26.0 Residual Risk Analysis

26.1 Methodology

This risk analysis for the Project is based on a process adapted from *AS/NZS ISO 31000:2009 Risk management – principles and guidelines*. The process is qualitative and based on the residual risk matrix shown in **Table 26-3**. Residual environmental risk is assessed on the basis of the significance of environmental effects of the Project and the ability to confidently manage those effects to minimise the risk of harm to the environment.

The significance of environmental effects is given a numerical value between one and five, based on:

- The receiving environment (its sensitivity and values);
- The level of understanding of the type and extent of impacts; and
- Likely community response to the environmental consequences of the Project (refer to **Table 26-1**).

The manageability of environmental effects is similarly given a numerical value between one and five based on the complexity of mitigation measures, the known level of performance of the safeguards proposed, and the opportunity for adaptive management (refer to **Table 26-2**).

Table 26-1 Significance of Effects

Significance	Receiving Environment
Extreme	Undisturbed receiving environment, type or extent of impacts unknown, substantial community concern.
High	Sensitive receiving environment, type or extent of impacts not well understood; high level of community concern.
Moderate	Resilient receiving environment, type and extent of impacts understood; community interest.
Minor	Disturbed receiving environment; type and extent of impacts well understood; some local community interest.
Low	Degraded receiving environment; type and extent of impacts fully understood; uncontroversial project.

Table 26-2 Manageability of Effects

Significance	Mitigation Measures
Complex	Complicated array of mitigation measures required; safeguards or technology are unproven; adaptive management inappropriate.
Substantial	Significant mix of mitigation measures required; past performance of safeguards is understood; adaptive management feasible.
Straightforward	Straightforward range of mitigation measures required; past performance of safeguards is understood; adaptive management feasible.
Standard	Simply suite of mitigation measures required; substantial track record of effectiveness of safeguards; adaptive management unlikely to be required.
Minimal	Little or no mitigation measures required; safeguards are standard practice; adaptive management not required.

Table 26-3 Residual Risk Matrix

Significance of Effects	Manageability of Effects				
	Complex	Substantial	Straightforward	Standard	Minimal
Low	Medium	Low/Medium	Low/Medium	**Low**	**Low**
Minor	High/Medium	Medium	Low/Medium	Low/Medium	**Low**
Moderate	High/Medium	High/Medium	Medium	Low/Medium	Low/Medium
High	**High**	High/Medium	High/Medium	Medium	Low/Medium
Extreme	**High**	**High**	High/Medium	High/Medium	Medium

The chosen numbers are added together to yield a result which provides a ranking of potential residual effects of the Project when the mitigation measures identified in this EIS are implemented.

26.2 Analysis

The analysis of residual environmental risks for issues related to the Project is shown in **Table 26-4**. This analysis indicates the environmental risk profile of the Project based on the assessment of environmental effects, the identification of appropriate mitigation measures and the Summary of Mitigation Measures provided in **Section 27.0** of this EIS.

Table 26-4 Residual Risk Profile

Issue	Initial Risk Rating (No Controls)			Residual Risk Rating (Controls in Place)
	Significance of Effects	Manageability of Effects	Risk Score	Residual Risk
Noise and vibration	Minor	Standard	Low/Medium	Low
Air quality and odour	Moderate	Standard	Low/Medium	Low
Ecology	Moderate	Substantial	High/Medium	Low/Medium
Transport	Low	Minimal	Low	Low
Aboriginal heritage	Low	Minimal	Low	Low
European heritage	Moderate	Straightforward	Medium	Low/Medium
GHG emissions	Low	Minimal	Low	Low
Hazard and risk	Moderate	Standard	Low/Medium	Low/Medium
Socio-economic effects	Moderate	Standard	Low/Medium	Low/Medium
Surface water, industrial water and flooding	Minor	Straightforward	Low/Medium	Low/Medium
Soil and groundwater	Moderate	Standard	Low/Medium	Low/Medium
Landscape and visual amenity	Low	Minimal	Low	Low
Waste management	Moderate	Standard	Low/Medium	Low/Medium
Land use	Low	Minimal	Low	Low

26.3 Conclusion

The above residual risk analysis indicates that the Project, including appropriate mitigation measures as outlined in this EIS, would give rise to predominately a low to low/medium risk in relation to the identified environmental issues.

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27.0 Summary of Mitigation Measures

Relevant DGRs: The EIS must include a consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS.

27.1 Environmental Commitment

As stated in **Section 8.0**, the Project would aim to meet the objectives of Shell's HSSE and SP policies, which align Shell's operations, are compliant with relevant legislative requirements, and assist in achieving continuous performance improvements.

A CEMP for the demolition and construction works would be prepared to minimise impacts of the Project during this period. Additionally, the existing OEMP for the Clyde Terminal would be revised to align with operation of the converted Clyde Terminal as a finished petroleum products import, handling and distribution terminal. This would take into account the conversions proposed to be undertaken/installed in order to further improve the environmental performance of the Project Area. The contents of the CEMP and OEMP are outlined in **Table 27-1** and in **Sections 28.1** and **28.2**.

27.2 Summary of Mitigation Measures

Table 27-1 provides a summary of the mitigation measures that would be implemented during the Project, and which would be incorporated into the CEMP and OEMP as appropriate.

Table 27-1 Summary of Mitigation Measures

Summary of Mitigation Measures	Project Phase
Commitment	
The Project is to be undertaken in accordance with the commitments provided within this EIS.	All
Transport	
The TIA prepared by AECOM has concluded that the Project would not create significant impacts for the surrounding road network. However, it is nevertheless proposed that: - Vehicular traffic would be minimised during peak hour traffic periods where practical do to so; - A Construction Traffic Management Plan be prepared prior to the works commencing; and - Demolition and construction generated traffic would be parked at the Project Area to limit the numbers of vehicles situated in the streets surrounding the Clyde Terminal.	Demolition and Construction
Social and Economic Effects	
Mitigation measures proposed to minimise potential social and economic impacts of the Project on the surrounding Parramatta LGA during the demolition and construction works, and during the continued operation of the converted Clyde Terminal include: - Shell would continue to undertake stakeholder engagement and consultation regarding the Project; - Environmental reporting procedures would continue to be implemented, including a complaints register; - A Construction Traffic Management Plan would be prepared to avoid and minimise potential impacts associated with access routes and major intersections; - A CEMP would be prepared to minimise potential environmental, heritage and social impacts during the demolition and construction works (refer to **Section 28.1**); and - An OEMP would be prepared to minimise potential environmental and social impacts during operation of the converted Clyde Terminal (refer to **Section 28.2**). Shell would continue to communicate and consult with staff regarding possible alternative redeployment opportunities for those that would no longer be required at the Clyde Terminal once the conversion works have been completed, where this is reasonable and feasible.	All

Summary of Mitigation Measures	Project Phase
Further, mechanical trade and instrument electrical trade apprenticeship roles would be retained where possible to enable completion of those apprenticeships. Shell would also continue to support its Employee Assistance Program.	
Surface Water, Industrial Water and Flooding	
In managing surface water, industrial water and flooding at the Project Area, Shell would implement the following mitigation measures:	
- A detailed ESCP is to be compiled and included in the CEMP; - Demolition and construction waste would be stored on a sealed and bunded surface whilst awaiting transfer or processing; - Dust suppression and sediment runoff prevention would be undertaken during the demolition and construction works to prevent impacts to surface water quality as follows: • Areas of demolition and construction activities would be watered down as required in order to suppress the migration of dust; • In the event that excess industrial water is required, e.g. for dust suppression, sediment traps would be employed around the Project Area to prevent runoff and ensure that any contaminated water is treated and managed appropriately; • Where excavation activities are undertaken soil exposure would be minimised where possible and land disturbance would occur for the shortest time possible. Access to the demolition and construction areas would be controlled and vehicles and machinery would be kept to well defined areas away from excavation sites; • Runoff generated outside of demolition and construction areas would be diverted away from those areas to decrease the potential for contaminated runoff to migrate throughout the Project Area; and • Stockpiles of excavated material would be clearly labelled, located away from trafficked areas and other potential disturbances, placed on geo-fabric lining prevent leachate and erosion, be no more than 5 m tall, and allow adequate room for transport around and management of each stockpile. - Wastewater that has been potentially contaminated during the demolition and construction works would be directed via CPIs to allow for sediment and oil to be removed; - Temporary stormwater management measures (such as sandbags, sediment fences and berms) wouldto be used to minimise the risks of sediment-laden runoff and other construction pollutants entering downstream systems; - During demolition works, potential chemical pollutants (e.g. fuels, oils, lubricants, paints, herbicides, etc.) would be stored in appropriate containers within bunded areas within construction compounds to minimise the risk of spillages and mobilisation of these pollutants into aquatic environments; and - Water saving devices would be installed wherever possible during the conversion works to reduce wastage.	Demolition and Construction
- Surface water quality and volume limits for discharge from the Project Area would continue to be monitored, for example as per the sampling of discharge points identified in EPL No. 570, or any replacement/ amended EPL as provided under the POEO Act; - All fuel products and other potentially hazardous substances at the Project Area would continue to be stored in sealed, bunded areas that would prevent their migration offsite in the event that a storm surge or flood event impacts the Project Area; - The Project would not involve the construction of extensive new infrastructure on land lying within the 1:100 year flood event; - Any new development or infrastructure at the Project Area would be constructed with regard to the design principles and standards outlined in the Floodplain Matrix of Planning and Development Controls identified in the Floodplain Risk Management Policy; - Shell would consult with Parramatta City Council and WMA concerning the results of *Duck River and Duck Creek Flood Study Review: Final Draft Report* (WMA, 2011) whilst this report is still in draft format; - In consultation with Parramatta City Council as the WMA Final Draft Report is finalised	All

