7. ENVIRONMENTAL FEATURES AND ASSESSMENT OF KEY ENVIRONMENTAL ISSUES

This section describes the existing environment of the site in terms of the physical, biological and socio-economic environment. It presents an assessment of the potential impacts and describes the measures proposed to avoid, minimise and offset the impacts.

7.1 TOPOGRAPHY, GEOLOGY AND SOILS

CES prepared a Contamination Summary Report and a Geotechnical Review as input to the EA. This section provides a description of existing conditions in relation to topography, geology and soils derived from these reports (refer Technical Report No 1 and Appendix E).

7.1.1 Existing Conditions

Topography

The site which is located on the southern bank of the Parramatta River is part of a larger area of land which prior to 1996 was occupied by James Hardie (JH) for the manufacture of fibrous cement and related products and chemical manufacturing. The JH Site consisted mainly of warehouse buildings which have been demolished down to slab level. Large quantities of fill have been used to level the various parts of the JH Site. Asbestos cement waste and friable asbestos are within this fill. The site and surrounding land is relatively flat. The embankment along the river foreshore is approximately 3 – 5m high and generally slopes towards the Parramatta River (refer Technical Report No 1 and Plate 7.1).

Plate 7.1 General view across the site facing east (Source DSCA 2010)

Geology

The 1:100,00 Geological Series Sheet Sydney 9130, (Edition 1, 1983) indicates that the site geology contains Quaternary alluvial deposits comprising silty to peaty quartz, sand, silt and clay with minor ferruginous and humic cementations with occasional shell layers. The depositional environment is likely to be an alluvial estuarine environment. Bedrock underlying the fill and Quaternary sediments is expected to be part of the Wianamatta Group shales, comprising black to grey shale and laminated (refer Technical Report No 1).

Soils

Review of the Sydney 1:100 000 Soil Landscape Series Sheet 9130 (Soil Conservation Service of NSW) indicates that that the site is underlain by disturbed terrain which has been extensively disturbed by human activity including complete disturbance, removal or burial of soil. Local relief is typically less than 10 metres with slopes of less than 30 percent. The review of the soil map also indicates that the area of the site was developed terrain. The site stratigraphy typically comprises fill material overlying natural alluvial soils, which in turn is underlain by sandstone bedrock. The main variation across the site relates to the depth of fill and the consistency / relative density of the alluvial soils.

Across the site, the depth of fill material is relatively shallow (< 1.0m) with many locations encountering natural alluvial soils directly beneath the pavement (including any granular basecourse layer). The fill material contains asbestos in parts, building rubble, concrete, sand, gravel and clay. The alluvial soils comprise interbedded clay, silty clay, sandy clay, clayey sand and sand, which is typical of a river depositional soil profile. The alluvial soil is redbrown, brown, yellow-brown and grey in colour, and at least stiff and/or medium dense in consistency / relative density. Some loose and soft to firm layers are present, although rare (refer Technical Report No 1). The geotechnical assessment identified the possibility that voids may have formed beneath the site cap due to settlement of the underlying fill.

A Ground Penetrating Radar (GPR) Survey has been conducted to identify potential voids which exist below the site cap (refer Appendix E). GPR is a non-intrusive ground investigation technique that provides high resolution reflection profiles of the subsurface including location of buried objects and voids. Stage 1 of the survey has been completed over approximately 60% of the site. The remainder of the site was not able to be surveyed due to the presence of storage containers and other material associated with the current use of the site. The survey has identified several areas of potentially large voids between 1.5m^3 and 25m^3 and at a depth of between 0.2m and 0.3 m extending down to a depth of 0.4 m to greater than 1m. The remainder of the site will be surveyed prior to construction of the platform.

7.1.2 Impact Assessment

Construction of the facility will be undertaken over an 18 month period. The construction phase will involve three stages:

- Provision of site services including stormwater;
- Construction of a platform for the proposed RIRP; and
- Construction of the proposed RIRP.

The geotechnical assessment (refer Appendix E) reviewed the design of the facility and considered the potential for differential settlement resulting from the presence of variable fill materials across the site. As discussed a geophysical survey of the site has been undertaken to identify and locate any existing voids and areas that are susceptible to ground subsidence. Identified voids will be treated prior to construction of the platform in accordance with the requirements of the SMP and a SWP. In addition a Subsidence Management plan will be prepared which will include a subsidence monitoring programme and the requirement for preparation of an Action Plan in the event that subsidence is observed or monitored during operation of the facility.

All construction activities would be undertaken in accordance with the requirements of a Construction EMP (refer Sections 6 and 8). Silt fences will be maintained around the construction area for the duration of construction activities. Daily inspections will be undertaken to ensure the integrity of the fencing is maintained and any maintenance is undertaken immediately.

During the installation of services which involves breaching the site seal and disturbance of the underlying fill material, there will be an increase in the risk of exposure to the identified contamination. The management procedures outlined in the existing SMP and the SWP (refer Appendix D) would be adequate in minimising the exposure of site occupants and the environment (refer Technical Report No 1). With the exception of the repair of underground services (where required), there is unlikely to be the need to excavate into and expose the underlying contaminated materials during operation of the proposed RIRP.

Construction of the platform means that much of the site will be raised between 0.5 to 2m. Works will involve receival and temporary stockpiling of material. The stockpiles will be temporary and measures will be implemented to ensure no movement of sediment off site. The platform will be sealed with heavy duty concrete.

7.2 SURFACE WATER

7.2.1 Site Hydrology

The site is substantially sealed at the surface with concrete and bituminous concrete pavements and as such, precipitation falling on the site runs off, ultimately to the Parramatta River to the north of the site. There is an existing stormwater system on the site with a drainage channel located to the west of the REMONDIS site boundary. This drainage channel has an outlet on the outer surface of the retaining wall which runs parallel with the northern boundary of the site along the Parramatta River. Billbergia is to install a connection from the REMONDIS Lease area to this drainage channel.

The stormwater system for the RIRP has been designed to collect all surface run-off excluding roof water and direct it to a collection and retention system which will incorporate a first flush unit with an oil interceptor and gross pollutant trap.

During construction a temporary sediment trap arrangement will be installed including a silt fence around the construction area. This will be cleared and maintained as necessary during the construction works.

7.2.2 Flooding

CARDNO was commissioned to undertake an assessment of the site and the proposed RIRP in relation to flooding in accordance with the requirements of the Parramatta Council Draft DCP Clause 2.4.2.1 Flooding which incorporates the Category Definitions and Planning & Development Controls from Council's 2006 Local Floodplain Risk Management Policy. The assessment is provided in Technical Report No 2.

The Draft DCP Clause 2.4.2.1 Flooding identifies the following three steps to determine which design standards apply to proposed development:

- Step 1: identify the land use category of the development from Table 2.6 - It is proposed to develop resource recovery facility on Lot 1B Grand Avenue, Camellia. This fits under the definition of "Materials recycling or recovery centres". From Table 2.6 the land use is classified as "Commercial or Industrial";

- Step 2: determine which flood risk category applies to the land - In accordance with the definitions given in Council's 2006 Local Floodplain Risk Management Policy and based on the 1% AEP flood extents and the area of proposed development it was assessed that the development is located within a Low Flood Risk Precinct; and

- Step 3: apply the objectives and design principles and then the design standards in the planning matrix at Figure 2.7 as applicable to the floodplain and land use category.

The various Planning Considerations for Commercial & Industrial land use in a Low Flood Risk precinct were assessed as follows:

- Floor Levels - It was found that the freeboard to the access road and finished floor levels of the office building and the resource recovery facilities all exceed Council's requirement of at least 0.5 m freeboard;

- Flood Affectation - The 100 yr ARI flood level varies from 4.33 m AHD – 4.52 m AHD. The area subject to development is capped with a concrete slab. This existing concrete capping is at approx. 5.3 m AHD. An area to the west of the site will not be used for the proposed RIRP. It is therefore concluded that the planned development will have nil effect on the assessed 100 yr ARI flood levels and velocities in the Parramatta River and on any adjacent properties because the imperviousness of the site remains unchanged and the area subject to development is at a level higher than the 100 yr ARI flood level.

  While the site is subject to inundation in a PMF event it was noted that the extent of cross sections used to assess the PMF levels do not extend into the area to be developed. That is, the site to date has been assumed to be hydraulically ineffective in a PMF event. It is therefore concluded that the planned development will have nil effect on the assessed PMF flood levels and velocities in the Parramatta River and on any adjacent properties because the area subject to development has already been assumed to be hydraulically ineffective.

- Car Parking and Driveway Access

  The proposed level of open car parks is no lower than 6.0 m AHD. This provides a freeboard above the 100 yr ARI flood level of 1.48 – 1.67 m.

  The proposed driveway levels between the access road and the car parks are no lower than 6.0 m AHD which is 1.48 – 1.67 m above the 100 yr ARI flood level.

- Evacuation - Applicant is to demonstrate the development is consistent with any relevant flood evacuation strategy or similar plan. A search of the SES website found no occurrences of an evacuation plan for Camellia. It would be proposed to demonstrate consistency with a relevant flood evacuation strategy if Council and /or the SES identifies that such a strategy exists or is developed for commercial and industrial properties in Camellia.

It was concluded that the proposed RIRP would have nil effect on the assessed 100 yr ARI and PMF flood levels and velocities in the Parramatta River and on any adjacent properties. It was also concluded that the proposed RIRP complies with the relevant requirements of the Parramatta City Council's Draft DCP Clause 2.4.2.1 Flooding.

7.3 HYDROGEOLOGY

7.3.1 Regional

The direction of groundwater flow, based on available information (URS, 2006), is generally to the north towards Parramatta River. Given the proximity of the site to the Parramatta River and the data from previous groundwater monitoring events conducted across the site, the localised groundwater table is expected to vary between 1.5-5.0 m below ground level. Given the close

proximity of the site to the Parramatta River, there is likely to be connectivity between surface water and groundwater.

7.3.2 Local Conditions

Assessment of groundwater levels indicates that the overall flow of the groundwater is to the north east, towards the river with a mound in the northern portion of the site modifying the flow pattern (refer Technical Report No 1). Another, smaller mound in the water table was indicated in the south of the site. While not as pronounced as the northern mound, the southern mound also had the effect of modifying the groundwater flow towards the river. Data indicates that the groundwater in that area of the site is tidally influenced and water table levels fluctuate by as much as approximately 0.2 m.

Woodward Clyde (1994) noted that surface water runoff and stormwater was discharged directly into the Parramatta River from the site's stormwater system. The report noted that historical waste water discharges are not documented in detail, however anecdotal information obtained from interviews with former James Hardie employees suggested that from the early 1970's process water generated in the manufacture of fibre cement on the eastern portion of the site was directed to a waste water treatment and recycling plant. Any water excess to recycling demands was discharged to the Parramatta River.

CES (2007a) also made reference to a concrete lined channel, at the bottom of what was believed to have been a former basement level in the north-western part of the site. The channel was believed to have been used for the collection of waste water used in former manufacturing processes undertaken on the site. The channel is presumed to have directed waste water to a waste water treatment plant previously located in the northern part of the site. The remains of the water treatment plant were observed during a site walkover (25 September 2007) and comprised a sump with a weir, that connected to the basement level channel. It was likely that the channel discharged storm water directly from the site to the Parramatta River.

7.3.3 Impact Assessment

As described in Section 3, the site (fill, soil and groundwater) is contaminated by asbestos, hydrocarbons (TPH, BTEX and PAH) and metals associated with the filling of the site with asbestos wastes, storage and/or usage of hydrocarbons, the historical operation of facilities such as the oil press, power house, boiler house and wash down areas and regional contamination issues present within the Camellia peninsula. The proposed RIRP and associated structures will be constructed on a raised engineered platform above the existing site seal. Penetration of the site seal will occur during the installation of underground services. The management procedures outlined in the existing SMP and the SWP Work Methods Statement are considered adequate in minimising the exposure during the construction of the proposed facility on the site (refer Technical Report No1). Once constructed the site would be sealed hence there is no potential for further impacts on existing groundwater conditions as a result of the proposed operations.

7.4 FLORA AND FAUNA

7.4.1 Existing Conditions

Biosis Research has undertaken a Flora and Fauna Assessment of the proposed RIRP and site (refer Technical Report No 3). Biosis assessed the study area being the land owned by Billbergia with the study site being the parcel of land on the eastern section of the Billbergia site. A field survey conducted by Biosis Research confirmed that native vegetation was mostly absent and represented by weeds and exotics. Small patches of Mangrove Forest were present on the northern perimeter adjoining the Parramatta River.

Weeds, Exotics and Plantings

Based on the field survey, most of study area consisted of sealed surfaces (mostly concrete) with disturbed areas dominated by weeds and exotics along with native tree plantings. Dominant weed species included exotic perennial grasses such as *Eragrostis curvula*, *Melinis repens* and *Paspalum urvillei.* Exotic annual and perennial shrubs such as *Ageratina adenophora, Bidens pilosa*, *Foeniculum vulgare* and *Crassocephalum crepidioides* were also a prominent feature. Scattered woody weeds were also present and included *Olea europaea* subsp. *cuspidata.*

The perimeter of the study area included planted native and exotic trees such as *Populus nigra* 'Italica', *Lophostemon confertus, Eucalyptus tereticornis, Casuarina glauca, Acacia parramattensis* and *Melaleuca quinquenervia.*

Based on the highly altered soil conditions and subsequent lack of natural vegetation, the study area was considered to constitute an Unnatural Landscape.

Mangrove Forest

Small patches of riparian vegetation represented by Mangrove Forest occurred on the Parramatta River foreshore to the north east and north west of the study area. These areas have undergone substantial disturbance due to previous land uses and ongoing erosion largely resulting from turbulence (e.g. from the Rivercat) within the boat wash and tidal zone. The narrow patches of Mangrove Forest ranged between one and four metres in width along the river foreshore with some Mangroves actively collapsing into the river. Large stretches of the foreshore no longer included a vegetated riparian zone with the river being in direct contact with the constructed wall.

The dominant Mangrove canopy species present was *Avicennia marina* with some individuals up to six metres in height. The smaller, *Aegiceras corniculatum* was also present in small numbers. Scattered native groundcovers such as *Tetragona tetragonoides* were also present. Weed species were present along the edges of the Mangrove Forest and included the perennial shrub, *Ageratina adenophora* along with the woody weed, *Olea europaea* subsp. *cuspidata.* Weeds species were notably present in proximity of the stormwater outlet adjacent to the Mangrove Forest.

Based on the presence of weeds, high degree of disturbance and subsequent erosion, Mangrove Forest within the study area was considered to be in Moderate to Poor condition.

Flora

A total of 57 vascular plant species were recorded from the study area during the survey, comprising 9 (16 %) locally indigenous and or naturally occurring native species and 48 (84 %) exotic weeds, planted natives and ornamentals.

Based on a literature and database review, a total of 22 threatened plant species listed on the TSC and/or EPBC Acts have previously been recorded or have potential habitat within 10 km of the study area (Table 2, DECC Atlas of NSW Wildlife; DEWHA Online EPBC Database).

The non local, threatened tree species, *Eucalyptus nicholii* was recorded on the perimeter of the study area, near Camellia train station. Due to the proximity of previous records and the presence of associated estuarine vegetation (Mangrove Forest), potential habitat may exist on the northern perimeter of the study area for the threatened species; *Wilsonia backhousei.*

Fauna

The fauna habitat within the study area had been highly modified from its natural state. Habitats in this area were considered to be in Poor condition.

Myrtaceaeous trees (Melaleuca and Eucalypt species) were scattered sparsely along the periphery of the study area (predominantly the south and western sides), providing direct (foliage, nectar, exudates) and indirect food (arthropods) for a range of vertebrates, particularly birds. Despite being in poor condition, patches of woody weed infestations may still provide habitat for small birds such as the Superb Fairy-wren *Malurus cyaneus*. Leaf litter and fallen branches (predominantly occurring just to the north-west of the site) may provide habitat for small reptiles and frogs.

Given the cleared and disturbed nature of the study area, shelter habitats for small mammals and birds were largely absent. No hollow-bearing trees were recorded in the study area. However, an underground stormwater drainage channel runs south to north across the western side of the study area. Some cave dwelling microchiropteran species such as the Eastern Bentwing Bat *Miniopterus schreibersii oceanensis* and Southern Myotis *Myotis macropus* are known to roost within man-made structures such as drainage culverts and may roost within the concrete opening of this artificial channel (refer Technical Report No 3).

The study area shares its northern border with the Parramatta River, with the site being raised approximately 4 m from the bank of the river. It is expected that a number of migratory waterbirds and waders may forage along the muddy banks and within the mangroves along the Parramatta River on the perimeter of the site.

Potential habitat for six threatened and/or migratory species occurs within the study area. No threatened or migratory species were recorded in the study area.

Aquatic Fauna

Parramatta River Southern Foreshore / Mangrove Forest

The Parramatta River flows from west to east adjacent to the northern boundary of the study area. The southern foreshore of the Parramatta River forms the northern boundary of the study area and extends for a length of approximately 20 km with a catchment of approximately 130km^2. Based on topographic data (1:25,000 scale), the size and complexity of the Parramatta River within the study area would be categorised as a fifth order stream under the Strahler Stream Order (Strahler 1957). Current and previous land uses have altered the natural hydrological regimes of the Parramatta River, resulting in an alteration of flows to the Parramatta River from the surrounding landscape.

Currently the Parramatta River adjacent to the site lacks significant riparian vegetation, indicative of historical and current land use. However, small patches of riparian vegetation represented by Mangrove Forest occur on the Parramatta River southern foreshore to the north east and north west of the study area. These areas have undergone substantial disturbance due to historical land uses. These small Mangrove Forest areas were of minimal width along the river foreshore due to the removal of riparian vegetation, further highlighting areas of the foreshore that no longer include a vegetated riparian zone.

The dominant Mangrove canopy species present was *Avicennia marina* with small numbers of *Aegiceras corniculatum*. Based on the absence of a significant buffer zone and evidence of unstable banks within the study area, the Parramatta River southern foreshore within the study area was considered to be in suboptimal condition according to condition categories (refer Technical Report No 3).

Aquatic Fauna Habitat

Aquatic habitat was present within the southern foreshore of the Parramatta River and was dominated by the Mangrove Forest. Channel widths along the length of the Parramatta River adjacent to the study area were estimated at between 70m to 80m. Width of riparian zone habitats was estimated at < 1m adjacent to the site, providing limited aquatic fauna habitats.

Based on a modified HABSCORE assessment, the Parramatta River southern foreshore on the northern boundary of the study area was classed suboptimal habitat. The sloughing of bank substrates and lack of riparian buffer, limit the preferred habitat for native species through the reduction in trailing bank vegetation and epifaunal substrate cover. However, the small Mangrove Forest areas that are present provide important cover and habitat for local native species.

In general, the habitat assessment considered that the aquatic environments provided by the southern foreshore of the Parramatta River are of high aquatic significance, and contain habitats that are of suboptimal quality for native fish and macroinvertebrate species.

Significant Aquatic Fauna

Database searches have indicated that no known threatened fish species listed under the *Fisheries Management (FM) Act* and/or *EPBC Act* have been recorded within a 10km radius of the study area (DPI Fisheries Database).

7.4.2 Impact Assessment and Management

Key Threatened Processes

Clearing of native vegetation
‘

Clearing of native vegetation’ is listed as a Key Threatening Processes (KTP) under Schedule 3 of the *Threatened Species Conservation Act (TSC) Act*, ‘Land clearance’ is listed as a KTP under the *EPBC Act*. The proposal may require the removal of a few planted trees, weeds and the small patch of *Casuarina glauca* within the study area. The impacts of vegetation removal associated with the proposal are considered negligible and are not considered likely to increase the operation of this KTP.

Degradation of native riparian vegetation along NSW water courses

The proposal will not involve the removal of riparian vegetation and therefore degradation of riparian vegetation as a result of the proposal is considered negligible.

Removal of large woody debris

The proposal will not involve the removal of large woody debris during construction or operation and therefore this KTP will not apply.

Weed invasion

‘Invasion of native plant communities by exotic perennial grasses’ is listed as a KTP under Schedule 3 of the *TSC Act*. Exotic perennial grasses are those that are not native to NSW and have a life-span of more than one growing season (refer Technical Report No 3). A relatively small number of these perennial grasses threaten native plant communities and it is these species which are of concern. *Cortaderia selloana* (Pampas Grass), a grass species listed as being of specific concern under this KTP is present in the study area along with other species such as *Eragrostis curvula*. Disturbance as a result of the proposal has the potential to increase the dispersal of these weed species within the study area. However, given the lack of native vegetation in proximity of the study area, invasion of native plant communities by exotic perennial grasses is unlikely to result from the proposal.

Changes in drainage patterns and water quality

The study area has completely altered drainage patterns as a result of previous land uses. Given that the proposal includes the re-use of stormwater collected on site, alterations to the existing stormwater drainage infrastructure are likely to decrease the amount of flows from the site into the adjoining Parramatta River. This is likely to have a positive effect on the receiving waters and Mangrove Forest located in proximity of the existing stormwater outlet.

Management

In order to minimise the overall impacts of the proposed RIRP the following mitigation measures would be implemented:

- All vegetative waste and materials potentially containing noxious weed propagules would be removed and disposed of at an appropriate waste disposal facility;
- Noxious and environmental weeds occurring within the proposed RIRP site will be controlled and suppressed during and post construction;
- Current best practice sediment and erosion controls for the construction industry (Landcom 2004) will be implemented including preparation of erosion and sediment control plans; and
- Post construction inspections of the stormwater infrastructure will be undertaken to ensure their integrity and potential downstream impacts will be monitored, especially after heavy rainfall events.

7.4.3 Conclusion

Technical Report No 3 assessed the ecological significance of threatened plant and animal species, populations and ecological communities that occur, or have the potential to occur, within the study area affected by the proposed RIRP, in accordance with the requirements of the *EP&A, FM, TSC* and *EPBC Acts*. No EECs as listed under the *TSC* or *EPBC Act* were recorded within the study area. The non local threatened tree species, *Eucalyptus nicholii,* was recorded near Camellia train station and would not be impacted by the proposed RIRP.

Due to the proximity of previous records and the presence of associated estuarine vegetation (Mangrove Forest), potential habitat may exist on the northern perimeter of the site for the threatened species; *Wilsonia backhousei.*

An underground stormwater drainage channel runs south to north across the western side of the site. Some cave dwelling microchiropteran species such as the Eastern Bentwing Bat and Southern Myotis are known to roost within man-made structures and may roost within the concrete opening of this artificial channel. No impacts are proposed in relation to the potential habitats afforded by the stormwater drainage channel.

Based on the nature of the proposed RIRP, database interrogation, literature review regarding the ecology of each species, and information gathered during the current and previous field surveys within the study area, no threatened or migratory species are considered likely to be subject to negative impacts resulting from the proposed RIRP.

No known occurrences of threatened fish species have been recorded within a 10km radius of the study area. Small patches of Mangrove Forest were recorded on the northern perimeter of the study area, which are protected as marine vegetation under the *FM Act*. No adverse impacts are likely to occur on the Mangrove Forest patches as a result of the proposed RIRP.

7.5 AIR QUALITY

7.5.1 Introduction

PAE Holmes has prepared an air quality assessment in relation to the construction and operation of the proposed RIRP. The results are presented in Technical Report No 4. This section provides a summary of the findings of that report.

7.5.2 Dust

Construction

Activities during the construction stage have the potential to temporarily generate dust. The development on-site will involve construction of buildings and related infrastructure. Dust emissions due to the construction activities have been estimated and presented in Table 7.1. Details of the dust emission estimation techniques are presented in Appendix A of Technical Report No 4.

Stage 1 involves excavation and trenching activities below the capping layer required for the provision of utility services and extension of the stormwater system. As the site contains asbestos material below the capping layer, appropriate management practices will be in place to ensure no off-site impacts from this material will occur. These include extensive use of watering during the trenching activity and disturbance of the material removed, controlled stockpiling and ensuring dust emissions are minimal. The time frame for this activity has been estimated to take approximately six to eight weeks.

