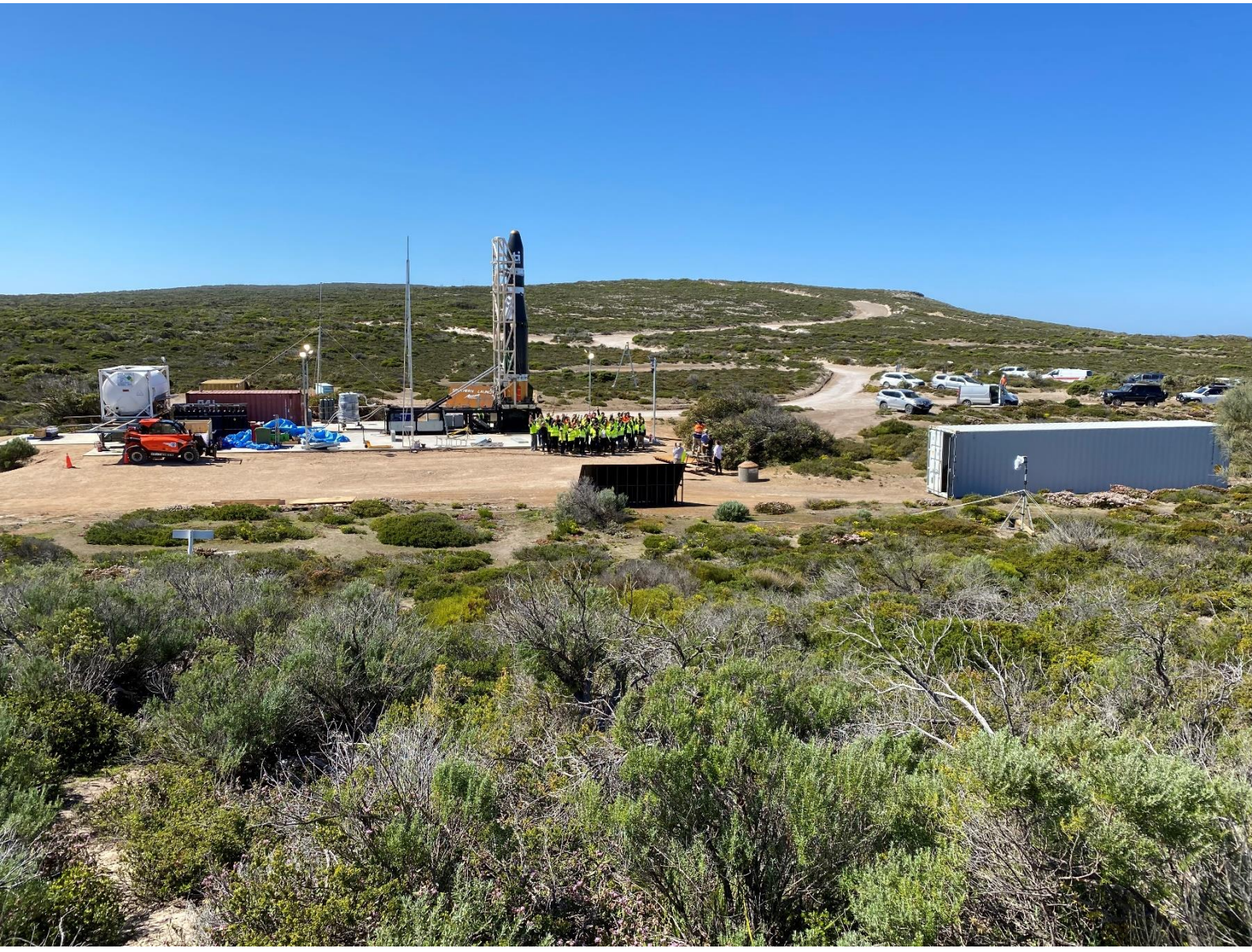
State Planning Commission

# ASSESSMENT REPORT

## Whalers Way Orbital Launch Complex – Sleaford, Eyre Peninsula

Southern Launch Pty Ltd



April 2024

**CONTENTS**

## Milestones and Key Dates

| Milestone | Date |
|---|---|
| Declaration of Major Development | 22 August 2019 |
| Release of Guidelines and Level of Assessment | 20 August 2020 |
| Release of Environmental Impact Statement (EIS)prepared by Southern Launch Pty Ltd (the Proponent) for public comment | 5 August 2021 |
| Submission of Final Response document by the Proponent. | 26 August 2022 |
| Release of Response Document | 9 November 2022 |
| Release of Public Submissions | 6 December 2022 |
| State Planning Commission (SPC) meeting to consider draft Assessment Report | 16 February 2023 |
| Proponent's Further Information | 11 August / 20 October 2023 |
| SPC Meeting to consider the Proponent's Further Information | 2 November 2023 |
| Proponent's Summary Document (EIS Update) | 5 December 2023 |
| SPC Meeting to consider update to draft Assessment Report | 14 December 2023 |
| SPC site visit | 21 December 2023 |
| SPC Meeting to ratify draft Assessment Report drafting instructions | 15 February 2024 |
| SPC Meeting to approve draft Assessment Report | 21 March 2024 |

## 1. Executive Summary

On 20 August 2019, the proposal to establish a rocket launching facility and associated infrastructure at Whalers Way, Sleaford was declared a 'Major Development' under s.46 of the *Development Act 1993*.

SouthernLaunch.Space Pty Ltd (Southern Launch – the proponent) has entered into a long-term lease arrangement with a private landowner, Theakstone Pty Ltd, to utilise a portion of the land for the launch of domestic and international vehicles (rockets) for the purpose of polar and sun synchronous orbit satellite insertion. A total of up to 36 launches are proposed each year (from two launch pads), with a smaller number (up to six) of test launches from smaller vehicles.

The Whalers Way project area was selected as the preferred location for the launch complex through an extensive review of potential locations across Australia. The key criteria being unobstructed flight paths, low aircraft/shipping volumes, low population in the immediate vicinity, year-round temperate climatic conditions, coupled with the skilled local workforce and a robust logistics supply network. Whalers Way meets all essential criteria, which makes the site ideal to establish technologically advanced launch operations at cost-competitive prices.

Based on a comprehensive set of assessment guidelines, endorsed by the State Planning Commission (the Commission), the proponent prepared an Environmental Impact Statement (EIS) to assess the potential environmental, social and economic impacts of the development.

The proposal (as addressed in the EIS) was initially the subject of a six-week public consultation period, two public meetings, council and state government agency referrals. Of the 261 public submissions received, 133 were supportive of the proposal, noting the positive economic impacts for the region and the view that environmental impacts could be properly managed. 124 submissions were opposed to the proposal on largely environmental grounds.

A Response Document was then prepared by the proponent, with Additional Information also submitted following a further request from the State Planning Commission.

This document, the Assessment Report (AR), comprises a detailed assessment of the environmental, social, and economic impacts of the proposal to establish a rocket launching facility at Whalers Way. The AR has thoroughly considered the EIS, Response Document and Additional Information provided by Southern Launch, along with the public, council and agency submissions and advice received. Ultimately its findings represent the view of the State Planning Commission as a whole, having considered all the material before it.

From the start of the assessment process, it was recognised that the locational advantages and economic and social benefits of the proposed launch facility, would need to be carefully considered against the loss of environmental, landscape and recreational / tourism values in the selected location.

There are clear and undeniable positive strategic, economic and social benefits from the proposal.

The key economic benefit of a rocket launch facility at Whalers Way, is the support it would provide to the development of the local space industry. It would generate employment in space-related and ancillary industries, provide long-term educational opportunities, encourage technological innovation and new investment in South Australia.

Such developments are also consistent with the Australian Civil Space Strategy 2019-2028, that seeks to develop a globally responsible and respected space sector that inspires and improves the lives of Australians. Importantly, the development of a launch facility would complement the 'Lot Fourteen' precinct's focus on space. The precinct, in Adelaide's central business district, is home to the Australian

Space Agency, the Australian Space Discovery Centre, Mission Control Centre and the SmartSat Cooperative Research Centre. South Australia has been facing increasing competition from other states in recent years, so a launching facility would be a critical asset in maintaining the state's role as a national centre for space.

The predicted economic benefit to South Australia is conservatively valued at $500 million per annum, based on a predicted pipeline of two launches per month, but could potentially double to one billion dollars per annum. This economic stimulus would have associated social benefits in terms of sustained employment opportunities across a range of industries, including the attraction of high-income secure jobs, along with the attendant education, service delivery and health and well-being benefits to be enjoyed both locally and state-wide. Social benefits would also accrue from new opportunities and connections generated in an emergent sector of the state's economy.

The main point of additional consideration for the AR has been the environmental impacts associated with the proposal.

The recognised sensitivity of the receiving environment became the principal focus of this assessment, due to its coastal location, significant flora / fauna (especially threatened species), the existing native vegetation Heritage Agreement over the land (i.e. previously entered into between the landowner and the Minister for Environment in the late 1980's) and nature-based tourism /recreation activities.

The proposal would introduce an industrial land use into an area set aside for conservation purposes, disrupting the experience and enjoyment of the undeveloped remoteness and scenic landscape values of the Jussieu Peninsula, both for local residents and those who periodically visit Whalers Way (albeit noting that it is privately owned land) and nearby Fishery Bay. An issue has also been raised regarding the need to temporarily restrict the use of adjoining airspace and marine waters by others.

The introduction of such a use has required careful consideration of the facility's scale and whether management measures are readily available to successfully mitigate impacts from noise and air emissions, waste generation, stormwater discharge, chemical storage and unplanned hazard events from explosion and fire.

The proposal would also result in the loss of intact native vegetation in the order of some 23.4 hectares (ha). Whilst the extent of direct vegetation clearance is relatively small (in the context of a large site), importantly it forms habitat critical to the survival for two endangered bird species – the Western Whipbird and Southern Emu-wren.

It is apparent that there will be a measurable impact to these fauna species during construction and operation. A moderate to higher level of operational impact is expected to be realised, especially for the launch of the largest rockets. Due to a paucity of knowledge about each species, there is uncertainty about the actual behavioural effects from rocket launch noise. Birds could suffer periods of disturbance (which could reduce the quality of habitat and affect breeding success) or they may habituate to the activity.

It is noted that significant effort has been made to reduce such impact in the appropriate siting of the infrastructure and in minimising the amount of clearance required.

Unregulated access to the site has led to a degradation of sensitive areas of the land. However, a control on unregulated access, along with a focus on controlling pest species, would assist in improving environmental outcomes.

The ability to utilise monies payable as part of any agreed-to Significant Environmental Benefit (SEB) Offset (costed in the order of approximately $2 million and required to be endorsed by the Native Vegetation Council) provides further opportunity to suitably offset and manage any impacts.

This could include more targeted habitat conservation and species management initiatives in the region (especially addressing other threatening processes to the survival of endangered species). Implementation of comprehensive management plans also provides an opportunity for an adaptive approach, along with strengthening the scientific knowledge base about the birds. It is also noted that the proponent has funded two PhD students to undertake further research work on bird species.

Conversely, it is also recognised that the level of such impact (either a lower or higher impact) will only conclusively be understood once the facility is operationalised and reporting provided about the actual on-site impacts. The capacity to respond to any such findings moving forward will be essential in the effective management of impacts.

Similarly, and in relation to the issues raised about impacts to commercial fishing operations, the targeted nature of launch operations, along with the management plan framework, including the communication protocols and the work undertaken by the proponent in engaging with operators, provides sufficient confidence that any impacts can be appropriately managed moving forward.

In summary, the AR both formally acknowledges there will be impacts, but also, on balance, arrives at the view that these can be appropriately managed to the degree that support for the proposal is warranted, based on the overall assessment and consideration of all the available information. A decision to approve the development can therefore be supported, having considered the environmental, social and economic impacts.

The Commission has made several recommendations in respect to potential condition-setting, including reserved matters requiring the submission of further information (such as a range of management plans and final documentation), set out in Chapter 16 of this Report. These matters provide the framework for a robust and methodical process to be adopted in the project's finalisation, such that it can be appropriately developed and responsibly operated, noting the need to formally secure a range of other State and Commonwealth government approvals, licences and permits (such as required by the South Australian Environment Protection Authority and the Australian Space Agency).

With the completion of the major development assessment process, the Commission's role has concluded. Whether the development is to be conditionally approved or refused, is solely a matter for the Minister for Planning under the Act. The Minister has complete discretion in these matters and there is no statutory time limit for a decision to be made.

It is also acknowledged that, in addition to any approval issued under the *Planning, Development and Infrastructure Act 2016,* for the development to proceed a separate approval under the state jurisdiction will be required to amend the existing Heritage Agreement over the land, in accordance with the provisions of the *Native Vegetation Act 1991.* This will require the approval by the Minister for Climate, Environment and Water and the Native Vegetation Council, following application from the landowner. This will need to occur before any consideration of clearance of intact stratum.

In addition, approval under the Commonwealth *Environment, Protection and Biodiversity Conservation* (EPBC) *Act 1999* will be required in relation to the impacts on affected listed Matters of National Environmental Significance (MNES). Whilst not a part of the state-based EIS process, the proposal has also been declared a 'controlled action' under the EPBC *Act 1999*. This is a separate Commonwealth assessment process, for which a decision remains to be made by the Commonwealth Minister for the Environment and Water on the potential listed impacts to MNES, including the Western Whipbird and Southern Emu-wren.

The timing of these decisions is a matter for these other authorities to determine in accordance with the requirements of those relevant legislative instruments.

## 2. Introduction

The subject site (the site) is located at the southern tip of the Eyre Peninsula and is proposed to be located on a single freehold allotment, being Allotment 101 in Deposited Plan 71437, which has a total area of 2,640 ha (refer to Figure 1). The site is owned by Theakstone Pty Ltd.


**Figure 1: Location plan of the proposed site and surrounds.**

The site is within the Biodiversity Area of Jussieu Peninsula to Coffin Bay Peninsula, which contains a large tract of remnant native vegetation and fauna habitat. The native vegetation is currently managed under a Native Vegetation Heritage Agreement. The Thorny Passage Marine Park adjoins the coastal boundary of the site.

The site is largely unimproved by structures or buildings and has been utilised for recreational and tourism activities, such as self-sufficient camping, bush walking and passive pursuits.

The proposal has been the subject of a Major Development assessment pathway, including the preparation and release for public consultation of an Environmental Impact Statement (EIS) that detailed the proposal, described the site and discussed the potential impacts and possible measures to mitigate them.

This Assessment Report (AR) assesses the environmental, social and economic impacts of a proposal by SouthernLaunch.Space Pty Ltd (Southern Launch - the proponent) for an orbital launch complex and associated infrastructure at Whalers Way, Sleaford. The complex will enable the launch of domestic and international vehicles (i.e. small-lift rockets) for the purpose of polar and sun synchronous orbit satellite insertion.

# 3. Assessment Process

## 3.1 Declaration and Guidelines

Following the Major Development declaration on 20 August 2019, Southern Launch lodged a formal Development Application on 21 November 2019 with the former Minister for Planning, the Hon Stephan Knoll MP. The State Planning Commission (the Commission) determined that the assessment would be subject to an Environmental Impact Statement (EIS) process and on 23 July 2020 confirmed the Assessment Guidelines (issues to be considered) for the preparation of the EIS. The guidelines were then publicly released on 20 August 2020, both online on the SA Planning Portal, and via public notice in the *Port Lincoln Times* and the Adelaide *Advertiser.*

## 3.2 Consultation on the EIS

Public consultation on the EIS occurred between Thursday, 5 August 2021 until Thursday, 16 September 2021, a period of 30 business days. Copies of the Executive Summary and EIS were made available at the offices of the Port Lincoln Council, District Council of Lower Eyre Peninsula, and State Planning Commission.

Electronic copies were available on the SA Planning Portal. Two public notices were published in the *Port Lincoln Times* and the Adelaide *Advertiser,* advising of the release of the EIS, where to obtain or view a copy of the EIS, and the dates of the public meetings.

These meetings were convened by staff from the Planning and Land Use Services division within the then Attorney-General's Department (AGD-PLUS) and held in Port Lincoln on 24 August 2022. A total of 140 members of the public attended both public meetings (80 at day session / 60 at evening session), held over a four-hour period.

## 3.3 Response Document

Public, council and state government agency submissions on the EIS were provided to the proponent. All the matters raised in the comments were required to be addressed in a Response Document, which the proponent submitted in August 2022 and released for public information on 9 November 2022. The document also included additional information related to further investigations undertaken in response to submissions and the results of the first test rocket launch and an engine testing trial. This is discussed further in Section 13.

## 3.4 State Planning Commission

Under the *Planning, Development and Infrastructure Act 2016*, the State Planning Commission (the Commission) is responsible for providing an Assessment Report (including recommendations) to the Minister for Planning for decision-making purposes. At the 16 February 2023 meeting, following the receipt of updated advice from Primary Industries and Regions SA and the Department for Environment and Water, the Commission resolved to request additional information for further assessment from the proponent comprising:

- a Native Vegetation Management, Restoration and Monitoring Plan, and a Threatened Species Management and Monitoring Plan, to provide further assistance to quantify and narrow the extent of potential impacts to at-risk flora and fauna and
- additional modelling to consider potential impacts from rocket launch events on all activities within the marine exclusion zone, and an expanded economic analysis of potential economic impacts to commercial fishing operations from the imposition of Launch Exclusion Zones.

At the 2 November 2023 meeting the Commission considered the additional information provided by the proponent comprising:

- Southern Emu-wren Management Plan (19 July 2023). [Note: Version 6 of the plan, dated 20 October 2023, was released by the proponent as part of the EPBC Act consultation documentation]
- Mallee Whipbird Management Plan (19 July 2023). [Note: Version 6 of the plan, dated 1 December 2023, was released by the proponent as part of the EPBC Act consultation documentation]
- EPBC Offset Strategy – Sothern Emu-wren and Mallee Whipbird (19 July 2023)
- request for further information – Launch Exclusion Zones (undated), which further considered potential impacts on seafood industries.
- Additional Information Addendum (undated), which further considered potential impacts on seafood industries.

At the 14 December 2023 meeting the Commission considered a 'Summary' document (undated) submitted by the proponent, which provided an 'update' to the EIS and Response Document, and a draft Assessment Report.

On 21 December 2023 the Commission inspected the Whalers Way site, with representatives from relevant agencies in attendance, and met with staff from affected councils to discuss the proposal.

## 3.5 The Relevant Authority

Regulation 11(3) of the *Planning, Development and Infrastructure (Transitional Provisions) Variation Regulations 2017* has the effect of making the Minister for Planning the decision-maker for the application.

When making a decision, the Minister must have regard to the EIS, public, agency and council submissions, the Response Document, an Assessment Report provided by the Commission, relevant planning policies of the Code, the Planning Strategy, the *Environment Protection Act 1993* and any other matters that the Minister considers relevant.

## 3.6 Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

During a period some time after the major development declaration, Southern Launch referred the proposal to the then Commonwealth Minister for the Environment, under the *Environment Protection and Biodiversity Act 1999* (EPBC Act) [EPBC Reference Number 2021/9013]. The delegate of the Minister decided on 10 September 2021 that the proposal was a 'controlled action' (i.e. involving activities that would affect Matters of National Environmental Significance or Commonwealth areas) that required assessment and a decision under that Act.

This was due to the potential impact on 'listed threatened species and communities' (EPBC Act Sections 18 and 18A), 'listed migratory species' (sections 20 & 20A) and 'Commonwealth marine areas' (sections 23 & 24A). It should be noted the 'Commonwealth marine area' is defined in section 24 of the EPBC Act and comprises any part of the waters of the sea within Australia's exclusive economic zone and any waters over the continental shelf of Australia, including the seabed under those waters and any airspace over those waters, that is not state or Northern Territory waters. Whilst the proposal is not located within a Commonwealth marine area, a significant portion of the 'potential marine impact zone' (i.e. for rocket trajectories) is within Australia's exclusive economic zone and over the continental shelf of Australia.

The proposal also has the potential to impact on Commonwealth marine areas through interaction with the airspace above. In addition, the proposal has the potential to impact the natural values of Commonwealth marine areas as a result of noise and rocket debris.

With no Bilateral Agreement (Assessment) in existence between the South Australian and Commonwealth governments, a separate assessment and decision process is required under the EPBC Act.

## 3.7 International Obligations

While the proposed land use can be considered and assessed through the Major Development process under the *Development Act 1993*, the proposal has the potential to have impacts beyond the legislative authority of this Act, given the aerial launching nature of the proposal and potential for spent rockets to accumulate on the seabed. Guideline 17 sought further information to understand the connections between the relevant state, national and international obligations, policy directions and strategic objectives. At this juncture, it is important to note the following broad regulatory interconnections.

The Coastal Waters immediately adjacent the subject site are regulated by the South Australian Government and extend from the coastline out to sea three nautical miles (nm - 5.5 km equivalent). Between the coastline and 12 nautical miles (22 km) are the Territorial Waters, regulated by the Australian Government. Australia's sovereignty extends to the seabed and to the airspace above.

Although there are other zones between the Territorial Waters and the edge of the Continental Shelf (comprising the Exclusive Economic Zone up to 200 nm), it is relevant context to note that from a distance of 12 nm and beyond is considered International Waters (from a transport and movement perspective) which is governed by the United Nations Law of the Sea Convention (UNCLOS III).

Unsuccessful launches may result in spent rockets landing within Coastal or Territorial Waters, where the Commonwealth *Environment Protection (Sea Dumping) Act 1981* is the relevant legislation which regulates pollution in line with Australia's international obligations under the London Protocol. Successful launches will potentially drop spent rockets and material between 45nm (85 km) and 809nm (1500 km) within International Waters where, as indicated above, the United Nations *Law of the Sea Convention* (UNCLOS III) applies.

In regard to activities in space, it is understood that the Commonwealth *Space (Launch and Returns) Act 2018* solely regulates activities and is supported by the Flight Safety Code. Importantly, Australia has ratified all five space treaties which will apply for the proposed operations relating to damage caused by space objects, registration of launched objects and the exploration of space and the like.

## 3.8 Temporary Launch Program

It is noted that a development application to undertake up to three test launches was made by Masterplan (on behalf of Southern Launch) on the Whaler's Way site for a temporary period up until 31 December 2021. The application was assessed by the State Planning Commission, having been previously 'called in' by the Minister for Planning, and following an amendment to the Major Development declaration. The development was publicly notified and referred to relevant state agencies and the local council, with a planning consent subsequently granted.

The approved works included a concrete launch pad and other temporary facilities to support the test launch camping. On 21 September 2021, the first test launch of the Hapith 1 Rocket was attempted, however the resultant fire and explosion resulted in a delay to the other launches. A request by Southern Launch to extend the time to complete the test launch program (i.e. the final two launches) was subsequently approved by the the Commission on 22 March 2022 (with all other conditions of

approval remaining unchanged), following an agreement by the Minister to further amend the declaration. The approval required the test launches to be completed by 31 December 2022.

On 15 June 2022, the Australian Space Agency (ASA) concluded its investigation of the initial test launch rocket failure and published its findings. The investigation was carried out under the *Space (Launches and Returns) Act 2018 (the Act).* The report concluded that *no non-compliances against the conditions of the applicable launch facility licence (02/2021), Australian launch permit (01/2021) or the Act were identified*, and that the accident was likely the result of the first stage thermal blanket combusting due to accidental movement. A number of recommendations were made to reduce the likelihood of this re-occurring in the future, including improved practices and regulatory procedures.

The test launch planned to occur during the week commencing 14 November 2022, was cancelled following damage to the rocket by lightning. Subsequent launch events scheduled for the week following also did not take place.

A request by Southern Launch to further extend the time to complete the test launch program was approved by the Commission, following an agreement by the Minister to further amend the declaration, with the remaining two test launches required to be undertaken by 14 November 2023. However, no test launches were undertaken.

## 3.9 Secondary Approvals

### Environment Protection Act

The Response Document (Section 15) identifies a range of activities associated with construction and operation of the project that may require a licence to operate under the *Environment Protection Act, 1993* and would be subject to further consideration based on detailed design documentation and proposed operational practice (if the project is approved). Southern Launch will apply for all relevant licences before the project proceeds.

A summary of the proposed works that may require an EPA licence is provided below.

*Chemical Storage and Warehousing Facilities*

The storage of chemicals would occur on the site sporadically and would be dependent on when launches occur. It is likely that chemicals required for the launch vehicle operations would be present on the site during this time. It is not envisaged however that chemicals would be stored in bulk quantities for long periods outside of specified launch windows, apart from small quantities, required for ongoing operation and management of the site. The storage of chemicals would not be on an ongoing basis. If in the future it becomes advantageous to store bulk chemicals on the subject site, Southern Launch acknowledges the requirement to consult with the EPA to discuss licence requirements.

*Hydrocarbon Storage or Production Works*

Regarding the storage of fuels for launch vehicles, the required fuels would be transported onto the site with the launch vehicle and remain safely stored onsite until the end of the launch cycle (where it is anticipated the fuel supply would be exhausted from launch operations). The quantity of fuel largely depends on the demands of the launch vehicle which can vary significantly based on the fuel type used, design and fuel consumption of the specific launch vehicle. The quantities of hydrocarbons stored onsite would not exceed 2,000 $m^3$. If in the future it becomes advantageous to store more than 2,000 $m^3$of hydrocarbons onsite for longer periods, Southern Launch commit to consulting the EPA to discuss licence requirements.

*Concrete Batching Works*

A temporary concrete batching plant would be required onsite to facilitate build requirements and is likely to exceed production capacity of 0.5 $m^3$ per production cycle – therefore requiring an EPA

licence. Southern Launch will consult with the EPA on obtaining an EPA licence at the detailed design stage to operate the proposed temporary concrete batching plant.

### Native Vegetation Act

The EIS (Section 5.1.2) estimates that approximately 23.76 ha of native vegetation will need to be cleared during construction, including launch pads, access tracks and associated laydown areas. The Response Document revised this figure down to 23.4 ha as a result of the relocation of Launch Site A.

A Significant Environmental Benefit (SEB) would be required to be provided, prior to any actual clearance, under Division 5 of the *Native Vegetation Regulations 2017*. It is noted that a Heritage Agreement (HA) also currently applies to the areas of vegetation proposed to be cleared. The HA will need to be formally varied prior to any clearance occurring.

### Harbours and Navigation Act

In order to exercise control over the South Australian coastal waters maritime exclusion zones that would need to be imposed during a launch event (i.e. in order to ensure public safety), an Aquatic Activity License would need to be granted under the *Harbours and Navigation Act 1993*.

### Space Act

The Commonwealth *Space (Launches and Returns) Act 2018* establishes a system for regulating space activities in Australia or by Australian nationals outside Australia. The following activities would require approval under the Act:

- launching a space object from Australia
- returning a space object to Australia
- launching a space object overseas (for Australian nationals with an ownership interest)
- returning a space object overseas (for Australian nationals with an ownership interest)
- operating a launch facility in Australia
- launching a high-power rocket from Australia.

The proposal would be required to obtain all necessary permits and licences for a facility of this nature under the Act prior to initiating actual operations at the proposed facility. An application under the *Space (Launches and Returns) Rules 2019*, which outlines the required information to be provided and all licences and permits that must be obtained, would need to be submitted.

# 4. The Assessment Report

This Assessment Report (AR) assesses the environmental, social and economic impacts of the Whalers Way Orbital Launch Complex proposal by Southern Launch. The AR takes into consideration the requirements established under the *Development Act 1993*, including an assessment of the proposal as presented in the EIS, Response Document and further information sought, plus the comments raised in community, council and agency submissions on the EIS.

The EIS, the Response Document, Additional Information and submissions are available at: https://plan.sa.gov.au/state_snapshot/development_activity/major_projects/majors/sleaford_southern_launch

The AR does not include an assessment of any elements of the proposal against the provisions of the Building Rules under the *Development Act 1993*. Further assessment of the elements of the proposed development against these rules will be required should an approval be issued.

The Response Document and Additional Information, along with the EIS, forms part of the finalised proposal.

# 5. Proposal

## 5.1 Overview

The proposal consists of a change in land use to establish a rocket launching facility, the construction of buildings and ancillary infrastructure to support the facility and a related division of land in the form of a lease that exceeds five years.

The establishment of a launch facility would support the growing demand for the launch of domestic and international vehicles for polar and sun-synchronous orbit satellite insertion. The facility will accommodate the latest technology 'smallsat' satellites (up to several hundred kilograms), with the overall size of rockets in the range of 10 to 30 m in height. Figure 2 shows the possible size of rockets that could be launched, namely the Electron, New Shepherd and Vega rockets. The Falcon rocket was used for the noise modelling in the EIS, which was based on a worst-case scenario using a rocket that is of much greater size (and greater noise) than any rockets likely to be launched. For comparison, the Vega (30 m in height) has an average thrust force of approximately 2,200 kN (kilonewtons), whereas the Falcon (70 m in height) has an average thrust of approximately 7.6 MN (meganewtons), with one MN equal to 1,000 kN. Thus, there is a substantial difference in the magnitude of noise generated. It should be noted the revised noise modelling in the Response Document used noise data for the New Shepherd and Vega rockets. The STS (Space Shuttle) is provided for comparison purposes only.

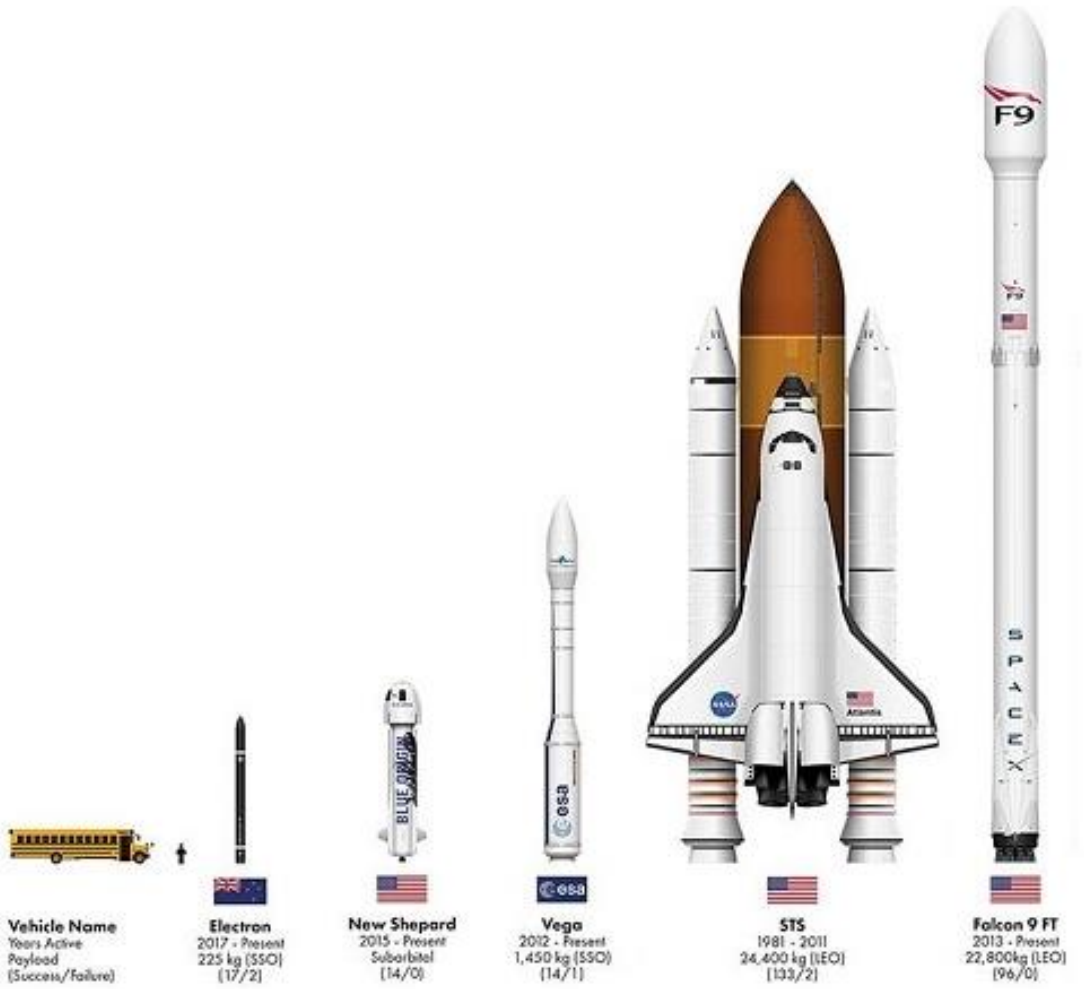



**Figure 2: Indicative size of rockets (Electron, New Shepherd and Vega) that could be launched.**

The expected operation of the facility would seek to accommodate one rocket launch every two months initially (i.e. six in the first year), increasing to one rocket launch per fortnight then up to a maximum of 36 orbital launches per year (in year five of operation). In addition, up to six sub-orbital / sounding rockets (i.e. test launches that do not reach orbit in order to collect data to inform launches) per year would be launched. Thus, there would be up to 42 launches undertaken per year at full capacity. The regularity of the launch schedule would be determined by customer demand, suitable meteorological conditions and total fire ban periods.

The facility is proposed to be developed in four or more stages in response to market opportunities and conditions. Whilst the EIS anticipates the potential for additional development over time, the current proposal represents the proposed full development of the complex. Any additional works or features, such as new launch pads or facilities, would be the subject of a further assessment process.

The capital expenditure associated with delivering all phases using traditional launch infrastructure is estimated by the proponent to be in the order of $43.25 million dollars.

## 5.2 Lease Area

Since the release of the EIS, further negotiations occurred between the owner of the Whaler's Way site, Theakstone Property Pty Ltd, and Southern Launch to determine the optimal lease area based on the most up to date design and operational considerations.

The previous proposed lease area was defined by a line of latitude, bisecting the site at 34.923 degrees south (Figure 3). The revised lease area extends further northwards (the previous eastern, southern, and western boundaries remaining the same), resulting in an overall increase in area from 1200 ha to 1590 ha.


**Figure 3: Previous and proposed Lease areas (Source: Response Document).**

The revised lease area provides for a greater separation of operational areas from site boundaries, accommodates the northerly emergency access within the leased area, the majority of the areas excluded from the Heritage Agreement are contained within the new lease boundary, contains a greater proportion of the required launch buffer areas, and provides for a most substantive area for Southern Launch to manage and rehabilitate in a coordinated manner.

## 5.3 Detailed Proposal

The EIS (Section 5) and the Response Document (Section 2) provide the detailed background on each proposed project element, noting that any amendments to the design and layout of the facility as originally described in the EIS document, are contained in the Response Document (referenced as the *'amended proposal'*).

### Layout

The proposal seeks the development of an orbital launch facility at the southern end of Whalers Way, to allow the launch of domestic and international satellites into polar and sun-synchronous orbit. The main facilities to be developed include two launch sites, a maintenance / workshop complex, range control building and associated launch infrastructure and road construction.

It should be noted that the main change made between the exhibition of the EIS and the preparation of the Response Document, is that Launch Site A has been moved 700 m to the north-east in response to state agency and public submissions received during the consultation process.
The proposed layout is shown in Figures 4 and 5.

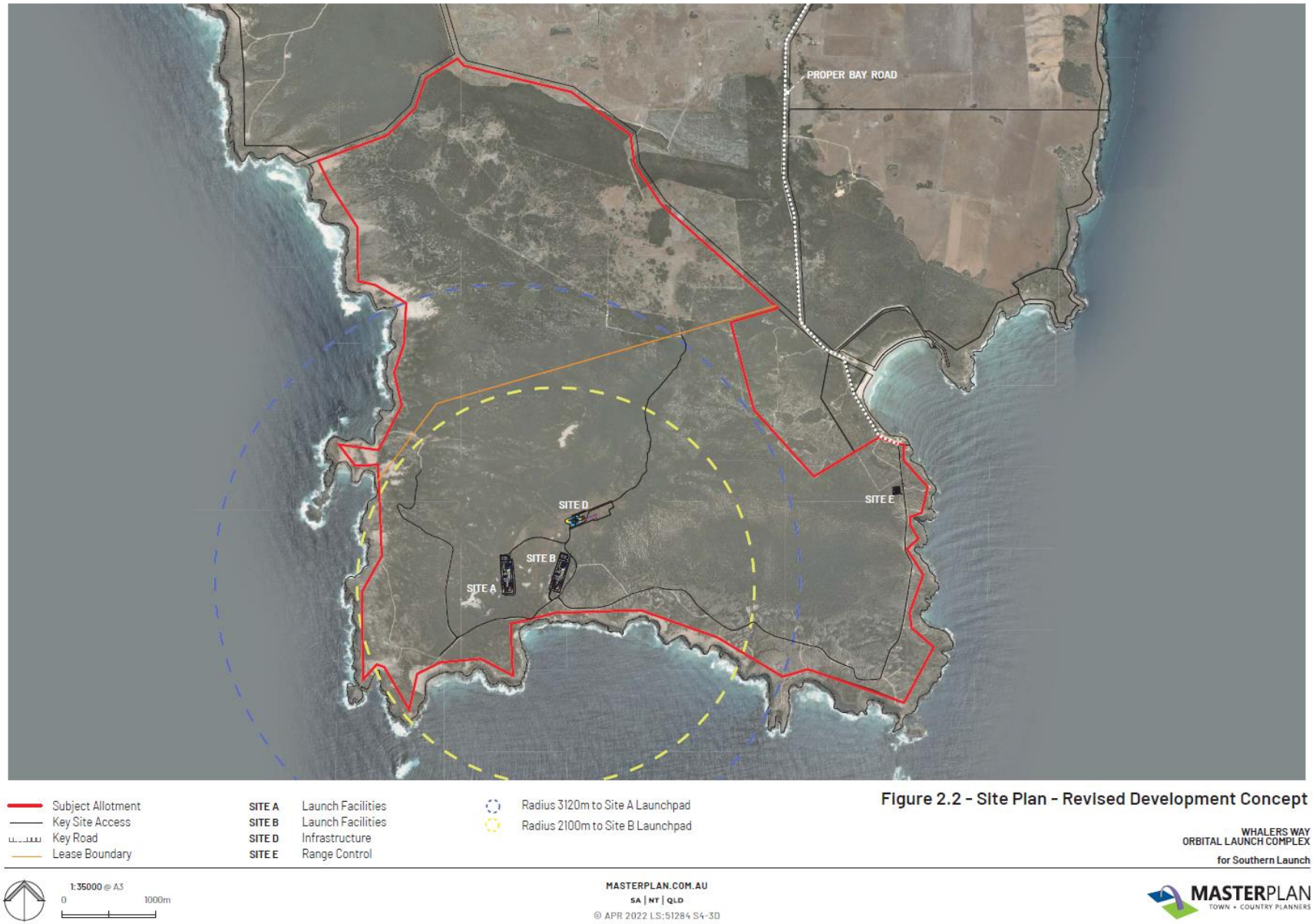



**Figure 4: General site plan**

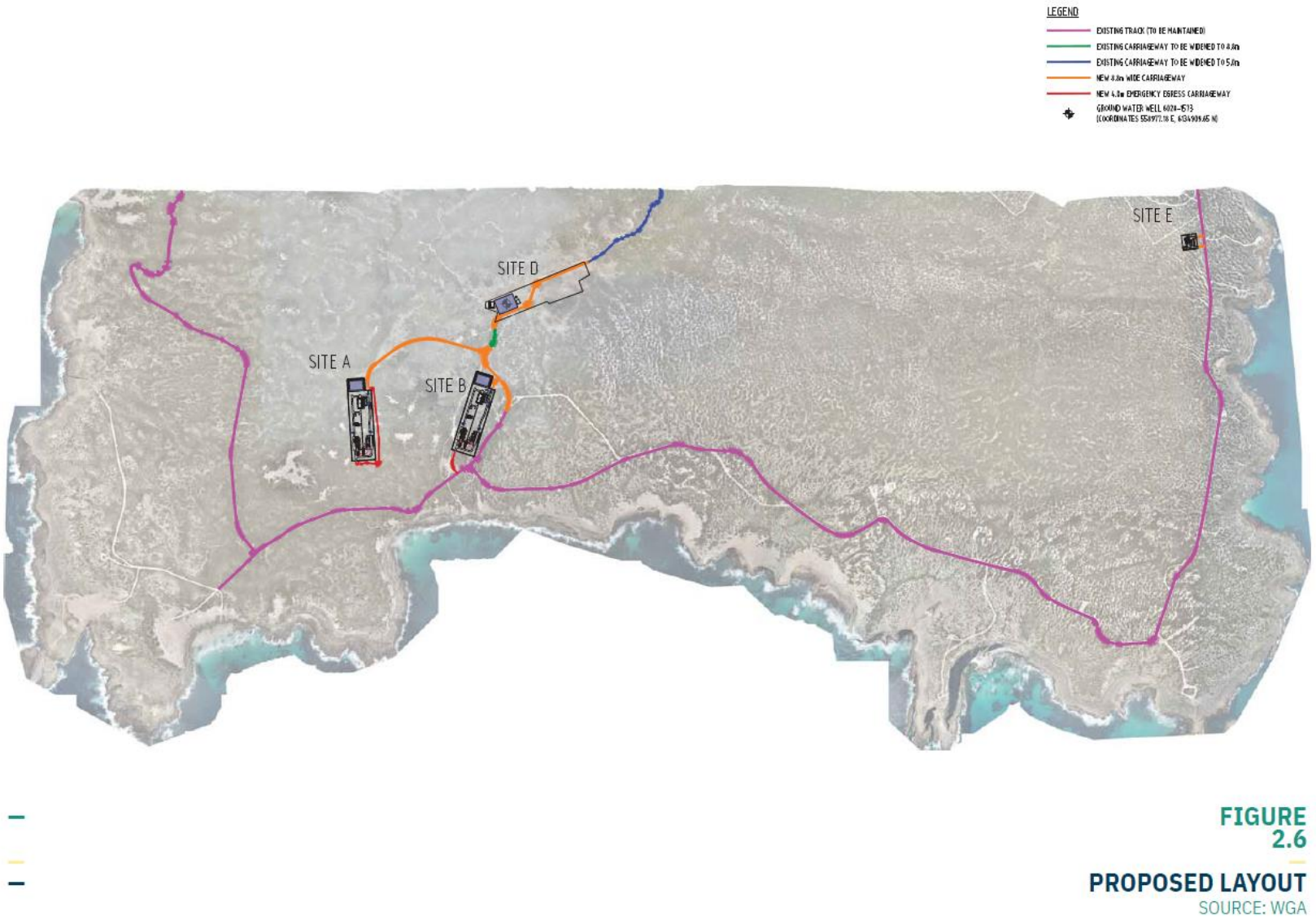



**Figure 5: Site plan – Launch Sites A + B and Infrastructure Facility Site D**

### Launch Sites A and B

Two launch sites are proposed to be constructed. Each will comprise a range of integrated features and structures to support launch activities. These being for the assembly, preparation, staging and launch of various launch vehicles. Each of the two launch sites will contain a *similar* range of elements and structures, with Site A catering for larger launch vehicles than Site B. Launch Site A is intended to cater for launch vehicles typically of greater than 30 tonnes (t) up to approximately 100 t. Launch Site B is intended to cater for smaller launch vehicles typically of up to approximately 60 t.

The launch sites are rectangular in shape, oriented in a generally north-south direction, with the launch pad located near the southern end of the site and the assembly building located near the northern end. A dam is located adjacent each of the launch sites, being at the northern end of each launch site. Each launch site is rectangular in shape measuring 350 m x 120 m (42,000m$^2$) with an adjoining stormwater basin measuring 90 m x 65 m (5,850 m$^2$).

Each launch site is connected to internal access roadways, with the perimeter of each launch site to be fenced. Clearance footprints for each launch site will need to accommodate the necessary site works and drainage systems to construct and operate each launch area.

Details of the proposed launch sites are shown in Figures 6 to 9.

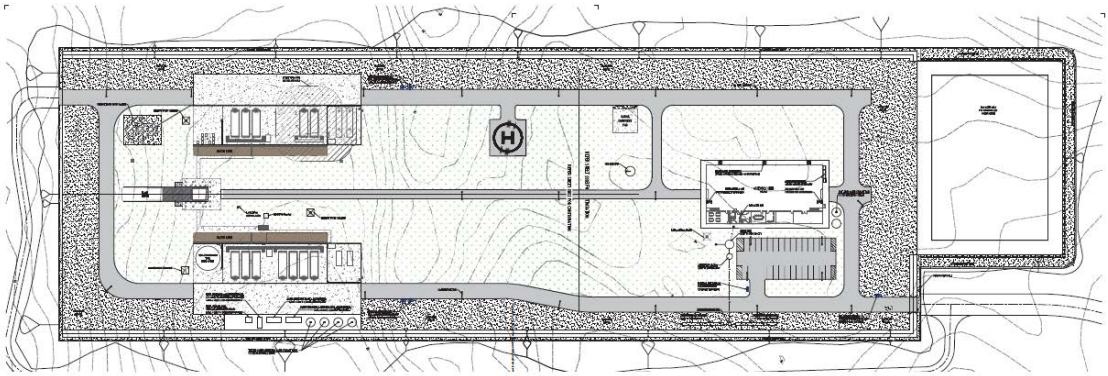


**Figure 6: Launch Site A (Source: Response Document).**

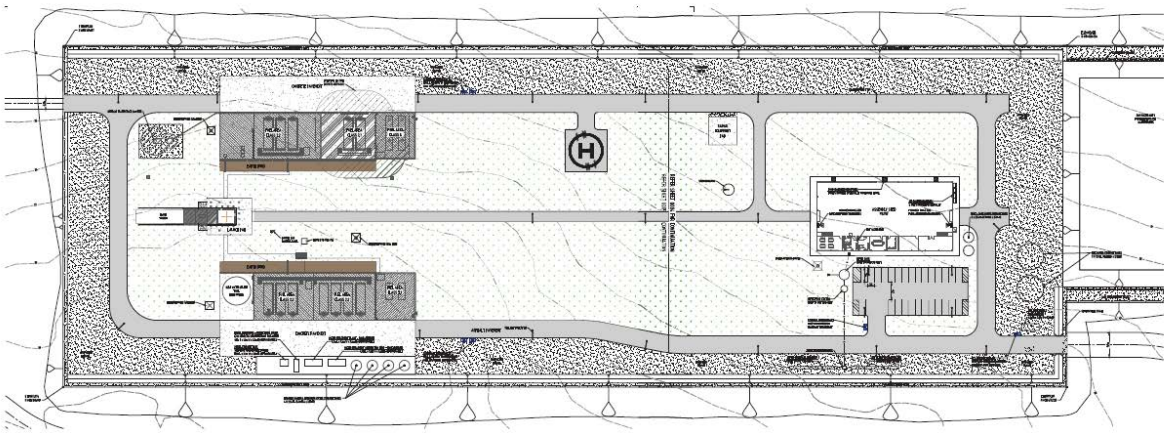


**Figure 7: Launch Site B (Source: Response Document).**

**Figure 8: Launch Site A perspective (Source: Additional information supplied by proponent).**

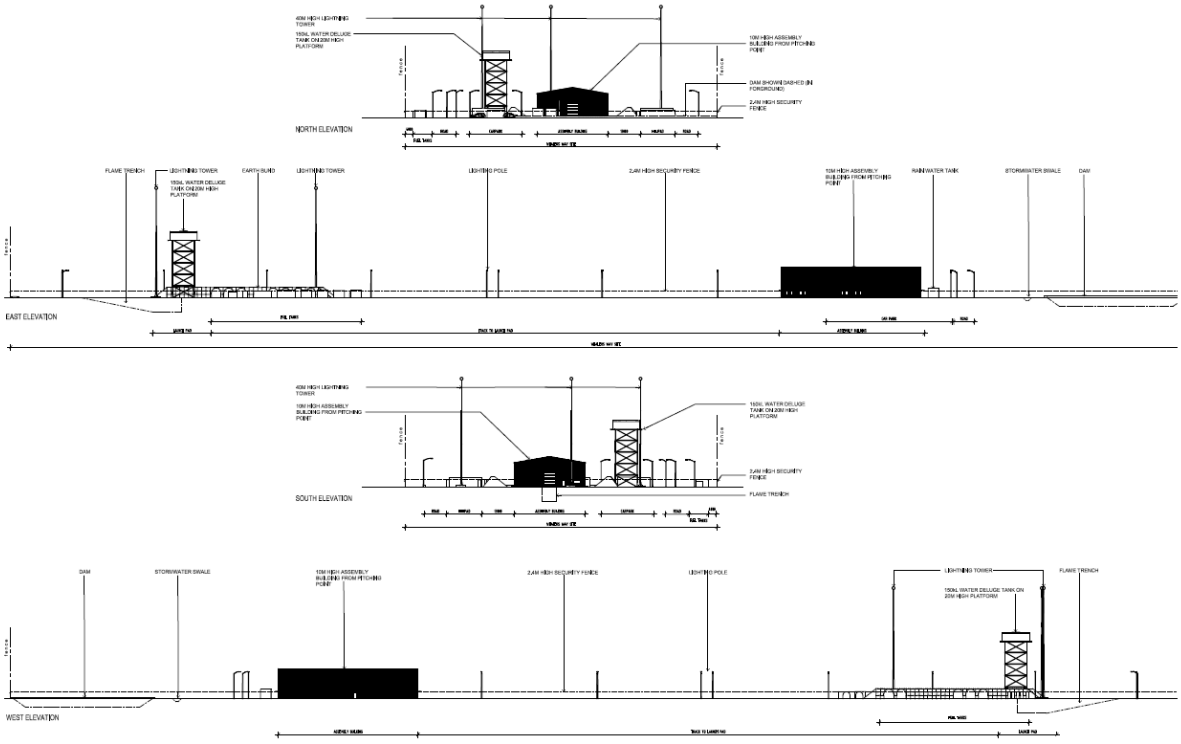



**Figure 9: Launch Site A elevation (Source: Additional information supplied by proponent).**

### *Earthworks*

Limited earthworks (cut and fill) would be required to prepare and level pads for each of the launch sites. Each pad surface will have a nominal slope of two per cent longitudinal and two per cent lateral. The lateral slopes will be towards the outside where a swale will be located, ensuring that all runoff from the site is not allowed to enter the surrounding environment. Batter slopes at the outer edges of the launch sites would blend the sites into the surrounding landform.

### *Assembly Buildings*

Each launch site would feature an assembly building at the northern end of the site. The building dimensions are approximately 48m long x 24 m wide x 11 m high. Each facility would have an internal crane facility, capable of supporting unloading and assembly operations. The majority of the floor area is devoted to assembly works, with one side of the building comprising office, storage, server and amenities rooms. Twenty to forty staff can be accommodated in peak periods. The buildings will be designed to maintain positive pressure for vehicle hygiene purposes. The 'runway' connecting the assembly building to the launch pad is approximately 200 m. Each building will be clad in Colorbond steel (Woodland Grey).

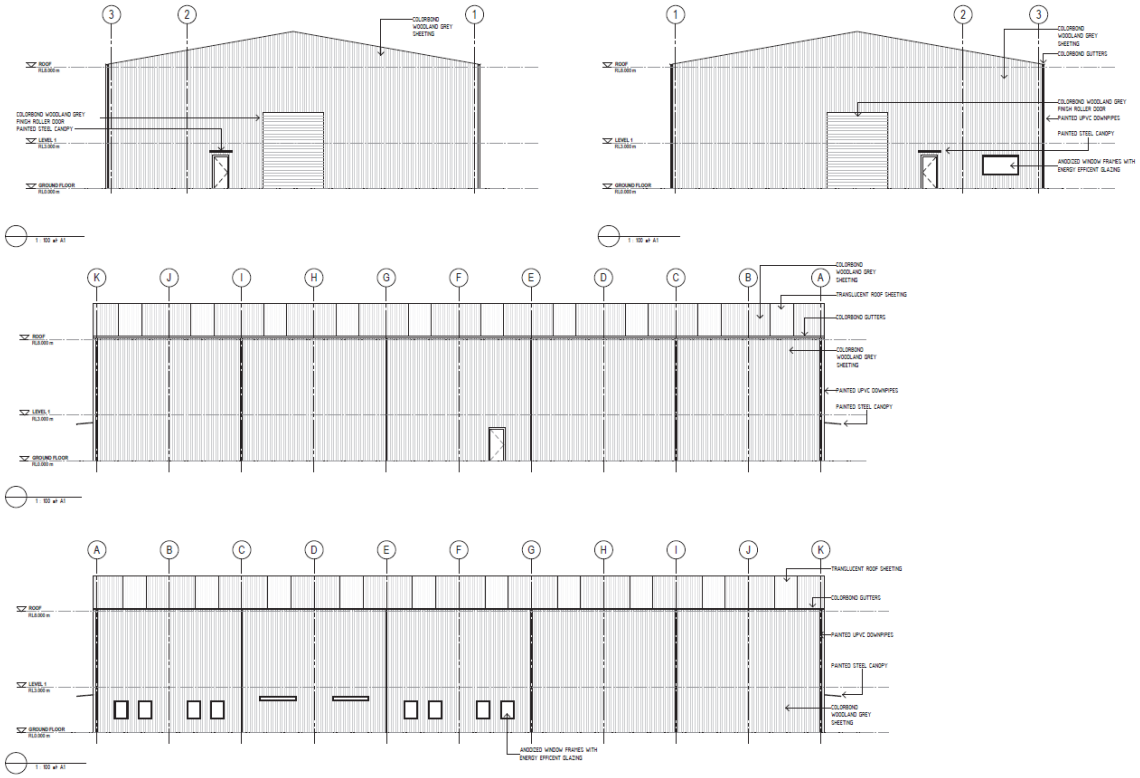


**Figure 10: Assembly Building elevations (Source: Response Document).**

### *Stormwater Capture and Detention Basin*

A site stormwater system would capture and retain all stormwater on the site footprint. This will include a detention basis to capture and store launch deluge water, which will also be used for irrigation and firefighting purposes (subject to water quality requirements). The detention basins would be designed as follows:

- Site A – 90 m by 65m (5,850m$^2$), with a capacity of approximately 6,380 m$^2$. The basin will have a nominal depth of 2 m, with 1 in 3 batter walls.

- Site B - 90 m by 65 m (5,850 $m^2$), with a capacity of approximately 6,380 $m^2$ The basin will have a nominal depth of 2 m, with 1 in 3 batter walls.

Each basin will have a geotextile lining, covered and externally sealed with a floating geotextile cover. Overland flows (upstream of the launch site) will either be captured and retained or intercepted and diverted around the site past the detention basin.

### *Water Deluge System*

A water deluge system will be employed to mitigate impacts from launch activities, such as reducing and/or dissipating noise and heat effects at the time of vehicle launch. To provide the pressurised flow required (1,600 litres (L) per second at 20 m head), a 150,000 L tank will be elevated on a 20 m high water tower (refer to Figure 11). Prior to a launch event, the tank will be filled. The tower is an open, lattice-steel tower, which will be visually permeable, with a tank atop, 9.3 m in diameter and 3 m in height.

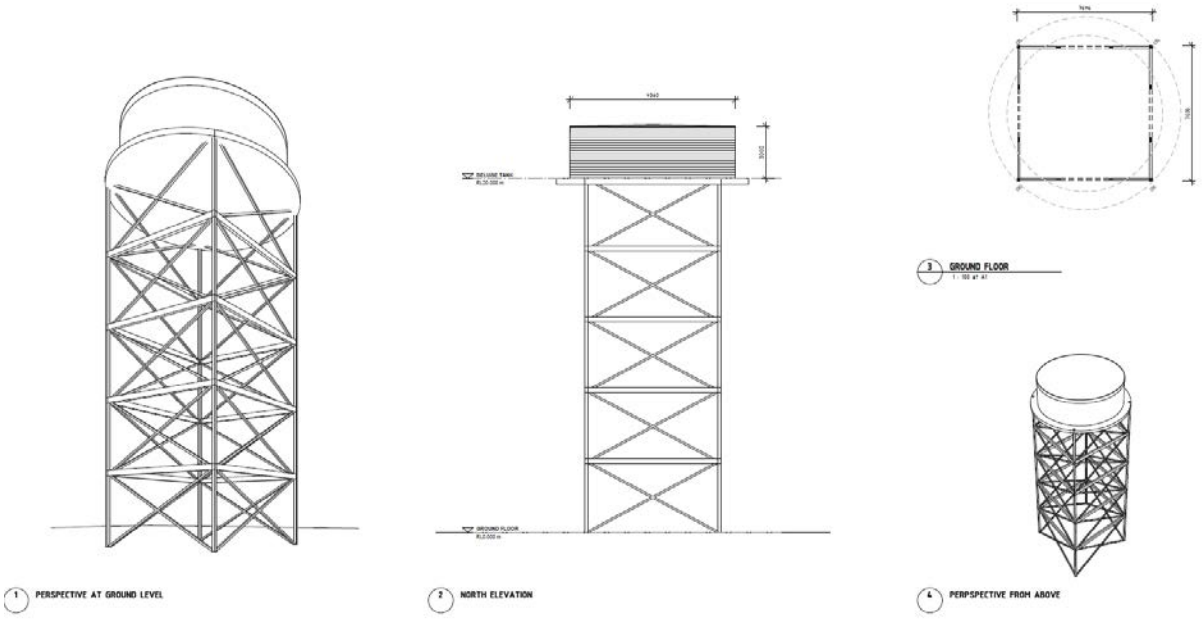



**Figure 11: Water Deluge Tank profile and elevation (Source: Response Document).**

The launch pad and surrounds have been designed to capture water generated during a launch, being directed into the flame trench. Dependent on contaminant levels, where acceptable or pre-treated, retained water would be pumped into the detention basin for reuse. If not suitable, it would be pumped into a truck for offsite disposal by a licensed contractor in accordance with EPA requirements.