Summary of Mitigation Measures	Project Phase
and is officially adopted by Council, Shell would develop a site specific Emergency Response Flood Plan demonstrating Shell's ability to secure or move plant, goods and substances above the one percent AEP flood level within the flood warning time that is likely to be available. This Emergency Response Flood Plan would also include requirements for personnel evacuation drills and procedures for equipment and product protection; - Infrastructure at the Project Area would continue to be located outside of the riparian buffer zone along the southern and eastern borders of the Project Area; and - The Project would not result in a reduction of wetland or riparian vegetation.	
- The *Clyde Terminal Conversion Project: Clyde Waste Water Management System* (Shell, 2012a) would be revised once the demolition and construction activities are complete, so that it is up to date for operation of the converted Clyde Terminal; and - Once operation of the converted Clyde Terminal commences, Shell would undertake an internal audit of the Project Area to take stock of how reduced operations have reduced water consumption and improved water efficiency. Further recommendations of the audit would then be taken into consideration if further potential water resource savings or opportunities for reuse are identified.	Operation
Land Use	
It is considered that the Project would not have any significant impacts on land use as it would involve the continued use of the Project Area for purposes similar to its current use. Shell would continue its dialogue with land users who are currently leasing land adjacent to the Project Area from Shell. In considering a future use of the surplus land in the western and north-eastern sections of the Project Area, Shell would take into account: - The extent of any contamination that is discovered in the western and north-eastern sections of the Project Area; - The extent of any remediation that is required subsequent to those contamination investigations; and - Consultation with relevant Government departments and agencies such as the EPA, DP&I and Parramatta City Council, and Council's desired strategic planning outcomes for the Camellia Industrial Estate.	All
Air Quality and Odour	
Potential fugitive dust and odour impacts resulting from demolition and construction works would be managed by the CEMP which would include the following measures: - Loads would be covered during transportation; - Exposed surfaces and roads would be watered as required; - Measures would be implemented to modify or suspend dust-generating activities during periods of high wind speeds or whenever dust plumes from the works are visible. A high wind value should be decided though discussions with regulators, however a typical value is 8 m/s averaged over a 1-hour period; - Regularly trafficked surfaces would be sealed as soon as possible after construction; - Roadway use would be controlled i.e. through defined road access to minimise dust; - Complaints management system would be in place; and - Accidental spills would be immediately cleaned up. Potential fuel combustion emissions resulting from vehicles and equipment associated with the demolition and construction works would be managed with the following measures: - Engines would be turned off while parked onsite; - Vehicular access would be confined to designated, sealed access roads; - Equipment, plant and machinery would be regularly tuned, modified or maintained to minimise visible smoke and emissions; - Project Area speed limits would be implemented; and	Demolition and Construction

Summary of Mitigation Measures	Project Phase
- Haul road lengths would be minimised.	
Ecology	
It is considered that the Project would not have a significant effect on the GGBF, Microbats, Grey-headed Flying-fox or any other flora and fauna in the vicinity of the Project Area. Any impacts to species can be adequately managed through development of the following mitigation measures. For the conversion works, measures shall be incorporated into a CEMP.	
Green and Golden Bell Frog A GGBF specific mitigation strategy is to be prepared and included as a sub-plan to the CEMP for the proposed Project, in consultation with the NSW OEH OEH. The CEMP GGBF sub-plan shall include, but not be limited to: - Design and implementation of pre-works surveys (conducted by a suitably qualified ecologist) to identify and, if necessary, relocate frogs found within the footprint of the actual conversion works; and - Any frogs found would be relocated to the remnant wetland (within the Project Area boundary), by appropriately trained personnel adopting the *Frog Hygiene Protocol* (Department of Environment and Climate Change, 2008d). This would not require licensing for translocation of threatened species under the NSW TSC Act. Compensatory actions considered to date for the loss of opportunistic habitat sites within certain tankfarm bunds include those in accordance with Shell's *Wetland Management Plan – Clyde Wetlands Shell Refinery Rosehill, 2007*. This management plan would be updated to include management measures for GGBF, and would continue to be applied to the remnant wetlands as follows: - Creation and management of refuge habitat such as rock piles (being a less complicated refuge habitat option) for long term placement within the subject areas to provide over-wintering habitat; - Replacement of non-endemic vegetation such as *Juncus acutus* (Spiny rush) within the remnant wetland with alternative native sedges, rushes and grasses to provide GGBF shelter habitat; - Additional enhancement of land within the boundary of the remnant wetland to suit GGBF habitat such as developing additional pondage and/or by the placement of smaller prefabricated ponds to provide additional habitat during breeding season; and - Design and implementation of a systematic monitoring, reporting and feedback program to assess GGBF relocation, mitigation measures undertaken, and population dynamics for this site. ***Management of Impacts*** A suitably qualified ecologist is to be engaged prior to the issue of plans for demolition and construction works to improve tankfarm drainage to advise on the following: - Proposed works to reduce the risk of potential impacts to GGBF, and - Proposed specific mitigation strategies contained within the CEMP. The CEMP GGBF sub-plan is also to include: - Management of site demolition and construction works such that disinfection of demolition and construction plant and equipment is carried out at a safe distance from the remnant wetland, so that excess disinfecting solution or material does not contaminate waterways; and - Site inductions for all workers are to include emphasis on the special requirements for identifying and protecting GGBF. Inductions are to be mandatory prior to access permission to the construction site. Routine updates of the induction are to be provided at routine 'toolbox' meetings.	All (as appropriate)
Grey-headed Flying Fox and Microbat Species Prior to demolition works, inspection of exterior casings and insulations on towers (i.e. potential habitat where microbats have historically been observed) is to be undertaken	Demolition and Construction

Summary of Mitigation Measures	Project Phase
regularly for signs of microbat occurrence. Regular inspections would also be undertaken of buildings scheduled for demolition.	
Protection of Flora While it is recognised that the proposed Project would require negligible vegetation clearing, the following measures are proposed to ensure that minimal potential impacts occur to vegetation in and adjacent to the proposed works areas: - The final demolition plan should minimise the construction footprint and the requirement for clearing of native vegetation wherever possible and within reason given the need to minimise fire hazard risks onsite; - There would be clear marking and delineation of the boundaries between the designated construction sites and "no-go" zones, including vegetation that is to be retained, prior to the commencement of construction. This would include signage, barrier fencing and tree guards, wherever they would be appropriate. There would be no storage of soil, building materials, tools, paints, fuel or contaminants, etc. within the no-go areas; - The Australian Standard 4970 (AS4970) for the protection of trees on development sites should be adopted to reduce the impact of incursions into the root zone of trees to be retained; - Shell would continue to undertake ongoing bush regeneration in and around the vicinity of the Project Area; - If any damage occurs to vegetation beyond the nominated work area the Project Manager should be notified so that appropriate remediation strategies can be developed and implemented; - Should the proposed demolition footprint be changed such that works would encroach into more densely vegetated areas, then it is recommended that a suitably qualified ecologist is to be engaged to: • Conduct pre-clearance surveys of the final footprint immediately prior to demolition commencing, and • Undertake additional impact assessment if required. - The riparian vegetation along the southern and eastern borders of the Project Area would continue to be preserved.	Demolition and Construction
Weed Management The following measures would be put in place to manage weeds: - Weed infestations found within the Project Area would be removed or controlled prior to works commencing; - Earth-working equipment and vehicles would be cleaned of excess soil by brushing and/or hosing at the start and finish of construction works to minimise the risk of spreading of weed seeds and plant pathogens; - Sediment fences and sediment traps would be installed for the duration of the construction works and stabilisation of disturbed areas by rehabilitation works. This is to contain any sediments containing weed seeds, propagules or plant pathogens at the Project Area; - Soil and vegetation removed would be covered during transport and taken to an approved disposal sites to minimise the risks of spreading weeds and pathogens beyond the work sites; - Weeds (including vegetation, fruit and seed) removed during clearance would be disposed at an approved green waste site. Weed seed heads or flowers should be carefully removed and bagged immediately onsite before appropriate disposal; - Where applicable, weed control would be undertaken in accordance with NSW Agriculture's noxious and environmental weeds control handbook; and - Contractors undertaking weed removal or control would be trained or experienced in weed identification and removal (as per the *Pesticide Act 1999*).	All
Plant Pathogen Hygiene *Phytophthora cinnamomi* is not known to be present in the Project Area and there is little likelihood that the proposed Project would lead to its establishment or spread. However, the	Demolition and Construction