Stage 2 involves the construction of the platform above the capping layer. The platform is designed to avoid the penetration of the capping layer for the construction of the main buildings and structures. The dust generating activities have been identified as vehicle movements on-site, emplacing clean fill material and handling of the clean fill material. The time frame for this activity has been estimated to take approximately two to three months.

To ensure dust generation is controlled, the site will implement dust mitigation measures which will be utilised to help reduce any off-site impacts from any construction activities.

Mitigation measures to control dust include watering of any exposed materials and heavily trafficked areas, covering stockpiles of clean fill during platform construction, limiting vehicle speeds and rehabilitation of completed sections of the site.

Stage 3 involves the construction of the buildings and structures for the proposed RIRP. These activities normally have a low propensity to generate dust. As there are no bulk earthworks in this stage, the major dust generating activity will be truck movement. The time period for this activity is nine to twelve months. The total amount of dust generated from the construction of this facility is predicted to be minor without any significant off-site impacts and were not considered further in the assessment.

Operational

Dust emissions from activities taking place when the facility is at full operating capacity will be minor and are presented in Table 7.1. All trafficked areas are sealed and dust generating activities such as sorting, loading and unloading will take place under enclosed conditions (within the building). The potential of generating off-site dust impacts due to the operational activities are minimal and were not considered further in the assessment.

Table 7.1
Dust Emission Inventory

ACTIVITY	TSP emission (kg)	Intensity	units	Emission factor	units	Variable 1	units	Variable 2	units
Construction (Time Period – 6 to 8 weeks)									
Trenching	0.2	1,632	tonnes	1.37E-04	kg/t	1.10	average (ws/2.2)^1.3	10	moisture content - %
Loading material	0.2	1,632	tonnes	1.37E-04	kg/t	1.10	average (ws/2.2)^1.3	10	moisture content - %
Hauling material – Deliveries	12.8	131	trips	0.2	kg/VKT	0.40	Km/return trip		
Hauling material offsite	6.4	80	trucks	0.2	kg/VKT	0.40	Km/return trip		
Building Platform (Time Period – 2 to 3 months)									
Hauling material	192	2,400	trips	0.2	kg/VKT	0.40	Km/return trip		
Emplacing material	13.7	100,000	tonnes	1.37E-04	kg/t	1.10	average (ws/2.2)^1.3	10	moisture content - %
Spreading / Compacting (bulldozer)	838.3	480	hours	1.75E+00	kg/hour	6	moisture content - %	5	silt content
Wind Erosion	2.0	5	ha	4.00E-01	kg/ha/hour	2160	hours		
Construction of Facility Buildings (time period – 9 to 12 months)									
Hauling material	416	5,200	trips	0.2	kg/VKT	0.40	km/return trip		
TOTAL CONSTRUCTION	1,480								

7.5.3 Odour

Odour Performance Criteria

The determination of air quality goals for odour and their use in the assessment of odour impacts is recognised as a difficult topic in air pollution science. Procedures for assessing odour impacts using dispersion models have been refined considerably. There is still considerable debate in the scientific community about appropriate odour goals as determined by dispersion modelling. The DECCW (now OEH) has developed odour goals and the way in which they should be applied with dispersion models to assess the likelihood of nuisance impact arising from the emission of odour.

There are two factors that need to be considered:

- What "level of exposure" to odour is considered acceptable to meet current community standards in NSW; and

- How can dispersion models be used to determine if a source of odour meets the goals which are based on this acceptable level of exposure.

The term "level of exposure" has been used to reflect the fact that odour impacts are determined by several factors the most important of which are:

- the **F**requency of the exposure;

- the **I**ntensity of the odour;

- the **D**uration of the odour episodes; and

- the **O**ffensiveness of the odour (the so-called FIDO factor).

In determining the offensiveness of an odour it needs to be recognised that for most odours the context in which an odour is perceived is also relevant. Some odours, for example the smell of sewage, hydrogen sulfide, butyric acid, landfill gas etc., are likely to be judged offensive regardless of the context in which they occur. Other odours such as the smell of jet fuel may be acceptable at an airport, but not in a house, and diesel exhaust may be acceptable near a busy road, but not in a restaurant.

In summary, whether or not an individual considers an odour to be a nuisance will depend on the FIDO factors outlined above and although it is possible to derive formulae for assessing odour annoyance in a community, the response of any individual to an odour is still unpredictable. Odour goals need to take account of these factors.

The DECCW (now OEH) Approved Methods include Ground-Level Concentration (glc) criteria for complex mixtures of odorous air pollutants. They have been refined to take account of population density in the area. Table 7.2 lists the odour glc criterion to be exceeded not more than 1% of the time, for different population densities.

Table 7.2
Impact Assessment Criteria for the Assessment of Odorous Air Pollutants

Population of affected community	Impact Assessment Criteria for Complex Mixtures of Odorous Air Pollutants (OU, nose-response-time average, 99th percentile)
≤ ~2	7
~10	6
~30	5
~125	4
~500	3
Urban (2000) and/or schools and hospitals	2

The difference between odour goals is based on considerations of risk of odour impact rather than differences in odour acceptability between urban and rural areas. For a given odour level there will be a wide range of responses in the population exposed to the odour. In a densely populated area there will therefore be a greater risk that some individuals within the community will find the odour unacceptable than in a sparsely populated area.

The residential areas to the west of the site are considered as urban. Therefore, as shown in Table 7.2**,** the relevant impact assessment criterion is 2 ou. For the industrial areas to the east of the site a less stringent criterion, between 4-5 ou, should be applicable as the population is sparser and in some instances only present during part of the day.

Odour Management

The main objectives of the air management system within the main building complex are to:

- Retain odorous air inside the buildings;
- Remove odorous air from the various building areas to the tunnel composting plant;
- Provide heated/cooled fresh air and extraction to the sorting cabins;
- Provide heated fresh air and extraction to the amenities areas; and
- Provide heat pump air conditioning and fresh air to the office areas and the control rooms.

Collection hoods (extraction grills) will be mounted over the high emission areas within the building such as the material unloading, storage and handling areas. The air extraction rate in the various parts of the building will be controlled (ramped up/down) by means of various dampers extraction grills. For example, higher extraction rates will be applied in the reception area during waste delivery and pick-up, tunnel loading and unloading.

One fan in each building complex will extract odorous air and deliver the air along the duct pathways to a duct manifold at the rear of the tunnel composting plant. The manifold connects to all fresh air dampers of the tunnel air ventilation system which controls the air supply into the composting process.

The system will maintain a slight negative pressure inside the respective building areas. Any balance of the odorous air from the buildings is automatically drawn from the biofilter fan and ducted into the biofilter facility.

All frequently trafficked doors (truck delivery and pickup) will be equipped with fast speed roller doors, programmed to only open during delivery times, maintaining negative pressure and containing emissions within the building for the majority of the time. If required, an option to retrofit the system with additional air curtains mounted above each fast speed roller door entrance can be installed and operated in case of temporary roller door failure or during truck delivery to retain odorous air inside the building.

The fresh air demand for each tunnel will be automatically restricted to a minimum through the recycling of odorous air back into the tunnel. Exchange of exhaust air between the tunnels is controlled through a one-way valve in the discharge duct.

The total building ventilation system air volumes will not exceed 60,000 m³/hour at any time.

Modelling

Air quality modelling has been carried out in accordance with the OEH "*Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*" (refer Technical Report No 4).

The air dispersion modelling conducted for this assessment has been based on an advanced modelling system using the models TAPM and CALMET/CALPUFF (refer Technical Report No 4).

The modelling system works as follows:

- TAPM (v. 4.0) is a prognostic meteorological model that generates gridded three-dimensional meteorological data for each hour of the model run period;

- CALMET (v. 6.326), the meteorological pre-processor for the dispersion model CALPUFF, calculates fine resolution three-dimensional meteorological data based upon observed ground and upper level meteorological data, as well as observed or modelled upper air data generated for example by TAPM; and

- CALPUFF (v. 6.263) then calculates the dispersion of plumes within this three-dimensional meteorological field.

Emission Estimation

With the proposed air management system, the main buildings will maintain a negative pressure and high speed roller doors will operate in truck delivery and pickup areas to retain the odorous air inside the buildings. Therefore the main source of odour from the proposed operation will be the two biofilters located at the rear of the proposed buildings. The size of each biofilter would cover an area of approximately 576 m² (32 m x 18 m).

Specifications for the biofilters have been provided by the biofilter manufacturer. It is noted that the exhaust volume of each biofilter will not exceed 50,000 m^3/hour and the biofilter surface emission will not exceed 125 ou. It is also noted that, operating data from a similar biofilter facility operation at Port Macquarie, operated by REMONDIS, showed that the exhaust volume of each biofilter during normal operation can be expected to be around 70% of the design volume equivalent to around 35,000 m³/hour at any one time with a slight fluctuation of around 10% between night and day times. However as a conservative approach, the design flow rate of 50,000 m³/hour has been used in this assessment.

Modelling Scenarios and Source Parameters

Modelling of the initial biofilter design and estimated maximum emission rate predicted exceedences of OEH criteria at nearby sensitive receptor locations (Camellia Railway Station and

the Aldi carpark). Therefore several iterative model runs were conducted to investigate other practical control options to achieve compliance with OEH criteria at nearest sensitive receptors without changing the biofilter design. However model predictions showed that compliance with OEH criteria could not be met using the initial biofilter design and an alternative design was necessary to comply with OEH criteria.

Based on the outcomes of the iterative modelling analysis, the biofilter design was modified to a fully enclosed pitch roofed system with a vertical discharge stack to enhance dispersion of odour. The modified design (fully enclosed biofilter) was used in the modelling for this assessment. A fan provides the initial momentum flux for the odorous air from the stack. Figure 4.5 presents a schematic diagram of the full enclosed biofilter design.

It is noted that there is potential for other sources of fugitive odours to be generated on-site. These odours would generally occur from the receival of waste to the facility. Odour management principles considered in the design of the facility will minimise the potential for these fugitive emissions to be generated.

Management practices and the facility design features include:

- No outdoor handling of materials;
- Traffic management procedures will include co-ordination of the delivery schedule to avoid a queue of the incoming or outgoing trucks outside the building for an extended period of time;
- Spill management procedures will include immediate cleanup of any spill/leakage from the incoming and outgoing trucks, identify the cause and take appropriate action to prevent any future spill/leakage incidents;
- Maintain an odour complaint logbook. Once any complaint is received, the site manager will immediately investigate any unusual odour sources (including spill or leakage in the traffic areas) within the site boundary and take appropriate action to eliminate any unusual odour sources;
- Real-time processing of odorous feedstock material and raw materials will not be stockpiled for more than a day under normal operating conditions;
- The air management system will include ventilation hoods over emission sources;
- Odorous air will be recycled as far as possible through the tunnel composting system to minimise air volume into the deodorisation;
- Stockpiles will be managed to facilitate natural ventilation to prevent anaerobic zones;
- The air management system will ensure the building is under negative pressure; and
- If required additional air curtains mounted above each fast speed roller door entrance will be installed.

Surrounding Sensitive Receptors

The proposed site is surrounded by several sensitive receptors including public places (Camellia Railway Station, Rosehill Racecourse), an Aldi supermarket and a childcare centre. Most of these receptors are adjacent to the site boundary. The locations of these receptors and residential receptors to the north, east and west are presented in Figure 7.1 (refer Technical Report No 4).

Modelling Results

Predicted odour concentrations due to the proposed RIRP with the enclosed biofilter have been presented in Figure 7.2. It can be observed from this figure that predicted ground level odour levels at surrounding receptors comply with the OEH odour criterion of 2 ou. The maximum predicted off-site odour concentration is less than 0.6 OU, which is less than the minimum theoretical level at which odour can be detected.

Conclusion

Dispersion modelling has been used to predict off-site odour levels due to the activities of the proposed RIRP. The dispersion modelling took account of meteorological conditions and terrain information and used odour emission estimates to predict the odour impacts at surrounding sensitive receptors. Iterative dispersion modelling was conducted to find the optimal design parameters for biofilters. Based on the iterative dispersion modelling results, each biofilter was redesigned to comply with OEH odour criterion at surrounding sensitive receptor locations. Results from the dispersion modelling show that odour levels at nearby residences comply with the OEH's odour criterion and the predicted maximum offsite odour levels will be less than 0.6 OU. Appropriate mitigation measures and management practices will be applied to minimise fugitive odour emissions. Based on the modelling results, it can be concluded that with the full enclosed biofilter design of the proposed RIRP will comply with OEH odour criterion at all locations.

7.6 NOISE

SLR Consulting Australia was commissioned to undertake a noise assessment for the construction and operation (including traffic noise) for the proposed RIRP. This report is included as Technical Report No 5.

7.6.1 Local Setting and Sensitive Receivers

The RIRP site is located at 1 Grand Avenue, Camellia. A Locality Plan showing the location of the site and surrounding area is shown in Figure 7.3. The nearest potentially affected residence is situated at 100 m to the west of the closest boundary of the RIRP site, at the intersection between Grand Avenue and James Ruse Drive (RR1-BG2). The nearest potentially affected residences to the west-southwest are located 285 m from closest boundary of the RIRP site, on James Ruse Drive (RR2). Other residences are located further to the west 550 m from closest boundary of the RIRP Site, on Arthur Street (RR3).

The nearest potentially affected educational receiver, the University of Western Sydney (CR1-BG3), is located on the other side of the river 500 m to the north from the closest boundary of the RIRP. It is noted accommodation associated with the university is on another site north of Victoria Rd and more than 1 km from the RIRP. A child care centre (CR2) is located 30 m to the south of the closest boundary of the RIRP.

The nearest potentially affected commercial receivers are the Hooters restaurant (CR3) and the Rosehill Bowling Club (CR4) and are located 250 m to the west-southwest of the closest boundary and 276 m to the west of the closest boundary of the RIRP respectively. The nearest potentially affected industrial premises are located 120 m to the west of the closest boundary of the RIRP Site (IR1), 20 m to the east of the closest boundary of the RIRP Site (IR4) and 30 m to the south of the closest boundary of the RIRP Site (IR2 and IR3).

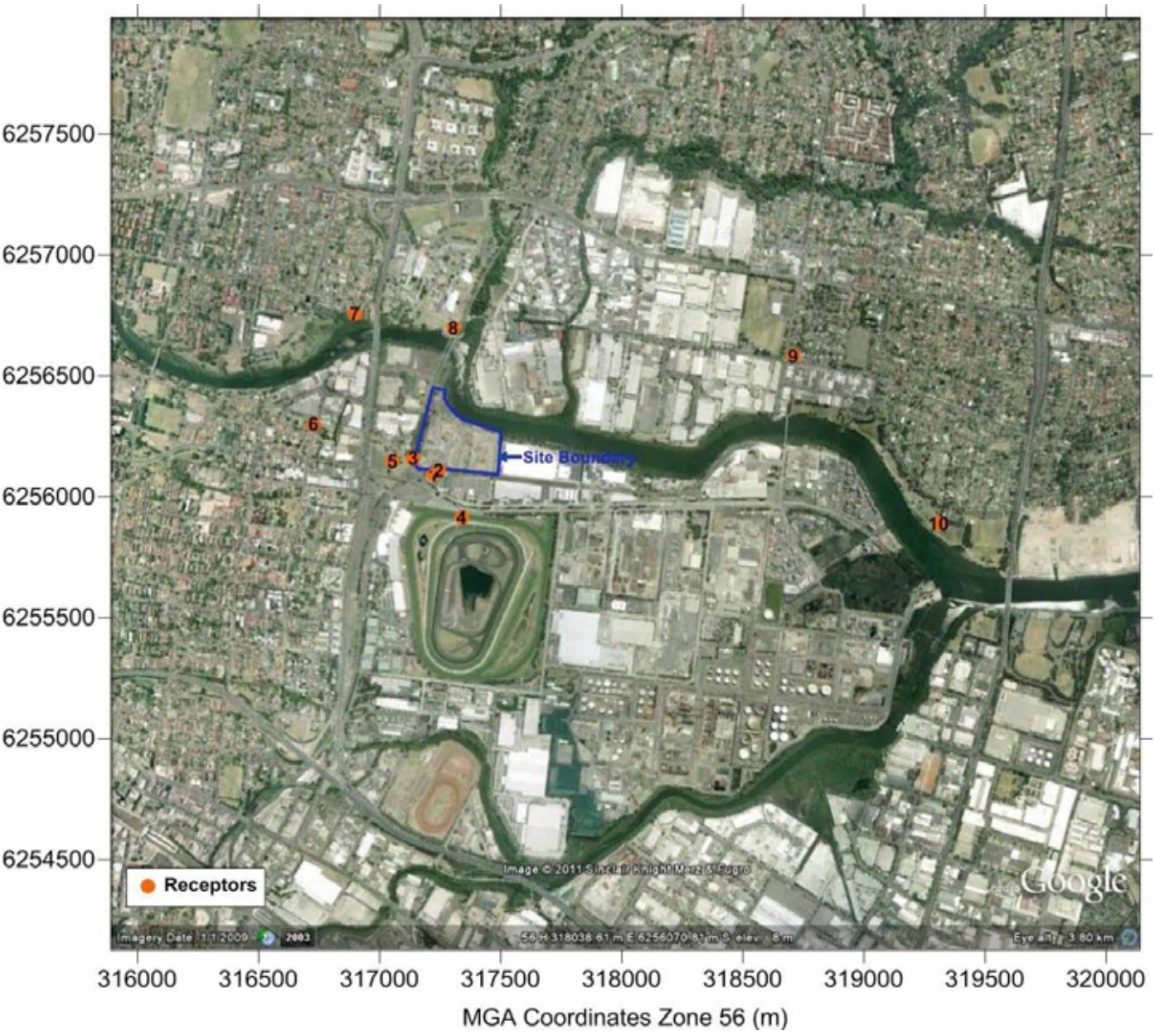


Figure 7.1 **Location of Sensitive Receptors**

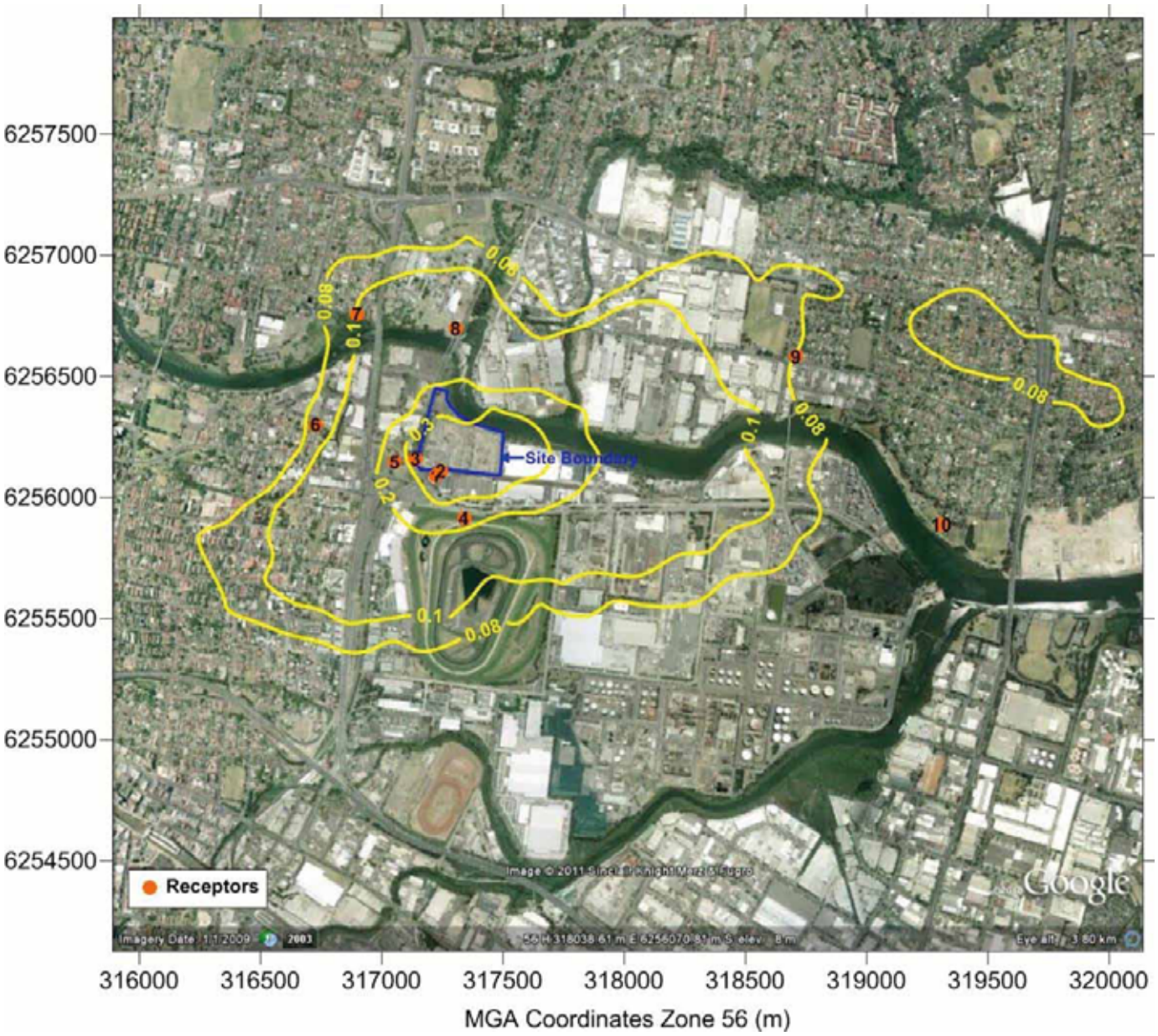


Figure 7.2 **99th Percentile Nose Response Ground Level Odour Concentrations**

Figure 7.3 **Locality Plan and Sensitive Receivers**

7.6.2 Existing Acoustical Environment

Environmental noise monitoring was conducted at the potentially most affected (representative) noise-sensitive locations in order to characterise the existing noise environment in the vicinity of the proposed RIRP and to establish the noise levels upon which to base the operation noise emission objectives. Unattended background noise monitoring was conducted between Tuesday 9 March 2010 and Thursday 18 March 2010 at three locations considered representative of the existing ambient noise environment in the vicinity of the proposed RIRP.

The results of the noise surveys are presented in tabular form in Table 7.3. Operator-attended (15 minute) noise surveys were conducted at each of the locations listed in Table 7.3, on Tuesday 9 March and Thursday 18 March 2010, in order to determine the character of the existing background noise levels. The results of the surveys are presented in Table 7.4 together with a description of the noise sources and the prevailing weather conditions.

Table 7.3
Summary of Existing LA90(15minute) Rating Background Levels (RBLs) and Existing LAeq(period) Ambient Noise Levels - dBA re 20 µPa

Location	$L_{A90(15minute)}$ Rating Background Level (RBL)			$L_{Aeq(period)}$ Existing Ambient Noise Level		
	Daytime 0700-1800 Hours	Evening 1800-2200 Hours	Night-time 2200-0700 Hours	Daytime 0700-1800 Hours	Evening 1800-2200 Hours	Night-time 2200-0700 Hours
BG1 240 George Street	46	46	41	62	61	49
BG2 33 James Ruse Drive	54	51	48	65	61	60
BG3 University of Western Sydney	53	53	47	61	57	55

Table 7.4
Operator-Attended Background Noise Survey Results

Location Start Time Conditions	Measurement Description	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission and Typical Maximum Levels (LAmax)
		L_{Aeq}	L_{A1}	L_{A10}	L_{A50}	L_{A90}	
Location BG1 [1] 240 George Street 1215 hours Wind At 10m : 4.2 m/s W	Ambient	63	75	68	52	47	Cicadas 48-49 Car 65 Aeroplane 57-58 Dogs barking 70-75
		Ambient background noise environment influenced by distant traffic					
Location BG2 [2] 33 James Ruse Drive 0925 hours Wind At 10m: 1.7 m/s W	Ambient	65	72	68	63	58	Trucks 65-75 General Traffic 59-67 Horn discernible Dog barking discernible Birds discernible
		Ambient noise dominated by traffic on Grand Avenue mainly					
Location BG3 [1] University of Western Sydney 1336 hours Wind At 10m: 5.3 m/s W	Ambient	56	66	59	53	49	Aeroplane 56-69 Cicadas 56-58 Wind in trees discernible
		Ambient noise environment by cicadas and traffic on James Ruse Drive					

Note 1: Measurement undertaken Tuesday 9 March.
Note 2: Measurement undertaken Thursday 18 March.