### *Launch Pad*

The Launch Pad would be constructed of reinforced concrete and engineered to accommodate both launch and support operations (and being approximately 1 m thick). Anchor bolts would be installed to allow for the launch pedestals to be secured in position.

The launch pad will have removable sections over the flame trench. These would take the form of three concrete platforms which can be craned into, and out of position over the flame trench. Each platform is to be securable in position to ensure the launch vehicle thrust does not lift it out of position.

### *Flame Trench*

For each launch site, a flame trench would be installed, being 5 m wide and 35 m long. The trench would have a sump at the low point. Any water which remains in the flame trench after a launch needs to be collectable and able, after testing, to either be returned to the detention basin or removed offsite.

### *Ancillary Infrastructure*

Each launch site would also include a range of ancillary launch infrastructure, including lightning rods (four at each site to 35 m in height); propellant and water storage tanks; generator and fuel tanks; reinforced and earthen blast walls and bunding around liquid storage areas, flare stack and cold box.

Whilst most launches would occur during daylight hours, some launches may occur during low light or night conditions. A flood lighting system would be installed (to a maximum height of 12 m) for both security and operational purposes, whilst building, access-way and perimeter lighting would be carefully designed to ensure localised effects and minimal spillage.

The launch site would contain a helipad of asphalt construction, with lighting, windsocks, and painted markings to the appropriate standard. The helipad provides for emergency access to the site and would not be used for regular transport and operational purposes.

Lidar and radar pads are to be concrete with access to electricity and communications connectivity. These facilities would allow for tracking of the vehicles post launch. Two camera towers up to 15 m in height would also be installed to capture high-speed footage.

The perimeter of the launch site is to be fenced with 1.8 m high chain wire mesh topped with three stands of barbed wire for a total height of 2.4m. The retention basin and flame trench will also be fenced to a height of 1.8m and 1.2 m respectively.

### Infrastructure Site D

The Infrastructure Site is a construction and operational compound to accommodate activities and facilities that would support the construction and, during operation, future maintenance activities (refer to Figure 12). The facility would consist of the following elements and/or functions:

- quarry (construction stage only) and then 30 ML water storage dam
- pump station
- workshop/maintenance building
- electrical generation zone
- explosive and dangerous goods compound
- perimeter fencing to 2.4 m.

Earthworks for Infrastructure Site D would principally involve the excavation of the dam. The dam will have side slopes with a 1 in 3 batter. The dam (100 m long x 75 m wide) would have a base level of 5.4 m Australian Height Datum (AHD) and a top level of 10.4 m AHD. Sealing of the dam would be by polymer lining.

The workshop building would measure 18 m long x 12 m wide x 8 m high. The workshop would be a steel portal warehouse type structure on a reinforced concrete slab. The workshop would contain office, toilet and kitchen facilities for approximately five staff.

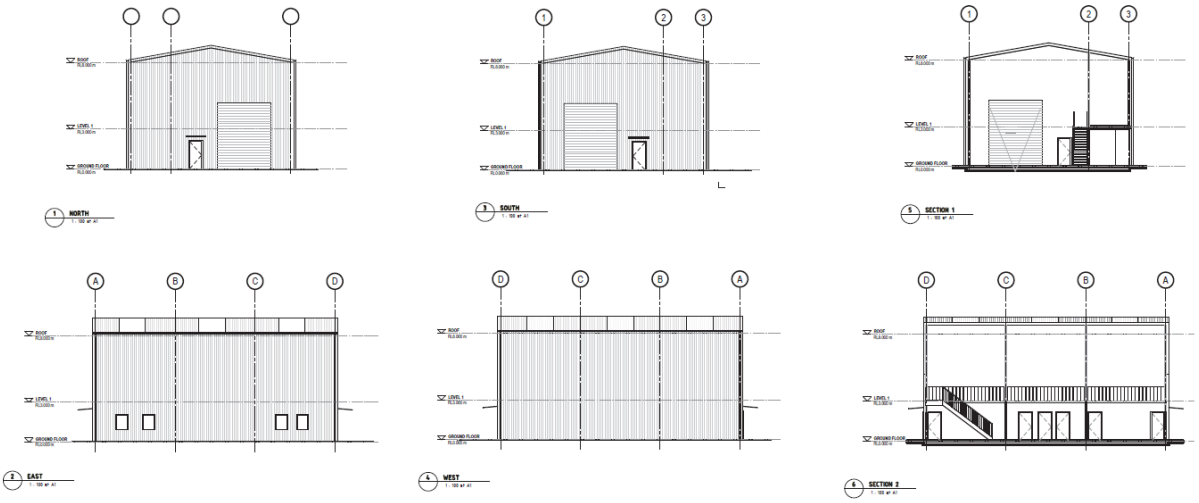


**Figure 12: Workshop-Maintenance building (Source: Response Document)**

## Range Control Site E

Range Control Site E would accommodate the range control building. This facility provides for the operational, security and emergency services personnel of the complex (and for visitors). Site E is approximately 55 m long x 55 m wide, located on the western side of the project area (i.e. near the main entrance). The southern and eastern areas of the site would feature two stormwater detention basins and car and bus parking area.

The Range Control building is a single storey structure (25 m long x 12 m wide x 6.5 m high), with its external materials being a combination of colour coated steel and glazing (refer to Figures 13 and 14). The building would contain integrated office accommodation, toilet facilities and kitchen facilities. The proponent has advised that up to 80 persons may attend during launch events (40 staff, 20 observers and 20 emergency services staff).

Roof stormwater will be captured and directed to three 25,000 L tanks to be utilised as potable water and for firefighting requirements. Swales will direct overland stormwater flows around the site into two stormwater detention basins. Water quality treatment and detention will be provided for stormwater from carparking and other hard surface areas. The building will be serviced by a package aerobic wastewater treatment system and irrigated onto a dedicated area on the western and northern sides of the range control building.

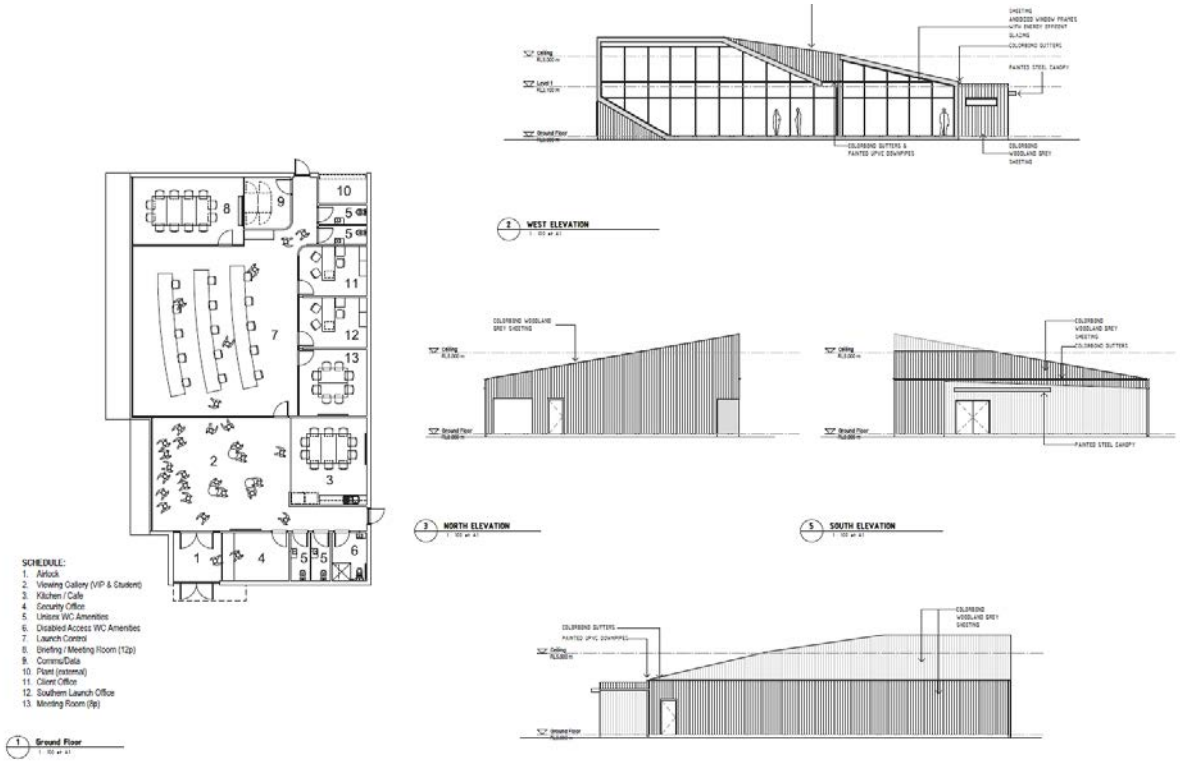



**Figure 13: Range Control Site E - floorplan and elevations (Source: Response Document)**

**Figure 14: Range Control Site E – perspectives (Source: Response Document)**

## Utilities

Rocket assembly activities are 'dry', such that potable water needs are confined to amenity, ablutions and kitchen areas, utilising either captured rainwater or delivered via tanker. Four 25,000 L tanks would be installed for this purpose.

Power would be supplied by diesel generator(s) in the initial construction and operational stages, and then augmented by mains electricity and/or renewable sources (subject to demand).

Each launch site would have a wastewater control system for staff ablutions – either in the form of a soakage system or an aerobic system with irrigated landscaped areas. Areas surrounding the assembly building, launch pad and roadway would be used for this purpose.

Fire service provision would be in the form of two 150,000 L tanks, located between the assembly building and the perimeter of the site. Fire hydrants, pumps and associated infrastructure would be distributed around the site (i.e. to provide ease of access and serviceability). A water storage dam (Site D) would provide the main source when completed and would reduce the need to truck cartage.

### Road Access and Carparking

Vehicle access and circulation within the project area would be supported by a combination of upgrades to existing access tracks and the construction of new access tracks to connect Launch Site A, Launch Site B, Infrastructure Site D and Range Control Site E to the upgraded existing access tracks.

Whalers Way Drive would be retained in its current condition, with localised grading and re-sheeting as required to maintain all weather access. These localised works will not affect the existing alignment and would not require an expansion of the existing footprint.

A new road alignment would be constructed to the east and north of Launch Site B, and south of Infrastructure Site D. Other connections will be provided to Launch Site A, including to the main circulation road. Where existing conditions are inadequate for the forecast vehicle movements, localised works would be required.

New roads would be constructed of an all-weather rubble surface, similar to the existing surface. Car parking and circulation roads within each facility, as detailed on the plans for each site, would be hard surfaced in either concrete or bitumen.

Roads for commercial vehicles within and between the launch sites would be designed to cater for vehicle sizes up to a 19m semi-trailer and to meet relevant Australian Standards.

Heavy vehicle movements to the launch sites are expected to be low, dependent on the launch program, and would involve the delivery of fuels and oxidiser, crane trucks, waste pump out and general transport movements. A minimum of 25 parking spaces will be provided at each launch site. Staff carparking areas will be of asphalt construction.

### Waste Collection

All waste is to be stored on-site in covered containers until collected by a licensed contractor. Waste types are typical for an office structure and would include kitchen and office waste. Waste from the preparation and launch activities would be limited and would be removed from site in accordance with legislative requirements for the specific type of waste generated.

## 5.4 Preconstruction Works and Staging

The EIS and Response Document set out the scope of construction works, management and mitigation measures and the location of temporary facilities and types of equipment to be used.

Preliminary activities include:

- site survey and set-out
- establishing site access roads and site compound
- identifying and providing signage of site services
- fencing the project boundary and environmental / cultural heritage sites

- installing erosion and sediment controls
- constructing transverse (clean water) drainage
- establishingtemporary site facilities
- clearing vegetation, strip and stockpile topsoil
- preparing foundations for structural works
- removing unsuitable materials
- upgrading access tracks and haul roads.

Blasting is not envisaged to be necessary for construction outlined within the proposal.

The primary site compound with amenities, lunchrooms, training and meeting facilities and associated bathroom amenities would be located at Infrastructure Site D. Laydown areas, plant and machinery parking and maintenance areas, and stockpile locations would be cleared with a suitable surface established and signposted (refer to Figure 15).

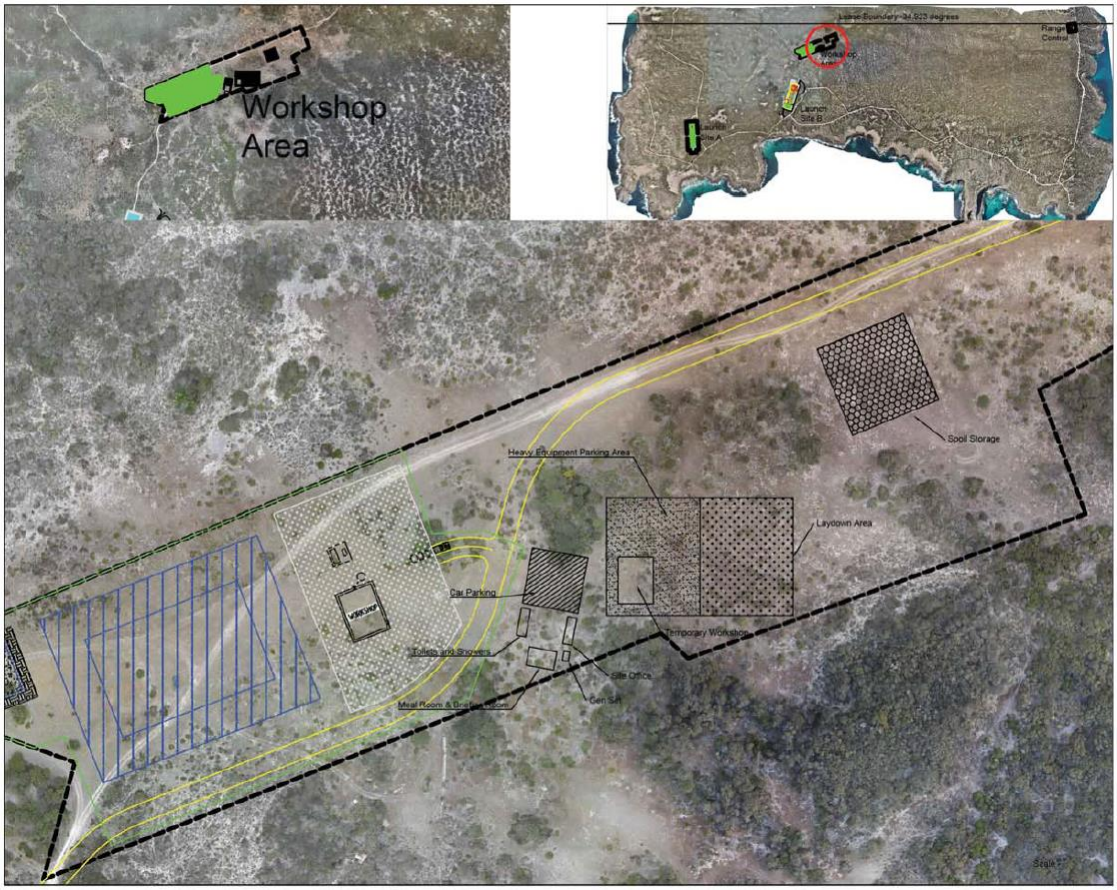



**Figure 15: Construction Facilities plan (from Response Document).**

## 5.5 Vegetation Clearance and Topsoil Stockpiles

The development of the launch complex and associated facilities would require the removal and/or disturbance of existing native vegetation and habitat for fauna species. Following revisions to the project and minor footprint changes, the overall footprint was reduced from 23.76 ha to 23.4 ha. The majority of the leased project area (98.5%) remains undisturbed from any physical works.

The selected site areas (A to D) would be cleared and grubbed as required by a bulldozer and mulching equipment. Mulch would then be moved to stockpile sites for later reuse, including for erosion and

sediment control during the earthworks phase. Where necessary, beneath the formation, grubbing would occur up to a depth of 500 mm below natural surface to remove all stumps and tree roots.

Topsoil would be stripped and transported to nominated stockpile sites within the site for later use in environmental rehabilitation works. The topsoil stockpile will be wheel rolled to provide suitable compaction and stability. Erosion controls would be installed around the topsoil stockpiles in accordance with the proponent's Erosion and Sediment Control Plans. Stockpiles may be seeded with a mix of suitable grass species to stabilise the surface and water carts will be available for dust control as required.

Catch drains would be formed along haul roads and access tracks for any potential hazards due to their steepness or soil erodibility. All drains will be formed to intercept and divert runoff from roads to stable outlets. Temporary sediment trapping devices would be installed downstream of the embankment works area, within the disturbance boundary. They will be provided during construction to filter sediment laden runoff or water from dewatering operations.

All water would be sampled, analysed and results assessed to ensure that any dewatering would comply with all regulatory requirements. All dewatering activities would be in accordance with the dewatering procedures within the Construction Environmental Management Plan (CEMP) and Soil Erosion and Drainage Management Plan (SEDMP). All works will be conducted as per the CEMP and SEDMP, for the suppression control of dust. Any exposed areas which allow for revegetation to be used as dust control barriers, including stockpiles and mounds, will be applied as soon as practical. Otherwise, a water cart or other appropriate method of dust mitigation will be used.

### 5.6 Workforce and Construction Hours

The construction workforce is estimated to be up to 56 FTEs. Launch Sites A, Launch Site B and Infrastructure Site D are located some distance from the nearest sensitive receptors, such that immediate and direct impacts from noise and dust during construction are expected to be negligible. A CEMP would need to be implemented to ensure all site establishment, clearance and construction works are undertaken within relevant EPA guidance.

### 5.7 Post Construction Works

Revegetation of disturbed areas and embankment footprints would be prioritised post-construction, to reduce the potential for erosion and assist with water runoff. Seeding would be applied by an approved process and would include one application over each area. It would commence as soon as topsoil is returned, subject to the appropriate seasonality for the seeding of vegetation. Storage tanks, containers and equipment used in the hydro seeding and mulching process would be checked for potential contamination sources.

## 6. Site Operations and Management

The operation of the orbital launch facility would be operated, managed and secured by Southern Launch, but will also involve third party customers involved in launch activities. Southern Launch, as the operator of the facility and holder of the various regulatory approvals and licence, would be responsible for compliance with those approvals and licences and will coordinate closely with launch customers (in respect to these requirements*).*

## 6.1 Assembly and Launch Process

The EIS (Section 6) provides a detailed description of the rocket delivery process, preparatory and launch activities that lead to a rocket launch. These steps are broadly described below.

- Vehicle stages are shipped to the site via proximate air or sea facilities where they will be loaded onto suitable road transport for delivery to the site.
- Vehicle stages are transported and unloaded at the Assembly Building at Launch Site A or B.
- Vehicle stage electronics and systems are checked.
- Payloads (satellites) are delivered onsite and checked.
- Payloads are integrated into the final vehicle stage.
- Vehicle is assembled (horizontal position) within the Assembly Building at Launch Site A or B.
- The assembled vehicle is driven to the launch pad and lifted into vertical position.
- The vehicle is tested on the pad.
- The launch corridor (range) is cleared and an exclusion zone imposed to ensure there are no aircraft, vessels, personnel, or ground traffic in the area.
- The vehicle is launched.

From the receipt of the rocket to its eventual launch will take about seven days, with then an additional period of up to 21 days (forming the 'launch window'). Whilst the annual number of launches will be dependent on initial operations, Southern Launch has indicated that there would likely be six launches in the first year of operations, increasing to a maximum of 36 launches per year in year five.

The facilities have been designed to cater for multiple launch customers, with a typical launch cycle of three to five weeks, but may vary dependent on the nature of the launch vehicle and the specific requirements of an individual launch mission. At least in the initial 'start-up' phase, the operational tempo of the orbital launch facility will vary, such that there will periods of relative inactivity awaiting the start of the next pre-launch phase (which will comprise both off-site activities, such as pre-assembly of non-locally sourced componentry, and those on-site activities described above).

## 6.2 Types of Rockets

The facility would cater for the launch of two types of rockets.

- Domestic and international vehicles for polar and sun-synchronous orbit satellite insertion (often known as 'CubeSats'). Typical vehicles will range between 9 m to 30 m tall with a payload capacity of 50 to 400 kg and will deploy satellites typically at around 1,000 km above sea level.

- Sounding rockets or suborbital rockets that do not go, or stay in orbit, around the Earth. The rocket and payloads will weigh up to 20 kg. These vehicles will generally reach altitudes of between 50 to 120 km, to support atmospheric research, the testing and qualification of space systems and STEM education. Smaller payloads can be launched to altitudes above 150 km, from which they can descend through the atmosphere. The vehicles will return to earth (and fall into marine waters).

The time period from ignition to orbit of the orbital launch vehicles will take approximately 45 minutes, whilst any observable impact of the launch event (when viewed or experienced from the locality) would be for a period up to three minutes.

## 6.3 Safety Zones

The operation of the facility during a launch event would require the imposition of an exclusion zone to ensure people are safe during the launch process, both around the launch site (Launch Exclusion Area), and along the path the rocket will fly to get into space (Launch Exclusion Corridor). For safety reasons, access for persons, vehicles and vessels would be restricted during a launch (Refer Figure 16 below).


**Figure 16: Launch Safety Zones (Source: Response Document p126).**

The EIS and Response Document state that Exclusion Zones would only be in effect when they are needed and the public would be given notice before they are put in place through the standard Notices to Airmen (NOTAM) and Notices to Mariners (NOTMAR) in accordance with Australian regulatory requirements. Appropriate advanced notice would be required for air and maritime users, before any rocket launch operations would be implemented in close coordination with Australian regulators. Additional notification of launches via media channels would be undertaken to inform the public through the processes defined by the Australian Space Agency. The exact size and location of exclusion zones would be based on the size of the rocket being launched and the flight path the rocket will follow. Exclusion zones would be designed to not encroach on any neighbouring properties or other private land beyond lease boundary without prior consent. Exclusion zones across public areas would be designed with the relevant Australian authority, taking into account feedback from existing commercial users.

The final dimensions of the exclusion zones would be approved by the relevant Australian regulator for the airspace or maritime areas, prior to being put in place. For the purpose of the assessment, nominal safety zones have been calculated based on the largest rockets expected to launch from the site. The calculated exclusion zones for individual launches are expected to be smaller, and often significantly smaller than the safety zones.

In addition, to exercise control over the maritime exclusion zones during a launch event (i.e in order to ensure public safety), an Aquatic Activity License would need to be granted under the *Harbours and Navigation Act 1993*.

# 7. Land Use and Tenure

## 7.1 Existing Land Uses

The project (leased) area is predominantly an undeveloped vegetated coastal area, accessible by coastal tracks, with some previously disturbed areas and infrastructure relating to its recreational use. The privately owned 'Whalers Way Wilderness Sanctuary' is managed as a relatively informal camping area and tourist drive, especially due to its spectacular coastal scenery (and attractions such as sheer cliffs, blowholes, crevasses and rock pools). Access to the site is allowed (for a small fee) by the current landowner.

The Cape Wiles High Frequency Ocean Radar Station is located on the cliff top in the south-eastern corner of the allotment but is not included in the proposed site.

## 7.2 Land Tenure

The subject land is held in freehold title owned by Theakstone Property Pty Ltd. Southern Launch has entered into a Commercial Access Lease ('the Lease') with the landowner to develop a portion of the land for the purposes of an orbital launch facility. The surrounding Crown Reserve, that compromises coastal land, and is under the care and control of the Minister for Environment and Water, does not form part of the project area (and is not relied upon to access the land nor operate the development). The project area is accessible via the public road network and has its own independent access.

## 7.3 Heritage Agreement

A Heritage Agreement was executed between the landowner, Robert Theakstone, and the Minister for Environment and Planning, the Hon Don Hopgood, on 16 October 1987 under the SA *Heritage Act 1978*. The Agreement is now protected under the *Native Vegetation Act 1991.*

The land subject to the Agreement was delineated as 'A', 'B', 'C' and 'D' in GRO Plan GP 463/1987. The principal clause of the agreement (Clause 3) states that:

> *During the term of this agreement the subject land is dedicated to the conservation of native vegetation and native fauna on the land and subject to this agreement shall not be used in a manner inconsistent with that dedication.*

Furthermore, under Clause 4 the landowner shall not without the written consent of the Minister, undertake or permit the clearance of native vegetation, the grazing of stock, the construction of buildings, or any other activity that is likely to damage, injure or endanger the native vegetation or native fauna on the subject land.

Whilst some of the leased area is excluded from the Heritage Agreement (refer to Figure 17), and consideration was given to using the excluded areas for development purposes, the proponent concluded (following a comprehensive ecological assessment of these areas) that this would not result in reduced impacts, such that the Agreement will require amendment to facilitate the Project.

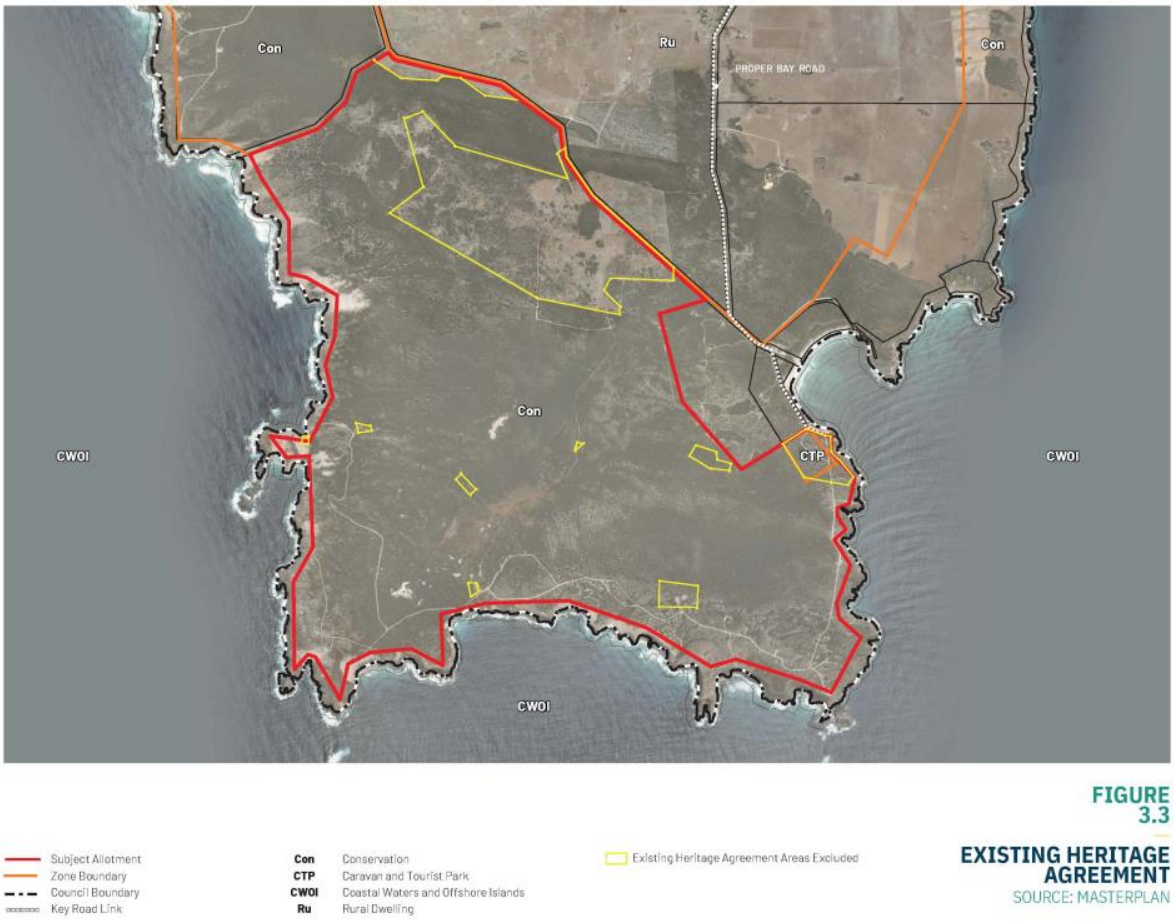



**Figure 17: Project area (red) and excluded sites (yellow) from Heritage Agreement.**

The proponent is seeking to amend the Heritage Agreement to relocate and consolidate exclusion areas to cover the development footprint. If approved by the Minister for Climate, Environment and Water and the Native Vegetation Council, the amendment of the Heritage Agreement would ensure that the proposed development would not conflict with the agreement and would be located outside of areas to which it applies.

In addition, the clearance of any native vegetation within the exclusion areas will require the endorsement of the Native Vegetation Council (NVC) of a sufficient Significant Environmental Benefit (SEB) offset. The SEB must provide a positive impact on the environment that is over and above the negative impact of the clearance.

## 8. Description of the Existing Environment

The site is located at the southern tip of the Eyre Peninsula near Sleaford, on private land commonly known as the 'Whalers Way Wilderness Sanctuary'. The land is covered by a Native Vegetation Heritage Agreement due to the large tract of intact, remnant vegetation and fauna habitat it supports. Vegetation communities comprise coastal heath and low Mallee (with average canopy heights between 0.5 m and 2 m tall) with cover ranging from 50% to 90%. Soils are grey sand over limestone. There are no defined watercourses within the site and there are no significant groundwater resources in the general locality (noting that the Uley South Basin is located approximately 10 km north-west of the site). The area provides known habitat for nationally threatened fauna species, especially the Southern Emu-wren and Western Whipbird (eastern). The rugged coastline has high coastal landscape values.

The site is within a key biodiversity area identified in the Biodiversity Plan for Eyre Peninsula (Department for Environment and Heritage, 2002) – one of two 'Large Remnant Areas' – the Jussieu Peninsula to Coffin Bay. Large Remnant Areas generally contain plant communities that are relatively intact or undisturbed. These areas provide sufficient habitat to sustain populations in the long term.

They include:

- large blocks of native vegetation
- blocks of vegetation that are close together or form a semicontinuous tract of remnant native vegetation
- species diversity as close as possible to the community prior to European settlement
- good estimated population sizes for many species within these areas
- populations of species of high conservation significance, at least at the regional level.

In this region, the Sleaford Mere Conservation Park and the Lincoln Conservation Park are located to the north-east of the site (refer to Figure 18). The Lincoln National Park is located further north-east, with the Memory Cove Wilderness Protection Area located within the park covering the south-eastern portion of the Jussieu Peninsula. Land to the north-west of the site includes the Cathedral Rocks Windfarm. Land due north of the site is characterised by agricultural activities, currently being utilised as grazing land. Private landholdings form a boundary to the site in the north and north-east (refer to Figure 19). The locality has a very low population density, with only three private residences near the proposed site. These 'sensitive receivers' (i.e. residents that could potentially be affected by the proposal, especially noise from launch activities) are located approximately 3-4 km north-east of the proposed launch pads.

The Thorny Passage Marine Park borders the coast and incorporates the waters off lower Eyre Peninsula, extending from Frenchman Bluff in the west to Memory Cove in the east (refer to Figure 20). It includes Liguanea Island (part of the Lincoln National Park), which is located approximately 4 km south of the proposed site. The launch trajectory zone also passes over Commonwealth Marine Parks that are outside State waters, including parts of the following:

- South-west Marine Parks Network:
  - Great Australian Bight Marine Park
  - Western Eyre Marine Park
  - Western Kangaroo Island Marine Park
  - Southern Kangaroo Island Marine Park.

- South-east Marine Parks Network:
  - Murray Marine Reserve
  - Nelson Marine Reserve
  - Zeehan Marine Reserve.

The EIS provides a comprehensive review and analysis of the physical and biological receiving environment of the proposed site and surrounding region. Native vegetation and fauna communities are further discussed in Section 14.5.


**Figure 18: Site context (Source: SAPPA)**

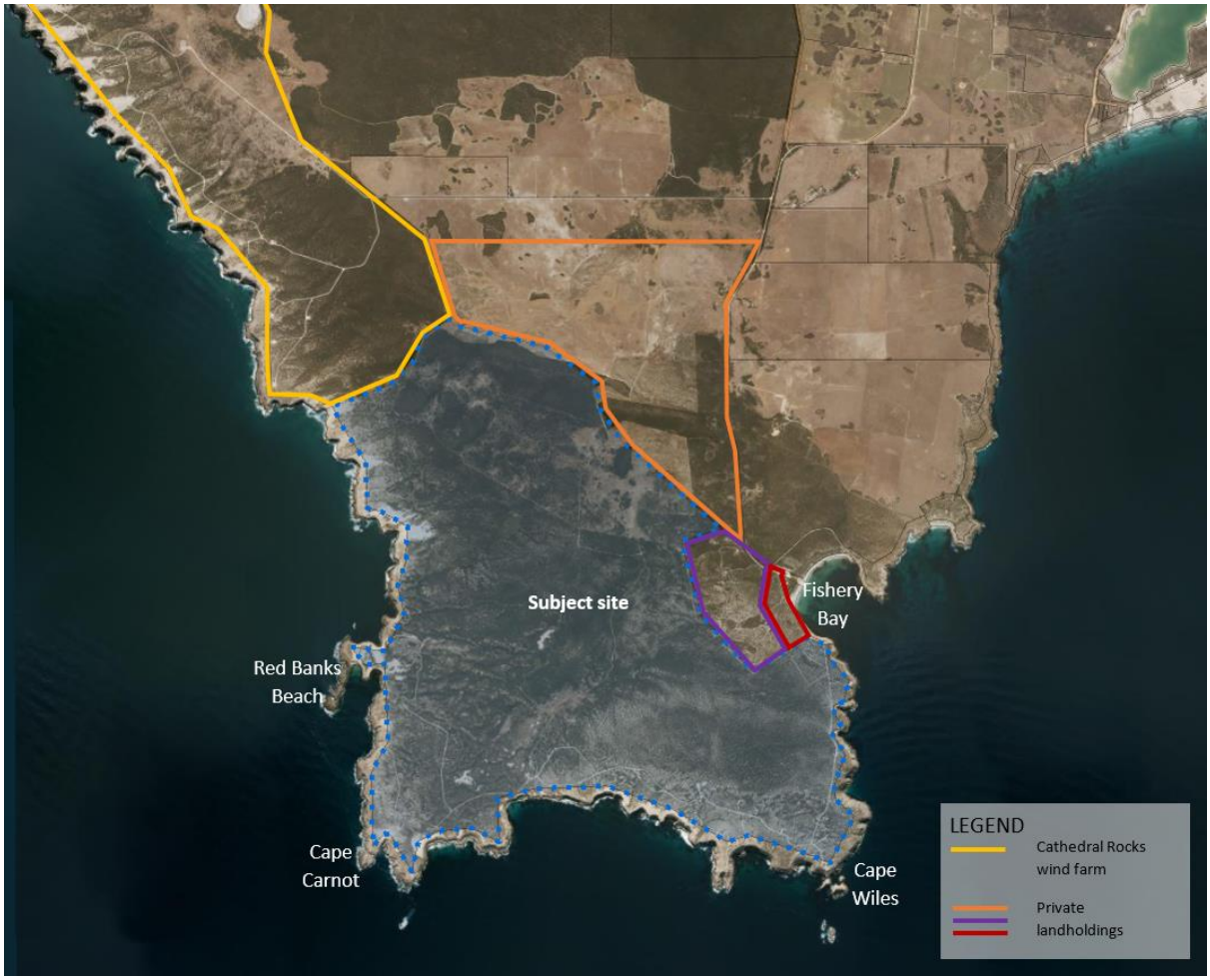



**Figure 19: Regional context (Source: SAPPA)**

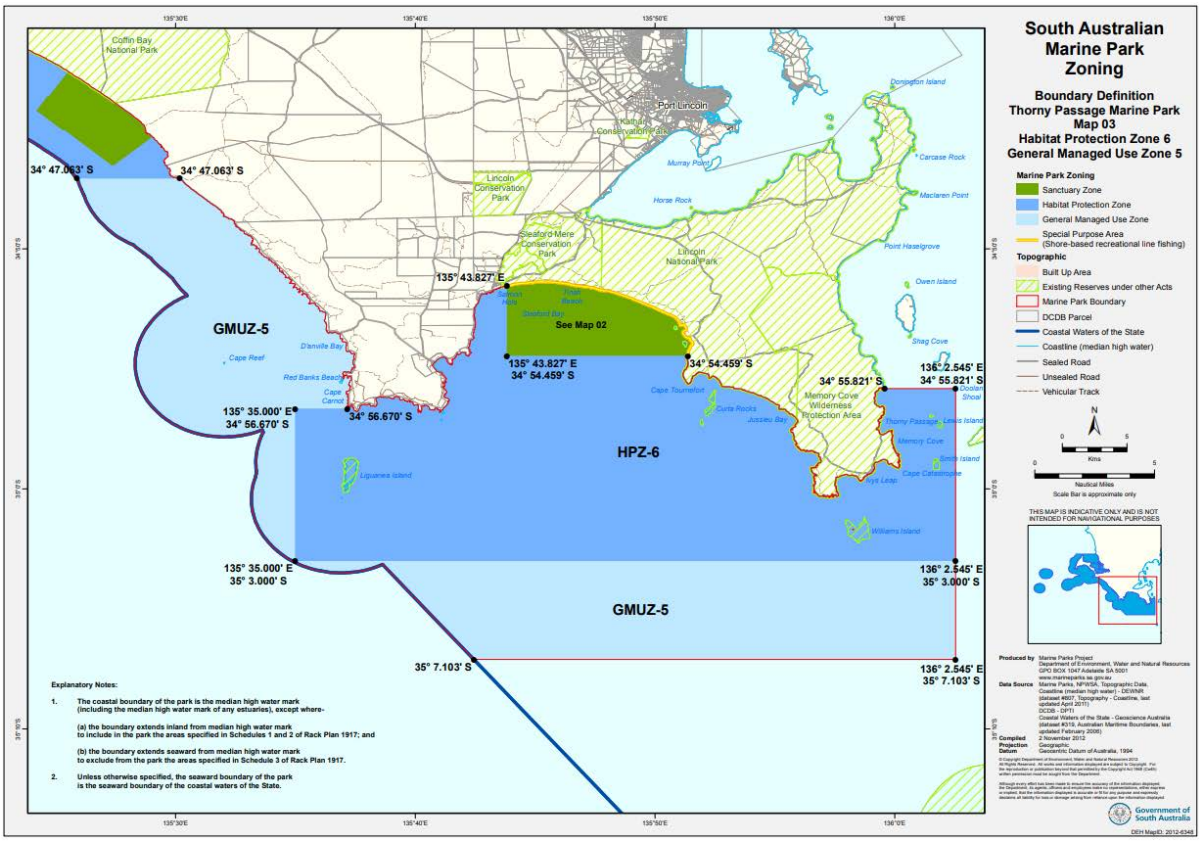



**Figure 20: Location of Marine Parks surrounding the site**

## IBRA Bioregion

The Interim Biogeographic Regionalisation for Australia (IBRA) classifies Australia's landscapes into 89 large geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information. It is endorsed by all levels of government as a key tool for identifying land for conservation under *Australia's Strategy for the National Reserve System 2009-2030*.

Other priorities include:

- key habitats for nationally listed threatened species or migratory species and/or Ramsar sites or wetlands of national importance
- areas that contribute to whole-of-landscape conservation outcomes, such as places that offer refuge and or contribute to connectivity and the adaptation of biodiversity to changing climate.

The site is located within the Eyre Yorke Block Bioregion and the Talia Sub-region. Heritage Agreement areas are considered to be land used for conservation purposes (i.e. in addition to State and National parks). The Talia Sub-region has 56% native vegetation, of which 32% is protected in formal reserves. The Mungerowie Association has 78% native vegetation of which 25% is formally protected. The remnants of native vegetation within Whalers Way are highly valuable in providing connectivity between the Port Lincoln National Park and the Coffin Bay National Park.

## 9. Public Consultation

A total of 261 submissions were received during the six-week consultation period.

The overall breakdown of responses are as follows:

| Supportive | Further information | Concerns / Objection |
|---|---|---|
| 133 | 3 | 125 |

It was noted that the majority of the supportive submissions were single-line, emailed responses, whilst those submissions raising concerns and/or objections were more substantive in nature, referencing multiple and specific issues to the proposed orbital launch facility at Whaler's Way.

In addition, several of these submissions were from environmental groups or organisations, including the South Australian Nature Alliance (representing Conservation Council SA, Conservation Volunteers Australia, Friends of Parks SA, Greening Australia, Landcare Association SA, National Trust SA, Nature Conservation Society SA, Nature Glenelg Trust, The Wilderness Society, Trees For Life and Birds SA).

The key matters raised have been considered against the assessment guidelines in Appendix B and are summarised as follows:

<u>Supportive Submissions</u>

- Development of a sovereign space launch facility.
- Support for science-related disciplines and value adding industries.
- Local, state and national opportunities for employment, goods and services.
- Supporting the continued growth and diversification of a regional economy.
- Development will boost the development of new technologies and local industries.
- Allow for the application of new technology and provide new research opportunities.
- Support new space-related tourism experiences and opportunities.
- Provide opportunities for the use of renewable energy.
- Create opportunities to improve conservation outcomes (through targeted monitoring and management programs and pest eradication and weed control).
- Environmental impacts can be appropriately managed.
- Coastal reserves, conservation areas, beaches and marine waters can still be enjoyed and accessed by members of the public and businesses.

<u>Objection Submissions</u>

- Permanent and irretrievable loss of an important ecological area and tourist site.
- Proposed launch facility should be in a different location (with alternative locations subject to an independent review by the State Planning Commission).
- An existing Heritage Agreement is in place on the land which should be respected and retained, and as such is an inappropriate location for a rocket launch facility.
- Excessive clearance impacts on critical habitat for threatened (and other) fauna species.
- Noise and vibration impacts on threatened (and other) fauna species, where the area impacted is much larger than any physical clearance, whereupon animals are scared or flee from launch events never to return (or interrupts breeding cycles).
- Native vegetation clearance under-estimated, as additional hazard reduction and fire protection zone clearances will be required to facility components.
- Development will further fragment and isolate key habitat areas.

- Increased bushfire hazard risk from rocket launches, machinery use etc, where fire events can lead to loss of additional habitat, property and lives on adjacent land.
- Aboriginal cultural heritage impacts and importance of the land to Aboriginal groups.
- Tourism impacts from loss of access to Whaler's Way (either for temporary periods or permanently) and interruption to the use and enjoyment of adjacent beaches.
- Unavailability of test launch data to inform the EIS for noise and other impacts (assessment process should be delayed until these results are made available and verified).
- Loss of coastal habitat and nesting sites for raptor species, and potential impacts on marine species, such as seals and whales, white bellied sea eagles and ospreys that frequent nearby coastlines, marine waters and offshore islands.
- Diminished air quality: airborne propellant and contaminants (and cumulative impacts).
- Additional noise impacts on local fauna and other sensitive receivers (including residents) from low-flying helicopters coming to and from the launch site.
- Contamination of marine waters: deposition of spent rocket debris and materials.
- Pressure on local water supplies: significant volumes required for each launch which will need to be diverted from scarce supplies serving the local community.
- Diminished water quality: deluge water and storages will be a source of on-going contamination (and higher concentrations over time through retention and reuse), both from overland flows (or dispersed within the environment) and increased concentrations of harmful chemicals in both surface and groundwater sources.
- Absence of a publicly available disaster response and emergency management plan.
- Reliance on single data sources (wind data 2009), and modelling of chemical/airborne fallout from launch activities and extent of areas affected beyond the launch facility.
- Additional impacts from future expansion, which will continue to have a negative effect on local biodiversity and habitat for critical species.
- Significant impacts to the "wildness" of a sensitive coastal area, and diminution of the use and experience of popular beach and surf breaks within the locality (Sleaford and Fishery's Bay).
- Loss of seclusion and amenity by local residents (and effects on health and wellbeing).
- Loss of landscape character and visual amenity loss – particularly from the siting, height and scale of the proposed launch facilities – when viewed from within the locality.
- Launch facility is contrary to local planning policies (Conservation Zone), which seek development that maintains and enhances environmental values or is for a public purpose (and not an industrial development of this nature).
- Rocket launch facility may become a military target (or sabotage); clarification needed on whether civilian or military satellites are to be launched from the site.
- Periodic restrictions on marine water access via the imposition of an exclusion zone for recreational and commercial fishers, the later comprising abalone and tuna vessels operating within or through this zone on a regular basis.
- Related impacts of public access and viewing areas (and lack of amenities) or event planning have not been properly considered or planned for by the developer.
- Significant clean-up process required at end of project life (or from abandonment).
- Use of scarce and publicly funded local emergency services (CFS, SAPOL, SAAS, MFS) to support launch activities.
- Impacts on the local road network through increased vehicle traffic (and heavier vehicles), including heightened road safety risk for local residents, cyclists, school buses and visitors.
- Heightened safety risk from rocket malfunctions beyond the launch site.
- Increased greenhouse emissions and undermines international sustainability / climate change goals, being contrary to state and federal policies that seek to reduce emissions and not undertake such impactful projects on the natural environment.

- Poor and inadequate consultation process by the proponent; and just four weeks to read, understand and provide a formal response on thousands of pages of EIS documentation.
- Development will undermine eco-tourism initiatives and ventures and curtail any future initiatives or experiences that rely upon its unique natural settings and experiences.

Three submissions were neutral - seeking further information or clarification from the proponent. A potential mitigation measure (raised in more than one submission) was the abandonment or relocation of Launch site A to ensure the retention of critical habitat in that location.

## 10. Agency Advice

A number of state agencies were consulted on the draft EIS. The key matters raised have been considered against the assessment guidelines in Appendix B, and can be summarised as follows:

- **Aboriginal Affairs and Reconciliation (DPC-AAR)**

  DPC-AAR confirmed that the central archives hold no records for any listed Aboriginal heritage site, place or object within the project area. It was acknowledged, however, that Aboriginal heritage may exist within a given area even though it is not recorded on the central archives.

  DPC-AAR noted that the Cane Report advises that Aboriginal artefacts were identified in the north-eastern corner of Launch Site A. In response, AAR understands that Southern Launch altered the boundary of Launch Site A to avoid these artefacts. AAR encourages Southern Launch to adopt this type of culturally appropriate and flexible approach to heritage management throughout the duration of the Project. Four additional sites were identified outside the project area.

  DPC-AAR supports preparation of a Heritage Management Plan and Construction and Environmental Management Plan if the development were to proceed, provided these are considered to be appropriate measures for dealing with heritage discoveries during construction and/or operation of the development. DPC-AAR is available to deliver legislative awareness training sessions to Southern Launch's staff and contractors.

  Aboriginal tradition dictates that the nature and location of some heritage must not be widely shared. In addition, Traditional Owners and Aboriginal organisations maintain local archives that contain information not held on the central archives. Early and meaningful consultation with Traditional Owners and relevant Aboriginal organisations is therefore strongly recommended as part of a robust Aboriginal heritage risk management strategy.

  DPC-AAR provided contact details for local Native Title bodies and representative bodies, to facilitate further engagement and consultation.

- **Department for Environment and Water (DEW)**
  The DEW response considered potential impacts from the development on threatened plant and animal species. The response also considered the development of the project in close proximity to a sensitive coastal reserve and cliff top area, alongside the requirement to modify the physical environment through site clearance, and the importance of rehabilitation and recovery measures post-construction.

  Whilst DEW noted that the proponent's investigations had concluded that *"no threatened flora species listed under the Environment Protection & Biodiversity Conservation (EPBC) Act or National Parks and Wildlife (NPW) Act were observed within the Project Footprint or within the Project Site" and that "It is deemed unlikely that any such flora species are present"*, the

baseline field surveys may have missed some flowering NPW (and EPBC) listed species that may occur on site.

It was recommended that a strategy for follow-up surveys of the footprint area and what to do if any are located should be developed and incorporated into the Response Document. If threatened plants are located, advice should be sought from the SA Seed Conservation Centre.

The main listed threatened fauna species of concern – as identified by the EIS - are the NPW and EPBC Act listed Eyre Peninsula Southern Emu-wren and Western Whipbird (eastern). Much of the vegetation within the proposed development footprint, and its surrounds, provides 'habitat critical for survival' of both species.

Whilst the clearance of habitat has been addressed as per requirements of the *Native Vegetation Act,* the potentially greater impacts to both species are likely to arise from sudden and relatively severe noise generated by rocket launch events.

DEW noted that the predictive modelling used for the noise impact assessments *"should be considered conservative as the noise levels produced by the smaller rockets (i.e. quieter) planned for use have not been considered for these worst-case scenarios".* The agency also noted that "*there is no clear consensus within available literature whether long term behavioural changes on wildlife would be caused by launch vehicles or if the birds in this area would habituate to the sound of launches and testing."*

The potential (temporary) impact area during a rocket launch (where noise levels exceeded ambient noise levels) was considered to be up to 5 km or 7800 ha, which in rare cases could lead to temporary hearing loss for local fauna within 1500 m of the launch site (an area of 700 ha). For the Western Whipbird in particular, the EIS observed that:

> *Operational noise through the launching of rockets at a frequency of once every three weeks for a duration of 75 seconds will generate noise at a level that will likely impact the species up to a distance of 4-5 km from the launch site. The species is sensitive to discrete, unpredictable disturbances such as sudden loud noises that can cause physiological effects, such as stress, avoidance and fright-flight responses, damage to hearing from acoustic over-exposure, and masking of important bioacoustics and communication signals, such as the ability to hear each other or predators, which may also lead to dynamic behavioural and population effects. Impacts from noise may displace individual birds in the area."*

Whilst the EIS concludes that these impacts would be both localised and of short duration, this statement is queried, and as such other areas of suitable habitat within nearby national parks will not be likely to act as a suitable refuge because, if suitable, they are likely to be fully occupied by whipbirds. And because of this, the impacts are likely to lead to a long-term decrease in the overall whipbird population.

Similarly, with an estimated 18 Eyre Peninsula Southern Emu Wrens observed to be within the project area footprint, and around 100 individuals within a more localised area from Cape Carnot to Cape Wiles, quite minor population impacts can lead to significant changes, and that as a minimum the project is likely to reduce the occupancy area of several species. DEW further notes that whilst acclimation to a disturbance is something that may occur if the disturbance is repeated frequently – e.g. at least daily – and at a predictable time of day, disturbances at three-weekly intervals and at different times of day and night are unlikely to lead to acclimation. If the project were to proceed, then targeted, long-term resourcing is required to monitor potential impacts to these and other bird species from rocket launches.

Furthermore, both Osprey and White-bellied Sea Eagles are known to occur in this area. Both these species have undergone a significant decline in South Australia and are now listed as Endangered under the NPW Act. While the Coastal Raptor Assessment (Appendix R) states that there are no known nests near the site, the assessment only checked the known vacant sites, and did not include a comprehensive survey of the area by a suitably qualified raptor expert, as previously recommended by DEW. DEW has subsequently advised that a breeding pair of Ospreys and chick were confirmed at one of the nesting sites at Cape Wiles towards the end of 2023.

As the breeding territories of local Osprey and/or White-bellied Sea Eagles populations within the project area have not been fully investigated, appropriate mitigation and monitoring measures have not been incorporated into the proposal. This is a potentially significant impact on a small and declining population. Should the proposal proceed, a comprehensive survey by a suitably qualified coastal raptor expert should be undertaken and mitigation and monitoring measures identified and implemented.

In relation to construction and/or operational issues, further clarification was sought from the proponent on the remediation of erosion and sand drift within the cliff top dune system (as a result of the development), and relevant environmental controls for any requirement to use irrigation methods to dispose of wastewater within the project area. This would include more detailed information on any changes to existing physical landforms, and to describe management and rehabilitation measures for these areas.

- **Native Vegetation Council (NVC)**

  The NVC clarified the process for satisfying regulation 27b of the Native Vegetation Regulations 2017 to enable vegetation clearance (including the provision of a suitable Significant Environmental Benefit). The process for changing a Heritage Agreement (HA) under the *Native Vegetation Act 1991* was also outlined. However, the NVC is unable to comment on varying the HA until an application is received from the landowner.

  The NVC notes the site has high ecological value, representing an extensive area of high-quality native vegetation and critical habitat for native fauna including a number of both state and nationally threatened species. In particular, the site has been formally protected by the HA for over 30 years and development should be avoided in such areas. Although, previous advice to the proponent acknowledged that parts of site have been degraded due to recreational use and that excluded areas could potentially be developed (as initially envisaged when the HA was established). The NVC also noted the site selection process did not consider its mitigation hierarchy to avoid impacts on vegetation (i.e. comprising the four elements – 'Avoid', 'Minimise', 'Rehabilitate or Restore' and 'Offset').

- **Department for Infrastructure and Transport (DIT)**
  DIT noted that the EIS satisfactorily addresses the traffic impacts for the construction and operational phases (via the Traffic Impact Assessment contained in the EIS document). No arterial road upgrades are required for the type or volume of vehicles anticipated to and from the development area. In the event that Restricted Access Vehicles (including oversize and over mass components) are required, the proponent will need to ensure that all necessary approvals/permits are obtained from the National Heavy Vehicle Regulator (refer link: https://www.nhvr.gov.au). The advice from DIT also noted that marine and aviation operational exclusion zones will need to be actioned as required.

- **Environment Protection Authority (EPA)**
  The EPA's comments were qualified in that the consideration of noise impacts only related to those on human sensitive receivers during the construction and operational phases of the development and were based on background measurements and theoretical modelling data, with no successful launches undertaken before the EIS was released. Any future test launch data should be incorporated into the applicant's Response Document.

  The EPA's response considered environmental matters related to marine ecology, air quality, noise and vibration, water quality (for both stormwater and wastewater management), construction management, and legislative requirements. The agency noted that specific recommendations made in respect to operational monitoring, management and mitigation measures in the specialist technical reports should, where relevant, be incorporated into the Operational Management Plan framework (OEMP) for the development.

  The EPA supports the proposed specified mitigation measures outlined in the Executive Summary (page 3) and throughout the EIS. The EPA also strongly supports informing residents prior to launch activities as this has proven to assist in managing community concerns associated with other activities/industries that have periodic, loud, short-duration noise impacts elsewhere in South Australia. The EPA also supports an ongoing monitoring program if and when permanent operations are commenced. Clarification was sought on operational noise benchmarks and the associated methodology and monitoring period when using Day Night Levels (DNL) for indicative purposes.

  The proposed approach to stormwater management for the launch facilities was generally supported, such that any risks to the environment were considered to be low. It was noted that wastewater management would need to deal with contaminated product, in the form of deluge water arising from launch activities (~50 KL per launch). A monitoring and testing regime will need to be implemented to ensure that any storage and re-use requirements remain fit for purpose. All wastewater ponds will need to be designed in accordance with EPA guidance.

  A Soil Erosion and Drainage Management Plan (SEDMP) is recommended for construction.

  The EPA advice also considered spent vehicle debris in state coastal waters, and the requirement to seek an exemption for each launch under s.37 of the EP Act, which may include the need to undertake reasonable and practicable actions to retrieve any aerospace debris that washes up on coastlines. Spent rockets / debris landing outside state coastal waters, is a matter for the Commonwealth Government to consider and license.

  If the development is approved and the facilities made operative, a number of the proposed activities associated with the development will require an environmental licence to operate under the EP Act. Licence requirements will also be dependent on storage requirements, and fuel burring capacity (and is subject to future review by the EPA).

- **Department of Primary Industry and Regions, South Australia (PIRSA)**
  The focus of PIRSA's comments related to the potential impact of launch operations on commercial fisheries and the imposition of exclusion zones for vessels during these periods. The economic effects of any exclusion period (i.e. frequency and duration) needs to be appropriately quantified, including the legislative authority to establish and impose them on third parties, either at the State or Commonwealth level.