Summary of Mitigation Measures	Project Phase
consequences of infection can be severe. Therefore, the mitigation proposed for consideration for weed management would also provide a precautionary measure for limiting the risk of spread of soils and vegetation of origin other than the Clyde Terminal.	
Protection of Aquatic Environments The following additional measures are recommended to minimise potential impacts to aquatic flora and fauna and water quality of the aquatic environment of the Duck and Parramatta rivers. - A detailed ESCP is to be compiled and included in the CEMP; - Demolition and construction waste would be stored on a sealed and bunded surface whilst awaiting transfer or processing; - Dust suppression and sediment runoff prevention would be undertaken during the demolition and construction works; - Wastewater that has been potentially contaminated during the demolition and construction works would be properly treated via the Clyde Terminal wastewater treatment facilities to ensure compliance with the conditions of Shell's EPL No. 570; - Temporary stormwater management measures (such as sandbags, sediment fences and berms), are to be used to minimise the risks of sediment-laden runoff and other construction pollutants entering downstream systems; - During demolition works, potential chemical pollutants (e.g. fuels, oils, lubricants, paints, herbicides, etc.) are to be stored in appropriate containers within bunded areas within construction compounds to minimise the risk of spillages and mobilisation of these pollutants into aquatic environments; - All fuel products and other potentially hazardous substances at the Project Area would continue to be stored in sealed, bunded areas that would prevent their migration offsite in the event that a storm surge or flood event impacts the Project Area; - Manage ASS in accordance with the mitigation measures detailed in **Section 17.3** and the Soil and Groundwater Contamination section below. - The riparian buffer zone along the southern and eastern borders of the Project Area, which has the potential to further minimise the impacts of flooding at the Project Area, would continue to be preserved as follows: • Contaminated stormwater and wastewater generally would continue to be treated before they are discharged in the vicinity of this riparian buffer zone; • Infrastructure at the Project Area would continue to be located outside of this riparian buffer zone; and • The Project would not result in a reduction of wetland or riparian vegetation.	Demolition and Construction All Demolition and Construction All All
Soil and Groundwater Contamination	
Currently, soil and groundwater conditions at the Clyde Terminal site are regulated by Condition U1 of EPL No. 570 which references the need for the SGMP 2010 and an associated annual report. The ongoing operations at the Project Area would also continue to be regulated by the requirements of the POEO Act and CLM Act.	
Demolition and Construction Mitigation Measures - Prior to demolition and construction activities taking place, Shell would develop an ESCP to manage those risks at the Project Area. The ESCP would be incorporated as part of the CEMP and would be developed in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004); - The SGMP 2010 would be revised as part of the conversion activities where necessary to take account of demolition and construction activities; - Shell would undertake the following actions in accordance with the CEMP for the Project. During the limited excavation activities that are planned for the conversion works, the following management measures would be applied: • Reference would be made to the identification of certain Contaminants of Concern in specific areas of the Project Area as per Conceptual Site Model 2012; • With reference to the Conceptual Site Model 2012, soil and groundwater conditions at the Project Area would continue to be managed through a series of triggers and appropriately designed response mechanisms;	Demolition and Construction

Summary of Mitigation Measures	Project Phase
• Identify any required occupational hygiene monitoring for demolition and construction personnel in relation to VOCs; • Any subsurface works would be designed to control and protect the health and safety of people onsite; • The use of geotextile liners or temporary capping would be used to reduce infiltration of surface water runoff where soil is to be excavated during demolition and construction; • Groundwater routine reporting would continue to be undertaken as per Shell's GWSAP, which would be revised as part of the Project; and • If trigger values are exceeded at the Project Area for soil and groundwater quality as outlined in the Environmental Conditions Summary Report (ERM, 2012), the Conceptual Site Model 2012 would be used to guide appropriate clarification or mitigation measures. - If contaminated soils are discovered during excavations, they would be separated and managed in accordance with Shell's existing waste management system for the Project Area (refer to **Section 20.0**), which would be incorporated as part of the Project CEMP; - Further investigations would be undertaken in areas that are currently unable to be accessed due to plant and equipment on these areas, once the aboveground infrastructure is removed and access to the relevant areas is available; - Throughout the Project, Shell would continue to undertake the following management measures as part of the SGMP 2010: • Contaminants of Concern would continue to be monitored as part of the ongoing SGMP 2010. A data gap would be identified in the event that one or more of these Contaminants of Concern are detected at concentrations exceeding their applicable groundwater screening criteria and may have the potential to pose a risk to identified receivers. Additional evaluation would then be completed to fill in those data gaps to confirm whether there is a risk that warrants further action; and • In the event that remedial actions are required to mitigate the risk of pathway exposure to contamination, the Conceptual Site Model 2012 would serve as a design basis for that remedial action. - In general, Shell would continue to use a hierarchy of controls, including engineering controls, to mitigate risks and prevent loss of containment during both the conversion works and operation of the converted Clyde Terminal. Shell would continue to focus its incident prevention at the Project Area on strengthening preventative barriers against spills. The infrastructure upgrades undertaken as part of the conversion works would assist in preventing loss of containment by: • Upgrading safeguards to prevent tank overfills; and • Ensuring pipelines continue to be designed to withstand greater pressures than the maximum pump discharge pressures. - Existing bund walls at the Clyde Terminal would be inspected prior to the conversion works commencing to identify any necessary improvements. These improvements would include either: • The demolition of the existing bund walls; or • Injection of concrete into the existing bund walls to strengthen the structure or repair any faults. - ASS would be managed according to an ASSMP which would be incorporated into the existing *Soil and Groundwater Management Plan Shell Clyde Refinery and Parramatta Terminal, Durham Street, Rosehill, NSW* (Shell, 2010), the WMP 2013 and the CEMP to be prepared for the conversion works; - Identify any ASS impacted soils within the Project Area before excavation activities are undertaken; - Any ASS impacted soils excavated from the Project Area would be kept wet at all times until it is disposed of and managed in accordance with the *Waste Classification Guidelines Part 4: Acid Sulphate Soils* (Department of Environment and Climate Change, 2008e); and	

Summary of Mitigation Measures	Project Phase
- Any residual impacts caused by lapses in the effectiveness of the ASSMP are likely to be identified through the continued implementation of the Soil and Groundwater Management Plan. The ASSMP would also include a contingency plan to manage impacts that have the potential to occur if specified management strategies fail, and to outline any remediation and restoration actions that may therefore be required. This would ensure that the ASSMP addresses its own effectiveness and reliability in managing any residual ASS impacts.	

Summary of Mitigation Measures	Project Phase
Ongoing Operational Mitigation Measures - The SGMP 2010 would be revised as part of the operation of the converted Clyde Terminal to take account of the upgraded operations; - Shell would determine if the surplus land in the western and north-eastern portion of the Project Area is to be made available for an alternative use and a separate development application would need to be submitted so that any necessary remediation and also redevelopment of this land can take place (the Clyde Remediation and Redevelopment Application); - Following the conversion works and when unimpeded site access is re-established in certain areas, additional investigation and remediation can be completed as required; - The three key barriers to receivers' exposure would be maintained: primary source management; operational area (internal) monitoring; and boundary containment monitoring. These three key barriers would continue monitoring to evaluate barrier effectiveness on a quarterly basis and when otherwise triggered; - Shell's risk management systems would continue to be reviewed and amended before critical changes throughout the conversion works to identify and assess the risks that these changes pose both onsite and offsite, and to ensure multiple layers of controls exist to minimise the opportunity for incidents to occur; - Shell would notify WorkCover of any changes to the levels of risk before critical changes occur throughout the conversion works and would submit safety reports to WorkCover as required, ensuring WorkCover's oversight of the risks and controls at the Clyde Terminal; - Shell would continually review and amend the Emergency Procedure Plans to account for the changes in risks and the changes in fire fighting equipment at the Clyde Terminal throughout the conversion activities, and consult with Fire and Rescue NSW during this process; - The following management measures would be incorporated as part of the OEMP and undertaken to prevent and manage the implications of any loss of containment scenarios: • Current systems in place at the Project Area that would continue to prevent loss of primary containment and spill incidents include: ▪ Log checklists carried out every shift by operators to ensure that equipment such as valves are in the correct position; ▪ Water drain tanks through quick flush tanks to separate water from fuels, returning fuel to tanks and draining water to wastewater treatment facility, thus minimising the opportunity for fuel to enter the interceptor system; ▪ Decontaminate the tankfarms, drainage and wastewater systems across the Clyde Terminal area to ensure minimal opportunity for stormwater to be impacted by remnant hydrocarbon contact; ▪ Re-profile tankfarm floors to ensure adequate and effective stormwater draining and bund capacity is preserved to serve its primary purpose of protection of the environment from hydrocarbon spillage; and ▪ Review and repair tankfarm bund walls where required to ensure integrity in the event of a spill incident. • Tank overfill would continue to be prevented through a combination of: ▪ An automatic tank level gauging system with multiple level alarms including: target fill level; high level alarm with time for appropriate operator action at each point and before the next level; an alarm point; and manual dips to provide accuracy of the tank level gauging system; ▪ A final independent high-high level alarm system that provides an alarm independently from the other alarms and tank level gauging system. This system provides for sufficient response time before overfill is anticipated to occur and would trip inflow facility pumps shutting down product inflow to tanks; ▪ The movement management system that provides for the analysis of data and tank movement management; and ▪ Operational readiness planning with procedural support.	All (as appropriate)

Summary of Mitigation Measures	Project Phase
• A series of facility integrity checklists would be developed consistent with other Shell terminal facilities to ensure inspections and maintenance of safety and environmentally critical equipment and repairs are undertaken in a timely manner; • Shell's existing Permit to Work system would be changed to be appropriate for converted Clyde Terminal operations and would be introduced with appropriate training and mentoring to ensure controls are in place across the Clyde Terminal to control all works, and to integrate these with non-routine activities during operation of the converted Clyde Terminal; • Operators would continue to be trained to look for spills and leaks in the course of their shift rounds; • Operators would be trained in the new environmental controls appropriate for the converted Clyde Terminal operations and specifically in the use of newly installed environmental control equipment; • Existing interceptors within the Project Area would continue to be maintained as a means of tertiary containment; and • Spill incidents would be reported within the Shell incident reporting system and, where required, to the EPA and WorkCover. - If a release event is known or suspected to have occurred, additional assessment may be justified to determine if there have been any soil and groundwater impacts under the SGMP 2010 as follows: • A program of works would be developed to cover any data gaps and determine whether any associated risks are within acceptable levels; • Investigation techniques to be employed would include, where relevant: ▪ Trial pit excavations; ▪ Advancement of soil bores; ▪ Monitoring well installations; and ▪ Analytical sampling of soil and groundwater quality. • If investigation shows that risks are greater than acceptable levels identified in the SGMP 2010, some form of remedial action would be warranted in order to eliminate or reduce potential exposure pathways. This would be likely to involve one or more of the following: ▪ Excavation of surface soil and removal or treatment before reinstatement; ▪ Excavation of interception trenches and associated pumps as needed to remove and prevent further spread of shallow groundwater contamination; ▪ Installation of pumps in groundwater wells to remove or control the spread of contamination; and ▪ Emplacement of impermeable materials in soil trenches to contain the spread of contaminated groundwater.	
European Heritage	
It is anticipated that the impacts to the historical and technical significance of the Refinery can be managed through a full photographic and documentary archival recording of the facility. Specifically, the following mitigation measures are recommended for the Project to minimise impacts on heritage significance.	

