed emissions limits from Stack 5.	Operational
Biodiversity		
41.	Limit the construction disturbance footprint area of the Project as far as possible through the use of flagging to restrict plant and machinery movements.	Construction
42.	Minimise soil transportation within, or out of the Project footprint to reduce the potential for weed spread.	Construction
43.	Stockpile or store construction materials within the existing hardstand areas of the WA Site.	Construction
44.	Apply appropriate erosion and sedimentation controls around the Project Area during construction to prevent impacts to downstream riparian habitats.	Construction
Heritage		
45.	Aboriginal Cultural Heritage: - Although no archaeological heritage items have previously been identified within the Project disturbance area or immediate surrounds, should an artefact or item of Aboriginal cultural heritage be discovered during construction works, the following standard procedure should be adopted:	Construction

Ref#	Management and Mitigation Measures	Timing
	- Cease all works immediately in the area to prevent any further impacts to the site; - Notify the OEH; - Engage a suitably qualified archaeologist and Registered Aboriginal Parties (RAP) to determine the nature, extent and significance of the site and provide appropriate management advice. Management action(s) will vary according to the type of evidence identified, its significance (both scientific and cultural) and the nature of potential impacts; - Prepare and submit an AHIMS site card for the site; and - In the event that potential human skeletal remains are identified within the Project area at any point during the life of the Project, all work in the vicinity of the remains should cease immediately and OEH should be notified for further instruction.	
46.	Non-Aboriginal Heritage: - Should any items of potential cultural heritage significance be uncovered during earthworks, the immediate area of the potential find will be isolated and the heritage officer at Cessnock City Council contacted for advice.	Construction
Visual Amenity		
47.	The waste processing building will be clad in green Colorbond and the use of reflective materials will be avoided where possible.	Design / Construction
48.	Exterior lighting will be designed and constructed in accordance with *Australian Standard 4282 – Control of Obtrusive Effects and Outdoor Lighting*.	Design / Construction

Part H – Project Justification

This part summarises the justification for the Project from an environmental, biophysical, social and economic perspective. An assessment of the Project ability to meet the principals of Ecologically Sustainable Development (ESD) is also made. IN addition the consequences of the Project not proceeding are also summarised.

26.0 Justification for Approval

26.1 Biophysical, Economic and Social Considerations

Pursuant to Schedule 2, Clause 7(f) of the EP&A Regulation, the Project is justified in terms of biophysical, economic and social considerations as described below.

26.1.1 Biophysical

An assessment of the potential biophysical impacts of the Project has been undertaken as provided in **Part F** of the EIS. Assessment of air quality and noise impacts concluded that the Project would be able to operate within the relevant EPA criteria. The biodiversity assessment found that the Project Area is void of significant threatened biodiversity and the Project is unlikely to result in impacts to any listed species populations or communities. Assessment of potential surface and groundwater impacts identified that potential impacts would be minor and easily managed in accordance with practices detailed in this EIS. Impacts to soils would be negligible given the disturbed nature of the Project Area.

26.1.2 Economic

The Project represents a new and diversified economic activity that would be operated from the WA Site. Given the reduced investment in and contraction of the aluminium smelting industry in Australia, typical sources of material to process have been steadily reducing. The Project represents an opportunity to diversify the plant to introduce a new income stream independent of the aluminium industry. This would provide not only an additional income streams to help secure its ongoing operation at WA but it would also help secure the existing employment and economic feedbacks the facility provides to the local and regional economy.

26.1.3 Social

The Project is located within an established industrial area. The assessment of social impacts indicated that the Project would have a minimal impact on local communities. An assessment of potential hazards, risks and human health impacts of the Project concluded that it is unlikely to pose a risk to the health or wellbeing of the community. Furthermore, by providing an appropriate means for the disposal of wastes that are potential health hazards to the community, the Project would have a positive benefit on health and wellbeing. The Project is proposed fully within land owned by the proponent and requires no additional land holdings or acquisition. The Project Area is located within an established industrial area with appropriate buffers to sensitive (residential) land uses, meaning the Project is unlikely to have an impact on personal or property rights. For these reasons, the Project is justified from a social perspective.

26.2 Ecologically Sustainable Development

26.2.1 Precautionary Principal

The Precautionary Principle, in summary, holds that where there are threats of serious or irreversible environmental damage, the lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

A precautionary and conservative approach to development of the Project was taken in order to avoid or minimise potential impacts to the environment and community, including the following:

- The use of an existing operation and brownfield site and existing infrastructure to minimise the impacts that would otherwise be required to setup and operate from a new site;

- A range of environmental protection measures have been built into the Project, notably air quality management systems, designed to limit emissions from the Project and potential impacts which may result from its operation;
- The Project location is situated with appropriate buffer distances to sensitive (residential) land use zones providing a buffer from potential impact, even though modelling in this EIS has shown impacts would be minimal; and
- Provision has been made for the ongoing monitoring and management of the Project to reduce the potential for impacts to occur over time, with monitoring to be undertaken in unison with DP&E, the EPA and other stakeholders.

