SOUTHERN LAUNCH

Whalers Way Orbital Launch Complex.

Draft Construction Environmental Management Plan (CEMP)

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Approved By:	**Andrew Curran**
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List of Acronyms

AMSA	Australian Maritime Safety Authority
CEMP	Construction Environmental Management Plan
CFS	South Australian Country Fire Service
DEW	South Australian Department of Environment and Water
DAWE	Commonwealth Department of Agriculture Water and Environment
DPC-AAR	South Australian Dept of Premier & Cabinet - Aboriginal Affairs & Reconciliation
DPTI	South Australian Dept of Planning Transport and Infrastructure
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
HMP	Heritage Management Plan
MNES	Matters of National Environmental Significance
NVC	South Australian Native Vegetation Council
PIRSA	South Australian Dept of Primary Industries and Regions
SAAS	South Australian Ambulance Service
SAPOL	South Australian Police
SEB	Significant Environmental Benefit
SEDMP	Soil Erosion and Drainage Management Plan
WWOLC	Whalers Way Orbital Launch Complex

1. INTRODUCTION

SOUTHERN LAUNCH proposes to establish and operate the Whalers Way Orbital Launch Complex (WWOLC) using an environmental management framework (EMF) that is consistent with Australian Standards (i.e. AS/NZS ISO 14001:2015 Environmental Management Systems).

Southern Launch has developed a strategy to manage potential environmental impacts during the construction of the Whalers Way Orbital Launch Complex. This strategy will be fully defined during the detailed design process. Construction activities at the Whalers Way site will ultimately be managed through the development and implementation of Environmental Management Plans (EMP) incorporating all relevant construction activities.

The overall goal of this Draft Construction Environmental Management Plan (CEMP) is to avoid, mitigate, manage and/or control any potential adverse impacts of the construction activities associated with the development on the biological, physical, social or economic environment. The CEMP would also give effect to any approval conditions imposed, and all commitments made by Southern Launch.

This Draft CEMP has been prepared for the purpose of the supporting the Environmental Impact Statement as part of the assessment of the application for the facility as a major development pursuant to Section 46 of the Development Act, 1993. This plan will ultimately be reviewed and updated during detailed design as a final CEMP prior to construction commencing.

1. Site Location

The subject land site is located at the southern tip of the Eyre Peninsula in South Australia. The site is approximately 25 km south of Port Lincoln in the area named Sleaford and is commonly known as “Whalers Way”. The location of the site is shown on Figure 1 below.

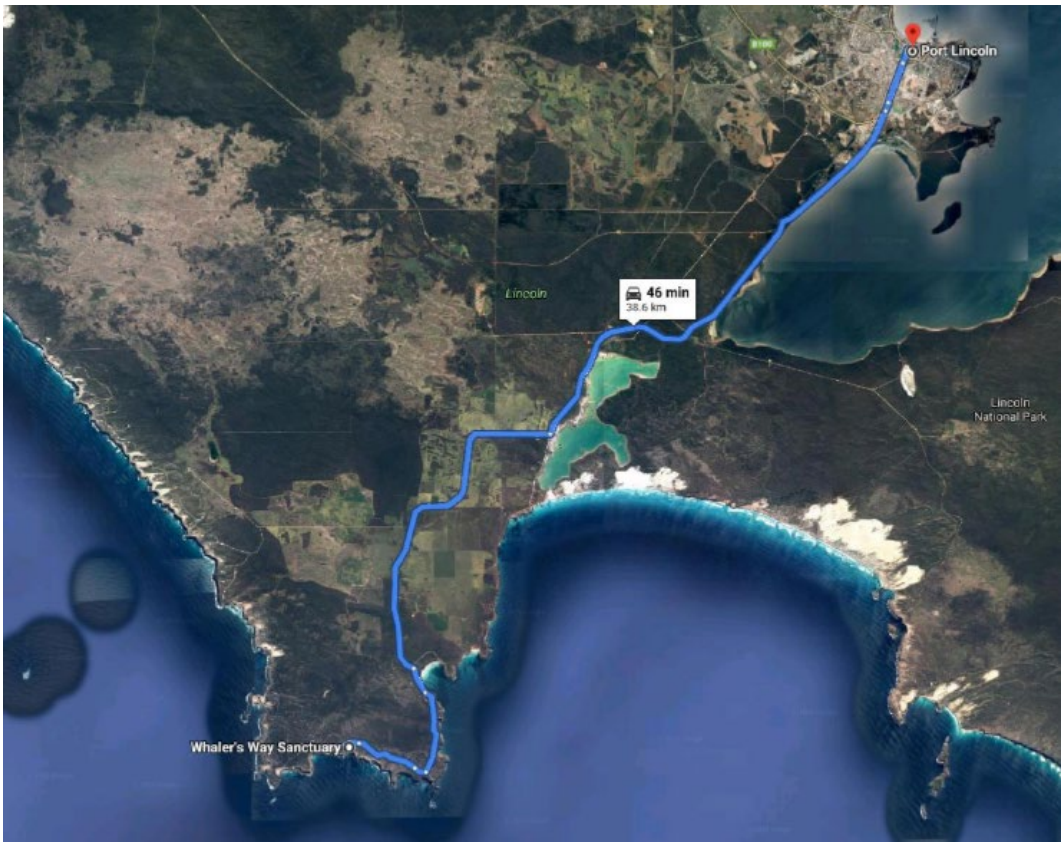

Figure 1 – Port Lincoln to Whalers Way

2. Facility Operations

Southern Launch is constructing a launch facility which will efficiently and safely cater for a broad range of clients with launch vehicles ranging from less than 1 tonne to approximately 100 tonnes. Fuel types catered for include solid, hybrid and liquid.

Southern Launch are responsible for the supply of infrastructure to a set interface. The client is responsible for the design of infrastructure/equipment beyond that interface line. The client can contract aspects of their design and/or fabrication to Southern Launch if they desire. The client can design their equipment to match the various interfaces, or contract Southern Launch to undertake that design.

- The total site area is 2640 hectares.
- Southern Launch will be developing the following infrastructure on the site,

SITE	AREA (incl 10m Buffer Zone) m	DESCRIPTION
Launch Site A	55,300	Rocket Launch Facility designed to cater to orbital vehicles between 30 tonne and 100 tonne mass. Facilities include launch pad, flame trench, water deluge, fuel/oxidiser facilities, assembly building and utilities.
Launch Site B	54,950	Rocket Launch Facility designed to cater to orbital and sub orbital vehicles between 20 kg and 60 tonne mass. Facilities include launch pad, flame trench, water deluge, fuel/oxidiser facilities, assembly building and utilities.
Workshop Area	62,000	Workshop/Warehouse for site general maintenance. Main water storage dam (30 ML). Potentially could be a site for future power generation and or storage.
Range Control	9,300	Control room and facility for rocket launches. Conventional single level office building.

1. Components to be Constructed

a) Components of the Launch Facilities (Sites A and B)

- Assembly building – 48m long x 24m wide industrial shed with 8m (H) eaves.
- Runway – 200m long, asphalt construction.
- Launch Pad
- Flame Trench
- Flame Diverter
- Water Deluge System
- Fuel and Oxidiser Storage and Delivery
- Flare stack pipework and tanks.
- Lidar System.
- Utilities

b) Components of Workshop Area

- Workshop/warehouse – 15m long x 10 wide
- Main water storage (30 ML dam)
- Utilities
- Vehicle Parking Areas
- Explosives Storage Pad
- Potential for Power Generation or Storage Facilities in the Future

c) Components of the Range Control Area

- Range Control Building – Conventional single level office building 25m long by 12 m wide.
- Roads and Parking
- Utilities
- Lighting
- Fire Fighting
- Landscaped Areas

2. Application of the CEMP to Construction

- The CEMP would apply to all contractors and sub-contractors involved in the construction of the facility.
- The CEMP and relevant plans would be included in contractor documentation.
- The CEMP would be finalised following approval being granted for the facility. Comments and submissions from the public and agencies may be incorporated into the CEMP.
- It is anticipated that conditions of any approval would require the final CEMP to be submitted to the relevant government agencies for further approval before construction activities commence.
- The practical implementation of the CEMP is structured around environmental aspects and key construction activities that have a potential risk for environmental impact. The implementation of the management controls to lower risks to acceptable levels is therefore required.

3. Roles and Responsibilities

All personnel involved in the project including Southern Launch employees, contractors and sub-contractors, are required to work in accordance with this CEMP, and in accordance with all relevant Acts, Policies and Regulations.

Table 1 - Roles and Responsibilities outlines the roles and responsibilities for the implementation of the CEMP. Throughout detailed planning and construction phases, names will be allocated to the roles prescribed in the CEMP.