If such exclusion zones were to be imposed, the method of notification (via a NOTMAR or similar) needs to be outlined in the Response Document. PIRSA noted that traditional communication methods may not be readily accessed or checked by mariners, with additional communication methods recommended, such as eNotices which the Australian Hydrographic Office offer to notify mariners via email, to improve safety of mariners.

- **Department for Energy and Mining (DEM)**
  DEM considered the potential interaction with existing mining and exploration tenements. The following mining tenements are located in close proximity to the project site and may be impacted by the proposed orbital launch activities:

  - Minerals Leases (MLs) and Retention Leases (RLs) and Exploration Lease (EL); ML5561, ML5562, RL66, RL67, EL6224 held by Quantum Graphite Tenements.
  - Extractive Mineral Lease (EML) 6510 – held by Theakstone Sands.

  DEM noted that a detailed description of the activities undertaken on these tenements and their location in relation to the proposed Project is provided in Section 14.4.1 of the EIS and a map with MLs and EMLs is provided on Figure 14.2 of the EIS. Theakstone Sands (EML 6510) is aware of the proposed Project as a result of their EML application preparation (consultation with adjacent landholders including Southern Launch), which occurred in May 2020.

  In the department's response, DEM also noted that Section 14.4.5.2 of the EIS provides an assessment of potential impacts on Mining Activities within the Project area. DEM supports the proponents approach that potential (mining) interface issues could be managed through appropriate communication protocols and recommended that further engagement with the adjacent mining and exploration tenement holders occur at early stages of the Project schedule, to develop these protocols.

- **Eyre Peninsula Landscape Board (EPLB)**
  The EPLB recommended that the proponent undertake a comprehensive survey of the size and extent of the Western Whipbird (eastern) and Southern Emu Wren (Eyre Peninsula) both within the project area and adjacent habitat areas to better inform the assessment.

  It recommended that the proponent undertake further research to better define what the indirect impacts (such as noise during construction works and rocket launch operations may have on these species (and where they nest and feed)) and also implement appropriate measures to minimise any adverse impacts.

  The Board was supportive of the Weeds and Pests sub-plan to be developed as a component of the CEMP and OEMP in accordance with any future conditions of approval.

## 11. Council Comments

Two local councils were consulted on the draft EIS. The key matters raised are summarised as follows:

- **District Council of Lower Eyre Peninsula** (DCLEP)
  DCLEP noted a number of planning issues requiring further clarification, namely the use and reliance upon the local road network, specifically the increase in the number and type of vehicles using Proper Bay Road and Fishery Bay Road to access the orbital launch facility site during construction and operation.

Operational volumes (based on the proponent's advice) will result in a 10% to 35% increase (respectively) for Proper Bay Road and Fishery Bay Roads.

In the Councils' view, such increases will have a significant effect on pavement life and lead to an accelerated degradation of these road surfaces over time. One solution is to increase the frequency of grading, however this is not practical, as would require additional expenditure for re-sheeting at reduced intervals.

Council considers it is unfair for local ratepayers to meet any additional costs to repair and maintain unsealed roads for a private development and has recommended that the affected roads be upgraded to a sealed pavement standard, with all costs met by the proponent (or alternatively, another funding sources, such as state or federal funds).

A dilapidation report has also been requested before construction to ensure that existing road conditions are maintained.

Two other issues were raised by Council.

Firstly, the management of sightseers and visitors to observe launch events, which will need to be addressed, either as potential viewing platforms in prominent locations and/or a requirement for an Event Management Plan to be developed.

Whilst it is acknowledged that the viewing areas would *likely* be outside the project area, further work should be undertaken to ensure potential visitor increases are appropriately managed without cost or longer-term expense to the Council.

Secondly, local amenity and interface considerations must be taken into account in the assessment process. Council notes the launch site is in close proximity to sensitive receptors (i.e. dwellings), and wants to ensure any pertinent information arising from the test launch campaign (including potential environmental impacts beyond the project site)are considered, and managed appropriately.

- **City of Port Lincoln**
  No comments were received.

## 12. Response Document and Additional Information

On 26 August 2022, Masterplan (on behalf of Southern Launch) provided a formal Response Document (RD) that sought to address the matters raised in the public submissions, agency advice and council comments. The RD noted the number of submissions received and issues raised, including a summary of community engagement to date.

The main points to be noted from the RD are outlined below:

- A summary and ranking of the key response issues was prepared.
- The project was amended in the following ways:
  - relocation of Launch Site A (outlined in the proposal section), noting that Launch Site B, Infrastructure Site D and Range Control Site E were retained
  - revised proposal for land division that expands the leased area northwards. The revised lease boundary increases the separation distance of all four development sites from the lease boundary
  - inclusion of a secondary emergency egress
  - confirmation of construction stages and timing.

- A number of additional technical investigations and reports were prepared, including an Environmental Assessment Report, Supplementary Noise Advice (particularly on the marine environment), Terrestrial Biodiversity Report, updated Marine Ecological Assessment, Static Motor and Engine test details, Bushfire Emergency Plan and Economic Impact Statement and Analysis. These reports will inform the further assessment of the proposal.

State agencies reviewed the adequacy of the initial (draft) RD and feedback was subsequently incorporated into the final version. The RD is considered to have suitably responded to the issues raised by public, council and agency submissions received during the notification period. The Assessment Report will consider the overall adequacy of this information.

In response to a request from the State Planning Commission for further information for assessment, the proponent provided the following:

- Southern Emu-wren Management Plan (19 July 2023)
- Mallee Whipbird Management Plan (19 July 2023)
- EPBC Offset Strategy – Sothern Emu-wren and Mallee Whipbird (19 July 2023)
- Request for further information – Launch Exclusion Zones (received 20 October 2023), which further considered potential impacts on seafood industries
- Additional Information Addendum (received 20 October 2023), which further considered potential impacts on seafood industries
- Summary document (received 5 December 2023), which provided an 'update' to the EIS and Response Document, especially the interpretation of the original scientific studies and assessment conclusions (i.e. in the context of the above listed reports). The document clarified some of the perceived ambiguities of the proposal (i.e. nature, number and impacts of launches, including launch exclusions) and the communication of the science regarding noise generation and impacts on native fauna species.

The Department for Environment and Water (DEW) and Primary Industries and Regions SA (PIRSA) reviewed the documents and their feedback has been considered in the relevant sections of the Assessment Report.

# 13. Assessment of Key Issues

## 13.1 Need for the Proposal

The EIS (Section 1.2.2) identified that an important trend in the space sector is the expanding range of uses for small and micro satellites (such as CubeSats) in low Earth orbits, and particularly polar and sun-synchronous orbits, which could be accessed from the proposed complex. At a typical distance from the Earth of around 1,000 km above sea level, these are significantly lower than the more traditional geosynchronous orbits (typically 36,000 km above sea level). Most existing launch sites throughout the world are designed for geosynchronous orbits and are situated much nearer to the equator and hence not suited to launching the new class of smaller launch vehicles (i.e. rockets). This makes the southern coast of South Australia, with its lack of population centres, or major air routes or maritime transportation routes to its south, an attractive potential launch site.

The new CubeSats can image the Earth multiple times every day and provide higher resolution, time critical, commercial information to farmers, emergency services, transport operators and general consumers when compared to their GEO predecessors. This satellite technology advancement has revolutionised the space industry, advancing the number of missions these smaller satellites undertake and significantly reducing the size of the rockets needed to get them into orbit.

CubeSats are now proposed to be constructed and built in Australia, with South Australia positioning itself to develop a significant space industry. To reduce supply chain lengths, many of the rocket companies are looking to relocate their assembly and manufacture facilities to Australia, creating local, high technology jobs and growth. It is expected that key aspects of rocket manufacture could be located to the industrial sites surrounding Port Lincoln, Adelaide and around Australia more broadly. Should the launch facility be successfully established in South Australia, it is anticipated that there will be significant benefits to allied manufacturing. There is the potential for one or more launch vehicle manufacturers to be attracted to locate either final assembly, or potentially their full manufacturing operations, to South Australia.

Southern Launch aims to develop a commercial operation capable of addressing the rapidly increasing demand for high latitude launching sites for polar and sun-synchronous orbits. Such a dedicated polar Earth orbit launch facility is aimed at providing clients throughout the world with rapid response, cost effective access to space.

Thus, the proposal aims to take advantage of the emerging space market.

The EIS (Section 2.5) considered that not proceeding with the proposal, would result in loss of the forecast direct, indirect and induced economic and social benefits accrued from the project proceeding. Having regard to there not being other advanced proposals for competing launch facilities within Australia, there is a high probability that, should the proposed project not proceed, the market for such launches will be met overseas. The loss of this market share to other countries would likely have a significant impact on the development of the commercial space industry in Australia, and the allied scientific and industrial sectors in both South Australia and Australia. It would also represent a lost opportunity to establish as high-technology, high-skill industry which has the potential to catalyse significant multipliers in the education, logistics, technical, scientific and tourism sectors.

The EIS further considered that the current management of the site does result in some adverse impacts on the environment, including the accumulation of waste, erosion, loss of vegetation and fauna disturbance through impacts from camping and recreational uses (such as edge effects and vehicle and human trampling of vegetation). The proposal offers opportunities to improve the

management of the site, undertake rehabilitation projects and ongoing improvements, whilst continuing to facilitate managed access to the site for tourism and recreational purposes.

### 13.1.1 Background

In recent estimates, the value of the global space economy was USD$350 billion with expectations that it will triple to US$1.1 trillion by 2040. The Australian Space Agency has a clear objective to grow Australia's space industry by tripling the space sector's contribution to GDP to AUD$12 billion per year and creating an additional 20,000 jobs by 2030. South Australia, with its vibrant space ecosystem, is already playing an important role in achieving this goal and fuelling a thriving and enduring South Australian space sector, supporting Australia's national space strategy, while capitalising on the opportunities of NewSpace**.**

The Australian Civil Space Strategy 2019-2028 identifies a strategic vision for the Australian space sector, specifically a globally responsible and respected space sector that lifts the broader economy and inspires and improves the lives of Australians. It identifies a strategy for growth, including four main strategic space pillars to:

- open international doors for global competitiveness
- increase our national capability
- promote a responsible space sector culture through responsible regulation, risk management and culture
- inspire industry, researchers, government and the Australian community to grow the next generation of the space workforce.

The proposal is consistent with the vision and strategies outlined in the Strategy and will assist in achieving the strategic pillars while operating within the responsible regulatory framework.

South Australia's emerging space sector consists of more than 100 private companies, research and educational institutions, and government departments. They specialise in a broad range of space activities, from upstream manufacturing of next-generation satellites and space technology, to downstream infrastructure and applications, as well as the processing and disseminating of space data.

The South Australian Government Space Strategy was developed through close consultation with community, government at all levels, industry and academia. The vision for 2030 is that South Australia will be designing, manufacturing, launching, and operating small satellites; to deliver actionable, space derived intelligence for sovereign Australian missions. The strategy further describes three main pillars for growth, notably including launch as a key enabler and driver for growing an enduring space ecosystem. Specifically, the aim is to:

- contribute to Australia's national space strategy, including launches into accessible low earth orbits and food production in space under NASA's Moon to Mars mission
- capitalise on opportunities in the NewSpace economy, such as using many small, connect satellites and using machine learning and artificial intelligence to exploit space-derived data
- cultivate South Australia as a centre-of-gravity for Australia's expanding space activities by building a skilled workforce, innovative ecosystem, supportive infrastructure and a globally competitive trading environment that is attractive to investors.

South Australia has also received significant investment for Australia's space industry, putting the state at the centre of the nation's space endeavours. The Australian Space Agency, the SmartSat Cooperative Research Centre (CRC), and a proposed $66 million Space Manufacturing Hub, are the centrepiece of a vibrant entrepreneurial ecosystem contributing to South Australia's thriving space economy.

South Australia is also building a world class entrepreneurial community and supporting infrastructure for innovators to collaborate and grow their ideas at 'Lot Fourteen' in Adelaide's central business district. Ultimately, this community will deliver the entire space value chain and enable the design, launch, and mission control of NewSpace capabilities. The precinct is home to the Australian Space Agency, the Australian Space Discovery Centre and Mission Control Centre and the SmartSat CRC. It also includes pioneering home-grown start-up companies, such as Inovor Technologies, Myriota and Neumann Space, as well as multinationals such as Italy's SITAEL and Canada's Lux Aerobot. This commitment to the space industry in South Australia was further exemplified with the announcement in January 2021 that a satellite, to be built at Lot Fourteen in collaboration with resident start-ups, would become the first to be put into space by an Australian state government. The project is part of the $6.5 million, ground-breaking SASAT1 mission in partnership with the precinct's SmartSat CRC, Inovor Technologies and Myriota.

This is also demonstrated by the announcement in September 2022 that Equatorial Launch Australia (ELA) will set up its base in Adelaide, due to the assistance provided through the South Australian Landing Pad program, which provides financial incentives to lure companies to the state. The company, which owns and operates the Arnhem Space Centre in Northern Territory, considers that its new Adelaide headquarters would become a hub for launch preparation and safety assessment activities, which would attract space-related engineering, project management and safety analysis talent to the South Australia. The move also puts ELA closer to the Australian Space Agency, the regulatory authority that grants launch permits for every launch from Australia.

The Australian Space Park to be established at Adelaide Airport also aims to accelerate Australia's sovereign space manufacturing capability and capacity, by initially co-locating four space manufacturing companies in a purpose-built facility. It will have a focus on collaboration and production of small satellites and their payloads, rockets, electric vertical take-off and landing vehicles (eVTOL), and supporting componentry and technical systems.

Through these initiatives, South Australia has emerged as a national leader in the development and application of space technology – one of the world's fastest expanding industries, with 'Lot Fourteen' being the launch site for much of the sector's growth in Australia. Importantly, the space industry also contributes to the development of other priority sectors for South Australia including defence, agriculture, mining, and tourism, as well as services for the community (such as health and education).

Thus, the proposed Whalers Way Orbital Launch Complex (in conjunction with Space Launch's Kooniba Test Range facility) aims to be a key component of the state government's emerging space industry and to establish South Australia as the national centre for space-related manufacturing, launch activities, research and education.

From a national perspective, the Whalers Way facility could also become a site of significance to Australia, both from a commercial perspective and as national critical infrastructure. Global supply chains were significantly diminished due to the impact of the COVID pandemic, reinforcing the importance of sovereign capabilities for Australia. Furthermore, there is presently no ability to launch satellites from Australia in polar or southerly orbital inclinations. Should the proposal be approved, it is entirely foreseeable that it could be used for national space missions and federally funded projects.

On 26 October 2023, Australia and the United States of America signed The Technology Safeguards Agreement (TSA) that will allow US companies to carry out space launch activities in Australia, whilst protecting US technology (including rockets and satellites). The US demand for launching capabilities will increase investment in launch infrastructure, thereby encouraging Australia's domestic launch sector, spaceports and advanced space manufacture to scale and grow. This market expansion would uplift the entire local space sector, including advanced manufacture, assembly, integration and testing.

This could support a reduction in the cost of access to space, through commercial efficiencies and experience. This will make Australia more attractive as a global launch hub and lead to more international and domestic launches in Australia. Industries such as construction, transport, hospitality, security, maintenance, operations and logistics will benefit as Australia's launch sector expands. It's expected these benefits will be particularly in rural and remote areas where most launch activities will occur. The demand for launch capability is expected to exceed supply by 3:1 over the next 10 years.

The significance of the TSA to the Australian sector allows for industry to develop critical sovereign infrastructure. New Zealand based launch provider, Rocket Lab, moved its registration from New Zealand to the United States, and opened headquarters in Huntington Beach, California in 2013 due to limitations to customer access due to legal restrictions with the US. The signing of the TSA therefore increases Australia's attractiveness as a place to launch, adding to the ability to access different orbits and trusted alliances to protect sensitive technologies.

In addition to the commercial possibilities for launch, the US and Australian Defence sector have also announced enhanced cooperation in the space domain. Enhanced Space Cooperation was declared as a new Force Posture Initiative at the 2023 Australia – US Ministerial Consultations (AUSMIN). This initiative enables closer cooperation through increased space integration on existing exercises and operations under the AUS-US Force Posture Agreement, which includes launch. Presently the US Space Force is reviewing tactically responsive launch, which seeks to introduce speed, agility, and flexibility into the launch enterprise to respond to dynamic changes in the space domain or an operational theatre. This would enable a combatant command to insert or replace assets in orbit much faster than standard timelines.

South Australia aims to retain its leadership role as the Centre of Gravity for Space within Australia, home to the Australian Space Agency and the full up-stream and down-stream space capability ecosystem. Access to launch facilities enables the entire sector including manufacture, testing, assembly, integration, and logistics. Launch is fundamentally necessary to the stability and growth of the ecosystem. Should the Whalers Way Orbital Launch Complex not be approved, the Australian space industry will likely re-locate to other States (some of which now have access to launch and the associated manufacture and advanced technology ecosystem) or overseas. As the Defence & Space State, South Australia must take advantage of the current national initiatives, including AUKUS Pillar 2 to support sovereign launch capability through Whalers Way as a means to secure the advanced manufacturing and innovation ecosystem within the state.

### 13.1.2 Project Benefits

Notwithstanding the broader benefits arising from a launch facility as described above, the EIS (Section 2.3) details the direct and flow-on economic benefits of establishing the Whalers Way Orbital Launch Complex, based on an economic analysis undertaken by the SA Centre for Economic Studies (as detailed in the EIS: Appendix N). The gross economic impact of the proposed activities on the South Australian economy was assessed using an input-output model. The methodology employed involves

estimating the total direct and indirect employment and gross state product arising from the production operations and sustainment investment activities. The analysis considered there would be three forms of potential economic effects – the capital works required to establish the facility, the ongoing operation of the facility and the increase in visitor numbers associated with the launches (i.e. space tourism). The economic impacts of the proposal are discussed further in Section 14.17 of this AR.

The 'Whalers Way Wilderness Sanctuary' is privately owned and managed as a destination for tourism and recreation. Visitors pay a fee to access the land for a 'nature-based experience'. Due to the lack of facilities and condition of the roads, accessibility to the site's features is generally gained by more adventurous visitors with 4WD vehicles. Campers need to be self-sufficient as there is no power, water or sewer provided. Nonetheless, Whalers Way is a popular low-budget tourist attraction for the region (and a favourite holiday location for locals). Use of Whalers Way for rocket launching activities would significantly restrict use of the area for tourism and recreation. There would be a disbenefit in the loss of relatively unrestricted access to the coast for tourism, with a changed focus from unmanaged to controlled tourism. Unlimited recreational use of the site would cease.

However, the current use of the site is proposed to change to more value-added forms of tourism, such as guided tours (including cultural and environmental awareness) or bespoke experiences (such as eco-cabins or glamping). The proposal would also provide an opportunity for 'space tourism' to develop as a new attraction. Thus, Whalers Way would continue to be a tourism attraction for the region. Improved management of public access and activities could also provide environmental benefits, especially by reducing disturbance from visitors. Coupled with proposed measures to improve the environmental management of the heritage agreement area, including land rehabilitation and ecological restoration.

The economic effects of the proposal would also result in a range of social benefits to Port Lincoln, especially by establishing a high-tech industry and providing an additional and unique tourist attraction. Greater national and international attention could also provide an opportunity to boost tourism for both the region and the state.

**The AR concludes that the development of a rocket launching facility on the Eyre Peninsula would provide critical infrastructure to support the development of the emerging space industry in South Australia. Combined with the space industry precinct established at 'Lot Fourteen' in Adelaide, the proposal aims to be a key component of the state government's strategic objective to foster a space industry. In particular, the aim to establish South Australia as the national centre for space-related manufacturing, launch activities, research and education. This would deliver substantial strategic and economic benefits to the state, especially if the launch facility becomes a catalyst for establishing a new high-tech manufacturing sector. Direct economic benefits would arise through employment and investment, especially for Port Lincoln and the Eyre Peninsula Region (including flow-on effects to the goods and services sector). New space tourism opportunities could also provide significant benefits, including increased exposure for regional tourist attractions.**

## 13.2 Site Selection

The EIS (Section 1.2.2) states that the Whalers Way site was identified as the preferred location for the launch complex through an extensive review of potential locations across Australia, based on specific location criteria. In summary, the unobstructed flight paths, low aircraft/shipping volumes, low population in the immediate vicinity, year-round temperate climatic conditions, coupled with the skilled local workforce and a robust logistics supply network, makes the site ideal for the establishment of technologically advanced launch operations at cost-competitive prices.

The EIS (Section 4) included an extensive site selection process undertaken across Australia, which indicated that the number of potential sites for a facility of this nature is extremely constrained. The most critical criteria for site selection were natural geography that safeguards the public during any launch events to the south, close to a sizeable service centre for logistics support, yet remote enough to minimise any risks or hazards associated with rocket launching. The fundamental requirement to suitable launch sites is an inability for launched vehicles to pass overpopulated land. In essence, this key constraint means that orbital launch sites need to be located in immediate proximity to the coast, without any populated land (including individual sites containing dwellings or other forms of human occupation), between the launch site and the water. Having regard to orbital launch facilities around the world, immediate proximity to open ocean is a common locational factor of almost all facilities. On the basis of these fundamental constraints, the southern coast of South Australia, with its lack of major population centres and limited density of major air routes or maritime transportation routes to its south, provided an attractive potential locational search area for suitable launch sites.

### 13.2.1 Site Selection Process

The EIS (Section 4.2) identified the key site characteristics to be a suitably large area that has topography suitable for the various facilities required to be constructed, along with the associated amenities and facilities for the workforce. The activities on the site are required to be appropriately secured, both physically and electronically, and be supported by a range of services, including (but not limited to) electrical, communications, mechanical, hydraulic, fire and security. The remoteness and proximity to the coast needs to be balanced against the need to supply and provide a logistic connectivity to a high technology operation staffed by a highly educated and skilled workforce.

Proximity to a large service centre with suitable accommodation and services is also of importance. As launch operations would occur over weeks or months, proximity to a larger service centre obviates the need for the site to be self-contained in respect of its workforce and servicing. The benefit of this approach is two-fold, reducing the operational cost of the site (and thus improving its viability) and maximising the economic impact of the proposal to the local area (i.e. versus a 'fly-in, fly-out' operational arrangement).

The site selection process was based on a weighted multi-criteria analysis, which involved review of 16 locational criteria (as detailed in Table 4.1 of the EIS). The criteria include some which are critical and essential, and for which a failure to meet the criteria will immediately rule a site out of contention. Other criteria are less critical, where a failure to meet the criteria will not necessarily rule a site out of contention (as mitigation may be possible), but would make a site more challenging or complex. A multi-criteria analysis weighting identified the following critical criteria:

- latitude
- launch trajectories
- coastal access
- weather
- land size
- critical national infrastructure
- population
- environment.

Following a broad analysis, and excluding areas that were too remote or where the launch trajectories are too limited to provide for a viable operation (as identified in Figure 21), the following locations were identified as search areas for suitable site options:

- Sale, Victoria
- South-east South Australia/Western Victoria
- Southern Eyre Peninsula, South Australia
- Western Eyre Peninsula/West Coast, South Australia
- Albany, Western Australia.


**Figure 21: Areas considered in the site selection process (Source: EIS, Section 4).**

A more granular search of these locations involved looking at remote sensing data of land adjacent the coast to identify sites which met suitable buffer distances from populated land, including dwellings and land and buildings with other human occupation. Also surveyed were existing transport connections to sites, to consider existing levels of accessibility. The following potential candidates were identified for further consideration:

- RAAF Base East Sale and Portland (VIC)
- Albany (WA)
- Cape Jervis, Kangaroo Island, Cape Douglas, Ceduna, Mid Eyre Peninsula and Port Lincoln (SA).

The site candidates were then investigated at a fine-grained level, with a further review of launch trajectories based on actual launch pad locations and the location of dwellings, primary production land, public roads and publicly accessible coast / beaches. Following the detailed review, the following potential site candidates remained:

- Port Lincoln (SA) – Southern Tip of Eyre Peninsula (Lincoln National Park and Whalers Way).
- Albany (WA): - West Cape Howe National Park.

Whilst these sites were considered suitable from a launch trajectory perspective, were in suitable proximity to service centres, workforce, logistics and transport facilities, only the Whalers Way site is located on freehold land, with the two National Park sites both being public land that is dedicated for conservation purposes.

Further consideration was given to whether a suitable site could be found to the north of Whalers Way, thereby avoiding the need to locate the facility on a site with a significant amount of remnant native vegetation. This consideration involved mapping the constraints in the vicinity of the Whalers Way site, which showed that to the north-east and east are located a significant number of occupied dwellings, a beach accessible to the public, a Caravan and Tourist Park Zone and a site candidate for a proposed desalination plant (refer to Figure 22). To the north-west is the Cathedral Rocks Windfarm and electricity transmission infrastructure. Further north is a bore field providing water supply to the Eyre Peninsula.


**Figure 22: Local constraints to the siting of launch facilities (Source: EIS)**

Three hypothetical sites were developed, for which the buffer distance and range of launch trajectories applicable to the Whalers Way site were applied, comprising:

- immediately to the north of the Whalers Way site
- approximately 4 km to the north of the Whalers Way site
- approximately 1 km north-east of the Whalers Way site.

An analysis of the required buffer distance, together with the separation between the Cathedral Rocks wind farm and the nearest dwellings, indicated this was not possible without reducing the buffer zone and limiting the size and type of vehicles that could be launched. Any site to the north would require the Whalers Way site to be cleared of members of the public to enable launches to proceed. It was ultimately concluded that alternative sites on the Southern Eyre Peninsula that met selection criteria did not exist. As such, the proposed site position within Whalers Way was selected as the preferred option.

### 13.2.2 Alternative Sites

The EIS (Section 2.5) states that the site selection process (as detailed in Section 4 of the EIS) indicated that the supply of sites meeting the critical search criteria is extremely constrained and that many of these potential sites present the same similarities and challenges. Delivering the project in a different location is therefore unlikely to materially reduce the environmental impact of the proposal, but merely relocate these impacts. It is moderately likely that other sites meeting the criteria would present a similar or higher level of environmental impact than the selected site. It is also likely that alternative sites with a lower level of environmental impact could have a higher level of public interface and amenity impacts.

Whilst the potential for a similar facility to be constructed on an alternative site along the southern coastline of Australia cannot be excluded, the fact that no serious competing proposals have emerged infers the level of complexity in locating a suitable site and proceeding through the design and approval process.

The EIS recognises that, whilst it is possible an alternative site which does not feature remnant native vegetation exists (and was not identified by the site selection process), the exhaustive nature of the process undertaken indicates a strong correlation between other (cleared) sites and proximity of sensitive receivers. A key benefit of the subject site is a low density of sensitive receivers in close proximity, thereby reducing the potential for adverse social and amenity impacts generated by the proposal.

The submission from the Nature Conservation Society of SA (NCSSA) considered that 'hypothetical site 1' (refer to Figure 23) could be suitable if the launch trajectories for the proposed site were applied (i.e. as per Figure 2.4 in the EIS and Figure 24 below). This site would avoid impacting on threatened bird species.

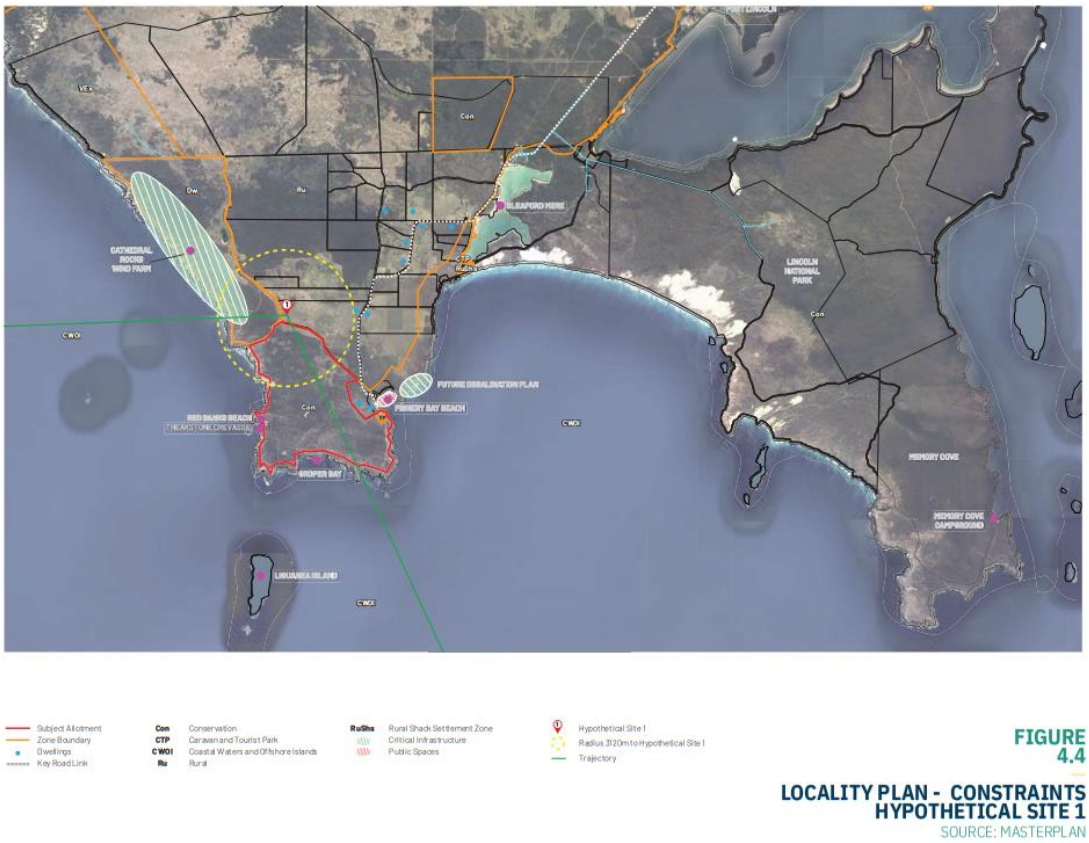



**Figure 23: Hypothetical Site 1 (Source: EIS Figure 4.4)**


**Figure 24: Flight trajectories from the site (Source: EIS, Section 2.2)**

The trajectories shown in Figure 24 represent the polar and sun-synchronous orbit trajectories that correspond to bearings of approximately 185° and 195° (based on True North as 0 degrees and due South as 180 degrees), which are expected to collectively account for about two thirds of launches. These trajectories are the most favoured for launches as they are the closest to the chosen orbits to achieve the mission objective set by the customer. Trajectories further east would have lower fuel costs (but need to provide a suitable buffer distance from Kangaroo Island and Tasmania), whereas trajectories further west would incur greater fuel costs (but may be viable for small payloads).

Trajectories for other launches could be within an arc between bearings of 145° and 265°, as shown in Figure 25. Trajectories within the western range of the arc could be used for the testing and evaluation of rockets and space systems (including hypersonic rocket technology), where orbit launches are not required. In addition, it could also be used for scientific and experimental purposes, such as using rockets (with or without a payload) to collect atmospheric (including ionospheric) or ground-based data (such as from Western Australia). Thus, a broad launch trajectory requirement of 145° – 265° (with a Potential Marine Impact Zone extending for 1,000 km from the site) is considered to be reasonable for a polar launch site.

The proposed orbital inclinations from the site are entirely feasible for commercial customers and represent a good range of options desired by satellite operators that are likely to consider contracting the use of the Whalers Way launch facility. Approximately two-thirds of launches are likely to use the $90^0$ – $98^0$ trajectories (i.e. for polar and sun-synchronous orbits), but one-quarter of existing satellites presently do use the proposed wider trajectory range. Over time it is likely that the optimal polar and sun-synchronous orbits may become congested with increasing satellite traffic and alternative trajectories may be considered favourable. This would provide greater flexibility for the mission objectives of potential customers, which would increase the economic viability and strategic benefits of the facility.

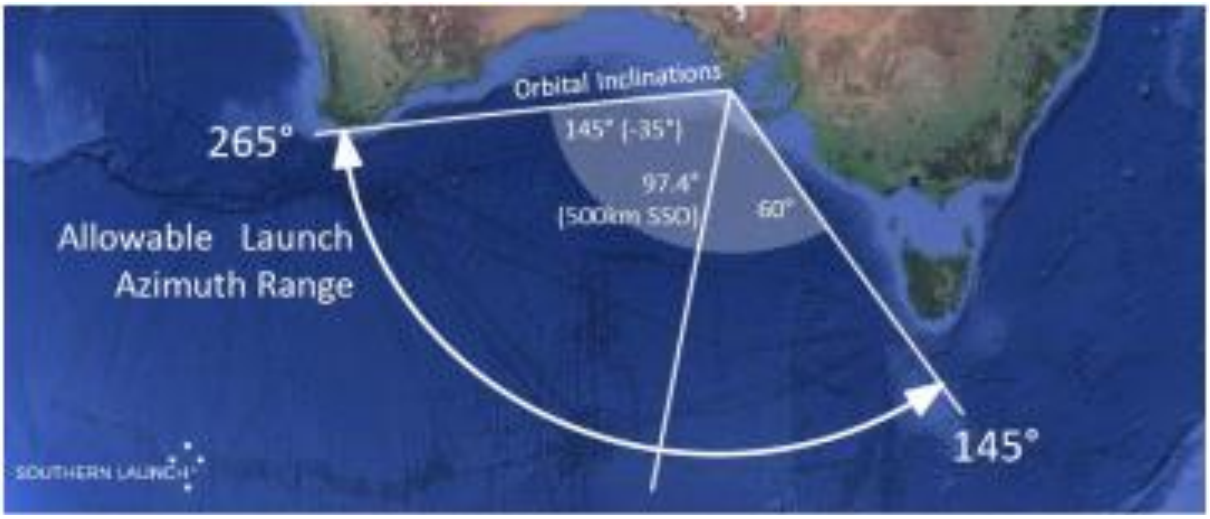



**Figure 25: Proposed launch trajectory arc (Source: RD, Appendix B)**

A number of the potential alternative sites in southern Australia that had lower environmental impacts (especially already cleared of native vegetation) were either occluded due to their remoteness, higher population densities and/or had a restricted trajectory arc (especially due to the need to avoid trajectories over Tasmania or Kangaroo Island). Within South Australia, potential sites near Ceduna (and the 150 km stretch of coastline west of Ceduna) and the western coastline of Eyre Peninsula were also occluded by the southern extents of Western Australia and southern Eyre Peninsula (i.e. due to high population densities).

Ceduna was considered as a possible launch site but was deemed less attractive than Whalers Way due to more restrictive launch lanes (i.e. that must avoid overflying land) and many other factors (especially the need for proximity to airports, ports, service centres, Adelaide manufacturing sites etc.). Furthermore, moving further northward into the bight raises other concerns due to the problems of keeping a large area clear downrange due to falling rocket parts (especially the second stage booster). The ability to secure a broad trajectory arc increases the flexibility of the launch facility by providing a wide range of trajectory options for customers. This was considered essential for marketability and the financial viability of the project (especially to provide a competitive advantage).

It is considered there could also be a potential option to relocate the launch facility to a site just inside the northern boundary of the Heritage Agreement Area, where the land is cleared or the vegetation fragmented. Whilst some vegetation clearance may be required, it is unlikely to involve critical habitat for threatened species. However, suitable safety buffers from the Cathedral Rocks Windfarm and residents may not be achieved. The buffer would also extend to the north over freehold land used for primary production, over which an agreement with the landowner would be required to exclude people during launches. Launching rockets over a large tract of native vegetation would also increase the fire risk (primarily if a launch fails or has to be aborted and leads to an explosion or fire), which could be a threat to critical habitat and fauna populations. Locating the site within the large exclusion area in the northern part of the Heritage Agreement area would have similar constraints (and would be closer to residents).

### 13.2.3 Alternative Site Configuration

The EIS (Section 2.5.2) also considered different layout scenarios for the siting of the project components, including a single launch pad only and consolidating elements in a single location.

Based on the proposal for up to 36 launches per year, a single launchpad would reduce the capacity of the facility by over 40% and remove the economies of scale achieved by having common infrastructure facilities serving multiple launch sites. Such a configuration is likely to make the proposal unviable.

An alternative configuration involved consolidating more of the elements in a single location on the site, rather than having them spread across the site. The range control facility needs to be located remote to the launch pads so that it can be occupied during launches. The potential exists for the infrastructure site to be co-located with launch sites. However, the infrastructure site has been specifically located in an area of the site which has a low elevation and degraded vegetation, making it an efficient location and minimising the environmental impacts.

Another alternative was to locate the infrastructure site and range control on land remote to the site, which potentially was already cleared of vegetation to minimise footprint impacts. This option would require these elements to be located significantly further from the launch facility. In respect of the infrastructure site, a pipeline for water supply between the selected sites and launch pads would be required, resulting in impacts from the construction of an underground or surface pipeline. Furthermore, clearance of vegetation would be required to accommodate the pipeline and its construction. The inefficiencies resulting from the infrastructure site being located remote to the launch sites would be significant and would adversely impact the viability of the proposal. Locating the range control facility near the site entrance provides suitable security and a barrier to site entry during critical launch periods.

A significant number of the public submissions on the EIS generally supporting the proposed use, but not on the subject site due to the conservation and tourism / recreational values of Whalers Way.

Many suggested that an alternative site should have been selected, especially on cleared land or where the environment has low conservation values. Some of the public submissions make specific suggestions for alternative sites, including Woomera or Southern Launch's Koonibba Test Range, located to the north-west of Ceduna.

The RD (Section 4.5) reiterated that it has been demonstrated in the EIS that relocating the facility to an alternative site is not a viable option and would result in the project not proceeding. The locations available for launch sites that meet operations requirements are very highly constrained, especially to meet the operational and safety requirements for launches. This includes the potential option put forward by some representors for a northward relocation within the locality of Whalers Way onto land which has previously been cleared.

**The AR concludes that an extensive site selection process has been undertaken as described in the EIS. Due to the specific criteria for the siting of launch pads (especially trajectory options and buffer zone requirements) and the constraints imposed (especially avoiding residents), the Whalers Way location would provide an optimal opportunity for safe and effective launch activities. In particular, being located close to the substantial service centre of Port Lincoln provides a significant benefit to maximise the potential economic opportunities the proposal could generate, especially for local businesses and allied industries. The development of a launching facility could establish Port Lincoln as a regional space hub to build upon South Australia's growth as the national centre for this new industry (especially with the focus on 'Lot Fourteen' in Adelaide as an incubator for space aligned businesses). The trade-off would be the selection of a location that has substantial environmental, landscape and recreational / tourism values. However, environmental off-sets are proposed (primarily through a native vegetation Significant Environmental Benefit and improved environmental and land management) and tourism use of the site would be better managed to reduce associated impacts.**

## 13.3 Impacts on Existing Land Uses and Activities

Being located near the southern coastline of Whalers Way, the siting of the proposal ensures a suitable buffer distance can be achieved from surrounding landowners and land uses, including the three residences to the north-east of the site, primary producers to the north and the Cathedral Rocks Windfarm to the west. The separation distance allows for the provision of adequate launch safety control zones and for noise attenuation (especially for the closest sensitive receivers). The main impacts from the proposal on surrounding residents and landowners would be from noise emissions (primarily during launch events) and increased traffic during launch campaigns, which could cause a level of inconvenience (or nuisance) and reduced amenity. Increased fire risk could also affect the safety and wellbeing of local residents. Tourism and recreational use of the nearby Fishery Beach would generally be unaffected, although the area is likely to experience greater visitation by tourists to observe launch events.

## 13.4 Impacts on the Physical Environment

The physical environment would be impacted primarily during the construction phase due to earthworks for each component of the proposal (including access track upgrades). Being located in a coastal environment, the proposed site is subject to a high risk of wind erosion, especially of the thin sandy soils and sand dune landforms present on the site. In particular, there is a risk that the removal of native vegetation cover on the dunes could result in 'blow-outs' or sand drift that could lead to further vegetation loss and dune destabilisation due to accelerated erosion. Creating exposed clearings within coastal landforms, especially with substantial areas of hard surfaces, could also increase wind erosion along any exposed edges within the dune fields.

The Response Document (Section 10.3) considered the potential for erosion and sand drift to be exacerbated by the proposal to be a low risk. The proposed sites for each component are located a considerable distance from the coastal interface (except for some parts of the existing access road). Areas disturbed by earthworks would be remediated (including revegetation) as soon as construction activities are completed. For hard surface, stormwater run-off would be controlled to minimise water erosion and localised flooding risk that could affect the surrounding environment.

The Construction Environmental Management Plan would include standard management practices to address erosion risk and to control stormwater.

## 13.5 Flora and Fauna

The proposed site has a near continuous cover of intact coastal vegetation that provides habitat for a range of native fauna species, including several species that are listed as threatened at a state and national level. The majority of the site is relatively undisturbed, although the coastal fringe has been impacted by tourism and recreational activities over the past decades (especially from human disturbance and the establishment of access roads, lookouts, parking areas and camping areas). The site has a low level of introduced plant and animal species (weeds and pests), which are mainly associated with disturbed areas along the coast.

Due to the ecological value of the site (and the remainder of the subject land parcel), the location is covered by a Heritage Agreement to protect native vegetation and fauna communities.

The EIS (Section 7.4.5) identified the following ecological impacts associated with the proposal:

- habitat loss and fragmentation through vegetation clearing
- invasion of weed and pest species
- edge effects
- effects of dams and detention basins
- irrigation effects
- increased fire risk
- indirect impacts.

Habitat loss was the issue raised most frequently in the public submissions that referred to terrestrial biodiversity issues (especially the impacts on threatened bird species). In particular, habitat loss was cited as a primary reason for the proposal being inappropriate or in an inappropriate location. Habitat loss is not limited to the clearance of the project footprint but includes a much larger area of habitat degradation (and projected decreased occupancy by threatened species) due to launch-noise extremes.

### 13.5.1 Adequacy of Information in the EIS, Response Document and Additional Information

The EIS included satisfactory descriptions of the potentially affected native vegetation communities (Section 7; Appendix Q); terrestrial native fauna communities and habitat (Section 9; Appendix P); and marine fauna communities (Section 9; Appendices S and R). The EIS (Section 8; Appendix O) also included an analysis of potential noise and vibration impacts on fauna and a description of the potential effects on the conservation values of the site and surrounds (EIS Section 11).

Initially, desktop studies were undertaken using Commonwealth and state databases, aerial imagery, Eyre Peninsula fauna surveys published on NatureMaps (Department for Environment and Water) and

scientific and technical reports. Baseline and targeted autumn and spring field surveys were completed to establish the baseline environment and determine the potential environmental values present. The desktop assessment was used to inform a baseline field survey program. The vegetation surveys were undertaken by a Native Vegetation Council (NVC) accredited consultant (in accordance with the EIS Guidelines) using the NVC Bushland Assessment Method (2019) to measure biodiversity value, comprising three components - vegetation condition, conservation value and landscape context. These were combined to determine a Unit Biodiversity Score (UBS) for a hectare (ha), which can be multiplied by the total site area (ha) to provide a Total Biodiversity Score for the site.

The field surveys were undertaken between 16 - 19 March 2020 (baseline flora and fauna), 22 - 24 June 2020 (targeted bird) and 13 - 15 October 2020 (targeted flora). These were led by an accredited ecologist, who was assisted in each survey by different assistants, consisting of an Environmental Scientist (March Survey), Ornithologist (June Survey), and a second NVC accredited ecologist (October Survey). Targeted searches were conducted for threatened flora and fauna species (i.e. listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *National Parks and Wildlife Act 1972* (NPW Act)) that were considered likely to occur in the project footprint, using a 'ramble' survey method (i.e. walking through areas of vegetation to cover different topography and habitats).

A targeted survey was also undertaken, focusing on two species of conservation significance – the Southern Emu-wren (Eyre Peninsula) and the Western Whipbird (eastern). The methodology involved walking through the preferred habitat and listening for calls or physical signs of the species. If a call was heard or brief sightings, call playback applications were used to confirm the sighting. For the Southern Emu-wren (Eyre Peninsula) a broadscale assessment was undertaken, covering an area of approximately 350 ha over three days. The Western Whipbird (eastern) is incredibly difficult to observe by sight but has a highly unique and unmistakeable call. As such, they were recorded by call, detecting their presence through recording occurrences of their distinctive song (and logging the location).

A coastal raptor assessment was undertaken to determine the distribution and status of the local Eastern Osprey and White-bellied Sea Eagle populations. The investigation consisted of a:

- review of surveys in the locality to determine likely population distribution
- review of literature in respect to breeding habits / habitat and to known sources of disturbance and observed behavioural / physiological responses
- review of known records of sightings and nests in the area (dating back to the 1970's and 1960's respectively)
- analysis of the Whalers Way environment, location and condition of known nests
- analysis of known nests in the wider region (nesting practices globally)
- review of common disturbance mitigation strategies utilised in other circumstances.

The marine ecological assessment used a desktop analysis (which to describe the habitats and marine populations known to exist in the area. It considered a variety of resources, including state / Commonwealth Government environment mapping, a review of previous studies of the area (including diver surveys) and a review of relevant literature. These resources were also used to define the key ecological values of the local marine environment. The ecological values of the Thorny Passage Marine Park and the Southern Ocean were also considered.

The Response Document (Section 1.4) states that, since the EIS was prepared, the following additional ecological investigations have been undertaken:

- Updated Terrestrial Biodiversity Technical Report (AECOM) – August 2022
- Raptor Memo Review (EBS Ecology) – February 2022
- Updated Marine Ecological Assessment (J-Diversity) – August 2022
- Environmental Assessment Report – Noise and Vibration (AECOM) – March 2022.

In particular, the environmental impact reduction benefits of relocating Launch Site A were detailed in a Technical Memorandum – Proposed Relocation of Site A (EnviroAdvice) – February 2022.

The EIS studies also included a review of a number of similar rocket launch facilities and any associated records of bird interaction to further bolster understanding of risk and likely behavioural and physiological impacts.

Further information was also provided by the proponent on two nationally listed threatened bird species of concern, comprising:

- Southern Emu-wren Management Plan, prepared by EBS Ecology (dated 19 July 2023)
- Mallee Whipbird Management Plan, prepared by EBS Ecology (dated 19 July 2023)
- EPBC Offset Strategy – Southern Emu-wren and Mallee Whipbird, prepared by EBS Ecology (dated 19 July 2023).

The Southern Emu-wren Management Plan provided an update on the information provided in the EIS and Response Document, including a summary of ecological and targeted bird surveys undertaken at Whalers Way to date. The Plan also acknowledged that the Eyre Peninsula Southern Emu-wren (*Stipiturus malachurus parimeda*) is now listed as Endangered under the EPBC Act. The listing was changed to be effective from 5 July 2023. Reasons for listing are restricted distribution and small, continuing declining populations (DCCEEW 2023a). However, as this occurred after the controlled action decision (10 September 2021), under section 158A of the EPBC Act, this listing event is to be disregarded for the purpose of the assessment and approval decision. Thus, the conservation status is to be regarded as Vulnerable under the EPBC Act for the purpose of assessment.

The Mallee Whipbird Management Plan also included a summary of ecological and targeted bird surveys undertaken. The species is also now listed as Endangered (effective on 21 December 2023) but is to be regarded as Vulnerable for assessment purposes.

### Test Launch Campaign

The Response Document (Appendix D) stated that data collection during the Test Launch Campaign would include a detailed series of works around noise and vibration monitoring, air quality monitoring and assessment of terrestrial and marine ecological effects to validate modelled data and to determine the impact of launches on the environment. Detailed monitoring and investigations would be undertaken prior, during and after each launch event.

For the test launch campaign, a program for monitoring the potential impacts on the threatened Southern Emu-wren (Eyre Peninsula) and the Western Whipbird (eastern) was established.

The methodology of the program consisted of:

- Establishment of ‘Control’ and ‘Impact’ sites that can be used to monitor the impact of Test Launch Campaign activities and to collect baseline data from these sites (i.e. before and after test launches)

- Avian surveys at 'Control' and 'Impacts' sites, including 20min/2ha active searches, to determine the presence of common and threatened avian species (including playback experiments before and after test launches to record impacts on local avifauna)
- map noise and vibration monitoring data of the test launch in relation to the test launch site and threatened avian species monitoring sites
- report the findings of the Pre- and Post-launch avian surveys.

Data to be collected during five surveys, as per the following schedule:

- Survey 1 - Site Selection Survey
- Survey 2 - Test Launch 1 - Pre Launch Survey
- Survey 3 - Test Launch 1 - Post Launch Survey
- Survey 4 - Test Launch 2 - Post Launch Survey
- Survey 5 - Test Launch 3 - Post Launch Survey.

The Pre-launch avian survey was undertaken from 18 – 21 August 2021. The first test launch attempt was undertaken by Southern Launch on 16 September 2021. The post-launch avian survey was undertaken from 21 – 24 September 2021.

The further bird surveys collected additional records for the proposed site and new records for the control sites (including opportunistic records of other bird species).

### Relocation of Launch Site A

The results from the site selection surveys for the test launch campaign identified that the original location of Launch Site A contains a high density of records of the Southern Emu-wren (Eyre Peninsula), and it was inferred that habitat within the original location is critical habitat for the species. Considering the data collected and the EIS submissions from the public and government agencies, a further targeted bird survey for both the Emu-wren (Eyre Peninsula) and Western Whipbird (eastern) at multiple site options for Launch Site A was undertaken. The intent of the further survey was to locate a site that minimised impacts to both species as much as possible, with consideration of ecology, heritage and launch trajectories constraints. A new proposed site for Launch Site A was selected, that would have a lower impact on the Emu-wren and Whipbird compared to the original site. Full details of the site relocation process were provided in the Response Document. A total of five options were put forward for consideration for the targeted survey. Option one was not surveyed for birds, as this site was unsuitable for cultural heritage reasons. The additional targeted field survey was conducted between 16 -17 December 2021.

In summary, the RD (Section 4.4) considered that the survey methodology undertaken represents a significant level of investigation of the terrestrial biodiversity values of the site, which has provided a comprehensive understanding of the likely impacts of the proposal and possible mitigation options. In particular, ecologists have now undertaken field surveys of the terrestrial site on seven occasions. The work has resulted in the acquisition of a significant set of data pertaining to the ecological conditions of the subject site. These include:

- Desktop Assessment (February 2020)
- Baseline Survey (March 2020)
- Targeted Fauna Surveys (June and October 2020)
- Site Selection Survey (June 2021)
- Pre-Test Launch 1 Surveys (August 2021) and Post Test Launch 1 Survey (September 2021)
- Site A Relocation Survey (December 2021).

**The AR concludes that the proponent has undertaken a substantial level of investigations for the proposed site to describe the environmental values that could be affected by the proposed activities. In particular, further studies were conducted in response to the submissions made on the EIS and to collect real-time data on the potential effects of noise during launch events (including refined noise modelling). As a result, Launch Pad A was relocated to reduce its environmental impact. This has also led to a greater understanding of the status of threatened bird species and the potential effects launch activities could have on them, primarily for the Southern Emu-wren, Western Whipbird, Eastern Osprey and White-bellied Sea Eagle. Importantly, the ongoing collection of survey data, including as part of a long-term environmental monitoring program during the construction and operation of the facility (if the proposal is approved and proceeds), would further increase knowledge about each species and quantify the actual impact of the proposal (and possibly the need for further mitigation).**

### 13.5.2 Native Vegetation Communities

During the baseline and targeted flora surveys conducted over two seasons (autumn and spring respectively) a total of seven vegetation associations were recorded for the site (refer to Table 1), which gradually transitioned between associations resulting in a lack of distinct vegetation changes. All the vegetation associations typically occur along the southern Eyre Peninsula. Vegetation community composition on the subject site depends on exposure to salt laden winds and soil type and depth. Specifically, the subject site varied in soil type from bare sheet limestone to moderately mobile sand dunes, with the majority of the area highly alkaline decomposed limestone and light grey loams. While the subject site does not represent highly diverse vegetation in terms of species numbers, the population and density of the vegetation is significant.

Vegetation gradually transitions from one association to another, effectively causing a mosaic landscape. Very Low Open Shrubland occurs along exposed and/or elevated sections of clifftop where a lack of soil, high alkalinity and salt laden winds result in specific niche communities dominated by ground hugging shrubs and mat plants. Low Shrubland over sclerophyllous shrubs is primarily dominant along the near cliff zone where stable dune habitats are intertwined with exposed sheet limestone, which is generally devoid of vegetation or contained only sparse sclerophyllous shrubs. Low Mixed Mallee over sclerophyllous shrubs occurs on stable dunes as a transitional association between the low coastal shrublands of the clifftop edges and the higher elevation calcareous clay loam soils. With distance from the coastline, the community structure changes into a more continuous and taller stratum with average heights of 3.5 m and a denser canopy cover. Low Mixed Mallee is present where soils are largely a calcareous silty loam. The soil surface is highly stable and forms a thick crust with high levels of biocrust and Moss species. Dryland Tea-tree is common, with Coastal White Mallee found on lighter soils. Native Pine mixed with other sclerophyllous shrubs occurs on calcareous silty loam soils.

Disturbed areas comprise Low Very Open Shrubland over exotic annual grasses, with regeneration evident by the occurrence of pioneer species, such as Coast Bitter Bush (*Adriana quadripartita*). Numerous environmental weed species are present throughout this community type and grass species are dominated by annual exotic species such as Brome (*Bromus*), Fescue (*Vulpia*) and Wild Oat (*Avena*). Overall, the condition is very poor, with regeneration of local species patchy.

| NUMBER | DESCRIPTION |
|---|---|
| 1 | *Beyeria lechenaultii* (Pale Turpentine Bush) *Melaleuca lanceolata* (Dryland Tea-tree) Low Shrubland over sclerophyllous shrubs. |
| 2 | *Acrotriche patula* (Prickly Ground Berry) Very Low Open Shrubland. |
| 3 | *Eucalyptus diversifolia* (Coastal White Mallee) Low Mixed Mallee over sclerophyllous shrubs. |
| 4 | *Eucalyptus angulosa* (Ridge Fruited Mallee)+/-*Eucalyptus rugosa* (Coastal White Mallee) Low Mixed Mallee. |
| 5 | *Leucopogon parviflorus* (Coastal Bearded Heath) Low Very Open Shrubland over exotic annual grasses. |
| 6 | *Callitris* sp. 'Limestone' (Native Pine) Low Shrubland. |

**Table 1: Summary of vegetation associations that occur over the site (Source: EIS Section 7).**

The main vegetation association types affected by the footprint of the proposal are shown in Figures 24 – 27.

**Figure 26: Low Shrubland (Vegetation Association 1) – Portion of relocated Launch Site A (Source: RD Appendix D)**

**Figure 27: Low Mixed Mallee over sclerophyllous shrubs (Vegetation Association 3) – Launch Pad Sites (Source: EIS Section 7)**

**Figure 29: Low Mixed Mallee (Vegetation Association 4) – Range Control Site (Source: EIS Section 7)**

**Figure 28: Disturbed Area (Vegetation Association 5) – Infrastructure Site (Source: EIS Section 7)**

The EIS identified that no Threatened Ecological Communities (TEC's) of vegetation or threatened flora species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1993* (EPBC Act) or the South Australian *National Parks and Wildlife Act 1972* (NPW Act) were observed within the site or within the general Whalers Way region during the baseline and targeted flora surveys conducted over two seasons.

### 13.5.3 Native Vegetation Clearance and Disturbance

The EIS (Section 7.4.2) states that the total area of native vegetation estimated to be cleared for the proposed project footprint (including access and laydown area requirements) is 23.76 ha. The Response Document (Section 2.1) states that the revised design (i.e. relocation of Launch Pad A) has resulted a minor reduction of clearance from 23.76ha to 23.4ha. Each site would have a clearance footprint that is larger than the site to accommodate batter slopes and enable suitable external access to the fencing and a nominal 10m width buffer beyond this. The Response Document (Appendix D) included a revised native vegetation clearance data report that calculated the amount of vegetation for each association type that is predicted to be cleared for all elements within the proposal footprint. The Response Document (Section 2.3.2) also states that an existing track from the Infrastructure Area site would provide a secondary emergency egress to an unmade road to the northeast of the site. It is not specified whether the track would be upgraded and require any incidental vegetation clearance.