The attended noise monitoring confirmed that the measured background noise levels were influenced by traffic noise. Also no other significant industrial noise sources were audible at any of the monitoring locations during the attended noise measurements.

7.6.3 Construction Noise Assessment

OEH has published guidelines in its "*Interim Construction Noise Guideline*", 2009 (Guideline) for the management of construction works noise. The Guideline recommends the following approaches to mitigating adverse noise impacts from construction sites. The Guideline recommends confining permissible work times as outlined in Table 7.5.

Table 7.5
Preferred Hours of Construction

Day	Preferred Construction Hours
Monday to Friday	7.00 am to 6.00 pm
Saturdays	8.00 am to 1.00 pm
Sundays or Public Holidays	No construction

The OEH Guideline recommends that the LAeq(15minute) noise levels arising from a construction project, measured within the curtilage of an occupied noise-sensitive premises, ie at boundary or within 30 m of the residence, whichever is the lesser, should not exceed the levels indicated in Table 7.6. These Noise Management Levels (NMLs) are generally consistent with community reaction to construction noise. The Guideline also recognises other kinds of noise sensitive receivers and provides recommended construction NMLs for them. Those specific receivers and their recommended noise levels are presented in Table 7.7. The OEH Interim Guideline LAeq (15minute) construction NMLs are presented in Table 7.8.

Table 7.6
Recommended OEH General NMLs for Construction Works

Period of Noise Exposure	LAeq(15minute) Construction NML
Recommended Standard Hours	Noise affected[1] RBL[2] + 10 dBA
	Highly noise affected[3] 75 dBA
Outside Recommended Standard Hours	Noise affected[1] RBL + 5 dBA

Note 1: The noise affected level represents the point above which there may be some community reaction to noise.

Note 2: Refer to Appendix A, Technical Report No 5.

Note 3: The highly noise affected level represents the point above which there may be strong community reaction to noise.

Table 7.7
Noise at Sensitive Land Uses (other than Residences)

Land use	LAeq(15minute) Construction NML
Classrooms at schools and other educational institutions	Internal noise level 45 dBA
Hospital wards and operating theatres	Internal noise level 45 dBA
Places of worship	Internal noise level 45 dBA
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External noise level 65 dBA
Passive recreation areas (characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External noise level 60 dBA
Community centres	Depends on the intended use of the centre
Industrial premises	External noise level 75 dBA

Table 7.8
Recommended OEH NMLs for Construction Works

Location	Noise Management Levels (LAeq(15min))
	Recommended Standard Hours[1]
BG1 - 240 George Street	56
BG2 - 33 James Ruse Drive	64
BG3a - University of Western Sydney (Internal)[2]	65
BG3b - University of Western Sydney (External)[3]	60

Note 1: OEH's standard construction hours: 7.00 am to 6.00 pm Monday to Friday, 7.00 am to 1.00 pm (if inaudible at residential premises) otherwise 8.00 am to 1.00 pm on Saturdays and no work on Sundays or Public Holidays.

Note 2: The NML of 65 dBA is based on the 45 dBA internal noise level and an external to internal noise reduction (fixed non openable windows) of 20 dBA).

Note 3: The NML is based on the external INP criterion of 60 dBA for passive recreation.

The two noisiest scenarios have been modelled (Site preparation - Earthworks and SSORRF and CIRRF buildings construction). The output results from the RIRP construction noise model are presented in Table 7.9 together with the relevant LAeq(15minute) construction noise management levels for each noise assessment location. A daytime LAeq (15minute) noise contour diagram for the 'worst-case' construction scenario (SSORRF and CIRRF buildings construction) is presented in Figure 7.4.

Table 7.9
Predicted Daytime RIRP Construction Noise Levels - dBA re 20 µPa

Noise Assessment Location	Predicted LAeq(15minute) Noise Level		Recommended Standard Hours Management Level
	Earthworks Scenario	SSORRF and CIRRF Construction Scenario	
RR1 - 33 James Ruse Drive	52	53	64
RR2 - 43 Oak Street	43	44	64
RR3 - 135 Arthur Street	40	42	56
IR1 - 3/175 James Ruse Dr	57	58	75
IR2 - 1 Grand Avenue	67	70	75
IR3 - 11 Grand Avenue	62	64	75
IR4 - 11B Grand Avenue	67	67	75
CR1a - University of Western Sydney (Internal)[1]	42	44	65
CR1b - University of Western Sydney (External)	42	44	60
CR2 - Child Care Centre[1]	64	65	65
CR3 - Hooters Restaurant[1]	46	48	65
CR4 - Bowling Club[1]	44	46	65

Note 1: 65 dBA external noise level is assumed to correspond to an internal noise level of 45 dBA, based on a 20 dBA noise reduction from outside to inside for a building with fixed (non-openable) windows.

Noise emissions from earthworks and concreting construction activities during daytime recommended Standard Hours are predicted to meet the LAeq (15minute) criteria at all receivers. It is noted whilst compliance is 'just' achieved at the childcare centre, the 20 dBA noise reduction from outside to inside is conservative and is likely to be exceeded by the centre.

7.6.4 Operational Noise Assessment

Objectives

Noise objectives for the assessment of industrial/commercial facilities at residential receivers are detailed in the Industrial Noise Policy (INP), as administered by the OEH. The policy is normally applied at the residential property boundary.

The INP's objectives are:

- To establish noise criteria that would protect the community from excessive noise;
- To preserve the amenity for specific land uses;
- To use the criteria for deriving project specific land uses; and
- To promote uniform methods to estimate and measure noise impacts including a procedure for evaluating meteorological effects.

Implementation is achieved by ensuring that:

- Noise from any single source does not intrude greatly above the prevailing background noise level. This is known as the intrusive noise criterion; and
- The background noise level does not exceed the level appropriate for the particular locality and land use. This is known as the amenity criterion.

In order to satisfy the above two requirements, an intrusive and an amenity noise criterion is determined of which the lower is adopted as the project specific noise level.

Assessing Intrusiveness

For assessing intrusiveness, the background noise generally needs to be measured. The intrusiveness criterion essentially means that the equivalent continuous noise level (LAeq) of the source should not be more than 5 dBA above the measured (or default) Rating Background Level (RBL).

Assessing Amenity

The amenity assessment is based on noise criteria specific to the land use and associated activities. The amenity criteria are shown in Table 7.10 and relate only to industrial-type noise and do not include road, rail or community noise. If present, the existing noise level from industry is generally measured. If it approaches the criterion value, then noise levels from new industries need to be designed so that the cumulative effect does not produce noise levels that would significantly exceed the criterion. The cumulative effect of noise from industrial sources also needs to be considered in assessing the impact. The correction to be applied to the source is shown in Table 7.11.

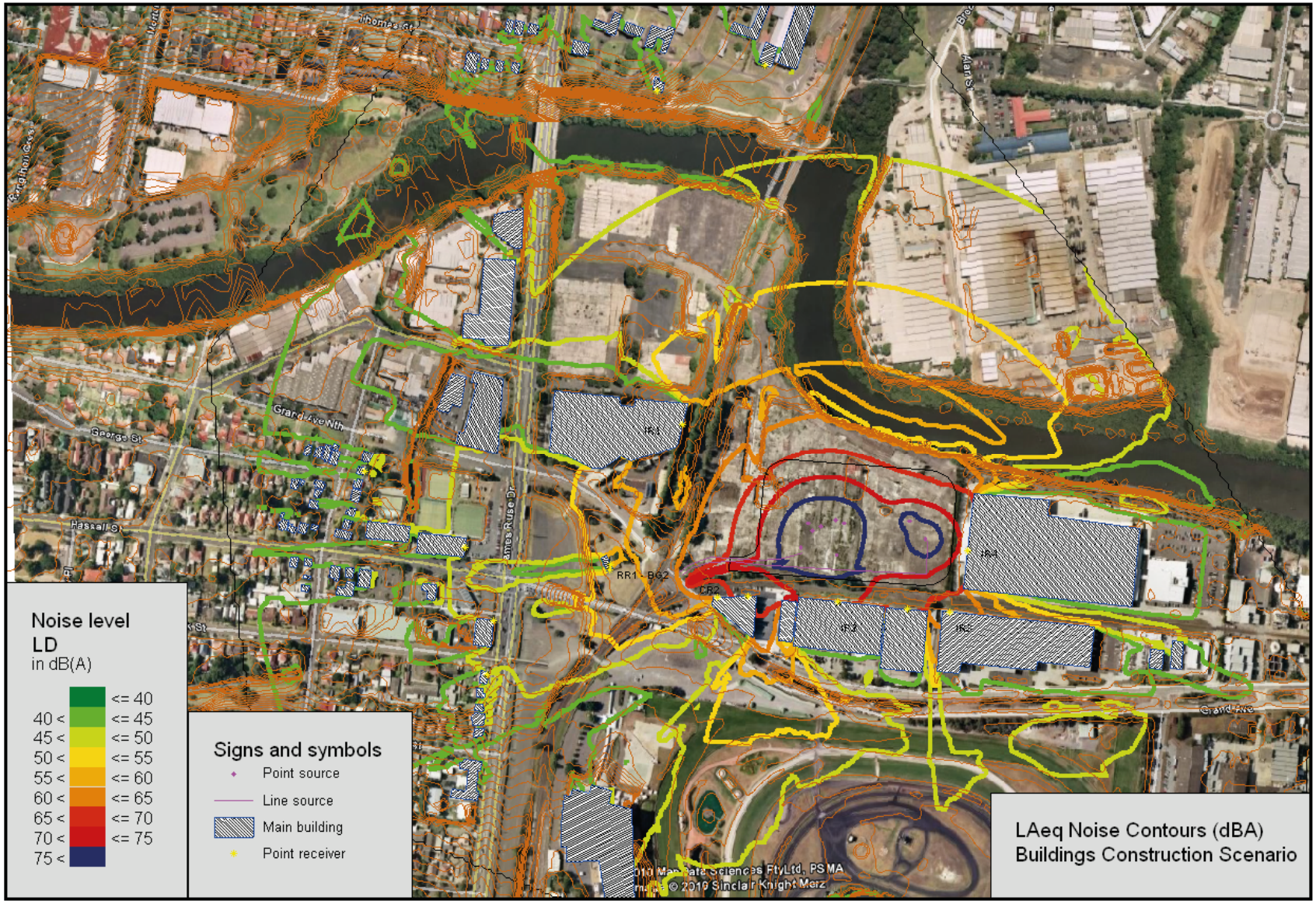


Figure 7.4 **Noise Contours - Construction Scenario – Buildings Construction**

Table 7.10
Amenity Criteria - Recommended LAeq Noise Levels from Industrial Noise Sources

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended LAeq Noise Level	
			Acceptable	Recommended Maximum
Residence	Rural	Day	50 dBA	55 dBA
		Evening	45 dBA	50 dBA
		Night	40 dBA	45 dBA
	Suburban	Day	55 dBA	60 dBA
		Evening	45 dBA	50 dBA
		Night	40 dBA	45 dBA
	Urban	Day	60 dBA	65 dBA
		Evening	50 dBA	55 dBA
		Night	45 dBA	50 dBA
	Urban/Industrial Interface - for existing situations only	Day	65 dBA	70 dBA
		Evening	55 dBA	60 dBA
		Night	50 dBA	55 dBA
School classrooms - internal	All	Noisiest 1-hour period when in use	35 dBA	40 dBA
Active recreation area (eg School playground, golf course)	All	When in use	55 dBA	60 dBA
Commercial premises	All	When in use	65 dBA	70 dBA
Industrial premises	All	When in use	70 dBA	75 dBA

Notes: For Monday to Saturday, Daytime 7.00 am - 6.00 pm; Evening 6.00 pm - 10.00pm;
Night-time 10.00 pm - 7.00 am.
On Sundays and Public Holidays, Daytime 8.00 am hours - 6.00 pm; Evening 6.00 pm - 10.00 pm;
Night-time 10.00 pm - 8.00 am.

Table 7.11
Modification to Acceptable Noise Level (ANL)[1] to Account for Existing Level of Industrial Noise

Total existing LAeq noise level from industrial sources, dB(A)	Maximum LAeq noise level for noise from new sources alone, dB(A)
≥ Acceptable noise level plus 2	If existing noise level is likely to decrease in future: acceptable noise level minus 10 If existing noise level is unlikely to decrease in future: existing level minus 10
Acceptable noise level plus 1	Acceptable noise level minus 8
Acceptable noise level	Acceptable noise level minus 8
Acceptable noise level minus 1	Acceptable noise level minus 6
Acceptable noise level minus 2	Acceptable noise level minus 4
Acceptable noise level minus 3	Acceptable noise level minus 3
Acceptable noise level minus 4	Acceptable noise level minus 2
Acceptable noise level minus 5	Acceptable noise level minus 2
Acceptable noise level minus 6	Acceptable noise level minus 1
< Acceptable noise level minus 6	Acceptable noise level

Note 1: ANL = recommended acceptable LAeq noise level for the specific receiver, area and time of day from Table 7.10

INP Assessment of Prevailing Weather Conditions

Wind

Wind has the potential to increase noise at a receiver when it is light and stable and blows from the direction of the noise source. As the strength of the wind increases the noise produced by the wind will obscure noise from most industrial and transport sources. When the source to receiver wind component is at speeds of up to 3 m/s for 30% or more of the time in any seasonal period (ie daytime, evening or night-time), then wind is considered to be a feature of the area and noise level predictions must be made under these conditions.

The INP Section 5.3, Wind Effects, states that:

"Wind effects need to be assessed where wind is a feature of the area. Wind is considered to be a feature where source to receiver wind speeds (at 10 m height) of 3 m/s or below occur for 30 percent of the time or more in any assessment period in any season."

Continuous weather data was obtained from the nearby Horsley Park weather station, in order to identify periods of adverse weather during the unattended noise logging survey. The Horsley Park Weather Station was selected as it is a station providing detailed meteorological data that falls within the guideline offset distance as nominated in the INP and is located in the same topographic basin as the proposed RIRP. An assessment of existing wind conditions has been prepared from the meteorological data recorded by the Bureau of Meteorology at the Horsley Park weather station for the period January 2007 to April 2010. This weather station is located approximately 17 km from the proposed RIRP and the recorded weather conditions are considered representative of those in the vicinity of the RIRP. The dominant seasonal wind speeds and wind directions are presented in Technical Report No 5. Any prevailing winds of speed less than (or equal to) 3 m/s with a frequency of occurrence greater than (or equal to) 30%, and considered to be a feature of the STP site in accordance with the INP, are presented in Table 7.12.

Table 7.12
Project Site Prevailing Wind Conditions in Accordance with the INP

	Winds ± 45° ≤3m/s with Frequency of Occurrence ≥30%		
	Daytime	**Evening**	**Night-time**
Any Season	Nil	Nil	Nil

Temperature inversions, when they occur, have the ability to increase noise levels by focusing sound waves. Temperature inversions occur predominantly at night during the winter months. For a temperature inversion to be a significant characteristic of the area it needs to occur for 30% or more of the total night-time during winter or about two nights per week. The INP states that temperature inversions need only be considered for the night-time noise assessment period ie 10.00 pm to 7.00 am.

Temperature Inversion

The INP Section 5.2, Temperature Inversions, states:

"Assessment of impacts is confined to the night noise assessment period (10:00 pm to 7:00 am), as this is the time likely to have the greatest impact - that is, when temperature inversions usually occur and disturbance to sleep is possible." "Where inversion conditions are predicted for at least 30% (or approximately two nights per week) of total night-time in winter, then inversion effects are considered to be significant and should be taken into account in the noise assessment."

In the absence of measured data, the INP nominates default inversion parameters for non-arid areas where the average rainfall is greater than 500 mm namely:

"3°C/100 m temperature inversion for all receivers, plus a 2 m/s source-to-receiver component drainage-flow wind speed for those receivers where applicable."

An assessment of atmospheric stability has been prepared from the meteorological data set at Horsley Park and the evening and night-time frequency of occurrences of atmospheric stability classes for the period January 2007 to April 2010 are presented in Table 7.13 together with the estimated Environmental Lapse Rates (ELR).

Table 7.13
Prevailing Atmospheric Stability Frequency - Evening and Night-time - January 2007 to April 2010

Stability Class	**Frequency of Occurrence**				**Estimated ELR °C/100 m**	**Qualitative Description**
	Summer	**Autumn**	**Winter**	**Spring**		
A	0.0%	0.0%	0.0%	0.0%	<-1.9	Lapse
B	0.0%	0.0%	0.0%	0.0%	-1.9 to -1.7	Lapse
C	0.0%	0.0%	0.0%	0.0%	-1.7 to -1.5	Lapse
D	56.9%	47.2%	50.8%	53.4%	-1.5 to -0.5	Neutral
E	8.1%	10.7%	12.2%	9.5%	-0.5 to 1.5	Weak Inversion
F	13.9%	16.4%	17.3%	16.4%	1.5 to 4	Moderate Inversion
G	21.1%	25.7%	19.7%	20.7%	>4.0	Strong Inversion
F + G	35.0%	42.0%	37.0%	37.1%	>1.5	Moderate to Strong Inversion

Note 1: ELR (Environmental Lapse Rate).

In accordance with the INP, as the frequency of occurrence of moderate to strong (ie 1.5 to >4.0℃/100 m) winter temperature inversions are greater than 30% during the combined evening and night-time period, temperature inversion requires assessment.

Modifying Factors

Modifying factors are to be applied to the predicted noise levels if the source noise, at the receiver, is low frequency, tonal or intermittent in nature. No modifying factors need to be applied in the subject assessment.

Sleep Disturbance

The OEH's most recent policy considers sleep disturbance as the emergence of the LA1(1minute) level above the LA90(15minute) level at the time. Appropriate screening criteria for sleep disturbance are determined to be an LA1(1minute) level 15 dBA above the Rating Background Level (RBL) for the night-time period (10.00 pm to 7.00 am).

When the criterion is not met, a more detailed analysis may be required which should cover the maximum noise level or LA1(1minute), the extent that the maximum noise level exceeds the background level and the number of times this occurs during the night-time period. Some guidance on possible impacts is contained in the review of research results in the appendices to the NSW Environmental Criteria for Road Traffic Noise (ECRTN).

Other factors that may be important in assessing the extent of impacts on sleep include:

- How often high noise events will occur;
- Time of day (normally between 10.00 pm and 7.00 pm); and
- Whether there are times of the day when there is a clear change in the noise environment (such as during early morning shoulder periods).

It is noteworthy that there are no specific criteria for sleep disturbance nominated in the INP, in the INP Application Notes, the ECRTN, or in the ICNG. This is consistent with the statement in the ECRTN that "*at the current level of understanding, it is not possible to establish absolute noise level criteria that would correlate to an acceptable level of sleep disturbance".*

A substantial portion of the ECRTN is a review of international sleep disturbance research, indicating that:

- A maximum internal noise levels below 50-55 dBA are unlikely to cause awakening reactions; and
- One or two noise events per night with maximum internal noise levels 65-70 dBA are not likely to significantly affect health and wellbeing.

Project Specific Operational Noise Goals

The RIRP operational noise emission criteria have been set with reference to the INP, as outlined in Technical Report No 5. The intrusiveness criteria have been set for the proposed hours of the RIRP operations based on the RBLs at the surrounding residences.

To assist in the determination of the indicative noise amenity area and hence determine the amenity criteria the INP notes and Parramatta Draft LEP Zoning map were used. The zoning map has areas of 'low density residential', 'medium density residential' and 'high density residential' in the residential areas to the west of the site and west of James Ruse Drive. The single isolated receiver located west of the site 33 James Ruse Drive (RR1-BG2) is in an area zoned 'enterprise corridor'. For the INP indicative noise amenity areas presented in Table 7.10 and consistent with definitions for these areas in the INP and the Parramatta Draft LEP, the residences west of James Ruse Drive are best described by the 'suburban' receiver type. Residences on James Ruse Drive and 33 James Ruse Drive are best described by the 'urban' receiver type.

The amenity criteria have been set in accordance with the INP using both the recommended LAeq(period) contribution from industrial noise for receivers west of James Ruse Drive and 33 James Ruse Drive.

The resulting operational intrusive and amenity noise emission criteria are given in Table 7.14.

Table 7.14
INP Project Specific Noise Assessment Criteria (dBA re 20 µPa)

	Project Specific Assessment Criteria					
	Intrusive LAeq(15minute)			**Amenity LAeq(Period)**		
	Day	**Evening**	**Night**	**Day**	**Evening**	**Night**
BG1 240 George Street	51	51	46	52	51	39
BG2 33 James Ruse Drive	59	56	53	55	51	50
BG3 a University of Western Sydney (Internal)[1]	58	58	52	55	55	55
BG3 a University of Western Sydney (External)[2]	58	58	52	50	50	50

Note 1: The amenity criteria for the University of Western Sydney is based on the internal INP criterion of 35 dBA for schools and an external to internal noise reduction of 20 dBA for fixed (non-openable) windows.
Note 2: The amenity criteria for the University of Western Sydney is based on the external INP criterion of 50 dBA for passive recreation.

The overall noise criterion for noise emissions from the site is generally the lower of the intrusive and amenity criteria. Note that the intrusive criterion is applicable over any 15 minute period whereas the amenity level is applicable over the whole daytime, evening or night-time period, as appropriate.

The INP and Australian Standard AS/NZS 2107:2000 '*Acoustics – Recommended design sound levels and reverberation times for building interiors'* do not provide guideline values for internal noise levels in childcare centres. The Association of Australian Acoustical Consultants has a Technical Guideline - *Child Care Centre Noise Assessment* and this recommends an internal level of 40 dBA for playing and sleeping areas, which has been adopted for this assessment.

Road Transportation Noise Assessment procedure

Whilst operating on the project site, the assessment procedure for vehicle noise is documented in Technical Report No 5. That is, road vehicle noise contributions are included in the overall predicted LAeq(15minute) RIRP operational noise emissions. On public roads, different noise assessment criteria apply to the vehicles, which would be regarded as "traffic", rather than as part of the RIRP operations noise sources.

In June 1999, the DECCW (now OEH) issued a document entitled "*Environmental Criteria for Road Traffic Noise*". The ECRTN presents recommended road traffic noise criteria for various types of road and land use developments. James Ruse Drive performs the role of a sub-arterial road and Grand Avenue the role of a local road that carries traffic to/from James Ruse Drive from/to an Industrial complex.

In terms of the functional categories of roads, the document states that:

"It is noted that some industries (such as mines and extractive industries) are, by necessity, in locations that are often not served by arterial roads. Heavy vehicles must be able to get to their bases of operation, and this may mean travelling on local roads. Good planning practice recognises that we must acknowledge this type of road use and develop ways of managing any associated adverse impacts. To this end, the concept of 'principal haulage routes' has been endorsed by the Department of Urban Affairs and Planning's North Coast Extractive Industries Standing Committee. Ways of identifying 'principal haulage routes' and managing associated adverse impacts have not yet been fully defined. Where local authorities identify a 'principal haulage route', the noise criteria for the route should match those for collector roads, recognising the intent that they carry a different level and mix of traffic to local roads."

Grand Avenue can then be considered as 'Principal Haulage Route' therefore the collector criteria apply.