Summary of Mitigation Measures	Project Phase
- Parramatta Council requires consideration be given to provision of an Arts Plan. As such, oral histories are to be recorded from past and present staff regarding the operations of the former Clyde Refinery, and a full photographic and documentary archival recording of the Project Area would be used to manage the impact to the historical and technical significance of the former Clyde Refinery; - Photographic recording would be undertaken in accordance with the NSW Heritage Branch guidelines *How to prepare archival records of heritage items* (NSW Heritage Office, 1998) and *Photographic recording of heritage items using film or digital capture* (NSW Heritage Office, 2006); - Archival recordings would be undertaken to capture, prior to demolition works taking place, and for infrastructure that would be demolished; - Documentary recording would contain a detailed timeline of each piece of equipment and tankfarm, together with copies of plans and schematics; - A photographic archival recording would be undertaken prior to the demolition of the stacks. The recording would include broad views of the larger Clyde Refinery area; - Subsurface impacts to the area of archaeological potential identified around the bitumen gantry through the removal of foundations or other invasive works, are to be managed through the preparation and implementation of an Archaeological Research Design and Methodology; - The memorial to John Simpsom Fell, Horace Liddon Spencer and Albert Edward Ward, located near the bitumen gantry, is to be relocated to a publicly accessible area (e.g. visitor car park or Project Area). Shell would investigate the feasibility of undertaking a memorial relocation ceremony involving family and descendants of the three men and use of the plaque as a teaching aid for the importance of workplace safety; and - A brief management section is to be prepared within the Project Area's OEMP to guide the management of archaeological potential at the historical residential area along Devon Street and at the second bitumen gantry.	Demolition and Construction
Hazard and Risk	
Risk Management in Design All tanks converted as part of the Project would be constructed to recognised Australian and International Standards, in line with the existing tanks at the Clyde Terminal. The design would be subject to the Shell risk management process. Risk management activities that directly relate to the NSW Seven Stage Planning Process are outlined below: - Preliminary Hazard Analysis; - Shell's Hazard and Effects Management Process; - Hazard and Operability Study; - Fire Safety Study; - Final Hazard Analysis; - Emergency Response Plan Review annually or prior to each critical modification; - Construction Safety Study; - Commissioning review; and - Safety Management System Update.	Design and Construction
Terminal Safety Systems Safety Systems proposed for the Project are as follows: - Process Control: The process control system (i.e. tank level gauging) is integrated with the existing Clyde Terminal process Distributed Control System; - Process Shutdown Systems: Existing pump interlocks would be retained and new tank high level trips would be provided as required to demonstrate as low as reasonably practicable risk; - Bund Walls and Drains: The existing bunds and drains would be retained; - Articulated and remotely operated foam application system would be installed; - Fire Water: The existing firewater main, monitors and hydrants would be modified for the converted Clyde Terminal operations;	All

Summary of Mitigation Measures	Project Phase
- Tank Rim Seam Foam Pourers: Rim seal foam pourers would be modified or installed to meet the revised tank configuration; and - Hazardous Area Classification: Ignition sources would be controlled by the application of suitable hazardous area classification standards.	
Safety in Operation The existing Clyde Terminal and Gore Bay Terminal Management System would be updated to align with operation of the modified Gore Bay Terminal and converted Clyde Terminal. The ERP 2012 would also be updated again as required before operation of the converted Clyde Terminal commences, and in particular the Final Hazard Analysis would be prepared at this time. The implementation of the ERP would include the activation of external emergency services if required.	Operation
Proposed Automation and Safeguarding Operation The following safeguards and automation upgrades are proposed: - Yokogawa Prosafe SGS would be installed to replace the functionality of the existing relay logic; - Permissives (interlocks) would be improved to prevent the incorrect valves being opened; - Motorised valves would be installed inside tank bunds to allow quicker acting valves and remote operation; - The reliability of telemetry between Clyde/Gore Bay would be improved; - The Independent High Level Alarm and tank gauging systems would be improved; - Pump trip systems would be improved; - The site fire system and dump valve logic would be improved; and - Non-safeguarding controls would also be upgraded.	Design and Construction
Waste Management	
Demolition and Construction Waste Mitigation Measures Demolition, construction and operational waste would be managed and disposed of in accordance with relevant State legislation and Government requirements. The existing WMP 2013 would be prepared for demolition and construction works, and this would be incorporated into the CEMP. The following waste management mitigation measures would be incorporated as part of the CEMP for the Project to eliminate or reduce the risk of environmental impacts: - Demolition and construction contractors would be required to provide a detailed waste management plan and tracking system that incorporates available recycling options; - Before transfer to the designated locations as per the waste permit system, wastes may require stockpiling. Wastes would be: • Clearly labelled, to ensure that all such waste is clearly identified and stored separately from other types of materials and wastes, and particular to ensure that contaminated and non-contaminated wastes are stockpiled separately; • Located away from trafficked areas and other potential disturbances; • Placed on geo-fabric lining and covered to prevent leachate and erosion; and • Be no more than 3 to 5 m tall depending in the type of wastes stockpiled, and allow adequate room for transport around and management of each stockpile. - Demolition and construction waste would be stored on a sealed and bunded surface whilst awaiting transfer or processing; - Radioactive substances waste would be disposed of as per the requirements of the *Radiation Control Regulation 2003* and the *Waste Classification Guidelines Part 3: Waste Containing Radioactive Material* (Department of Environment and Climate Change, 2008e); - A small amount of asbestos is present on the Project Area and would require removal during demolition activities. As such, Shell and its contractors would comply with the following obligations set out in Chapter 8 of the WH&S Regulation: • Ensure that exposure to asbestos at the Project Area is eliminated as far as reasonably practicable; • Ensure an asbestos register is maintained; • Ensure an asbestos management plan is in place for the Project Area;	Demolition and Construction

Summary of Mitigation Measures	Project Phase
• Engage a licensed asbestos contractor to carry out the removal of asbestos from the Clyde Terminal; • Ensure that health monitoring is provided to those personnel undertaking asbestos works as part of the Project; • Ensure access to the asbestos removal area is limited to those who are actually involved in the removal of the asbestos, including the placement of relevant signage and barriers; • If there is uncertainty as to whether the exposure standard is likely to be exceeded, Shell would engage a competent contractor to perform air quality monitoring in the area; • Decontamination facilities would be provided at all times at the Project Area; and • Ensure that asbestos waste, and asbestos contaminated plant or clothing is decontaminated, sealed and labelled before it is removed from the Project Area to a site that is authorised to receive asbestos waste. - As per the requirements of clause 42 the POEO Waste Regulation, asbestos waste would be securely packaged, be in a sealed container, be wetted down, or be contained in a covered, leak-proof vehicle.	
Operational Waste Mitigation Measures Waste management mitigation measures for operation of the Clyde Terminal would be incorporated into an updated version of the WMP 2013. Operational waste management mitigation measures include: - Waste management would continue to be undertaken in accordance with the *Waste Avoidance and Resource Recovery Act 2001* and the *Waste Avoidance and Resource Recovery Strategy 2007* (Department of Environment and Conservation, 2007), in that resources would be used efficiently, and the hierarchy of waste avoidance, recovery and disposal would be followed; - Waste would continue to be identified, characterised, classified and separated in accordance with the *Waste Classification Guidelines* (Department of Environment and Climate Change, 2008e), and records of these procedures would be maintained for the life of the conversion works, and beyond that, for the required statutory period; - The waste permit system for the onsite and offsite transfer and disposal of waste would continue to be followed; - EPL No. 570 would continue to provide the key guidelines for waste management at the Project Area. In particular: • Waste designated for recycling would be stored separately from other wastes; • All above ground tanks containing material with the potential to cause environmental harm would be bunded or have an alternative spill containment system in place; and • Dewatered oily sludge would be treated in an onsite landfarm or disposed of offsite to a place that can lawfully accept that class of wastes. - Waste materials would be stored in the designated locations as per EPL No. 570 and the WMP 2013; - Wastes scheduled under the POEO Waste Regulation would continue to be subject to waste tracking requirements, except where an exemption exists under EPL No. 570. A record of these waste movements would nevertheless be maintained by Shell; - Leachate or residual water from waste dewatering activities would be directed to the interceptors for treatment before being released as licensed discharge. Waste materials separated out at the interceptors would be disposed at an offsite licensed facility; - In the unlikely event that waste or its leachate is released to the environment, the investigation and remediation measures outlined in the SGMP 2010 would be adhered to; and - PCB wastes would be managed and disposed of according to the CCO issued by the EPA for the handling of PCB wastes.	Operation