Table 1 - Roles and Responsibilities

Role	Responsibility
Southern Launch	Responsible for implementing requirements set for the development in legislation, regulation, codes of practice, and industry standards and implementing its environmental policy to minimise impacts and demonstrate commitment to sustainable practices.
	Ultimately responsible for compliance.
Southern Launch - Whalers Way Site General Manager	Promoting the culture of environmental protection and providing clear expectations and guidelines.
	Overseeing the involvement of all internal and external stakeholders and addressing issues raised.
	Supporting the Project Manager in resourcing project teams.
	Ensuring resources are provided to implement the EMF.
	Intervening, if required, to ensure any deviation from EMF requirements is corrected.
	Reporting to the Southern Launch Board.
Southern Launch - Whalers Way Site Project Manager	Ensuring that CEMP requirements are communicated to all relevant contractors and consultants involved in the construction at Whalers Way.
	Overseeing the development and implementation of the CEMP.
	Ensuring that sufficient funds are available for the implementation of the CEMP.
	Ensuring that all environmental management requirements in the CEMP are understood.
	Ensuring that environmental management requirements are clearly communicated to all relevant contractors via appropriate inductions.
	Providing contractors with written instructions/protocols/methods regarding environmental management requirements.
	Monitoring performance and report on progress against CEMP objectives
	Intervening, if required, to ensure any deviation from CEMP requirements is corrected.
	Reviewing and updating the CEMP as required.

Role	Responsibility
Southern Launch - Whalers Way Construction Managers	Ensuring that all environmental management requirements in the CEMP are clearly communicated to all relevant contractors via appropriate inductions.
	Providing contractors with written instructions/protocols/methods regarding environmental management requirements and responsibilities.
	Ensuring all necessary environmental approvals and licences are secured before work begins.
	Ensuring and monitoring compliance of construction activities with conditions of relevant licences, permits and the CEMP.
	Liaising with EPA and other regulatory authorities as required.
	Intervening, if required, to ensure any deviation from CEMP requirements is corrected.
	Notifying any legislative breaches or environmental incidents to authorities.
	Responding to any complaints received.
Southern Launch - Whalers Way Contractors	All contractors must take their environmental responsibilities seriously and diligently following all environmental procedures communicated to them by their supervisors.
	Undertaking all required inductions and/or environmental awareness training before starting work on site.
	Reporting any environmental incidents to the Construction Manager immediately.
Southern Launch - Whalers Way Environmental Manager	Ensure the CEMP is implemented, and update documentation as required to reflect environmental legislation, design or operational changes.
	Coordinate monitoring programs and reporting to authorities.
	Manage environmental incidents and responses.
	Ensure that Southern Launch environmental policy is reviewed annually.
	Manage environmental matters in relation to stakeholder engagement.
	Coordinate environmental awareness training and implement sustainability initiatives.

4. Training

All Whalers Way Orbital Launch Complex staff and contractors are required to undertake training in environmental management as part of their induction to the site and its activities before their participation in any construction activities can begin.

Induction training will address:

- Background to the Whalers Way Orbital Launch Complex project
- Approval conditions, and the role of the EMPs
- Legislative requirements of the company and individuals
- Key personnel and roles
- Whalers Way Orbital Launch Complex EMPs
- Environmental issues at the site and relevant management plans and procedures
- Community issues related to the project and relevant management plans and procedures
- Penalties for non-compliance with required plans and procedures
- Hazard and incident reporting and management procedure
- Emergency response plan.

Job-specific training will also be required. The Whalers Way Orbital Launch Complex project manager/s would be responsible for overseeing training, through the relevant functional (e.g. environment) and area managers.

5. Environmental Legislation, Regulations and Guidelines

The following environmental legislation, regulations and guidelines provide the regulatory framework around which the CEMP is based:

- Environment Protection Act 1993
- Environment Protection (Water Quality) Policy 2015
- Environment Protection (Air Quality) Policy 1994
- Environment Protection (Noise) Policy 2007
- National Environment Protection (Ambient Air Quality) Measure
- National Environment Protection (National Pollutant Inventory) Measure
- Guideline for Air Quality Impact Assessment Using Design Ground Level Pollutant Concentrations (EPA South Australia 2006)
- Guideline for the use of the Environment Protection (Noise) Policy (EPA South Australia 2007)
- Guidelines for the Assessment and Remediation of Groundwater Contamination (EPA South Australia, 2009)
- Space (Launches and Returns) Act 2018
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ 2000).
- Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention, 1972)
- 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 (London Protocol)

Southern Launch will also ensure that its employees have relevant permits and that contractors provide copies of their permits and licences to Southern Launch. Contractors are also required to be responsible for ensuring their staff have relevant permits and licences before they commence work on the development.

The CEMP seeks adherence to the conditions of these licences, ensuring that all onsite works are compliant.

6. Environmental Aspects

The environmental aspects are defined as elements of an organisation's activities, products or services that could interact with the environment. A significant environmental aspect has, or could have, a significant environmental impact (AS/NZS ISO 14001:2015). The significant environmental aspects for the proposal were identified from the environmental assessment and are shown in Table 2 - Environmental Aspects below.

Table 2 - Environmental Aspects

Environmental Aspect	Objective	Activity	Potential Impacts
Native Vegetation Clearance Native Vegetation Clearance Soil Disturbance Excavation Spread of Pest Plants and Animals	Minimise loss of abundance or diversity of native vegetation Minimise loss of native Fauna	Construction Activities Road Improvement Activities Vehicle Movements	Loss of additional vegetation beyond the approx 23.76 hectare of native vegetation (very poor to good condition) from the 2640 Ha site identified in the site footprint. Loss of fauna habitat Potential displacement of fauna Potential fauna fatalities resulting from vehicle movements
Biosecurity Introduction or spread of pest animals, plants or diseases.	Minimise the risks to the biosecurity status of the Whalers Way site. To minimise the risk of adverse impact on the biodiversity status of locations around the Whalers Way site.	Vehicle Movements	Introduction of pest species and/or diseases which could negatively impact on the ecosystem.

Environmental Aspect	Objective	Activity	Potential Impacts
Terrestrial Fauna Traffic Movements Noise Generation	Minimise impact on terrestrial fauna species No significant adverse impacts to listed threatened species (South Australia and Commonwealth) population in the development area	Construction Activities Vehicle movements	Potential impacts on native animals which inhabit the area such as kangaroos and emus. Potential impacts on ground dwelling birds such as the Emu Wren and Western Whipbird. Potential fatalities of terrestrial fauna from vehicle impacts
Generation of Waste and Discharges Stormwater runoff Waste generation Accidental release/spill of fuels or chemicals	Ensure the quality and quantity of discharged surface water and stormwater effected by site activities meets the required standards No adverse effects on water table quality No significant contamination of soils as a result of storage and/or use of fuels or chemicals Minimise the generation of waste Maximise reuse and recycling of waste	Construction Activities Onsite fuel storage and use Onsite chemical storage and use	Accidental release/spill of fuels and/or chemicals resulting in soil and/or water contamination Generation of waste requiring disposal Pollution which impacts of local flora and/or fauna

Environmental Aspect	Objective	Activity	Potential Impacts
	Ensure all waste is disposed of in accordance with all relevant legislation.		
Emissions from Plant and Equipment Noise and vibration generation Dust generation	No adverse public nuisance impact from noise/vibration or dust generation	Construction activities	Potential temporary noise disturbance to neighbouring farms - this is considered highly unlikely do to the distance between the site of construction works and the neighbouring properties Potential temporary dust disturbance to neighbouring farms - this is considered highly unlikely do to the distance between the site of works and the neighbouring properties

Environmental Aspect	Objective	Activity	Potential Impacts
Community Interaction Changes to Visual Amenity Light emissions Noise Emissions Socio economic values	Ensure the impacts to amenity are reduced to as low as possible No adverse public nuisance impact from noise or light emissions from the site To maintain or improve the existing social and economic values of the region	Construction Activities Vehicle movements	The construction sites are not visible from any point on land which is outside the Whalers Way site. The construction sites are a considerable distance from the site boundaries and it is highly unlikely that people off the site will detect light, noise or visual impacts The sites are generally not visible from the sea except for a few small areas. The impact is highly likely to be negligible. There will be vehicle movements along Fisheries Bay Road, but the volume of vehicle movements is likely to decrease from current levels due to a reduction in tourism generated movements
Marine Disturbance Water quality Impact on marine animals	No negative impact on sea water quality No significant adverse impacts to specified marine environmental values of Whalers Way and Liguanea Island	Construction activities	Noise impacts on marine birds or seals on Liguanea Island - considered to be highly unlikely due to location of construction activities Pollution of sea water from construction activities - considered highly unlikely due to location of construction activities

7. Land Disturbance

Numerous activities associated with the construction of Whalers Way Orbital Launch Complex have the potential to cause land disturbance. The aspects of the development related to land disturbance include:

- Site clearance and excavation for construction of the proposed infrastructure.
- Upgrading of the access road.

Potential impacts associated with these aspects include:

- loss of additional vegetation beyond the approx. 23.76 ha of remnant native vegetation (very poor to good condition) identified in the site footprint
- loss of fauna habitat
- potential impacts on Aboriginal or non-Aboriginal heritage items
- unanticipated disturbance of contaminated soil
- potential for introduction of pest plant species or disease through contaminated soil on vehicles, construction equipment and landscaping materials, including plants.