A detailed understanding of the issues and potential impacts associated with the Project has been obtained through consultation and assessment to a level commensurate with the scale of the Project, industry standards, the level of environmental risk and the legislative framework under which the Project is permitted. Specialist assessments, including the use of engineering and scientific modelling, have been undertaken to aid the design of the Project and for impacts relating to waste, air quality, noise and vibration, human health, hazard and risk, ecology, groundwater, surface water, biodiversity, Aboriginal cultural heritage, non-Aboriginal heritage, traffic, and visual to be understood. Assessment has also been undertaken for other issues, including social, economic, and land use considerations. To this end, there has been careful and thorough evaluation undertaken in order to recognise the potential for and then avoid where possible, serious or irreversible damage to the environment. This is evidenced through the assessment of potential residual risk undertaken in **Section 23.0** which concluded a primarily low potential for residual risk following the implementation of Project management measures.

26.2.2 Intergenerational Equity

Intergenerational Equity is centred on the concept that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. There is a moral obligation to ensure that today's economic progress, which would benefit both current and future generations, is not offset by environmental deterioration.

The primary objective of the Project is to provide a means for disposing of a range of hazardous and other types of wastes. These wastes, if disposed of by traditional means such as landfills, have the potential to cause persistent or delayed impacts to environmental and community health. Removing these waste streams and neutralising them would reduce the burden for future generations who may otherwise have to manage the impacts that inappropriate disposal of these waste may cause.

The engagement of suitably qualified and experienced consultants has ensured that the planning, design and environmental assessment phases of the Project have been transparent. The contents of this EIS (including appendices) has enabled the potential implications of the Project to be understood, and WA has committed to management strategies, mitigation measures and monitoring activities to ensure potential impacts are appropriately minimised.

26.2.3 Biological Diversity and Ecological Integrity

The principle of Conservation of Biological Diversity and Ecological Integrity should be a fundamental consideration for development proposals. The potential impacts of the Project on biological diversity and economical integrity are limited due to the footprint of the Project on an already disturbed area.

The Project has initially aimed to avoid and minimise potential impacts on ecological values during both construction and operation. An ecological assessment undertaken for the Project concluded that there is a low level of ecological constraints in the immediate area of the Project. It is therefore unlikely that the Project would have a significant impact on any listed species, population or ecological community.

26.2.4 Improved Valuation and Pricing of Environmental Resources

The principle of Improved Valuation and Pricing of Environmental Resources is based on environmental factors being included in the valuation of assets and services. The cost associated with using or impacting upon an environmental resource is seen as a cost incurred to utilise that resource.

As the Project seeks approval to diversify the WA Site to provide a local, NSW-based facility with the ability to process biomedical wastes, among others which cannot be disposed of through other means, no significant draw on resources is required to enable the Project to proceed. Therefore there would be negligible impacts to the price and value of resources as a result of the Project proceeding.

In order to mitigate the potential impacts of the Project, for example through the installation of air quality treatment devices, WA acknowledges and accepts the financial costs associated with all the measures required to avoid, minimise, mitigate and manage potential environmental and social impacts of the Project.

26.2.5 Climate Change and Greenhouse Effect

The EIS has undertaken a review of the Project in the context of the GHG that would be generated directly by Project activities and through the GHG generation from Scope 1, 2 and 3 activities. It incorporates assessment of the potential GHG generation in relation to both direct and indirect emission sources from the Project.

The GHG assessment found that the contribution of GHG to both Australian and global emissions of total emissions would be minor. Therefore the Project would have a minor impact on climate change and the greenhouse effect.

26.2.6 Conclusions on Project Sustainability

This EIS has provided a thorough assessment of the Project's potential environmental impacts and recommended measures to manage impacts to acceptable levels. Subject to the implementation of these measures, the assessment of the Project in accordance with the principals of ESD has concluded that the Project:

- Would be undertaken in a manner which affords due consideration to the biophysical, economic and social environment within which the Project would operate, at a local, regional and national scale;
- Has appropriately considered and implemented the precautionary principal during planning to minimise and avoid where possible impacts on the environment and community;
- Has demonstrated that the Project is highly unlikely to result in inequalities between generations as a result of undue environmental impact, short term economic gain or a lack of appropriate management measures to prevent or minimise environmental impacts;
- Would not be undertaken in a manner that would result in impacts to biodiversity or ecology that would be significant or lead to a loss of integrity to flora or fauna such that significant impacts may occur;
- Would not be undertaken in a manner that degrades the pricing or valuation of resources by present day pricing, for example through the extensive use of certain resources or the through impacts to access resources; and
- Does not represent a significant contributor to global GHG emissions such that it could significantly impact the processes of climate change or the greenhouse effect.