Summary of Mitigation Measures	Project Phase
Hazardous Waste Mitigation Measures Hazardous wastes generated during demolition and construction activities, and/or operation of the converted Clyde Terminal would be treated or immobilised in the following manner before being transported offsite by a licensed waste contractor: - Asbestos wastes according to the requirements of the POEO Waste Regulation, that it be securely packaged in a sealed container and wetted down or contained in a covered, leak-proof vehicle; - PCB wastes according to the CCO issued by the EPA for the handling of PCB wastes; - Oil filters and packing and used oily rags would be managed as prescribed waste. Any powdery used oil-absorbent materials would be bagged or drummed or otherwise contained to facilitate their safe handling and disposal; - Oily sludges (for example, from tank cleaning during the ongoing operation of the Clyde Terminal) would continue to be treated in the sludge dewatering facility and/or the landfarm area, as per EPL No. 570; - Redundant equipment containing any radioactive isotopes would be disposed of as per the requirements of the *Radiation Control Regulation 2003* and the *Waste Classification Guidelines Part 3: Waste Containing Radioactive Material* (Department of Environment and Climate Change, 2008e); and - Organic solvents, contaminated blue metal and empty drums would be managed by chemical fixation to convert the hazardous contaminants to a chemically stable form. Where this is not possible, macroencapsulation would be used to place a physical barrier between those contaminated wastes and the surrounding environment.	All
Aboriginal Heritage	
Whilst the ACHA predicts that the Project would not impact on the Aboriginal heritage values of the area, the following management measures would nevertheless be implemented if any potential Aboriginal objects or human remains are discovered at the Project Area.	
- Should any suspected Aboriginal objects be uncovered during demolition or construction works, all works in the vicinity should cease immediately to prevent any further impacts and a qualified archaeologist be brought onsite to make an assessment. If the object is found to be an Aboriginal object, it would be notified under the *National Parks and Wildlife Act* as soon as possible; - If suspected human remains are exposed, all construction work is to cease immediately in the near vicinity of the find location and the Project Manager is to be immediately notified to allow assessment and management: • An area of 20 m radius is to be cordoned off by temporary fencing around the exposed human remains site - construction work can continue outside of this area as long as there is no risk of interference to the human remains or the assessment of human remains; • The Police and the OEH are to be contacted immediately; and • A physical or forensic anthropologist would be commissioned by the Police to inspect the remains in situ (organised by the Police unless otherwise directed), and make a determination of ancestry (Aboriginal or non-Aboriginal) and antiquity (pre-contact, historic or modern). - Subsequent management actions would be dependent on the findings of the forensic anthropologist: • If the remains are identified as modern and human, the area would become a crime scene under the jurisdiction of the NSW Police; • If the remains are identified as pre-contact or historic Aboriginal, the site would be secured and OEH and all Registered Aboriginal Parties notified in writing. Where impacts to exposed Aboriginal skeletal remains cannot be avoided, remains would be retrieved via controlled archaeological excavation and reburied outside of the Disturbance Boundary in a manner and location determined by Registered Aboriginal Parties; • If the remains are identified as historic non-Aboriginal, the site is to be secured and	Demolition and Construction

Summary of Mitigation Measures	Project Phase
the NSW Heritage Branch contacted; and • If the remains are identified as non-human, work can recommence immediately. - The above process functions only to appropriately identify the remains and secure the site. From this time, the management of the area and remains is to be determined through one of the following means: • If the remains are identified as a modern matter liaise with the Police; • If the remains are identified as Aboriginal liaise with the proponent, OEH and Aboriginal stakeholders; • If the remains are identified as non-Aboriginal (historical) liaise with the DP&I and the Heritage Office; and • If the remains are identified as not being human then work can recommence immediately.	
Noise and Vibration	
Demolition and Construction Waste Contractors would demonstrate best practicable means and include noise mitigation measures in the CEMP plan, which could include: - Construction activities to be limited to between 7am and 6pm Monday to Friday and 8am to 1pm Saturday; - Where work is undertaken outside of the standard working hours it would be in accordance with the *Interim Construction Noise Guideline* (EPA, 2009); - Construction of noise bunds or barriers, where feasible and effective for noise suppression, at the early demolition and construction stage; - Use of temporary barriers for stationary noisy equipment; - Possible restrictions to construction hours (beyond the above hours) where noise impacts are significant; - All plant items should be properly maintained and operated according to manufacturers' recommendations in such a manner as to avoid causing excessive noise; - All pneumatic tools would be fitted with silencers or mufflers; - Any compressors brought on to site should be silenced or sound reduced models fitted with acoustic enclosures; - Consultation with property owners likely to be affected prior to works being carried out; and - Noise monitoring at sensitive locations as agreed with EPA for any excessive noise or noise complaints being assessed with appropriate action taken.	Demolition and Construction
Traffic Noise The existing OEMP includes provisions for vehicle protocols in and around the Clyde Terminal and the Parramatta Terminal. This would be revised for operations once the demolition and construction works have been completed.	Operation
Blasting The CEMP would include a blast plan and control measures to minimize the impact of ground vibration and noise as a result of blasting at a particular site. Items to be considered in the development of this part of the CEMP are: - Reducing maximum instantaneous charge, for example by reducing blasthole diameter or deck loading; - Using a combination of appropriate delays; - Allowing for excessive humps or toe in the blast design; - Optimising blast design by altering drilling patterns, delaying layout or altering blasthole inclination from the vertical; - Exercising strict control over the location, spacing and orientation of all blastholes and using the minimum practicable sub-drilling that gives satisfactory to conditions; and - Establishing times of blasting to suit the situation; - Using experienced blast contractor to be used; - Using a series of test blasts to be used to determine site specific conditions. As a result	Demolition

Summary of Mitigation Measures	Project Phase
of these tests the maximum instantaneous charge should be determined; - Restricting blasting or ceasing blasting if the predictions indicate that air blast overpressure levels are likely to be exceeded at neighbouring dwellings unless agreed with the owner(s); - Ensuring all reasonable attempts are made to contact sensitive receivers located within 500 m of a blast location; - Using linear enclosures or shielding would be used to assist in airblast attenuation if required; - Ensuring stemming type and length is adequate; - Eliminating exposed detonating cord and investigating alternative initiation method; - Making extra efforts to eliminate the need for two shots (e.g. better control of drill patterns); - Using survey methods, as appropriate, to ensure burden is adequate; - Considering delaying or cancelling the blast by not loading if the weather forecast is unfavourable; - Allowing for the effects of temperature inversion and wind speed and direction on the propagation of airblast to surrounding areas; - Orientating faces where possible so that they do not directly face residences; - Varying the direction of initiation; - Exercising strict control over the burden, spacing and orientation of all blastholes; - Taking particular care where the face is already broken or where it is strongly jointed, sheared or faulted; - Considering deck loading where appropriate to avoid broken ground or cavities in the face (e.g. from back break); - Adequately monitoring the blasts to help minimise complaints and also to provide documentation in the event of any claims for damages arising from blasting; and - Recording of complaints associated with blasting, identifying the nature of the complaint, the particular operation that initiated the complaint, and documenting action taken.	
GHG Emissions	
Shell would undertake an internal energy audit of the Project Area following completion of the demolition and construction works to take stock of how the operation of the Clyde Terminal has reduced electricity consumption and improved energy efficiency. Recommendations arising from the audit would then be taken into consideration where significant further energy savings can be made.	Operation
Landscape and Visual Amenity	
Dust control measures included in the CEMP and outlined in the **Surface Water, Industrial Water and Flooding** section of this table would avoid or minimise potential visual impacts from dust.	Demolition and Construction
The riparian vegetation within the wetlands would be retained thereby conserving the visual amenity and landscape character of the area.	All

Summary of Mitigation Measures	Project Phase
Ongoing Monitoring at the Converted Clyde Terminal	
Shell would continue to undertake existing environmental and safety monitoring at the Project Area following completion of the conversion including: - Interceptor sampling; - Wetlands management; - Waste management; - Groundwater sampling and analysis; - Safety critical equipment inspection and maintenance; - Safety management system auditing; - Process safety observations and audits; - Emergency response exercises and plan reviews; - Hazard and effect management process reviews; and - Competency assessment of all operational staff.	All

27.3 Statutory Commitment

As the proponent, Shell would be responsible for ensuring that the principal contractor and its personnel for the Project have obtained all required licences, permits and statutory approvals as outlined in **Section 7.0** and **Section 8.0** of this EIS.

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28.0 Environmental Management and Monitoring

28.1 Construction Environment Management Plan

A CEMP would be prepared for the Project and would include the demolition and construction mitigation measures identified in **Table 27-1**.The CEMP would be developed in consultation with the DP&I and relevant statutory authorities prior to the commencement of any demolition or construction activities. The CEMP would provide the overarching framework under which all demolition and construction environmental management and monitoring measures are conducted, incorporating those commitments which have been documented in this EIS. In addition, several supplementary plans focused towards specific demolition and construction activities would be updated to align with the changed activities, and additional plans would be developed where necessary. The CEMP would outline appropriate response procedures for emergencies such as spills and leaks during demolition and construction activities, and would present the training and induction procedures for the Project, and site responsibilities.