1. Legal and Other Guidance

- Environmental Protection Act 1993
- Environment Protection and Biodiversity Conservation Act 1999
- Native Vegetation Act 1991
- Aboriginal Heritage Act 1988
- Biosecurity Act 2015
- Natural Resources Management Act 2004
- Plant Health Act 2009
- Livestock Act 1997
- EPBC Environmental Offsets Policy 2012
- South Australian Biosecurity Policy 2017-2021 (PIRSA)
- National Environment Protection (Assessment of Site Contamination) Measure 1999
- Space (Launches and Returns) Act 2018

2. Values

The environmental values to be protected include:

- Remnant vegetation
- Terrestrial ecosystems
- Aboriginal and non-Aboriginal heritage
- Soil quality
- Ground water quality

3. Objectives

- No introduction of new weeds or pests, nor material increase in the abundance or area of existing weed or pest species
- Minimal impact of abundance or diversity of native vegetation
- Minimal impact on native animals
- Minimal impact to Aboriginal or non-Aboriginal heritage items (unless prior approval obtained from relevant government agency).
- Any impact on soils to be within required legislative tolerances.
- Any impact on groundwater to be within required legislative tolerances

4. Environmental Management Measures

The management measures to be implemented during construction activities are provided in Table 2 - Land Disturbance Management. Stand-alone management plans and/or procedures would be developed prior to the commencement of construction to address specific activities that may result in land disturbance.

These include:

- Native Vegetation Management Plan
- Flora and Fauna Management Plan
- Offset Implementation Plan
- Planting Guide
- Coastal Acid Sulphate Soil (CASS) Management Contingency Plan
- Contamination Management Contingency Plan
- Stormwater Management Plan
- Heritage Management Plan

Table 3 - Land Disturbance Management

Management Item	Responsibility	Management Measure
Terrestrial Ecosystems	WWOLC Project Director	The proposed footprint has been minimised to reduce impact
		Sites have been positioned in areas already disturbed as far as possible to reduce impact
		Under the Native Vegetation Act 1991, clearing a small amount of terrestrial native vegetation would require the preparation of an offset strategy developed in consultation with the Native Vegetation Council. The offset package would likely include and on-ground SEB to protect and area of vegetation and provide fauna habitat
		Prior to construction commencing, set-out of the sites will occur by a licensed surveyor, supervised by the ecological consultant. Site footprints and access routes will be clearly identified, with 'no-go' and go-slow' areas also identified, set out and clearly marked with readily identifiable markings.
		A digitised model of the set out, including 'no-go' and 'go-slow' areas will be made available to all contractors, and all constructions vehicles with precision guidance systems will have the set-out model loaded into those systems.
		Training and induction processes will include detailed instruction on the set-out model and the importance of ensuring that site boundaries are observed and respected at all times.
		All reasonable precautions would be taken throughout construction to prevent bushfires resulting form human activity associated with the development
		Development of the road network has utilised existing roads and tracks to minimise impact
Matters of National Environmental Significance	WWOLC Project Director Main contractor Project Manager All staff and contractors	Standard vehicle hygiene protocols will be followed to reduce the risk of introducing or spreading pest plants, pest animals and/or pathogens
		Weeds and pest species will be appropriately managed
		Any spill or pollution incidents and any trends in their occurrence will be monitored
		Any marine spill and/or pollution incident will be reported to the Australian Maritime Safety Authority (AMSA)
		Any terrestrial spill and/or pollution incident will be reported to the relevant state or federal authority as required by the relevant legislation

Management Item	Responsibility	Management Measure
	All site visitors	Should any Western Whipbird or Emu Wren be injured by a vehicle, it shall be taken to a vet in Port Lincoln for treatment and the incident reported to the Department of Environment and Water
		Should any Western Whipbird or Emu Wren be killed by a vehicle, it shall be frozen and delivered to the local office of the Department of Environment and Water so the bird can be subject to autopsy for research purposes
Groundwater and Surface Water	WWOLC Project Director Main Contractor Project Manager	A Contamination Management Contingency Plan will be developed for the management of contamination should it be unexpectedly found during works. The plan will developed by the main contractor and will meet EPA requirements.
		A CASS Management Contingency Plan will be developed for deeper excavation work by the main contractor. The Plan will provide contingent actions for minimising exposure of CASS and treatment if such soils were exposed
		A soil management plan will be developed by the main civil contractor to guide specific sampling of surplus soil (either in situ or once stockpiled) to determine waste classification and disposal options, should surplus soil requiring offsite disposal be generated.
		During the construction phase, a Soil Erosion and Drainage Management Plan (SEDMP) will be implemented in accordance the Environmental Protection Act 1993
Heritage	WWOLC Project Director	A Heritage Management Plan will be developed to minimise potential impacts on any unanticipated discovery of heritage items. Plan requirements include: An aboriginal heritage and European heritage induction procedure for construction staff A site discovery protocol for construction activities
		If a potential Aboriginal heritage site were discovered. The discovery will be immediately reported to the WWOLC Project Director who will inform DPC-AAR

Management Item	Responsibility	Management Measure
		Under s.27(2) of the Heritage Places Act 1992, the discovery of any non-aboriginal archaeological artifact of heritage significance must be reported to the South Australian Heritage Council. The HMP would include site discovery protocol that details the steps to be taken if a non-aboriginal artefact of potential heritage significance is discovered. The protocol would include reporting the items to the South Australian Heritage Council
		If a potential Aboriginal or European heritage item were discovered. The following steps would be taken All activity in the area will immediately stop The area will be clearly identified and secured No material will be removed from the suspect site until cleared by the WWOLC PD The construction site manager and the WWOLC PD will be immediately informed of the situation The construction site manager will contact the relevant government department to report the potential discovery The site will be assessed by a suitable qualified and experienced expert as directed by the relevant government department If the area is not deemed as a heritage site, the WWOLC PD will give permission for works to recommence If the area is deemed a heritage site, the WWOLC PD will liaise with the relevant authorities and stakeholders to determine the appropriate management strategy. This may require a permit, authorisation form or notification process to the relevant government authority before works can recommence.

5. Assessment Criteria and Monitoring

Assessment Criteria	Monitoring
All native vegetation clearance approved under the Native Vegetation Act 1991.	Post clearance audit of cleared areas versus approved clearance areas.
No evidence of increased pest animals in the development area.	Regular inspections of waste storage facilities and pest control devices.
No spread of existing weed species or introduction of new weed species to the development area.	Regular site inspection for declared weed species.
No unauthorised disturbance to Aboriginal or European heritage.	Staff trained to identify potential heritage items and trained to react appropriately
No land contamination from leaks or spills of fuels or chemicals.	Regular inspection of fuel/chemical storage areas.

6. Reporting

- Any suspected breaches of authorised clearance areas to be reported to DEW, with SEB offsets to be revised where required.
- Any observed increases in weeds or pests to be reported to the WWOLC Project Director.
- Should any heritage items or sites be discovered within the development area, findings will be reported and recorded as detailed in the Heritage Management Plan.
- Any leaks/spills of fuels or chemicals to be reported to WWOLC Project Director and the relevant authorities as required by the relevant legislation.
- Compliance reporting would be undertaken in accordance with relevant licences/permits issued by government regulators.

7. Non-conformance

- Any unplanned disturbance or clearance that is beyond the extent described in the Draft EIS would result in an increase area under the SEB.
- Should any heritage items or sites be discovered, relevant work activities would be reduced or ceased in accordance with the Heritage Management Plan.
- Should an Emergency Plant Pest or suspected Emergency Plant Pest (declared under the Plant Health Act 2009) be detected in the development area, implement the Terrestrial Biosecurity Response Procedure and notify the relevant authorities.
- Non-conformances would be reported to the WWOLC Project Director and appropriate corrective action undertaken.

8. Key Government Departments

- Commonwealth Department of Agriculture, Water and the Environment (DAWE)
- Attorney General's Department – Planning and Land Use Services (AGD-PLUS)
- Department for Environment and Water (DEW)
- Native Vegetation Council (NVC)
- Environment Protection Authority (EPA)
- South Australian Heritage Council
- Department of Primary Industries and Regions, South Australia (PIRSA)
    - Biosecurity SA
- Department of the Premier and Cabinet
    - Aboriginal Affairs and Reconciliation (DPC - AAR)

8. Terrestrial Fauna and Flora

The construction of the Whalers Way Orbital Launch Complex will result in risks to terrestrial fauna around the area of works. The aspects of the development related to interaction with terrestrial fauna include:

- traffic movements
- excavation and vegetation removal
- noise generation.

Potential impacts associated with these aspects include:

- Impacts on native animals that potentially inhabit the site
- Displacement of native fauna during construction
- Road kills of native fauna
- Disturbance to fauna, particularly the Western Whipbird and the Emu Wren.

1. Legal and Other Guidance

- Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
- MNES Significant Impact Guidelines
- National Parks and Wildlife Act 1972
- Environment Protection (Noise) Policy 2007
- Guideline for the use of the Environment Protection (Noise) Policy (EPA South Australia 2007).