Table 2 shows the amount of clearance for each vegetation association for each element of the proposal. Figures 28 - 34 show the location of the clearances and the types of vegetation to be cleared for each site.

| Veg Assoc | Project Area | | | | | Total (ha) |
|---|---|---|---|---|---|---|
| | Site A | Site B | Site D | Site E | Access Roads | |
| 1 | | 0.68 | 0.26 | | | **0.94** |
| 2 | | | | | 0.07 | **0.07** |
| 3 | 7.65 | 6.0 | 1.16 | | 1.1 | **15.91** |
| 4 | | | | 1.0 | | **1.0** |
| 5 | 0.08 | | 4.58 | | 0.23 | **4.89** |
| 6 | | 0.54 | | | | **0.54** |
| **Total** | **7.73** | **7.22** | **6.0** | **1.0** | **1.4** | **23.4** |

**Table 2: Vegetation clearance amounts for the footprint of the proposal (Source: RD Appendix D).**

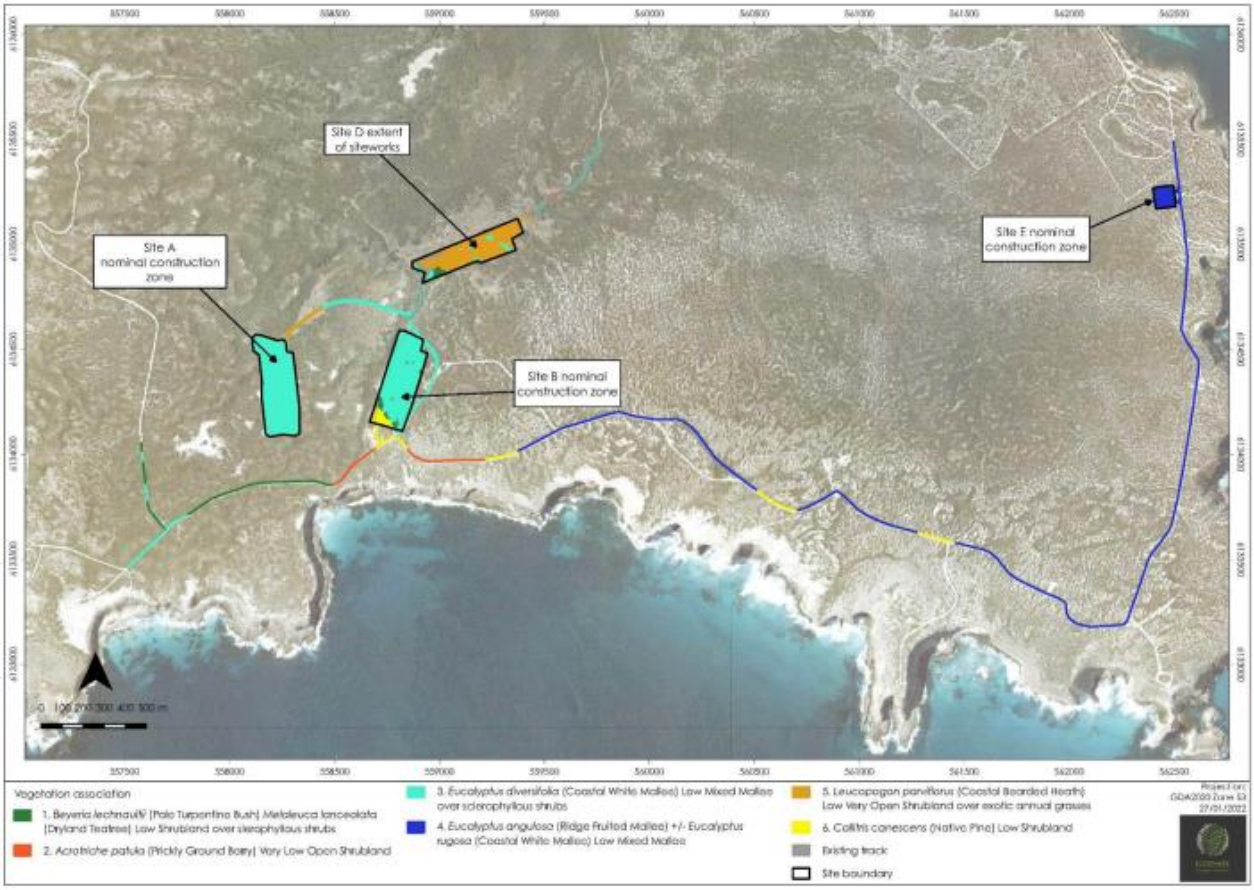



**Figure 30: Location of vegetation clearance areas (Source: RD Appendix D)**

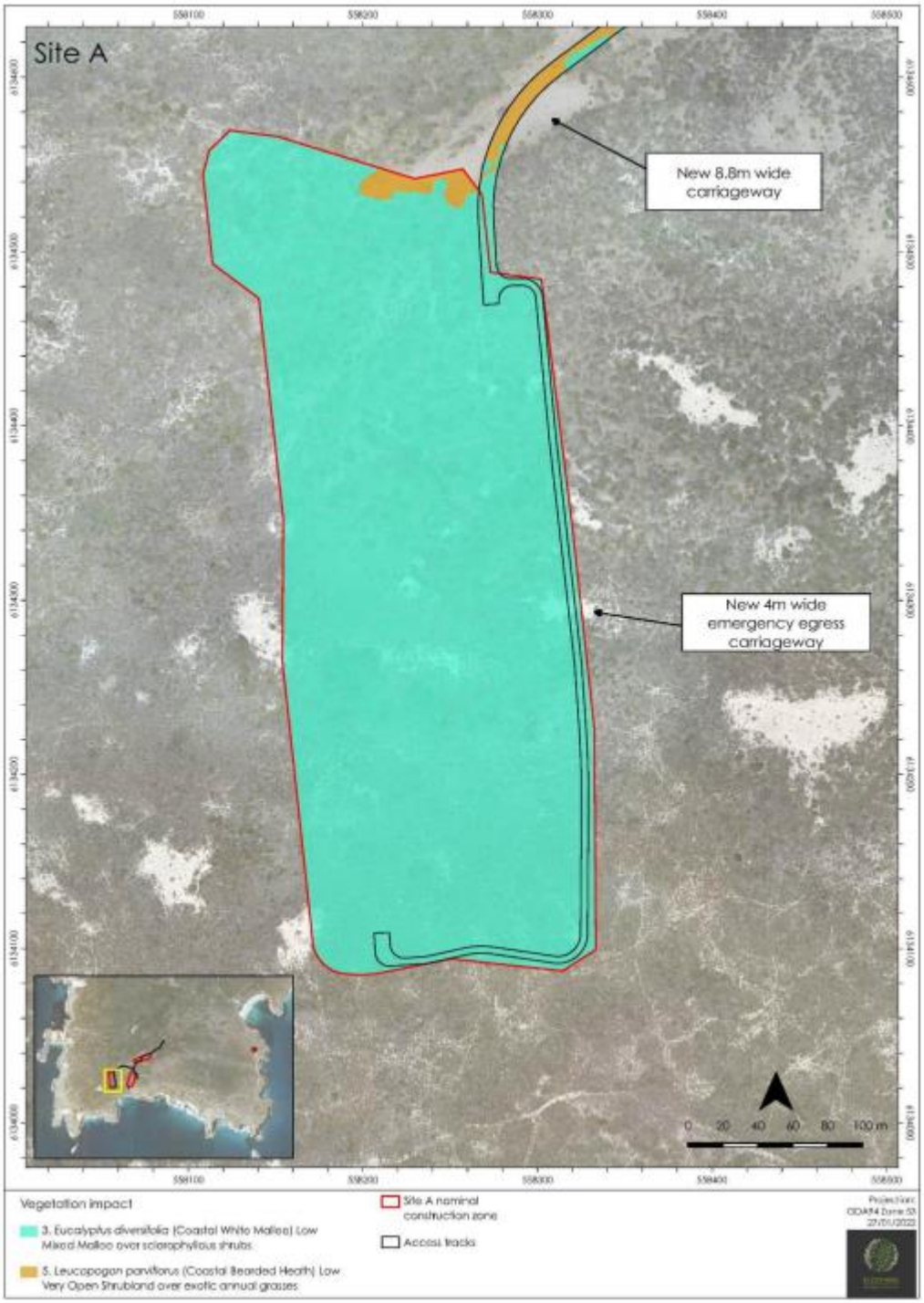



**Figure 31: Vegetation association clearance for relocated Launch Site A (Source: RD Appendix D)**

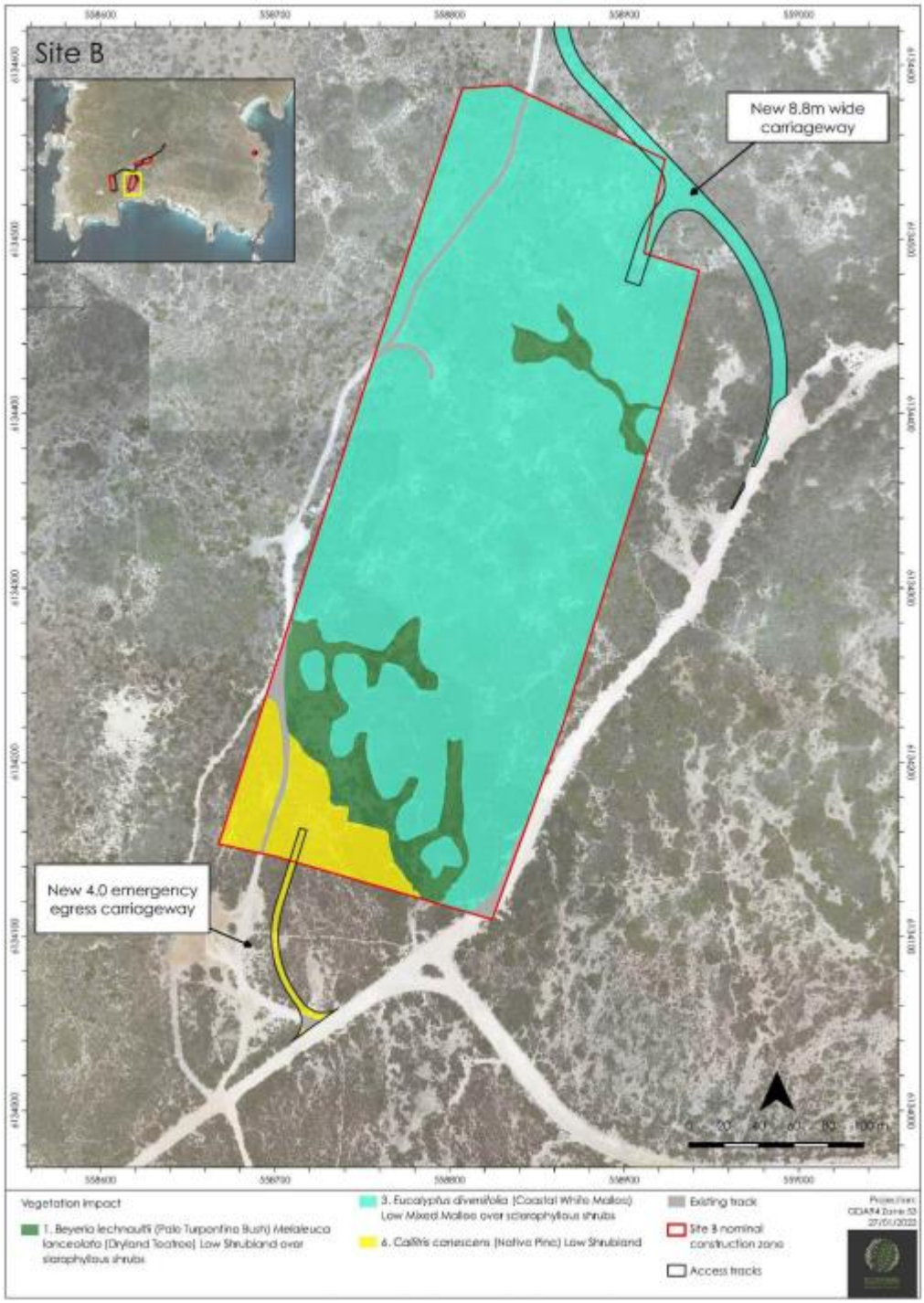



**Figure 32: Vegetation association clearance for Launch Site B (Source: RD Appendix D)**

**Figure 33: View looking south-east over Launch Site A (Source: RD Appendix D).**

**Figure 34: View looking east over Launch Site B (Source: RD Appendix D)**

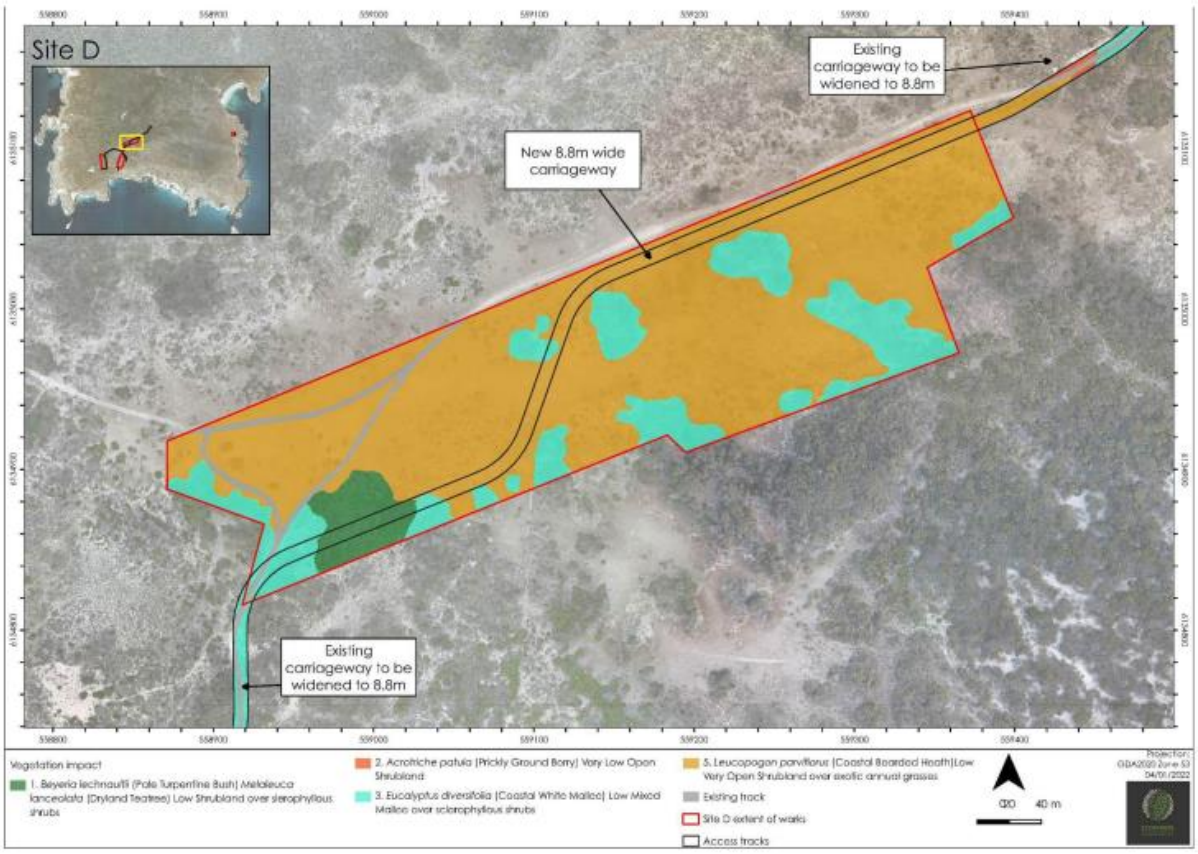



**Figure 35: Vegetation association clearance for Infrastructure Site D (Source: RD Appendix D)**

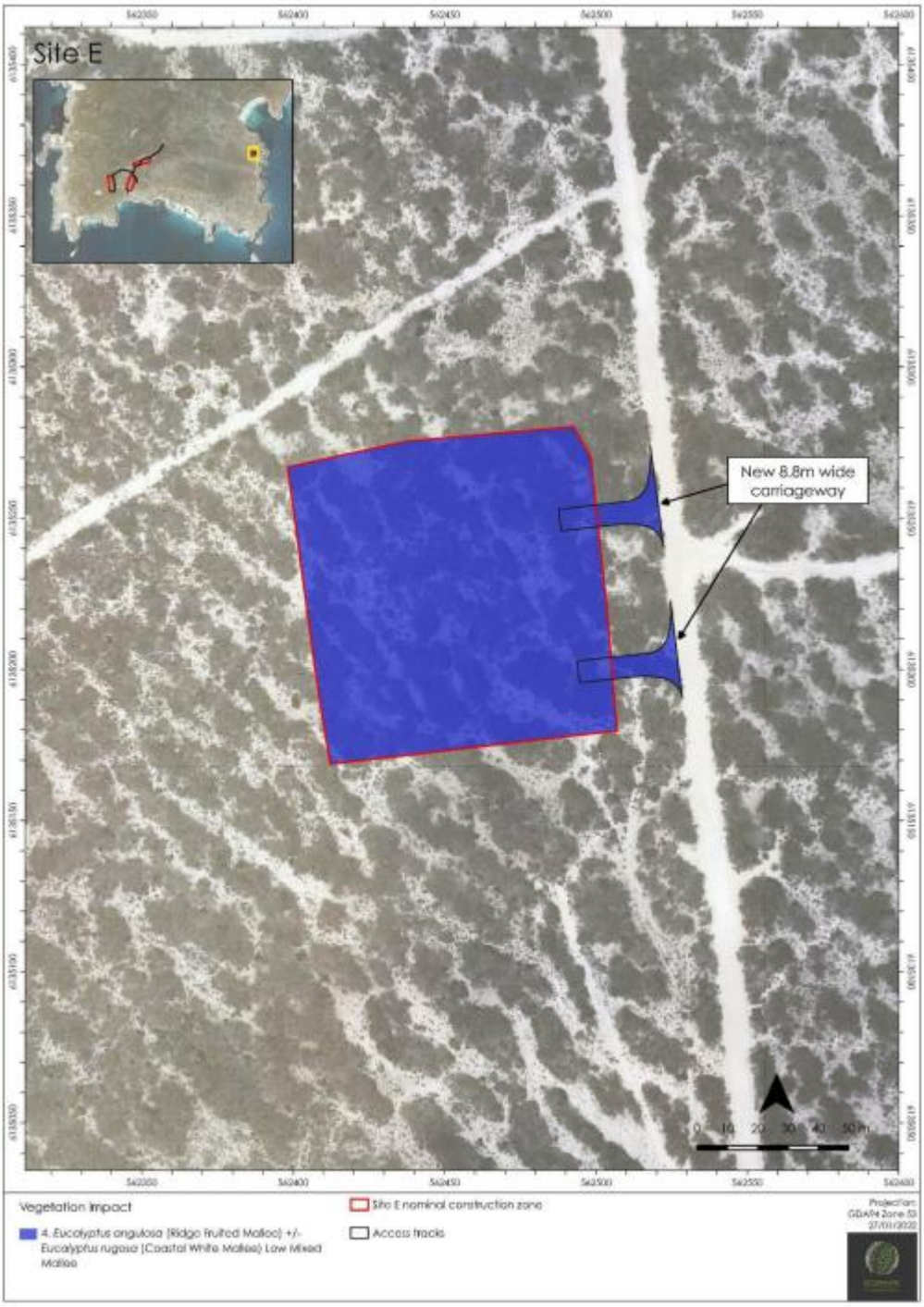



**Figure 36: Vegetation association clearance for Range Control Site E (Source: RD Appendix D)**

A Bushland Assessment Method (BAM) assessment was used to determine scores for the condition of the vegetation to be cleared. Launch Site A (original site) had the highest average condition score of 67.09, whilst Infrastructure Site D had the lowest condition score of 30.66. Launch Site B had a score of 58.64 and the Range Control Site had a score of 57.41. The scores are largely influenced by partial clearing, weed invasion and species richness.

The EIS (Section 7.4.3) identified that the site is relatively undisturbed and has significant vegetation cover, with fragmentation of vegetation occurring due to access tracks that have been constructed for recreational and tourist access to Whalers Way. It considers the proposal would contribute to fragmentation of vegetation by increasing the number and width of access tracks and the clearing of

four discreet footprint areas. Fragmentation was considered to be localised, with the majority of affected species able to traverse the distance a track represents. The vegetation in the local area is contiguous and provides ample connectivity across Whalers Way and it is unlikely that vegetation clearing will result in the inability of any species to become genetically isolated and lead to sub-populations in the local area. Fragmentation was therefore considered to be limited and unlikely to be significant.

The total amount of vegetation clearance is relatively small, especially when compared to the amount of remnant vegetation on the Whalers Way land and within the surrounding area / region. In particular, the level of clearance has been minimised through careful site selection that favours already cleared or degraded areas (including the use of existing access roads / tracks). Some of the vegetation loss would be compensated for by rehabilitating and revegetating degraded areas within the site. The Response Document (Section 2.3.5) states that the revised proposed lease boundary increases the area for which the proponent would be responsible for improved environmental management, from approximately 1,200 ha to approximately 1,590 ha. The clearance would primarily be offset through a biodiversity offset program developed in accordance with the Native Vegetation Council (NVC) guidelines.

It is intended that the proposed development sites to be cleared would be excluded from the heritage agreement to be consistent with the total area of existing exclusion areas. Existing excluded areas would be revegetated (if needed) and reincorporated into the heritage agreement. The proposed development sites to be cleared represent a like-for-like swap in terms of area for those areas already excluded from the agreement. The renegotiation of the Heritage Agreement would occur between the NVC, the Minister for Climate, Environment and Water and the landowner. A Significant Environmental Benefit (SEB) to offset the native vegetation clearance would need to be separately negotiated with the NVC. It should be noted that offset requirements at the state level are different to those that may be sought at the Commonwealth level under the EPBC Act.

### Native Vegetation Act Requirements

Clearance of native vegetation requires approval under the *Native Vegetation Act 1991* and vegetation may be cleared in prescribed circumstances in accordance with the Act. Specifically, vegetation clearance is able to be undertaken where incidental to a major development approved under section 48 of the *Development Act 1993* (or under the equivalent provisions of the *Planning, Development and Infrastructure Act 2016*). The *Native Vegetation Regulations 2017* (Schedule 1, Part 4, clause 27) clarifies that clearance can occur where an EIS (in this instance) has been prepared, the EIS has been referred to the Native Vegetation Council (NVC) and comments from the NVC have been included in the Assessment Report.

The EIS (Appendix I-6) included a draft Native Vegetation Clearance Data Report, which would be part of a vegetation clearance application (i.e. if the proposal is approved). A revised Data Report is included in the Response Document (Appendix D), based on the relocation of Launch Site A.
An assessment of the proposal against the 'Principles of Clearance' Schedule 1 of the Act) is provided in Table 3.

| | |
|---|---|
| Principle 1a - it comprises a high level of diversity of plant species | The plant diversity scores for 10 of the 26 sites assessed within Whalers Way were >20 points meaning they were seriously at variance with this principle:<br>• Launch Site A<br>• Launch Site B, associations 3 and 6<br>• Launch Site B to infrastructure area access associations 1 and 5<br>• Infrastructure Site D, association 1 |

| | |
|---|---|
| | • Infrastructure access associations 1 and 7<br><br>The remaining 16 sites were between 10 and 20 points being at variance with this principle. |
| Principle 1b - significance as a habitat for wildlife | The Whalers Way area is under a current Heritage Agreement and constitutes an intact vegetation community. The area has numerous landforms and vegetation associations present and forms a link in a chain of a number or reserves and national parks in the southern Eyre Peninsula. The area has records for over 120 fauna species within 10 km of the project site. The site directly provides critical habitat for two nationally threatened terrestrial species (Southern Emu Wren and Western Whipbird) and at least 12 terrestrial species at state level. A further nine species listed as migratory/marine at federal level or of state conservation significance are known to, likely to or will possibly utilise the habitat present within the project areas. All areas resulted in a threatened fauna score of 0.1, which is greater than 0.05 points making clearance of vegetation within all project area seriously at variance with this principle |
| Principle 1c - plants of a Rare, Vulnerable or Endangered species | No threatened flora species were recorded within the Project site areas directly or in other sites surrounding the project areas. |
| Principle 1d - the vegetation comprises the whole or part of a plant community that is Rare, Vulnerable or Endangered | The low shrubland and Mallee communities within Whalers Way are not recognized as threatened at national or state level. The proposed clearance is not at variance with this principle. |
| Principle 1e - it is significant as a remnant of vegetation in an area which has been extensively cleared. | The remnants within Whalers Way are highly valuable in providing connectivity between the Port Lincoln National Park and the Coffin Bay National Park. Clearance of vegetation with a biodiversity score of greater than 500 and over 30% remnancy is at variance withthis principle. |
| Principle 1f - it is growing in, or in association with, a wetland environment. | The clearance is not at variance with this principle. |
| Principle 1g - it contributes significantly to the amenity of the area in which it is growing or is situated | The vegetation does contribute significantly to the amenity of the area. The types of soil present in the area mean the vegetation plays a highly significant role in stabilising an otherwise fragile environment. Careful management of stormwater will be required. The clearance is not at variance with this principle. |

**Table 3: Proponent's assessment of the proposal against the Clearance Principles.**

It should be noted that, ultimately the Department for Environment and Water (Native Vegetation Management Branch) and the Native Vegetation Council would decide whether the information provided demonstrates impacts are 'seriously at variance' or 'at variance' as per the definitions outlined in the relevant guidelines and policies.

The EIS determined that a 'Level 4' clearance application would need to be approved by the Native Vegetation Council, including a Significant Environmental Benefit (SEB) offset as per the Significant Environmental Benefit Policy and Guide (NVC 2020c,d). The Data Report calculated that an SEB requirement as a payment into the Native Vegetation Fund would amount to some $1.9m.

The proponent intends to provide an SEB in the form of an inground offset provided by SEB credit providers within the region, with the SEB offsets to be like-for-like for the habitat cleared.

**The AR concludes that the proposed site contains a large tract of intact remnant vegetation that is in good condition and provides habitat critical for the survival of a number of listed threatened fauna species (especially those listed as 'Endangered'). No listed threatened flora species or communities were identified within the project footprint. The individual sites selected for the launch pads and supporting infrastructure were designed to utilise areas that have already been partially cleared or disturbed by recreational uses of the site. Launch Pad A was relocated to a site that required less clearance of habitat. It is proposed to remove a total of 23.4ha of native vegetation, which is an equivalent area of 12 Australian Rules Football grounds combined (i.e. based on the playing field of the MCG being approximately 2ha in size). The majority of the clearance would comprise potential critical habitat for the Southern Emu-wren and the Western Whipbird, although the sites chosen (especially for the launch pads) have been identified in the EIS as containing sub-optimal habitat for these species. The native vegetation to be cleared would be offset by the Significant Environmental Benefit (SEB) required under the *Native Vegetation Act 1991*. The proponent has determined that the SEB offset could not be provided on-site, so a financial payment calculated to be around $1.9 million would be paid into the Native Vegetation Fund. The intention is that the payment would be used for the protection and/or improved management of the same type of vegetation / habitat in the region (i.e. like-for-like compensation that delivers an overall improved environmental outcome). A management plan for the Heritage Agreement would also be implemented that would aim to improve the environmental values of the area to help mitigate the impacts of the proposal and lead to better environmental outcomes. In particular, existing disturbed areas would be rehabilitated and revegetated.**

### 13.5.4 Terrestrial Fauna

The removal of vegetation resulting in habitat loss and degradation was considered to pose the greatest potential risk of adverse impacts for terrestrial biodiversity. The impact may be direct in the form of vegetation and habitat clearance, or indirect, such as habitat degradation in areas adjacent to direct impacts (i.e. from edge effects) or from human disturbance (especially from noise during launch events).

The EIS (Section 7.4.4) identified the following habitat types located within the proposal footprint:

- Coastal Heath: high quality habitat with multiple shrub layers and sedges, grass tussocks and mat plants with low exposed bare ground area
- Shrubland on Scree: high quality habitat particularly for small reptiles as it includes plants, rock/stones with cracks, and sand hummocks
- Low Mallee: high quality fauna habitat with numerous structural layers of vegetation with moderate to high litter cover.

The EIS (Section 9.4.1.1) stated that a total of 34 fauna species were recorded during the field survey. This included 28 bird species, four mammal species, and two reptile species. One native mammal species was recorded throughout the site, being the Western Grey Kangaroo (*Macropus fuliginosus*). Two reptile species were recorded - the Shingleback Lizard (*Tiliqua rugosa*) and the Mallee Heath Dragon (*Ctenophorus chapmani*), which are widespread and commonly observed in most habitat types. Numerous skinks (not able to be identified) were also noted. Three exotic mammal species are listed as Declared Pests under the *Landscape South Australia Act 2019* - the Domestic Cat (F*elis catus*), with tracks frequently observed; the European Rabbit (*Oryctolagus cuniculus*), which is an introduced pest species common in all states and is widespread; and the Red Fox (*Vulpes vulpes*), which was

identified from numerous scats. Of the 30 bird species recorded, one is a declared pest - the Common Starling (*Sturnus vulgaris*). Four bird species were associated with the cliffs in the south, and four associated with inland vegetation. The remaining species were common and widespread. A comprehensive species list is presented in the EIS (Appendix P).

The following threatened fauna were recorded during field surveys:

- Western Whipbird (eastern) (*Psophodes leucogaster leucogaster*) - listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1993* (EPBC Act)/ listed as Endangered under the South Australian *National Parks and Wildlife Act 1972* (NPW Act). It should be noted the EPBC Act listing was upgraded to Endangered on 21 December 2023. [Note: also called the Mallee Whipbird or White-Bellied Whipbird]
- Southern Emu-wren (Eyre Peninsula) - Vulnerable under EPBC Act / Endangered under NPW Act. It should be noted the EPBC Act listing was upgraded to Endangered on 5 July 2023
- Eastern Osprey (*Pandion haliaetus*) - Migratory and Marine under EPBC Act / Endangered under NPW Act
- White-bellied Sea Eagle (*Haliaeetus leucogaster*) - Marine under EPBC Act / Endangered under NPW Act
- Australian Fairy Tern (*Sternula nereis*) – Vulnerable under EPBC Act / NPW Act. Recorded at Redbanks Beach (approximately 1.3 km from the launch pad sites), so unlikely to be impacted
- Eastern Hooded Plover (*Thinornis cucullatus cucullatus*) – Vulnerable under EPBC Act and NPW Act. Recorded at Fishery Bay (approximately 4.6 km from the launch pad sites). Unsuitable habitat at Redbanks Beach, so unlikely to be impacted.
- Diamond Firetail (*Stagonopleura guttata*) - Vulnerable under NPW Act. Prefers open grasslands, so unlikely to be impacted.
- Rock Parrot (*Neophema petrophila*) - Rare under NPW Act. Restricted to coastlines and rocky offshore islands, so unlikely to be impacted.

While not observed during the surveys, a number of NPW Act listed species have historically been recorded on the site, including:

| Common name | Scientific name | Status | Survey record |
|---|---|---|---|
| Australia Bustard | *Ardeotis australis* | Vulnerable | Three historical records |
| Cape Barren Goose | *Cereopsis novaehollandiae (NC)* | Rare | Three historical records |
| Peregrine Falcon | *Falco peregrinus* | Rare | Three historical records |
| Black Falcon | *Falco subniger* | Rare | Three historical records |
| Sooty Oystercatcher | *Haematopus fuliginosus* | Rare | Four historical records |
| Purple-gaped Honeyeater | *Lichenostomus cratitius occidentalis* | Rare | Five historical records |
| Elegant Parrot | *Neophema elegans* | Rare | One historical record |
| Australian Fairy Tern | *Sternula nereis* | Vulnerable | Two historical records |
| Painted Buttonquail | *Turnix varius* | Rare | Three historical records |
| Yellow-tailed Black Cockatoo | *Zanda (Calyptorhynchus) funerea whiteae* | Vulnerable | Six historical records |

**Main threatened bird species recorded at the site. Clockwise: Southern Emu-wren; Western Whipbird; White-bellied Sea Eagle; Osprey.**

### Southern Emu-wren

The Southern Emu-wren (Eyre Peninsula) (*Stipiturus malachurus parimeda*) is endemic to the southern tip of Eyre Peninsula. The species was listed as Vulnerable under the EPBC Act (now Endangered) and Endangered under the NPW Act. The 11 known populations (refer to Figure 35) are estimated to contain less than 1000 mature individuals and are fragmented with communities not exceeding 250 individuals. Five important sub-populations are located at MacLaren Point–Point Haselgrove, Marble Range, Merintha Creek–Kellidie Bay, West Point and Whalers Way (and environs). Thus, the Whalers Way area is considered important for the long-term survival and recovery of the species.

The Emu-wren is a tiny bird that is shy and has a weak flight, preferring to spend most of its time low down in dense cover. The main threats to the species include land clearance / fragmentation (especially due to poor dispersal ability), bushfire causing habitat loss (including climate change resulting in increased frequency and intensity of fires) and predation by foxes and cats.

The critical habitat is Low Coastal Shrubland dominated by Prickly Ground Berry (*Acrotriche patula*) / Coastal Turpentine bush (*Beyeria lechenaultii*) identified in the EIS as Vegetation Association 1, or Native Pine (*Callitris* sp. 'Limestone') - Vegetation Association 6, that has an average height of 500 mm. This habitat was further enhanced if the shrubs are 'wind hedged' into a very tight, dense canopy cover enabling the individuals to move through the area without being sighted. Thus, habitat for the species occurs as a relatively narrow band along the coast.


**Figure 37: Distribution of Southern Emu-wren populations (Source: DCCEEW 2023)**

The Response Document (Section 4.7) further investigated the species occurrence and identified that, if the following qualitative habitat preferences are met within Whalers Way, there is a high likelihood the Emu-wren will be present:

- low coastal heath with average height of 300–400 mm with shrubs connected or spacings of less than 300 mm on average; and
- *Eucalyptus diversifolia* low mallee individuals of up to 1 m in height with a density of at least 1-2 m per hectare.

Habitats identified as less preferable occur where either:

- Heath shrub spacings exceed 500 mm on average; and
- *E. diversifolia* is not present or is substituted by *E. angulosa*; or
- *E. diversifolia* becomes the dominant overall cover (>50%); or
- *E. diversifolia* dominant cover is greater than 1.2 m in height on average.

Based on the availability of habitat, it is expected that groups/individuals inhabit the entire coastal strip from Point du Bastion, west to Redbanks and beyond, linking with the Cathedral Rocks Wind Farm sighting records. Almost all records occur within 200-800 m distance from the cliff edge, with the average occurrence around 300 m from the cliff. A majority of records are in the Cape Carnot area, which has a lower elevation than the eastern section and is more exposed to prevailing winds. As a result, the south-western corner of Whalers Way associated with Cape Carnot has the highest frequency and broadest geographical section of critical habitat.

Records are spaced at 300-400 m intervals on average (each containing on average two individuals) over the approximately 7.5 km length of the coastal strip, which indicates that around 100 mature individuals are likely to inhabit the Whalers Way area in total.

A total of 18 individuals were sighted during the field surveys, consisting of four pairs, one group of three and seven singles. Figure 36 identifies the locations of the Emu-wren recorded during the targeted bird survey. Aside from the north-western observations, all sightings confirmed previous records of the species.

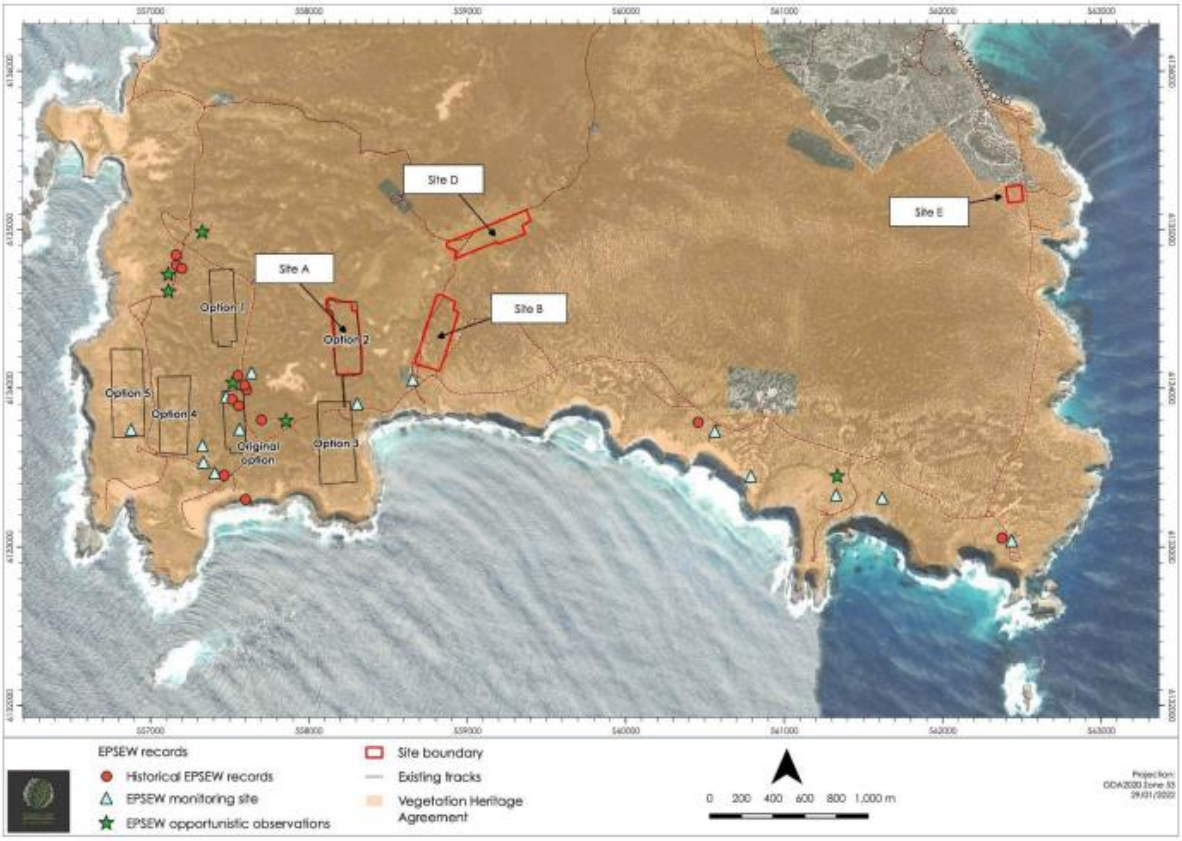



**Figure 38: Records for Southern Emu-wren (Source: RD Appendix D)**

The EIS stated that any clearing of vegetation or risk of increased mortality is likely to be considered a significant impact. There is potential that indirect impacts from construction and operational activities may lead to behavioural changes which may disrupt the breeding cycle or cause further reduction in habitat availability.

The Southern Emu-wren Management Plan, prepared by EBS Ecology (dated 19 July 2023) considered that the total population estimate for the species has decreased from 1,000 individuals to 750 individuals (which was the basis for the status of the species recently being upgraded from Vulnerable to Endangered under the EPBC Act). However, the reliability of this estimate is classed as low. The previous extent of occurrence (EOO) estimated at 21,000 km$^2$ (range 19,000 – 23,010 km$^2$) has decreased to a restricted EOO estimated at 2,686km$^2$ (range 1,900 – 5,400 km$^2$). The Area of Occupancy (AOO) previously estimated at 54km2 (range 30 – 230km$^2$) has increased to a restricted AOO estimated at 264 km$^2$ (range 54 – 304 km$^2$).

Based on a AOO of 264 km$^2$ and an average number of adult birds/ha of 2.26, the Plan estimated the population size to be around 60,000 birds, which is considerably larger than current estimates. It was

considered this disparity in data / population estimates must be acknowledged and demonstrates the need for ongoing research.

### Western Whipbird (eastern)

The Western Whipbird (eastern) (*Psophodes leucogaster leucogaster*) ranges across Victoria and South Australia and occurs in three isolated regional populations:on the southern Eyre Peninsula, on the south-western Yorke Peninsula and in the Murray-Mallee region of south-eastern South Australia. The species is listed as Vulnerable under the *EPBC Act* (now Endangered),being identified as the Mallee Whipbird, and Endangered under the *NPW Act*,being identified as the White-bellied Whipbird. Total population numbers are estimated at 6,000 mature individuals with the southern Eyre Peninsula, accounting for the largest sub-population of 5,000 birds, largely within the Coffin Bay and Lincoln National Parks. It was estimated that up to 250 mature individuals may inhabit the Whalers Way area.

It is a small bird (20-25 cm long) that typically moves short distances within the mid-upper canopy of Mallee habitat and spends some of its time at ground level. It has been noted that it lacks an ability to fly long ranges, with the longest continuous flight recorded only 30 m. It usually occurs singly or in pairs, though has been observed to sometimes occur in small groups of three or four birds. The Whipbird forages actively in Low Mallee, hopping through dense vegetation. The Whipbird is largely sedentary, making short distance flights only, which limits the ability for dispersal away from areas that have been cleared. The main threats to the species include clearing of Mallee habitats, bushfire causing habitat loss (and climate changes resulting in increased frequency of fires), plus heatwaves, floods and drought impacting on food resources.

The habitat of the Western Whipbird (eastern) was observed as Low Mallee, generally *Eucalyptus diversifolia* (Vegetation Association 3) and *Eucalyptus angulosa* Low Mallee (Vegetation Association 4), with an average height of 1.5-2 m. This habitat is extensive and widespread in the Whalers Way area, with occurrence of the species also being widespread. Low Mallee is also the dominant vegetation type affected by the footprint of the proposal.

During the field surveys, numerous individuals were recorded by their distinctive call, far outweighing the solitary bird observed and seven birds recorded via GPS. Figure 37 identifies the locations of the Western Whipbird (eastern) recorded during the targeted bird survey. This species is considered prolific at the subject site, with the preferred habitat of Low Mallee occurring extensively.

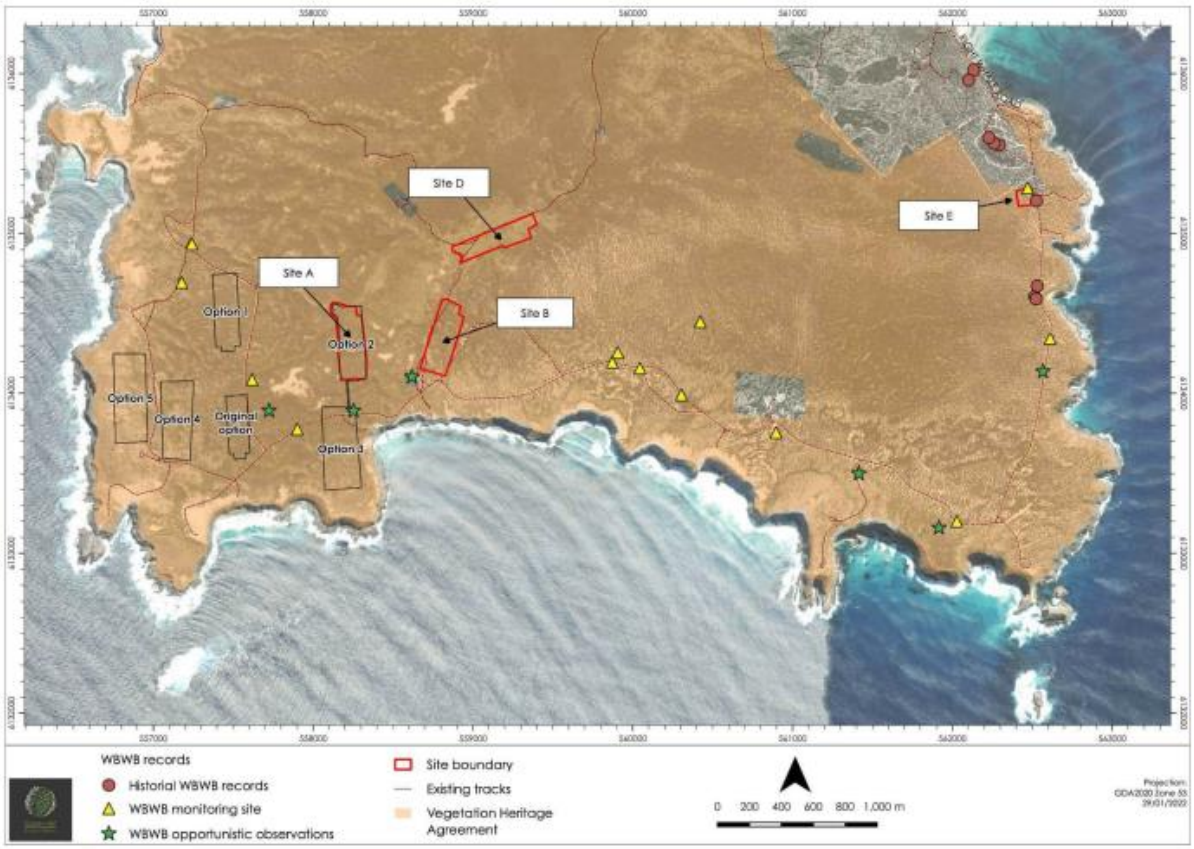



**Figure 39: Records for Western Whipbird (eastern) (Source: RD Appendix D)**

The Mallee Whipbird Management Plan, prepared by EBS Ecology (dated 19 July 2023), considered that the previous total population estimated at about 6,000 mature birds (with the largest subpopulation of about 5,000 birds located at the southern Eyre Peninsula location) has decreased to an estimated the population of about 1300 individuals (range 1,000-1,650), with the majority of one of the subpopulations (>1000 birds) occurring on the Eyre Peninsula Mallee. However, the reliability of these estimates was classed as low.

The extent of occurrence (EOO) of the Eyre Peninsula subpopulation was formerly more widespread, once occurring north to Cockaleechie, but has since declined due to habitat clearing and extensive wildfires. It's current EOO is estimated at 5,000 km$^2$ (range 4,500 – 44,000 km$^2$) across the Eyre and Yorke Peninsulas and Murray Mallee. The current Area of Occupancy (AOO) is estimated at 400km$^2$ (Range 360 – 500 km$^2$) and is estimated at around 20 birds/km$^2$ (or 0.15-0.25 birds/ha) across the Eyre and Yorke Peninsulas and Murray Mallee.

The EIS noted nearby populations in the Coffin Bay and Lincoln National Parks would be unaffected by the proposal and that the post-clearing environment would be able to support the current population without fragmentation into two populations. In summary, it considered vegetation clearance, ongoing noise and lighting impacts; resulting in interruption to the breeding cycle; would likely result in significant impacts on the Western Whipbird (eastern) at Whalers Way.

### White-bellied Sea Eagle

The White-bellied Sea Eagle (*Haliaeetus leucogaster)* is listed as Marine under the *EPBC Act* and Endangered under the *NPW Act*. The species is most commonly found occupying and foraging in coastal areas and islands and is known to reside in a range of habitats within South Australia, including territories across coastal, offshore island and inland river habitats. Nest sites include cliff-face ledges, shallow cave overhangs or on rock outcrops on steeply sloping terrain. Long-term studies of White-

bellied Sea Eagles in a range of habitats identified a negative relationship between human activities and nest productivity outcomes (i.e. disturbed territories produced eggs less often, fewer young and higher rates of nest failure than nests located in remote locations with less disturbance). Any disturbance during their nesting period, particularly from the cliff top, may cause the birds to abandon their nest. For nests that are more exposed or are on coastal terrain with low heath vegetation, a lack of visual screening increases vulnerability to disturbance from human activity.

A total of 33 territories are known within the Western Eyre Peninsula Bioregion where there are only seven mainland territories (that are sparsely distributed) and the remaining 26 are located on offshore islands. Nearby to the proposed site, White-bellied Sea Eagles occupy a territory and nest on the offshore Liguanea Island and a recent territory and nest site has been established less than 5 km to the east of the launch sites. The exact location of the mainland clifftop nest site remains undisclosed due to potential disturbances. It was considered highly unlikely that proposed launch activities would cause disturbance or a startle response as the nest is below any visual sight line and background noise from surf and or wind would be likely to cancel out the noise generated at launch. In particular, the site is more than a sufficient distance away to be beyond the 2,000 m breeding refuge zone prescribed in the South Australian Recovery Plan for Eastern Osprey and White-bellied Sea Eagle (DEW 2023).

White-bellied Sea Eagles have regularly been reported flying over the Whalers Way site, including well inland preying on juvenile Cape Barren Geese and feeding on sheep carcases or bathing in farm dams. During site surveys in November and December 2020, a pair of Sea Eagles were recorded circling inland coastal heath at Fishery Bay for a duration of 20 minutes prior to flying eastwards. Another pair of Sea Eagles were observed through a spotting scope overflying Liguanea Island and was last observed flying to the southern end of the island.

For the proposed site, four historical records were noted, mainly from the Cape Wiles area. One pair were recorded during the field survey, west of Cape Carnot. The EIS stated it was unknown which local habitat the species would occupy, as it is considered the Sea Eagle would only be a vagrant visitor to the site.

Key mitigation measures are identified in the EIS (Appendix R) to avoid impacts to White-bellied Sea Eagles. These measures are outlined below.

- A 2,000 m buffer disturbance would be adopted, from known active nests (based on recommendations in Dennis et al. 2011b, Dennis et al 2012), particularly during the breeding season.
- Where there are known nests or territories, construction should occur from mid-January to May, if outside this period (especially the breeding season from May to September) then a precautionary approach would involve confirming the exact location and activities of any eagles occurring in the area. It is noted that Dennis et al. 2015 and Dennis et al. 2012 distinguishes between critical breeding mid-May to mid-September and entire breeding season May to December.
- Note that line of sight is critical to disturbance and so disturbance activities will not be conducted within the line of sight of breeding White-bellied Sea Eagles (i.e. as per criteria in Dennis et al. 2011b to not be within 1,000 m of a primary nest).

The EIS considered that, due to the better managed public accessibility to the area, as a result of the proposal, it is highly likely that potential disturbance to the species from human activity would decrease.

### Eastern Osprey

The Eastern Osprey (*Pandion haliaetus cristatus*) is listed as Migratory and Marine under the *EPBC Act* and listed as Endangered under the *NPW Act*. Similar to the White-bellied Sea-Eagle, the Eastern Osprey occupies coastal areas and islands and will commonly utilise coastal and nearshore habitats and terrestrial wetlands. Foraging grounds for Osprey tend to be coastal areas where open fresh, brackish or saline water is found. Osprey are known to nest in coastal cliff environments, often utilising sea stacks as their nest location. Key sources of disturbance to Osprey nesting locations are attributed to activities occurring above their nest level, often associated with coastal recreational use by humans (walking trails, hiking, lookouts and car parks) and access by predators (especially feral cats and foxes).

Whilst the species is widespread along the northern temperate and subtropical Australian coastline, the isolated South Australian population is considered to be on the extreme southern edge of the species preferred bioclimatic range. Regular state-wide surveys indicate a decline in occupied territories from 58 to 43. The greatest decline has occurred at western South Australian locations and on Kangaroo Island. Of the 43 remaining known territories, only 30 occur on the mainland. Recent studies also considered that the current population is considered to be unstable, with a number of nest relocations and 'refugee' pairs relocating to start new territories. A number of nests in the Western Eyre Peninsula Bioregion, particularly those on 'sea-stacks', were severely damaged in the storms of 2015/2016. Surrounding records suggest a small and fragmented breeding population from Head of the Bight to Cape Spencer and Kangaroo Island. Active nests were 33 km apart on average but range from 3–83 km apart.

The proposed site occurs in an area with known Osprey territories that were still active during the most recent regional surveys between 2015-2017 (Detmar and Dennis 2018). Two currently inactive nests are located at Cape Wiles and another between Cape Wiles and Cape Carnot. At least one of the nests at Cape Wiles was known to be active in the 2023 breeding season, with confirmation of a breeding pair and chick. There are a number of other territories nearby, including a near-shore artificial platform at the Port Lincoln Marina, within the Lincoln National Park and at Cathedral Rocks.

The EIS considered that, due to human disturbance from recreational activities (including hiking, car parking and lookouts), the two Osprey nests located within 2 km of the site are highly likely to be inactive. Further to this, illegal dumping and waste left on the site by recreational users, over an extensive period of time, has likely resulted in increased predation within the Whalers Way area by invasive pest species (foxes and cats), which may have contributed to the abandonment of the nests. The EIS acknowledged there is potential for at least one Osprey territory to overlap the launch sites. However, given the lack of known active nests it is unlikely that a core nest territory occurs within 2 km of the sites or that the area forms a breeding habitat for the pair.

During the 2020 coastal raptor survey, a pair of Osprey were observed whirling and tumbling 500 m offshore. The flight path appeared to be from Liguanea Island eastwards beyond Fishery Bay. Osprey were also observed lofting from the Redbanks area due to vehicular presence. The Osprey flew westwards and commenced to hunt the waters adjacent to the Cathedral Rocks wind farm, in a circular pattern. It is possible (but unconfirmed) that the pair of Osprey that have abandoned the stack nest at Cape Wiles may have re-established an old nest on a stack off Cathedral Rocks which is greater than 5 km from the launch sites.

The field surveys recorded one nesting pair, observed near Cape Carnot and one nest which was sighted 400m east of the site on a cliff edge, approximately 2 km from Site B and 3 km from Site A. It was noted that the nest has been inactive for five years, although Osprey are known to return to inactive nests. Figure 38 shows the location of the known but inactive nests.

Distances are outlined below.

- The distance from launch Site B to Nest Site A (1) is approx. 4070 m.
- The distance from launch Site B to Nest Site B (2) is approx. 2000 m.
- The distance from Site A to Nest Site A (1) is approx. 4990 m.
- The distance from Site A to Nest Site B (1) is approx. 2975 m.

In accordance with the South Australian Recovery Plan for Eastern Osprey and White-bellied Sea Eagle (Department for Environment and Water, 2022), the sites are more than a sufficient distance away to be beyond the prescribed 1,000 m (osprey) and 2,000 m (sea-eagle) breeding refuge buffer zones.


**Figure 40: Location of existing (likely unoccupied) nest sites (Source: EIS Appendix R).**

The EIS considered the proposal would not directly impact the habitat of local individuals of the species, save for some noise related impacts. Noise impacts would be most significant to an individual nesting pair (if located within 2 km of the launch pads) during the critical breeding period. In addition, the launch pad and other infrastructure location are not within the line of site of a known nesting pair. Based on this, it was considered the proposal is unlikely to seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the Eastern Osprey. It was noted that an active nest persists at the nearby busy Port Lincoln Marina (27 km away) and that the noise impacts that may occur for the Southern Launch operations would occur at infrequent and irregular intervals.

The EIS states the proposal aims to better manage public access, particularly to the clifftop tracks and osprey viewing area (above an abandoned nest site), which could potentially benefit the local population by reducing the current level of human disturbance. It was anticipated that Osprey may then have the opportunity to use the coastline more actively.

### 13.5.5 Impacts on Native Fauna During Construction and Operation

The EIS (Section 9.4.2.1) identified there would be direct impacts to State and *EPBC Act* listed fauna species through the clearance of 23.76 ha of suitable habitat and indirect impacts from noise during operations of rocket launches. The relocation of Launch Site A has reduced the clearance requirement

to 23.4 ha. The removal of vegetation resulting in habitat loss and degradation is likely to pose the largest risk of adverse impacts for terrestrial biodiversity. The impact may be direct, in the form of vegetation and habitat clearance. It may also be indirect, such as a reduction in flora and fauna diversity due to shortages in available habitat resources or habitat degradation in areas adjacent to direct impacts. Small-scale clearing within largely intact patches of vegetation can cause localised depletion of some species.

Vegetation clearing and habitat loss cannot be avoided and is likely to result in permanent impacts to threatened biodiversity receptors. This includes a reduction of feed availability for habitat-specialist fauna species, which are dependent on native vegetation for food sources, such as the Western Whipbird (eastern) and Southern Emu-wren (Eyre Peninsula) that forage by hopping through dense vegetation. The direct loss of breeding and foraging habitat would lead to greater pressure on remaining available habitat, which is likely to increase individual animal stress levels and could result in reduced breeding success, genetic isolation and population decline over time.

The EIS considered the proposal would contribute to the localised fragmentation of fauna habitat by increasing the number and width of access tracks and clearing six discreet footprint areas. However, the majority of species at Whalers Way are mobile and are able to traverse the distance a track represents. The habitat in the local area is contiguous and provides ample connectivity across Whalers Way. It is unlikely that vegetation clearing would result in any species becoming genetically isolated and lead to sub-populations in the local area. Fragmentation was therefore considered limited and unlikely to be significant.

The siting and design of the proposed project components carefully considered minimising the level of vegetation clearance as far as practicable. In particular, Launch Site A was relocated to reduce habitat loss for the Southern Emu-wren, following further surveys. Most of the clearance is associated with existing clearings and tracks. Project sites have also been located along the coastal edges of the site, near existing disturbance corridors. The majority of the Heritage Agreement area would remain intact and largely unaffected (except by intermittent noise from launches). Although an existing track would provide an alternative access road through the site, to the northern boundary.

### Construction Impacts

The EIS identified that local fauna may be directly influenced by noise and vibration associated with construction, increases in traffic, operation and maintenance activities and the presence of construction vehicles/plant equipment.