26.3 Consequences of Not Proceeding

Without the Project proceeding there would not be the opportunity for a technologically modern thermal waste treatment facility to be constructed in NSW. Waste that requires incineration would continue to be processed in existing facilities located in Sydney or interstate for processing, mostly likely to Victoria or Queensland. This would mean the cost savings from processing waste within NSW instead of transporting interstate would not be realised.

The Project supports the diversification of activities undertaken at the WA Site. Owing to changes to the markets in which WA has historically operated, diversification is required to maintain the economic viability and sustainability of the operation. The 'do nothing' scenario would not support the economic diversification of the WA Site and therefore would not help in securing the ongoing operation of the site, its employment and positive economic contribution to the local community.

26.4 Conclusion

This EIS has demonstrated that impacts from the Project can be suitably managed through the implementation of a range of management plans and with operations controlled to minimise impacts on the environment and community. Significantly, the Project would build on its existing management system to minimise impacts for the duration of the Project. As the existing management system has demonstrated success to date, there is confidence that the Project can be operated in a manner which maximises benefits to the local and wider area as well as the State, while minimising potential impacts.

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Part I – EIS Findings

Part I provides a summary of the findings to the environmental assessment provided in this EIS and provides concluding statement about the Project and recommendation regarding whether the Project should proceed.

27.0 Concluding Statement

27.1 The Project

The Project seeks to diversify the activities at the WA Site to allow for the thermal treatment of a variety of general, hazardous and other types of wastes (such as restricted solid wastes, liquid wastes and special wastes), with up to 8,000 tonnes to be processed by the Project per annum.

27.2 Alternatives

The assessment of potential alternatives to the Project concluded that alternative sites could be identified in a variety of locations. However, no alternative could offer the ability to tie into existing infrastructure and operational elements of the WA site. In addition, the site is currently in the ownership of the proponent and as has been demonstrated by this EIS can accommodate the operation of the Project with minimal impact on to the community or environment. With these synergies in the operation of the WA Site's existing operational infrastructure, no additional consideration of alternative sites is considered necessary.

The 'do nothing' alternative is also deemed unacceptable as it would not support the economic diversification of the WA Site and therefore would not help in securing the ongoing operation of the site, long term employment for staff and positive economic spin off to the local community.

The Project therefore presents the best balance for the community and environment as opposed to any alternative.

27.3 Justification for the Project

This EIS has assessed the potential impacts of the Project in accordance with the SEARs issued on 16 December 2015. All relevant regulatory requirements, as well as regulator inputs into the SEARs have also been considered in its preparation.

The Project as designed, after considering all options, would maximise the continued social and economic benefits from the use of the WA Site by diversifying activities that may be undertaken at the WA Site. This would also assist in securing the long term employment of existing WA site workers and additional workers as required by the Project.

Due to the location of the Project within an established industrial site and making use of existing infrastructure environmental impacts would be minimised through reduced site establishment and material input. Further, the Project is consistent with the objects of the EP&A Act when the social and economic benefits are weighed carefully against its predicted social and environmental costs.

When the management and mitigation measures committed to in this EIS are adopted, the residual environmental impacts of the Project are within acceptable limits. These impacts are justifiable when considered against the need for the Project and its social and economic benefits.

27.4 Sustainability of the Project

The Project has been assessed utilising a risk-based approach to appropriately identify the potential environmental impacts of the Project.

At each stage of the assessment the principles of Ecologically Sustainable Development have been incorporated. As a result it has been concluded that with the recommended management measures in place, the Project would be undertaken in a sustainable manner.

27.5 Conclusion

This EIS has assessed the Project against the requirements of the EP&A Act and the principles of ESD and has concluded that the Project is consistent with the objective of the Act and principles of ESD.

A range of positive benefits associated with the development have also been identified including the economic benefits to the local, regional and State economies including:

- Diversification of activities at the WA Site to assist securing jobs for employees who would otherwise have worked in the aluminium processing side of the business. In particular, the Project would generate an additional six shift worker positions, full time equivalent, as well as two maintenance staff on a part time basis, and various contractor work on an as-needs basis;
- Assisting to meet the aims and objective of the WARR Strategy through improved management of a variety of wastes;
- Provision of an alternative means for the disposal of a variety of general, hazardous and other types of wastes (such as restricted solid wastes, liquid wastes and special wastes) thereby minimising potential threats to community and environmental health through:
    - The ability to process waste including biomedical waste that cannot be safety disposed of via other means;
    - Removing potential sources of human and environmental health impacts; and
    - Provision of a local, NSW-based facility to process certain wastes that would otherwise require transport over significant distances to alternative facilities in Victoria or Queensland;
- The use of a brownfield site which is heavily disturbed to reduce the environmental footprint compared to a greenfield project; and
- Local and regional flow-on benefits from project related capital investment during construction and ongoing purchasing by employees, contractors and WA during operations.

The benefits of the Project would outweigh its potential impacts with the implementation of the proposed management and mitigation measures as recommended by this EIS in place. It is therefore considered that it is appropriate and in the public interest to approve the Project.

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