The relevant assessment criteria for the RIRP traffic are presented in Table 7.15.

Table 7.15
Road Traffic Noise Criteria

Type of Development	Criteria Daytime (0700 hrs to 2200 hrs)	Criteria Night-time (2200 hrs to 0700 hrs)	Where Criteria Are Already Exceeded
7. Land use developments with potential to create additional traffic on existing freeways / arterials roads	LAeq(15h) 60	LAeq(9h) 55	Where feasible, existing noise levels should be mitigated to meet the noise criteria. Examples of applicable strategies include appropriate location of private access roads; regulating times of use; using clustering; using 'quiet' vehicles; and using barriers and acoustic treatments. In all cases, traffic arising from the development should not lead to an increase in existing noise levels of more than 2dB.
8. Land use developments with potential to create additional traffic on collector roads	LAeq(1h) 60	LAeq(1h) 55	Where feasible and reasonable, existing noise levels should be mitigated to meet the noise criteria. Examples of applicable strategies include appropriate location of private access roads; regulating times of use; using clustering; using "quiet" vehicles; and using barriers and acoustic treatments. In all cases, traffic arising from the development should not lead to an increase in existing noise levels of more than 2dB.

Note: Total traffic noise contribution including existing and project related vehicle movements.

Note that in all cases where the nominated criteria are already exceeded, traffic associated with a new development should not be permitted to lead to an increase in the existing noise traffic levels of more than 2 dBA. This can be achieved when the project related percentage increase in existing light and heavy vehicle movements is generally no greater than 60%.

Assessment

Predicted LAeq (15minute) noise level contributions from the 'worst case' proposed operations of the RIRP together with the respective criteria at the eleven assessment locations are presented in Table 7.16. Predicted LA1(1minute) noise level contributions to assess sleep disturbance are presented in Table 7.17 together with the respective criteria at the three residential locations.

Discussion

Review of Table 7.16 indicates that the operational noise emissions from the proposed RIRP are predicted to be below the noise criteria at all of the noise assessment locations. Compliance is predicted for daytime, evening and night-time. LAeq(15minute) noise contour diagrams for the daytime and night-time operational scenarios are presented in Figures 7.5 and 7.6 respectively.

It is noted that the criteria presented in Table 7.16 is the lower of the amenity and intrusive criteria. In this case the intrusive 15 minute noise levels have been calculated as a worse case scenario in a conservative approach. Amenity noise levels would be expected to be 3 dBA to 5 dBA lower than the intrusive noise levels.

In relation to the potential for sleep disturbance, the INP Application Notes, suggests that the LA1(1minute) noise level from any specific noise (ideally) should not exceed the LA90 background noise level by more than 15 dBA.

A review of noise events from the RIRP operations shows that the LA1(1minute) noise levels comply with the sleep disturbance criterion.

Furthermore the noise levels from a truck reversing alarm at RR1 are predicted to be 54 dBA, being 9 dBA below the criteria. It is noted whilst the sleep disturbance criteria is clearly met the alarm might be audible. In the event that reversing alarm noise is considered to be a source of disturbance, the alarm noise level should be checked against the appropriate regulatory and health and safety requirements and the necessary mitigating action taken to achieve an acceptable noise reduction without compromising safety standards.

Table 7.16
Predicted RIRP (LAeq(15 minute) Operational Noise Levels - dBA re 20 µPa

	Existing Predicted LAeq(15minute) Noise Level				LAeq(15minute) Noise Criteria		
	Daytime	Evening	Night-time Calm	Night-time Adverse	Daytime	Evening	Night-time
RR1	49	49	46	48	55	51	50
RR2	37	37	36	38	55	51	50
RR3	33	33	32	35	51	51	39
IR1	50	50	47	48	70	70	70
IR2	59	59	57	57	70	70	70
IR3	57	57	55	55	70	70	70
IR4	59	60	57	57	70	70	70
CR1a[1]	34	34	33	36	55	55	55
CR1b[2]	34	34	33	36	50	50	50
CR2[3]	58	59	55	55	60	60	60
CR3	40	40	38	40	65	65	65
CR4	38	37	36	39	65	65	65

Note 1: The noise criteria for the University of Western Sydney is based on the internal INP criterion of 35 dBA for schools and an external to internal noise reduction of 20 dBA for fixed (non-openable) windows.|
Note 2: The noise criteria for the University of Western Sydney is based on the external INP criterion of 50 dBA for passive areas.
Note 3: The INP does not contain noise criterion for Childcare Centres. In this instance an internal noise level of 40 dBA has been adopted, which is applicable to sleeping areas. The external 60 dBA goal is based on fixed windows to the childcare centre.

Table 7.17
Predicted RIRP LA1(1minute) – Sleep Disturbance - dBA re 20 µPa

	Predicted $L_{A1(1minute)}$ Noise Level		$L_{A1(1minute)}$ Sleep Disturbance Criteria
	Night-time Calm	Night-time Adverse	Night-time
RR1	57	58	63
RR2	44	47	63
RR3	39	43	56
IR1[1]	N/A	N/A	N/A
IR2[1]	N/A	N/A	N/A
IR3[1]	N/A	N/A	N/A
IR4[1]	N/A	N/A	N/A
CR1a[1]	N/A	N/A	N/A
CR1b[1]	N/A	N/A	N/A
CR2[1]	N/A	N/A	N/A
CR3[1]	N/A	N/A	N/A
CR4[1]	N/A	N/A	N/A

Note 1: N/A - Sleep disturbance apply to residences only.

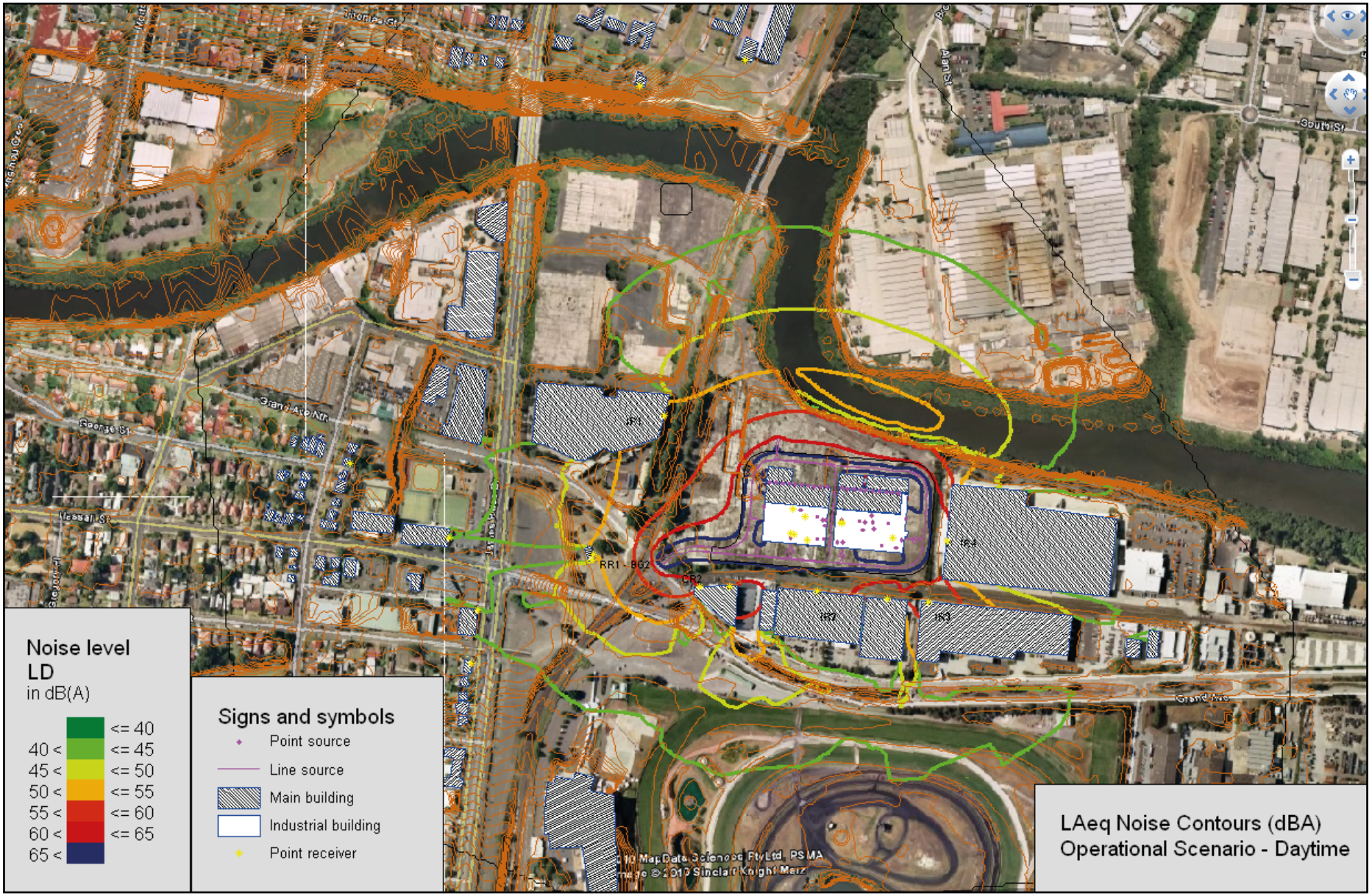


Figure 7.5 **Noise Contours - Operational Scenario – Daytime**

Figure 7.6 **Noise Contours - Operational Scenario – Night-time Adverse**

Road Traffic

In order to assess the potential impact of traffic noise at existing residences from the RIRP, noise level calculations were carried out using the UK Department of Transport, *"Calculation of Road Traffic Noise"* (CORTN 1988) algorithms. The modelling allows for traffic volume and mix, type of road surface, vehicle speed and ground absorption. The algorithm output of CORTN has been modified to calculate the relevant LAeq road traffic noise emission descriptors, as required. The calculated noise levels are determined by taking into account overall traffic volumes, vehicle speed, percentage of heavy vehicles and the distance between roadway and the receiver and includes a 2.5 dBA facade reflection.

In accordance with the ECRTN traffic noise levels at residences on access roads to the site are predicted with and without the contribution of the subject site associated traffic.

According to the ECRTN traffic associated with the development should comply with the baseline criteria and when this is exceeded not lead to an increase in the existing noise traffic levels of more than 2 dBA.

James Ruse Drive

Predicted noise levels for residences on James Ruse Drive have not been calculated given that the average daily percentage increase in light and heavy vehicles movements on these roads is predicted to be less than 1%. The associated increase in noise level will be significantly less than 1 dBA, complying with the 2 dBA allowance criterion.

Grand Avenue

There is only one residence potentially affected by RIRP trucks on Grand Avenue. The house is located at 33 James Ruse Drive, 46 m away from Grand Avenue and a noise logger was installed at that location to capture the ambient noise. The logger installed at 33 James Ruse Drive is representative of traffic noise occurring mainly on Grand Avenue. Table 7.18 shows the results of the traffic noise. The nominated criteria are already exceeded for both daytime and night-time; therefore traffic associated with the RIRP should not be permitted to lead to an increase in the existing noise traffic levels of more than 2 dBA.

Table 7.18
Traffic LAeq(1hour) Measured at 33 James Ruse Drive and Corresponding Estimated Increase in Noise Levels due to Traffic Generated by RIRP

Peak Period	LAeq(1hour)	Increase in noise level generated by traffic from the RIRP
Night-time 5.00 am - 6.00 am	60	0.6 dBA
Night-time 6.00 am - 7.00 am	62	0.4 dBA
Daytime 7.15 am - 8.15 am	64	0.3 dBA
Daytime 8.00 am - 9.00 am	64	0.5 dBA
Daytime 2.00 pm - 3.00 pm	65	0.6 dBA
Daytime 4.30 pm - 5.30 pm	63	0.5 dBA

The existing traffic noise levels exceed the baseline ECRTN criteria of 60 dBA and 55 dBA for daytime and night-time respectively. The traffic noise increase of up to 0.6 dBA for both daytime and night-time complies with the 2 dBA allowable increase.

7.6.5 Conclusion

The results of the study are summarised in the following points:

- An ambient noise survey was conducted and design criteria for operational noise developed in accordance with the OEH's INP. For residences a daytime goal of 51 dBA to 55 dBA, evening goal of 51 dBA and night-time goal of 39 dBA to 50 dBA were set. Goals were also set for the nearby childcare centre, the University of Western Sydney and commercial and industrial receivers;

- Predicted operational daytime evening and night-time noise levels comply with the design goals at existing residences, and also the childcare centre, the University of Western Sydney and commercial and industrial receivers;

- Changes to traffic noise levels as a result of the project comply with the OEH Environmental Criteria for Road Traffic Noise; and

- Noise levels predicted for construction activities comply with design criteria developed in accordance with the OEH Interim Construction Guideline.

7.7 VISUAL ANALYSIS

7.7.1 Background

Context has prepared a visual assessment for the proposed RIRP. The results are documented in Technical Report No 8 and are summarised in this section.

The methodology for the visual analysis and assessment involved the following steps:

- Desktop analysis of the baseline data, proposed RIRP, site and regional context, definition of study area and Zone of Visual Impact (ZVI) (area potentially visually affected by the proposal);

- Identification of potential key receptors and viewpoints;

- Definition of visual impact criteria - receptor/landscape sensitivity and magnitude of potential change;

- Site visit and photographic study for landscape character analysis and visual impact assessment;

- Review of key receptors and viewpoints against visual impact criteria;

- Assessment and definition of potential visual impacts of proposal on key receptors;

- Review of preliminary assessment outcomes with relevant parties;

- Identification of options for mitigation against visual impacts; and

- Conclusion - summarising visual outcomes and proposed mitigation measures.

7.7.2 Key Receptors and Viewpoints

Potential receptors and potential viewpoints were identified for on-site assessment as follows:

- University of Western Sydney - Rydalmere Campus;
- Parramatta River Corridor;
- James Ruse Drive;
- Residential Dwelling - Grand Avenue;
- Aldi Supermarket, Offices and Carpark - Grand Avenue;
- Explore and Develop Child Care Centre - Level 4, 1C Grand Avenue;
- Camellia Railway Station;
- Pedestrian and Vehicle Overbridge - Grand Avenue;
- Rosehill Racecourse; and
- Rosehill Residential Area.

Figure 7.7 shows the location of the viewpoints and Figure 7.8 provides a site analysis plan.

7.7.3 Visual Impact Criteria

Two key criteria which relate to “sensitivity to change” and “magnitude of change” have been used to assess the level of potential visual impact.

Sensitivity includes both that of the receptor or viewer and of the landscape in which the viewer experiences a change. To determine the sensitivity of a receptor to the proposed development and the magnitude and nature of potential effects experienced by a receptor, a range of quantitative and qualitative factors were identified. The factors determining sensitivity include:

- Number of potential viewers (a receptor may represent a population base or an individual);
- Type of receptor – e.g. private dwelling, commercial building, road, waterway, public facility, conservation area, tourist route etc;
- Quality of view from receptor – i.e. obstructions, existing landscape character and quality;
- Current and future landscape trends; and
- Ability of landscape to absorb the effects of the proposed development

The magnitude of visual impact on the landscape can change over time as mitigating effects such as planting and habitat restoration proposals mature, and as landscapes external to the development change over time. Factors determining the magnitude of the potential change imposed by the proposed development on each of the key receptors include:

- Nature of change - e.g. road, structure, removal of vegetation, combination;

- Scale of change (height and spread of visible development in the landscape);
- Duration or degree of permanence of effect; and
- Proximity of receptor to proposed effect.

The anticipated level of visual impact was determined by directly cross referencing sensitivity and magnitude criteria:

- Major Impact: where the Proposed Development could be expected to have a very significant impact (either positive or negative) on the existing landscape and visual resource;
- Moderate Impact: where the Proposed Development could be expected to have a noticeable impact (either positive or negative) on the existing landscape and visual resource;
- Minor Impact: where the Proposed Development could be expected to have a small, barely noticeable impact (either positive or negative) on the existing landscape and visual resource; and
- Negligible: visible change may be present however no relevant or meaningful impact is expected to occur as a result of the proposed development.

Technical Report No 8 provides further detail on the assessment methodology.

7.7.4 Landscape Character

There are few vantage points outside the site and within visible range to provide vistas or extended views of the proposed development. This is mainly due to the bulky built form and relatively flat topography of the area. Most significant high-rise development is located far away and of a scale that most views are screened by existing trees or adjacent buildings.

The site and immediate surroundings are flat however there is approximately 4-5m change in elevation to mean river level. Areas to the south and west of the site rise gently towards the Western Motorway to the south.

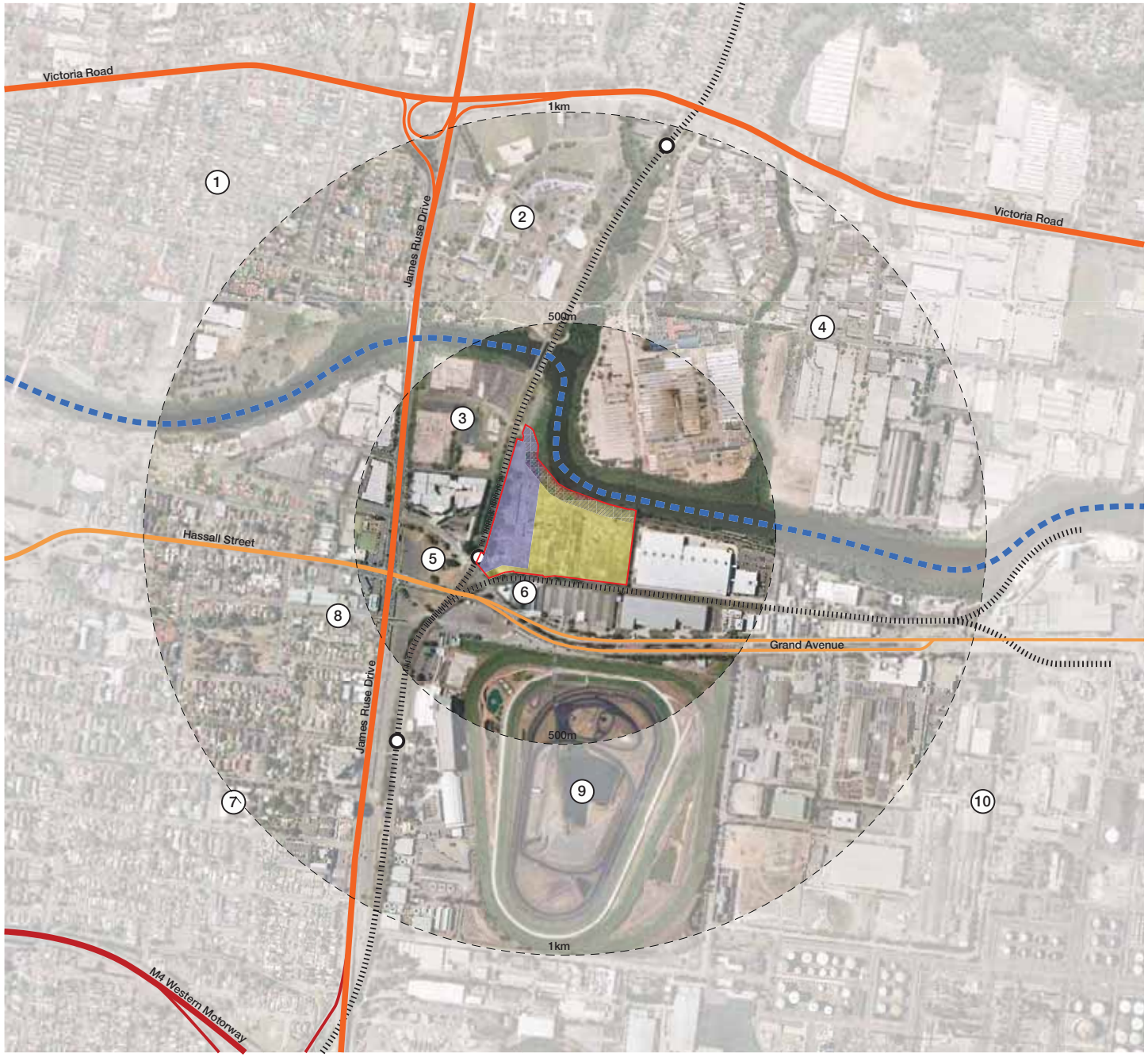
Many vistas and long range views throughout the area are limited or completely obscured by industrial development. These elements are typically large and imposing structures that would be widely considered to be of poor visual quality.

7.7.5 Proposed Site Master Plan

Section 4 provides details of the Site Master Plan which includes significant areas of planting, particularly along the southern boundary of the site and to the northern side of the proposed roadway near the Environmental Protection Zone. Planting around the proposed buildings will serve to partially screen these structures while providing shade for parking areas and offices and reduce hard surface area.