Existing operational management plans would also be reviewed to ensure that the environmental risks arising from the construction activities are also captured in the OEMP and that the CEMP integrates with the OEMP to be fully effective.

Shell's HSSE & SP Management System would be reviewed to include the additional demolition and construction scope of works to this work commencing. This review would ensure alignment between Shell's objectives and those of the principle contractor and their subcontractors to ensure an integrated approach to managing HSSE & SP for the Project Area.

28.2 Operational Environment Management Plan

An OEMP would be prepared for the converted Clyde Terminal and would include the operational mitigation measures identified in **Table 27-1**. Operational activities would be planned and executed in accordance with the OEMP and the overarching HSSE MS. Several of the specific sub-plans operating under the HSSE MS specific to the Project Area, as well as environmental management or pollution reduction plans currently implemented at Clyde would also require revision to accommodate the changed activities as outlined in **Table 27-1**. Some further management plans have already been prepared to specifically deal with the Project. Those management plans that would be implemented as part of the overall site OEMP are outlined in **Table 27-1**. Issues also to be documented in the OEMP relate to emergency response procedures, induction, training, auditing protocols, corrective actions procedures and OH&S initiatives.

Examples of relevant documents to be reviewed as part of the revision of the OEMP include:

- *Soil and Groundwater Management Plan Shell Clyde Refinery and Parramatta Terminal, Durham Street, Rosehill, NSW* (Shell, 2010);
- Conceptual Site Model for the Project Area (Shell, 2012);
- ERM, 2010. *Groundwater Sampling and Analysis Plan*: *Shell Clyde Refinery and Parramatta Terminal, Durham Street, Rosehill, NSW* (ERM, 2010);
- *Pollution Incident response Management Plans – Clyde Refinery* (Shell, 2012b);
- *Clyde Terminal Conversion Project: Clyde Waste Water Management System* (Shell, 2012a);
- Clyde Terminal HSSE MS;
- *Waste Management Procedure: Shell Clyde Refinery (Australia) Pty Ltd* (Shell, 2013);
- Work Health and Safety Plan;
- Traffic Management Plan;
- Emergency Response Plan 2012; and
- Should archaeological values remain before operation of the converted Clyde Terminal commences, the OEMP for the Project would also include an archaeological management section.

28.2.1 Training and Induction

Prior to any demolition or construction activities being undertaken all staff and contractors would be required to undergo an induction. The site-specific induction would ensure that all staff and contractors are fully aware of their OH&S and environmental responsibilities. All staff and contractors must be able to demonstrate competency for their role as part of this Project prior to undertaking any works.

28.2.2 Emergency Response

As outlined in **Section 8.2.3**, the ERP 2012 would be revised and updated once final engineering designs are prepared for the converted Clyde Terminal. This would be done in consultation with Fire and Rescue NSW and Parramatta City Council. The ERP would ensure that procedures are in place to provide for the safety of staff and the environment in the event of an emergency. As per clause 557 of WH&S Regulation, this ERP addresses all health and safety consequences of a major incident occurring, includes all matters specified in Schedule 16 to the WH&S Regulation, and provides for the testing of emergency procedures. A copy of the updated ERP would be maintained for the Project Area, with copies provided to identified stakeholders including Fire and Rescue NSW and surrounding councils.

The ERP would be reviewed with relevant sections amended before operation of the converted Clyde Terminal commences as the risks and as recovery equipment changes are implemented. This document would take into account the actions identified from the Final Hazard Analysis.

28.2.3 Incident Reporting

In the unlikely event that an incident does occur that would cause or is threatening to cause material environmental harm, Shell would notify the EPA and other relevant regulatory bodies immediately upon becoming aware of such incident as per section 148 of the POEO Act, and generally in accordance with Shell's PIRMP 2012. Furthermore if a notifiable safety incident occurs as a result of the Project, Shell would ensure that WorkCover is notified immediately after becoming aware of such an incident as per section 38 of the WH&S Act. As the Project Area would continue to be classified as a MHF, Shell's ERP 2012 would be followed in the unlikely event that any major incident occurs as per clause 531 of the WH&S Regulation. The implementation of the ERP would include the activation of external emergency services if required.

28.2.4 Clyde Terminal HSSE MS

The Clyde Refinery HSSE MS would be reviewed and updated to produce the Clyde Terminal HSSE MS to account for the changes in assets, operations and risks during the Project, and to include operational mitigation measures identified in **Table 27-1**. This process would involve consultation with the Project Area's Work Health and Safety Committee and key operational and specialist staff. All operational activities would be planned and executed in accordance with the OEMP and the overarching HSSE MS. The Clyde Terminal HSSE MS would be progressively updated throughout the Project to reflect any changes to risks at relevant stages of the Project. A final Clyde Terminal HSSE MS would be in place prior to the commencement of operations at the converted Clyde Terminal.

28.2.5 Monitoring Program

Shell would continue to undertake existing environmental and safety monitoring at the Project Area during all phases of the Project. The following existing plans and approvals would be updated (where relevant) to reflect the proposed works and the future operations of the Clyde Terminal:

- EPL No. 570;
- *Wetlands Management Plan – Clyde Wetlands Shell Refinery Rosehill, 2007*;
- *Waste Management Procedure: Shell Clyde Refinery (Australia) Pty Ltd* (Shell, 2013);
- *Clyde Terminal Conversion Project: Clyde Waste Water Management System* (Shell, 2012);
- *Soil and Groundwater Management Plan Shell Clyde Refinery and Parramatta Terminal, Durham Street, Rosehill, NSW* (Shell, 2010);
- Conceptual Site Model for the Project Area (Shell, 2012); and
- *Groundwater Sampling and Analysis Plan*: *Shell Clyde Refinery and Parramatta Terminal, Durham Street, Rosehill, NSW* (ERM, 2010).

28.2.6 Environmental Reporting

Throughout the Project, Shell would continue to provide an Annual Return to the EPA for each reporting period as dictated by condition R1 of EPL No. 570. Shell would also provide to the EPA any further reports that the EPA so requests as per condition R3 of the EPL. Furthermore, any information collected during closure of identified data gaps as part of CSM 2012 would continue to be supplied to the EPA annually within the Annual Progress Report on soil and groundwater monitoring and investigation required under condition U1 of the EPL. This information would also be provided to the EPA in a standalone report if so required.

As outlined in the SGMP, results from routine groundwater monitoring events are presented in the Groundwater Monitoring Report, submitted to the EPA annually. The results of the GSWAP and SGMP would continue to be reported internally within Shell on a quarterly basis.

After further environmental investigations, the remediation and redevelopment of land in the western and north-eastern sections of the Project Area would be subject to a separate assessment and approvals process conducted in accordance with legislative requirements (the Clyde Remediation and Redevelopment Application). As Shell investigates and addresses contamination issues that may be identified in the western and north-eastern sections of the Project Area, it would comply with its obligations under the CLM Act.

As outlined in **Section 7.6.2** Shell's operation of the converted Clyde Terminal would continue to be reported as part of the Shell's overall GHG emissions under the NGER Act.

Apart from the wastes that are specifically excluded under EPL No. 570 (refer to **Section 20.1**), Shell and its demolition and construction contractors would ensure that the transport of wastes offsite for further processing and disposal conforms with the waste tracking requirements, and to the specific requirements for the transport of asbestos wastes, as outlined in **Sections 7.5.5** and **7.5.1**.

28.2.7 Auditing

Shell is currently committed to commissioning an independent hazard audit every three years under the *Hazardous Industry Planning Advisory Paper No. 5 – Hazard Audit Guidelines* as per the terms of its project approval 07_0067 dated 28 April 2008 for the upgrade of the hydrodesulphurisation unit and associated infrastructure. Following the conversion works, Shell would continue to fulfil these auditing requirements.

After operation of the converted Clyde Terminal commences, Shell would also undertake internal auditing of the Project Area to take stock of how reduced operations have resulted in decreased water and electricity consumption. Further recommendations of these audits would then be taken into consideration if further resource savings or opportunities for water reuse are identified.

Shell would also comply with any environmental auditing requirements specified by the DP&I in granting development consent for the Project.

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29.0 Project Justification

Relevant DGRs: The EIS must include a justification for the proposed project.

29.1 The Need for the Project

There were several factors that were impacting on the refining industry in Australia and which created the need for Shell to consider a new business model for its activities within the NSW market. It was determined that further re-investment into Shell's former Clyde Refinery to make the facility more competitive was not economically justifiable. Shell therefore determined that conversion of the former Clyde Refinery into an efficient terminal facility, as well as modifications to its existing Gore Bay Terminal (subject to a separate development application), were necessary for it to import finished petroleum products for distribution throughout the NSW market. It was this decision making process that resulted in the cessation of refining activities at the former Shell Clyde Refinery, and the need to convert the current Clyde Terminal to create a more efficient and competitive finished petroleum products import and storage facility.

Shell facilities in Sydney including the Gore Bay Terminal, Clyde Terminal and Parramatta Terminal provide a unique and geographically advantaged supply chain for the NSW market. These facilities provide for import capability and the efficient transfer of finished petroleum products. Use of this existing infrastructure allows for the continued efficient distribution of finished petroleum products from the geographic heart of the Sydney metropolitan area without the impact of significant truck movements across the Sydney metropolitan area required should this supply route not be in place.