2. Values

The environmental values to be protected include:

- Terrestrial ecosystems
- Terrestrial fauna, particularly the Western Whipbird and the Emu Wren.

3. Objectives

- To minimise the disturbance to terrestrial fauna.
- To minimise adverse impacts to listed threatened species (South Australia and Commonwealth) populations in the development area.

4. Environmental Management Measures

The management measures to be implemented during construction activities are provided in Table 3 - Terrestrial Fauna Management. Stand-alone management plans and/or procedures would be developed prior to the commencement of construction to address specific activities that may result in interaction with terrestrial fauna. These include:

- Native Vegetation Management Plan
- Flora and Fauna Management Plan
- Offset Implementation Plan

Table 4 - Terrestrial Fauna and Flora Management

Management Item	Responsibility	Management Measure
Terrestrial Ecosystems	WWOLC Project Director	Measures implemented to reduce risk of native animals being killed by vehicle, including Warning signs to alert drivers of the presence of native animals Reduced on site speed limit Induction process to highlight the risks
		The CEMP will require the inclusion of any Commonwealth and State approval conditions stipulated for vegetation clearing with regards to fauna management. This may include a trapping program, presence of wildlife spotters onsite during clearing, and clearing being undertaken from disturbed areas toward undisturbed areas to encourage fauna to move away from the clearing operation.
		Design and operation measures to minimise the potential impacts
		Trenching guidelines, including appropriate temporary fencing and exit ramps, to ensure uncovered trenches do not pose a risk to fauna during construction
		Feral animal control program to be implemented
		Waste minimised and controlled to avoid attracting predators and scavengers
		A Weeds and Pests Sub-plan will be developed as a component of the CEMP and OEMP in accordance with the Development Act, the NV Act and relevant LSA board recommendations. The Weeds and Pests Sub-plan will ensure weed control methods for threatened species will be done in accordance with the relevant Recovery Plan for the species (i.e. the Western Whipbird (eastern) National Recovery Plan).
Matter of National Environmental Significance		The sites major road network will be regularly inspected for dead or injured wildlife. Dead wildlife will be removed to decrease feral cat and fox attractors.
		The general area will be inspected prior to construction commencing by a suitably qualified ecological professional. If Western Whipbird or Emu Wren nests are located, the professional will determine the strategy to relocate the nest.

		Vehicle strike data will be reviewed to determine any trends to assist in continuous improvement
		Inductions will include information so staff, contractors and visitors can identify significant species
		Feral cat sightings will be reported via the Feral Cat Scan app
		Southern Launch will support either Adelaide University and/or University of South Australia to conduct post graduate studies (masters or PhD) on the Western Whipbird and Emu Wren to lead to greater understanding of the species and to understand what, if any, Southern Launches operations have on these species.
Noise, Vibration and Lighting	WWOLC Project Director	Process and equipment that generate lower noise levels will be selected when feasible
		Acoustic enclosures or barriers will be installed around above ground equipment are predicted to exceed the relevant noise level targets at sensitive land uses, where safe and practical
		Truck movements on local roads would be limited as much as practicable and vehicles with larger load capacity chosen where possible to reduce the number of vehicle movements
		Truck movements on site roads will be restricted to a low speed limit – maximum 40km/h on site roads and maximum 10 km/h on work sites
		Equipment which is used intermittently will be shut down or throttled down to a minimum when not in use Equipment will be well maintained and have mufflers/silencers installed to meet the manufacturers specifications where relevant Metal to metal contact will be avoided where feasible Staff instructed not to drop material from a height unless dropping on to a surface (eg loose soil) which will dampen the noise The area of works is not visible from off site (landside) so visual impact is not a factor The area of works is not visible from off site (landside) so lighting impact is not a factor. Works will be kept to daylight hours as much as is practicable.

Management Item	Responsibility	Management Measure
Pre Construction Activities	WWOLC Project Director	All contractors are to be briefed on clearing requirements and restrictions (including fines) to prevent over-clearing of these areas.
		Clearing extents will be limited to the area of the permanent and temporary works, avoiding impacts tonative vegetation and habitats as far as practicable.
		Ensure all necessary permits and approvals are in place prior to the commencement of construction.
		Topsoil stockpiles will be a maximum of 3 m in height to avoid heat sterilisation of the seed bank. Further information will be detailed in the SEDMP.
		Topsoil stockpiles will be managed to maintain the viability of soil seed banks for flora species. Further information will be detailed in the SEDMP.
		Use vegetation clearing methods that encourage natural regeneration of rootstock, minimise land disturbance and maintain soil stability.
		Vegetation clearing to be undertaken in a sequential manner to allow fauna present sufficient time and space to move out of the area of their own accord, rather than being forcefully moved.
		Apart from initial earthworks to construct access tracks and hardstand areas, ensure all vehicles and construction equipment always utilise dedicated access tracks and hardstands within the Project Area and do not travel outside of these areas.
		Construct windrows (small soil berms) on the edge of access tracks and hardstands to delineate the boundary and prevent vehicles and construction equipment damaging vegetation beyond the construction impact zone.
		Ensure all physical flora control measures, such as windrows, signage and exclusion barriers/bunting are checked and maintained on a regular basis (weekly as a minimum).
		Where construction work (e.g. excavation) is required beneath the canopy of a tree, ensure that it is carried out carefully and by hand to avoid damage by equipment•This is to be guided

		by best practice and, where relevant, as per Tree Protection Zones detailed inAS49702009 Protection of Trees on Development Sites.
		Cease work immediately in relevant areas if any previously unknown threatened flora species are encountered.
		Display a fact sheet on threatened flora species on site notice boards and in lunchrooms.
		Do not disturb the ground beneath the canopy of any tree that is not in the approved clearance footprint and ensure that vehicles, construction equipment, materials or waste are not located beneath the canopy of any tree.
		A Weeds and Pests Sub-plan will be developed as a component of the CEMP and OEMP in accordance with the Development Act, the NV Act and relevant LSA board recommendations. The Weeds and Pests Sub-plan will ensure weed control methods for threatened species will be done in accordance with the relevant Recovery Plan for the species (i.e. the Western Whipbird (eastern) National Recovery Plan).
Post Construction Activities		A Rehabilitation Management Sub-plan will be developed for the Project, as a component of the CEMP and OEMP. As a minimum it will establish the following: -Location-specific objectives for rehabilitation of temporarily disturbed areas, reinstatement and/or stabilisation -Timeframes for rehabilitation and/or reinstatement/stabilisation works to be achieved - Details of the actions and responsibilities to progressively rehabilitate, regenerate, and/or revegetate areas, consistent with the agreed objectives -Include rehabilitation requirements such as: ♣Tyning and ripping of base and sub-base material; ♣Application of soil ameliorants; ♣Topsoiling and/or compost blanket; ♣Stabilisation and rehabilitation (e.g. planting and or seeding). -Consideration for maintenance or performance issues of rehabilitation e.g. vegetation that does not grow and obscure signals or impact the longevity of rail infrastructure

		-Procedures, timeframes, measurable performance objectives and responsibilities for monitoring the success of rehabilitation and/or reinstatement/stabilisation areas -Where temporary construction facilities are required, land shall be returned to a stable condition that complies with the conditions of applicable regulatory approvals.
		Restriction of the Project Area as far as practical, to that required to safely and efficiently construct and operate the Project. In doing so, avoid areas of MNES, NPW Act listed receptors and their associated habitat, where possible, thereby minimising significant adverse residual impacts to these matters.
		A biodiversity and native vegetation offset strategy will be developed in consultation with the NVC (SA) and the DAWE (Commonwealth), only if required.
Noise, Vibration and Lighting	WWOLC Project Director	Process and equipment that generate lower noise levels will be selected when feasible
		Acoustic enclosures or barriers will be installed around above ground equipment are predicted to exceed the relevant noise level targets at sensitive land uses, where safe and practical
		Truck movements on local roads would be limited as much as practicable and vehicles with larger load capacity chosen where possible to reduce the number of vehicle movements
		Truck movements on site roads will be restricted to a low speed limit – maximum 40km/h on site roads and maximum 10 km/h on work sites
		Equipment which is used intermittently will be shut down or throttled down to a minimum when not in use

		Equipment will be well maintained and have mufflers/silencers installed to meet the manufacturers specifications where relevant Metal to metal contact will be avoided where feasible Staff instructed not to drop material from a height unless dropping on to a surface (eg loose soil) which will dampen the noise The area of works is not visible from off site (landside) so visual impact is not a factor The area of works is not visible from off site (landside) so lighting impact is not a factor. Works will be kept to daylight hours as much as is practicable.

5. Assessment Criteria and Monitoring

Assessment Criteria	Monitoring
No preventable death or serious injury to Western Whipbirds or Emu Wrens during clearing or construction works	Inspection of the development area prior to commencement of clearing or construction activities for Western Whipbird and Emu Wren individuals and nesting sites. Visual inspections of open trenches and excavations.
No preventable death or serious injury to any native animal species during the construction phase	Speed limits on vehicles operating on site to reduce risk
No increase in attractors for predatory feral animals such as cats and foxes	Regular inspection of road network for dead animals Staff to report any dead animals Dead animals to be removed.