7.7.6 Zone of Visual Impact

Figure 7.9 defines the areas of the surrounding landscape or urban framework that may be visually affected by the proposed development. The map displays circular bands, each 100m apart and approximately centred on the site. These bands provide a reference as to the approximate distance from the proposed development. The proposed RIRP is approximately contained within a



Legend

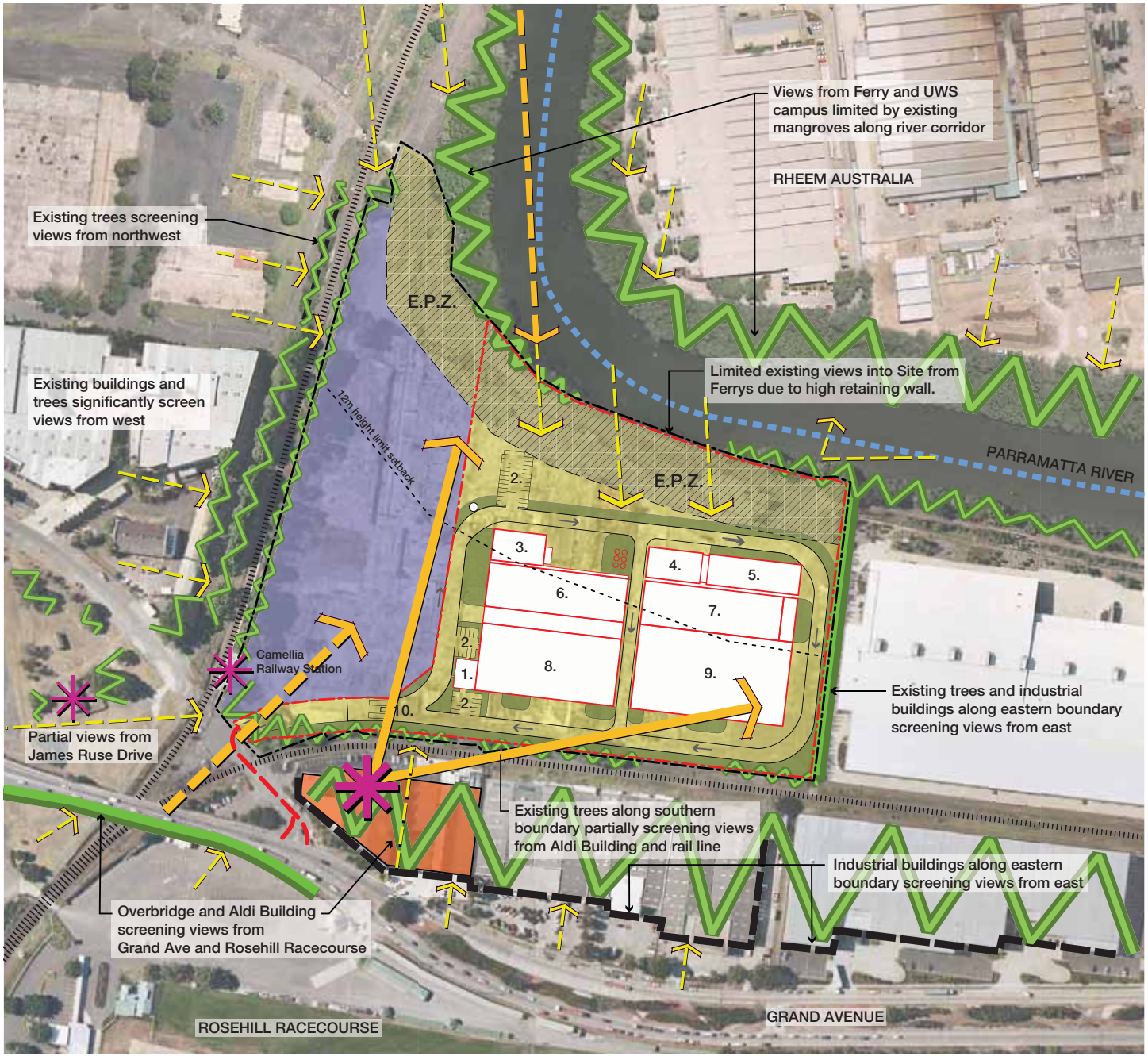
Transport

- Roads - Major Motorway
- Roads - Main Road - Thoroughfare
- Roads - Main Road - Access Road
- Railway Tracks and Stations
- Passenger Ferry Route - Parramatta to Circular Quay
- Existing Site Boundary
- Project Leased Area
- Non-Leased Area
- 30m wide Environmental Protection Zone (EPZ)

Key Features

1. Parramatta Residential Area
2. University of Western Sydney - Rydalmere Campus
3. Old Camellia Township Site
4. Rydalmere Industrial Area
5. Urban Parkland and Residential Dwelling
6. Aldi Stores Offices and Supermarket
7. Rosehill Public School and Residential Area
8. Commercial Area - Food and Retail
9. Rosehill Racecourse
10. Industrial Area - Shell Oil Ltd

Figure 7.7 **Study Area Visual Assessment**



Legend

Existing Features

- External Views partially screened by existing features
- Existing Sightlines to Proposed Development
- Screening provided by existing features
- Locations/receptors with potentially high visual sensitivity
- Railway Tracks
- Passenger Ferry Route - Parramatta to Circular Quay
- Project Boundary - Leased Area
- Existing Site Boundary
- Existing and Proposed Shared Site Accessway
- Aldi Building - Child Care Centre Level 4

Proposed Features

- Proposed Buildings
- Proposed Circulation Road
- Proposed Hard Surface Areas
- Proposed Landscape Areas
- Non-Leased Area
- E.P.Z. Environmental Protection Zone (Rehabilitation Area)

1. Admin/Office Building
2. Car Parking
3. SSORRF Biofilter
4. CIRRF Biofilter
5. Storage and Handling
6. Organic Waste Composting
7. CIRRF Waste Stabilisation
8. SSORRF Treatment and Sorting
9. CIRRF Treatment and Sorting
10. Weighbridge and Gate House

○ Rainwater Storage Tank

Figure 7.8 **Site Analysis Plan**

Legend

Key Receptors

- Main Roads - James Ruse Drive / Grand Avenue
- Bridge / Overpass
- Railway Tracks
- Passenger Ferry Route - Parramatta to Circular Quay
- Pedestrian/Cycleway
- Project Boundary - Leased Area
- Existing and Proposed Shared Site Access
- Proposed Buildings
- Hardworks and Softworks Areas
- Non-Leased Area
- 30m wide Environmental Protection Zone (EPZ)
- Potential Zone of Visual Impact (ZVI)
- University of Western Sydney - Rydalmere Campus
- Aldi Building - Child Care Centre Level 4
- Residential Dwelling / Camellia Railway Station
- Rosehill Racecourse

Key Viewpoints

- V4 Visual Assessment Viewpoint Locations

Figure 7.9 **Key Viewpoint & Receptor Plan**

200m radius of its centre. The ZVI is indicated on the map by the hatched area and includes all areas outside the site that may be potentially visually affected by the proposed RIRP. The ZVI displays a 'worst case' impact based on the condition of the site at the time of the on-site assessment and does not include elements or planting in the proposal which may provide screening to mitigate potential visual impacts.

The ZVI is significantly limited by buildings and vegetation despite the predominantly flat or gently undulating topography of the site and immediate surrounding area. As a result, several potential key receptors including James Ruse Drive, Rosehill Racecourse and most of Grand Avenue are shown to be outside the ZVI area. Due to the elevated position of the site above the river and screening provided by the existing vegetation, some parts of the Parramatta River corridor that are close to the site are outside the ZVI of the proposed RIRP. However, several key receptors will experience a level of visual impact from the development. A detailed assessment was carried out at all indicated locations to determine a Visual Impact Rating (refer Figure 7.10).

7.7.7 Impact Assessment

The visual assessment has been undertaken in terms of views from the key viewpoints identified in Figure 7.10. Technical Report No 8 provides a detailed assessment. The assessment identified the impacts from the viewpoints as:

- Viewpoint 1 - University of Western Sydney Campus - Southeast Carpark

  This view is dominated by the built structure of the existing bridges in the foreground, which contrast strongly with the extensive vegetation of the river corridor and the drainage line to the east. This receptor has a low sensitivity due to its primary use for parking, immediate proximity to passing trains and the visual intrusion created by the bridges and overhead wires. As the proposed RIRP would make up a small proportion of the view area from this location, the magnitude of change would be initially low and then potentially negligible once the existing Casuarinas along the riverbank and existing carpark planting in the foreground becomes established.

  A minor negative visual impact may occur in the short term and during construction however the visual impact would likely reduce to negligible in the long term.

- Viewpoint 2 - University of Western Sydney Campus - Level 1 Library Building

  This view is dominated by the cars and built elements in the foreground which contrast strongly with the extensive surrounding vegetation. Vertical light poles dissect the view beyond to the site and would significantly reduce the impact of any visible change resulting from the proposed RIRP. This receptor has a moderate sensitivity due to the relatively high number of potential viewers, however they would be viewing through a window and their attention would be unlikely to be focussed towards the proposed RIRP site.

  The elevated position of the view increases the visual range however the visual intrusion created by the bridges, lighting poles, overhead wires and existing vegetation which partially obscure the view to the site, in combination with the 400m+ distance further reduce any potential change in visual character. The magnitude of change would therefore initially be low and potentially become negligible in the long term. Proposed vegetation on the site will provide partial screening of the proposed RIRP from this location.

  Viewers at this location would experience only a minor negative visual impact that is likely to reduce over time.

- Viewpoint 3 - University of Western Sydney Campus - Cafe Outdoor Seating Area

  This view is dominated by the bridges in the middle distance which contrast strongly with the extensive surrounding vegetation and maintained lawns. Glimpses of industrial structures and high rise buildings in the far distance further reduce visual sensitivity to the proposed RIRP. This receptor has a high sensitivity due to the relatively high number of potential viewers and outward visual perspective. The elevated position of the view increases the visual range however the visual intrusion created by the bridges, lighting poles, overhead wires and existing vegetation which partially obscure the view to the site, in combination with the 400m+ distance further reduce any potential change in visual character. The magnitude of change from the proposed development would therefore be negligible, or potentially fully mitigated once the existing planting in the foreground becomes established.

  Viewers at this location would potentially be visually unaffected by the proposed development.

- Viewpoint 4 - University of Western Sydney Campus - Riverbank Pathway

  This view is focussed down the river corridor towards the proposed RIRP. A sense of semi enclosure and privacy is created by the vegetation lining the bank and heightened by the adjacent rail bridge and tall vegetation behind. This viewpoint has a moderate sensitivity due to the frequency of passers by utilising the pathway and evidence of stationary viewers at the time of assessment. This sensitivity rating also considers the viewers proximity to the rail bridge and passing ferries. The magnitude of change would be low due to the low elevation of the viewer relative to the site and the screening provided by existing vegetation along the river corridor and the relatively small visible area of the site. The proposed buildings and vegetation will obscure existing industrial buildings presently visible in the background. The form and visible bulk of the structures will be reduced by proposed vegetation once it matures.

  Viewers at this location would experience a minor visual impact from the proposed development that would potentially reduce over time.

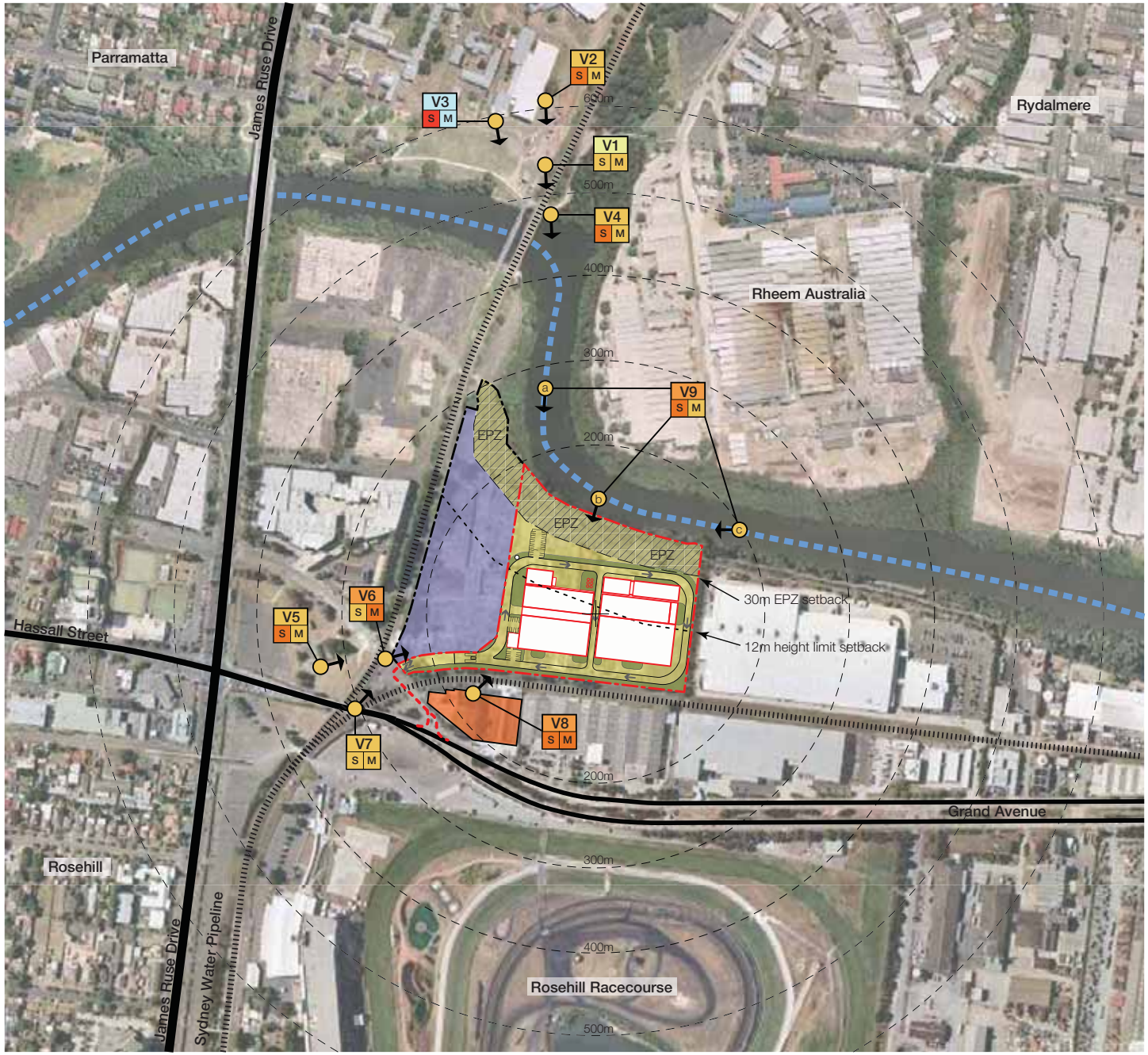
- Viewpoint 5 - Residential Dwelling - Grand Ave

  Due to the considerable existing vehicle movements surrounding the viewpoint in addition to the current use of the site, the sensitivity of this receptor to vehicle movements associated with the proposed RIRP is reduced. Therefore this receptor has a moderate sensitivity due to its residential nature. The site entrance is partially obscured by weed growth and the mesh fence along the rail corridor. Proposed screening vegetation along the southern boundary and the large existing trees to be retained along the west boundary would significantly restrict views into the site from this location. As views to the site and access road are not possible from inside the dwelling due to the fence around the property the magnitude of change would be low.

  Viewers at this location would experience a minor visual impact from the proposed development, primarily related to an increase in heavy vehicle movements through the site entrance.

- Viewpoint 6 - Camellia Railway Station

  This viewpoint is predominantly focussed around the access way, platform and building of Camellia Station. The Tilrox/Aldi building and Grand Avenue overbridge restrict views to the east and south. Significant heavy vehicle movements are already visible from this location



Legend

Existing Features

- James Ruse Drive - Main Road Thoroughfare
- Grand Avenue - Main Access Road
- Railway Tracks
- Passenger Ferry Route - Parramatta to Circular Quay
- Existing and Proposed Shared Site Access
- Site Boundary
- EPZ — 30m wide Environmental Protection Zone (EPZ)

Proposed Features

- Project Lease Boundary
- Proposed Buildings
- Proposed Site Works Area
- Non-Leased Area

Viewpoints

- Key Visual Impact Viewpoint Locations

Viewpoint Number and Visual Impact Rating

V8 S M

Sensitivity of Receptor — Magnitude of Change

Sensitivity/Magnitude	Visual Impact
Negligible	No Visible Change
Low	Negligible
Moderate	Negligible to Minor
High	Minor
	Minor to Moderate
	Moderate
	Major

Figure 7.10 Visual Impact Rating

along Grand Avenue as well as trains regularly stopping at Camellia Station. The present use of the site and the surrounding car parking further reduces the sensitivity of this receptor to vehicle movements associated with the proposed development. Therefore this receptor has a low sensitivity rating. The proposed development would be partially obscured by fencing and large trees around the site. Additional proposed planting would potentially provide further screening of on-site activities.

Viewers at this location would experience a minor to moderate negative visual impact from the proposed development, primarily due to their close proximity to increased vehicle movements through the site entrance.

- Viewpoint 7 - Top of Overbridge - Grand Avenue

  This elevated position of this receptor allows panoramic views of the surrounding areas. The adjacent Tilrox/Aldi building and Grandstand at Rosehill Racecourse restrict some views to the east and south, however there are distant views to the southeast, west and northwest. Stacks of the Shell Refinery site are clearly visible to the southeast. Significant heavy vehicle movements visually dominate this location and pedestrians also view trains regularly passing below to stop at Camellia Station. Therefore this receptor has a low sensitivity rating due to the visual dominance of existing heavy traffic and industrial character of the area. Remaining trees and proposed shrubs along the southern boundary would screen much of the proposed development on site. The development is similar in scale and form to existing surrounding landscape elements, therefore this would not facilitate a significant change in the wider landscape character.

  Viewers at this location would experience a minor visual impact from the proposed development, due to their close proximity to increased heavy vehicle movements to and from the site.

- Viewpoint 8 - Explore and Develop Child Care Centre - Level 4, 1C Grand Avenue

  The visual sensitivity of this receptor is moderate as the terrace is primarily an inward ‘play’ focussed space. The proposed development will potentially have a moderate negative visual impact on views from the Level 4 terrace during the short term construction phase. During operation these moderate negative visual impacts would potentially become minor in the mid to long term once proposed vegetation becomes established. The proposed development would potentially have a minor positive visual impact in the long term and provide some improvement to the existing landscape character as proposed vegetation matures.

- Viewpoint 9 - Parramatta River Ferry

  This receptor has a moderate sensitivity due to the high number of tourists present on the ferries however the high visibility of industrial elements and modification throughout the river corridor would reduce the visual expectation of pristine natural character for ferry passengers. The retaining wall would potentially obscure views of the proposed development from ferries immediately adjacent to the site, and existing and proposed planting along the northern roadway within the site would partially screen the proposed structures and vehicle movements from locations further along the river in both directions. The magnitude of visual change would be low as the form and scale of the proposed structures are similar to the surrounding area and buildings are set back from the river corridor.

The visual impact of the proposed development on viewers from the Parramatta Ferry would only be minor once construction is completed. Proposed planting within the site including the Environment Protection Zone would potentially further reduce visual impacts over the long term as it matures.

7.7.8 Proposed Mitigative Measures

Measures which can be adopted during the planning and design phase include:

- Boundary planting

  Tree planting at strategic locations around the site and along boundaries adjacent to potentially affected properties where possible should be undertaken to screen the development.

  During construction the extent of clearing should be kept to a minimum to maximise the screening effect of existing vegetation.

  Selection of colours for built elements should be recessive or neutral where possible and overall be sympathetic with the tone of the surrounding landscape character.

- Lighting design

  The 24/7 day nature of the operations means that lighting will be required within the site area of operations throughout the night. It is recommended that the lighting design for the site aim to avoid highlighting prominent built form such as the main buildings, minimise the spill of light into surrounding sites and ensure that all lighting associated with the development complies with *Australian Standard AS4282 (INT) 1995 - Control of Obtrusive Effects of Outdoor Lighting.*

- Construction phase

  Measures to reduce visual impacts during the construction period relate to maintenance of the construction areas in a neat and orderly state and adhering to approved vehicle movement guidelines.

7.7.9 Conclusion

The proposed RIRP will introduce several new industrial buildings and additional regular heavy vehicle movements to the site and areas along Grand Avenue. The surrounding region has an extensive history and ongoing development of a wide range of industrial and commercial facilities. The land on which the proposed development is located is a predominantly cleared and contaminated site, covered extensively by an existing hardstand capping and weed growth.

There is a moderate to high level of existing modification and industrial development visible from all of the key receptors and viewpoints identified. The area around the site is bisected by major transport corridors with significant existing heavy vehicle traffic and rail activity. The existing visual character of the site is poor due to its recent use as an industrial and freight vehicle storage facility.

Most of the key receptors would have a low to moderate sensitivity to the proposed development. Its scale, form and layout will be in keeping with the existing industrial character of the surrounding area.

The key receptors will generally experience a negligible to low magnitude of change from the proposed development and some will experience minor to moderate negative visual impacts in the short term. The Child Care Centre off Grand Avenue would potentially experience the most visible change due to its close proximity and elevated position. Due to this receptors moderate sensitivity and the existing poor visual condition and use of the site the overall visual impact is anticipated to be a minor positive effect from this location as proposed vegetation becomes established.

Long distance views to and from the site are very limited due to enclosure by existing built form, vegetation and relatively flat topography of the immediate area.

Long term minor negative visual impacts would be experienced by some key receptors located to the south and west of the site. These key receptors include the residential dwelling and grassed area to the southwest of the site, people accessing Camellia Railway Station on foot or by train and pedestrians crossing the Grand Avenue overbridge. These impacts would be mainly related to regular heavy vehicle movements to and from the site during normal operation of the facility.

There is opportunity for most anticipated negative visual impacts to be partially mitigated through retention of existing vegetation and proposed screen planting. Extensive proposed native planting will visually enhance the site from most key viewpoints and provide some additional habitat and foraging value for the area.

7.8 TRAFFIC

An assessment of road traffic associated with the construction and operation of the proposed RIRP has been undertaken by Traffix (refer Technical Report No 6). This report describes the site and its location, existing traffic conditions, the proposed RIRP, access and internal design aspects and assesses parking requirements and traffic impacts.

7.8.1 Road Hierarchy

The road hierarchy in the vicinity of the site is shown in Figure 7.11 and includes the following roads:

- M4 Motorway: a major arterial road (MR 6004) that forms Sydney's major east-west transport corridor, to the south of the site. It carries in excess of 81,500 vehicles per day to the east of the site;

- James Ruse Drive: an RTA classified road (MR 309) that runs in a north-south direction to the west of the site. It carries in the order of 63,000 vehicles per day;

- Victoria Road: a classified road (MR 165) that runs in an east-west direction, to the north of the site. It carries approximately 62,500vpd;

- Grand Avenue: a local industrial road that runs in an east-west direction to the south of the site and provides access from James Ruse Drive to the Rosehill Business Park;

- Grand Avenue North: a local road that runs in a northwest-southeast direction and provides the current and future access to the site. Camellia railway station effectively splits Grand Avenue North into two sections, the southern of which provides access to the site via Grand Avenue.

It can be seen from Figure 7.11 that the site is conveniently located with respect to the arterial and local road systems serving the region. It is therefore able to effectively distribute traffic onto the wider road network using industrial and arterial roads, minimising traffic impacts.

James Ruse Drive is constructed with a 24.5 metre carriageway and generally carries three lanes of traffic in either direction. It forms a signalised intersection with Grand Avenue and Hassall Street, to the west of the site. This includes a left turn slip lane for eastbound traffic turning north onto James Ruse Drive (refer Appendix D, Technical Report No 6).

Hassall Street is generally constructed with a 12 metre carriageway and carries two lanes of traffic in either direction. Localised widening in the vicinity of James Ruse Drive permits additional turning lanes to be provided at this intersection.

Grand Avenue generally carries a single lane of traffic in either direction with localised widening in the vicinity of James Ruse Drive to provide sufficient turning lanes at this intersection. The width narrows to approximately 7 metres on the overpass of the Clyde-Carlingford railway line, to the west of the site. Further to the east, Grand Avenue is constructed with a divided carriageway and includes a number of at-grade railway crossings of industrial spur lines along its length. A short left turn deceleration lane and 35 metre right turn storage lane are provided on Grand Avenue at its intersection with Grand Avenue North.

Grand Avenue North is divided by the Clyde-Carlingford railway line. Access to the site is provided via the southern section of Grand Avenue North, which is accessed via Grand Avenue. Vehicle access to the site requires traversing the at-grade rail spur line crossing, immediately to the southeast of the site access.

7.8.2 Public Transport

The site benefits from good access to the public transport system with Camellia railway station adjacent to the site access and buses travelling along James Ruse Drive. Due to the hours and nature of the proposed operations, the above services are expected to be used to a minimal extent by staff. Train service frequencies from Camellia railway station vary between 30-60 minutes depending on the time of day. For the purposes of the traffic assessment a worst case scenario has been assessed, with reliance on private cars assumed for 90% of all staff relating to their journey-to-work travel.

7.8.3 Surrounding Cycle Network

Grand Avenue forms a local on-road route of moderate difficulty which is assumed to be a consequence of the relatively high proportion of heavy vehicles using this route to access surrounding industrial developments. Copies of the Parramatta Council and RTA Cycleway maps are provided in Technical Report No 6.

7.8.4 Existing Site Generation

Recently the site has been used for container storage purposes on a short term basis. A traffic report included in the development application for the proposed use of the site for container storage states that the traffic associated with the use of the site would generate in the order of 212 trips per day, comprised of 200 truck movements plus 12 staff passenger vehicle movements.

7.8.5 Existing Intersection Performance

For the purposes of the assessment of traffic impacts of this development, surveys were undertaken of the most critical intersection immediate adjacent to the site, being the intersection of James Ruse Drive with Grand Avenue, to the west of the site. These were undertaken between the morning (7- 9am) and afternoon (4-6pm) on-street peak periods.