Fauna injury and/or death is most likely to occur during vegetation clearing, earthworks (including trenching), increased human activity (i.e. labour force on-site and the movement of vehicles) and from vehicle collision. Mammals, reptiles and birds are all at risk of vehicle strike, especially species that utilise roads for movement pathways. In particular, threatened species such as Western Whipbird (eastern), Southern Emu-wren (Eyre Peninsula) and Rock Parrot could be impacted by increased vehicle activity.

Scheduling of clearing activities would 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 would initiate mitigation measures for hazardous zones and relocation requirements relevant to the specific species identified. Construction activities would be limited to daytime, unless they are unavoidable. Quieter working methods would also be used (such as bored piles rather than driven piles).

For vegetation clearing, fauna management would include a trapping program, the presence of wildlife spotters on-site during clearing and clearing being undertaken from disturbed areas toward

undisturbed areas (i.e. to encourage fauna to move away from the clearing operation). A suitably qualified ecologist would complete a site survey, prior to the commencement of clearing, to identify and mark high-value fauna habitat trees that are not to be removed (i.e. with flagging tape or other appropriate marking method). Where clearing could not practicably be avoided any high-value fauna habitat trees to be felled would be done so in the presence of a spotter-catcher. Habitat suitable for relocation to non-disturbed areas, immediately adjacent to the disturbance footprint, should be relocated accordingly. All vegetation would be checked for fauna, immediately prior to any vegetation removal or clearing and grubbing works. If any fauna species are observed during construction, work would 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 would provide a suitable record to the Site Supervisor.

The proponent would need to ensure any person who is involved in the handling of native fauna holds a relevant permit under the NPW Act.

Signage and exclusion barriers/bunting would be installed around areas of known fauna habitat, prior to the commencement of any construction works in or within 200 m of these areas. This includes identification and fencing (or marking off buffer areas) around protected species nests that are known in the area. Revegetation is to occur through natural regeneration (and assisted planting) to create a vegetated buffer between the disturbance footprint and adjacent habitat. Plantings (tube stock and seed) would consist of native species analogous to adjacent vegetation community.

Entrapment of wildlife in utility diversions (e.g. trenches) or other excavations (e.g. for the flame trench and/or water deluge system) may cause physical trauma to individual fauna and can often result in mortality. All trenches would be closed / backfilled as soon as possible and not remain open for more than 48 hours (where possible). All trenches and excavations would have an escape route (i.e. soil ramp) to allow entrapped fauna to escape (where practicable). All trenches and excavations would 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 would be released. Potentially affected threatened bird species are mobile and likely to be able to fly out of any trench or excavation. As such, it is unlikely that wildlife entrapment would have a significant impact on these species.

The EIS (Section 9.4.7.3) stated that all disturbed land would be rehabilitated to achieve stable and sustainable conditions of soil cover and vegetation. 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 (i.e. where the action of stockpiling does not create a fire risk).

Speed limits would be reduced in the areas close to construction sites to limit the likelihood of vehicle strike with wildlife. If fauna is accidentally killed (particularly Western Whipbird, Southern Emu-wren or Rock Parrot) the bodies would be collected, reported to the Department for Environment and Water and frozen for the SA Museum.

Construction of access tracks and launch facilities infrastructure through large patches of intact native vegetation could result in the introduction of pest species (particularly predators such as foxes and cats) into these areas. Edge zones can be subject to higher levels of predation by introduced and native predators.

The proposal would result in impacts from light spill into adjacent receiving environments (i.e. fauna habitat) due to the operation of plant and equipment throughout the construction phase. Impacts associated with light spill may include direct impacts (i.e. increased susceptibility to predation from

increased light) or indirect impacts related to altered foraging and habituation in areas exposed to increased lighting. Light impacts associated with construction would be temporary.

Noise and vibration have the potential to adversely affect wildlife and sensitive habitat located near construction activities. Noise impacts may include changes in behaviour and physical harm, which have the potential to adversely impact sensitive wildlife populations.

The potential impacts of noise from construction on fauna is discussed in Section 14.7.

### Operational Impacts

During operation of the launch facility, impacts on fauna populations would result from the increased human presence and disturbance associated with the day-to-day activities during launch campaigns (including vehicle movements) and from the noise associated with each launch. Compared with the previous level of human activity associated with recreation and tourism, the facility could involve a greater level of activity spread over each year (especially when at full capacity). Recreational / tourism use is generally seasonal (i.e. over the Spring-Summer period), whereas launch operations could potentially be all year round (although fire restrictions are likely to limit launches over the summer period). The peak period of both activities would likely coincide with the breeding season for most fauna species (i.e. over the Spring period).

Launch activities would be concentrated inland along the southern edge of the peninsula (near Cape Carnot), whereas recreation and tourism activities mainly occur along the edge of all the Whalers Way coastline (and is more intrusive on coastal bird habitat). The EIS considers that the replacement of recreation and tourism activities, with launch activities, would result in less overall impacts on the environment from human disturbance. However, the EIS does indicate that limited tourism use could be undertaken outside of launch campaigns (such as guided tours or controlled camping).

The most significant impact of launch activities would be the effect on threatened avifauna species, especially populations of the Western Whipbird and Southern Emu-wren (and possibly the Osprey, White-bellied Sea Eagle and Rock Parrot). The greatest impact would result from noise generated during a rocket launch, which could have effects some distance from the launch site. The potential impacts of noise from launches on fauna is discussed in Section 14.7.

During each launch campaign (which could be a 3–5 week period) there would be a range of impacts that could affect local fauna, including from general noise, light spill, uncontrolled pedestrian access, vehicles (especially fauna strike), waste and pest plants and animals. Most of these impacts can be minimised or mitigated via standard practices through the implementation of an Environmental Management Plan. Visitors to the site would be managed through the formalisation of tracks and signage.

The proposal would result in impacts from light spill into the adjacent receiving environments (i.e. fauna habitat) due to the installation of lighting on infrastructure required for the operation of the facility, which would be long term and localised (e.g. around infrastructure sites when in use) or transient (i.e. vehicle movements). The magnitude and duration of the impact would be dependent on the frequency and duration of launch campaigns, which would increase over time as the facility progresses to full capacity. Lighting of an appropriate type that accords with the colour and intensity requirements of the *National Light Pollution Guidelines for Wildlife Including marine turtles, seabirds and migratory shorebirds* (January 2020 Version 1.0) would be implemented where possible.

The establishment of a rocket launching facility also introduces to the site and surrounding area an increased fire risk, primarily from a potential rocket fire or explosion on the launch pad or immediately

after launch. The day-to-day operation of the facility poses a low risk, as most fire causing activities would be undertaken within enclosed areas and/or the perimeter fencing of each site (with appropriate fire controls in place). This aspect is further discussed in Sections 14.3.8 and 14.13.

The EIS (Section 9.4.7.4) states that annual investigations would be undertaken into the effect rocket launch activities have on the local environment, including recommendations on the best methods to protect regional fauna and flora. Southern Launch is currently in negotiations with University of Adelaide and University of South Australia with a view to sponsoring one or two PhD candidates to undertake their thesis on the impacts on flora/fauna.

**The AR concludes that the most significant impact on native fauna would be the direct loss of habitat due to vegetation clearance for the footprint of each site and potential habitat degradation over a much wider area due to launch noise extremes. In particular, Whalers Way provides habitat critical for the survival of the Endangered Southern Emu-wren and Western Whipbird. A significant part of this impact is most likely to occur due to disturbance during the birds' breeding seasons, especially during the egg laying and incubation and young nestling stages. For Emu-wrens, the critical period occurs during spring and summer (August – January), when they produce one or two broods of 1–3 young. For Whipbirds, this period occurs during winter and spring (July – October). It is acknowledged that there is a level of uncertainty with determining the potential effects on each species, due to the difficulties in conducting survey counts, limited data on the distribution/abundance of each species and the paucity of information on the impact of noise disturbance. Due to such information gaps, the full extent of potential impacts remain unidentified. To ensure any actual impacts are identified and mitigated, further surveys would be undertaken and a Threatened Species Management Plan implemented, as detailed in the recommendations of this report.**

**The sites for each component of the proposal were chosen to avoid locations where each species has been recorded (especially after the relocation of Launch Pad A). To help minimise this impact, sites were also carefully selected that contain sub-optimal habitat for the Emu-wren and Whipbird, primarily where already cleared or partially cleared (including the use of existing access tracks). During construction, local fauna could also be affected by general noise and disturbance from human activity, entrapment in open excavations (including predation), light spill and injury or mortality due to vegetation clearance/civil works or from vehicle strike. During general operation of the facility, fauna could be affected by general noise and disturbance from human activity, increased fire risk, light spill and injury or mortality due to vehicle strike. Noise during launch events would also cause a short-term disturbance that could temporarily affect the hearing of fauna (and feeding and breeding activities) or cause displacement from territory (especially local populations of Southern Emu-wren and Western Whipbird). Noise impacts are further discussed in Section 14.7.**

### 13.5.5 Marine Fauna

The EIS (Section 9.22; Appendix S) undertook a marine ecological assessment that defined the key ecological values of the local marine environment, describing the habitats that are present and the marine fauna, avifauna and mammal populations known to inhabit the area. In particular, the ecological values of the Thorny Passage Marine Park and the Southern Ocean were considered. Marine mammals, including the Australian Sea Lion, Long-nosed Fur Seal and a number of cetaceans have been recorded on and around Liguanea Island.

#### Australian Sea Lion

The Australian Sea Lion (*Neophoca cinerea*) is currently listed as Endangered under the *EPBC Act* and Vulnerable under the *NPW Act*. Breeding sites are generally on offshore islands. A total of 58 regular

breeding colonies and 151 haul-out sites have been identified in South Australia and Western Australia. Liguanea Island is the fifth largest of 11 breeding colonies within the 'Spencer Gulf' metapopulation, representing about 3.3% of that metapopulation and about 0.9%of total pup production. The species mainly breeds on the southern peninsula of the island, although pups have been seen on the east coast. Sea lions haul-out around the entire coastline, as well as on top of the island. A total population for the island was estimated at 100 in 2015.

### Long-nosed Fur Seal

The Long-nosed Fur Seal is not listed as threatened under the *NPW Act* or the *EPBC Act*. The species breeds in New Zealand (and its subantarctic islands) and southern Australia (from New South Wales to Western Australia), mostly from 29 breeding sites in South Australia, of which 97 per cent are from colonies between Kangaroo Island and the southern tip of Eyre Peninsula. The population on Liguanea Island was estimated at 1832, which represents 9%of the pup production in South Australia. Additionally, Cape Wiles is known as a haul-out site.

### Cetaceans

There are a number of records of whale species in the region, including:

- Southern Right Whale (*Eubalaena australis*), records of up to eight individuals in winter on four occasions during 1991–2002, within 1.5 km of the site. Noting that Sleaford Bay, just east of the site, has been identified as a location where small, but increasing, numbers of mostly non-calving whales regularly aggregate briefly (between May until November for this critical life cycle period)
- Blue Whale (*Balaenoptera musculus*), a pair recorded 9 km south-east of the site in February 2007
- Humpback Whale (*Megaptera novaeangliae*), recorded in autumn 2001 (individual) and 2003 (pair), in both cases 20 km south-east of the site
- Killer Whale (*Orcinus orca*), undated record 8 kmsouth-west of the site
- Southern Bottle-nosed Whale (*Hyperoodon planifrons*), recorded in February 1994, 1.5 km south of the site
- Dolphin populations from this area are estimated at 2,800–10,600 in summer and 13,000–20,000 in winter.

### Seabirds

The Short-tailed Shearwater or Mutton Bird (*Ardenna tenuirostris*) is currently listed as Migratory under the *EPBC Act*. The species breeds in summer in Tasmania and off the coast of southern Australia, migrating to north of Japan for winter in May before returning in October. There are more than 10 million breeding pairs in southern Australia, including one million in South Australia across at least 33 colonies, including 14 in the Thorney Passage Marine Park. The breeding colony on Liguanea Island spans approximately a quarter of the island's area. The total number of burrows has been estimated at 10,665, corresponding to a population of 20,330. The Crested Tern (*Thalasseus bergii*) is listed as Migratory under the *EPBC Act*. There is a breeding population of 'several thousand' birds, of an estimated South Australian population of 13,000–25,000. Breeding in South Australia typically occurs in October. For most seabird species in the Great Australian Bight, there is little data on species distributions, and little or no quantitative data on their abundances.

The EIS considered the following impacts on the marine environment.

- Operational impacts: debris colliding with fauna (and other impacts associated with debris); noise and vibration (i.e. acoustic trauma and behavioural impacts); and pollution associated with debris.
- Construction noise.

The EIS (section 9.5.4.2) stated that acoustic energy from in-air noise does not effectively transfer across the sea surface meaning that most of the noise is reflected off the water surface. Therefore, noise and vibration impacts from a launch event are unlikely to result in impacts on marine fauna below the surface. It was determined that neither sound nor debris (functioning as a high-speed projectile) would have any significant impact on marine life below the surface because of rapid attenuation of both forms of energy on entering seawater. As such, the potential impacts are largely related to above-water marine fauna populations. No impacts on marine species are expected from noise associated with construction activities.

### Noise and Vibration Impacts on Marine Fauna

Noise from launches would temporarily alter the quiet setting of the natural environment for 1-2 minutes during launches. The EIS (section 9.5.4.2) states that the maximum instantaneous sound pressure level during a launch would be 125 dB at the closest shoreline to either launch site, less than 100 dB at Cape Wiles and about 95 dB at the northern end of Liguanea Island. Noise impacts from sonic booms were considered to be limited to behavioural impacts but are unlikely to occur in coastal waters or on Liguanea Island. The Response Document (Appendix D) included revised noise contour mapping, as shown in Figure 39.

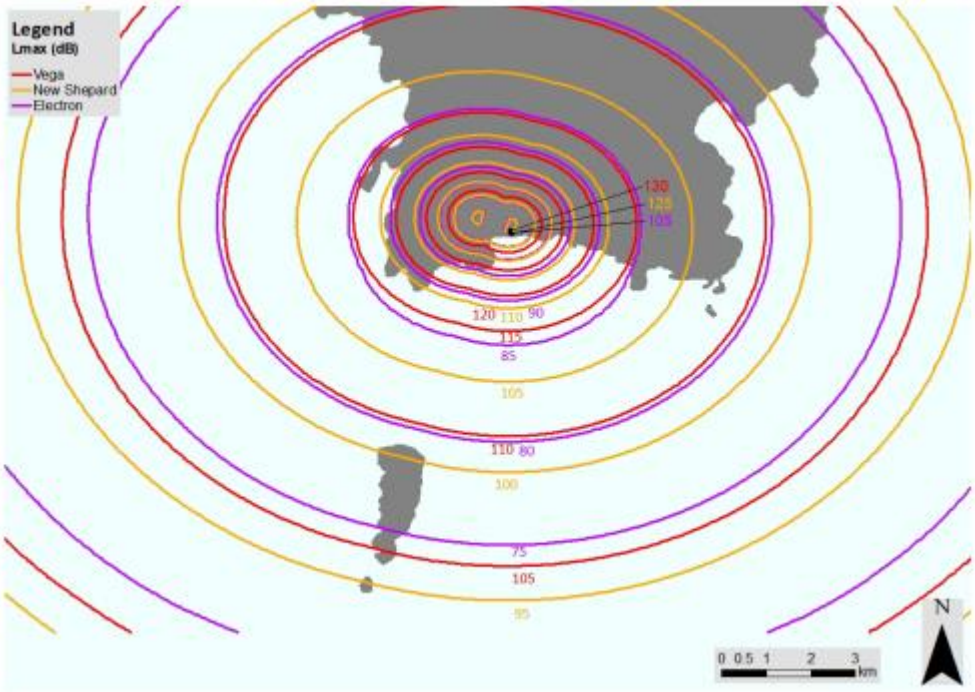



**Figure 41: Modelled offshore sound pressure levels (Source: RD)**

Based on published noise thresholds, the EIS (Appendix P) considered that birds on Liguanea Island (including Short-tailed Shearwaters and Crested Terns) would not incur permanent hearing loss. Birds towards the northern end of the island would be exposed to noise levels close to the threshold for temporary hearing impairment and behavioural change, but these impacts are unlikely because the threshold is derived from studies with continuous noise exposure of 12–72 hours duration, rather than less than two minutes.

The EIS noted that responses of seabirds vary on the stage of breeding or growth, for example:

- mon-breeding seabirds are more likely to flee, in comparison to breeding birds which are reluctant to abandon their eggs or chicks
- breeding birds flee more readily when their chicks are larger
- chicks in the creche stage are more sensitive to helicopter noise and more likely to stampede
- birds in the moult phase are more sensitive to helicopter operations.

Similarly, published hearing loss thresholds for seals would not be exceeded anywhere on Liguanea Island or at Cape Wiles. Behavioural impacts are possible for animals towards the north of the Island. Seals have been known to move both on land and occasionally into the water in response to launches in northern America but return within minutes to two hours. In the event that seals were sufficiently startled to stampede towards the water, pups are unlikely to be injured by trampling because the narrow habitat does not allow for a sufficiently dense concentration of seals, and after their first month, the pups are quite robust.

The Response Document (Section 3) stated that additional specialist advice was sought on the potential noise and vibration impacts on the marine environment, especially further detailed analysis of the noise modelling software (RUMBLE) that has provided a more realistic acoustic outcome for the expected launches from the site. This also included the transmission of noise from air to water and the specific impact on marine mammals and other marine fauna. Additional information about the presence of Southern Right Whales was also included (including museum records from waters adjacent to the site). In particular, Sleaford Bay (approximately 10 km east of the site) was identified as a location where small but increasing numbers of whales regularly aggregate briefly.

The Response Document (Section 5.3.2) identified that, for a typical, near-vertical rocket trajectory, the rocket would be at about 2 km in altitude before significant noise was able to transmit from the air into the marine environment. Sound attenuation through air and across the air/sea barrier would reduce noise to levels to well below the thresholds for hearing damage or impairment for marine mammals (including whales and pinnipeds) and no higher than noise that can frequently arise from wind and waves. Behavioural impacts on marine mammals resulting from such noise were considered possible only within 750 m of the shoreline for the largest few rockets, and such impacts would be short term in nature and impact. It is proposed that observations for whales in the vicinity of the site would be undertaken prior to launches occurring, with the presence of whales in a location where they could be subject to acoustic impacts resulting in a delay to the launch until the whales were no longer present in the critical location. It was also noted that an assessment of the impact of rocket launch noise on whales near the Kodiak Island launch facility in Alaska found that whales would only hear the launch if it flew directly overhead, and it would be unlikely that the noise would be at levels that would be sufficient to affected behaviour or cause injury.

In regard to of sea birds, the equivalent noise levels (LAeq,24hr) on Liguanea Island were predicted to be less than 60 dBA for all rockets modelled, which is well below the hearing loss thresholds. Therefore, no impacts are expected on the hearing of Short-tailed Shearwater, Crested Tern, Cape Barren Goose or other seabirds inhabiting Liguanea Island. Whilst there may be behavioural impacts, these are expected to be minor and short-term. Masking of acoustic signals is not expected to have any significant impact on bird communication, due to the infrequency and short duration of the rocket noise.

### Rocket Debris Impacts on Marine Fauna

The EIS identified several scenarios that could result in fauna being struck by high-speed projectiles associated with a rocket launch, including:

- nominal launch success: orbit achieved with slight variations in trajectory – some stages fall to earth at distances of 3–8 km and 40–150 km for suborbital rockets and >500 km for orbital rockets.
- launch failure (i.e. air burst): a launch vehicle explodes while in the air resulting in the vehicle breaking up into a number of pieces and landing over a large area. This can also be the result of a manual detonation of a rocket that is not behaving as expected (i.e. using a flight termination system).

Rockets are installed with a Flight Termination System (FTS) that allows the rocket to be detonated in mid-air in the event of unexpected and undesirable behaviour. This enables a rocket to be detonated away from any environmentally sensitive areas, such as Liguanea Island.

The EIS considered that any debris, functioning as a high-speed projectile, would not have any significant impact on marine life below the surface because of rapid attenuation of its kinetic energy on entering seawater. Rockets launched with Polar or Sun Synchronous trajectories are the most likely to pass close enough to Liguanea Island and present a remote risk of debris falling onto the island. No impacts are expected from successful launches because suborbital rockets would not be launched with a trajectory near Liguanea Island, and the first discarded stage from orbital rockets would fall more than 500 km offshore.

An air burst would result in a scatter of debris over an area that would increase with distance from the launch. For a debris fragment to collide with fauna on Liguanea Island, it would require not only failure of the rocket, but at such a precise time as would result in fallout over the island, and one or more of the few fragments falling on the island to coincide with the sparsely distributed fauna. The risk analysis modelling predicted this to be an extremely rare event. Explosion of a rocket on Liguanea Island would require failure of the FTS, in addition to other factors such as launch failure at the precise time that resulted in a collision with Liguanea Island.

Within the Southern Ocean, including the waters of the Thorny Passage Marine Park surrounding Liguanea Island, there could potentially be occasional debris strike impacts on individual animals on the sea surface but no impact at population level. This is also likely to be an extremely rare event.

The impacts of debris following contact with the sea surface depend on the nature of the rocket components of which the debris is comprised. Key points considered when assessing the risks included:

- all component materials are inert and harmless to the marine environment except lithium (within batteries) and copper (within electrical wiring)
- fuels would be expended before contact with the sea floor, or would burn, remain inert (rubber-based solid fuel) or vaporise (liquid fuels).
- most materials would sink, except rubber-based solid fuels (and liquid fuels prior to vaporisation) and some small pressure vessels which have not been punctured
- casings that have not already broken up during re-entry would generally shatter into thousands of pieces on impact with sea surface, with the possible exception of some thick carbon fibre components.

Copper fragments would sink to the seafloor where their slow dissolution may have long-term local effects on sediment in fauna, or be dispersed from areas of hard substrate, adding a very low total mass of copper relative to natural oceanic copper quantities. Lithium-ion batteries (about the size of two car batteries in volume) would likely rupture on impact with the sea surface or at depth. Lithium is already elevated in seawater and is not toxic but would react with seawater and in sufficient quantity could cause alkaline conditions with localised, short-term toxic effects. The descent of debris to the sea floor is expected to be slow enough to be avoided by mobile fauna, but sessile organisms may be impacted by larger items of debris or accumulations of fragments settling on the seafloor. Fragile biota may be damaged or destroyed, and feeding or respiration may be inhibited, but the area impacted would be insignificant compared to the extent of the receiving environment. Particles would be created that are small enough for pelagic and benthic fauna to digest, potentially impacting individuals but with negligible impact at population level. Any of the above impacts would be highly localised, the area impacted would be insignificant in comparison to the extent of the receiving environment and population level effects would be negligible.

**The AR concludes that there are a number of threatened coastal and marine species that could potentially be affected during the operation of the facility. Construction activities would have negligible impacts, except possibly low-level disturbance effects from noise and human activity within close proximity of the coastline (noting that the site is bordered by high cliffs that provide a separation distance buffer). During operation, noise from a rocket launch event may result in a behavioural response for species using habitat generally within 1 km of the launch site but could extend to the nearby Liguanea Island (which is 4 km away) for the largest rockets launched. The island is an important haul-out site for the Endangered Australian Sea-lion and a nesting site for migratory seabirds (such as the Short-tailed Shearwater and Crested Tern). Any launch noise transmitted underwater would likely have a minimal impact on whale hearing but for some launches may have minor, short-term impacts on the behaviour of whales close to shore. Southern Right Whales that congregate at the nearby Sleaford Bay are unlikely to be adversely affected. As a precaution, it is proposed that launches would be delayed until any whales observed within close proximity of the site have moved on.**

**A rocket explosion (air burst) over Liguanea Island would be a very rare event that could potentially result in mortalities. However, there would be negligible impact at a subpopulation level. Similarly, the risk of discarded rocket debris colliding with individuals of marine species is considered to be remote and would not occur when animals are submerged. Within the Southern Ocean, including the waters of the Thorny Passage Marine Park surrounding Liguanea Island, there may be a very occasional debris strike impact on individual animals on the sea surface, but there would be no impact at a population level. If required, the use of a Flight Termination System would enable rockets to be detonated in mid-air, away from any environmentally sensitive areas.**

**Monitoring of seal behaviour and noise on Liguanea Island and underwater noise in the nearshore area close to the launch sites would be undertaken before, during and after launches. A review of risks to the marine environment would be undertaken after the first three years of operation. If needed, noise impacts on marine fauna could be minimised by avoiding launches during particular periods in the breeding cycles of affected species.**

**Any pollution impacts from rocket debris would be highly localised and the area impacted would be insignificant in comparison to the extent of the marine environment. Thus, population level effects would be negligible. Rocket debris would also pose an insignificant level of toxicity risk.**

### 13.5.6 Introduced Plants and Animals

Construction activities have the potential to result in the introduction and/or spread of exotic plant species, including declared and environmental weeds, primarily through ground disturbance and vehicle/machinery movements. Introduction of new weeds or spread of existing weeds could degrade better quality vegetation around construction sites and can also potentially harbor predator pest species (e.g. foxes and cats). The dispersal and expansion of existing weed and pest species can also occur due to edge effects, where changes in environmental conditions (e.g. altered light levels, wind speed, temperature etc.) can occur along the edges of habitats. The clearance of vegetation to accommodate the footprint of each component of the proposal would create new edges in the vegetation. These new environmental conditions along habitat edges can promote the growth of different vegetation types (including weed species). Infrastructure Site D would use an existing cleared area where there are already edge effects (and weed invasion).

The EIS (Section 10.4) considered that design elements which have the potential to increase the attractiveness of the site to introduced flora and fauna, including the construction of accessible water bodies and changes in the environment though elements such as additional lighting. The introduction of new food sources, accessible waste streams and the accidental transportation of flora and fauna to the site during construction and operation were also identified as risks. The most likely cause of weed dispersal and introduction associated with the proposal include earthworks, movement and disturbance of soil, and attachment of seed (and other propagules) to vehicles and machinery entering and manoeuvring in the site during all project phases. Weed dispersal by vehicles along access tracks and roads could be a key source of weed invasion.

Four exotic species listed as Declared Pests under the *Landscape South Australia Act 2019* (LSA Act) were sighted (or evidence of their existence was sighted). Domestic Cat tracks were observed frequently; European Rabbit, which is an introduced pest species common in all states, was widespread and common; Red Fox was observed from numerous scats; and Common Starling was sighted. As part of the environmental improvement program for the site (i.e. the wider Heritage Agreement area), the EIS proposed to establish a predator proof fence to prevent foxes and cats from entering the area. This would be accompanied by a control program to eradicate introduced predators from the site. It is considered that this is an impractical measure as it would require extensive vegetation clearance (i.e. for the fence footprint, an access track and/or a buffer within which to undertake pest control outside the fence) and may not be as cost-effective as other control measures (such as shooting, baiting, trapping and grooming traps).

One Weed of National Significance (WONS), also a Declared Weed under the *LSA Act*, was recorded at Launch Site A, being the Bridal Creeper (*Asparagus asparagoides*). Most commonly observed during the field survey was the exotic species Sea Lavender (*Limonium companyonis*), with other non-declared exotic species also observed (including Horehound, Onion Weed and Stinkweed). The highest density of exotic flora was observed at Infrastructure Site D, where community structure was noted as highly disturbed. This area of the site has a high intensity of use by recreational and tourism visitors to the site at the present time.

The potential for increased abundance of existing pest and nuisance plants and animals is considered to be low to moderate. The proposal would result in direct impacts on only a small proportion of the site. Access to the remainder of the site will be limited, lowering the current risk of spreading pest and nuisance plants and animals from recreation. The site is already impacted to a degree, due to the existing use of the land for tourism and recreational purposes.

A Weeds and Pests sub-plan will be developed as a component of the CEMP and OEMP.It would detail the practical steps to be undertaken, during all project phases, to minimise the potential dispersal of pest species, including:

- ensuring construction compounds are kept neat and tidy at all times, to prevent pest animals from inhabiting the area
- ensuring food waste is placed in enclosed / covered bins, to prevent pest animals from accessing it.
- covering constructed waterbodies (which are to be located within perimeter fencing)
- reporting and recording rabbit/hare/fox/feral cat sightings
- conducting annual surveys of the site to identify if any pest fauna have become established, allowing management programs to be implemented or modified in suitable timeframe to reduce or avoid impacts on the existing terrestrial and/or marine environments
- controlling pest animal species (especially rabbits, foxes and feral cats) that may proliferate as a result of site activities
- undertaking 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
- undertaking weed control, especially removing or destroying all WONS and Declared and/or environmental weeds located within the construction impact zone, prior to construction commencing
- ensuring 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, ensuring 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
- installing a designated wash-down bay to clean vehicles and construction equipment during construction works and prior to leaving site
- ensuring all earthmoving equipment is clean and free of soil material prior to commencing earthworks within known threatened species habitat
- ensuring all fill materials (e.g. sand and aggregate) imported to site are sourced from weed and pathogen free sites
- undertaking weed control (if soil or fill material stockpiles become infested with weeds), as soon as practicable and at least 10 – 14 days prior to moving material.

The Weeds and Pests Sub-plan would also ensure weed control methods for threatened species would be done in accordance with the relevant Recovery Plan for threatened species, such as the *National Recovery Plan for the Mallee Emu-Wren (Stipiturus mallee), Red-lored Whistler (Pachycephala rufogularis), Western Whipbird (Psophodes nigrogularis leucogaster)* (2016)). Control measures would also need to be implemented in accordance with relevant threat abatement plans published by the Australian Government Department for Climate Change, Energy, the Environment and Water, such as the *Threat Abatement Plan for predation by feral cats* (2015), the *Threat Abatement Plan for predation by European red fox* (2008) and the *Threat Abatement Plan for competition and land degradation by rabbits* (2016).

**The AR concludes that construction activities and management protocols can minimise the risk of spread of pest plants and animals within the site (especially around launch facility infrastructure). The proposed establishment of a fox and cat eradication program could provide an environmental benefit, especially for threatened bird species. Better controlled and restricted public access to the site for recreation and tourism would substantially reduce the risk of introduction and spread of**

**weed species. The implementation of a weed control and eradication program (especially for Bridal Creeper) would lead to further environmental improvements.**

### 13.5.7 Fire Risk

The EIS (Section 7.4.5.5) identified that an increase in fire frequency is likely to disrupt the life cycle of flora and fauna. An increase in fire frequency often results in a change in vegetation structure, which includes loss of fallen timber and stags and is often followed by an increase in shrub density. While many Australian flora species have developed mechanisms to cope with fire in the landscape, frequent fires can decrease the habitat value and resilience of vegetation communities. The loss of critical habitat for threatened species due to fire can be catastrophic for small, isolated populations (especially for those with low dispersive abilities). An increased risk of predation often compounds the habitat loss.

The EIS acknowledges the proposal may increase the risk of fire due to hot works during construction activities and the chance of sparks occurring off the rocket launches, during times of hot and dry conditions (or if a rocket catches fire or explodes during a launch). The following measures are proposed to minimise the risk.

- Firebreaks would be incorporated along fences to protect and mitigate one of the primary threats to fauna species.
- All buildings and facilities are sited to achieve suitable clearance from vegetation for fire mitigation purposes (I.e. minimum fire clearance requirements under the National Construction Code.
- Assembly Building, Fuel Pad and Oxidiser pads will have firefighting services as per legislative requirements.
- Adequate water supply for firefighting will be available at each site including water stored in 25,000 L tanks at initial stages and then significant water supply through the dam and detention basins once established.
- Installation of 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.

Potential increased fire risk due to the proposal was frequently raised in public submissions on the EIS, especially the significant impact a fire could have on native vegetation and threatened species habitat and fauna populations (particularly the Southern Emu-wren). The Department for Environment and Water also made comment on the fire risk, especially the need to establish and maintain suitable firebreaks.

The Response Document (Section 4.18) considered the previous use of the site for recreation and tourism already posed a degree of fire risk, especially from unmanaged camping (i.e. campfires for cooking and heating). However, it was acknowledged that there is no record of a fire affecting the Whalers Way site in recent decades (i.e. not since 1931), as shown in Figure 40.

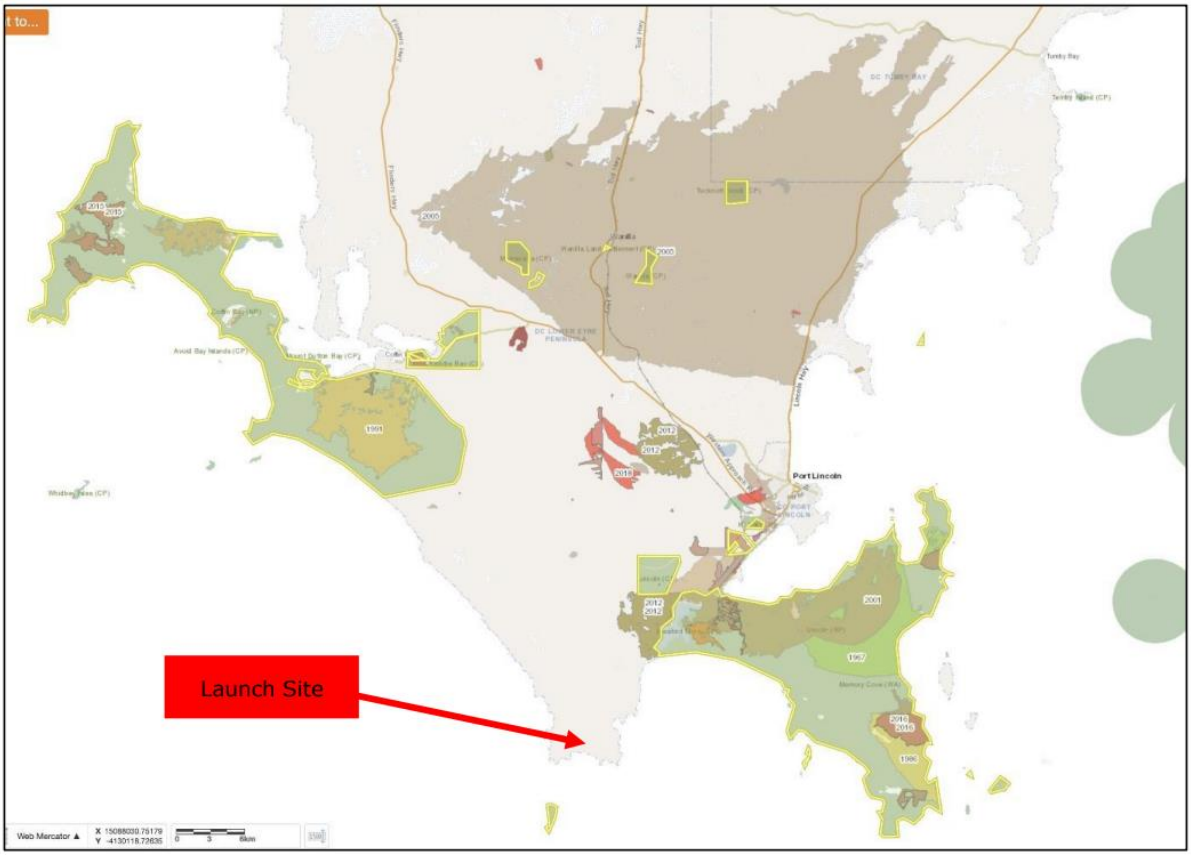



**Figure 42: Fire history map for the lower Eyre Peninsula – since 1931 (Source: RD Appendix I).**

The Response Document (Appendix I) now includes a comprehensive Bushfire Emergency Management Plan (prepared by SA Bushfire Solutions in accordance with the *Australian Standard 3745 – 2010 Planning for Emergencies in Facilities*) that details a bushfire risk assessment and addresses mitigation and emergency management measures.

The Plan identified that there is a contracted water bombing and observation aircraft, available over the fire danger period, based at Port Lincoln. The proposed site is within the Lower Eyre Peninsula Primary Response Zone, which ensures aviation resources are automatically dispatched to all reported fires. Availability and access to aviation assets is determined prior to the fire danger season via a 'fire probability assessment'. The use of aircraft is a critical component for fire suppression, which can be especially effective to assist in slowing the initial spread of fires. This AR considers the use of such a service should be considered for managing the fire risk at the site, such that an aircraft could be 'on standby' at the start of a launch so that if a fire is started in an inaccessible part of the site, it can quickly be extinguished.

**The AR concludes that the establishment of rocket launching activities would introduce an additional potential source of fire to the site that increases the current fire risk for the area. Similar to any other existing fire risk (such as from the recreational use of the site, lightning or a fire external to the site), a widespread bushfire would have the potential to cause catastrophic damage to the site, especially the loss of threatened species populations. The implementation of a suitable Bushfire Emergency Management Plan would adequately reduce this risk, especially with a fire response based on the provision of on-site firefighting equipment and back-up emergency response contingencies (such as water bombing aircraft).**

## 13.6 Impacts on Threatened Species and Conservation Areas

The Heritage Agreement area, within which the proposal is sited, contains a substantial tract of intact remnant vegetation that provides habitat for a number of threatened fauna populations. It is part of a continuous stretch of coastal habitat that extends along the southern coast of Eyre Peninsula from the Coffin Bay National Park to the west and the Lincoln National Park to the east. However, it is somewhat disconnected from these parks by the Cathedral Rocks Windfarm site (which is still vegetated) on the western boundary and cleared farmland along the northern and eastern boundaries. The southern coast is identified as a key biodiversity area in the region (a 'Large Remnant Area'), being a strong-hold for threatened species. The coastline also has very high landscape values. The surrounding coastal waters are within the Thorny Passage Marine Park, which contains high value coastal and marine habitats that support significant populations of threatened species (especially the Southern Right Whale). The nearby Liguanea Island is an important breeding site for the Australian Sea Lion and Short-tailed Shearwater. Commonwealth Marine Parks adjoin the park outside of State waters.

### 13.6.1 Threatened Fauna Species

The EIS identified a number of threatened fauna species (terrestrial and marine), either listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and/or the South Australian *National Parks and Wildlife Act 1972*, that are likely to be affected by the proposal. It should be noted that threatened species can generally be listed as 'Vulnerable', 'Endangered', 'Critically Endangered' or 'Extinct'. The Western Whipbird (eastern) and Southern Emu-wren (Eyre Peninsula), both now listed as Endangered under the respective Acts, would be directly impacted by critical habitat loss through the clearance of favoured vegetation associations and potentially displacement (or reduced breeding success) due to rocket noise disturbance within close proximity to each launch site. Both species have suffered major range-reduction from habitat loss from land clearance and habitat degradation (including from large fires) and are now predominantly confined to the southern tip of Eyre Peninsula.

As a result of habitat clearance and disturbance, there is a risk the proposal could lead to a long-term decrease in the size of important populations of the Southern Emu-wren and Western Whipbird. This would likely be due to:

- direct or indirect loss of breeding territories, including loss of a territory due to poor dispersive ability. A limited opportunity to relocate to a new territory may result in birds being forced to use sub-optimal habitat (or compete for optimal habitat), which could lead to reduced survival rates and breeding success
- loss of breeding pairs close to launch sites due to hearing impairment from launch noise possibly leading to increased predation risk
- adversely affected habitat critical to the survival of a species, including increased local competition for breeding territories or food due to displacement
- disruption to the breeding cycle of vulnerable populations, especially disturbance resulting from noise during the breeding season that could lead to nest abandonment or loss of eggs/chicks (i.e. resulting in reduced breeding success and recruitment).

The revised noise modelling in the Response Document (Appendix C) mapped the noise contours likely to be generated by the largest rockets that could be launched. Figure 41 shows the level of noise that would likely be experienced (i.e. for a worst-case scenario) in the terrestrial, coastal and marine environment surrounding the launch facility. Locations where the Emu-Wren and Whipbird have been

recorded are also shown. The 'hot-spot' of Emu-Wren territories around Cape Carnot would be most affected by noise levels of 60-70 dB.


Figure 3. Overview of noise contours for the predicted $L_{Amax}$ levels at Whalers Way.

Test Launch Campaign – Avian Survey Report Test Launch 1 - February 2022 22

**Figure 43: Modelled noise contours for a worst-case scenario (Source: RD)**

The cryptic / secretive nature of each species and limited flight response distance when disturbed may reduce the likelihood of birds being displaced too far from their territories. Birds are likely to fly only a short distance as a fright-flight response to launch noise, so may stay within their home range and not abandon a nest for long. Due to the secluded nature of their preferred habitat, the birds may also feel more secure staying 'in hiding' that leaving their territory (especially if the noise disturbance is a singular, brief occurrence). The behavioural response may be habituation (i.e. acclimatisation) to launch activities over time, especially if such intermittent noise is not perceived as a threat. Rocket launch activities may illicit a similar response to a thunderstorm (which has a similar noise profile), for which the birds may currently experience on an intermittent frequency. Alternatively, the noise impact could result in hearing impairment and/or prolonged stress (and disrupted feeding and breeding activities) or deter birds from using habitat with a certain distance from the launch pads. There is also a probability that birds may re-establish territories if they become accustomed to launch activities over time (which may be more likely to occur for future generations).

The magnitude of the potential impacts on the long-term viability and survival of the populations is difficult to determine with any degree of certainty due to the need for a greater understanding of the species (especially defining the location and size of territories) and the effects on the species (especially behavioural response to noise). Quantifying the actual impacts could only be achieved through long-term monitoring.

The survey results indicate that there are no records of either species within the footprint of each launch pad site, especially due to the relocation of Launch Site A away from an Emu-wren habitat hot spot. However, the sites still contain vegetation that could provide habitat for each species (albeit sub-optimal). The Response Document (Appendix D) acknowledges that the presence and abundance data for each species is considered to be an underestimate, as group size of such cryptic and secretive birds can be difficult to estimate without detailed behavioural observations repeated over an extended period of time and without marking individuals. Furthermore, the most recent survey period was brief, weather conditions were not optimal for avian surveys and seasonality (i.e. a summer survey) likely impacted on bird activity and detectability of the two species. It should be noted that the survey effort has substantially improved the current knowledge of each species, including the characterisation of optimal habitat for the Emu-wren. The establishment of 'Control Sites' for the avian monitoring program has also provided recent survey records for each species in the Lincoln National Park.

The Department for Environment and Water considered that, with an estimated total of 18 Southern Emu Wrens observed in proximity of the project area footprint, and around 100 individuals within a more localised area from Cape Carnot to Cape Wiles, minor population impacts can lead to significant changes. At a minimum, the proposal is likely to reduce the occupancy area of several species. It was further noted that, whilst acclimation to a disturbance is something that may occur if the disturbance is repeated frequently (i.e. at least daily) and at a predictable time of day, disturbances at three-weekly intervals and at different times of day and night are unlikely to lead to acclimation. If the proposal were to proceed, targeted, long-term resourcing based on scenario setting and potential responses would be required to monitor potential impacts to these and other bird species from rocket launches.

Threatened coastal raptor species (especially the Eastern Osprey and White-bellied Sea Eagle) and other coastal avifauna (such as the Fairy Tern and Rock Parrot) could also be indirectly impacted by noise from rocket launching and testing events. An adequate buffer distance from launch sites to nest sites or critical habitat for these species can be achieved to ensure any behavioural response to launch noise would not be substantial (nor affect the long-term survival of local or regional populations). Marine species that use the nearby Liguanea Island (especially the Australian Sea Lion) and nearshore waters (especially the Southern Right Whale) could also be indirectly impacted by launch noise (including underwater noise). Adequate buffers distances should ensure any impacts would be relatively minimal. In addition, there is a remote risk that marine species could be directly impacted by rocket debris in the event of a rocket explosion on the launch pad or after launching or from the disposal of spent rockets at sea.

The Response Document (Section 6) stated that, since the public consultation period on the EIS, a baseline survey for the Eastern Osprey and White-bellied Sea Eagle has been undertaken, comprising a Coastal Raptor Boat Survey conducted from the Jussieu Peninsula to NW D'Anville Bay. The results (as shown in Figure 42) confirmed the presence of a breeding pair of White-bellied Sea Eagle successfully raising an offspring to fledgling maturity approximately 4 km from Launch Site A. It is also 1 km from the swimming hole and a cliff top car park, which are frequently visited by the public for tourism (including photography). Recreational fishermen launch their boats from the Fishery Bay launch point (approximately 2 km from the nest) and the beach is frequently used by surfers. It was considered this demonstrated that, despite the potential human interference, birds have successfully habituated in this locality.

The survey also identified that one of the two unoccupied nest sites, located at Cape Wiles, is once again the object of intense Osprey attention. A pair of Osprey were observed engaged in potential nesting activities. One bird was sighted carrying what appeared to be nesting material and they eventually both occupied the lowest of the two nests. Whilst all this was happening a number of

tourists were present at the Cape Wiles observation point directly above them. It was considered that this is a firm signal of acceptance of human activity and presence proximal to a favoured nest site.


**Figure 44: Results of the 2022 Coastal Raptor Survey (Source: RD)**

In response to the survey results, it is now proposed that an 'action plan' for the Eastern Osprey and White-bellied Sea Eagle in the areas surrounding the facility would be implemented through a Coastal Raptor Monitoring Program, which would provide appropriate mitigation measures to manage and foster coastal raptors at Whalers Way. A systematic nest survey would be carried out prior to the commencement of construction of the launch facility, with the aim of identifying the status of any nests within a 6 km radius of the facility. The 6 km radius would incorporate the closest active nests to the project area and the extent of the predicted 93 decibal (A-weighted) (dBA) noise contour within which birds may experience temporary hearing impairment or disturbance (threshold shift) from rocket launches. The survey would also include nearby islands that occur within the 6 km radius (such as Liguanea Island). The survey would be repeated for the first two years of facility operation.

The results of the surveys would assist in determining if the facility has a negative impact on the breeding success of either species. If the results suggest that this has occurred, a detailed review of the operations and management of the facility would be undertaken. In addition to any changes to operational management measures, further monitoring will be required to determine if the changes have alleviated any negative impacts on nesting success.

### 13.6.2 Conservation Values

The conservation value of the Heritage Agreement would be reduced due to the introduction of an 'industrial type' of activity and the resultant effects of habitat loss from vegetation clearance and habitat displacement for fauna from noise impacts associated with launch events (and possibly from human disturbance during launch campaigns). The degree of reduction would ultimately depend upon the level of improved environmental management that can be achieved, especially the restoration of existing degraded areas (primarily through revegetation) and introduced predator control / eradication. The ability to reduce or eliminate current threatening processes affecting the local environment (especially human disturbance from recreation/tourism activities and rabbit/fox/feral cat predation) would also determine whether the potential impacts can be offset sufficiently to result in a net environmental gain for the area. From a regional perspective, the Significant Environmental Benefit would offset the on-site vegetation clearance losses at an off-site location, which could provide wider environmental benefits. The proposed research into the Southern Emu Wren and raptor species could also provide wider benefits to conservation efforts in the region.

The proposal is not expected to significantly affect the conservation status of regional populations of coastal and marine threatened species, primarily due to suitable buffer distances (including for Liguanea Island). In particular, the conservative noise modelling undertaken demonstrates there would likely be a low (if any) behavioural response to noise levels during a launch event. There would be a very remote risk of harm to marine fauna from a rocket explosion or from rocket debris.

Similarly, the conservation values of the offshore state and Commonwealth marine parks would likely be unaffected by the proposal. The low-profile nature of the facility (and adequate set-backs from the coast and natural screening due to topography and vegetation) would ensure coastal landscape qualities are not detrimentally affected from surrounding, publicly accessible vantage points.

### 13.6.3 Environmental Offsets

The main offset for the environmental impacts of the proposal, primarily the clearance of native vegetation and fauna habitat, would be achieved through a Significant Environmental Benefit (SEB) under the *Native Vegetation Act 1991*. A range of measures to improve the environmental management of the Heritage Agreement area would also be implemented (such as through the implementation of a Native Vegetation Management Plan). The proponent intends to provide the SEB in the form of an on-ground offset facilitated by SEB credit providers within the region, with the aim that a like-for-like compensation outcome can be achieved for the amount of intact vegetation communities and critical habitat that would be removed (i.e. resulting in a net expansion of the area of vegetation/species habitation on the Southern Eyre Peninsula that is under protection).

Offsets for mitigating the impacts on nationally threatened fauna species would also need to be achieved under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (such as through habitat protection/enhancement and/or the implementation of a Threatened Species Management Plan).

The Response Document (Appendix D) states the proponent intends to incorporate environmental restoration and conservation measures for the Whalers Way area as an essential part of the proposal, including:

- improved land management (especially weed and pest control)
- rehabilitation and revegetation of existing degraded areas

- predator proof fencing and eradication of predators (i.e. cats and foxes) from the entire Whalers Way Heritage Agreement area
- firebreaks incorporated along fences to protect and mitigate one of the primary threats to threatened species.

Rehabilitation of tracks that are remnants of previously visited but closed areas, or are no longer required, are proposed to be rehabilitated in a staged approach by using clearance material from clearance areas. The proposed tracks (refer to Figure 43) include the closed track to the southern tip of Whalers Way; a former track aligned south of the existing main track (which has partially self-regenerated); the old track alignment previously used prior to formation of the sinkhole; and the small loop track to Blue Whale Bay (which is significantly degraded due to wind erosion and ongoing off-road vehicle damage). Rehabilitation would be planned, such as ripping of the existing base material where present, spreading of topsoil from other clearance areas to provide the seedbank, and placement of organic material on top of that to stabilise and prevent erosion until natural regeneration occurs. These rehabilitation areas will act in reducing fragmentation of vegetation within the primary Southern Emu-wren habitat.

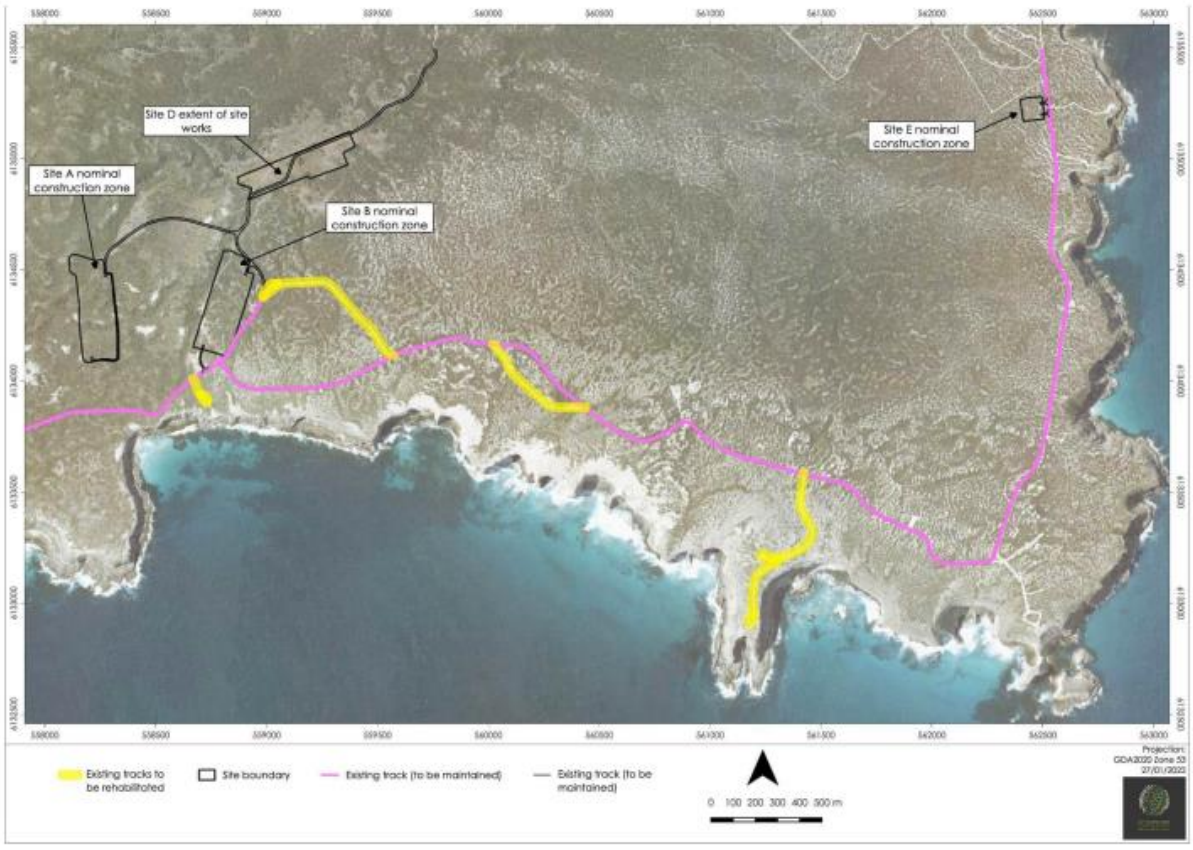



**Figure 45: Proposed track rehabilitation sites**

The Response Document (Section 2.3.5) states that the revised proposed lease boundary, increases the area for which the proponent would be responsible for improved environmental management (i.e. from approximately 1,200 ha to approximately 1,590 ha).

The Response Document (Section 4.22) also stated that Southern Launch has funded two PhD students undertaking investigations into the impact of the proposal on specific environmental values. A PhD student has commenced studies at Flinders University on the Southern Emu-Wren (Eyre Peninsula). The research will be undertaken over the next three years and seeks to understand behavioural

mechanisms driving differentiation among populations of the same species, which is important both from a conservation management point of view and to comprehend evolutionary processes. The research will assess diversity at a landscape scale and determine behavioural response differences across populations to highlight the value of conserving individual populations, including:

- updating the sub-species abundance and distributions
- assessing their behavioural response to human disturbance to highlight the potential need to mitigate disturbance
- monitoring nesting behaviour and success, based on habitat quality and human disturbance to determine current breeding trends and risks to population growth.

Overall, the thesis hopes to recognise and address new and emerging threats to the species, enhance knowledge on their ecology, update statuses and highlight the urgency for its conservation. In particular, it provides the potential to gain data on the acoustic impact on these species that does not currently exist in literature.

Southern Launch has also made a commitment to funding a student undertaking a PhD through Flinders University for raptor species. The study will investigate the ecology of a widespread and common raptor, the Nankeen Kestrel, across an urban/rural gradient in South Australia to better understand how raptors, in general, respond to human disturbances in their environment.

In regard to the *EPBC Offset Strategy – Southern Emu-wren and Mallee Whipbird (19 July 2023)* document provided by the proponent as part of the additional information requested by the State Planning Commission, the Department for Environment and Water (DEW) provided the following comments.

- Offsets proposed within a Heritage Agreement area are not supported from a state perspective.
- Habitats further away from the coast are generally not considered suitable offsets for this site. While the broad vegetation types occupied by the both species may occur within the proposed offsets, their finer-scale habitat requirements are unlikely to be met by some of the options presented (the Australian Government's conservation advice documents discuss the importance of habitat structure for both species).
- The low dense habitat structure at Whalers Way is maintained by coastal influences (e.g. salt-laden winds). These influences are not present further inland.
- The Management Plans understate the impacts to the species, in particular fragmentation and edge effects resulting from clearance within the remnant vegetation complex. These impacts cannot be mitigated.
- The offset should be more nuanced to reflect the habitat requirements of the species, and the offset sites should support habitat that is required by the listed species. The proponent should also look for sites where there are regenerationrestoration opportunities.
- New data should be available from recent Emu-wren and Whipbird surveys which could assist in informing restoration opportunities.

It should be noted that DEW supports the use of a Reserved Matter (as detailed in Section 17 of this report) to finalise environmental off-sets.

Whilst some public submissions and advice from the Department for Environment and Water express reservations about the level of increased environmental management that could be achieved and the consequential ecological benefits that may arise, this report considers there could be reasonable opportunities to counteract the potential impacts of the proposal. The Heritage Agreement area has not been the subject of environmental management practices in the past. Thus, current threatening

processes, that affect the conservation status of key species on the site, could be addressed through a long-term and sufficiently resourced environmental improvement program (especially the risk from human disturbance, introduced plant/animal species, dune erosion and fire risk). In particular, removing or substantially restricting recreational/tourism uses from the entirety of the Heritage Agreement area, could significantly reduce the level of human disturbance on the environment. It is noted that the launch facility proposal only relates to the portion of the Heritage Agreement area that the proponent intends to lease from the landowner. To extend environmental management measures over the entirety of the area would require the proponent to negotiate such an arrangement with the landowner (including the cessation of public recreation).