The NSW market is important for Shell and the design for the efficient terminal and current supply route will not only accommodate the existing customer demand but will support growth. These facilities are also vital for the NSW market as they provide a diverse and robust supply chain not only for the retail market but for the mining, manufacturing and aviation industries.

Section 5.2 outlines the proposed alternatives that were considered in comparison to the current Project. Taking into account the range of financial and environmental factors, the current Project, utilising existing facilities, was considered the most viable response to providing a seamless transition for the NSW liquid fuels market while minimising Shell's environmental footprint.

29.2 Justification for the Project

29.2.1 Biophysical Considerations

Potential biophysical impacts as a result of the Project have been assessed as part of this EIS. The implementation of a range of environmental mitigation measures (refer to **Section 27.0**) would avoid or minimise potential impacts on the biophysical environment, and the Project would therefore not have significant adverse impacts. For example, the Project is anticipated to yield the following benefits:

- Improved environmental controls over surface water and management of site drainage;
- Reduced potable water consumption;
- Reduced potential for soil and groundwater contamination as a result of upgrades to tank instrumentation and safeguarding systems and the installation of additional tank water draining facilities at the Clyde Terminal;
- Reduced electricity and natural gas consumption, improving sustainability and climate change performance of the Project Area;
- Improved noise and vibration performance of the Clyde Terminal;
- Improved air quality of the Clyde Terminal;
- Maintenance of a viable remnant wetland with the provision of a habitat for the Green Golden Bell Frog and other biota; and
- Reduced road transport associated with the converted Clyde Terminal operations.

The Project would also facilitate the future investigation of potential ground contamination within the Project Area, allowing this issue to be better understood and addressed in the future under a separate development assessment and approvals process, and in consultation with the EPA.

Overall, the Project is justified considering the potential residual biophysical impacts on the environment are anticipated to be minimal.

29.2.2 Social and Economic Considerations

Potential social and economic impacts associated with the Project have been assessed and shown to have improved as part of the Project, including:

- Support for the continuing economic growth of NSW through the use of existing infrastructure;
- Optimisation of the existing supply chain from Western Sydney rather than requiring a significant increase in road transport from Port Botany or other locations through the Sydney metropolitan areas before moving into the existing transport corridors for fuels delivery throughout Sydney and into regional NSW;
- Improved fire fighting systems;
- Improvements to land use, as the Project Area would become more efficient while its environmental footprint and hazard profile would also be reduced;
- Improvements to infrastructure, through the demolition and removal of redundant infrastructure and the upgrading of infrastructure suitable for a future use;
- Improved landscape character and visual amenity; and
- Minimised cumulative impacts.

The implementation of a range of mitigation and management measures recommended throughout this EIS (refer to **Section 27.0**) would avoid or minimise potential adverse social and economic impacts of the Project. The Project is anticipated to yield the following social and economic benefits:

- Enabling ongoing employment opportunities at the Clyde Terminal rather than the further job losses that would occur should the Clyde Terminal not continue to operate;
- Maintenance and improvements to the existing land use of the Clyde Terminal through upgrades to existing infrastructure and the demolition and removal of redundant infrastructure;
- An improvement of the hazard and risk profile of the Clyde Terminal by removing hazardous substances associated with redundant infrastructure, as well as the improvements to the Clyde Terminal's safety and emergency response mechanisms;
- Overall reduced environmental footprint;
- Maintenance and improvements to the existing visual amenity of the Clyde Terminal on the surrounding environment by removing redundant infrastructure from the Clyde Terminal;
- Potential social and economic benefits associated with the future reuse of the western and north-eastern portions of the Project Area; and
- Broader economic benefits in ensuring the security of a significant portion of the supply of fuels within NSW, including the direct supply of Jet fuel to Sydney Airport and the ability to accommodate supply to support economic growth.

When considering the potential residual social and economic impacts of the proposed Project, the Project is justified.

29.2.3 Ecologically Sustainable Development

Introduction

The Commonwealth Department of the Environment identifies ESD as "*development which aims to meet the needs of Australians today, while conserving our ecosystems for the benefit of future generations*" (SEWPAC, 2010). Furthermore, the EPBC Act also identifies the need for the consideration of decision-making processes in environmental impact, namely that "*decision making processes should effectively integrate both long term and short term economic, environmental, social and equitable considerations*."

One of the objects of the EP&A Act is stated as encouraging ESD (section 5(vii)), defined under the Act as the definition provided for ESD in section 6(2) of the *Protection of the Environment Administration Act 1991*, which encompasses principles of sustainable development that were originally detailed in the *Rio Declaration on Environment and Development (1992)*:

a) ***The precautionary principle*** *– namely, 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. In the application of the precautionary principle, public and private decisions should be guided by:*

   i) *Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and*

   ii) *An assessment of the risk-weighted consequences of various options.*

b) ***Inter-generational equity*** *– namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.*

c) ***Conservation of biological diversity and ecological integrity*** *– namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.*

d) ***Improved valuation, pricing and incentive mechanisms*** *– namely, that environmental factors should be included in the valuation of assets and services, such as:*

   i) *Polluter pays –that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement;*

   ii) *The users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste; and*

   iii) *Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

Clause 7(4) of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* requires that an EIS consider the precautionary principle, as well as the principles of inter-generational equality, conservation of biological diversity and ecological integrity, and the improved valuation, pricing and incentive mechanisms. The consideration of the Project against the requirements of ESD is provided below.

An altered economic climate has meant that the continuation of refining operations at the former Clyde Refinery was not financially viable and other operational options were required in order for the facility to remain competitive in the NSW market (refer to **Section 4.0**). The decision-making process that was applied to identify the Project as the preferred solution has been conducted in a manner that has integrated economic, community and environmental considerations.

The Precautionary Principle

The precautionary principle has been applied to the Project through the undertaking of detailed environmental investigations to gain a thorough understanding of the environmental characteristics of the Clyde Terminal, including the processes and interactions of various components. These investigations have been used to determine that the Project does not result in an increase in environmental impacts.

While the nature of the Clyde Terminal and the potential environmental impacts of the Project are generally well known, where it was not possible to accurately depict certain aspects of the Project in their entirety, conservative assumptions have been employed to take into consideration worst case scenario impacts. This approach is consistent with the precautionary principle.

Inter-generational Equity

The Project is consistent with the principle of inter-generational equity as the overall objective of the EIS is to identify and mitigate potential future impacts associated with the Project.

Operation of the converted Clyde Terminal would have a reduced environmental impact in comparison with the Clyde Terminal's previous operation as the Clyde Refinery and compared to its current operation as the unconverted Clyde Terminal. The Project involves the removal of certain hazardous chemicals and substances

from the Project Area including redundant infrastructure, thereby reducing the Clyde Terminal's overall hazard profile (refer to **Section 19.0**).

The Project utilises an existing industrial site for a purpose similar to its current use. The Project capitalises on the Project Area as a valuable land asset, making it more efficient and economically productive. The Project would ultimately ensure that the continued use of the Project Area would be economically beneficial.

The economic benefits of the Project would extend not only to existing but to future generations, aligning with the principle of inter-generational equity.

Conservation of Biological Diversity and Ecological Integrity

The Project involves the consideration of many options and alternatives to maintain the viability of the Clyde Terminal and its operations (refer to **Section 5.0**). As the Project involves the use of an existing industrial site and does not require any physical expansion, it is unlikely to result in direct impacts to loss of biological diversity or ecological integrity normally associated with clearing of previously undisturbed areas.

This EIS has considered in detail the potential impacts of the Project on the biological diversity and ecological integrity of the Project and its surrounds. It was determined that the Project would not result in a reduction in biological diversity or to ecological integrity of the Project Area or its surrounds (refer to **Section 16.0**). The Project therefore abides by the principles of conserving biological diversity and ecological integrity.

Improved Valuation of Environmental Factors

Given the different values placed on various components of the environment, it is difficult to assign a monetary value against the environmental costs and benefits associated with the Project. Given this, the approach adopted for the Project is an evaluation of the inherent values of the environment potentially impacted by the Project and the ability of mitigation measures to avoid, minimise or manage these impacts. Individual factors relevant to the Project were nevertheless valued according to qualitative, quantitative, economic, or non-economic criteria, or a mixture of these criteria, as appropriate. For instance,

- The qualitative worth of both Aboriginal and European heritage in the vicinity of the Project Area was valued (refer to **Section 21.0** and **Section 18.0**);
- The biological factors of air quality, soil and groundwater, water quality and industrial water and flooding were valued by identifying applicable standards and targets that should be met;
- The values of the terrestrial and aquatic ecology (particularly threatened species and communities) in the vicinity of the Project Area were considered according to their ecological and biological worth (refer to **Section 16.0**);
- Noise and vibration, road traffic and landscape and visual amenity were valued according to applicable standards and targets that should be met, as well as according to their qualitative worth in providing human amenity (refer to **Sections 22.0**, **11.0**, and **24.0**);
- Land use and infrastructure were valued according to their economic worth; and
- Social and economic factors relevant to the Project were analysed according to both their qualitative social worth and quantitative economic worth (refer to **Section 12.0**).

Project Sustainability Initiatives

Shell proposes to implement the sustainability initiatives summarised in **Table 29-1** as part of the Project.

Table 29-1 Project Sustainability Initiatives

Issue	Sustainability Objectives	Initiative	EIS Reference
Governance	Demonstrate sustainability leadership via the conversion works	Develop and communicate a project specific sustainability policy.	**Sections 4.0** and **5.0**
		Integrate sustainability initiatives in to approvals framework to provide basis for compliance.	
		Implement best practice assurance processes to deliver on sustainability commitments.	