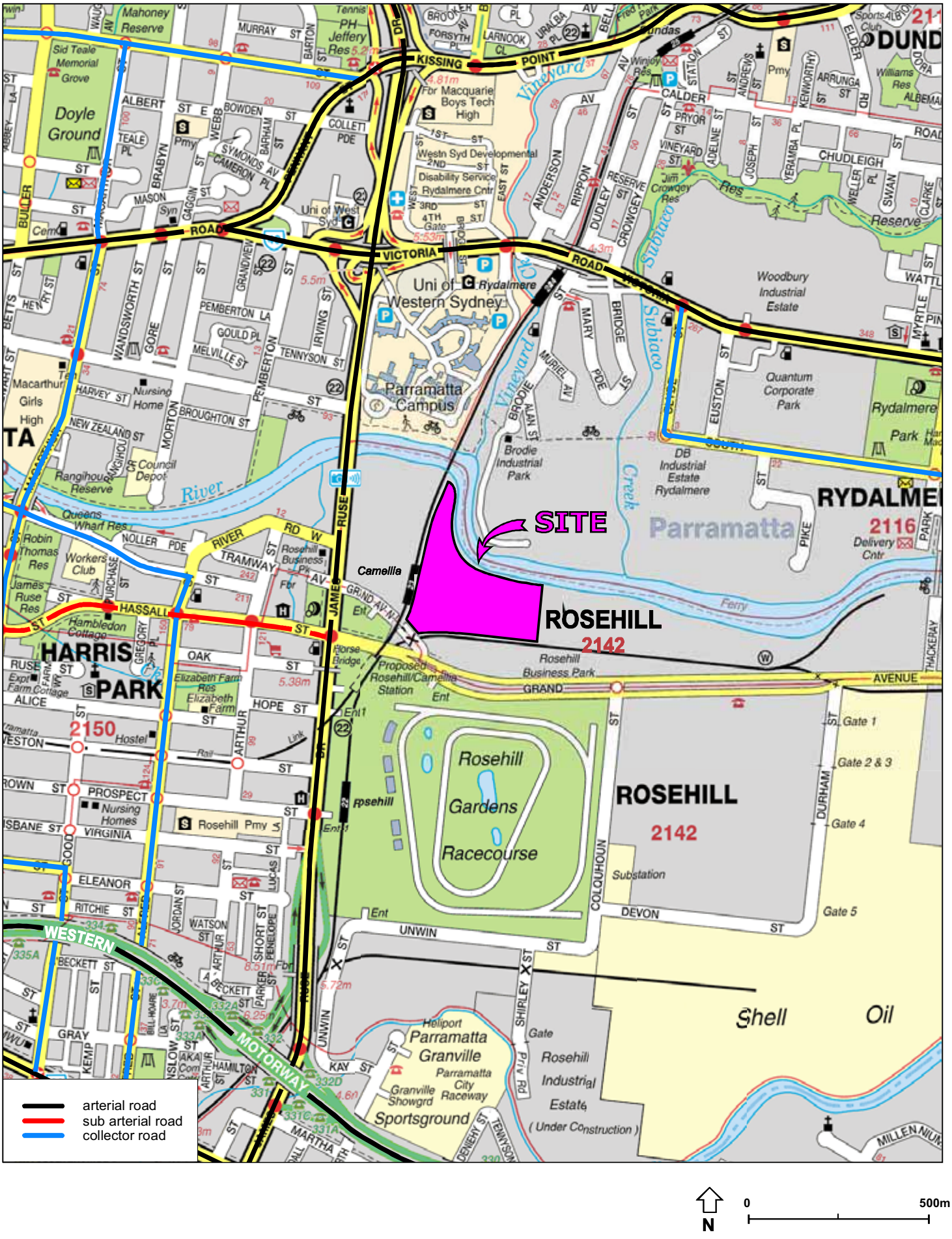


Figure 7.11 **Road Hierarchy**

Surveys were also undertaken between 1.30- 2.30pm as this period reflects the peak site related traffic generation, as raised by the RTA (refer Technical Report No 6). Surveys were also undertaken of the nearest intersection to the site at Grand Avenue/Grand Avenue North.

7.8.6 Impact Assessment

Trip Generation

Employee Trips

Having regard for existing bus and rail services and the need to promote alternate transport modes as far as practicable, 80% of employees have been assumed to drive to the site with an average car occupancy of 1.0 persons per vehicle. This represents a worst case scenario given the potential for some ride sharing. This results in a peak traffic generation of 48 vehicles per hour (with a 2:1 split in the direction of the main shift). This peak staff generation is expected to occur between 1.30-2.30pm, due to the shift changeover period, which occurs outside the on-street peak periods.

Staff traffic volumes are reduced during other periods with a total of about 104 movements per day associated with staff arrivals and departures.

Deliveries and Contractor Movements

A total of up to 184 truck movements per day are associated with the proposed RIRP. These deliveries are relatively evenly distributed over the course of the day.

Combined Trips

The peak traffic activity associated with the site will occur at approximately 2pm for both staff vehicles and peak truck arrivals and departures which results in a total of up to 70 vehicles per hour. As stated previously, this will occur outside the normal on-street peak periods.

Total daily traffic volumes will be in the order of 288 movements per day, the majority (184) of these being associated with truck deliveries.

Peak Period Intersection Performances

The peak site related traffic is expected to occur outside of on-street peak periods when additional capacity is expected to be available compared to peak on-street periods. Development related traffic during on-street peak periods will be associated with truck arrivals and departures with the following during both the morning and afternoon peak periods:

- AM peak 18 truck movements (14 in, 4 out);
- PM peak 12 truck movements (6 in, 6 out)

It is assumed that truck movements will be predominantly focused on the M4 Motorway to the south of the site which provides access to the wider Sydney region. This trend is evident from the existing truck movements at this intersection from Grand Avenue which demonstrate up to 75 percent of truck movements are directed to the south along James Ruse Drive. These increases are very moderate (even assuming all trucks use this route) in the context of the high traffic volumes on surrounding roads. Modelling indicates that the development will result in minimal change to the performance of this intersection during the on-street morning peak and site related peak traffic periods. Increased delays during the PM peak as modelled are 'disproportionate' to the increase in traffic of only 5 vehicles per hour on any one approach and is considered to be a result of the existing saturated conditions experienced by this intersection. The increase in traffic during

this period is expected to be within the daily fluctuations in traffic and is not considered to warrant any remedial works to any surrounding intersections.

The Level of Service at the intersection of Grand Avenue and Grand Avenue North is expected to reduce to LOS C (from B), however this still remains within acceptable performance parameters for an unsignalised intersection.

In summary, the proposed development generates only moderate traffic during on-street peak periods. Improvements to the James Ruse Drive / Grand Avenue intersection would be considered beneficial in terms of the performance of the surrounding road network, however any upgrading works are not considered warranted as a result of the subject development. In this regard, it is expected that any future works would be undertaken by the RTA and Council as a result of other considerations and these works are not relied upon by the subject development. Furthermore, development traffic has the ability to use Colquhoun Street, Unwin Street and Wentworth Street to access Parramatta Road negating the need for traffic to use this intersection, if required. Traffic modelling shows that delays at the intersections of James Ruse Drive with both Parramatta Road and Grand Avenue would remain relatively unchanged from the existing scenario with redistribution of site related heavy vehicle movements.

In this regard, the proposed alternate route seeks to reduce delays to existing traffic at the expense of additional travel time for site related traffic. This alternate route also permits vehicles to avoid potential queuing in Grand Avenue on approach to James Ruse Drive which can extend back to the intersection of Grand Avenue North. In summary, the impacts of the development can readily be accommodated through a suitable condition of approval requiring all truck egress movements to occur via this alternate route to Parramatta Road during the PM peak (4.00-6.00pm), in the event that Council and/or the DoPI were to consider the additional delays at the intersection of James Ruse Drive unacceptable. Vehicle movements from the site can be accommodated with only moderate changes to existing delays at all other times. In this regard, whilst widening of the rail over bridge could potentially improve the performance and capacity of the critical intersection (James Ruse Drive, Hassall Street and Grand Avenue), however these works are considered extremely costly and not considered justified for the purposes of the subject application.

Construction

The number of truck movements and staff numbers in all stages are less than is expected to occur when the development is operational. Therefore, any traffic impacts are also expected to be reduced and also acceptable.

Access and Internal Design

Access

Access by a Medium Rigid Vehicle (MRV) can be achieved whilst passing a Truck and dog combination vehicle (B85), at the intersection of Grand Avenue with Grand Avenue North, which is considered acceptable. A Heavy Rigid Vehicle (HRV) will require the full width of the road which is also considered acceptable having regard for the less frequent demand for vehicles of this size and the relatively low traffic volumes using Grand Avenue North and is also consistent with AS 2890.2.

Access to the site itself is proposed from Grand Avenue North, in the vicinity of the existing site access. This will provide access to an 14 metre wide internal road as discussed below. It is expected that access to the site will be required generally for 8.8 metre MRV, however access by up to 12.5 metre HRV and 'Truck and Dog' combination (B85) vehicles can be achieved.

Grand Avenue North traverses a rail level crossing to the south of the site. The *REMONDIS Risk Assessment - Impact of Recycling Operations at Grand Avenue on Camellia Level Crossing and Environs* (refer Technical Report No 7) concludes that the traffic associated with the development is acceptable, subject to some minor remedial measures.

Internal Design

The internal road system generally comprises a circulation loop road that runs in a clockwise direction around the centrally located facilities. Car parking areas are generally designed with a minimum space width of 2.5 metres. The proposed access and internal design would be subject to design certification prior to construction.

Road Safety Impacts

A preliminary review of road safety in the vicinity of the site has been undertaken to ensure that there are no significant issues that would affect the proposed development. In this regard, accident data was obtained from the RTA for the latest reporting period between 2005 and 2009.

There have been a number of accidents at the major signalised intersection of James Ruse Drive with Grand Avenue. The accident data demonstrates that a high proportion of these accidents relate to rear end and turning movement accidents in the vicinity of the James Ruse Drive and Grand Avenue intersection. This is expected to be a result of queuing on approach to this intersection and driver frustration at delays associated with this intersection operation which encourage drivers to accept reduced gaps in opposing traffic. In this regard, additional signage warning of potential queuing may be beneficial at this intersection. Nevertheless, it should be emphasised that there were no fatality crashes during the reported period. In this regard, it is expected that the priority for any remedial works would be lower than a number of other locations throughout the State.

Only a single rear end accident occurred at the intersection of Grand Avenue and Grand Avenue North over the reported period, with no accidents at the at-grade rail crossing on Grand Avenue North. This is consistent with the findings of the *REMONDIS Risk Assessment - Impact of Recycling Operations at Grand Avenue on Camellia Level Crossing and Environs (refer Technical Report No 7)*, which concludes that the traffic associated with the site is acceptable, subject to some minor remedial measures.

In summary, the moderate traffic volumes associated with the development are not expected to exacerbate any existing accident trends. A detailed Road Safety Audit can be undertaken prior to construction / occupation that can identify any low cost measures to assist in reducing existing accident trends in the locality, namely at the intersection of James Ruse Drive and Grand Avenue.

Conclusions

In summary the traffic impact assessment found that:

- The surrounding road network, particularly James Ruse Drive in the vicinity of the site, currently exceeds capacity resulting in significant delays for road users during peak periods. It should be noted that the proposed RIRP is a highly specialised and automated operation which results in a comparatively low traffic generation when considering other potential (and historic) uses of the site;

- The development will generate in the order of 288 vehicle movements per day with a peak hourly traffic generation of up to 70 vehicles per hour which does not coincide with on-street peak periods. Peak site related traffic is a result of shift changeover times which generally occur prior to on-street peak periods;

- Delays at surrounding intersections will remain relatively unchanged by the proposed RIRP during the peak site traffic and morning on-street periods. Increased delays at the intersection of James Ruse Drive and Grand Avenue are not considered to warrant works to this intersection on behalf of REMONDIS as there is the ability to redistribute site traffic to less congested intersections during these times;

- Traffic generation during on-street peak periods will be up to 18 vehicles per hour and 12 vehicles per hour during the morning and afternoon peak periods, respectively. These are moderate increases in traffic and are not considered to warrant improvements to the surrounding road deficiencies;

- A total of 44 parking spaces will be provided on-site for use by staff and visitors. This provides an allowance for some spare capacity to accommodate overflow parking that may occur during shift changeover periods; and

- The access and internal design are considered supportable 'in principle' subject to the comments above and subsequent construction design.

It is therefore concluded that the proposed RIRP is supportable on traffic planning grounds and will operate satisfactorily.

7.9 SOCIO-ECONOMICS

Elton Consulting were commissioned to undertake a Social Impact assessment for the proposed RIRP. The study is presented in Technical Report No 10. This section presents the findings of that report.

7.9.1 Social Impact Assessment

Community Profile

The proposed RIRP site is located within the Census Collection District (CCD) 1331310, an area generally bounded by Parramatta River, in the north, Duck River and Duck Creek to the south and James Ruse Drive to the west. A small area of this CCD lies west of James Ruse Drive, between Weston, Alfred, Oak, Arthur and Hassall Streets.

In 2001, the site was located within the suburb of Rosehill, which had an area equivalent to the CCD 1331310. However, between 2001 and the 2006 census, Rosehill and Harris Park suburbs were combined to form the current suburb of Harris Park.

Key features of this local (CCD 1331310) area in 2006 were:

- Population decline - In 2006, the population of this CCD was 271 people. This represents a decrease of around 10% from its population of 300 in 2001, and compares with a 5% decline for the suburb of Harris Park and an increase of 2.7% for Parramatta. Almost 55% of the population was male;

- Relatively younger population – The CCD has very few young children, but a relatively large proportion of its population was aged between 5 and 24 years (34.5%). The median age (30 years) was young compared with the LGA and Sydney as a whole, and had declined markedly from 35 years in 2001. While the median age for Harris Park is identical, the suburb is characterised by relatively few older residents and a very high proportion of residents aged 20-34 years (38%);

- Ethnically diverse - In 2006, 35% of the CD 1331310 population was born overseas. Although this proportion has increased since 2001, there are fewer immigrants here than in the suburb or the LGA. Many of the immigrants came from Lebanon and India. Of those who spoke a language other than English at home, Arabic is the dominant foreign language, spoken by almost 18% of residents. In Harris Park, immigrants accounted for almost 58% of residents, with India being the most common country of birth (19.5%). Languages other than English spoken at home in Harris Park included Arabic and Indian languages;

- Family households - Of 88 occupied private dwellings, 64% were family households, 26% were lone person households and 6% were group households. Although families have increased as a proportion of households since 2001, the actual number of families has remained stable. This is explained by a large (30%) decline in the number of dwellings (from 125 to 88). By contrast, Harris Park has a smaller proportion of family households (55%) than both Parramatta LGA and Sydney (67-68%);

- Relatively more families with children – Families living in the CCD are more likely to have children (55%) than those in Harris Park, Parramatta or Sydney (43049%). There are also relatively fewer single parent families (12%) than the comparison areas (16-17%);

- Moderate income levels - Individual incomes have remained unchanged for residents of the local area between 2001 and 2006 but household incomes have increased substantially. This would indicate an increase in working adults within households. Individual and household incomes are higher on average than for Harris Park, but consistent with Sydney SD.

- A range of occupations - The most common occupations for local residents are Community and Personal Service Workers (14%), Machinery Operators and Drivers (14%), Professionals (14%), Technicians and Trades Workers (13%) and Managers (13%). The most common industries residents are employed in are Horse and Dog Racing (7%), Supermarket and Grocery Stores (6%) and School Education (5%). The distribution of occupations and industries differs from that of Harris Park, where the most common occupations are Professionals (20%), Clerical and Administrative Workers (16%), Labourers (13%), Technicians and Trades Workers (13%) and the most common industry being Cafes, Restaurants and Takeaway Food Services (6%); This demonstrates a strong reliance on the local economy with many residents employed in local facilities such as the racing industry;

- Relatively high employment and low unemployment rates - Residents of the immediate area have very low rates of unemployment (2%) compared with those of Harris Park (9%) and the LGA (7%). A relatively high proportion of the population is employed full-time (64%) and in part-time positions (27%) than for comparable areas;

- Primarily detached dwellings - Of 88 occupied private dwellings, almost 90% were detached houses and 7% were apartments. This is a very different dwelling mix than that found in Harris Park, where only 18% of dwellings are detached;

- Relatively high levels of household ownership – Almost one third of dwellings are fully owned in CCD 1331310, which is a higher rate of ownership than all other comparison areas. However, only a relatively small proportion of dwellings (17%) are in the process of being purchased. Rental rates are consistent with Sydney averages. The large proportion of dwellings classified as 'Rented other/not stated' includes some dwellings being rented from a relative or other person, and small number rented from 'Employer-government (such as Defence Housing Australia) or other private employer. Housing tenure in this local area is very different to Harris Park, where more than 40% of dwellings are rented in the private

market and only 14% are fully owned. Across Parramatta and Sydney, the typical tenure pattern is equal proportions of dwellings that are fully owned and being purchased (around 28% to 31%) and around 20% to 23% rented privately; and

- Relatively large households - The average household size in CCD 1331310 is 2.8, which is slightly higher than that the Parramatta and Sydney averages of 2.7, but significantly higher than the Harris Park average of 2.5 persons per household.

Community Facilities

The suburbs of Camellia, Harris Park, Parramatta and Rydalmere (to the north) contain many important community facilities which serve local residents and the wider region. Technical Report No 10 provides further detail. In summary:

- The site is adjacent to Camellia station, on CityRail's Carlingford train line. Most services on this line operate as a Clyde-Carlingford shuttle. One service in the morning peak hour continues to Central; another service in the very early morning operates Lidcombe-Carlingford. For all other trains, a change of trains is needed at Clyde station. On race days at Rosehill racecourse, additional services operate to the Sandown line platform at Rosehill station. Proposals for the Chatswood to Parramatta Rail Link have included plans for Camellia station to be replaced or relocated;

- The site is located approximately 800m from Rosehill Public School, across James Ruse Drive to the west. Rosehill Infants' School is part of this school. Within Harris Park, there are another three schools, including St Oliver's School, The Australian International Performing High School and Our Lady of Lebanon College. These are located at a distance of about one kilometre or more from the proposed development site;

- There a numerous child care centres within a one kilometre radius of the site. The closest child care centre, Explore and Develop, is located immediately adjacent to the site, within the Tilrox/Aldi Building. Rosehill Child Care is located about 400 metres west of the site, at 103 Hassall Street, at the intersection of Arthur Street. Many others are located in Harris Park, between James Ruse Drive and the Parramatta CBD;

- The University of Western Sydney, Parramatta campus is located north of the site across the Parramatta River. Enrolments at this campus have been growing steadily and its 13,000 students make up more than one third of all students attending UWS;

- Two aged care facilities are located in the vicinity of the Camellia site: including Our Lady of Lebanon Hostel for Aged Persons (Alfred Street, Parramatta) and Kaloola Nursing Home (Good Street, Rosehill); and

- The local area is home to several important recreational areas, with the largest and best-known being Rosehill Racecourse. Others in the vicinity of the site include Rosehill Bowling Club, Parramatta Granville Sportsground, Code Red Laser Tag and Parramatta Workers' Club. Areas of open space nearby include James Ruse Reserve, Robin Thomas Reserve and Ranglihouse Reserve. Both the Racecourse and the Raceway are regional level facilities which attract large crowds, mainly on weekends.

Technical Report No 10 provides further detail on medical and cultural facilities.

Residential Areas

Although the proposed RIRP site is located within an area of heavy industry, there are several residential dwellings located nearby. The nearest residential dwellings to the proposed site are:

- Directly to the west, along Arthur Street, between Grand Avenue North and Hassall Street and further south to Oak Street;

- South west along Oak Street, between Arthur Street and James Ruse Drive;

- South west along James Ruse Drive between Oak Street and Hope Street; and

- North west, along Thomas Street.

Impact Assessment

As part of preparation of the assessment Elton Consulting undertook discussions with a member of Parramatta City Council's Social Outcomes team in relation to potential social impacts and concerns associated with the proposed RIRP. Key issues raised included:

- Health impacts for employees;

- Accessibility to the site, parking for employees, and the availability of public transport, in what is already a congested area;

- Potential impacts on local schools and child care centres in the Rose Hill area. Council noted the presence of two local schools (Rose Hill Primary School and Our Lady of Lebanon), two child care centres and a community garden in Jordan Street, Rose Hill. Many residents in Rose Hill were said to utilise community services provided in Harris Park.

- Potential impacts of this proposal on the University of Western Sydney; and

- Potential impacts on a recently announced plan by Parramatta City Council to upgrade of the Rydalmere Industrial Precinct, immediately to the north of the site, across the Parramatta River. Council minutes dated 7 December 2010 note that Council will undertake work, including strategic and planning studies, to identify the economic future of Rydalmere Industrial Estate.

The implications of this advice were included in the impact assessment (refer Technical Report No 10).

The key social impacts arising from this proposal can be conceptualised as being broadly divided into two categories:

- Those affecting stakeholders and activities occurring in the immediate area of the site; and

- Those affecting stakeholders across a wider area including Parramatta and the Sydney Metropolitan area.

The nature of social impacts arising from the proposal are likely to be quite different for each of these two groups. Local stakeholders have the potential to experience directly a range of mainly adverse social impacts. At the same time, significant benefits are likely to occur across the wider community, business and industrial operators, and government agencies operating across Sydney. Overall, benefits of the proposal are considered to be:

- Contribution towards an increased capacity for best-practice municipal and commercial waste management and recycling;

- Direct support for Federal and NSW State sustainability, waste management and recycling objectives and for local government land use and planning policies;

- Productive use of a strategically located industrial site;
- Support for existing markets for organic and recyclable waste, and for products made from the recycled material and fostering of new markets; and
- Direct and indirect employment opportunities.

However, the proposal also raises a number of potential social impact issues which may be of concern to the local community or others in the wider area. These include:

- Impacts on existing commercial activities (including sensitive uses), adjacent to this major new industrial facility;
- Additional heavy vehicle traffic has the potential for worsen existing traffic congestion, contribute to traffic noise, and conflicts with vehicles and pedestrians in the immediate locality;
- Other potential environmental impacts including operational noise and odours impacts;
- Potential for contamination;
- Access and parking impacts for adjacent property users, including Camellia Station; and
- Construction impacts.

Although located in an area which has historically been devoted to heavy industry and which remains appropriately zoned for this use, the proposal has the potential to impact, directly and indirectly, on several adjacent uses. The main potential impacts would be to the tenants of surrounding properties, including the Tilrox/Aldi building and commuters accessing the railway station. Other businesses using Grand Avenue on a regular basis would also experience some impacts from the development.

The Tilrox/Aldi building is a commercial development adjacent to the southern boundary of the site. Tenants include the Café Grand, Explore and Develop child care centre, an Aldi store, a training academy, a call centre for the Transfield engineering company, Invocare, and offices for the Tilrox development company. During community consultations, issues and concerns were expressed about the potential for impacts from the site, such as odour, contamination and noise, to disrupt existing activities. There was also concern about whether the proposed operation would create hazards or risks to workers at this property.

One of the greatest concerns expressed throughout the consultations was the proximity of the proposed RIRP to the child care centre, with the potential for noise disturbance, health impacts for child care workers and the children, and ultimately on its ongoing operational viability.

One suggestion raised during community consultations was that the introduction of the proposed development could adversely impact on property values in nearby areas. As the site is located within a large heavy industrial area and will have little or no impact on activities outside its boundaries, it is considered unlikely to be any impact on the value of properties in the general area. It is possible that there could be an impact on the value of the commercial property adjacent to the site. However, it is equally possible that this new use could generate income for the building owner through new customers for the café, supermarket and other tenants.

The presence of this large industrial area would already be factored into housing prices in the vicinity. In addition, the proposed site is considered too distant from residential properties for the proposal to have any direct effect on residential property values.

Potential social impacts would accrue mainly to local tenants, commuters and visitors to the immediate area:

- Concerns about risks to amenity and community health from operation of the processes such as odours, noise, traffic, contamination;
- Additional traffic delays due to heavy vehicles and staff accessing the site;
- Potential for pedestrian, vehicle and train conflicts in Grand Avenue North; and
- Construction impacts.

In order to address the social impacts identified, a number of specific actions have been incorporated into the development and included in the draft Statement of Commitments.

Conclusion and Recommendations

Based upon demographic analysis, strategic planning documents and consultation undertaken with Parramatta City Council, the study examined a variety of social factors associated with the proposed construction and operation of the proposed RIRP at Camellia. The development is expected to generate a number of positive benefits for the local community and wider inner west area. These include:

- Support for commercial and municipal recycling and waste management;
- Consistency with planning and sustainability policies across all levels of government;
- Support for markets for waste and recycled waste products; and
- Direct and indirect employment benefits.