6. Reporting

- Fauna encountered during pre-clearance checks to be reported to WWOLC Project Director.
- Any fauna deaths that appear to be the direct result of construction activities to be reported to the
- WWOLC Project Director and the construction and project manager/s immediately.
- Compliance reporting would be undertaken in accordance with relevant licences/permits issued by government regulators.
- Staff and contractors to report any sightings of dead animals to the construction and project manager/s immediately.

7. Non-conformance

- Unusual fauna injury/deaths to be investigated and appropriate corrective action undertaken.
- Non-conformances would be reported to the WWOLC Project Director and the construction and project manager/s immediately and appropriate corrective action undertaken.

8. Key Government Departments

- Attorney General's Department – Planning and Land Use Services (AGD-PLUS)
- Department for Environment and Water (DEW)
- Commonwealth Department of Agriculture, Environment and Water (DAWE)

9. Community Interaction

The construction of Whalers Way Orbital Launch Complex will impact the Whalers Way community in a variety of ways. The aspects of the development related to community interaction include:

- Dust emissions, noise, vibration and lighting during construction of the facility
- Effects on the local, state and national economy,
- Effects on utilities
- Effects on the community.

Potential impacts associated with these aspects include:

- Potential temporary disturbance to neighbouring landholders from noise. This impact is likely to be very low or non-existent as the site of works for Sites A, B and the warehouse sites to the nearest neighbour ranges from 3.0 km to 4.8 km. There is a significant hill between these sites and the neighbour to additionally reduce noise. Construction noise from the Range Control Centre may cause intermittent low-level disturbance.
- Effects from light disturbance are not expected as the neighbours cannot see the site of works
- Visual amenity impacts from construction are not expected as the neighbours cannot see the sites where significant works are to occur

1. Legal and other guidance

- Environment Protection Act 1993
- Environment Protection (Air Quality) Policy 1994
- Environment Protection (Noise) Policy 2007
- National Environment Protection (Ambient Air Quality) Measure
- AS4282-1997: Control of the obtrusive effects of outdoor lighting

2. Values

The environmental values to be protected include:

- Social amenity
- Visual amenity
- Local economy.

3. Objectives

- To ensure that impacts to amenity are reduced to as low as reasonably practicable
- Minimal adverse public nuisance impact from dust, noise or light emissions from the site
- To maintain or improve the existing social and economic values of the region.

4. Environmental Management Measures

The management measures to be implemented during construction activities are provided in Table 4 - Community Interaction Management. Stand-alone management plans and/or procedures would be developed prior to the commencement of construction to address specific activities that may result in community interaction. These include:

- Construction Environment Management Plan
- Bushfire Hazard Management Plan
- Heritage Management Plan

Table 5 - Community Interaction Management

Management Item	Responsibility	Management Measure
Traffic and Transportation	WWOLC Project Director	Truck movements on local roads would be limited as much as practicable and vehicles with larger load capacity chosen where possible to reduce the number of vehicle movements
		The vast majority of traffic movements generated by the construction phase will not leave the site, will not be visible from off site and should not be heard from offsite. As a result, traffic and transportation will have minimal impact on the surrounding community
		Tourism traffic will need to be restricted or eliminated during construction due to the high risk associated with members of the general public driving around heavy construction equipment
Public Safety	WWOLC Project Director	All reasonable precautions will be taken throughout construction to prevent bushfires resulting from human activity associated with the project
		Consider emergency response requirements (as per the bushfire management plan) to acknowledge the predicted increase in the number of severe fire danger days and the exposure of the workforce to work induced heat stress.
		Tourism traffic will need to be restricted or eliminated during construction due to the high risk associated with members of the general public driving around heavy construction equipment
		The cliffs around the site are high and generally undercut. There is a significant risk of cliff edges collapsing. Staff and contractors will not approach the edge of the cliffs and the general public will be restricted from access during the construction phase.
Agriculture	WWOLC Project Director	Application of measures to manage construction activities consistent with standard industry practice in Southern Australia to ensure minimal impact on our neighbours during those activities.
		Stormwater management, compacting storage/laydown/parking areas will reduce risk of negative impacts on our neighbours
		Management strategies will be implemented to limit dust generation

Management Item	Responsibility	Management Measure
		Dust suppression systems, including water damping, will be used to minimise dust generation particularly around roads and access tracks

5. Assessment Criteria and Monitoring

Assessment Criteria	Monitoring
Respond proactively to issues or complaints raised by the adjacent landowners and the community	Review of adherence to processes and timeframes in Complaints Management Procedure/Stakeholder Engagement Plan.

6. Reporting

- Record and respond to complaints in accordance with the Complaints Management Procedure/Community Engagement Plan.
- Compliance reporting would be undertaken in accordance with relevant licences/permits issued by government regulators.

7. Non-conformance

Non-conformances would be reported to the WWOLC Project Director and appropriate corrective action undertaken.

8. Key Government Departments

- Environment Protection Authority (EPA)
- District Council of Lower Eyre Peninsula
- South Australian Department of Environment and Water (DEW)
- South Australian Police (SAPOL)
- South Australian Ambulance Service (SAAS)
- South Australian Country Fire Service (CFS)

10. Generation of Waste and Discharges

Activities associated with the construction of Whalers Way Orbital Launch Complex will result in the generation of wastes and discharges, which must be managed appropriately. The aspects of the development related to the generation of wastes and discharges include:

- Stormwater runoff.
- Waste generation.
- Accidental release/spill of chemicals/fuels/diesel.

Potential impacts associated with these aspects include:

The mobilisation of potentially contaminated sediments during onshore construction activities

- Erosion/pollution due to stormwater runoff.
- Generation of wastes requiring disposal.
- Accidental release/spill of chemicals/fuels/diesel resulting in soil contamination.
- Biosecurity associated with construction operations.
- Marine pollution and effects on marine communities.

1. Legal and Other Guidance

- Environment Protection Act 1993.
- Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth).
- Dangerous Substances Act 1979.
- Biosecurity Act 2015.
- Fisheries Management Act 2007.
- Environment Protection (Water Quality) Policy 2015.

2. Values

The environmental values to be protected include:

- Terrestrial ecosystems.
- Local economy.
- Soil quality.
- Underground water quality.
- Marine water quality.
- Marine ecosystems.

3. Objectives

- No introduction of terrestrial or marine pests.
- To ensure that the quality and quantity of discharged surface water and stormwater affected by site activities meets required standards and objectives.
- No adverse effects on marine water quality.
- To minimise the generation of general wastes, maximise their reuse and recycling and ensure safe and lawful disposal of waste.

- No significant contamination of soils as a result of storage and/or use of hazardous materials.
- No significant contamination of underground water as a result of storage and/or use of hazardous materials.

4. Environmental Management Measures

The management measures to be implemented during construction activities are provided in Table 5 - Waste and Discharge Management. Stand-alone management plans and/or procedures would be developed prior to the commencement of construction to address specific activities that may result in the generation of wastes and discharges. These include:

- Stormwater Management Plan.
- Construction Management Plan.
- Biosecurity Management Plan and Response Procedure.
- Waste Management and Minimisation Plan.
- Water Quality Management Plan.
- Emergency Response Management Plan.
- Fuel and Chemical Storage and Handling Plan.

Table 6 - Waste and Discharge Management

Management Item	Responsibility	Management Measure
Terrestrial Ecosystems	WWOLC Project Director	Appropriate construction techniques will be adopted to prevent stormwater or silt to cause damage to the surrounding terrestrial environment.
Matters of National Environmental Significance	WWOLC Project Director Main contractor Project Manager	Any marine spill or pollution incidents will be reported to the Australian Maritime Safety Authority (AMSA)
		Waste and rubbish will be minimised and appropriately managed so as to not attract predators such as foxes and feral cats.
		Waste management practices will be monitored throughout construction
		All spill and pollution incidents (terrestrial or marine) and any trends in their occurrence would be monitored.
Groundwater and Surface Water	WWOLC Project Director Main Contractor Project Manager	During the construction phase of the development a Soil Erosion and Drainage Management Plan (SEDMP) shall be implemented in accordance with the Environment Protection Act 1993. A plan will be prepared to meet the requirements in accordance with the Code of Practice for the Construction and Building Industry (1999) as part of the construction documentation for the development.
		The minimisation of cleared land to minimise exposure to wind and rain.
		Construction sites will be designed to contain and manage all stormwater runoff during construction in order to eliminate uncontrolled channelling and concentrated runoff streams. No site stormwater would discharge to surface water bodies in an untreated state.
		The storage of all chemicals will be in compliance with the appropriate standards. Suitable spill kits will be kept on site at all times. Any spills will be contained and cleaned up. All spills will be reported to the relevant authority as required by law.
		Fuel and chemical storage areas will be bunded and will have an impermeable base.