This type of activity is generally concentrated along the coastline where most of the threatened bird species occur. Impacts can include loss or damage to native vegetation (especially through vehicle use outside of tracks), firewood collection (and increased fire risk from campfires), noise, waste (litter and bush toilets), increased dune erosion (which can also lead to vegetation loss) and the general presence of people. The most significant impact of unmanaged recreational use is the movement of people within a natural environment (such as camping, bushwalking, sightseeing and vehicle traffic), which can interrupt the feeding and breeding activities of bird species. As a result of the COVID pandemic there has been a substantial increase in local/regional tourism, especially for nature-based experiences (as shown by the increased popularity of Eyre Peninsula tourism locations on social media sites). This has led to increased congestion and environmental impacts at popular tourism locations. For example, anecdotal evidence suggests that the temporary removal of recreational activities from Whalers Way (especially during the test rocket launch campaigns) has resulted in the reestablishment of nesting activities of the Eastern Osprey at the site, due to reduced human disturbance at a popular lookout spot.

Whilst the EIS proposed to establish a predator proof fence around the site (in conjunction with an eradication program), this is considered impractical and not cost-effective. An extensive Introduced Plant and Animal Control Program should be implemented to eradicate pest species from the site (especially rabbits, foxes and cats). The EIS proposes to undertake rehabilitation and revegetation of existing cleared or disturbed areas on the site (especially unrequired tracks, parking areas and camping areas). This report recommends that the proponent should extend the opportunities for rehabilitation to the whole of the Heritage Agreement area, through an Environmental Improvement Program, prepared in consultation with the Department for Environment and Water and the Eyre Peninsula Landscape Board.

One of the most significant threatening processes to bird populations (and the environment in general) is wildfire. The occupation of the site for a launching facility would provide a permanent human presence and surveillance over this site. Constant vigilance would be maintained which would enable any fires originating on or outside the site to be identified and controlled. In addition, an on-site firefighting capability could enable a rapid response to extinguish a fire before it spreads. Such a level of surveillance and response does not currently occur on the site. Thus, there would be a level of protection provided for threatened species populations.

It is also recommended that impacts could be further mitigated by restricting the launching of the largest (i.e. noisiest) rockets to Launch Pad B. During the early years of operation, it would also be beneficial if Launch Pad B was used as the preferred site for the majority of launches, contingent upon launch scheduling (such as if two launches are planned to occur at similar times). This would provide a greater buffer distance from Emu-wren territories. Launch activities could also be avoided during the breeding season for threatened bird species. This would be especially important during the initial period of operation, during which time the effect on bird populations could be measured to determine the response to launch events and to evaluate the long-term impact on the species. Adaptive management of launch operations could then be employed to minimise impacts.

Reservations have also been expressed about the potential benefits of the student PhD study on the Southern Emu-wren,and the bird monitoring program proposed to be implemented for the operational phase of the launch facility. The difficulty in assessing the potential impact of launch noise on the Southern Emu-wren (and Western Whipbird) is the paucity of data on the location and abundance of local and regional populations. Due to their secretive behaviour and the closed nature of their habitat it is difficult to conduct extensive surveys without investing substantial amounts of time and effort (primarily due to the need to use call-response methods). The history of bird records often reflects survey effort and coverage, with access to habitat site often restricted by the availability of roads/tracks to prospective areas. It is noted that most recordings of the species from the Jussieu Peninsula to Coffin Bay have been along the coast and where survey efforts have been concentrated, such as the Whalers Way site, the Cathedral Rocks Windfarm site and the Lincoln National Park.

The additional information provided by the proponent and the Commonwealth Conservation Advice on the species, indicates that there are substantial areas of potential habitat on lower Eyre Peninsula that do not have records of the species being present (refer to Figure 44). Thus, the current size of the population (and sub-populations) may be underestimated to a degree. The PhD study and monitoring program would present an opportunity to increase the current level of knowledge of the population and habitat preference/use. In particular, surveys of habitat away from the coast may identify the presence of the species and expand the known range and abundance of populations.

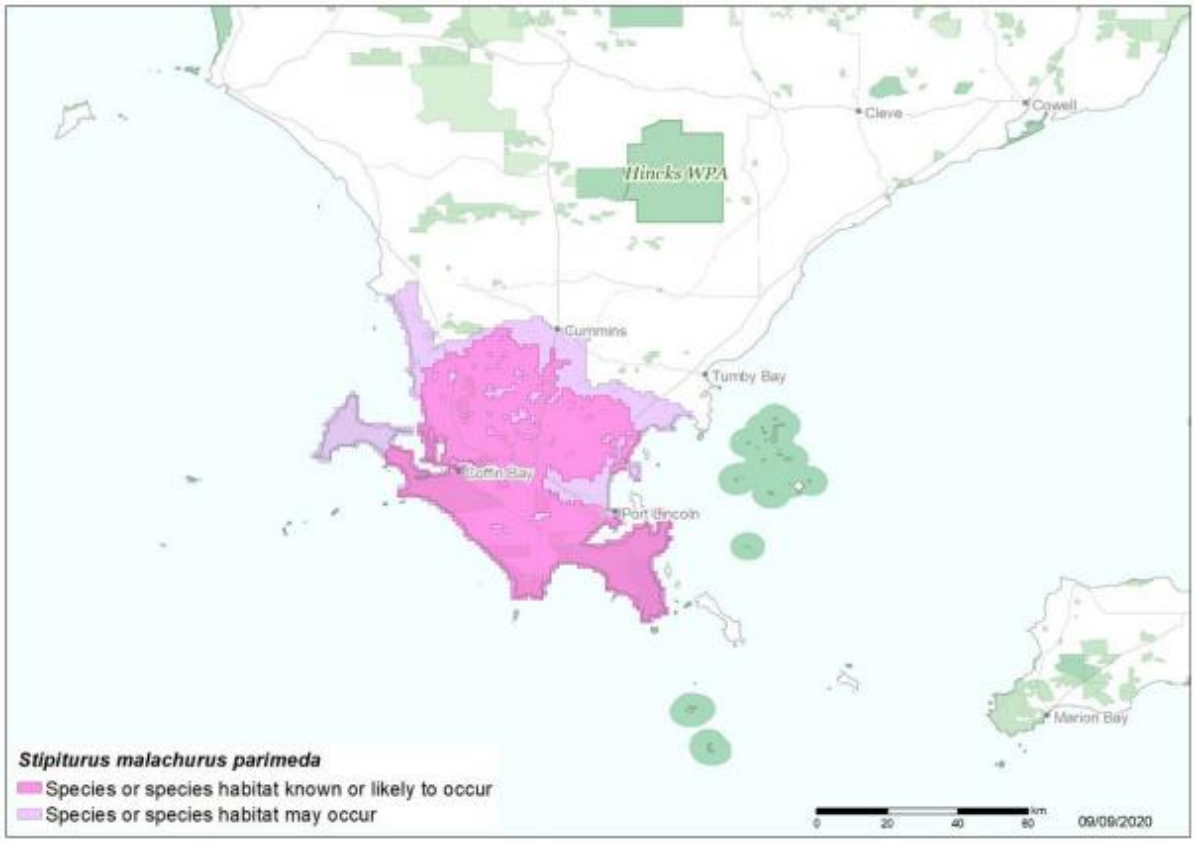



**Figure 46: Extent of Southern Emu-wren habitat where the species is known to/likely to occur or may occur (Source DCCEEW 2023).**

Whilst the student PhD study on the Nankeen Kestrel may increase knowledge about disturbance effects on raptors, it is unlikely to provide much of an understanding about the potential impact of the launching facility on more sensitive coastal raptors. In particular, the Kestrel is a relatively common species that has successfully adapted to human activities.

### 13.6.4 Matters of National Environmental Significance

Following a referral made by the proponent under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*), the proposal was deemed a 'controlled action' that requires assessment and a decision under the Act. This was due to the potential impacts upon nationally listed threatened species and communities, migratory species and communities, and Commonwealth marine areas. The determination can viewed at: http://epbcnotices.environment.gov.au/_entity/annotation/328d7b73-5a4e-ec11-80cf-00505684c137/a71d58ad-4cba-48b6-8dab-f3091fc31cd5?t=1652232083216

Based on the information provided and in consideration of the *EPBC Act Policy Statement 1.1 Significant Impact Guidelines – Matters of National Environmental Significance 2013* (Significant Impact Guidelines 1.1), it was determined there is a real chance or possibility that the action will lead to a long-term decrease in the size of an important population of a threatened species, reduce the area of occupancy of an important population, adversely affect habitat critical to the survival of a species, and disrupt the breeding cycle of an important population. It was considered that these impacts were likely to occur as a result of:

- clearing of high-quality suitable habitat, resulting in the direct loss of breeding and foraging habitat which has the potential to subsequently increase the pressure on available resources in the surrounding region, resulting in reduced breeding success, genetic isolation and population decline over time
- operational noise, vibration, dust and lighting associated with the launching of rockets at a frequency of once a week for a duration of one to two minutes. The launching of rockets will generate noise at a level that will likely impact the species up to 4-5km from the launch site.
- increased risk of fire that has the potential to result in changes to the condition of habitat, in areas surrounding the launch site, through loss of fallen timber and stags and an increase in shrub density
- injury and or death as a result of increased vehicle movement
- exposure to shockwaves
- displacement of the species from invasion of weed and pest species.

In taking a precautionary approach, it was considered there is a real or not remote chance of significant impacts to the Leatherback turtle, Loggerhead turtle, Southern Right Whale, Blue Whale and the White Shark as a result of the generation of anthropogenic noise associated with the operation of an orbital launch facility. Noise is likely to be generated during the launching of rockets, as well as noise arising from debris striking the sea surface. The way in which a species is impacted by these sounds would depend on the proximity to the source, hearing sensitivity of the species, the intensity and frequency of the noise source and the behavioural state of the species. The effects of elevated noise levels or continued exposure over time may lead to behavioural and physiological impacts to cetaceans, including displacement or avoidance of Biologically Important Areas, interruption to communication, reduced breeding success and potential physical damage (including temporary or permanent hearing impairment).

**The AR concludes that the conservation values of the Native Vegetation Heritage Agreement Area, within which the proposal is sited, would be affected by construction impacts (primarily vegetation clearance) and launch activities during operation (primarily noise during launch events and from general human disturbance). Whilst the level of disturbance would be restricted to a relatively small proportion of the coastline and would be similar to the current level of disturbance from**

**recreational/tourism use of the coast, the 'industrial' nature of the use is not generally compatible with the conservation objectives of the Heritage Agreement (nor the planning policies of the Conservation Zone). The use of already disturbed areas, to site the various components of the proposal and relocation of existing exclusion areas to encompass the site footprints, would ensure the total area of the Heritage Agreement (and the vegetation it protects) would not be diminished. The 23.4 ha of native vegetation to be cleared would be suitably offset through a Significant Environmental Benefit (SEB) under the *Native Vegetation Act 1991*.**

**The main threatened species that would be directly affected are the Western Whipbird (eastern) and Southern Emu-wren (Eyre Peninsula), due to the clearance of mainly sub-optimal habitat for these species and occasional short-term disturbance (i.e. possible hearing impairment and/or habitat displacement) from noise during each rocket launch event. Whilst a relatively small number of individual bird territories could be affected, this could be significant due to very low population numbers and the disconnected nature of critical sub-populations. Due to the uncertainties about the actual nature and level of impact, the effect on the survival rate of each species is difficult to predict. Investigation undertaken for the EIS and Response Document have improved the knowledge of each species, which would be further enhanced by the proposed ongoing monitoring programs (and the PhD study on the Emu-wren).**

**Threatened species that could also be indirectly affected are the Eastern Osprey and White-bellied Sea Eagle, due to disturbance from launch noise. At the time of the EIS, there were no active nest sites near the launch pads, although recent evidence indicates a vacated Osprey nest at Cape Wiles has now been reactivated for breeding. This is likely to be due to the recent removal of recreation/tourism activities at Whalers Way, during the test launch campaigns. Active nests in the locality are located a suitable distance away and are not likely to be significantly impacted. In particular, the site is more than a sufficient distance away to be beyond the 1,000 m breeding refuge zone suggested in the South Australian Recovery Plan for the species. If recreational activities are removed or restricted from Whalers Way, the reduced level of disturbance close to nest sites could improve the breeding success of the species. A Coastal Raptor Monitoring Program (including a comprehensive survey) would be implemented to identify whether these species are affected during operation.**

**Threatened coastal and marine species are unlikely to be significantly affected by noise during launch events or by discarded rocket debris (i.e. during the launch sequence or due to a failed launch). Fauna that use the nearby Liguanea Island (especially the Australian Sea-lion) and Sleaford Bay (especially Southern Right Whales) would be most at risk, but there is a very low probability of being impacted. The island is approximately 4 km from the site, so such a buffer distance would ameliorate any impacts. The conservation and landscape values of National Parks and Marine Parks surrounding the site would not be affected by the proposal.**

**The proposed removal of key threatening processes to the environment (and to the survival of endangered species), especially the eradication of pest species (i.e. rabbits, cats and foxes) and the removal/restriction of recreational activities, could provide suitable measures to counteract some of the impacts of the proposal. Improved environmental management of the entire Heritage Agreement Area (especially the revegetation of existing disturbed habitat) would also benefit a range of species. Measures to improve the ecological values of the area would need to be detailed in an Environmental Improvement Program.**

## 13.7 Noise and Vibration

The proposal has the potential to disturb fauna, nearby residents and visitors to the locality through the creation of noise and vibration impacts during construction and operation. In particular, each rocket launch event would produce a moderate level of operational noise over several weeks and a high level of noise for a very brief period during the launch itself. Noise impacts from rocket testing would also occur over a brief period. Vibration effects during a launch would be confined to within the launch pad. At the maximum operating scenario, the proposed facility will host in the vicinity of 36 yearly launches (one every 2-3 weeks on average), with a rocket launched at any time over a 24-hour period.

When a launch site is not occupied, the intensity of activity will typically be very low, particularly in times where no maintenance or repair work is occurring. Accordingly, the intensity of site use will vary throughout the course of the year, with times where there is no material activity on-site and only routine security present. At other times, when multiple launch sites are occupied, the level of activity will be more significant with larger numbers of staff on site. It should be noted the design of the proposal incorporates noise mitigation measures, including the water deluge system and blast wave bunding for the launch pads, which reduce noise at the source by 3-5 dB(A).
The EIS (Section 8) included investigations into the noise and vibration sources associated with the proposal and the potential impacts on sensitive receptors and the existing environment. Baseline conditions were defined, including the identification of sensitive receivers (i.e. closest residents) and characterisation of the existing acoustic environment. A study area up to 5 km from the site (i.e. allotment boundary) was adopted. An extensive review of available literature informed the assessment of potential impacts on fauna.

The closest residents are located at Fishery Bay and are approximately 3.5 km from the closest launch site and 2.45km from the Infrastructure Site D (refer to Figure 45).


**Figure 47: Location of sensitive receivers (R1-3) and noise monitoring sites (Source: RD – Figure 3.9)**

Unattended noise monitoring was undertaken at five sites within the survey area, for a period of up to two weeks to quantify the existing noise environment at these locations. Existing noise levels were monitored and reported with reference to the following descriptors.

- $L_{A90}$ noise level: The noise level that is exceeded for 90 per cent of a specified assessment period. Commonly referred to as the background noise level.
- $L_{Aeq}$ noise level: The noise level that is the average energy equivalent of noise measured within a specified assessment period. This descriptor is typically used to quantify industrial noise and to assess environmental noise impacts.
- A 15-minute assessment period is typically used for environmental noise assessments in accordance with the Environment Protection (Noise) Policy 2007.

The existing noise levels were measured with reference to Australian Standard 1055:2018 - Acoustics - Description and Measurement of Environmental Noise.

The background noise levels within the study area were identified as low and typical for rural and remote areas, with low residential density and little exposure to transportation or industrial noise (refer to Tables 4 and 5). The local acoustic environment is predominantly influenced by weather-induced noise, such as wind interaction with vegetation. Other noise sources are a result of insect and fauna activity.

| SITE | DESCRIPTION | MEASURED $L_{A90}$ NOISE LEVEL, dB(A) | |
|---|---|---|---|
| | | DAY | NIGHT |
| 1 | Low mixed Mallee | 24 | 32 |
| 2 | Low mixed Mallee | 23 | 30 |
| 3 | Low mixed Mallee | 23 | 26 |
| 4 | Open shrubland | 27 | 35 |
| 5 | Very low shrubland | 24 | 30 |

**Table 4: Background noise monitoring results - average measured $L_{A90}$ noise level (Source: EIS Table 8.3)**

| SITE | DESCRIPTION | MEASURED LAEQ NOISE LEVEL, DB(A) | |
|---|---|---|---|
| | | DAY | NIGHT |
| 1 | Low mixed Mallee | 42 | 37 |
| 2 | Low mixed Mallee | 38 | 33 |
| 3 | Low mixed Mallee | 39 | 30 |
| 4 | Open shrubland | 46 | 41 |
| 5 | Very low shrubland | 51 | 48 |

**Table 5: Ambient noise monitoring results - average measured $L_{Aeq}$ noise level (Source: EIS Table 8.3)**

The EIS noted a key observation from the noise monitoring was that the night-time background noise levels are greater than the day-time background noise levels, at all locations. Reasons for this have not been established, although it is possible for this to be caused by insects or birds.

It should also be noted that along the coastline the background noise profile previously would also have included sources associated with tourism and recreation, especially from vehicles and human activity.

Relevant policy, guidelines and legislation was reviewed to establish the parameters for acceptable and unacceptable noise and vibration criteria, which were used to assess the impacts from various noise sources. The criteria were derived from various policy and legislative instruments and local, national and international standards, including:

- South Australian *Environment Protection Act 1993* and Environment Protection (Noise) Policy 2007 – used for noise from day-to-day facility operations
- Australian Standard 2436-2010 Guide to noise and vibration control on construction, demolition and maintenance sites
- United States Federal Aviation Administration (FAA), 14 CFR Part 150 - Airport Noise Compatibility Planning (2018) – used for noise from launch activities (including rocket testing).

Having regard to the nature of the surrounding allotments containing dwellings and the adjacent land uses, the land containing sensitive receivers in the locality was categorised as Rural Living to set the noise criteria (as per Table 6).

| DESCRIPTION | NOISE GOALS | |
|---|---|---|
| | Day | Night |
| Indicative noise factor for Rural Living | 47 | 40 |
| Background plus 5 dB | 29 | 36 |

**Table 6: Noise criteria for the locality**

In accordance with the EPA Noise Policy, the criteria were set at:

- $L_{Aeq\ 15\text{-}min}$ 42 dB(A) - Daytime hours (7:00 am and 10:00 pm on the same day).
- $L_{Aeq\ 15\text{-}min}$ 35 dB(A) - Night-time hours (10:00 pm on one day and 7:00 am on the following day).

The source, location, duration and timing of activities that may cause an impact were determined and the level of noise or vibration produced by each activity at the identified sensitive receptors was calculated. The predicted noise levels were then compared to the assessment criteria relevant to each activity. Mitigation methods for managing noise and vibration impacts were considered where levels may exceed the assessment criteria.

Noise from construction activities and the day-to-day operation of the launch facility was calculated assuming geometric spreading of sound from each noise source. Vibration levels were predicted using empirical formulae that accounts for the distance between vibration source and receptors. Assumptions were made, where necessary, in terms of estimations of the noise level, location, duration and expected operation of noise sources.

Noise levels produced by the engine and exhaust during launches and rocket testing events were predicted using the RUMBLE computer modelling package, which is an acoustic simulation model designed to evaluate the far-field environmental noise impacts from commercial space rocket launch activities. The primary objective of RUMBLE is the prediction of environmental consequences associated with noise from launches. The model generated a series of noise contour maps for each launch site, for various noise measurements. The software is approved by the United States Federal Aviation Administration and considered suitable to use during the development stage of the project. It has been recently used for environmental assessments, including the SpaceX DragonFly Vehicle at the McGregor test site in Texas.

The computational models have relied on noise data that is not specifically oriented to rocket launches and has therefore applied other forms of aircraft and noise sources, which has limited applicability. This has been compensated for by adding substantial layers of conservatism to the models. Thus, the results are considered to be conservative, as the noise levels produced by the smaller (i.e. quieter) rockets planned for use, have not been considered for the worst-case scenarios modelled.

Predicted noise levels due to rocket launch and testing operations were described using the following acoustic descriptors:

- Day-Night Average Sound Level (DNL);
- Maximum A-weighted Sound Level ($L_{Amax}$);
- Maximum unweighted Sound Level ($L_{max}$);
- A-weighted Sound Exposure Level ($L_{AE}$); and
- Unweighted Sound Exposure Level (LE).

It should be noted the Environment Protection (Noise) Policy 2007 indicative noise levels are based on $L_{Aeq}$ noise levels.

Table 7 provides a general description of various noise measurements.

| TERM | DEFINITION |
|---|---|
| **dB** | Decibel – the measurement unit of sound. |
| **dB(A)** | Decibel (A-weighted) - an expression of the relative loudness of sounds in air as perceived by the human ear. |
| **dB(L)** | Decibel (Linear weighted) – a sound level frequency weighting, linear over a frequency range. |
| $L_{Aeq}$ | Ambient noise – all noise at a certain point from all noise sources far and near. |
| $L_{90}$ | Background level – the underlying noise level present in the ambient noise when extraneous noise is removed. |
| $L_{A90}$ | Arithmetic average background level – average background levels for each hour during a period of the day during which an activity typically operates. |
| $L_{eq}$ | Equivalent (energy average) noise level measured over a time period – A noise descriptor commonly used in environmental noise policies and assessments. The relevant time period is often included in the subscript (i.e., $L_{eq,\ 30min.}$). |
| $L_{max}$ | The maximum sound level recorded over the measurement period. |
| $L_{Amax}$ | The maximum A-weighted (dB(A)) sound level recorded over the measurement period. |
| **SEL** | Sound Exposure Level – a measure of the total acoustic energy transmitted to the listener during an event. |

**Table 7: Noise measurement descriptions**

A literature review was undertaken to determine the risk of adverse behavioural or physiological effects on sensitive receptors from sonic booms based on the location and intended direction of the launches. A sonic boom is caused by launch vehicles reaching velocity faster than the speed of sound (supersonic). The EIS (Section 8.4.6.4) states that supersonic speeds are assumed to occur approximately 3.0 kilometres from the coast during vehicle ascent over the ocean and are typically directed in front of the vehicle, with the boom occurring some distance downrange of the launch site. The small rockets to be used would limit the size of sonic boom being created. Hence, the overpressure produced by the sonic boom is not expected to exceed the assessment criteria of 133 dB(L) on land. The audible component of a sonic boom may result in a short duration startle response.

The EIS acknowledges the proposal is a novel form of development that has not occurred previously in Australia and has only occurred in a very limited number of locations across the world. No literature exists on the effect rocket launch noises have on the specific fauna found at the tip of the Eyre Peninsula. The investigation relies on computational models to predict the noise and vibrations generated during a rocket launch event and ecological studies have subsequently considered the effect these modelled impacts would likely have on the local fauna species.

Regarding the potential impacts on wildlife, studies were undertaken to determine the terrestrial and marine native fauna populations likely to be present in the area in order to predict the significance of likely noise and vibration impacts on these populations. The analysis conducted considered:

- Wildlife response to noise.
- Wildlife impacts during construction and operation.
- Exposure to shockwaves.
- Underwater impacts.
- Ground vibration.

Impacts on specific threatened species that are known or likely to occur within the footprint of the proposal were also considered, especially the Western Whipbird (Eastern) and Southern Emu-wren (Eyre Peninsula).

A desktop study was undertaken of relevant scientific research that describes the impacts of rocket noise on humans. This step was considered important as there are no standards, regulations and/or guidelines available for assessing airborne noise and ground vibration from rocket launch activities in Australia. The study found that all the noise assessments undertaken for new and modified launch facilities referenced the United States Federal Aviation Administration (FAA) Order 1050.1F (FAA, 2018). This policy specifies Day-Night Average Sound Level (DNL) as the standard metric for community noise impact analysis of rocket launch facilities. The DNL describes the daily noise energy exposure based on annual aviation activities. The DNL is calculated using a person's cumulative exposure to sound over a 24-hour period, expressed as the noise level for the average day of the year on the basis of annual operations. The metric incorporates a 10-dB penalty for noise at night to account for increased human sensitivity to noise between 10.00 pm and 7.00 am.

The FAA defines a "significant impact" due to aviation noise as a sensitive location exposed to noise greater than a DNL of 65 dB(A). The FAA notes that the application of this criterion should be considered carefully when determining the noise impact in areas of low existing noise levels. Accordingly, additional noise metrics were considered to help identify the potential impacts in a quiet rural environment. Where noise sources are in motion, for example an aircraft/rocket, the noise level changes over time. For a rocket launch, the maximum A-weighted sound pressure level ($L_{Amax}$) is used to describe the maximum level that would be produced during a launch. The $L_{Amax}$ can be a helpful metric for describing the possible disturbance to conversation, sleep or other common activities due to a noise event.

The Sound Exposure Level ($L_{AE}$) was also identified as another suitable metric as it represents the intensity and duration (total acoustic energy transmitted to the listener) of a single noise event. This parameter can also be used to calculate other energy-based acoustic metrics (e.g., $L_{Aeq\ 15min}$) using a single logarithmic subtraction.

The Response Document (Section 3.1) states that, since the exhibition of the EIS, there has been a significant volume of further work to better understand the noise and vibration impacts of the proposal. The test launch campaign had proceeded, with the first launch being undertaken. Whilst the first launch attempt did not result in the successful launch of a vehicle, a representative noise source occurred and provided additional understanding of the noise and vibration impacts. The modelling software (RUMBLE) has also been updated, including additional vehicle options and refined information to generate acoustic outputs.

Launch Site A has also been relocated, primarily to reduce the ecological impact, which has resulted in an alteration of the noise impacts through the relocation of key noise sources. Consequently, the

Environmental Assessment Report – Noise and Vibration in the EIS has been revised to include the updated modelling, the outcomes of the test launch campaign and the revised location for Site A. The improved modelling also provided a more realistic acoustic prediction of the transmission of noise from air to water and the specific impact on marine mammals and other marine fauna.

Two further packages of work were undertaken for the RD (Appendix C), comprising:

- Monitoring of the static rocket motor engine testing for the first stage of the Hapith I at a site in Queensland.
- Review and further interrogation of the RUMBLE software to determine the ability of the software to accommodate and model a vehicle, which better represents the worst-case scenario for rocket launch from the site, recognising that the previously modelled worst-case vehicle was the Space X Falcon 9, which is four times larger than the largest vehicle that would ever be launched from the site. A more appropriate vehicle was modelled, being the Avio Vega (mass of 137 tonnes), supplementing the previous models of the Blue Origin New Shephard (mass of 75 tonnes) and the Space X Falcon 9 (mass of 549 tonnes).

RUMBLE 3.0 includes several updates that improve the functionality of the software over the version used for the EIS (RUMBLE 2.0). The updates include:

- An expanded database of default rockets available for modelling.
- Updates to the rocket noise source levels and characteristics.
- Bug fixes and general improvements.

The software update has resulted in changes to the modelled noise level when compared to the EIS. A majority of the levels presented are slightly higher (up to 3 dB) than those previously presented for the Falcon 9 rocket. The exception being the calculated SEL that is notably higher (more than 10 dB) for the updated assessment. This has been attributed to the improvements to the software calculation module for this rocket.

It should be noted the Blue Origin New Shephard is slightly smaller than the largest rocket that would occasionally be launched, so is a close representation of the upper bounds of the size of vehicle to be launched from the proposed facility. Rockets expected to be launched would generally be relatively small in size, as indicated in Table 8.

| ROCKET | STATUS | MANUFACTURER | HEIGHT (M) | DIAMETER (M) | WET MASS (KG) | FIRST STAGE THRUST (KN) | LAUNCH LIKELIHOOD |
|---|---|---|---|---|---|---|---|
| **SS-520** | Active | JAXA | 9.7 | 0.52 | 2,600 | 176 | Regularly |
| **Electron** | Active | Rocket Lab | 17 | 1.2 | 12,500 | 225 | |
| **Miura 5** | Under Development | PLD Space | 25 | 1.8 | 32,000 | 408 | |
| **Firefly Alpha** | Active | Firefly Aerospace | 29 | 1.82 | 54,000 | 736 | |

**Table 8: Comparative rocket types (Source: RD Table 3.6)**

The RD (Section 3.5.16) stated that a bespoke Noise Monitoring Program would be implemented to collect ongoing data associated with launches, which will underpin the ongoing ecological monitoring

and assessment, including terrestrial based noise monitoring as employed for the first test launch (including noise monitoring on Liguanea Island and the placement of hydrophones to gain additional information in respect of underwater conditions during the launch).

For ongoing operations, permanent noise monitoring equipment would be installed on the site, which is proposed to be located adjacent the launch pads. A minimum of two further noise monitors would be placed at distances of nominally 1 km kilometre and 5 km kilometres from the sites. The monitoring equipment would be permanently powered and telemetered so as to provide noise data which is available in as close to real time as possible. The proponent would share the noise data with the EPA (and other relevant regulators) and summarised data with the public on an ongoing basis to ensure clear visibility of the noise generated by permanent operations on the site.

### Test Launch Noise Monitoring

Acoustic monitors for the test launch were set up in eight locations, with vibration monitors in four locations (refer to Figure 46). During the period the monitors were deployed, two were stolen. One monitor had corrupted data, which was unable to be downloaded, meaning that data was available from five of the eight acoustic monitors. Vibration data was available from two of the four vibration monitors.

A test launch of the Hapith I rocket occurred on 16 September 2021 from the temporary Pad 1. During the launch attempt only one of the four engines completed ignition and produced launch thrust, with less than full launch thrust being produced before the launch was aborted. Noise and vibration measurements were undertaken during this event to verify the levels in the surrounding environment and at residences closest to the site during launch (refer to Tables 9 and 10).


**Figure 48: Location of monitoring sites where data was collected (Source: Response Document Figure 3.1)**

| SITE | APPROXIMATE DISTANCE FROM LAUNCH SITE | MEASURED SOUND PRESSURE LEVEL, DB | | | |
|---|---|---|---|---|---|
| | | S2 Main Valve Open | | S2 Tank Rupture | |
| | | LAeq(1-min) | LAmax | LAeq(1-min) | LAmax |
| 2 | 900 metres | 65 | 71 | 69 | 79 |
| 4 | 1.7 kilometres | 62 | 74 | 64 | 88 |
| 5 | 3.0 kilometres | 43 | 49 | 44 | 54 |
| 7 | 2.1 kilometres | 61 | 68 | 56 | 68 |
| 8 | 6.2 kilometres | 62 | 66 | 65 | 69 |

**Table 9: Measured sound pressure level (Source: RD Table 3.15)**

| LOCATION | MAXIMUM MEASURED PEAK PARTICLE VELOCITY (PPV, mm/s) |
|---|---|
| | Test launch |
| Site 4 | 0.3 |
| Site 7 | 0.15 |

**Table 10: Measured vibration levels (Source: RD Table 3.16)**

Vibration measurements during the period of the launch indicated that the vibration was slightly above the measured average baseline levels. Levels at the magnitudes measured indicate that vibration-induced structural damage is unlikely to be a notable risk at residential receptors.

The Response Document stated that the EPA undertook noise monitoring during the rocket firing event on 15 September 2021 when the rocket was able to reach the stage of the igniters firing before aborting before fuel was engaged (at approximately 100 m from the rocket). Sound pressure levels measured during this activity were typically between 90 dBA and 105dBA with an $L_{Amax}$ of 109 dBA. TiSpace also undertook noise monitoring at the launch pad and inside the vehicle during rocket firing, with the levels recorded representing the highest level measured for each event before and after ignition (refer to Table 11).

| EVENT | COUNTDOWN T-ss | ACOUSTIC VALUE INSIDE LAUNCHER (dB) | ACOUSTIC VALUE ON RIGHT SIDE OF LAUNCHER (dB) |
|---|---|---|---|
| Before | ~ | 73 | 65 |
| Automatic Flight Mode | T-31 to T-25 | 71 | 65 |
| Activate Launcher Water Deluge System | T-24 to T-14 | 94 | 82 |
| Start S2 Ignition Command | T-13 to T-3 | 108 | 117 |
| S2 Main Valve Open | T-2 to T+1 | 108 | 135 |
| FTS Abort Command | T+2 to T+6 | 111 | 137 |

**Table 11: TiSpace measured noise levels 15 September 2021 (Source: RD Table 3.17)**

Based on the monitoring results, the noise contours were modelled in the Response Document (refer to Figure 47).

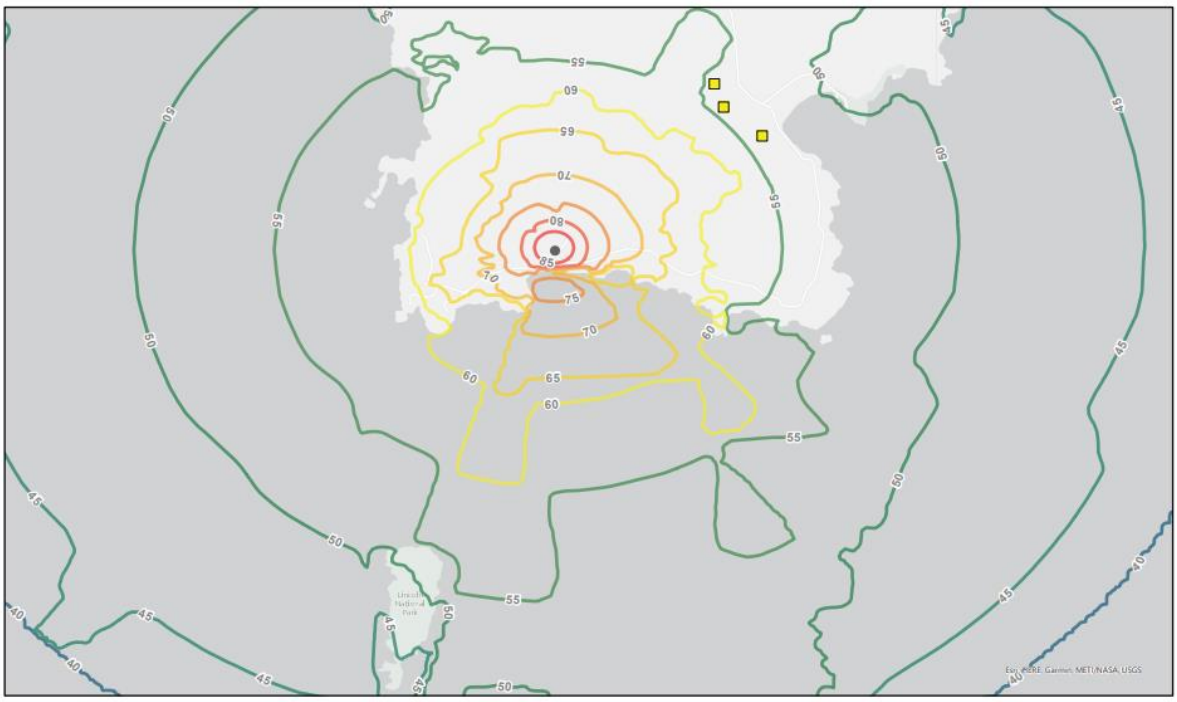



**Figure 49: Test Launch noise contours (Source: RD Figure 3.10)**

The RD also stated that visitors located within the site, approximately 3km from the launch, anecdotally reported that the test launch activities could not be heard.

### Static Rocket Motor Test

A static motor test of a Hapith 1 rocket was also undertaken at a launch site in Queensland in June 2022. As the motor test was for the engines of the same rocket being used in the test launch campaign, this test provided an opportunity to gain further empirical data in respect of the noise generated and the propagation of that noise at various distances from the motor test stand. In a similar manner to the test launch campaign, the data collected provided an opportunity to verify the computational modelling undertaken to predict the noise generated at the proposed facility. Eight noise monitors were deployed at various locations from the test to measure Unweighted and A-Weighted maximum ($L_{Max}$/ $L_{Amax}$) and Sound Exposure ($L_E$ / $L_{AE}$) levels. The results are presented in Table 12).

| LOCATION | UNWEIGHTED, DB | | A-WEIGHTED, DB(A) | | NOTES |
|---|---|---|---|---|---|
| | Lmax | LE | LAmax | LAE | |
| N1 | 120 | 121 | 112 | 116 | |
| N2 | 104 | 110 | 97 | 106 | |
| N3 | 73 | 83 | 65 | 75 | |
| N4 | 67 | 78 | 52 | 66 | |
| S1 | 115 | 122 | 107 | 122 | |
| S2 | 90 | 94 | 82 | 94 | Influenced by truck pass-by during test |
| S3 | - | - | 64 | 76 | |
| S4 | - | - | - | - | No data – equipment fault |

**Table 12: Engine testing noise levels (Source: RD Table 3.21). It should be noted that Site S1 was 62m from the engine, N1 120m, N2 500m, S3 2km and N4 6km (Source: RD).**

The Response Document compared the data with the predicted RUMBLE modelling noise levels and considered them to be similar in terms of the $L_{Amax}$ measurements, with the measured levels less than those predicted. It was concluded that the RUMBLE software provides a suitable predictive model for the noise levels of rocket launches. At larger distances and/or where there is shielding of the line of sight from topography or noise barriers, the measurement results were consistently less than predicted. These results were expected, since the RUMBLE model does not account for topography and shielding. This shows another degree of conservatism in the modelling and indicates that topography and native vegetation at the Whalers Way site may reduce noise levels to some extent.

### 13.7.1 Construction Noise

The EIS (Section 8.4.1.1) identified all noise sources associated with construction activities, as detailed in the Noise and Vibration Assessment (EIS: Appendix O). The noise producing construction activities include:

- site preparation
- utility construction (including ground compaction)
- foundations
- structural works
- testing and commissioning
- roads, landscaping, and reinstatement.

The types of vibration-intensive construction activities considered included drop hammer, excavation, hydraulic jacking rig, pile boring and vibratory rig.

The EIS determined that the construction activity with the greatest potential to impact on sensitive fauna and human settlements was utility construction works, with ground compaction being the noisiest feature (refer to Table 13). The noise levels likely to be experienced at the nearest residence to the site during utility construction was calculated to be less than 51 dB(A), which is compliant with the noise criteria under the Environment Protection (Noise) Policy 2007 (Noise EPP). All works would be conducted between Monday and Saturday between the hours of 7:00 am to 7:00 pm, during which times no noise limits apply under the Noise EPP if all reasonable and practicable steps to reduce noise have been undertaken.

| ACTIVITY REFERENCE | CONSTRUCTION WORKS | SOUND PRESSURE LEVEL, LAeq, dB(A), AT DISTANCES FROM SOURCE | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 25m | 50m | 100m | 200m | 500m | 1000m | 2000m |
| C1 | Site preparation | 78 | 72 | 66 | 60 | 54 | 48 | 42 |
| C2 | Utility construction | 83 | 77 | 71 | 65 | 59 | 53 | 47 |
| C3 | Foundations | 78 | 72 | 66 | 60 | 54 | 48 | 42 |
| C4 | Structural works | 75 | 69 | 63 | 57 | 51 | 45 | 39 |
| C5 | Testing and commissioning | 73 | 67 | 61 | 55 | 49 | 43 | 37 |
| C6 | Roads, landscaping and reinstatement | 77 | 71 | 65 | 59 | 53 | 47 | 41 |

**Table 13: Modelled construction noise levels and impact set back distances (Source: RD Table 3.8)**

Although construction noise is likely to be audible at times, it was considered unlikely that construction noise would present a significant impact to the existing acoustic amenity at the closest residential locations, especially as good practice construction methods would be adopted. Vibration impacts are also expected to be limited to within 100 m of the work area and were considered unlikely to disturb humans at any stage of construction.

Regarding impacts on wildlife, typically noise levels above 93 dB(A) could potentially result in temporary hearing loss, auditory fatigue, masking of environmental noise, and behavioural and/or physiological effects in birds. This results in a temporary shift in the auditory threshold (known as a temporary threshold shift), where the birds ear sensitivity will decrease as a measure of protection. Ground compaction during utility construction is expected to exceed 93 dB(A) at distances approximately 10-20 m from the works. At a greater distance from the works (approximately 1 km), it is expected that construction noise levels may be up to 20 dB above the ambient noise level. Continuous noise at 20 dB above background levels may temporarily mask the detection and discrimination of vocal communication signals between birds. Potential behavioural and/or physiological effects are noted as possible in any case where construction noise is audible. This includes both construction activities that produce short bursts of impulsive noise and the continuous noise. Noise impacts on native fauna are further discussed in Section 14.7.3.

### 13.7.2 Operational Noise

The key noise generating activities associated with the general operation of launch-supporting infrastructure include building generators, workshop activities, lifting cranes and truck movements. Noise during rocket launch and testing events can be attributed to the engine and exhaust noise produced during launches. It should be noted that the largest rockets would only be launched from Site A, which has now been relocated closer to Site B.

A sonic boom occurs when a rocket reaches a velocity faster than the speed of sound (supersonic). Air overpressure and noise are products of a sonic boom. Air overpressure is often perceived by humans and animals as ground vibration and can cause windows to rattle and other building elements to shake. The audible component of a sonic boom may sound similar to a distant thunderclap.

Ground vibration during launches is expected to be limited to the launch sites and the buildings supporting the launch. No evidence of damage or significant disturbance through ground vibration was identified during a literature review on typical launch and testing impacts.

### General Noise from Facility Operation and Activities

The EIS considered building generators to be the loudest component of the supporting infrastructure and would produce a noise level of 62 dB(A) at a distance of 25 m from the site of the generator, reducing at various intervals to a level of 20 dB(A) at 1 km from the site of the generator.

The closest residential dwelling is approximately 2.4 km away from Infrastructure Site D, so operational noise from supporting infrastructure is likely to be inaudible at the nearest sensitive receiver (refer to Table 14). In respect to impacts on animals, a noise level of 62 dB(A) within 25 m of the building generator is below the continuous noise level threshold of 93 dB(A) for causing temporary threshold shifts in birds. It is considered therefore that the risk of operational noise impacts from supporting infrastructure is minimal and would be limited to the temporary masking of communication signals and/or a brief behavioural response.

| CONSTRUCTION WORKS | SOUND PRESSURE LEVEL, dB(A), AT DISTANCES FROM SOURCE | | | | | | |
|---|---|---|---|---|---|---|---|
| | 25m | 50m | 100m | 200m | 500m | 1000m | 2000m |
| Building generators | 62 | 56 | 49 | 40 | 29 | 20 | <20 |
| Workshop activity | 59 | 53 | 48 | 38 | 25 | <20 | <20 |
| Lifting crane | 61 | 54 | 47 | 37 | 26 | <20 | <20 |

**Table 14: Setback distances and estimated noise levels from typical site facilities and supporting infrastructure (Source: RD Table 3.9)**

In addition to fixed supporting infrastructure, truck movements within the site would also produce noise. It was assumed that 16 truck movements per week could be expected. The maximum ($L_{Amax}$) noise produced by a single truck is approximately 85 dB(A) at 10 mfrom the vehicle. Noise levels produced by truck movements was also considered unlikely to cause temporary threshold shifts in birds and unlikely to be audible or cause significant noise impacts at the closest residential dwelling.

### Noise from Launches and Rocket Testing

Maximum external noise levels ($L_{Amax}$) of up to 101 dB(A) and 95 dB(A) for each scenario were calculated outside the residential properties closest to Launch Site B. Noise at this level is likely to be of short duration (i.e. seconds) when a launch vehicle is close to the ground at the beginning of a launch. This level would decline after launch due to the gradual decrease in energy output from the rocket and increase in altitude. A lower audible sound associated with the rocket engine may persist after the launch (approximately 1 – 2 minutes) under quiet conditions, such as a night time launch.

The modelling indicated that noise from launches and testing would temporarily alter the quiet setting of the natural environment for 1 - 2 minutes during launches and for up to 15 seconds during testing on the pad. Controlled rocket engine testing would be undertaken up to 10 times per year (between 7.00 am and 10.00 pm) at Launch Site A, with each test expected to occur for approximately 2.5 minutes. These events have the potential to disturb nearby residents and wildlife. During the evening and night, the internal levels within a typical residential building during a launch would likely be high enough to disturb sleep. Noise during a day launch or test may also be at an annoying outdoor level for a brief period (less than one minute). For context, a comparable level of sound could be experienced by standing close to a train pass by or below an aircraft flyover at low altitude.

The Response Document contained updated noise modelling results for the revised design of the proposal, using improved input parameters. The likely noise levels experienced at the closest residential properties is detailed in Tables 15 and 16. The modelled noise contours for different noise types are shown in Figures 48 to 50 (noting that only Launch Site B was used). This assessment should be considered conservative as the noise levels produced by the smaller (i.e. quieter) rockets planned for use have not been considered for these worst-case scenarios.

| LOCATION | LAUNCH FROM SITE A | | | LAUNCH FROM SITE B | | | DAY-NIGHT AVERAGE SOUND LEVEL (DNL) |
|---|---|---|---|---|---|---|---|
| | LAmax | Lmax | LAE | LAmax | Lmax | LAE | |
| Residence 1 | - | - | - | 96 | 112 | 117 | 62 |
| Residence 2 | | | | | | | |
| Residence 3 | | | | | | | |

**Table 15: Sensitive receptors near launch activities - Vega rocket (Source: RD Table 3.13)**

| LOCATION | LAUNCH FROM SITE A | | | LAUNCH FROM SITE B | | | DAY-NIGHT AVERAGE SOUND LEVEL (DNL) |
|---|---|---|---|---|---|---|---|
| | LAmax | Lmax | LAE | LAmax | Lmax | LAE | |
| Residence 1 | 93 | 104 | 120 | 95 | 105 | 121 | 57 |
| Residence 2 | | | | | | | |
| Residence 3 | | | | | | | |

**Table 16: Sensitive receptors near launch activities - New Shepard rocket (Source: RD Table 3.12)**

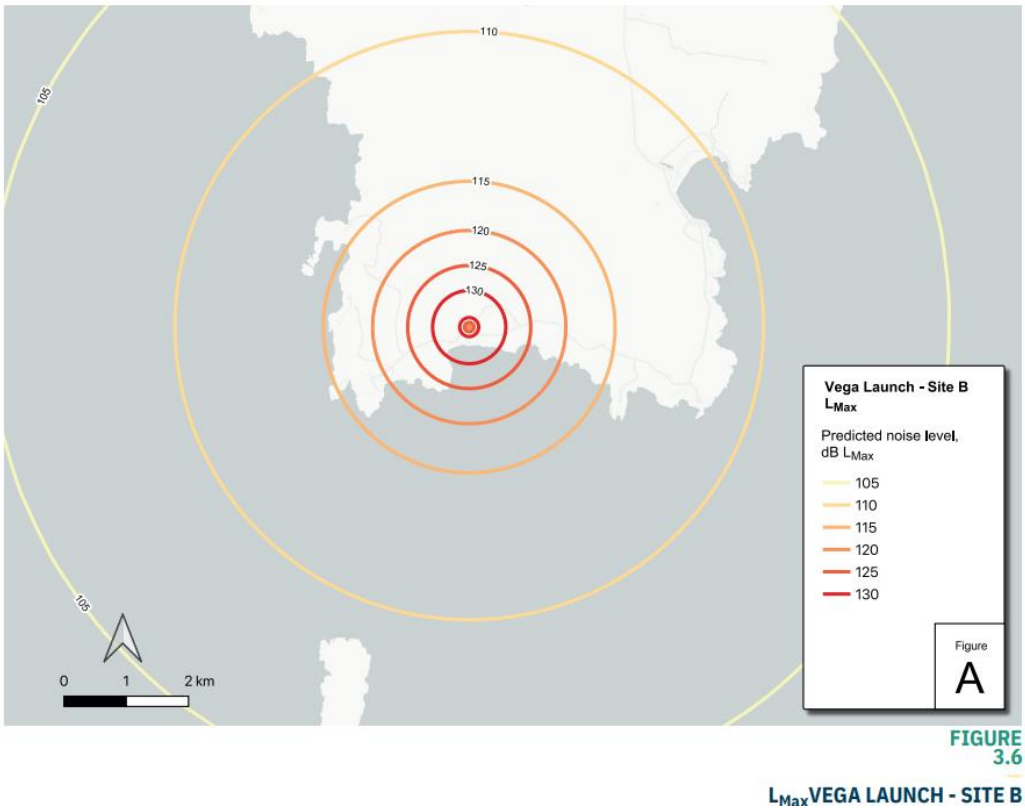



**Figure 50: $L_{Max}$ noise contours for the Vega Rocket**

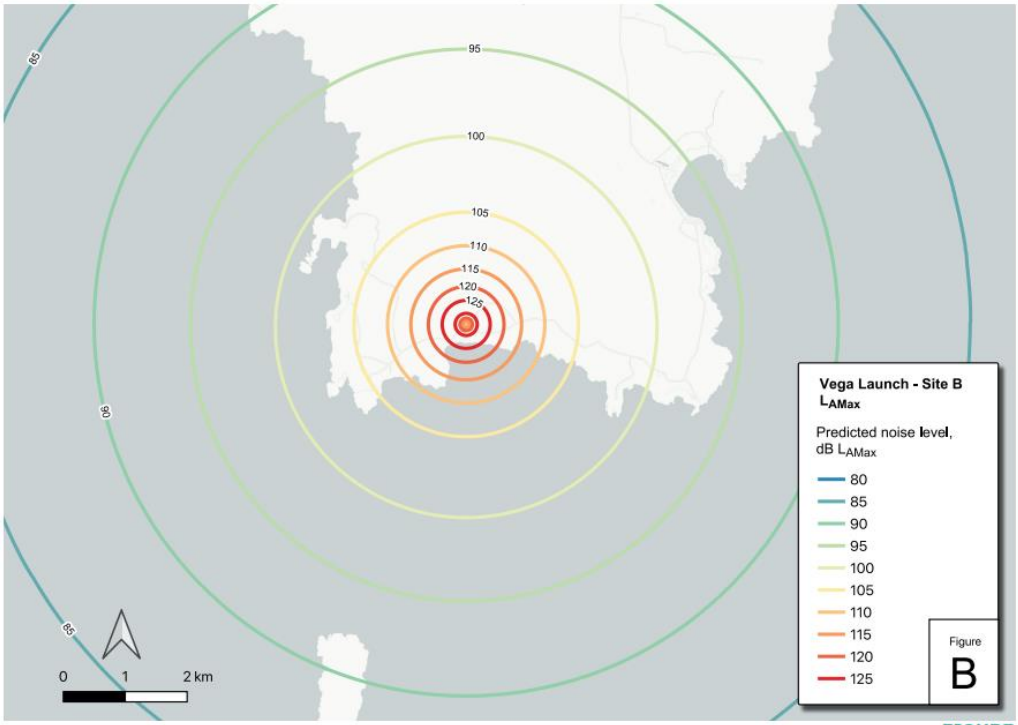



FIGURE 3.7

$L_{AMax}$ VEGA LAUNCH - SITE B

**Figure 51: LAMax noise contours for the Vega Rocket**

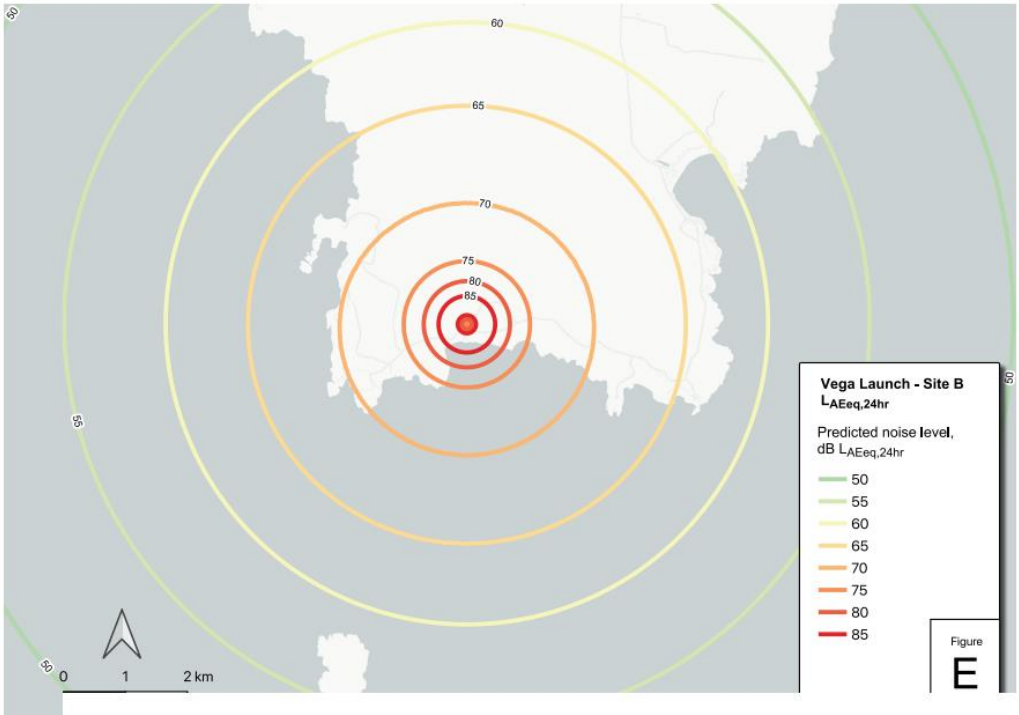



FIGURE 3.8

$L_{AEeq,24hr}$ VEGA LAUNCH - SITE B

**Figure 52: LAEeq,24hr noise contours for the Vega Rocket**

The Response Document (Section 3.5.6) stated the cumulative noise exposure (DNL) from the proposed ultimate operating scenario (conservatively based on 42 yearly launches) is predicted to be equal to the proposed assessment criterion of DNL 65 dB(A) for the worst-case scenario where all rockets are either Falcon 9 or the New Shepard rocket (refer to Figure 51). If only New Shepard rockets were used, the predicted DNL value would be below 60 dB. Achieving a DNL at or below 65 dB(A) indicates that the overall level and frequency of launch activities are less likely to cause a significant community response to noise, as per FAA recommendations. It should be noted this noise measurement is comparable to the yearly operation of an airport.

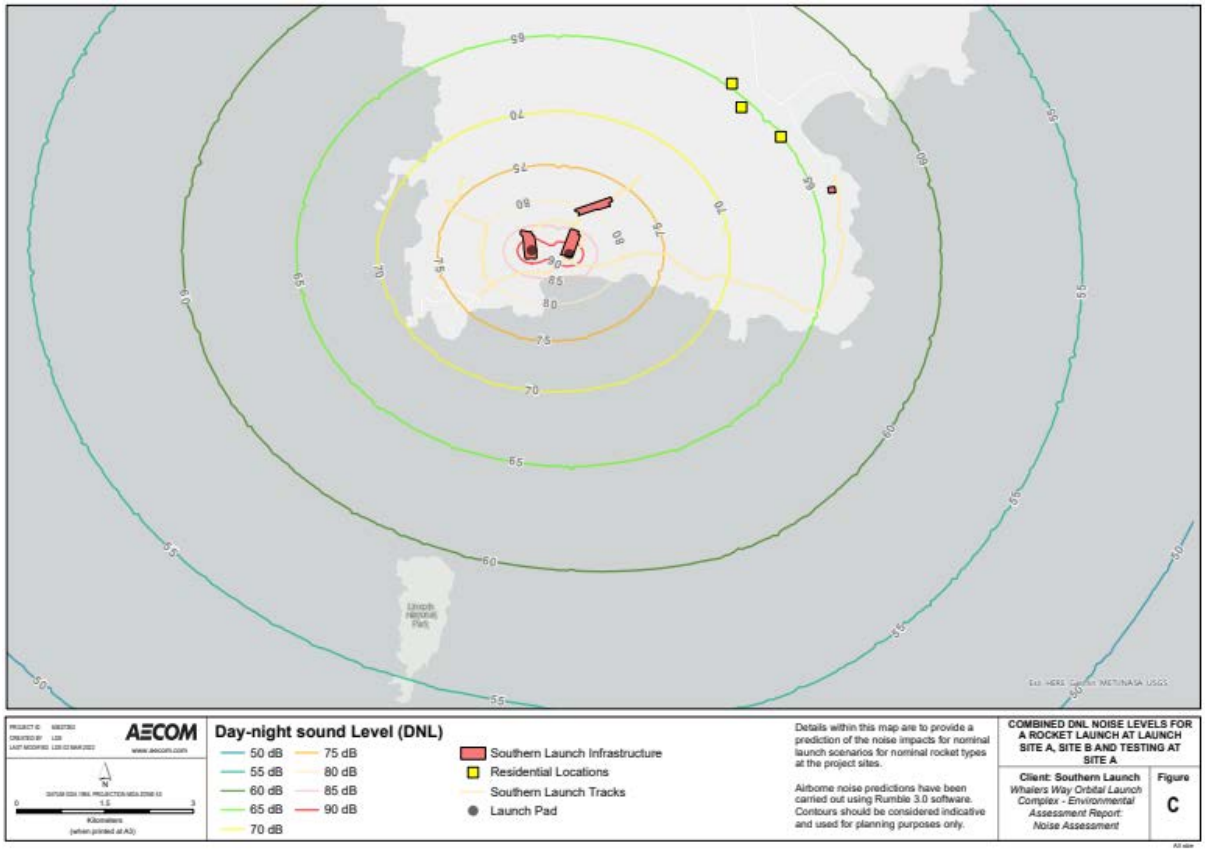



**Figure 53: Modelled combined noise (DNL) levels (Source: RD Appendix B)**

It should be noted the noise levels modelled were considered a conservative approximation based on the information available at the time of the assessment. Furthermore, the noise reduction from the mitigation measures incorporated into the launch pad design (i.e. water deluge and blast walls that reduce noise by 3 - 5 dB(A) at the source) have not been included within the results due to limitations of modelling software.