Key social issues that may adversely impact on the surrounding area include:

- Concerns about risks from operation of the processes such as odours, noise, traffic and contamination;
- Additional traffic delays due to heavy vehicles and staff accessing the site;
- Potential for pedestrian, vehicle and train conflicts in Grand Avenue North;
- Community health; and
- Construction impacts.

These concerns and potentially conflicting uses are important considerations in assessing both the real and the perceived impacts from the proposal. As a result, environmental analyses have been undertaken and the process carefully designed to ensure impacts are limited, as far as possible, to within the buildings or the site boundaries. The facility has been designed to limit risks of environmental impacts such as noise and odour extending beyond the site boundary. It was recommended that:

- An on-going community liaison group be established to encourage open dialogue with potentially affected local stakeholders, provide a channel through which concerns can be voiced directly and facilitate the integration and acceptance of this development into the local area;

- Procedures should be developed to monitor and report on odour and other impacts, in the event of emissions occurring;

- Traffic generated by this development be considered in any studies undertaken by the RTA for this industrial area;

- Employees of the site be required to park on-site;

- Drivers of heavy vehicles and others accessing the site be trained or receive specific briefings to avoid conflicts with pedestrians, other drivers and rail carriages; and

- The Construction Management Plan for the project note the potential risks of social impact identified in this report and include a consultation plan and company contact details, so that local concerns can be raised if necessary.

7.9.2 Economic Impact Assessment

Strategic Economic Solutions has undertaken an economic impact assessment study for the proposed RIRP. The study is presented in Technical Report No 9.

This section presents the findings of the report.

Parramatta Economic Context

Parramatta City is situated about 24 kilometres from the Sydney GPO, in Sydney's western suburbs. It is bounded by Baulkham Hills Shire and Hornsby Shire in the north, the City of Ryde in the east, the Auburn Council area, Bankstown City and Fairfield City in the south and Holroyd City and Blacktown City in the west.

Parramatta City's estimated resident population was 162,000 at 30 June 2008, an increase of 2.5% on the year before. The population has grown over the past decade since 1996 when the estimated number was 143,021. Almost two-thirds (63%) of Parramatta City's people are in the 20–64 year age group. Young people (0–19 years) make up 25% of the population, while around 12% are aged 65 or over. Just over half (52%) are known to be Australia-born, 40% born overseas, and almost 1% (1,218) are Indigenous.

Compared to the Sydney Statistical Division, in Parramatta City (2006) there are larger proportions of people born overseas as well as from non-English speaking backgrounds. Of those born in other countries: China, India and Lebanon are the most common birthplaces of people now living in Parramatta City. The city has a growing population, low unemployment and a skilled workforce, expected to grow from 86,000 by 30,000 over the next quarter century across a range of industry sectors. By 2051, the State Government estimates that the Parramatta CBD will host up to 100,000 jobs.

Parramatta is emerging as one of Sydney's most significant employment destinations, its accessibility being a key asset. The City is the financial and business centre of Western Sydney and home to some of Australia's biggest corporations and government agencies. 92,000 people work in the Parramatta LGA with 35,000 employed in the CBD alone. Within Parramatta, the three largest employing industries are:

- Health and community services;

- Manufacturing; and

- Property and business services.

Other sectors that employ large numbers of people in Parramatta are: retail trade; finance insurance & business services; wholesale trade; and Government administration & defence. Major employers include: AGC Finance, Boral, Burns Philp, Clyde Industries, Coca Cola Amatil, Collex, Department of Fair Trading, Freightcorp, Hunter Douglas, Merck Sharp and Dohme, NSW Police Service, the Office of State Revenue, Parramatta Leagues Club, Revlon, Seatons, Shell, Australian Turf Club, University of Western Sydney, Westbus, Westfield Shoppingtown and Westmead Hospital.

Parramatta is expected to consolidate its role as a regional service centre, with jobs growth forecasts particularly strong in the retail sector. After Sydney and Melbourne, Parramatta City has Australia's third largest regional economy. Its economic output (gross regional product or GRP) in 2006-07 was estimated at $11.1 billion, representing a growth 6.0% the previous period, matching overall State growth rate of 6.2% (BizFacts).

Parramatta's largest industry is finance and insurance (at $1.84 billion accounting for 16.5% of GRP), followed by manufacturing $1.45 billion (or 12.9%) and property and business with $1.41 billion (or 12.6%).

As Sydney's second CBD, Parramatta's economy is evolving and growing, becoming increasingly complex and diverse.

The State Government's vision statement for the City focuses on developing economic diversity and prosperity:

> *Parramatta City's productive and strong economy will continue to provide diverse employment and business opportunities, and harness local skills and talent. The City will be attractive to investors and young people and complement the CBD's role within the Sydney metropolitan region.*
>
> *The expected growth in population, workforce and local jobs provides a dynamic focus to the city's economic development. The look and feel of the City will continue to change over the next 25 years as more medium and high density residential apartments are built and occupied, and as the scale of CBD employment grows. The $1.4 billion Civic Place development of three hectares in the heart of the city, is described as one of the largest urban revitalisation projects in NSW this century.*

The labour force in Parramatta shows a diverse mix covering high skilled and managerial occupations, alongside trade and lower skilled workers. Parramatta's labour force is thus well-suited to a value-adding operation such as the proposed RIRP, which requires a diversity of skilled and non-skilled labour.

Construction Impacts

The value of construction the proposed RIRP is expected to be around $21million. Using an averaged multiplier for construction of 1.81 (ie every dollar of construction output requires another 81c of output from other parts of the economy), the total value of the development, including flow-on effects will be in the order of $38million.

Operational Impacts

The facility is to be open for waste delivery 24 hours per day and 7 days per week year round, with the main activity levels during the first (morning) shift (40 staff), mid level operations during the second (afternoon) shift (20 staff), and a small number of workers (5 staff) on during the night shift. The wages provided directly by the proposed facility are expected to total over $2.2 million per annum – with over one-third to be paid to skilled full-time staff. If it is assumed that 60% of these

wages will be spent on goods and services in Parramatta, then the facility would inject another $1.3 million into the city's economy through its staff. With a retail multiplier of 1.9 estimated by the ABS (Cat 5209.0) then this additional expenditure will induce another $1.2 million in flow on retail activity, equivalent to around three more local jobs supported in retail.

There are no competing operations in the region that replicate the processing of the organic fraction from C&I and source separated green and food waste collections. The CIRRF is expected to require an average 46 delivery trucks per 24 hours, while the SSORRF is expected to require 18 truck deliveries per 24hours. Outbound, the two activities are expected to require 28 truck movements every 24hours. The annual value of these contracted deliveries and dispatches is expected to be in order of $ 1.1 million, and much of this can be expected to go to local transport companies. With a multiplier of 1.84 the total impact of the transport contracts is expected to be over $2 million directly to transport businesses and indirectly to the enterprises that supply goods and services to these businesses.

The operation of the proposed RIRP is expected to also require over $0.5 million of expenditure on other services including, for example, security, electrical repairs, plant and equipment, and general repairs and maintenance. With an average multiplier across these service industries of 1.54 the total impact of these contracts is expected to be over $790,000 per annum. The main direct and indirect economic impacts of the proposed RIRP are summarised in Table 7.19

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Table 7.19
Economic Impacts

	Jobs	Value of business $pa	Flow on $pa
Construction	47	21m	16.8m
Site Operations	65		
Wages		2.2m	1.2m
Transport		1.1m	0.92m
Other contractors		0.5m	0.28m

The proposed RIRP would also add to existing waste related enterprises based in Parramatta to provide the nucleus of a potential waste management or recycling cluster in the City. Such a cluster would be of benefit to the City in handling its own waste, as well as being of benefit across Sydney of it were able to continue to offer innovative approaches to waste management and recycling.

7.10 HERITAGE

7.10.1 Background

An *Aboriginal Archaeological and Non-Aboriginal Cultural Heritage Impact Assessment* has been prepared by Dominic Steele Consulting Archaeology (DSCA). A copy of the report is presented in Technical Report No 11. This section provides a summary of the findings of the report. The objectives of the assessment were:

- Aboriginal Consultation
    - To initiate consultation with the local Aboriginal community with regards to the proposed RIRP of the subject land; and
    - To incorporate the views, possible concerns, and management recommendations provided by the local Aboriginal community.

- Background Research and Assessment

    - To undertake background research into the location and nature of any previously recorded Aboriginal archaeological sites (and/or areas of potential Aboriginal cultural heritage sensitivity) known to be present either within the boundaries of the study area or in immediately adjacent areas;
    - To provide on the basis of the Aboriginal archaeological and cultural heritage review, a predictive model outlining the potential Aboriginal archaeological sensitivity of the site and an evaluation of the possibility for as yet any unrecorded Aboriginal archaeological sites (and/or areas of likely sensitivity) to occur within the study area; and
    - To undertake a search of relevant national, state and local government heritage registers and listings into the location (and nature) of any previously recorded European archaeological sites or items that may be present within the boundaries of the study area.

- Site Inspection and Evaluation

    - To outline the rationale and methods to be employed during the site inspection(s) and recording of the study area; and
    - To provide a summary of the observations recorded during the site inspection(s), and an evaluation of the results of the fieldwork.

- Analysis, Evaluation and Report

    - To prepare a combined *Aboriginal and non-Aboriginal Archaeological Cultural Heritage Impact Assessment* that includes the outcomes of consultation undertaken with the local Aboriginal community, an evaluation of the results of the site inspection(s), and a discussion of the Aboriginal and European archaeological and cultural heritage management conclusions that have been developed to guide the development proposal; and

    - To provide appropriate Aboriginal and European cultural heritage management options and recommendations directed to establish a suitable framework for the ongoing protection (and/mitigation measures) of any documented and/or potential Aboriginal and European archaeological sites (or areas of potential cultural heritage sensitivity) that may be identified relative to the current 1 Grand Avenue development proposal.

Aboriginal Community Consultation

The *NSW Aboriginal Land Rights Act 1983*, administered by Aboriginal Affairs NSW, established the NSW Aboriginal Land Council (NSWALC) and Local Aboriginal Land Council's (LALCs). The Act requires these bodies to:

- Take action to protect the culture and heritage of Aboriginal person's in the Local Aboriginal Land Council's area, subject to any other law; and

- To promote awareness in the community of the culture and heritage of Aboriginal persons in the Local Aboriginal Land Council's area.

The proposed RIRP falls within the administrative boundaries of the Deerubbin Local Aboriginal Land Council (DLALC). A number of additional western Sydney Aboriginal community organisations also claim traditional and historical links within the greater Sydney landscape of which the Camellia site forms a part.

Currently, at-least five other Aboriginal community organisations (excluding the DLALC) are generally consulted with where Aboriginal heritage issues form a part of development applications and/or are contingent with notable land-use modification circumstances in the Parramatta City Council LGA. These organisations comprise the following:

- The Darug Custodian Aboriginal Corporation (DCAC);
- The Darug Tribal Aboriginal Corporation (DTAC);
- The Darug Aboriginal Cultural Heritage Assessments (DACHA);
- Darug Land Observations (DLO); and
- Yarrawalk (a division of Tocomwall Pty Ltd).

The OEH have produced a series of documents that have been progressively developed since 2005 to guide best-practice Aboriginal cultural heritage management approaches, protocols, and procedures in development circumstances comparable to the current development project. The current guidelines are *Aboriginal Cultural Heritage Consultation Requirements for Proponents. Part 6 National Parks and Wildlife Act 1974, 2010.* This document supersedes all previous guidelines and requires the need to extend the opportunity for any Aboriginal individual or group to express an interest in being involved in the assessment process and to have due input in decision making where OEH s.87/s.90 Permits are likely to be required. The OEH guidelines suggest this outcome would be best facilitated through public advertisement.

The current requirements also indicate it would be sufficient for development proponent to provide written notification to the organisations listed below at the preliminary phase of development planning process:

- The relevant OEH Environmental Protection and Regulatory Group – (EPRG);
- The relevant Local Aboriginal Land Council (s);
- The Registrar, *Aboriginal Land Rights Act 1983*, for a list of Aboriginal owners;
- The National Native Title Tribunal for a list of registered native title claimants, native title holders and registered Indigenous Land Use Agreements;
- The Native Title Services Corporation Limited (NTSCORP Limited); and
- The relevant Local Council(s).

In accordance with these requirements (and the DoPI DGR's), DSCA contacted the organisations listed above (in correspondence forwarded from DSCA dated 26 July 2010) and the nature and scope of the project was discussed. Available site plans and other pertinent background information were also forwarded to each of these organisations at that time.

The DECCW (now OEH) provided advice (dated 3 August 2010) regarding other possible Aboriginal community groups and individuals that may wish to express an interest in the project.

The *Office of the Registrar* subsequently provided advice for the project (dated 5 August 2010). A search of the *Register of Aboriginal Owners* relative to the subject site indicates the study area does not have any registered Aboriginal owners pursuant to Division 3 of the *Aboriginal Land Rights Act 1983* documented at this time.

A public notification for the project was placed with the *Koori Mail* on 3 August 2010. All responses from this public notification (seeking request for registration of interest in the project and input into the assessment process) were duly logged as per OEH requirements.

The responses received following the public notice comprised the following:

- Ms Leanne Watson – Chairperson - Darug Custodian Aboriginal Corporation (via mail dated 17 August 2010);
- Mr John Reilly – Sites Officer – Darug Tribal Aboriginal Corporation (via phone message dated 18 August 2010); and
- Mr Scott Franks – Manager – Yarrawalk – (via email dated 7 September 2010).

No additional responses were received by DSCA from any other organisations that were formally informed about the proposal as a result of the DSCA July 2010 correspondence and the subsequent August 2010 public notification.

A preliminary archaeological (scientific) inspection of the 1 Grand Avenue site was undertaken by DSCA (represented by Mr Dominic Steele and Mr Adrian Dreyer) on 23 July 2010. This site visit was carried out in order to:

- 'Ground-truth' the nature and context of the site and its immediate surrounds; and
- To compile an initial photographic record documenting the current condition of the site to assist in the development of an archaeological assessment of the place.

Two drafts of the report were forwarded to each of the above six Aboriginal community organisations for review and comment on the 14th of September and the 6th of October 2010 respectively.

Each group was invited to inspect the site independently and provide a *Cultural Heritage Statement* regarding their respective views on the results of the archaeological (scientific) conclusions and management recommendations that are documented here.

7.10.2 Aboriginal Cultural Heritage Context

Ongoing archaeological research has yielded considerable evidence concerning the nature of Aboriginal use and occupation of the greater Cumberland Plain in general, and within the *Parramatta City* LGA and its immediate surrounds in particular. The most common sites in the local landscape consist of open campsites and isolated finds, followed by far fewer scarred tree recordings.

Research into Aboriginal archaeological and cultural heritage investigations previously completed within the local landscape immediately surrounding the 1 Grand Avenue site was undertaken prior to the commencement of the current Aboriginal community consultation program, preliminary site inspection and assessment project.

This included a search of the *NSW Aboriginal Heritage Information Management System* (AHIMS) *Aboriginal Sites Register* maintained by the OEH, a review of reports compiled within the *OEH Catalogue of Reports* and an evaluation of other secondary sources.

Background research undertaken for the current study indicates that no Aboriginal archaeological sites (or any specific areas of potential Aboriginal cultural heritage sensitivity) have been previously registered with the *OEH AHIMS Site Register* to occur within the boundaries of the site.

An Aboriginal archaeological and cultural heritage predictive model for the site was prepared prior to the commencement of the site inspection and assessment program. Based upon information compiled within the *OEH AHIMS Sites Register*, and the background data for local Aboriginal archaeological contexts reviewed above, the types of sites/evidence that were expected to potentially occur/survive within (beneath) the site were:

- Sedimentological and environmental evidence such as pollen;
- Flaked and possibly ground stone artefacts;
- Possible midden materials including animal bones and shells;
- Possible features such as hearths; and
- Possible human burials.

7.10.3 European Archaeological and Cultural Heritage Context

A search of relevant heritage registers and listings into the location and nature of any previously recorded European archaeological sites or items that potentially may be present within the boundaries of the site and its immediate surrounds was undertaken at the initiation of the current study. This was supported by a background review of the nature of the known European settlement and development of the subject site and the surrounding local Camellia landscape. This research revealed that no European archaeological heritage sites or items of possible sensitivity were identified to be present within the proposed RIRP re-development footprint.

It appears that prior to the purchase of the land by the *James Hardie Company* in 1916 and subsequent industrial operations that commenced from 1917 that the site was used primarily for agricultural purposes.

Eleanor Magee and her infant child drowned in Parramatta River in 1793 and their grave is one of the oldest and undisturbed in Australia. The grave site is located within a reserve adjacent to the bank of Parramatta River and the Clyde-Carlingford Railway Line, currently fenced-off from public access. Situated to the north-west of the proposed 1 Grand Avenue RIRP re-development footprint and located within a small cluster of trees (GML 2000), the grave remains intact and will not be affected by the RIRP proposal. The grave appears to have been created within the vicinity of 'Magee's hut', although the exact location of this hut is unknown.

The types of European archaeological evidence that may be exposed by future site works potentially include the following:

- Evidence for modifications to the original soil profiles and topography of the locality that occurred at different times during the historic period. These possible evidences will be buried below considerable depths of various surface caps and underlying fill materials and are unlikely to be exposed by the depth of excavation required for the RIRP proposal;

- Archaeological features and deposits associated with activities or structures not identified in the available historical documentation related to the earliest (and subsequent) periods of European visitation and use of the locality dating from c.1788 to c.1916. This evidence may include building remains (such as footings etc) and refuse dumps/dispersed artefact scatters associated with former agricultural use(s) of the site;

- Traces of some of these types of potential archaeological features and deposits associated with such historical uses are likely to be ephemeral, if not largely invisible in the archaeological record to begin with, and are likely to have been further obscured as a result of ongoing impacts associated subsequent use and development of the site; and

- Subsurface industrial features sealed below the current surface slabs and capping fills associated with the use and development of the former JHI site from c.1916 to 1996. It is unlikely that significant basement-level features (previously un-recorded historically) will be exposed by future site works.

7.10.4 Assessment

Aboriginal Archaeological & Cultural Heritage Impact Statement

The background Aboriginal archaeological and cultural heritage research, site inspection, analysis and assessment of the site indicate that:

- No previously documented Aboriginal archaeological sites or 'objects' were known to occur within the boundaries of the subject site. However, the entire proposed RIRP re-development footprint is currently covered by hard surfaces and no natural soil profiles are presently visible;

- It is unclear at present whether deposits associated with the 'Parramatta Sand Sheet' either occur or survive beneath the currently sealed footprint of the subject site. A number of significant Aboriginal archaeological sites have been identified to occur in association with this geomorphic formation some 1.8km to the west of the site in recent years (refer Technical Report No 11); and

- Due to the considerable alterations to the pre-Contact landscape of the site that followed the initial occupation and subsequent industrial development and use of the former JH site between c.1916 to 1996, and the limited scope of subsurface impacts associated with the RIRP proposal, it is expected that any as yet undetected evidence for past Aboriginal visitation and use of the site that may be exposed by future works will consist of materials most likely encountered in largely disturbed recovery contexts.

It was concluded that in terms of Aboriginal archaeological heritage, the study area appears to be potentially of relatively low sensitivity due to previous historic uses and disturbances with the likelihood that future works will extend to minimal depths below the current capping surfaces that seal the site.

In terms of the site comprising an area of potential historical '*Aboriginal association'* available documentary records indicate that areas in and around Camellia were the focus of post-Contact visitation and use by Aboriginal people, particularly during the Macquarie period. This use of the local landscape appears to have continued up to the mid 1830s at which time the available historical records become largely silent. Whether any tangible (physical) archaeological evidence documenting this period of Aboriginal history is present and/or survive within the RIRP footprint is unknown. Recognition however of the importance this area of the Camellia Peninsula may have played in the lives of the traditional Aboriginal owners is acknowledged.

It is concluded that the proposed RIRP is unlikely to have a significant adverse impact upon the Aboriginal archaeological heritage values of the place and that no clear or obvious Aboriginal archaeological constraints are apparent.

European Archaeological & Cultural Heritage Impact Statement

The background European archaeological and cultural heritage research, site inspection, analysis and assessment of the site indicate that:

- No previously documented European archaeological sites, features or deposits relative to the historically recorded use and occupation of the proposed RIRP site have been identified;

- The site is listed on the Parramatta 1996 LEP in respect to the proximity of the historic grave of Eleanor Magee and child that dates to c.1793. The grave location and its curtilage will not be affected by the proposed RIRP;

- No additional areas of potential European archaeological heritage sensitivity have been identified in any other areas of the proposed RIRP site during the course of the research, site inspection, and assessment program documented here; and

- The potential for as yet undocumented European archaeological features or deposits of significance to be present on the property relative to the scale of works associated with the RIRP proposal is assessed to be low.

It is concluded that the proposed RIRP is unlikely to have a significant adverse impact upon the non-Aboriginal archaeological heritage values of the place and that no identified constraints are apparent for the proposal proceeding as planned.

7.10.5 Management Recommendations

It is assessed that the proposed RIRP is unlikely to have an adverse impact upon the Aboriginal and European archaeological and cultural heritage values of the place. It was therefore concluded that there are no *significant* Aboriginal archaeological (scientific) or European heritage constraints for the proposal proceeding at this time subject to the consideration of the following conditions:

- Recognition of the legal requirements and automatic statutory protection provided to Aboriginal 'objects' and 'places' under the terms of the *National Parks and Wildlife Act 1974* (as amended 2010);

- Consideration of the views and advice that may be provided for the proposal by the Deerubbin Local Aboriginal Land Council, the Darug Tribal Aboriginal Corporation, the Darug Custodian Aboriginal Corporation, the Darug Aboriginal Cultural Heritage Assessments, the Darug land Observations, and Yarrawalk; and

- Recognition of the protection provisions of the *NSW Heritage Act 1977.*

It was consequently recommended that:

- Prior to the commencement of future works on the site, all planners and contractors involved should be made aware of the possibility that as yet undiscovered Aboriginal archaeological materials may exist within (beneath) the footprint of the proposed RIRP activity areas. This could be undertaken through a site induction notifying all involved of their obligations under the *National Parks and Wildlife Act 1974*;

- Prior to the commencement of future works on the site, all planners and contractors involved should be made aware of the possibility that as yet undiscovered European archaeological features and deposits may occur on the site and their obligations and responsibilities under the *NSW Heritage Act 1977*;

- In the (largely) unexpected circumstance that any Aboriginal or European objects are unearthed as a result of future works, it is recommended that activities should temporarily cease within the vicinity of the find locality, be relocated to other areas of the site, and the OEH be contacted to advise on the appropriate course of action to allow the identified item(s) in a timely fashion to be recorded/conserved to ensure works schedules are maintained and balanced with statutory heritage requirements; and

- Two copies of the study report should be forwarded to the groups identified in Technical Report No 11.

7.11 POTENTIAL HAZARDS

7.11.1 Hazard Assessment

A hazard is defined as a physical restriction with the potential for:

- Human injury;

- Damage to property;

- Damage to the environment; and

- A combination of these.

Hazards typically associated with waste handling and sorting include health hazards, safety hazards and fire hazards.

Fire Hazards

The risk of fire at the proposed RIRP is considered equivalent to that of any other well managed industrial development. The risk can come from spontaneous combustion of waste materials, an ignition source; such as a spark from machinery, from waste which is already ignited upon receipt at the RIRP, bushfires or from arson. Fires have the potential to damage equipment and site facilities, as well as posing the threat of spreading to neighbouring landholders. Fire management is incorporated in the RIRP building design with fire hydrants, hose reels and extinguishers located in accordance with the relevant regulations. The layout of fire hydrants and hose reeks is shown in Appendix F. The stormwater system has been designed to meet requirements in relation to retention of Fire Water (refer Figure 4.13).