5. Assessment Criteria and Monitoring

Assessment Criteria	Monitoring
No direct stormwater discharge from the construction site to the ocean or to any other surface water source.	Regular inspection of stormwater management system
Spills/accidental releases of fuel/chemicals are contained	Containment and clean-up of accidental spills will be monitored against Spill Response Plan.
All waste material to be appropriately classified and segregated for reuse, recycling or offsite disposal as per the Waste Management and Minimisation Plan.	Implement a regular inspection program to monitor storage handling and disposal of wastes as per the Waste Management and Minimisation Plan.

6. Reporting

Results of inspections would be documented and any uncontrolled releases or spills reported. All waste disposed of off-site would be documented as per the Waste Management and Minimisation Plan. Compliance reporting would be undertaken in accordance with relevant licences/permits issued by government regulators.

7. Non-conformance

Non-conformances would be reported to the WWOLC Project Director and appropriate corrective action undertaken.

8. Key Government Departments

- Environment Protection Authority (EPA)
- Department of Primary Industries and Regions, South Australia (PIRSA)
- Biosecurity SA
- Department for Environment and Water (DEW)
- Australian Maritime Safety Authority (AMSA)
- Commonwealth Department of Agriculture, Water and Environment (DAWE)

11. Emissions from Plant and Equipment

The employment of equipment used for the construction of Whalers Way Orbital Launch Complex will result in the generation emissions including noise, vibration and dust. The aspects of the development related to emissions from plant and equipment include:

- Dust emissions, noise, vibration and lighting during construction of the Whalers Way Orbital Launch Complex.

Potential impacts associated with the release of such emissions includes temporary disturbance to neighbouring farms (from noise and fugitive dust).

1. Legal and Other Guidance

- Environment Protection Act 1993
- Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth)
- Environment Protection (Noise) Policy 2007
- Environment Protection (Air Quality) Policy 2016
- Environment Protection (Water Quality) Policy 2015
- National Environment Protection (Ambient Air Quality) Measure
- Guidelines for the use of the Environment Protection (Noise) Policy (EPA South Australia 2007)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ 2000)
- Workplace Exposure Standards for Airborne Contaminants (Safe Work Australia 2013).

2. Values

The environmental values to be protected include:

- Social amenity
- Air quality
- Local economy

3. Objectives

- No adverse public nuisance impact from noise/vibration, lighting or dust generation from the site.

4. Environmental Management Measures

The management measures to be implemented during construction activities are provided in Table 6 - Emission Management. Stand-alone management plans and/or procedures would be developed prior to the commencement of construction to address specific activities that may result in emissions from plant and equipment. These include:

- Soil Erosion and Drainage Management Plan (SEDMP)
- Waste Management and Minimisation Plan
- Spill Response Plan
- Emergency Response Management Plan

Table 7 - Emission Management

Management Item	Responsibility	Management Measure
Noise	WWOLC Project Director	Processes and equipment which generate lower noise will be selected wherever feasible
		Noisy plant, access roads and site compounds will be sited as far away from neighbouring properties as is practical
		Fixed plant and equipment which emits noise in a particular direction will be sited such that noise is directed away from neighbouring properties
		Acoustic enclosures or barriers will be installed around above ground equipment where noise levels are predicted to exceed the relevant noise level targets at neighbouring properties wherever safe and practical
		Noisier construction works would be scheduled with consideration to neighbours if the generated levels are likely to cause an inconvenience at the neighbouring property
		Training and induction processes will cover noise management and complaints. This will be reinforced through ongoing training such as toolbox meetings
		Stakeholder communication will be undertaken, advising of noise generating activities or works if those activities are projected to impact the neighbouring properties
		Truck movements on local roads will be limited as much as possible.
		Equipment will be well maintained and have mufflers and silencers installed that meet the manufacturers specifications where relevant.
		Metal-to-Metal contact to be avoided where possible
		Works are only expected to be undertaken in daylight hours. Where this is not feasible, every attempt will be made to only schedule works which will not generate sufficient noise to be audible at the neighbouring properties
Vibration	WWOLC Project Director	Training and induction processes will cover vibration management and complaints. This will be reinforced through ongoing training such as toolbox meetings

Management Item	Responsibility	Management Measure
	Main contractor Project Manager	Stakeholder communication will be undertaken, advising of vibration generating activities or works if those activities are projected to impact the neighbouring property
		Low vibration plant alternatives, such as the smallest practical vibratory compactor, will be used where feasible.
Lighting	WWOLC Project Director Main Contractor Project Manager	Induction will cover lighting management and complaints. This will be reinforced through ongoing training such as toolbox meetings
		Stakeholder communication will be undertaken, advising of light generating activities or works if those activities are projected to impact the neighbouring property
Air Quality	WWOLC Project Director Main Contractor Project Manager	Unpaved roads will be watered as required to minimise dust generation
		Cleared areas during construction/land clearing will be watered as required to minimise dust generation
		Vehicle speed in construction zones will be 10 km/h
		Scheduling construction works where practical to avoid dry, windy weather conditions which are most likely to result in dust impacts on neighbouring properties

5. Assessment Criteria and Monitoring

Assessment Criteria	Monitoring
Investigation of air quality and/or noise complaints raised by the community indicates no exceedance of project air quality and/or noise criteria due to construction activities.	Daily visual monitoring and observation of dust/noise and implementation of adaptive management strategies as required.

6. Reporting

- Record and respond to complaints in accordance with the Complaints Management Procedure/Community Engagement Plan.
- Summary of monitoring results and any complaints received to be documented in monthly report.
- Compliance reporting would be undertaken in accordance with relevant licenses/permits issued by government regulators.

7. Non-conformance

Should an exceedance of nominated criteria occur (identified through monitoring or investigation of a complaint) alteration of site practices should occur which may include but is not limited to ceasing work in windy conditions, increased operational controls (e.g. additional watering, reducing level of exposed areas, relocation of noisy equipment) or more rigorous monitoring/observation.

Non-conformances would be reported to the WWOLC Project Director and appropriate corrective action undertaken.

8. Key Government Departments

- Department for Environment and Water (DEW).
- Environment Protection Authority (EPA).
- District Council of Lower Eyre Peninsula.
- Commonwealth Department of Agriculture, Water and Environment (DAWE).

12. Detailed Mitigation Strategy

The following table gives the detailed mitigation strategy

Table 8 – Detailed Mitigation Strategy

Delivery Phase	Aspect	Proposed Mitigation Measures
Detailed design	Minimisation of impacts to ecology - flora and fauna values	• Portions of the Project are located within existing access tracks and wherever possible, have been aligned to be co-located with existing access tracks to limit the amount of native vegetation and fauna habitat to be cleared. Tracks will be formalised initially into gravel roads and upgraded to asphalt in the future, which will minimise the generation of dust and potential impacts to surrounding vegetation and fauna habitat.
		• The size of the Project Area has been reduced in size from 70.58 ha to 23.76 ha through design considerations, in particular the re-design of Infrastructure Site D to position the footprint into more degraded vegetation. Southern Launch will undertake detailed design and/or construction planning to minimise the construction footprint and avoid impacts to vegetation as far as practicable.
		• Disturbance footprints will be limited to those areas required to construct and operate the works, as practical for safety, especially in regard to the clearing of native vegetation.
		• As Detailed Design progresses it will define temporary and permanent storm water, erosion and sediment/pollution control measures in a Soil Erosion and Drainage Management Plan (SEDMP), that complies with regulatory requirements. Temporary and permanent measures will be appropriate to the site conditions, responding to environmental receptors, climatic zone and seasonal factors. The SEDMP will also establish and specify the monitoring and performance objectives for handover on completion of construction.
		• Fencing around the Launch Sites A and B, Infrastructure Site D and Range Control Site E as detailed in Section 2.1 and Section 7.1.10 will be incorporated into the design to minimise risk to fauna and channel fauna toward safe movement opportunities. A 1800 mm chain mesh fence with three strands of barbed wire will be installed to ensure threatened bird species can't fly through or get caught in the fencing.
		• Firebreaks incorporated along fences to protect and mitigate one of the primary threats to EPBC listed species present.
		• All buildings and facilities are sited within the Project Area to achieve suitable clearance from vegetation for fire mitigation purposes. The siting of all buildings and facilities within the Project Area footprint achieves the minimum fire clearance requirements under the National Construction Code • Assembly building, Fuel Pad and Oxidiser pad will have firefighting services as per legislation.
		• The Project will be designed to only support micro-lift and small-lift rocket vehicles not requiring the development of large infrastructure that may have a greater impact on the surrounding environment.
		• Where necessary and possible geo-barriers will be employed to limit the potential damage from a spill or leak of liquids.