The literature review undertaken for the EIS found that maintaining a level below a peak of 133 dB(L) would minimise the chance of damage to buildings and structures, and limit disturbance to sensitive receptors (human and animal) caused by air overpressure produced during launch events. Noise and air overpressure resulting from sonic booms are not expected to exceed the assessment criteria of 133 dB(L) on land. This is due to the fact that supersonic speeds are not expected to be achieved until the launch vehicle is 3 km from the coastline. Furthermore, due to the relatively small size of the rockets, the sonic boom will be limited in size and unlikely to be large enough to reach the surface.

The RD (Section 3.6) concluded that, on balance and having regard to the level of research and investigations undertaken, it was considered that the noise and vibration impacts on sensitive receivers of the proposed facility have been adequately modelled using appropriate computational

predictive modelling software. It was further considered that the predicted noise and vibration impacts on sensitive receivers, in respect of construction, ordinary operations and type of rocket launches proposed are acceptable. The EIS noted that, whilst the impact of operational noise from rocket launches is anticipated to have an impact on the nearest sensitive receivers, there is no legislated regulatory standard against which to quantitatively assess the appropriateness of this impact. The cumulative impact has been assessed using the DNL standard recommended by the FAA and, given the level of conservatism built into the modelling, the actual impact on the nearest sensitive receivers is anticipated to be less than the guideline. The impact would have some similarities to that of aircraft noise, although the frequency would be significantly less than that of an airport or significant flight path. Vibration, air overpressure and sonic boom impacts on sensitive receivers were considered unlikely to be material.

### 13.7.3 Impacts on Fauna from Noise and Vibration

The EIS (Section 8.4.6) stated that birds have been identified as the primary noise-sensitive receptors for local fauna. The potential impacts of anthropogenic noise on birds are commonly identified as:

- physiological effects, such as stress, avoidance and fright-flight responses
- damage to hearing from acoustic over-exposure and
- masking of important bioacoustics and communication signals, such as the ability to hear each other or predators, which may also lead to dynamic behavioural and population effects.

The Response Document (Section 4.15) identified that these behavioural and population effects are described in increasing severity of effect, as outlined below.

- Behavioural and physiological disturbance: these are short-term responses, such as avoidance, flipper-flapping and increased heart rate.
- Masking: No change in the ability of an animal to perceive sound, but biologically meaningful sounds are “drowned out” (masked) by anthropogenic noise.
- Temporary Threshold Shift (TTS): A temporary reduction in the ability of an animal to perceive sound. Recovery to pre-exposure levels is expected to occur.
- Acoustic Injury and Permanent Threshold Shift (PTS): Acoustic trauma may result in mortality or injury (namely, PTS). A PTS is a permanent reduction in the ability of an animal to perceive sound. Recovery is not expected to occur.

The noise from a rocket launch could elicit a startle response in birds located in the immediate area of the launch. Noise generated during launch activities has the potential to disturb birds, resulting in the potential abandonment of nesting, breeding or feeding areas. High levels of disturbance (such as from aircraft operations) that cause sudden nest abandonment can lead to a potential loss of eggs or chicks through breakage, trampling, chilling and predation.

The EIS acknowledged that rocket launch and testing events have the potential to disturb and cause an adverse physiological or behavioural impact on the wildlife located in the surrounding habitat. Noise from launches and stationary rocket testing are predicted to temporarily alter the quiet setting of the natural environment, with noise briefly above the measured ambient level at distances further than 5 km from the launch. The Southern Emu Wren (Eyre Peninsula), Western Whipbird (eastern) and other threatened species that inhabit the area close to the launch sites are at greatest risk of increased stress, adverse behaviour reactions and physiological impacts. Coastal species are predicted to generally be exposed to low levels of noise, so a brief adverse behavioural response is likely.

A desktop study was undertaken of relevant scientific research that describes the impacts of noise on wildlife receptors, as there are limited standards, regulation and guidelines available for assessing airborne noise and ground vibration impacts on wildlife. It was found that scientific information on the hearing sensitivity of local wildlife species to in-air sound is scarce or non-existent. In the absence of specific criteria, guidance for similar species and taxa have been used. The California Department of Transportation's *Technical Guidance for the Assessment and Mitigation of the Effects of Traffic Noise and Road Construction Noise on Birds* (Dooling & Popper, 2016) provides a comprehensive summary of the studied effects of noise on birds from the construction and operation of roads. It recommends interim guidelines for potential effects to birds from different noise sources (refer to Table 17).

| NOISE SOURCE TYPE | NOISE EFFECT | | | |
|---|---|---|---|---|
| | PTS onset $L_{Amax}$, dB(A) | TTS onset $L_{Aeq}$, dB(A) | Masking $L_{Aeq}$, dB(A) | Potential behavioural effects |
| **Single impulse** (for example, starter's pistol 6" from the ear) | 140[1] | Not available[3] | Not applicable[5] | Any audible component of traffic and construction noise has the potential of causing behavioural and/or physiological effects. These are independent of any direct auditory effects on the auditory system of PTS, TTS or masking. |
| **Multiple impulse** (for example, jackhammer and pile driver) | 125[1] | Not available[3] | 50-60[6] | |
| **Non-strike continuous** (for example, construction noise) | Not applicable[2] | 93[4] | 50-60[6] | |
| **Traffic and construction noise** | Not applicable[2] | 93[4] | 50-60[6] | |
| **Alarms** (97 dB/ 100 ft) | Not applicable[2] | Not applicable[2] | Not applicable[7] | |

**Table 17: Noise guidelines for potential impacts on birds (Source: RD Table 4.6).**

**1. Estimates based on bird data from Hashino et al. (1988) and other impulse noise exposure studies in small mammals. 2. Noise levels from these sources do not reach levels capable of causing auditory damage and/or permanent threshold shift based on empirical data on hearing loss in birds from the laboratory.3. No data available on TTS onset in birds caused by impulsive sounds. 4. Estimates based on study of TTS onset by continuous noise in the budgerigar and similar studies in small mammals. 5. Cannot have masking from a single impulse. 6. Conservative estimate based on addition of two uncorrelated noises. Above ambient noise levels, critical ratio data from 14 bird species, well documented short-term behavioural adaption strategies and a background of ambient noise of a quiet suburban area would suggest noise guidelines in the range of 50-60 dB(A). 7. Alarms are non-continuous; therefore, they are unlikely to cause masking effects.**

An interim guideline threshold of 50 dB(A) was used to assess where noise may begin to interfere with acoustic communication in birds. A threshold of 140 dB(A) has been identified as the permanent hearing damage threshold for wildlife. This level is equivalent to gunshot, fireworks or airplane take-off at 25 m away. 130dB is the hearing threshold of pain for humans in close proximity to the noise source. A clap of thunder typically registers at about 120 dB in close proximity to the ground stroke. The noise maximum was predicted to be between 130-140 dB, up to 80 m from the launch pad (noting that this noise level is a worst-case scenario and is expected to be generated by the largest vehicles that would rarely be used at the site).

The EIS (Appendix P) considered that during construction, masking of communication signals may occur temporarily depending upon the type and level of activities being undertaken. Construction level noise would peak at 73-83 dB(A) for approximately 8 months (6 days a week between 7am and 6pm), with the noise levels being equivalent to busy traffic or a vacuum cleaner. Ambient sound measured throughout the study area was as low as 38 dB(A) during the day and 30 dB(A) at night, meaning that construction noise could be up to 20 dB(A) above the ambient level at approximately 1 km from the proposed construction areas. Continuous noise levels that are 20 dB(A) above background (50 – 60 dB(A)) in the frequency region of bird hearing and communication can have a detrimental effect on the detection and discrimination of vocal signals by birds. Potential behavioural and/or physiological effects are noted as possible in any case where construction noise is audible. This includes both construction activities that produce short bursts of impulsive noise and the continuous noise produced by mobile and fixed machinery.

Operational (non-launch) noise would peak at 63 dB(A) at the launch sites for an estimated average of 4 hours per day 5 days a week (i.e. 12% of the time). This calculation allows for movement of vehicles and use of air driven hand tools throughout the day (noting that hand tools will be used inside the assembly building, which would reduce the noise impact). These noise levels are equivalent to just above the level of a clothes dryer/normal conversation. Similarly, the predicted noise level of 62 dB(A) at 25 m from the project area is below the continuous noise level threshold of 93 dB(A) for causing temporary threshold shift in birds. It is considered that the risk of operational noise impacts from general site facilities would be limited to the masking of communication signals and brief behavioural response. It was noting that during a southerly storm event or even a large southerly swell, the wave noise generated at the cliff interface would nullify any construction or operational (non-launch) noise over 100 m away.

There was no clear consensus within available literature whether long term behavioural changes on wildlife would be caused by launch vehicles or if the birds in this area would habituate to the sound of launches and testing. In respect to mammals, studies have shown that noise levels of 120dB(A) can damage their ears, and levels at 95 dB(A) can cause temporary loss of hearing acuity. It is likely that the possible impacts to mammals would be similar to birds.

The launching of rockets at a frequency of once every three weeks for a duration of 75 seconds will generate noise at a level that will likely impact sensitive bird species, such as the Western Whipbird and Southern Emu-wren. These species are sensitive to discrete, unpredictable disturbances such as sudden loud noises. Impacts from noise may displace individual birds in the area. Operational noise impacts have the potential to lead to a long-term decrease in the size of the population of a species However, the EIS considers these impacts are anticipated to be localised and of short duration, so should not reduce the area of occupancy for any extended period in the local vicinity.

The EIS stated that no wildlife is predicted to be exposed to levels above the permanent hearing damage threshold of 140dB(A). Noise from launches and stationary rocket testing were predicted to temporarily result in noise above the measured ambient level, which may cause a brief behavioural response from wildlife. In rare extreme cases (i.e. for the largest rockets) temporary hearing loss at up to 1,500 m from either launch site could be experienced. The static rocket engine test monitoring indicated that the closest site at around 60 m away recorded an $L_{Amax}$ noise level of 107 dB(A). Noise levels were 112 dB(A) at 120 m away, 97 dB(A) at 500 m and 64 dB(A) at 2 km.

The EIS (Appendix P) mapped the modelled noise contours for each launch site in relation to the location of records for the Southern Emu-wren (Eyre Peninsula) and Western Whipbird (eastern). The Response Document (Appendix D) provided revised noise contour mapping based on a more

representative rocket type (i.e. the Avio Vega) and updated modelling (and the relocated Launch Site A), as shown in Figures 52 - 54.

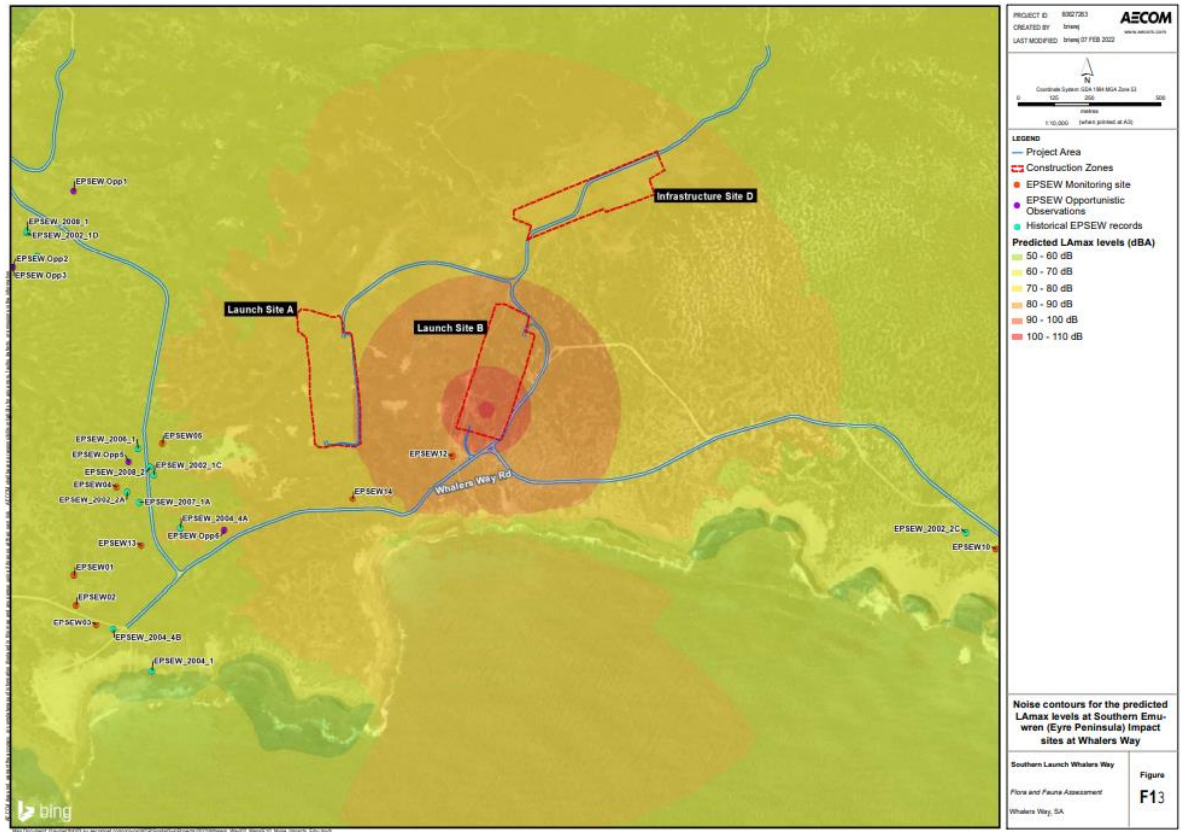



**Figure 54: Noise contours in relation to the location of records for the Southern Emu-wren**

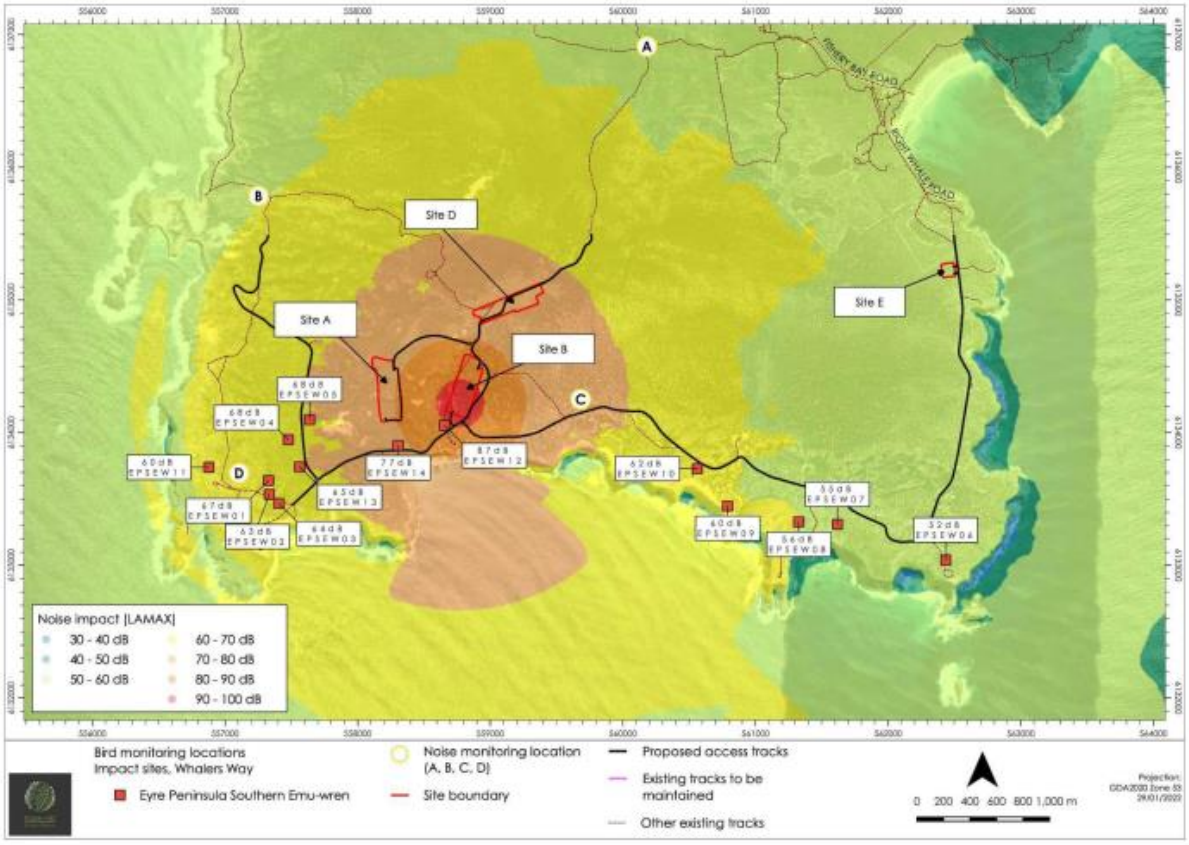



Figure 4. Noise contours for the predicted $L_{Amax}$ levels at EPSEW Impact sites at Whalers Way.

**Figure 55: Noise contours in relation to the location of records for the Southern Emu-wren**

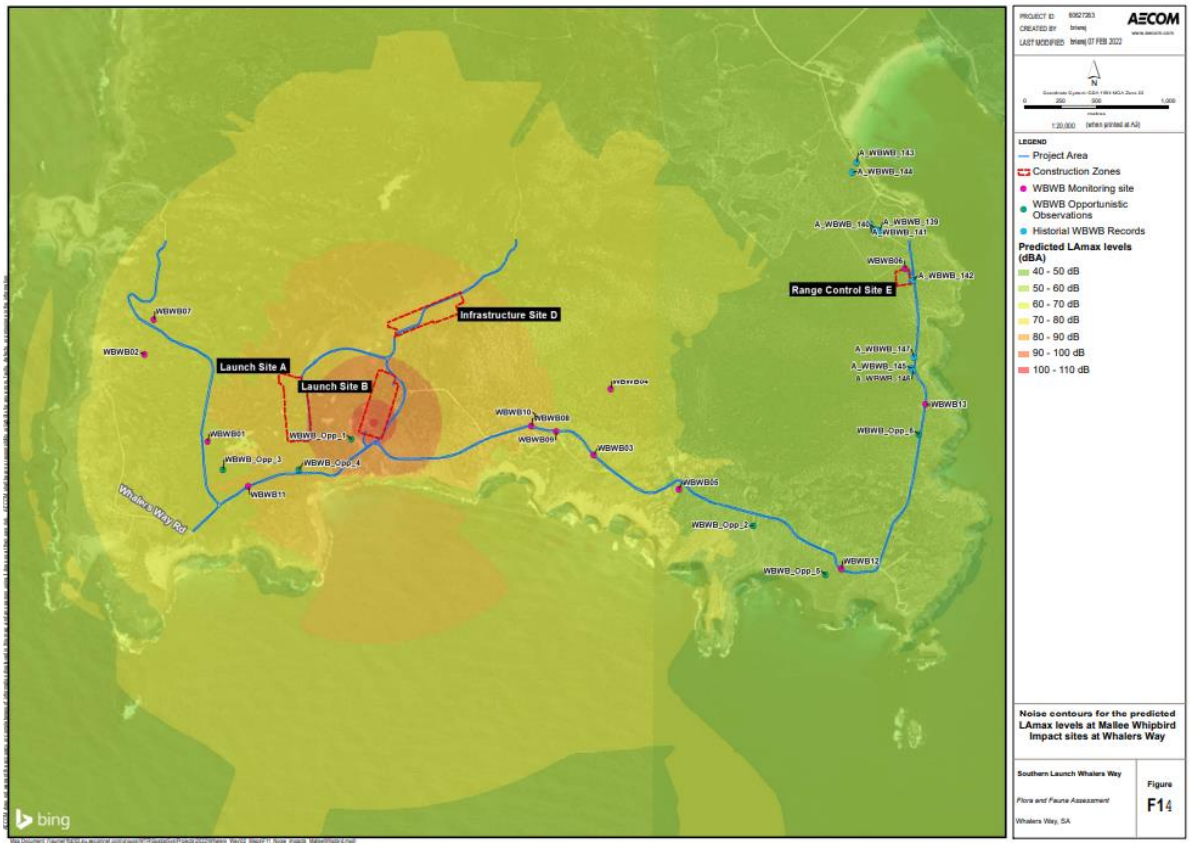



**Figure 56: Noise contours in relation to the location of records for the Western Whipbird**

The noise contour mapping shows that at a distance of approximately 130 m from a launch on Site B the noise level reduces to 80-90 dB(A), which would affect one bird territory for each species (i.e. based on the location of records). At 500 m, the level drops to 70-80 dB(A). At around 1,000 – 1,250 m the level would be 60 – 70 dB(A), which would affect the majority of Emu-Wren territories. Within these zones any birds present could experience temporary hearing loss / impairment and masking. Beyond these zones noise disturbance impacts would decrease with increased distance.

It is noted that the noise modelling adopted a conservative approach by using noise data for a much larger rocket than would be used at the facility. Thus, the noise contours are likely to be an over estimation of the noise levels likely to be generated, so the actual impacts are expected to be less than predicted.

The Response Document (Appendix D) concluded that predicted noise levels from launch of a Vega rocket are less than the recommended PTS and TTS guideline criteria of 140 dB $L_{Amax}$ and 93 dB $L_{Aeq,24hr}$ respectively, even in very close proximity to the launch sites. On this basis there is low risk of temporary hearing injury to birds as a result of a nominal worst case rocket launch. It was noted that any audible noise has the potential of causing behavioural effects in birds, independent of any direct TTS or PTS effects on the auditory system. Information from the studies reviewed could not confirm whether long-term behavioural changes would be caused by launch vehicles or if the birds in this area would habituate to the sound of launches and testing. Some birds have demonstrated the ability to habituate to repeated, regular, and predictable aircraft flights. Some species can become accustomed to aircraft, whereas others may become sensitised to aircraft noise and become more easily disturbed.

The behavioural response data for the Southern Emu-wren (Eyre Peninsula) and Mallee Whipbird collected during first test launch was considered to be short-term behavioural response data. While no immediate impacts on avifauna as a result of the launch attempt was detected, the data is inconclusive, as only one of the four engines was engaged during the aborted attempt. The longer-term impacts of rocket launches on the avian community and focal species remains unknown.

The Southern Emu-wren Management Plan, prepared by EBS Ecology (dated 19 July 2023), considered that there is no risk of hearing injury (i.e. permanent threshold shift (PTS) or temporary threshold shift (TTS)), because the predicted noise levels from the worst-case vehicle are below established PTS and TTS thresholds for long duration exposures to avian species in the literature and the fact that avian hearing sensor cells regenerate unlike mammal hearing sensors (Dooling and Popper 2016). The Resonate (2022a) report identifies there is a risk that adverse behavioural effects (e.g. startle response, with birds returning to normal behaviour within minutes) could occur, however due to the low frequency and short duration of noise, the overall impact is considered to be low. This is consistent with observation of bird species in proximity to other launch facilities in the available literature (Resonate 2022b).

The number of launches, based on the initial phase of the development, is anticipated to commence with approximately six launches in the first year of operations, increasing to a maximum of 36 launches per year in year five of operations. Each launch period would take 3-5 weeks from occupation to vacation of the launch site. It is possible that the progressive increase in the frequencies of launches may enable wildlife to habitualise (i.e. become accustomed) to the noise levels and occurrences.

Based on worst case scenario noise modelling, the EIS (Appendix R) suggests that noise levels from Launch Site A would dissipate to 100 dB(A) and to 95 dB(A) at the closest Osprey nest sites (nest site 1 and 2 + the northern end of Liguanea Island respectively). Noise levels from Launch Site B would dissipate to 105 dB (nest site 2), 98 db (nest site 1) and < 95 dB (Liguanea Island). It is noted that the

modelling did not consider the effect of terrain or vegetation to buffer noise, which would lower the impacts to surrounding fauna (i.e. residual noise impacts would be lower than predicted in initial noise modelling). Whilst there is potential for at least one Osprey pair to utilise the habitat near the proposed site, the location does not support a known nesting pair. Noise impacts would be most significant to an individual nesting pair (if located within 2 km of the launch pads) during the critical breeding period. In addition, the launch pad and other infrastructure location are not within the line of site of a known nesting pair.

It was considered highly unlikely that proposed launch activities over 5 km away from the closest White-bellied Sea Eagle cliff top nest would cause disturbance or a startle response, especially as the nest is below any visual sight line and background noise from surf and or wind would cancel out any possible minimal noise generated at launch. The Australia Fairy Tern has been recorded at Red Banks Beach (approximately 1.3 km from the launch sites) and may also breed along the cliffs of Whalers Way (approximately 2 km kilometres away). This species is likely to be similarly unaffected.

The impact of launches on threatened bird species was further discussed in section 14.6.

The EIS (Appendix R) notes that a local population of the Shore plover, which nest on the shoreline of Waikawa/Portland Island (about two kilometres from the rocket launch site at the tip of the peninsula) has been unaffected by the activities of the Rocket Lab facility in New Zealand since 2018.

In an effort to limit the presence of fauna in immediate proximity to the launch pads, it is proposed that a noise gas gun would 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 allows for maximum accumulated peak level for impulsive noise devices of 118 dB. These devices generate approximately 120 dB and can be used multiple times throughout hours of 7.00 am to 8.00 pm. Primary producers set these devices to generate loud noise bursts for 6 - 10 (or more) bursts per day which results in potentially over 130 (or more) loud and sudden bursts of every three weeks. The proposal involves one loud burst of noise every three weeks to encourage fauna in the immediate vicinity of the launch to move away from the area.

It is uncertain whether this would be an effective mitigation measure or whether it would exacerbate the noise effects of launches. The suitability of this strategy would need to be tested (including the monitoring of bird behaviour), prior to the operation of the facility.

**The AR concludes that the proponent has undertaken adequate investigations into the types and levels of noise and vibration that would be generated during the construction and operational phases of the proposal. In particular, modelling was used to generate noise contour maps for each launch pad site. The modelling was for a worst-case scenario (i.e. noise levels for a much larger rocket than would be launched) and was refined by using recently acquired data from similar rockets to be launched and noise monitoring results from an engine testing event. Monitoring was undertaken on the site to determine existing background noise levels, which were compared with the modelled levels to determine noise impacts.**

**Noise criteria were set for the closest 'sensitive receivers' in the locality (i.e. three residences approximately 3.5 km from the launch pads), being categorised as Rural Living in accordance with the EPA Environment Protection (Noise) Policy 2017. The noise policy does not specifically address rocket launching activities, so a policy developed by the United States Federal Aviation Administration (Order 1050.1F - FAA, 2018) was used for the noise assessment. This policy has been used for other new and modified launch facilities and specifies a Day-Night Average Sound Level (DNL), which describes a person's cumulative exposure to sound over a 24-hour period, as the metric**

**for community impact analysis. The modelling indicated that noise at nearby residents would be unlikely to exceed the recommended FAA level that would cause a 'significant impact' (i.e. no greater than a DNL of 65 dB(A) for the largest rocket that could be used). However, due to the nature of a launch noise, during the day it might reach an annoying outdoor level for a brief period (i.e. for one to two minutes), whereas at night it may disturb sleep.**

**Noise criteria for 'environmental receivers' (especially threatened bird and marine mammal species) were determined based on relevant scientific literature. Survey records for the endangered Southern Emu-wren (Eyre Peninsula) and Western Whipbird (eastern) were plotted onto noise contour maps to determine the potential extent of behavioural responses to launch noise. The worst-case modelling identified that noise levels that could cause mortality of injury to fauna would be limited to the immediate site of a launch pad, where birds would not be present due to disturbance from launch activities.**

**Whilst there are 1-2 recordings of Emu-wrens and Whipbirds within close proximity to the launch pads, the majority of recordings are around 1,000 – 1,250 m away, which is within the 60 – 70 dB(A) noise contour. Within this zone, any birds present could experience temporary hearing loss / impairment and reduced ability to identify other bird calls (masking). The noise would also elicit a fright-flight behavioural response that could cause momentary stress for birds. Birds are unlikely to fly too far from the site due to their nature. Other terrestrial, coastal and marine species would generally be buffered from noise impacts due to separation distances.**

**Noise generated during construction and the general day-to-day operation of the facility is not likely to unduly affect residents or wildlife. However, given the quiet nature of the locality, some of the loudest activities may be noticeable at times. Vibration effects would be limited to the immediate site of a launch pad.**

**A Noise Monitoring Program (including the installation of permanent noise monitoring equipment) would be implemented for the operational phase, which would build on the baseline monitoring undertaken for the EIS and Response Document. Data collected for each launch would need to be used to verify the modelling that was undertaken. It would also be linked with the ecological monitoring programs, primarily for the populations of threatened bird species surrounding the launch sites.**

## 13.8 Cultural Heritage

### 13.8.1 European Heritage

There are no listed state heritage places on the subject land. The nearest state heritage place is located to the north-east of the project area, being the *Former Fishery Bay Whaling Station, Thorny Passage Marine Park* (confirmed on the SA Heritage Register on 23 September 1982), but is essentially an archaeological site, the whaling station having been established and abandoned by the mid-1840s. The proposal should not affect the heritage value of this place, nor impede its continued enjoyment and preservation. No local places of heritage significance are located within the immediate locality, nor any protected shipwrecks within adjacent coastal waters.

### 13.8.2 Aboriginal Cultural Heritage

The project is located within the traditional lands of the Nauo people.

The EIS was informed by a comprehensive Cultural Heritage Investigation, including field surveys of the proposed development footprints, and a relocation of Launch Site A (as detailed in the Response Document). Both investigations concluded that the respective launch facility sites were culturally acceptable, following extensive consultation with Nauo representatives and the project anthropologist.

Whilst no registered sites of Aboriginal Cultural significance will be impacted by the development, noting the requirements of the *Aboriginal Heritage Act 1988* in respect to construction activities, , each launch and facility site was carefully surveyed by Nauo representatives.

Three artefacts were located on original Launch Site A, but none on Launch Site B, nor the maintenance or operational areas (sites C, D & E). The original cultural heritage report concluded that there are no sites or items of cultural significance located within the proposed development footprints.

The change in location of Launch Site A prompted an update to the earlier assessment (also undertaken by Scott Cane, in a report dated 10 December 2021), with two initial relocation options considered (identified as Option 1 and Option 2). No evidence of Aboriginal cultural material was located during the inspection of Option 1. However, the site is within close proximity to an area of mythological significance and associated ceremonial site, such that Option 1 was discounted from further consideration. Option 2 was found to be a suitable alternative, with no Aboriginal artefacts observed, nor signs of previous occupation identified, and was cleared for development activities (which supported the relocation of Launch Site A).

Whilst targeted surveys were undertaken in prospective development areas, the more general survey findings revealed that Aboriginal settlement was focused on dune areas and associated points of water along the coast, rather than across its more barren calcrete interior, with additional secular and sacred areas of cultural significance identified within the investigations area.

Two sites of mythological significance (1 and 2) and two significant habitation areas (3 and 4) were identified (Figure 55 below), the latter being areas of noted occupational intensity and cultural sensitivity. These would not be directly impacted by the proposed development.

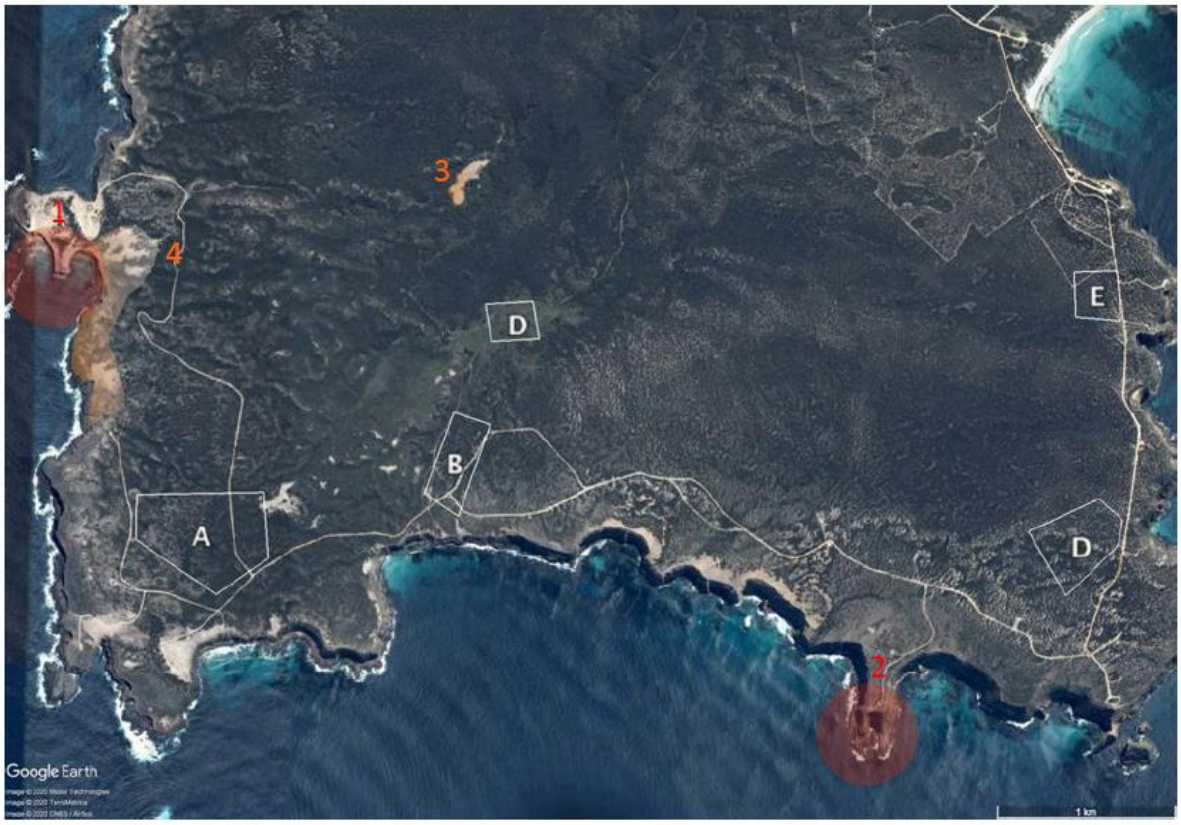



**Figure 57: Mythological places and archaeological places of significance (Source: EIS Section 17).**

An opportunity exists, in conjunction with the Nauo peoples, to establish an Environmental and Cultural Sanctuary, where Nauo cultural heritage and cosmology could thus form a necessary and interesting part of the Sanctuary as both a companion in sound land management and an integral part of the broader socio-economic goals of Southern Launch in fostering conservation, education, employment and tourism.

Furthermore, the cultural heritage report noted that the mythological significance of the discovered sites, have a connection and relevance to key constellations in the night sky, and coincidentally align with the astronomical scientific and philosophical ethos of Southern Launch in their development of a launch facility on the land. This provides a significant opportunity to develop a unique, educational and cultural package, befitting both the project and the land's significance.

> The cultural heritage report recommended that a relatively senior Nauo person be employed as a member of the construction team so that if and when construction gets underway, that person can be available to identify any artefacts or human remains, should they be uncovered. Work should then stop at the location while that person notifies senior Nauo people and the materials are removed and reburied at another location. This is a routine activity and has been undertaken by the Nauo elsewhere.

**The AR concludes that potential impacts to sites of European and Aboriginal Cultural Heritage could be appropriately avoided during construction and operation.**

## 13.9 Visual Amenity

The proposal involves the establishment of infrastructure associated with the launch facility in four locations on the site where limited built form currently exists. Internal tracks are proposed to be upgraded including the establishment of new minor access tracks.

The locality derives its character from elevated coastal views and undeveloped vegetated coastal areas with varying degrees of human impact that has modified the natural environment to support access and passive recreational uses. The locality has a very low population density and is predominantly a natural environment. The nearest sensitive receptor of note is a habitable dwelling, located to the east of the allotment, with two dwellings being located within allotments on the western side of Right Whale Road (each being approximately 100 m east from the boundary of the subject land).

A key consideration when assessing the visual impact of the proposal, is contemplating the extent to which people are actually present in the locations from which views can be obtained. The Response Document (Section 11.4) notes the most significant views of the proposed infrastructure will be obtained from within the site itself, accessible by staff or visitors of the facility (or possibly by persons accessing the site for managed tourism and recreation purposes).

The proposal comprises significant built elements associated with the launch facility, including buildings (maximum height of 10 m and 23 m high elevated water tanks), launch gantries (30 m in height and only evident during launch-events) and a 40 m lightening tower established at 'Site A' and 'Site B'. Infrastructure relating to launch-events, which is considered to be taller and more prominent are not permanent and are not likely to cause a visual impact on the locality.

The EIS (Section 14) includes a Landscape and Visual Impact Assessment (VIA) to assess the potential visual impact of the proposal. The report evaluates the existing landscape character, undertakes a visual impact assessment of the site and provides an assessment regarding the degree of visual change that is likely to result from the introduction of the proposal within the landscape of the Lower Eyre Peninsula.

The VIA acknowledged there would be visual effects on the character of the locality of Whalers Way as a result of the proposal. However, the separated development footprints will assist in fragmenting the visual effect of the overall development. It is further noted, the low raised built form and the existing screening provided by local ridgelines would minimise the visual effect of the proposal. The impact of the development on visual amenity in the locality is described in the VIA as slight to moderate.

The Response Document confirms that Site A has been relocated to also reduce visibility of the proposal in the area of Theakstone Crevasse. Site A is now relocated to a position located further east, approximately 400 m west of Launch Site B.

The original siting of Site A was situated on an inclined plateau facing north away from the coastal edge, towards the modified rural landscapes. The revised location of Site A will position the launch facility further to the north, away from the south-facing coastal edge of the locality. While the revised position has a slightly higher elevation than the original position, it is surrounded by local ridgelines that provide screening to the west and fragmented screening to the north, south and east, mitigating the overall visual effect of the launch site, particularly to the south.

The Response Document provides a summary and response to the seven public submissions expressly relating to the need to protect and preserve the natural landscape in the locality. The impacts were perceived to be derived from the visibility of the proposed built form and infrastructure, combined with the perceived high-quality of the existing landscape character.

The Response Document and VIA confirm the relocation of Site A would have a compact visual impact across the central coastal basin of the locality. The adjacent ridgelines and vegetation cover provide distinct viewsheds to the east and west. The revised location, in combination with the underlying topography, mitigates the potential visual effects of the proposed development.

The position of Site B is surrounded by the local landforms that restrict views to the broader landscape. In addition, a local ridgeline to the south restricts visual impacts on the coastal cliffs. Site D is set well back from the coastline and is located in a low-lying basin, visually separating it from the broader locality. The locations of the proposed sites are detailed below in Figure 56.

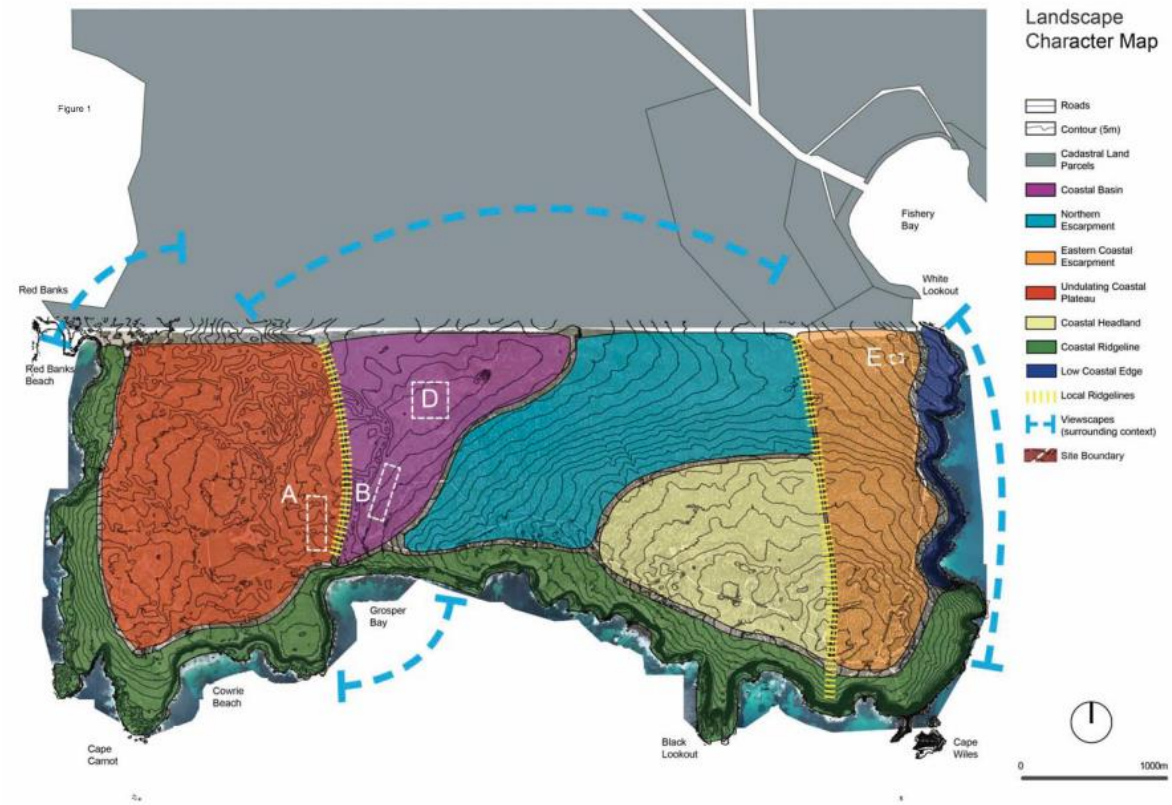



**Figure 58: Proposed location of launch sites (Source: Response Document Section 11)**

It is further noted when considering the visual impact of the proposal from the sea looking towards the development site, the sites can be typically seen at distances over 1 km offshore. The height of the coastal cliffs creates a defined viewshed that screens the coastal edge from any potential visual impact.

**The AR concludes that the visual impacts from launch facility infrastructure have been reduced through site selection and using temporary infrastructure where possible. In addition, suitable materials and finishes are proposed to visually integrate the structures and complement the existing character of the area.**

## 13.10 Traffic and Transport

A number of representors (and the District Council of Eyre Peninsula) raised the potential impact of the development on the local road network through increased vehicle traffic (particularly heavier vehicles), leading to a heightened road safety risk for local residents, cyclists, school buses and visitors. If approved, the Council was concerned about the level of increase in the number and type of vehicles using Proper Bay Road (10% increase) and Fishery Bay Road (35% increase) to access the site during its construction and operation.

The Lower Eyre Peninsula Council considered that such increases would have a significant effect on pavement life and lead to an accelerated degradation of these road surfaces over time. Local residents shared these concerns, as this is their only access to more remote properties reliant on unsealed roads. Given the increase in the type and number of vehicle movements, such maintenance costs would place an undue burden on the local Council and ratepayers for what is a new development, only accessible via the local road network.

The clear advice to the Commission (from the submissions received) is that the affected roads be upgraded to a sealed pavement standard, with all costs met by the proponent (or alternatively, another funding source, such as state or federal funds).

The EIS included a Traffic and Impact Assessment (TIA) and a supplemental report in the Response Document. The original TIA considered the following matters:

- traffic impacts on the arterial and local road networks (to/from Port Lincoln)
- traffic and access impact during construction, operations and maintenance
- details of the transport vehicle sizes and movements outside of gazetted limits and
- minimisation and/or mitigation of traffic and transport impacts.

The development site has access from Right Whale Road at the north-eastern corner of the site. Access to the site from Port Lincoln is via Proper Bay Road, Fishery Bay Road to Right Whale Road before entering the site and a private road known as Whalers Way Road. Aside from the Western Approach Road (a sealed arterial road maintained by DIT), the remainder of the public roads used to access the project area (being Pine Freezers Road, Investigator Road, Proper Bay Road, Fishery Bay Road and Right Whale Road) are all council-maintained roads.

Fishery Bay Road and Right Whale Road are unsealed. The TIA identified that these roads, given their distance from Port Lincoln, and relatively low vehicle volumes (i.e. 150 vehicle movements per day) would likely be the most affected by the increase in traffic volumes, during both construction and operation.

Prior to and during launch operations a number of vehicles would be utilised to deliver, operate and maintain the various site infrastructure. The following vehicles are expected to be used.

- 19 m semi-trailers (rocket component ray and other goods)
- Small rigid vehicles (SRV)
- 19 m semi-trailers (sealed fuel tanker)
- maintenance vehicles and cranes.
- passenger vehicles and 4WD vehicles.

It is noted that some of these deliveries will comprise fuel and other dangerous goods.

The TIA noted that a total of 1400 heavy vehicles (comprised of tipper trucks with dog box and 19 m semi-trailer loads) will require access to the site during construction operations (building of access tracks and launch pad infrastructure). Assuming a 120-day construction duration, this equates to 12 heavy vehicles per day using the access track.

During operations, the TIA estimated there are typically expected to be approximately 10-20 people on site at any one time, with peak numbers approaching 50 people. Accommodation requirements are expected to cater for 12-15 people. When there are no customers on site, there may only be 1-2 staff members on site.

This equates to 56 vehicle movements for all types per day during typical operational periods, and more specifically, 460 heavy vehicle trips per annum (on the basis of 36 launch events). For security and operational reasons, unescorted tourist and visitor access to the site will be more limited and better managed. This would result in a reduction in vehicles on the site associated with tourist and visitor access (i.e. 22 4WD and passenger vehicles).

In respect to road upgrades, the TIA found the existing intersections were fit for purpose (i.e. could cater for the expected vehicle types) and that any additional maintenance (such as more frequent grading), would likely be required on Fishery Bay Road to cater for the additional proposed traffic volumes. In addition, the Response Document notes that it is acknowledged that additional traffic increases exposure to road safety risks. In addition, provided that these roads are maintained appropriately, the proposed increase in traffic is not expected to create additional road safety issues.

The main focus of the Response Document was on various road impact, road safety, cliff stability and road maintenance issues, raised in public submissions. Whilst the general conclusions as to the nature, type and number of movements is accepted, no definitive allowance has been made to maintain and upgrade the local (public) road network that would be attributable to the wear and tear from a development of this nature, either directly funded, partly funded or based on certain thresholds being reached where upgrade works were required.

Whilst current resident vehicle numbers are lower on those roads closest to the proposed site (excepting tourist traffic) it's also reasonable to conclude that the projected increase in traffic volumes (especially larger commercial and heavier vehicle types) would inevitably result in a significant increase in overall movement totals, as a result of the development.

The Commission has concluded that, as a new development reliant on rural (unsealed) road access to a remote coastal location, the onus is on the proponent to ensure the safety and efficiency of the road network, including to fund and maintain all required upgrades.

Given the interruption to and loss of amenity for local residents, the upgrade of the local road network, which also must cater for emergency vehicles (and additional tourist traffic that may result from the operation of a launch facility), this requirement is reasonable and fair. This would also include regular, independent monitoring of pavement conditions over the long-term.

Reserved matters have been recommended in respect to the preparation of a Road and Traffic Management Plan and associated Road Infrastructure Agreement (to be negotiated between local and state road authorities), with all costs met by the proponent. The project cannot proceed without the agreement and resolution of these matters, for both the operational and construction phases.

**Subject to reserved matter requirements being satisfied, this AR concludes that anticipated increases in traffic volumes can be accommodated by the local road network, whilst internal upgrades can be undertaken in accordance with accepted design standards. The proponent would be required to undertake all necessary improvements (and maintain them) over the life of the development. The local council should not be required to address any attributable maintenance**

**issues through additional expenditure, that would otherwise be expended under current circumstances, for what is the establishment of a new land use in a remote coastal location.**

## 13.11 Air Quality

The proposed development has the potential to introduce air quality impacts on the immediate locality and surrounding environment. The Response Document (Section 12.1) notes that impacts on air quality primarily relate to rocket launches, where exhaust from the combustion process enters the atmosphere. Potential impacts on air quality relate to the direct air quality impacts and those relating to the greenhouse gas impacts.

The EIS included an Air Quality Assessment (Appendix W) and a Greenhouse Gas Assessment Report (Appendix X), including modelling regarding the potential air quality impacts associated with the proposal. The technical assessment and related findings informed the development and planning of the design, construction, and operational stages of the proposal.

The EIS (Section 12.2.1) stated that emissions from each launch event were estimated using dispersion modelling (CALPUFF) on a worst-case basis, considering the size of the rocket and type of fuels to be used at the facility. This included emissions from launches from Launch Site B (located closest to the nearest receptors) and rocket engine tests at the engine test facility located at Launch Site A, for all times of the day (i.e. 24-hour operations). The air quality impact assessment showed there is a low risk associated with air quality impacts from the proposal.

### Amended Air Quality Impact Assessment

The Response Document (Section 12) included a review of relevant public submissions and the air quality modelling with respect to the decision to relocate Launch Site A. The distance to the nearest receptor from Launch Site A (as first proposed) was approximately 4.7 km, with the distance from the new location now approximately 3.8 km. An updated Air Quality Impact Assessment, including verification of the existing modelling, relating to the proposed facility, is also contained in the RD.

### Direct Air Quality Impact

The Response Document included further rocket engine exhaust emissions data and identified the following pollutants (liquid and solid) to be relevant for assessment purposes:

- Carbon monoxide (CO) – combustion product from liquid RP1 (kerosene) fuel
- Nitrogen oxides as nitrogen dioxide ($NO_2$) – combustion product from liquid RP1 (kerosene) fuel
- Hydrogen chloride (HCl) – emitted from certain solid fuel engines
- Particulate matter (PM) as for combustion emissions assumed to be fine particulate matter ($PM_{2.5}$) – emitted as part of all combustion, with worst-case emissions from solid fuels.

It is noted that emissions would only occur for a very short time during each launch event, being a single individual launch with no consecutive launches. The Response Document stated that emission rates from a launch event are very high (compared to standard dispersion modelling applications), with variable emissions files set up (including a rocket launch/engine test every second hour of the year for each scenario). It is further noted, the modelling undertaken includes assessment of a scenario-based total of 4,380 launch events and 4,380 engine tests within a year. The annual total of proposed launches is forty-two (being 36 orbital launches and 6 sub-orbital launches) and the number of engine tests would be limited and smaller scale than assumed for the purpose of the modelling. Thus, the modelling adopted an extremely high level of conservatism.

In consideration of the reduced separation distance to the nearest sensitive receiver resulting from Launch Site A being relocated, the dispersion modelling was updated to reflect launches d) occurring at the new location.

The Response Document concluded that the dispersion modelling of engine tests at the new Launch Site A location, showed marginal exceedances for the modelled emissions of CO, $NO_2$ and $PM_{2.5}$. It is further noted that the modelling assumed engine tests occurring every second hour of the assessment year, with a total of scenario-based 4,380 engine tests, although it is only envisaged that a smaller number of engine tests (compared to the planned 42 launches per year) may be performed each year. It is recommended that engine tests should be undertaken in daytime conditions only and avoiding tests when wind directions are towards the nearest receptors (i.e. south westerly wind direction) in light wind conditions.

The updated Air Quality Impact Assessment demonstrates that there is a low risk associated with air quality impacts, from the proposed orbital launch complex and satisfies Schedule 2 of the *Environment Protection (Air Quality) Policy 2016*.

### Greenhouse Gas Emissions

The EIS (Section 12.2.3) identified the activities likely to generate greenhouse gas emissions during the construction and operation phase of the proposal, including land clearing, construction, vehicle movements, launches and the production, supply and haulage of materials. In regard to the relocation of Site A, the Response Document determined there would be no further material impact on the greenhouse gas emissions, due to the scale and intensity of the proposed facility. For reference, Table 18, below, compares the proposal's Greenhouse Gas Emissions contribution on a state and national scale:

| TOTAL EMISSIONS - 2018 | | | |
|---|---|---|---|
| Southern Launch | | Australia | South Australia |
| Construction and Operations ($tCO_2$-e) | 395,819 | 537,446,390 | 24,241,070 |
| Percentage of National/State Inventory | - | 0.07% (0.002%PA) | 1.6% (0.06%PA) |

**Table 18: Southern Launch GHG Emissions comparison table (Source: EIS)**

The proposed development would contribute only a small proportion of South Australia's Greenhouse Gas Emissions (i.e. 6/1000$^{th}$). Further, the proponent asserts that these emissions would occur irrespective of the location of the proposed facility.

The Response Document (Section 12.1.2) provides a summary and response to the 29 public submissions expressly relating to air quality, including chemical toxic fallout from a launch, air pollution and contribution to greenhouse gas emissions.

The Response Document (Section 12.1.2) states that the EPA has assessed the EIS, specifically in relation to the impact of the development on air quality and provided the following commentary:

> *'The air quality impact assessment was performed as a highly conservative assessment, particularly with regards to the level of activity at the site. The expectation is for 36 launches per year, lasting 30 seconds per launch, and a few engine tests per year for up to 2.5 minutes per test. The modelling assumed a launch and test for every second hour for the whole year,*

> *equating to 4,380 launches and engine tests. Even with this significant level of conservatism, the modelling predictions show compliance to the maximum ground level air pollutant concentrations contained in Schedule 2 of the Environment Protection (Air Quality) Policy 2016, aided by the significant distances to sensitive receivers.'*

**The AR concludes that impacts on air quality from the proposed facility are considered acceptable and comply with relevant legislative policies and guidelines. The total emissions generated from activities on site would contribute a very small proportion to both the Australian and South Australian total greenhouse gas emission levels.**

## 13.12 Hazards

The EIS evaluated a range of hazards and how such risks are to be managed. These can broadly be defined as: rocket malfunction/fire, damage to rocket launching infrastructure leading to incorrect trajectory, harm to persons or fauna via hazardous materials, and damage to ancillary infrastructure that supports the development. The EIS (Section 20 and Response Document (Section 10) considered these issues in detail.

The EIS states that no dwellings or other static accommodation exists within the allotment containing the proposed facility. The closest dwelling is located approximately 3.6 km to the north-east of Launch Facility B, outside of the boundary of the allotment. Noting the proposed launch path is to the south and directly over the sea, the risk of impact on surrounding dwellings and property, public infrastructure and human life arising from a catastrophic event on the range, or during a launch event, is considered minimal.

In the event of a hazardous emergency, and to ensure people within the locality are safe during the launch process, an exclusion zone will be established around the launch site (Launch Exclusion Area) and on the ground along the path the rocket would be launched (Launch Exclusion Corridor). For safety reasons, no unauthorised persons or vehicles would be allowed in these areas during a launch. Figure 57 shows the nominal launch safety zones overlaid on the site.