Safety Hazards

Safety hazards in a waste handling and sorting facility are posed by truck movements, operating equipment and material stockpiles. These hazards typically result in personal injury but can also result in damage to equipment or the environment.

Impact Assessment

The operation of a waste handling and sorting facility inherently creates the potential for hazards. These hazards include exposure to biological organisms, unsafe work practices, agricultural pests, fire and electrical hazards. However, the proposed RIRP will operate in a manner aimed at minimising the risk associated with these hazards throughout all stages of the development in accordance with current REMONDIS practices.

Risk Assessment

SEPP No 33 requires a risk screening procedure to be conducted to determine if any industry is potentially hazardous or offensive under the SEPP. The SEPP applies to developments such as the proposed RIRP. If the proposed use is considered potentially hazardous or offensive then SEPP No 33 applies. The DoPI "Applying SEPP 33 Guidelines (Consultation Draft 2008)" provides a definition of hazardous and offensive industries and defines the types of development to which the policy applies. In addition to industry, the policy can apply to storage establishments. Appendix 3 of the Guidelines lists the industries which may fall within SEPP No 33. Waste disposal and/or management are not included in the indicative list provided as being potentially hazardous but are included in the list of potentially offensive industries.

A screening assessment has been undertaken in relation to hazardous materials stored at the proposed RIRP in accordance with the guidelines. The materials held on site are listed in Table 4.6. They comprise diesel (10 x 205 L drums) and grease (1 x 205 L drums). These quantities do not exceed the on-site storage thresholds for dangerous goods. In addition as a consequence of small quantities of hazardous materials that would be used and stored on site, there would be no more than one truck delivery per week which is well below the screening threshold of 60 vehicles per week. Consequently the development is not assessed as potentially hazardous using the screening thresholds for SEPP No 33 and the conduct of a preliminary hazard analysis is not required.

In addition, in order to determine if the proposed RIRP would be potentially offensive, an assessment has been made as to whether the proposed RIRP would emit a polluting discharge which would cause a significant level of offence. The environmental constraints described elsewhere in this Section indicate that there would be the potential to emit polluting discharges from the proposed RIRP in terms of water, air and noise emissions. The assessments described in Sections 7.2 and 7.3 show that the measures proposed to be incorporated in the operation and design of the Facility would ensure that there would not be polluted water discharges from the site. The assessment presented in Section 7.5 shows that dust and odour emissions would be at acceptable levels. Section 7.6 presents the results of noise modelling predictions for operations on the development site. The assessment undertaken concludes that the noise levels in areas adjacent to the site and within the local area will comply with the OEH goals at the nearest sensitive receivers. On this basis it is considered that the proposed RIRP is not potentially offensive having regard to the sensitivity of the receiving environment.

7.11.2 Rail Risk Assessment

Railcorp requested that a rail risk assessment be undertaken in relation to the proposed RIRP and the interface with the Camellia Level Crossing. The potential impact of the proposed REMONDIS operations on the safety of road and rail traffic movements at the Camellia Level Crossing location has been reviewed in accordance with procedures in the RailCorp Safety Management System (SMS). The risk assessment was undertaken by Minciv Management Services.

Background

The development is to be undertaken on land owned by Billbergia and leased to REMONDIS. Billbergia has previously applied for development approval for a container depot operation of up to 200 truck movements per day carrying empty shipping containers into and out of the site, principally between 7pm and 4am. This was intended as a temporary approval for a two year operation to store up to 2,000 empty containers from Port Botany on the site, and would have expired before the REMONDIS operation commences. However, the empty storage contract was not realised and the only Billbergia traffic during this period has been for remedial works and the storage of 30 to 40 containers on site.

The scope of risk assessment for this study is for the REMONDIS operation only, noting that Billbergia has committed to upgrade works in accordance with the conditions of the application for the 2,000 container operation. Proposed improvements to the site to assist in the safety of this crossing were nominated as follows:

- New sign to be installed by Parramatta City Council on the eastbound lane of Grand Avenue approaching the Grand Avenue North intersection warning motorists of the location of a rail level crossing on Grand Avenue North;

- New high visibility reflective line marking on Grand Avenue North either side of the level crossing in accordance with the latest version of RailCorp engineering standard ESC520.

- New line marking through RailCorp car park adjacent to Billbergia property fence for clearly designating a safe pedestrian access route from Camellia Station to the level crossing. This pedestrian crossing should be extended across the Aldi entrance gates to the footpath on Grand Avenue North;

- New lighting required either side of the level crossing with minimum lux levels to ensure good visibility at night of the level crossing itself and approaching trains, motor vehicles and pedestrians;

- Improvements will be required to the subgrades and road surface along Grand Avenue North and at the level crossing itself to allow for the substantial increase in proposed truck movements on this road;

- All new truck drivers appointed to deliver containers to/from this site are to be formally inducted including full safety briefing of their requirements in relation to negotiation of the Camellia Level Crossing; and

- Improve sight lines through the following measures:

    - RailCorp Metro West to clear local vegetation on either side of the freight line track within the rail corridor on the eastern side of the level crossing; and
    - RailCorp Property to consider signage preventing car parking on south-east side of the level crossing to improve visibility to both train drivers and truck drivers

The upgrading work will be undertaken by RailCorp (Renewals) and negotiations on costs and reimbursement are being undertaken.

Camellia Station, Car Parks and Level Crossing

Camellia Station is on the Carlingford Line and has a low commuter usage. Data in the RailCorp Compendium of CityRail Travel Statistics, 7th Edition, June 2010, ranks it 268 out of the 309 stations surveyed in 2009 by way of commuter barrier counts. Over a 24 hour period there were 40 commuters in and out. Actual figures are provided in Technical Report No 7.

The station also has a commuter car park that is located between the station and the Clyde - Sandown Line, and is accessed from Grand Avenue by driving over the level crossing on the Sandown Line. The commuter car park does not have formal car space markings. As a consequence, cars can park within the 'danger zone' ie 3m metres from the Sandown rail line adjacent the level crossing location. In its current condition it does not appear to comply with the standards nominated in the RailCorp Rail Station Commuter Car Parks, RailCorp Business Requirements, ver 7, Mar 09. There is car parking available either side of the rail line.

The public car park to the west of the level crossing is used by rail commuters and is delineated by fencing from a RailCorp works area to south. To north there is a fence on the Billbergia boundary. The rail corridor and level crossing runs through the interface of these two car parking areas. Thus access to the REMONDIS site will be via a public road that crosses the RailCorp Sandown Branch Line rail corridor. There is no boom or flashing lights across the level crossing, just a STOP sign to warn motorists. Locos have right of way, and as per the road rules the motorists should give way. In addition to road and rail traffic, some 200 pedestrians per day may walk through the public car park areas and cross the level crossing.

Rail Corridor and Operations

At present the Sandown Yard is unattended, and although the line is currently not being used, the accredited operators include Pacific National, Shell, Patrick Rail Services (Seaton's), RailCorp and other accredited operators who access the Yard as sub-contracted to RailCorp.

Previously freight trains travelled mainly between peaks during the day. However, these train operations ceased in June 2010, and Shell and Patricks (Seaton) are not using their sidings or facilities in the Sandown Yard at present. But, the line is not truncated and is used by the RailCorp RVX Track Recording Machine (self-propelled), that crosses the level crossing one (1x) per day at 10am.

The Level Crossing on the Clyde - Sandown Line is an at grade crossing providing vehicular access to Camellia station, commuter car park and vehicular access to the Billbergia site, as well as pedestrian access from Grand Avenue and the Tilrox/Aldi building to and from Camellia station. The commuter car park (western car park adjacent the station) is used by train commuters and persons working in or visiting the area. Rail traffic always has priority at level crossings and passive protection is applied to the road reserve.

Technical Report No 7 provides data on incidents since 2000 on the Sandown Branch Line from the RailCorp Incident Information Management System. No incidents occurred at the Camellia level crossing, which is the subject of this Risk Assessment.

Risk Analysis

A site review was held on 31 August 2010 with representatives from the NECS, Rail Corp Access and (separately) Parramatta Council. Following the risk workshop, a site inspection was also held with Billbergia and RailCorp (Renewals).

A risk workshop was held on 26 October, 2010. The participants identified hazards at the interfaces of people, road vehicles, trucks and trains, and reviewed the impact of additional truck movements from the proposed REMONDIS operation. Specific hazards and their causes of accidents at the level crossing are identified in the Hazard Log in Appendix A of Technical Report No 7.

The risk analysis was based upon hazards identified by Subject Matter Experts (SMEs) and stakeholders during the workshop at which a likelihood and consequence was assigned to each hazard. The risk levels were derived by applying the likelihood and consequence ratings in the RailCorp Level 2 Risk Matrix, and these have been included in the Hazard Log that is attached in Appendix A of Technical Report No 7. Additional measures were nominated to reduce risk levels and then an ALARP determination was made as to the justification of further measures and expenditure to reduce risks to tolerable and where possible broadly acceptable target levels.

The results substantiate the assessment and recommendations of an earlier study including proposed signage, line marking, road surface and lighting improvements. The study endorsed the previous conclusion:

- The rail level crossing does not require flashing lights and warning bells to safely manage the increase in road traffic; in addition, manual train driver operated push button barriers have also been discounted as they would cause delays to freight rail operations.

The scope of recommendations for upgrading the car park and level crossing include specific recommendations from the previous study and those developed in the current study, and comprise:

- Warning sign installed on the eastbound lane of Grand Avenue approaching the Grand Avenue North intersection alerting motorists of the crossing;
- High visibility reflective line marking on Grand Avenue North either side of the level crossing in accordance with RailCorp engineering standard ESC520;
- Line marking through eastern commuter car park designating a pedestrian access route from Camellia Station to the level crossing across the Tilrox/Aldi building entrance gates to the footpath on Grand Avenue North;
- Lighting either side of the level crossing to ensure good visibility at night;
- Upgrade subgrades and road surface along Grand Avenue North and through the level crossing;
- Induction and training of truck drivers on the site conditions; and
- Clearing vegetation on the eastern side of the crossing and installing signage to prevent car parking on south-east side of the crossing to improve visibility.

These recommendations are in line with the nominated safety targets and optimise:

- Sighting and visibility for motorists, truck and train drivers;
- Directional and warning signage for vehicles;
- Separation of pedestrians and road vehicles; and

- Minimise likelihood of unintentional and intentional (eg dangerous passing) vehicle driver errors using line and road markings.

Billbergia is currently meeting with RailCorp regarding the upgrading of the crossing in the rail corridor. A review is currently being undertaken by Parramatta City Council and Railcorp regarding a draft Interface Agreement for on-going management of the site. Billbergia has committed to all works being completed within 3 months of a project approval for the proposed RIRP.

7.12 GREENHOUSE GAS ASSESSMENT

A greenhouse gas assessment has been undertaken by PAE Holmes and is included in Technical Report No 4. This section presents the results of the assessment.

7.12.1 Australian Context

Australia and the Kyoto Protocol

The Kyoto Protocol is an international agreement under the United Nations Framework on Climate Change (UNFCC) that was agreed in 1997. As of October 2009 it has been ratified by 187 countries. Australia ratified the protocol in December 2007.

The aim of the Protocol is to reduce global greenhouse gas emissions by requiring developed countries to meet national targets for greenhouse gas emissions over the five year period from 2008 to 2012. Australia's annual target is 108% of the 1990 emissions.

Countries are required to take on a range of monitoring and reporting commitments, which are designed to ensure they remain on track to meet their obligations and to measure the overall success of the Protocol. Australia is in the process of developing a Carbon Pollution Reduction Scheme to ensure compliance with its Kyoto targets and successive international agreements to constrain greenhouse emissions.

National Greenhouse and Energy Reporting Act

The *National Greenhouse and Energy Reporting (NGER) Act 2007* was passed in September 2007. The *NGER Act* establishes a mandatory corporate reporting system for greenhouse gas emissions, energy consumption and production. The NGER scheme consolidates existing greenhouse reporting schemes.

The *NGER Act* is underpinned by a number of legislative instruments that provide greater detail about obligations, which in conjunction with *the NGER Act*, form the National Greenhouse and Energy Reporting System, as follows:

- The National Greenhouse and Energy Reporting Regulations 2008; and

- The National Greenhouse and Energy Reporting (Measurement) Determination 2008.

NGER is seen as an important first step in the establishment of a domestic emissions trading scheme. This intention is explicitly stated in the objectives for the NGER scheme, as follows:

- Establish a baseline of emissions for participants in a future Australian emissions trading scheme;
- Inform the Australian public;

- Meet international reporting obligations and

- Assist policy formulation of all Australian governments while avoiding duplication of similar reporting requirements.

Companies must register and report if they emit greenhouse emissions or produce/consume energy at or above the following trigger thresholds:

- If they own facilities that emit greater than 25kt greenhouse emissions (expressed as CO_2-e) or produce/ consume greater than 100 TJ of energy; and

- If the corporate group emits greater than 125kt of greenhouse emissions (expressed as CO_2-e) or produce/ consume greater than 500TJ of energy.

A project is required to report to the NGER system if it will emit greater than 25kt of greenhouse emissions. As such, the proposed RIRP would not be subject to the reporting under the system (refer Technical Report No 4).

7.12.2 Greenhouse Gas Emission Calculation

Emission Factors

Data provided in the National Greenhouse Accounts (NGA) Factors, published by the then Department of Climate Change (refer Technical Report No 4) were used. DCC defines three scopes (or emission categories):

- Scope 1 covers direct emissions from sources within the project boundary such as fuel combustion and manufacturing processes;

- Scope 2 covers indirect emissions from the consumption of purchased electricity, steam or heat produced by another organisation; and

- Scope 3 includes all other indirect emissions that are a consequence of the organisations activities but are not from sources owned or controlled by the organisations, for example, production of diesel fuel, off-site transport of the product, or staff travel etc.

For the purposes of this assessment, a full fuel cycle emission factor (that is the sum of Scope 1, Scope 2 and 3 emission factors, where applicable) has been used. Table 7.20 provides a summary of the emission factors used.

Table 7.20
Summary of Emission Factors for Greenhouse Gas Assessment

Type of Fuels and Electricity	Emission factor		Scope	Source
Diesel - Stationary	69.5	kg CO_2-e/GJ	1	Table 3 (**DCC, 2009a**)
	5.3	kg CO_2-e/GJ	3	Table 3 (**DCC, 2009a**)
Diesel - Transport	69.9	kg CO_2-e/GJ	3	Table 4 (**DCC, 2009a**)
Electricity	0.89	kg CO_2-e/kWh	2	Table 39 (**DCC, 2009a**)
	0.18	kg CO_2-e/kWh	3	Table 3 (**DCC, 2009a**)

Fuel and Electricity Usage

Table 7.21 presents a summary of annual diesel fuel and electricity usage. Hours of operation for the proposed RIRP are assumed to be 24 hours per day and 7 days per week all year.

Table 7.21
Summary of On-Site Diesel and Electricity Usage

Diesel Usage Per Year (Kl)	Electricity Usage Per Year (kWh)
315	1,500,000

The energy content of diesel was taken to be 38.6GJ/kL (refer Technical Report No 4).

Composting

Greenhouse gas emissions generated from the composting of waste materials have not been included in this assessment. If not used in the composting process, these waste materials would undergo natural decomposition and release equivalent greenhouse gas emissions. Well managed composting facilities replace the anaerobic conditions of landfilling with aerobic decomposition and can reduce greenhouse gas emissions. Therefore the composting process undertaken at this facility is not expected to contribute any additional greenhouse gas emissions as the waste would otherwise be landfilled.

The amount of organic waste sent to the composting facility per year is summarised in Table 7.22.

Table 7.22
Summary of Organic Waste Composted

Annual Mass of Wet Organic Waste	Amount (tonnes/year)
CIRRF facility (food and paper waste)	37,000
SSORRF facility	50,000

Source: REMONDIS

Other Scope 3 Emissions

Activities occurring at the proposed RIRP require inputs and outputs of materials delivered to the site. These inputs and outputs have been considered as part of the Scope 3 emissions generated for the site.

Materials delivered to the site will be sourced from various locations within the Sydney metropolitan area. As it is difficult to accurately determine the travel distances of the trucks, it was conservatively assumed an average return travel distance of 50 km when calculating the emissions generated. Truck numbers visiting the site per day are estimated at 92 trucks per day. The average fuel consumption of articulated trucks was taken as 54.6 litres per 100 km. The annual fuel usage to transport product is calculated to be 916,734 L/year.

Greenhouse Gas Emissions Results

Based on the fuel and electricity usage and amount of organic waste composted the annual CO_2-e emissions for the site are summarised in Table 7.23.

Table 7.23
Summary of Estimated CO_2-e Emissions (t CO_2-e/y)

	Scope 1	Scope 2	Scope 3	TOTAL (t CO2-e)
Diesel - Stationary	845	-	64	909
Electricity	-	1,335	270	1,605
Diesel – Transport	-	-	2,473	2,473
Composting	**15,635***	**-**	-	
Total	**845**	**1,335**	**2,808**	**4,987**

Note: some figures not exact due to rounding
* Based on the discussions presented in Technical Report No 4

On an annual basis it has been estimated that the proposed RIRP would release approximately 0.002 Mt/y of additional CO2-e (Scope 1 (excluding composting) and 2 emissions). The annual greenhouse emissions in NSW for 2008 were 164.7 Mt CO2-e (DCC, 2010). Therefore the facility represents approximately 0.001% of the total NSW greenhouse emissions.

Australia's total greenhouse gas emissions were estimated at 581.9 Mt CO2-e (refer Technical Report No 4). Comparing the annual emissions for the proposed facility, the predicted increase is approximately 0.0003% of the total Australian emissions in 2008.

7.13 CUMULATIVE IMPACT ASSESSMENT

Cumulative impacts can result from a number of different existing and proposed developments which have interacting local and/or regional impacts.

The site of the proposed RIRP is currently used for the temporary storage of shipping containers. As such it contributes to the cumulative impact of all activities in the local area chiefly in relation to road traffic but to some extent in relation to noise, visual impact and surface water drainage. It is not known if this use will continue on the portion of the site not occupied by the proposed RIRP and or how long this use may continue. On this basis the impacts have been assessed taking into account the impacts from this use.

On-going operations of commercial and industrial development will continue in the Camellia area to the south and east of the site and to the north on the opposite side of the Parramatta River. In this EA the impacts of the proposed RIRP have been assessed taking into account contributions from these operations. Where appropriate, the assessment identifies the presence and location of uses which may be sensitive to impacts resulting from construction and operation of the proposed RIRP and specifically assesses the impact on these areas.

The assessment undertaken and described previously in this section of the EA demonstrates that, with the exception of road traffic and visual aspects, all impacts will be contained within the property taking into account the level of existing environmental conditions. In relation to traffic the assessment found that the additional trucks would result in minimal change to intersection performance. There will be increased truck and other vehicle movements in and out of Grand Avenue North over the Sandown Branch Line which may impact on commuters and occupants and visitors to the Tilrox/Aldi building on Grand Avenue. Work and management measures recommended as a result of the Rail Risk Assessment would ameliorate current conflicts in this area and mitigate future impacts resulting from construction and operation of the proposed RIRP.

The visual assessment undertaken found that in the context of views of the site from adjacent locations, the industrial appearance of the proposed RIRP building will be mitigated by the maintenance of existing vegetation and tree and shrub plantings on site. This would be in contrast to the current appearance of the site which comprises areas of bare concrete and rubble, weeds and unmaintained vegetation and stacked storage containers.

There may be cumulative impacts in the future with local projects which are in various stages of planning. Three specific projects have been identified:

- Upgrade of Rosehill Racecourse as a result of the merger of the Australian Jockey Club and Sydney Turf Club;

- A proposal for an adjacent site on the other side of the Clyde-Carlingford Rail line for bulky goods, large floor plate retailing, a supermarket and other retail outlets (refer Appendix B, DoP Western Sydney Regional Team); and

- A proposal under investigation for an innovation and sustainability centre of excellence involving the University of Western Sydney in the Brodie Street precinct of the Rydalmere Industrial Estate.

The Rosehill Racecourse upgrade would involve internal construction to improve facilities and the construction of new access bridges over the railway line from and over James Ruse Drive. While these measures may result in improved local traffic conditions in the longer term there is the potential for cumulative impacts from heavy vehicle traffic during construction. Details of traffic volumes, timing and access are not available. However, it can be assumed that access would be off James Ruse Drive and Grand Avenue and that traffic impacts may be cumulative if the two construction periods coincided. There is unlikely to be any other cumulative impacts as the impacts associated with both developments would otherwise be contained within the respective sites.

The proposed development of the adjacent land would not be expected to have impacts that would interact with impacts from the proposed RIRP and its construction. Access to the adjacent site is off James Ruse Drive to the north of Grand Avenue intersection and would not impact on the intersection or Grand Avenue traffic. The visual impact of both would be commensurate with the appearance of commercial/industrial buildings and would be in keeping with local land uses.

The mooted University development, possibly involving mixed residential/industrial development is subject to a market feasibility study and no specific details are available. While the specific site is not known, the only potential cumulative impact would be in relation to visual impact. Traffic access to the site would be off Victoria Road. In relation to visual impact, the appearance of the RIRP building will be similar to adjoining commercial /industrial buildings and in accordance with land zoning. The proposed landscaping measures will “soften” the appearance of the appearance of the structure and screening from the northern bank of the river by the extensive vegetation will obscure direct views.

7.14 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

7.14.1 Background

Schedule 2 of the EP&A Regulation lists four principles of ESD which must be considered when determining a DA. The objective of these requirements is to determine whether a proposed development can be sustained by the environment.

The Regulation lists four principles which are to some extent inter-related:

- The Precautionary Principle;

- Inter-Generational Equity;

- Conservation of Biological Diversity and Ecological Integrity; and

- Improved Valuation and Pricing of Environmental Resources.

The following sections present a summary of the proposed RIRP in the context of these principles. These matters are dealt with throughout the relevant sections of the EA.

7.14.2 Precautionary Principle

This Principle is defined as "*that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation".*

A description of the existing environment has been prepared and the environmental impact assessment has been undertaken based on scientific investigation and computer modelling. As the impact assessment process possesses some degree of uncertainty, as a precautionary measure, safeguards and mitigation measures have been proposed in respect of key impacts. The proposed operations of the RIRP are designed in recognition of the need to prevent environmental impacts and to contain the impacts within the site boundaries as far as possible. The operation is predicted to cause minimal impacts outside the site boundaries which will not have adverse environmental consequences.

The environmental management practices and controls will be incorporated in the site EMP which will include specific management activities associated with operation of the RIRP including a comprehensive monitoring programme. This will enable the identification of any adverse environmental impacts which are not predicted in this EA, and will enable the development and implementation of appropriate controls and remedial measures if required. This approach is consistent with the Precautionary Principle.

7.14.3 Inter-Generational Equity

Inter-Generational Equity is defined as "*that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations".*

The aim of the RIRP is to process C&I waste and SSOM kerbside collection in the Metropolitan Sydney area with the objective of maximising resource recovery and minimising landfill disposal. This will in particular reduce the need for putrescible waste disposal in landfills which in turn will reduce the need for landfill capacity and area and the medium to long term environmental consequences of landfill disposal of waste. The resource recovery operations will contribute to a reduction in resource use in the future. These actions are consistent with the principle of Inter-Generational Equity.

7.14.4 Conservation of Biological Diversity and Ecological Integrity

This is a key component of ESD and a minimal requirement of Inter-Generational Equity. The proposed development of the RIRP on the highly disturbed and capped site will not have an adverse impact on the biological diversity and ecological integrity of the site or adjacent areas.

7.14.5 Improve Valuation and Pricing of Resources

The need to determine proper values for the utilisation of natural resources is the basis for the "user-pays" and "polluter pays" principles. Prices for natural resource use are to cover the associated full social and environmental costs.

The costs of waste disposal at the RIRP will include contributions for environmental management and monitoring of the facility and Federal, State and Local Government charges and taxes.