Delivery Phase	Aspect	Proposed Mitigation Measures
		• The proposed detention basins and dam will be lined with a polymer lining, a 1800 mm chain mesh fence with three strands of barbed wire will be installed around all the three open water bodies and they will be covered with a geotextile tarp or shade cloth to detract bird species, and keep pest species and native ground dwelling fauna species out of the open water bodies.
		• The CEMP and OEMP will require the inclusion of any Commonwealth and State approval conditions stipulated for vegetation clearing with regards to fauna management. This may include a trapping program, presence of wildlife spotters onsite during clearing, and clearing being undertaken from disturbed areas toward undisturbed areas to encourage fauna to move away from the clearing operation.
		• The CEMP and OEMP to be prepared for this Project will incorporate mitigations measures proposed in this table, and further progressed mitigation measures that are developed as the Project progresses through approval pathways.
	Weeds and pests	• A Weeds and Pests Sub-plan will be developed as a component of the CEMP and OEMP in accordance with the Development Act, the NV Act and relevant LSA board recommendations. • The Weeds and Pests Sub-plan will ensure weed control methods for threatened species will be done in accordance with the relevant Recovery Plan for the species (i.e. the Western Whipbird (eastern) National Recovery Plan).
	Water quality	• Stormwater is to be captured on each launch pad site and no stormwater is to leave any site. Launch Site A, Launch Site B and Range Control Site E will have swales along the site boundaries. Infrastructure Site D has a large catchment area and it is planned to install a dam (possibly 30 ML) to supply the site's water needs. The dam would be the quarry site to supply engineered road materials.
		• Initially, all water needs will be supplied by water trucked onto the individual sites and stored in 25,000L on site. Once the dam is constructed, water would be supplied in each site's stormwater detention basin from Infrastructure Site D via direct pumped mains. This water would then be used for deluge, fire and irrigation.
	Noise	• A water deluge system and flame trench has been included in the design to mitigate noise impacts, which reduce the noise level by approximately 5-10dB.
	Post construction - rehabilitation	• A Rehabilitation Management Sub-plan will be developed for the Project, as a component of the CEMP and OEMP. As a minimum it will establish the following: - Location-specific objectives for rehabilitation of temporarily disturbed areas, reinstatement and/or stabilisation - Timeframes for rehabilitation and/or reinstatement/stabilisation works to be achieved - Details of the actions and responsibilities to progressively rehabilitate, regenerate, and/or revegetate areas, consistent with the agreed objectives - Include rehabilitation requirements such as:

Delivery Phase	Aspect	Proposed Mitigation Measures
		▪ Tyning and ripping of base and sub-base material; ▪ Application of soil ameliorants; ▪ Topsoiling and/or compost blanket; ▪ Stabilisation and rehabilitation (e.g. planting and or seeding). - Consideration for maintenance or performance issues of rehabilitation e.g. vegetation that does not grow and obscure signals or impact the longevity of rail infrastructure - Procedures, timeframes, measurable performance objectives and responsibilities for monitoring the success of rehabilitation and/or reinstatement/stabilisation areas - Where temporary construction facilities are required, land shall be returned to a stable condition that complies with the conditions of applicable regulatory approvals.
	Offsets	• Restriction of the Project Area as far as practical, to that required to safely and efficiently construct and operate the Project. In doing so, avoid areas of MNES, NPW Act listed receptors and their associated habitat, where possible, thereby minimising significant adverse residual impacts to these matters.
		• A biodiversity and native vegetation offset strategy will be developed in consultation with the NVC (SA) and the DAWE (Commonwealth), only if required.
Pre-construction/ Construction	Native vegetation and flora	• All contractors are to be briefed on clearing requirements and restrictions (including fines) to prevent over-clearing of these areas.
		• Clearing extents will be limited to the area of the permanent and temporary works, avoiding impacts to native vegetation and habitats as far as practicable.
		• Ensure all necessary permits and approvals are in place prior to the commencement of construction.
		• Topsoil stockpiles will be a maximum of 3 m in height to avoid heat sterilisation of the seed bank. Further information will be detailed in the SEDMP.
		• Topsoil stockpiles will be managed to maintain the viability of soil seed banks for flora species. Further information will be detailed in the SEDMP.
		• Use vegetation clearing methods that encourage natural regeneration of rootstock, minimise land disturbance and maintain soil stability.
		• Vegetation clearing to be undertaken in a sequential manner to allow fauna present sufficient time and space to move out of the area of their own accord, rather than being forcefully moved.

Delivery Phase	Aspect	Proposed Mitigation Measures
		• Apart from initial earthworks to construct access tracks and hardstand areas, ensure all vehicles and construction equipment always utilise dedicated access tracks and hardstands within the Project Area and do not travel outside of these areas.
		• Construct windrows (small soil berms) on the edge of access tracks and hardstands to delineate the boundary and prevent vehicles and construction equipment damaging vegetation beyond the construction impact zone.
		• Ensure all physical flora control measures, such as windrows, signage and exclusion barriers/bunting are checked and maintained on a regular basis (weekly as a minimum).
		• Where construction work (e.g. excavation) is required beneath the canopy of a tree, ensure that it is carried out carefully and by hand to avoid damage by equipment • This is to be guided by best practice and, where relevant, as per Tree Protection Zones detailed in *AS4970 2009 Protection of Trees on Development Sites*.
		• Cease work immediately in relevant areas if any previously unknown threatened flora species are encountered.
		• Display a fact sheet on threatened flora species on site notice boards and in lunchrooms.
		• Do not disturb the ground beneath the canopy of any tree that is not in the approved clearance footprint and ensure that vehicles, construction equipment, materials or waste are not located beneath the canopy of any tree.
	Fauna	• Scheduling of clearing activities will be done to avoid breeding seasons as far as reasonably practical. Where this is not practical, and where breeding sites are identified within the corridor during pre-clearance surveys, a suitably qualified person will provide mitigation measures for hazardous zones/ relocation requirements relevant to the specific species identified.
		• Any required fauna fencing will be installed in accordance with the fencing strategy which will be finalised and documented in the detailed design.
		• A suitably qualified ecologist to complete a site survey prior to the commencement of clearing to identify and mark high-value fauna habitat trees which are not to be removed with flagging tape (or other appropriate marking method), trees that are not to be felled without the presence of a spotter-catcher (where clearing cannot be avoided and the tree is an identified habitat trees), and to identify habitat features suitable for relocation to no disturbed areas immediately adjacent to the disturbance footprint.
		• Display a fact sheet on expected fauna on site notice boards and in lunch rooms, in particular threatened species such as the Western Whipbird (eastern) and Southern Emu-wren (Eyre Peninsula).

Delivery Phase	Aspect	Proposed Mitigation Measures
		• Install signage and exclusion barriers/bunting around areas of known fauna habitat prior to the commencement of any construction works in or within 200 m of these areas. This includes identify and fence or mark buffer areas around protected species nests that are known in the area.
		• Check all vegetation (trees, bushes, shrubs and grassland) for fauna, immediately prior to any vegetation removal or clearing and grubbing works.
		• Construct windrows (small soil berms) on the edge of access tracks and hardstands to delineate the boundary and prevent vehicles and construction equipment damaging habitat beyond the construction impact zone.
		• All trenches will be closed / backfilled as soon as possible and will not remain open for more than 48 hours, where possible.
		• All trenches and excavations will have an escape route (e.g. soil ramp) to allow entrapped fauna to escape, where practicable.
		• All trenches and excavations will be checked for trapped fauna first thing in the morning and again in the afternoon prior to works finishing for the day and any trapped fauna will be released.
		• All cable junction pits (which may be required to stay open for extended amounts of time) will be covered and/or fenced off to prevent inadvertent trapping of fauna.
		• If any threatened fauna species are observed during construction, work will cease in the immediate vicinity of the sighting until it has relocated, or it has been removed by a suitably qualified spotter-catcher. The fauna spotter-catcher will provide a suitable record to the Site Supervisor.
		• Any fauna that require relocation shall be relocated using appropriate animal hygiene. These include: - Wash hands between handling of different animals; - Handling of frogs will be done with the use of disposable and pre-rinsed vinyl gloves. Do not handle multiple individuals wearing the same gloves; and - Animals are to be immediately bagged in a suitably sized calico bag or plastic zip lock bag for amphibians. Do not reuse bags or use a single bag for multiple individuals.
		• Any fauna which are relocated will be documented throughout the course of construction and operation. This record will include: - Species; - Location found; - Location of relocation area; and - Condition of the animal.