Issue	Sustainability Objectives	Initiative	EIS Reference
Climate Change	Be resilient to climate change impacts.	Shell would undertake consultation with Parramatta City Council in relation to future development of the surplus land in the Project Area, having regards to the *Parramatta Local Floodplain Risk Management Policy* (Parramatta City Council, 2006a), and the NSW Government's projected sea level rises of 0.4 m and 0.9 m that are expected to take place before 2050 and 2100 respectively (Department of Environment and Climate Change and Water, 2010). Shell would also consult with Parramatta City Council and WMA concerning the results of *Duck River and Duck Creek Flood Study Review: Final Draft Report* (WMA, 2011) while this report is still in draft format.	**Sections 14.2** and **13.2**
Carbon management	Reduced operations and the resultant carbon emissions.	The Clyde Terminal has already experienced a significant reduction in GHG emissions since the cessation of refining activities in late 2012. The Project itself is considered to have a neutral impact on the overall global GHG emissions budget.	**Section 23.2**
Energy efficiency	Implement measures to improve energy efficiency.	Electrical infrastructure at the Project Area would continue to be used with significantly improved electricity efficiency following the conversion works. The Project may therefore result in decreased electricity consumption.	**Section 23.2**
		Once operation of the converted Clyde Terminal commences, Shell would undertake an internal energy audit of the Project Area to take stock of how reduced operations may have decreased electricity consumption. Further recommendations of the audit would then be taken into consideration if further energy savings are identified.	**Section 23.3**
Land use and community benefits	Promote liveability and sustainability benefits of improved Project Area.	Actively engage local residents, community and other stakeholders in the changes to the Project Area proposed as part of the Project.	**Section 9.0**
Resources – water efficiency	Minimise demand for and use of potable water as well as maximising the opportunity for water recycling and re-use.	The Project is anticipated to result in decreased potable water consumption. The converted Clyde Terminal would continue to be supplied with potable water by Sydney Water. Wastewater at the Project Area would be captured, processed and reused where possible. Clean wastewater and stormwater would only be discharged offsite where it cannot be reused onsite, and where it meets quality criteria under EPL No. 570.	**Section 13.0**
		Once operation of the converted Clyde Terminal commences, Shell would undertake an internal audit of the Project Area to take stock of how reduced operations have improved water efficiency. Further recommendations of the audit would then be taken into consideration if further water resource savings or opportunities for reuse are identified.	**Section 13.3**

Issue	Sustainability Objectives	Initiative	EIS Reference
Resource – waste and materials	Reduce materials use and minimise waste through the Project life cycle.	Shell would continue to operate the waste receipt and processing functions of the Project Area once the conversion to the Clyde Terminal has been completed.	**Section 13.0**
		The converted Clyde Terminal would continue to be managed according to Shell's WMP 2013, NSW and Commonwealth legislation, and Shell global standards. This includes a commitment to the *Waste Avoidance and Resource Recovery Strategy 2007* (Department of Environment and Conservation, 2007b) by providing a hierarchy of resource use as follows: - Prevention; - Minimisation; - Reuse; - Recycle; - Recovery measures; or - Disposal of waste.	**Section 13.3**
Heritage conservation	Promote and protect local heritage through appropriate design, planning and management controls.	The Aboriginal heritage assessment undertaken as part of this EIS has demonstrated that the Project is not anticipated to impact on Aboriginal heritage in the vicinity of the Project Area (refer to **Section 21.2**). However, mitigation measures have been proposed so that any residual impacts to Aboriginal heritage can be managed in the event that they do arise (refer to **Section 21.3**). The assessment of European heritage undertaken as part of this EIS identified that the conversion works would have significant impacts on the heritage values of the Project Area (refer to **Section 18.2**). However, the assessment concluded that, with the proposed mitigation measures in place (i.e. archival recording), these impacts can be managed to an appropriate level of impact (refer to **Section 18.3**).	**Sections 21.0** and **18.0**
Ecology	Protect existing biodiversity through appropriate planning, management and financial controls.	The Ecological Assessment undertaken as part of this EIS has demonstrated that, with the proposed mitigation measures in place, the Project would not significantly impact the ecological values of the Project Area or its surrounds.	**Section 16.0**
Pollution Control	Reduce sources of pollution and optimise control at source to avoid environmental harm.	Demolition and construction activities are to be undertaken in accordance with the proposed CEMP, and operation of the fully converted Clyde Terminal would be undertaken according to an updated OEMP, to ensure that the Project does not result in release events to the environment that are above the threshold criteria in EPL No. 570. The cessation of refining has had substantial benefits for air quality in the vicinity of the Project Area which would be further improved by this Project (refer to **Section 15.0**).	**Section 28.0**

29.3 Summary

Undertaking the Project in the manner outlined in this EIS is justified, when considering its compatibility with existing land use as well as its biophysical, social and economic benefits. The Project would create an efficient terminal capable of meeting the continuing NSW demand for liquid fuels consistent with the key policy priorities of the *Energy White Paper 2012: Australia's Energy Transformation* (Department of Energy, Resources and Tourism, 2012).

The Project would improve the hazard profile and environmental footprint of the Clyde Terminal while improving its operational efficiency and economic competitiveness in the local fuel market.

The Project conforms to the principles of ESD in that:

- The decision making processes behind the Project have integrated environmental and economic considerations;
- The methodology in undertaking this EIS and the commitments made by Shell to mitigate potential environmental impacts resulting from the Project embody the precautionary principle;
- The Project provides for inter-generational equity by reducing the overall environmental footprint of the Project Area while improving the efficiency and productivity of the Clyde Terminal's operations;
- With the proposed mitigation measures in place, the Project would not significantly impact on the biological diversity or ecological integrity of the Project Area or its surrounds; and
- This EIS has provided for the evaluation of environmental and related factors that are relevant to the Project, and Shell commits to providing appropriate mitigation measures at its own cost.

Shell would commit to ensuring the principles of ESD are followed throughout the entire Project by implementing the mitigation measures outlined in **Section 27.0**.

Assessment of the Project against these considerations demonstrates that the Project is environmentally sustainable and justified.

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30.0 Concluding Statement

This EIS has been prepared for the conversion of Shell's existing Clyde Terminal into an efficient and competitive finished petroleum products import terminal. This involves demolishing redundant refining infrastructure, and upgrading existing storage and distribution infrastructure to support the more efficient receipt, storage, product dosing and distribution of finished petroleum products. The existing Clyde Terminal is located on land owned and leased by Shell, and the converted Clyde Terminal would continue to be operated by Shell on these same parcels of land. The Clyde Terminal would be used for the receipt, storage, product dosing and distribution of high quality Gasoline and Diesel throughout the Sydney Metropolitan area and regional NSW, as well as a direct supply of Jet fuel for Sydney Airport.

The Project Area is well suited to Shell's continued operation of the Clyde Terminal for the receipt, storage, product dosing and distribution of fuels as the Project aligns with various strategic land use objectives. The Project also capitalises on existing infrastructure and the use of land that is also zoned for industrial purposes, and would decrease the environmental footprint and hazard profile of the Project Area. Changed economic forces within the refining industry led Shell to cease its refining operations, and the Project ensures the continued viability of Shell's fuel distribution and marketing activities within NSW and the maintenance of a robust and secure supply chain.

The Project, operated in accordance with the Summary of Mitigation Measures, is in accordance with the principles of ESD and the objects of the EP&A Act.

The changes derived from this Project would result in significant improvement to GHG emissions, air emissions and traffic when compared to the previous refinery operations. Consequently, the amenity of nearby industrial, commercial and residential receivers would be maintained or improved upon. Shell's ongoing waste generation – particularly in the areas of prescribed and hazardous waste – would be significantly reduced thus reducing burden on the environment and community.

Once the conversion works are complete, Shell would need to modify its staffing arrangements at the Clyde Terminal. The Project would therefore have some residual socio-economic impacts, the effects of which cannot be completely mitigated. Indeed, as the staffing requirements of the converted Clyde Terminal change, some employees may be offered redeployment (where reasonable and feasible) or made redundant. However, Shell commits to undertaking extensive consultation with those affected employees to make this transition as smooth as possible.

Whilst the Project is not anticipated to impact on Aboriginal Heritage in the vicinity of the Project Area, there would be some unavoidable impacts to European heritage at the Project Area through the demolition of infrastructure that contains rare historical value. However, it is acknowledged that it is not feasible to maintain such heritage infrastructure, and furthermore that there is little public interest value in doing so as the Project Area is a privately owned site. Historical archives are proposed to be prepared before demolition takes place, which would mitigate this demolition of heritage items to an acceptable level of impact.

In addition, there is potential for the Project to have impacts on the Commonwealth and State listed Green and Golden Bell-frog (GGBF). The Commonwealth assessment guidelines for this species require that an assessment of significance be undertaken by first considering the impacts of the activity on that species without considering the mitigating effects of suitable management measures. In this context, it is concluded that the Project may have the potential to have a minor and temporary impact on this species in some operational areas that are unnatural GGBF habitats. However, when considered in the context of the relevant mitigation measures and the extent of the non-impacted areas, it is nevertheless concluded that the impacts to this species are likely to be minor and would be manageable.

This EIS has fully considered the beneficial and adverse effects of the Project, with a full consideration of the principles of ESD as discussed above. If the mitigation measures outlined in this EIS are implemented, it is unlikely that significant adverse impacts would occur within the vicinity of the Project Area and its surrounding environment.

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