Delivery Phase	Aspect	Proposed Mitigation Measures
		• Ensure all physical fauna control measures, such as windrows, sediment fencing, signage and exclusion barriers/bunting are checked and maintained on a regular basis (weekly as a minimum).
		• Speed limits to be reduced in the areas close to Launch Site A and Launch Site B to limit the likelihood of vehicle strike with wildlife.
		• If fauna is accidentally killed, in particular Western Whipbird, Southern Emu wren or Rock Parrot bodies are collected, reported to DEW and frozen for the SA Museum.
	Weeds and pests	• The Weeds and Pest Sub-plan, as a component of the CEMP and OEMP, will be implemented (refer above).
		• Undertake a weed survey within and immediately adjacent to the construction impact zone prior to construction commencing, to understand existing weed conditions and potential impacts (e.g. spread) during construction.
		• Remove or destroy all WONS and Declared and/or environmental weeds located within the construction impact zone, prior to construction commencing.
		• Undertake weed control such as (but not limited to) slashing, spraying, or physical removal, prior to the weeds setting seed. Ensure weed control methods within threatened species habitat areas are in accordance with the relevant National Recovery Plan for the species.
		• Display a fact sheet on Declared and environmental weeds known to occur within the construction impact zone, on site notice boards and in lunch rooms.
		• Ensure all vehicles and construction equipment are clean and free of soil material containing weed seed or propagules, prior to arriving on site. If vegetative material or earth is present, ensure that the equipment is taken away and washed down at an appropriate facility to prevent vegetative material or earth potentially containing weed seeds being brought into the site.
		• Install a designated wash-down bay to clean vehicles and construction equipment during construction works and prior to leaving site.
		• Ensure all earthmoving equipment is clean and free of soil material prior to commencing earthworks within known threatened species habitat.
		• Ensure all fill materials (e.g. sand, aggregate) imported to site are sourced from weed and pathogen free sites.
		• Locate stockpiles of clean, weed free soil or fill material away from areas of weed infestation.
		• If stockpiling of weed infested material is required, ensure it is stored on a constructed hardstand and separated from clean, weed free materials.

Delivery Phase	Aspect	Proposed Mitigation Measures
		• If soil or fill material stockpiles become infested with weeds, undertake weed control (spray with herbicide) as soon as practicable and at least 10 – 14 days prior to moving material.
		• Store construction vehicles and equipment on constructed hardstands, away from areas of weed infestation.
		• Ensure construction compounds are kept neat and tidy at all times, to prevent pest animals from inhabiting the area.
		• Ensure food waste is placed in enclosed / covered bins, to prevent pest animals from accessing it.
		• Report and record rabbit / hare / fox / feral cat sightings.
	Noise	• Locate haul routes and construction laydown areas away from sensitive receptors.
		• Use off-site construction or other alternative processes that eliminate or lessen resulting noise.
		• Avoid blasting.
		• Limit construction activities to daytime unless they are unavoidable.
		• Plan for quieter working methods, i.e. bored piles rather than driven piles.
		• Consider using site structures as a method of acoustic screening.
		• A noise gas gun will be used to 'scare' any fauna that are near the immediate area prior to launch in accordance with SA EPA *Environmental Noise Guidelines – Audible Bird Scaring Devices* (EPA 2007). This mitigation measure will reduce the number of fauna in the immediate noise zone close to the launch pad.
	Water Quality	• Water in the basins will be tested (every 6 months) to ensure that the water meets the standard where it presents no risk to animals or other contamination issues. If there is evidence of contamination, the water will be treated to remove that contamination.
Post Construction	Rehabilitation of disturbed areas	• All disturbed land will be rehabilitated to achieve stable and sustainable conditions of soil cover and vegetation.
		• Identify stockpile locations for retaining soil and vegetation for rehabilitation purposes.
		• Topsoil and vegetation temporarily disturbed to support the construction of temporary laydown areas, hardstands and utilities trenching activities will be temporarily stockpiled separately to subsoil material and will be utilised to support the reestablishment of the soil profile and rehabilitation of these locations. Soil and vegetation removed for these activities will be supported to remain along the length of the disturbance footprint where the placement of the excavated material does not impact on remnant areas.

Delivery Phase	Aspect	Proposed Mitigation Measures
		• Selected logs and branches from the cleared trees (where not otherwise habitat features) are to be stockpiled in designated stockpile areas for use in rehabilitation in areas with existing tree cover (where practicable, e.g. where the action of stockpiling does not create a fire risk).
		• Original stockpiled materials are to be utilised to reinstate the natural soil profile in disturbed areas, being: 1. Subsoil; 2. Topsoil; and 3. Vegetation (where available).
		• The areas disturbed for construction but not forming part of the operational footprint, will be re-profiled to original or stable contours, re-establishing surface drainage lines and other land features. Site specific stabilisation measures will be necessary to prevent slumping or erosion. Erosion and sediment control is to be completed in accordance with the SEDMP. Where practicable, temporary erosion control measures will be left in place until bare soil has stabilised, and other natural material dragged over as cover until vegetation cover has re-established etc.
		• Revegetation is to occur through natural regeneration as well as through assisted planting to create a vegetated buffer between the disturbance footprint and adjacent values. Plantings (tube stock and seed) to consist of native species analogous to adjacent vegetation community.
		• All rehabilitation works to be consistent with bushfire and operational safety requirements.
Operation	Minimisation of impacts to ecology - flora and fauna values	• Manage visitors to the site through formalisation of tracks and signage as well as rubbish management.
		• Engage with LSA bodies to join region wide initiatives.
		Bush fire risks will be mitigated through the installation of Southern Launch firefighting equipment at every launch event. Initial firefighting capabilities during rocket launch attempts will be augmented by local Country Fire Service (CFS) crews. Sufficient water will be located onsite to successfully control and contain any unexpected fire. There will also be a fire truck on site during launches.
		• Annual investigations into the effect rocket launch activities have on the local fauna and flora with subsequent recommendations on the best methods to protect the regional fauna and flora. Southern Launch is currently in negotiations with University of Adelaide and University of SA with a view to sponsoring 1 or 2 PhD candidates to undertake their thesis on the Project site in respect of impacts on flora/fauna. This study/s will take approximately 4 years. This will result in a strong understanding of the impacts of operations on local flora/fauna. In respect of baseline information - the detailed studies already undertaken on the Project site as part of the Development Approval process forms that baseline.

Delivery Phase	Aspect	Proposed Mitigation Measures
	Flora	• Display a fact sheet on threatened flora species West Coast Mintbush on site notice boards and in lunchrooms.
		• Do not disturb the ground beneath the canopy of any tree that is not in the approved clearance footprint and ensure that vehicles, construction equipment, materials or waste are not located beneath the canopy of any tree.
		• Maintenance activities and refuelling must be carried out a minimum of 50 m from vegetation and waterways, with appropriate interception measures in place to avoid impacts to waterways, aquatic habitats, and groundwater.
	Fauna	• Any fauna that require relocation shall be relocated using appropriate animal hygiene. These include: - Wash hands between handling of different animals; - Handling of frogs will be done with the use of disposable and pre-rinsed vinyl gloves. Do not handle multiple individuals wearing the same gloves; and - Animals are to be immediately bagged in a suitably sized calico bag or plastic zip lock bag for amphibians. Do not reuse bags or use a single bag for multiple individuals.
		• Any fauna which are relocated will be documented throughout the course of construction and operation. This record will include: - Species; - Location found; - Location of relocation area; and - Condition of the animal.
		• Ensure all physical fauna control measures, such as windrows, sediment fencing, signage and exclusion barriers/bunting are checked and maintained on a regular basis (weekly as a minimum).
		• If any fauna needs to be destroyed under a Permit to Destroy Wildlife to reduce their impacts on wind farm infrastructure, destruction will be humane and comply with the *Animal Welfare Act 1985* and codes of practice.
		• Speed limits to be reduced in the areas close to Launch Site A and Launch Site B to limit the likelihood of vehicle strike with wildlife.
		• If fauna is accidentally killed, in particular Western Whipbird, Southern Emu wren or Rock Parrot bodies are collected, reported to DEW and frozen for the SA Museum.
	Weeds and pests	• Prevent establishment of new weed species and/or infestations during the operational phase by implementing standard hygiene practices when bringing equipment, vehicles and other materials which have the potential to harbour weed seed or propagules, onto the site (e.g. for maintenance purposes) and by practicing minimal disturbance methods.

Delivery Phase	Aspect	Proposed Mitigation Measures
		• Conduct an annual survey to identify and monitor the location, extent and abundance of weed species, particularly WONS and Declared weed species.
		• Control pest animal species (especially rabbits, foxes and feral cats) that may proliferate as a result of site activities. Ensure rabbit control is in accordance with the *Threat abatement plan for competition and land degradation by rabbits* (DotEE 2016).
		• Ensure waste is unable to be accessed by pest animals.
	Noise	• Use earth bunds to reduce noise during rocket take-off.
		• Use site structures as a method of acoustic screening for noisy equipment.
		• Implementation of a water deluge and flame trench, which reduce the noise level by approximately 5-10dB.
		• Locate launch sites as far away from residential and other sensitive areas as possible.
		• Development of a stakeholder engagement plan with procedures for notifying residents of all planned launch events in advance.
		• Develop a noise monitoring and reporting program to verify noise impacts of rocket launches.
	Water Quality	• The captured deluge water and firefighting water will be tested after every launch. If it meets the required quality standard, it will be pumped into the water detention basins. If it does not, it will be pumped into trucks and taken off site to be disposed of in a manner that meets legislative requirements
		• Water in the basins will be tested (every 6 months) to ensure that the water meets the standard where it presents no risk to animals or other contamination issues. If there is evidence of contamination, the water will be treated to remove that contamination.
	Offsets	• Ensure all monitoring, auditing and reporting requirements detailed in the biodiversity and native vegetation offset strategy are implemented during the operation phase of the Project.