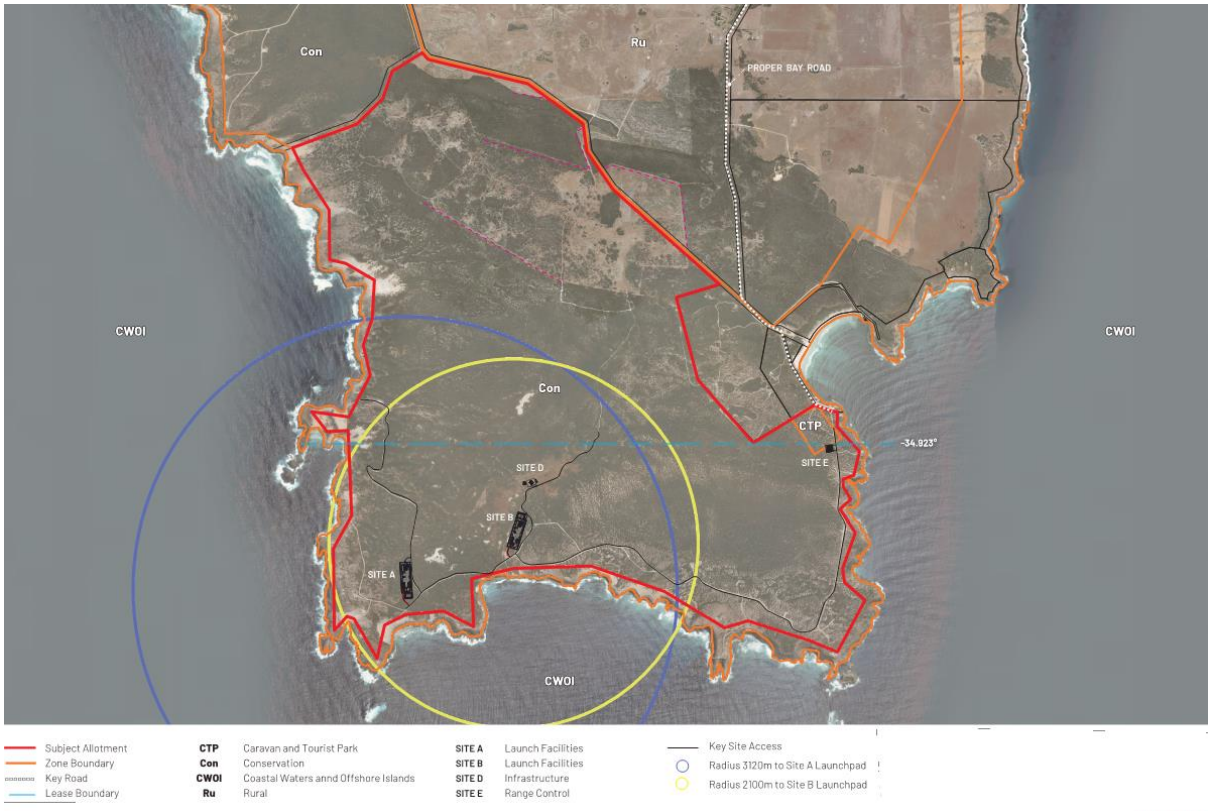



**Figure 59: Launch safety zones site plan**

One of the main risks identified in public submissions related to rocket malfunction and fire and the potential impact on property/assets and the surrounding environment. The Response Document considered the public submissions, which highlighted reliance on the CFS and other emergency agencies during launches.

Following the exhibition of the EIS, the proponent determined that further investigations were required in respect of bushfire risk assessment, mitigation and emergency management. SA Bushfire Solutions was engaged to provide further advice and develop a Bushfire Emergency Management Plan for the proposed facility.

The Response Document (Section 10.2.9) confirmed Southern Launch would have its own capability for emergency response, including fire management detailed within the respective management plans. Further, 25 mitigation measures would be applied to the development to reduce the bushfire risk rating, which are outlined in the Bushfire Emergency Plan.

A program of regular inspection and maintenance of the site would also be undertaken to ensure all roads and access tracks through the site meet the current South Australian Government fire access track guidelines.

**The AR concludes that the development contains an appropriate level of emergency management and mitigation measures to address hazard risks on site. In addition, a further review of emergency procedures would occur during the detailed design, construction and operational planning phases of the development.**

## 13.13 Soil and Water Contamination

Construction activities have the potential to contaminate the receiving environment (soil and water) through excavation of contaminated soil; dewatering; incorrect management of wastewater and hazardous material and poorly managed construction operations.

The EIS concluded that soil disturbance during construction may increase the risk of invasion from weed and/or pest species, which can further reduce habitat quality and compromise the integrity of adjacent areas of native vegetation. These potential impacts are proposed to be mitigated through detailed construction and operational management practices and will include ongoing, active management and control of pest plant and animal species.

Furthermore, water in the detention basins will be tested at regular intervals (every 6 months), to ensure water on site meets the standard where it presents no risk to animals or other contamination issues for soil or water. If there is evidence of contamination, the water would be treated to remove contamination.

The EIS noted that irrigation is proposed for revegetation around the project footprints. It would be subject to the detailed design phase and the finalisation of an irrigation management plan and water quality monitoring program to manage irrigation. The EIS confirmed that any irrigation on site would likely increase the salt content within the soil, therefore leading to a decline in nutrients in soils and potential loss of habitat for native flora and fauna species.

The Response Document confirmed that native species would be utilised to minimise irrigation water demand and assist in reducing the potential for non-indigenous species to spread into the surrounding environment. Irrigation water will be sourced from the wastewater treatment system and supplied by the retention basin. The risks that irrigation pose, on soil quality, can be suitably managed by the proponent at the detailed design stage and implementing appropriate mitigation measures (as recommended in the EIS).

Dewatering during construction of the development would be sampled, analysed and results assessed to ensure any dewatering would comply with all regulatory requirements and in accordance with the dewatering procedures within the Construction Environmental Management Plan (CEMP) and Soil Erosion and Drain Management Plan (SEDMP). All dewatering activities are proposed to be monitored with records maintained by the proponent.

Regarding sediment-laden runoff, temporary sediment trapping devices would be installed downstream of the embankment works area, within the disturbance boundary. The devices would be provided during construction, to filter sediment-laden runoff or water from dewatering operations and positioned to filter sediment before crossing the disturbance boundary and entering any natural watercourses downstream of the works area.

During the construction phase, the suppression and control of dust would be undertaken in accordance with the CEMP and SEDMP. Dust impacts have potential for both localised and longer-term impacts on some species. Any exposed areas that allow for revegetation to be used as dust control (including stockpiles and mounds) would be treated as soon as practical. Otherwise, a water cart or other appropriate method of dust mitigation would be allocated for works in these areas.

Operation of the temporary concrete batching plant would require an EPA licence, which incorporates wastewater management requirements. Turbid and highly alkaline wastewater, dust emissions and noise are the key potential impacts associated with concrete batching plants. The temporary concrete

batching plants should be sited to minimise impacts on the environment. The final CEMP should identify measures to minimise the environmental impacts and ensure that any waste is disposed of in accordance with relevant EPA guidelines.

**The AR concludes that no existing or potential contamination sources have been identified that would impact on the quality of soil and water on site. The CEMP and SEDMP propose appropriate mitigation measures to minimise potential contamination sources (such as chemical storage, wastewater management, etc) to the land and the coastal environment.**

## 13.14 Waste Management

Construction of the development would generate a range of general construction waste materials, as well as spoil from excavated materials; cleared vegetation/organic matter; wastewater and hazardous materials and chemicals.

The proponent has adopted the waste management hierarchy under the *Environment Protection Act 1993* for the Waste Management and Minimisation Plan (WMMP). The WMMP would be prepared as part of the CEMP and OEMP stand-alone management plans and procedures. The objective of the WMMP would be to minimise generation of general wastes, maximise their reuse and recycling and ensure safe and lawful disposal during the life of the project.

It is anticipated that waste generated from preparation and launch activities would be limited and would be removed from the site in accordance with the relevant legislative requirements for the specific type of waste generated. These requirements would be further documented in the WMMP.

Waste fuels would be burnt off using the flare stack and waste oxidisers will be disposed of in the cold box. The fuel and oxidiser requirements for launches can be accurately predicted, meaning the surplus quantities requiring disposal will be limited. Any materials which cannot be disposed of in the flare stack or cold box would be trucked off-site by a licensed contractor in accordance with regulatory requirements. The proponent asserts that no waste will be disposed of on-site.

It is considered the proponent has comprehensively considered all types of waste that would be generated, either temporarily during construction or on an ongoing basis. Should approval be granted, the proponent would be required to finalise and adopt a Waste Management and Minimisation Plan.

**The AR concludes that temporary waste sources and storage areas can be appropriately minimised and managed during the construction phase. Any operational waste impacts can be appropriately addressed via the OEMP.**

### 13.14.1 Spent (Discarded) Launch Vehicle Management

The proposed dumping of discarded launch vehicles is not expected to have a significant and/or ongoing impact on the marine or coastal environment, as all reasonable and practicable measures would be undertaken to ensure that any environmental harm is minimised, both in terms of risk and impact, in accordance with relevant legislation.

The proposal would result in spent (discarded) rocket vehicles landing in the sea under two flight scenarios – successful and unsuccessful launch events.

The EIS (Section 22.1) detailed that, in the normal event of a successful launch as the fuel and oxidiser are expended, each stage is ejected from the launch vehicle in sequence at varying distances down range. The ejected stage falls to earth and lands in the ocean (beyond state waters). Similarly, in the event of an unsuccessful launch where the vehicle fails during flight, the vehicle could explode and/or

fall to earth over the ocean in an unpowered and uncontrolled manner (potentially within state waters).

As detailed in the EIS, in the event of an explosion, fuel and oxidiser would likely burn up during decent and pieces of the vehicle would fall to the ocean over a large area. In the event of an uncontrolled descent, the vehicle would strike the ocean as a single unit.

The spent vehicles would therefore strike the ocean and the debris would remain in the marine environment. This has been the approach for space launches since the inception of the space industry and well-established international law and protocols exist for dealing with spent space launch materials.

In addition, Southern Launch acknowledge the requirement for an application pursuant to Section 38 of the *Environment Protection Act 1993* for the EPA to grant an exemption pursuant to Section 37 of the Act in respect of all launches. The purpose of these exemptions is to authorise Southern Launch to carry out the specified activity (rocket launches) which involve spent launch vehicle hardware landing in state waters. The EIS concluded that the materials intended to land in state waters would not cause any environmental harm and do not pose a risk of potential harm.

The Response Document (Section 12.3.2) provided a summary and response to the 12 public submissions expressly relating to environmental impacts as a result of spent launch vehicles falling into the ocean. The issues raised include waste, pollution, toxic materials and debris impact.

**The AR concludes that the impact of spent rockets and/or rocket debris (from successful or unsuccessful launches) on the environment and public safety is considered to be low and would be in accordance with relevant legislation and standard industry practice. Mitigation measures would be implemented to manage the impact/risk in the immediate locality of the site.**

## 13.15 Security and Public Safety

The proposal requires a level of security that complies with national requirements and extends across land, water and airspace. Security and safety issues have been summarised in the EIS and further denoted in the technical document '*Protective Security Threat Assessment and Security Considerations, Southern Launch Whaler's Way Orbital Launch Complex, Spartica Australia Pty Ltd, August 2019*'. This document was redacted during the public notification process.

In addition, a Whalers Way Emergency Management Plan (WWEMP) has been prepared and provides the base document for conducting a risk assessment. The main aim of the risk assessment process contained within the WWEMP is to maintain staff and public safety throughout the core functions of the operation and coordination of the response to emergency situations. The EIS (Section 21) and Response Document (Section 10) considered potential security and public safety impacts in detail.

The EIS concluded that the likelihood of most threats associated with the proposal, would be in the medium and low range of probability, with four in the high range of probability during the operational phase of the project. None of the identified threats were in the very high probability range. The result of the analysis for the construction and operational phases are summarised in the EIS (Section 21.4).

The EIS noted that the facility would only operate at full capacity leading up to and during launch-events. Outside of operational requirements, the complex would be largely unattended other than by operational and maintenance staff. Southern Launch acknowledge the requirement to secure the site outside of launch event windows and would consider a full-time security guard presence on site as part of the operational and security threat environment.

It is acknowledged the operation of a rocket launching facility would have an impact on the current informal public access arrangements, whereby visitors travel across private land to coastal camping spots.

The current public access to the subject land is at the landowner's discretion and is subject to change, irrespective of the development proposed. Southern Launch asserts that at any time, the owner of the land could undertake an activity on the land or consider (for any other reason) that it is no longer appropriate to allow public access across the land.

The EIS noted that a portion of public land (coastal Crown Reserve) would be within the 'Exclusion Zone' identified to apply on rocket launch days, such that public access to this land within the exclusion zone will be temporarily required. Given the very limited access to such public land (located to the perimeter of the allotment) from public areas, essentially the sea, and the limited times this will operate, this impact will have minimal material impact on accessibility to the coast.

Further to this, it is noted that public access to adjoining land uses including White Lookout and Fishery Bay Beach would remain unaltered during the temporary launch events and, with unaltered access to these sites, will act as viewing locations for launches.

The development would result in some limitations, when compared to the current level of public access to the allotment. However, appropriately managed public access would still be able to occur when there is no operational reason to exclude public access. Additionally, the allotment would be able to support managed tourism access and should support the growth of 'space tourism' where visitors come to observe launches and visit the facilities outside of active operations.

The EIS considered the general effects on human populations, in detail. The safety of the general public would generally be preserved through implementation of appropriate buffer zones to exclude people when the launch event is taking place. The location of the proposed launch sites is considered to be suitable, ensuring appropriate buffer zones can be achieved without a requirement to exclude people from adjacent freehold allotments or terrestrial publicly accessible locations. No dwellings are located within the planned launch safety areas – therefore no persons would be required to be evacuated during launches.

The EIS considered the impact of commercial and private aviation within the vicinity of the launch site (over-head), the rocket flight path, and the exclusion zone. As part of any launch process, Notices to Airmen (NOTAM) for air traffic and Notices to Mariners (NOTMAR) for sea traffic are issued in accordance with Australian regulatory requirements. Southern Launch acknowledge that temporal and spatial separation between air and maritime users, and any rocket launch operations would need to be implemented during launch-events, with close coordination with Australian regulators.

**The AR concludes that an appropriate level of assessment regarding public safety and security has been undertaken by Southern Launch, including the identification of risks and potential treatment and mitigation measures to be implemented prior to launch events and during/after emergency events.**

## 13.16 Social and Community Impacts

The EIS (Section 18) included information on the potential impacts of the development on individuals, communities and the economy during the construction and operation of the development.

### 13.16.1 Construction Impacts

Construction impacts would involve increased traffic movements for workers and materials travelling to and from the development site. The immediate locality is sparsely populated, however there will be a number of immediately affected residents (with access from Right Whale Road and Fishery Bay Road), who may be inconvenienced by additional traffic on local (unsealed roads), and related potential impacts of raised dust and equipment and machinery noise.

Given the expected numbers of on-site workers during construction, and a readily accessible regional service centre, there will be no need for a separate construction camp, but rather a reliance on existing service, hospitality, accommodation and shopping facilities in Port Lincoln. The City of Port Lincoln did not make any comments during the formal referral period, however there is no reason to believe that existing services (including hospital and emergency services) – could not support a temporary workforce of up to 53 FTEs during the construction period.

Construction impacts by their very nature are both variable and temporary, and that subject to an appropriate Construction and Environmental Management Plan (CEMP), can be effectively mitigated or managed by Southern Launch. The CEMP will need to take into account the sensitivity of the receiving environment, whilst a Traffic Management Plan will be required to monitor road conditions, and where required, maintain and upgrade the road surface as needed (refer to Section 14.10).

### 13.16.2 Operational Impacts

The operation of the proposed development would have the potential to impact on the local community and nearby residents, including traffic movements, hazard risk, visual amenity loss and disturbance from launch activities and increased tourist visitation. There would also be impacts on the local environment, especially various threatened species and their habitat. These matters have generally been considered in other sections of this report, such as operation of the rocket launch facility itself (in terms of air and noise pollution and water quality). Other sections of this report also cover potential public safety, traffic restrictions and marine exclusion areas that may impact on local residents and fishing boats, particularly during launch events.

To effectively manage any residual impacts than cannot be effectively avoided or mitigated, an Operational Environmental Management Plan, to be prepared by the proponent, is recommended.

Similar to the construction workforce, the operational workforce is estimated to be 56 FTE direct and 15 FTE indirect jobs, the higher levels being during launch events, such that any external impacts on the availability of accommodation, the use of local services or the provision of facilities to support a slight increase in local population are considered to be negligible (noting that the estimated population of Port Lincoln from the 2021 Census was 14,880 persons). However, there may be a requirement for additional resourcing for the SA Country Fire Service (and related first responders), given the elevated bushfire risk from launch events, and the anticipated need to support launch events with fire services personnel and equipment (particularly during the fire danger season).

In addition, whilst the establishment of the launch facility would invariably lead to restricted public visitor access to the launch facilities site (and a net reduction of tourist traffic visiting Whalers Way), the launch activities themselves may generate a range of other visitors, both formal and informal, associated with each launch event. The local Council has raised this as a specific management issue, and where and how such visitors will be accommodated in the local area, and that specific vantage points should be established, along with appropriate communal facilities, such as carparks and public toilets. Road upgrades may also be required.

The funding for any visitor facilities outside the project area would need to be met, either through a developer contribution and/or public funding from state or local government. At a minimum, an Event Management Plan would need to be developed by the proponent to provide a management framework for how visitor numbers can be managed.

**The AR concludes that direct social and community impacts may be varied, due to the relative remoteness of the launch site from more settled areas, although the construction phase would result in increased demand for goods and services, and temporary accommodation for the construction workforce within and/or close to a regional city. There would be some inconvenience for local landowners with temporary traffic controls and possible speed restrictions to enable the movement of heavy vehicles and equipment to and from the site during the construction phase.**

## 13.17 Economic Impacts

South Australia plays a critical role in the development of the global space industry and the Whalers Way Orbital Launch Complex could provide a cost-effective economic opportunity for international space companies to access space from our State. There is forecast high demand, within the next few years, for satellites to reach polar orbit for geospatial services, earth observation, monitoring of the environment and climate change research. Australia is forging international partnerships for space related activities with leading companies in Europe, Japan, India and the United States of America.

The predicted economic value of launch in South Australia is conservatively valued at $500 million per annum based on a predicted pipeline of two launches per month. This amount could double to a one billion dollar per annum capability if the Whalers Way Orbital Launch Complex is approved for development, as the facility can cater to one launch per week, if required. Additional economic benefits can be expected through the Koonibba Test Range Complex which can capture the return of payloads. Southern Launch advises it currently has $170 million in presale contracts covering FY24-30 for this capture service.

The additional space sector investment opportunity for South Australia would also provide millions to the state as international launch vehicle companies would need to establish offices and employ technical level staff, such as aerospace engineers, to support launch campaigns. The location for these offices would most likely be Lot Fourteen and will provide additional contract and collaboration opportunities with companies in the existing ecosystem.

With the recent announcement of the Technology Safeguards Agreement (TSA) which allows for the transfer of US space technology including rockets and satellites to be launched and/or returned to Australia, the industry is poised to capitalise on the opportunity, with South Australia well-positioned to secure our state as the centre for space within Australia.

The proponent commissioned an Economic Impact Analysis of the project from the SA Centre for Economic Studies (SACES) in 2019, which was then updated in 2022. Additional advice was also sought in respect to the first test launch, and the importance of establishing a test launch facility in South Australia. The Response document concluded that the economic impact of the proposal was modelled to be significant in the context of the Eyre Peninsula, South Australia and Australia. The benefits apply from both the establishment of a launch facility in South Australia (in terms of a generic benefit), and to the local economy and Eyre Peninsula more specifically.

In general terms, the economic benefits of the project are as follows.

- Capital expenditure to construct and operate the development.
- Creation of employment opportunities (56 FTE direct, 15 FTE indirect) during operations and between 33-53 FTEs during construction.
- Demand for local housing and accommodation.
- Demand for goods and services.
- Contribution to Gross State Product of $26m by 2026/27.
- Supporting the growth of a local commercial space sector.
- Retaining and/or stimulating the growth of upstream activities (i.e. rocket and satellite manufacture). This would create additional opportunities and economic value to the state.

There are also downsides to the development activity proposed, largely from the closure and/or periodic restriction of visitors to Whalers Way, although it is but one attraction of many within the Port Lincoln area and wider region. Access to the development site is also conditional, noting the land is held under private ownership, where such formal or informal visitation arrangements could be discontinued at any time, either through a change of circumstance or land ownership.

However, it is reasonable to conclude that there will be an impact on tourism and visitation numbers, but there will be a form of substitution effect, in that other visits will be prompted by launch activities, and that overall visitor numbers – to the regional as a whole – could well be unaffected.

Whilst the proponent's assessment has indicated the potential for jobs to be created from rocket viewing events (i.e. launch visitation) at 5.1 FTE to 30 FTEs, over the course of several years, this would appear to be overly optimistic, in terms of how this might be reflected within the local economy.

Launches are expected to be infrequent over the course of a year, as compared to everyday access currently available for nature-based visitation at Whalers Way (albeit of lower economic value).

Other matters raised in the consultation period included the economic impacts from restrictions on aviation and marine vessels movements, through temporary exclusions zones imposed during launch activities. The proponent has responded that ample warning will be provided prior to each launch, and that appropriate management protocols will be put in place to minimise any disruption.

A draft Communications Protocol plan has been prepared.

This information will include the date and duration of the proposed launch window, the nominal flight trajectory of the rocket and the areas of greatest marine risk, as calculated through the application of the *Space (Launches and Returns) Act 2018*. The proponent has also advised that:

> *A marine safety zone is active in a defined area downrange of the site (based on the specific launch trajectory) from two hours before a launch window until 30 minutes following the launch window. The marine safety zone will only be active on a day when a launch is actually being attempted. Vessels are not permitted to remain in the marine safety area when active. Vessels seeking to cross the marine safety area are asked to contact Rocket Lab launch control to arrange coordination.*

A marine safety zone would only be designated when a launch is permitted (30 days prior, enabling sufficient coordination time) and will typically cover an area 25 km in width and 40-80 km in length.

The scheduling and operational process involved, is detailed in the Response Document. The approach has been supported by industry bodies and SARDI.

In response to a request from the State Planning Commission for further information for assessment, the proponent provided a document titled 'Request for further information – Launch Exclusion Zones' (undated), which further considered potential economic and operational impacts on seafood industries that could be affected. The assessment of all seafood industries that may operate within the area of temporary restriction zones was undertaken, primarily using the 'catch value' data in AgInsight, supplemented by additional information provided by the Department of Primary Industries and Regions South Australia (PIRSA). It was found that only a few seafood industries could potentially be affected by the four-hour duration temporary restriction zones. The rock lobster industry would be the main fishery affected. In the hypothetical, worst-case scenario, the maximum potential economic loss was calculated to be less than $45,000 per annum (noting the conservative assumptions used).

Importantly, the communication protocols proposed for launch events would enable the majority of fishers to plan operations around each restriction period, so that there would be no overall economic loss.

The report considered there would be an opportunity for the industry to gain an economic benefit from launch activities, by providing ocean services required in the implementation of the launch protocols (e.g., patrolling the marine exclusion zone pre, during and post launch and providing fuselage/debris recovery services). Historical test launch exercises required two vessels over a 1.5-3 day period. When extrapolating these costs for a maximum of 42 launches, the annualised cost ranges between $750,000 to $950,000, which could provide year-round income to the seafood industry.

The document also emphasised that Southern Launch has been engaging with representative organisations for the seafood industry for many years (including the development of the communication protocols). The following have advised, on behalf of their seafood sector, that they do not foresee any negative economic impacts due to the proposal:

- Spencer Gulf Prawn Fishermen's Association
- West Coast Prawn Fishermen's Association
- Australian Southern Bluefin Tuna Industry Association
- South Australian Sardine Industry Association
- South Australian Research and Development Institute

Primary Industry and Regions SA, in assessing this updated information, has provided commentary on the potential economic impact on commercial fishing operations. In recognition, and should the development be approved, it is recommended that consultation take place on operational protocols to further mitigate and manage any impacts, primarily through Seafood Industry South Australia.

Overall, the proposed development would have a significant direct and indirect economic benefit to the Eyre Peninsula region and to South Australia as a whole. The further development of a locally based space industry, will also support the adoption of new technologies, promote science and allied disciplines more generally, and provide opportunities for graduate employment.

**The AR concludes that the economic impacts of the development are positive, from a local, state and national economic perspective, notwithstanding the restrictions on nature-based visitation that will result from the establishment of a rocket launch facility.**

## 13.18 Infrastructure Requirements

The proposed development is not expected to have a significant and/or ongoing impact on existing infrastructure and services within the project area.

Infrastructure Site D is a construction compound proposed to accommodate activities and facilities that will support the construction and, subsequently, the on-going maintenance of the overall launch facility. The infrastructure site is proposed to consist of a:

- quarry to produce engineered pavement materials in the initial stage of the development, which will subsequently be converted into a water storage dam with a 30 ML capacity
- pump station
- workshop/maintenance building
- magazine for the storage of explosive compounds and dangerous goods
- potential provision for future on-site power generation.

A 30 ML capacity dam is also proposed to be located at Infrastructure Site D to provide for storage of water associated with uses across the whole of the project. Southern Launch will implement a testing regime for water in the retention basins as part of the irrigation management plan (Section 4.18 – Response Document).

The southern and eastern portions of the site would feature two stormwater detention facilities. The eastern portion of the site will feature the range control building. The building will be designed to complement the character of the locality and enhance the launch experience for both staff and visitors.

In addition, temporary infrastructure associated with construction of the development would primarily include a concrete batching plant, site and construction offices and facilities, laydown areas, and construction access tracks.

Water deluge is required to mitigate two impacts resulting from a launch. Primarily, the water deluge system reduces noise effect by generating water droplets. The water droplets interact with the generated sound waves and convert them to heat energy through the water being turned to steam. The secondary impact is the heat generated by the launch vehicle. The water deluge reduces the heat impact on surrounding concrete and other infrastructure, protecting it and extending its life.

Captured stormwater will be utilised in the water deluge system which ameliorates acoustic impacts during the launch. The EIS (Section 2.4.3.6) stated that the design of the water deluge system would cater for 1,600 L per second at 20 m head with the water storage being in a 150,000-L tank elevated on a 20-m tower. Water is to be pumped into the tower over an eight-hour period prior to a launch with delivery by gravity operation. The water would be tested for contaminants against appropriate guidelines and appropriately treated or disposed in accordance with relevant legislation.

Internal access tracks are required within the subject site to connect the physically separated sites. Southern Launch proposed to use existing internal tracks where possible and propose minor extensions where required. The EIS confirms the existing external road network is sufficient and suitable to support the intended use on site.

**The AR concludes there would be minor impacts to local infrastructure. Any impact on local infrastructure resulting from the development would be temporary and can be appropriately**

**managed. In addition, the temporary infrastructure proposed is warranted to support the construction phase of the development.**

## 13.19 Construction and Operational Effects

The project would be constructed and operated under a comprehensive environmental management framework outlined in the EIS (Appendix AD and Appendix AE). The following draft plans are provided in the EIS:

- Draft Construction Environment Management Plan (CEMP).
- Draft Operational Environment Management Plan (OEMP).

The environmental management framework identifies mitigation measures to avoid, mitigate, manage and/or control any potential adverse impacts of the construction, operation and de-commissioning of the development on the biological, physical, social or economic environment.

The proponent has confirmed the draft Management Plans would be reviewed and finalised following approval (if granted) to reflect any conditions of approval and the final design and scope of the facility.

In addition, specific management plans would address procedures for specific elements and events. These would be developed/finalised prior to the commencement of construction and operation to address specific activities that may result in environmental issues and could include:

- Air Quality Management Plan
- Biosecurity Management Plan and Response Procedure
- Bushfire Hazard Management Plan
- Contamination Management Contingency Plan
- Emergency Management Plan
- Fuel and Chemical Storage and Handling Plan
- Heritage Management Plan
- Native Vegetation Management Plan
- Fauna Management Plan
- Pest Plant and Animal Plan
- Noise Management Plan
- Offset Implementation Plan
- Sand Drift Hazard, Soil Erosion and Drainage Management Plan
- Spill Response Plan
- Stormwater Management Plan
- Waste Management and Minimisation Plan
- Water Quality Management Plan.

The plans set-out various legislative requirements and industry-accepted principles, procedures and practices to manage and mitigate construction and operational impacts to land and resources, and to further identify and protect areas of cultural significance.

The Southern Eyre Peninsula has been subjected to extensive bush fires throughout its occupied history. A specific Bushfire Management Plan (Appendix AB of the EIS) has been drafted by the proponent to manage and mitigate potential bushfire impacts to life, property and environmental assets during construction and operation of the project.

For noting, due to the sensitivity of the contents of the Emergency Management Plan, the document was not included in the package of information released to the public. Following the exhibition of the EIS, Southern Launch determined that further investigations were required in respect of bushfire risk assessment, mitigation and emergency management. Southern Launch engaged SA Bushfire Solutions to provide further advice and develop a Bushfire Emergency Management Plan for the proposed facility.

The Bushfire Management Plan will outline specific measures and detail the arrangements for seeking refuge, evacuation and relocation in the event of an emergency. The plan will also highlight potential issues to be considered when taking appropriate action in the event of a bushfire approaching the site.

The plan has been developed in consultation with key stakeholders, considers emergency situations that may occur on-site and the local bushfire environment and all potential sources of fire ignition. Bushfire risks would be mitigated through the installation of firefighting equipment at each individual launch event. The EIS stated that initial firefighting capabilities during rocket launch attempts will be supplemented by local Country Fire Service (CFS) crews. In addition, sufficient water would be located onsite to control and contain any unexpected fire event. CFS trucks/vehicles will also be present on-site during launch events.

The draft management plans have been reviewed by relevant state agencies – and subject to their further review and finalisation – are considered to be comprehensive and fit for purpose. It is understood that Southern Launch would be responsible for implementing each plan and would update them as required based on launch events and feedback from other authorities.

**The AR concludes the development can be undertaken to minimise impacts to the natural or developed environments within the locality, subject to the preparation, implementation and ongoing review of appropriate management plans as detailed in the EIS.**

## 13.20 Management, Mitigation and Monitoring

The proposal would need to be constructed and operated in accordance with a comprehensive environmental management framework, established by the EIS documentation and approval requirements, primarily through the implementation of Environmental Management Plans (and associated sub-plans and programs). The plans would address measures to minimize and mitigate all residual and/or short-term impacts that cannot be adequately avoided during construction and operation. The plans would need to prescribe measurable outcome-based objectives and metrics so that impacts and mitigation measures can be quantified and benchmarked. Monitoring and auditing would ensure the measures have been effective or require refinement to avoid any long-term detrimental impacts.

Periodic inspections, record keeping, formal auditing and compliance actions will need to be undertaken to verify that various conditions and requirements of any development authorisation are complied with, both at the state and Commonwealth level. Monitoring and reporting protocols would need to be included in the final CEMP and OEMP documents (including the need to periodically review and update these plans), ensuring a process of adaptive management and response is undertaken that can measure both the effectiveness and performance of the control and mitigation measures.

In particular, regular inspections and monitoring of work practices and potential impacts to native flora and fauna (especially threatened species) would be required over the course of the construction

and operational phases of the development. Importantly, the proponent has made a commitment to ongoing noise monitoring during launch events, until a detailed understanding/confirmation of the noise impacts of launches on the environment is understood. Monitoring and reporting protocols are included in the draft CEMP and EMP in the EIS, including compliance reporting in accordance with relevant licences/permits that would need to be issued.

The development would be required to be undertaken in accordance with a range of other legislative requirements and environmental standards that seek to protect, conserve and maintain the natural environment under the *Environment Protection Act 1993* (including companion air quality, water quality and noise policies), the *Landscape South Australia Act 2019* (including weed/pest control and water affecting activity policies and procedures) and the *Environment Protection and Biodiversity Conservation Act 2003*. Reference to these requirements will need to be carried across to various management plans.

The Australian Space Agency (ASA) regulates each individual launch to ensure public safety is assessed prior to each proposed rocket launch event. Southern Launch is committed to adopting measures requested by ASA and seeking all approvals from the respective regulators before undertaking each individual rocket launch event.

The development is required to be undertaken in accordance with other legislative requirements and environmental standards that seek to protect, conserve and maintain the natural environment where applicable (Section 1.6 of the EIS). Reference to these requirements will be carried across to various management plans.

**The AR concludes that a regular monitoring and reporting program, will ensure environmental impacts and established modelling can be verified and assessed during the operational phase of the development. In addition, monitoring and reporting will be undertaken to measure the impact of the development on nearby residents.**

## 14. Consistency with Current Planning Policies

The assessment of a Major Development proposal only has to have regard to current planning policies, comprising State Planning Policies, Regional Plans, the Planning and Design Code, and for reference purposes, previous Development Plans (now superseded). Unlike a standard development application, which is considered against the planning framework at the time of lodgement, a Major Development process is guided by more expansive guidelines, which cover a wider range of issues and requirements to be satisfied. The assessment also considers relevant planning policies (and other legislative requirements, policies, standards, guidelines etc) at the time it is conducted.

### 14.1 State Planning Policies

State planning policies (SPPs) address the economic, environmental and social planning priorities for South Australia. They are the highest level of policy in the state's planning system. SPPs set the general direction for new development within the state's urban and regional areas.

A number of SPPs are relevant to the assessment of the proposal:

**SP4: Biodiversity**—the maintenance of a healthy, biologically diverse environment ensures greater resilience to climate change, increases productivity and supports a healthy society. The Planning System has a role to play in ensuring biodiversity and associated life-supporting functions are maintained and enhanced. It does so by identifying and protecting areas of high biodiversity value,

ensuring development occurs in appropriate locations, and assessing the cumulative impact of development on biodiversity, including spatial, temporal and incremental impacts.

**Comment**: Objective 4.1 seeks to minimise impacts on areas with recognized natural character and values, such as native vegetation and habitat, so that critical life supporting functions to our state can be maintained, and where impacts to biodiversity cannot be avoided (Objective 4.5), these impacts should be minimised, and where possible offset. The development seeks to avoid, manage and/or mitigate such environmental impacts, including clearance footprints, minimising the area affected (and previously disturbed areas) and locating facilities adjacent to existing access roadways, where possible. In addition, any adverse impact on native vegetation that cannot be avoided or minimised will be offset by the achievement of a Significant Environmental Benefit contribution under the *Native Vegetation Act 1991*.

Overall biodiversity of the Whalers Way area (and the Heritage Agreement) would generally not be detrimentally affected by the proposal, which mainly affects the coastal strip. However, the proposal has the potential to significantly affect two endangered bird species due to disturbance from rocket launch noise. The level of impact is difficult to determine due to the unknown behavioural response of the birds, with conservative noise modelling indicating that birds within 1,000 – 1,250 m of launch sites (i.e. where the noise level would be 60 – 70 dB(A)) would be most affected. A range of environmental improvement measures would be implemented to benefit local biodiversity and counteract some of the impacts of the proposal.

**SP5: Climate Change**—seeks to build resilience within our built and natural environment through the adaption and mitigation of the impacts of climate change. The planning system has a role to play in supporting new infrastructure that can lower our carbon footprint (either directly or indirectly) and encourages the adoption of new technology.

**Comment:** Objective 5.5 seeks to avoid development in hazard-prone areas or, where unavoidable, ensure risks to people and property are mitigated to an acceptable or tolerable level through cost-effective measures. Whilst the biodiversity and ecological values of land also need to be considered (Objective 5.7), the development is strategically designed and sited to minimise impact on the ecological values of the land and includes mitigation measures to protect people and property within the locality.

**SP7: Cultural Heritage**—the enduring living, spiritual and cultural connection to the land is recognised and acknowledged as an essential part of our cultural heritage. For infrastructure projects, the planning system has a role to play by protecting places of recognised heritage value through early identification and avoidance, particularly those places, items and objectives of significance for South Australia's First Peoples.

**Comment**: Objective 7.2 seeks to recognise and protect Indigenous cultural heritage sites and areas of significance, whilst Objectives 7.3 and 7.4 seek to recognise, protect and maintain such places for the community and future generations more generally. Objective 7.5 seeks the implementation of appropriate design guidance to maintain heritage values, which is consistent with the design and relocation of Site A (being located outside of areas identified of having cultural significance). In addition, the proposal is not expected to impact on Aboriginal sites of archaeological or anthropological significance.

**SP13: Coastal Environment**— The interface between sea and land is dynamic and is subject to coastal hazards such as flooding, erosion, sand dune drift and acid sulfate soils. The impact of climate change and ongoing sea level rise has increased the risk for coastal developments and threatens the viability of tide dependent ecosystems and primary industry. The planning system

aims to conserve the marine and coastal environment. At the same time, it needs to enable existing settlements to be able to adapt to coastal hazards while ensuring new development is sustainable and not at risk.

**Comment**: Objective 13.1 seeks to protect and enhance the natural coastal environment and its resilience to a changing climate, including environmentally important features, such as mangroves; wetlands; estuaries; marine-protected areas; sand dunes; cliff tops; beaches; native vegetation; living creatures; and other important habitats. Objective 13.3 seeks to strike a balance between social and economic development outcomes in coastal areas with the protection of the natural environment. The proposal is considered to contain a suitable setback from the coastline and cliff-face, so that coastal landforms would not be affected (such as from earthworks, stormwater runoff and vibration during launches). Coastal fauna populations (especially endangered bird species) would be affected by noise disturbance from launch events during the operational phase. The setback would also minimise the visual impact of the proposed built structures.

**SP16: Emissions and Hazardous Activities**— Land-use planning has an important role to play in supporting industrial clusters and protecting communities from harmful emissions via separation. Identifying regional level (or cumulative) air quality and noise risks is critical to strengthening the liveability and resilience of our state. The planning system is one part of the government's integrated approach to managing site contamination. The role of the planning system is to ensure that as much as possible, land is not developed for more sensitive uses unless site contamination risks have been considered and appropriate cost-effective remediation measures put in place.

**Comment**: Objective 16.1 seeks to protect communities and the environment from risks associated with industrial emissions and hazards, while ensuring that industrial and infrastructure development remains strong through appropriate separation distances, zoning controls and minimising emissions. The Air Quality Impact Assessment, as updated for the revised location of Launch Site A, demonstrates that there is a low risk associated with air quality impacts from the proposed orbital launch complex and satisfies Schedule 2 of the *Environment Protection (Air Quality) Policy 2016.*

**Summary**: The Whaler's Way Orbital Launch Complex is considered to be consistent with current SPPs. The project includes mitigation measures to protect the surrounding coastal environment and is designed and sited to protect cultural heritage and ecological values of the locality. In addition, the facility is expected to become a significant tourist attraction in the region and would assist in the growth of space and sustainable defence industries in South Australia.

## 14.2 Regional Planning Policies

Each region in South Australia has a plan to guide development and reflect the vision of the State Planning Policies. Regional plans set the direction for future planning and development of South Australia. The current (operative) plans are the Eyre and Western Regional Plan (being a volume of the South Australian Planning Strategy).

Regional South Australia also encompass many matters of National Environmental Significance (NES) that are protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is noted that these matters will be principally considered under the existing EPBC Bilateral Agreement with the Commonwealth for projects previously declared under section 46 of the Development Act 1993.

Key points in the Eyre and Western Regional Plan include:

- retaining and enhancing the region's unique natural assets and culture to support tourism
- building population, employment and services in key growth centres that can also serve rural and remote residents and businesses
- recognising, protecting and restoring the region's environmental assets
- avoiding adverse impacts of development on the ecological health of coastal, estuarine and marine environments
- avoiding adverse impacts on identified scenic landscapes through appropriate development, siting, design and landscaping choices
- protecting, enhancing and promoting the assets and activities that attract tourists and that are of value to the community and
- ensuring high-quality design of developments to protect scenic landscapes and productive coastal areas.

In summary, whilst the Eyre and Western Regional Plan was released in April 2012, it is noted that the plan specifically seeks to retain and enhance the region's unique natural assets, whilst encouraging commercial and economic opportunities to stimulate employment and growth in the region.

It is acknowledged the proposal would have varying degrees of impact on the immediate natural environment which are generally considered to be locally significant. The main impact would be the potentially significant effect on two endangered bird species, due to disturbance from rocket launch noise. Appropriate mitigation measures would be implemented to minimise the majority of impacts, with an ongoing commitment to environmental management and monitoring.

When considered holistically, the proposal is considered to create growth opportunities for the region, including employment opportunities and ancillary economic benefits that support key centres in the region, in accordance with key economic policies of the Eyre and Western Regional Plan.

## 14.3 Planning and Design Code

### 14.3.1 Zones

On 29 August 2019 a proposal by Southern Launch to establish an orbital space launch facility at Whalers Way, Sleaford was declared a Major Development by the former Minister for Planning under section 46 of the *Development Act 1993*. The assessment of a Major Development only has to have regard to the policies of the Planning and Design Code, due to the focus on the strategic benefits of a proposal. This is unlike a standard development application that has to be in general accordance with the policies of the Code.

The assessment of a Major Development is based on the planning policies (and legislative requirements) that apply at the time of making a decision for a proposal. For a standard development application, the assessment is based on the policies that apply at the date of lodgement. Thus, this assessment has been considered in the context of the planning policies contained within the current Planning and Design Code. A detailed assessment of the development against the relevant desired outcomes and performance outcomes of the Code are contained in Appendix C.

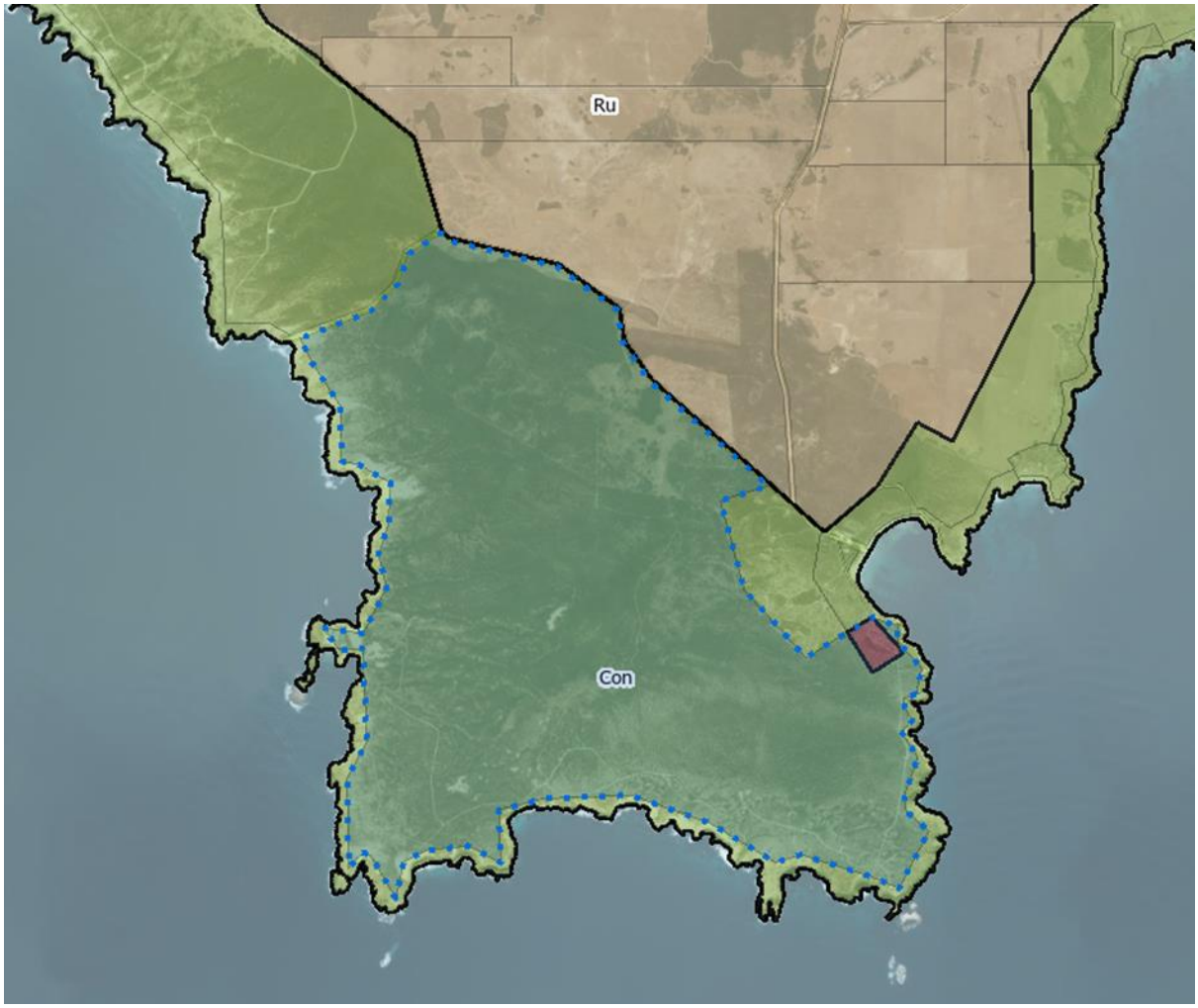



**Figure 60: Zoning (Source: Planning and Design Code)**

Where relevant, and to provide appropriate context, comparisons are also drawn to that superseded planning policy contained previously with respective Council Development Plans. A summary of repealed Development Plan Policy is provided in Appendix D.

The site of the proposed development is located within the Conservation Zone (Visitor Experience Subzone) of the Code v2022.18 dated 29 September 2022. It is noted that a portion of the host allotment is designated as Caravan and Tourist Park Zone to the west, however, this represents a small (approximately 17 ha) area of land adjacent the Right Whale Road entry point to the land, in proximity to Fishery Bay.

The Conservation Zone seeks the conservation and enhancement of the natural environment and natural ecological processes for their ability to reduce the effects of climate change, for their historic, scientific, landscape, habitat, biodiversity, carbon storage and cultural values and provision of opportunities for the public to experience these through low-impact recreational and tourism development. The repealed Lower Eyre Peninsula (DC) Development Plan contained similar policies that seek development that is subservient to the conservation of the coastal environment to ensure that the fragile coastal environment is protected, and biodiversity maintained.

The key policies of the Conservation Zone do not envisage the development of a rocket-launch facility or supporting ancillary development proposed. The proposed development is an undefined

land use when considered against the Code and is not specifically envisaged within the Conservation Zone.

The Built Form and Character provisions of the Zone include policy objectives for buildings and structures to be sited and designed unobtrusively, to minimise the visual impact on the natural environment. In addition, the Zone seeks development that does not obscure existing public views to landscape, river or seascape features and is not visibly prominent from key public vantage points, including public roads or car parking areas.

The proposed development does not include a land use listed in the Conservation Zone (Visitor Experience Subzone) and is in contravention of the intent, objectives and policies of the Zone. Whilst the vast majority of the native vegetation and biodiversity of the site would be largely unaffected by the proposed development, the main effects would be concentrated around the two launch pads near the coast. The key impact would be the potentially significant effect on two endangered bird species, due to disturbance from rocket launch noise. This would result in a level of environmental trade-off in order to secure the strategic and economic benefits of the proposal to the region and the state. The site selection process identified Whalers Way as the most suitable from a range of logistical, social and environmental perspectives. It is considered that the strategic importance of the proposal justifies the proposal being at variance with the zoning (and the coastal overlay).

The current unmanaged recreational and tourism use of Whalers Way would be changed if the site is used for a rocket launching facility. During launch campaigns, the public would be excluded from the site for safety and security reasons. Public access to the site may be prevented on the private land parcel (such as for environmental reasons) or substantially restricted (based around managed tourism, such as guided tours or 'glamping'). It is noted the EIS mentions that the proposal may introduce future tourism experiences and opportunities in the region and South Australia (such as 'space tourism'). Any tourism opportunities are required to avoid delicate or environmentally sensitive areas such as sand dunes, cliff tops, estuaries, wetlands or substantially intact strata of native vegetation. A separate development application may need to be lodged for any future tourism uses, which would be assessed against the Code and Zone planning policies. Preventing or prohibiting access would mean the public could not visit the coastal features and vantage points around the site.

The subject land adjoins the Caravan and Tourist Park Zone (towards the north-east). The zone is situated on private land owned by the lessor of the development site. There are no current tourist facilities established at this location. It is considered the proposal would not prejudice the intent of the Caravan and Tourist Zone nor would a tourist facility on the land prejudice the operation of a rocket launch facility.

### 14.3.2 General Development Policies

General Code policies considered to be applicable are summarised in Appendix C. General Code provisions primarily relate to the impact of a proposal on sensitive receivers and provide guidance to ensure development is located and designed to mitigate adverse effects on or from neighbouring and proximate land uses.

The *Interface between Land Uses* general policy seeks that development is located and designed to minimise adverse impacts to adjacent land uses. The establishment of the launch facility would have an impact on the immediate and surrounding environment. These impacts can be appropriately

managed through the implementation of specific management plans, with ongoing review from relevant agencies.

In regard to the short-term impacts during construction, such as noise / dust emissions and heavy vehicle movements, these would be minimised and managed through a Construction Environmental Management Plan (CEMP).

It is acknowledged there will be some noise associated with the launch events at the facility, however each launch will be limited to the period the rocket is within 10 km of the launch site (60 seconds from lift off). The proposal anticipates approximately 36 launch-events per year (once every three weeks). This high-level noise would be brief, but similar to the noise of a large airplane. Due to the short duration of the launch, the noise generated will not create an ongoing a hazard or nuisance to adjacent land uses and is considered to sufficiently accord with key policies of the *Interface between Land Uses* general provisions.

Code policies seek development integrated with the existing transport system and designed to minimise its potential impact on the functional performance of the transport system. In addition, safe and convenient access should be provided to minimise impact or interruption on the operation of public roads. The proponent has committed to implementing mitigation measures as outlined in the Traffic Assessment undertaken by WGA.

### 14.3.3 Overlays

The following overlays are considered relevant: Coastal Areas, Hazards (Bushfire - High Risk), Marine Parks (Managed Use), Native Vegetation, State Significant Native Vegetation and Water Resources. The overlays provide guidance for biodiversity and native vegetation conservation, protection of water resources, bushfire protection, coastal protection, and hazard risk minimisation.

A summary of the key desired outcomes of each Overlay is contained below:

The **Coastal Areas Overlay** seeks the natural coastal environment (including environmentally important features such as mangroves, wetlands, saltmarsh, sand dunes, cliff tops, native vegetation, wildlife habitat, shore and estuarine areas) is conserved and enhanced.

The **Hazards (Bushfire - High Risk) Overlay** seeks development that is sited and designed to minimise the threat and impact of bushfires on life and property.

The **Marine Parks (Managed Use) Overlay** aims to protect marine habitats and biodiversity are protected through limiting development to coastal infrastructure (jetties, marinas, pontoons), aquaculture, tourism, recreation and renewable energy facilities.

The **Native Vegetation Overlay** aims to protect areas of native vegetation, and ensure they are retained and restored in order to sustain biodiversity, threatened species and vegetation communities, fauna habitat, ecosystem services, carbon storage and amenity values.

The **State Significant Native Vegetation Areas Overlay** aims to protect, retain and restore significant areas of native vegetation.

The **Water Resources Overlay** aims to protect the quality of surface waters considering adverse water quality impacts associated with projected reductions in rainfall and warmer air temperatures as a result of climate change.

**The AR acknowledges the proposal is not specifically envisaged within the Conservation Zone, is an undefined land use and is generally in contravention of the zone objectives and policies. Thus, there would be a level of environmental trade-off in order to secure the strategic and economic benefits of the proposal to the region and the state. The site selection process identified the Whalers Way site as the most suitable from a range of logistical, social and environmental perspectives. It is considered that the strategic importance of the proposal justifies the proposal being at variance with the zoning and the coastal overlay.**

**The development, whilst occurring within an area of ecological value and importance, has been designed and sited to minimise its impact on the biodiversity and ecology of the area as far as practical. In addition, the proponent has committed to implementing measures within the EIS to minimise impact on the immediate environment, coastal areas and fauna and flora in accordance with key provisions of the Code.**

## 15. Conclusions

The Environmental Impact Statement (EIS) and associated documentation that form the major development application provide a comprehensive analysis of the potential benefits, impacts and implications of establishing the Whalers Way Orbital Launch Complex on the Eyre Peninsula. The EIS process involved extensive consultation with the public, affected councils and relevant state government agencies to inform the assessment process. It is acknowledged that a substantial number of public submissions raised several concerns with the proposal, especially the potential environmental impacts and whether an ecologically sensitive site, with high landscape and tourism values, is an appropriate location for such an 'industrial' type of activity. More specifically, the site is within a native vegetation Heritage Agreement Area and a Conservation Zone (and Coastal Areas, High Risk Bushfire Hazards, Significant Native Vegetation Areas and Marine Parks overlays) where the proposal generally contravenes the environmental protection objectives. It is also recognised that a similar number of submissions were in support of the proposal, especially due to the potentially significant economic benefits the proposal could deliver to Port Lincoln, the region and the state.

The Department for Environment and Water expressed concern about the paucity of information and knowledge about the potential impact of rocket launch noise on the long-term viability of endangered bird populations and coastal raptors, plus the level of environmental improvements that could be achieved to counteract potential impacts. The Department of Primary Industries and Regions (PIRSA) expressed concern about the potential economic impact on commercial fisheries, predominantly due to the imposition of exclusion zones during launch events. It was noted the proponent has consulted with relevant industry groups (and will further consult with Seafood Industry SA) and a Communications Protocol for launch events would be implemented. The EPA had no concerns with the proposal, noting that certain activities would need to be licenced under the *Environment Protection Act 1993*.

The District Council of Lower Eyre Peninsula raised concerns about the impact on local roads. The AR considers that the proponent should be responsible for any additional road maintenance requirements, as negotiated with council via a Road and Traffic Management Plan and a Road Infrastructure Agreement.

The establishment of rocket launching facility on the Eyre Peninsula would provide critical infrastructure to support the development of the emerging space industry in South Australia. Combined with the space industry precinct established at 'Lot Fourteen' in Adelaide (and the Australian Space Agency), the proposal aims to be a key component of the state government's strategic objective to foster a space industry. Importantly, establishing an Australian launch facility would provide sovereign capability and strategic advantages for the nations' defence capabilities (especially for surveillance requirements). Direct economic benefits would arise through employment and investment, especially for Port Lincoln and the Eyre Peninsula Region (including flow-on effects to the goods and services sector). Enhanced nature-based tourism and space tourism could also provide significant benefits (including increased exposure for regional tourist attractions). Overall, the economic value of the proposal to South Australia is conservatively valued at $500 million per annum, based on a predicted pipeline of two launches per month.

An extensive site selection process has been undertaken to choose a preferred location that meets the operational requirements of a rocket launching facility, whilst minimizing environmental and community impacts as far as practicable. Due to the specific criteria for the siting of launch pads (especially trajectory options and buffer zone requirements) and the constraints imposed (especially avoiding residents), the Whalers Way location provides the opportunity for safe and effective launch activities. In particular, being located close to the service centre of Port Lincoln provides a significant

benefit to maximise the potential economic opportunities the proposal could generate (and to attract workers), especially for local businesses and allied industries. The trade-off will be the selection of a location that has substantial environmental, landscape and recreational/tourism values. However, suitable environmental offsets are proposed and improved environmental management of the site would assist in counteracting the impacts of the proposal.

The proposed site contains a large tract of intact remnant vegetation that is in good condition and provides habitat critical to the survival of a number of listed threatened fauna species, especially the nationally endangered Southern Emu-wren (Eyre Peninsula) and Western Whipbird (eastern). The individual sites selected for the launch pads and supporting infrastructure were designed to utilise areas that have already been partially cleared or disturbed by recreational uses of the site. Launch Pad A was relocated to a site that required less clearance of critical habitat. It is proposed to remove a total of 23.4 ha of native vegetation, which comprises critical habitat for the Whipbird and Emu-wren, although the sites chosen (especially for the launch pads) have been identified as containing sub-optimal habitat for the Emu-wren and Whipbird. The native vegetation to be cleared would be offset by the Significant Environmental Benefit (SEB) required under the *Native Vegetation Act 1991*. A management plan for the Heritage Agreement would also be implemented that would aim to improve the environmental values of the area to help mitigate the impacts of the proposal and lead to better environmental outcomes (especially the eradication of Bridal Creeper, rabbits, foxes and feral cats). In particular, existing disturbed areas would be rehabilitated and revegetated. The AR recommends that public access to the site be prohibited or substantially restricted, in order to reduce current human disturbance impacts on the environment. An Environmental Improvement Program is recommended to be implemented for the entirety of the Heritage Agreement area, to maximise opportunities to counteract the potential impacts of the proposal (including the restoration of all areas degraded by recreational use).

The most significant impact on terrestrial native fauna would be the direct loss of habitat due to vegetation clearance for the footprint of each site and potential displacement due to rocket noise during a launch event. Noise during launch events is likely to cause a short-term disturbance that could temporarily affect the hearing of fauna or cause momentary stress and/or displacement from a territory, primarily for the Emu-wren and Whipbird. Whilst a relatively small number of individual bird territories could be affected, this could be significant due to very low population numbers and the disconnected nature of critical sub-populations. Due to the uncertainties about the actual nature and level of impact, the effect on the breeding success and survival rate of each species is difficult to predict with certainty. Investigation undertaken for the EIS and Response Document has improved the knowledge of each species, which would be further enhanced by the proposed ongoing monitoring programs (and the PhD study on the Emu-wren).

Threatened species that could also be indirectly affected are the Eastern Osprey and White-bellied Sea Eagle, due to disturbance from launch noise. Whilst the EIS identified that there were no active nest sites near the launch pads, at least one Osprey nest became active in the 2023 breeding season. However, active nests in the locality are located a suitable distance away to not be significantly impacted. A Coastal Raptor Monitoring Program (including a comprehensive survey) would be implemented to identify the status of nearby nest sites and whether these species are affected during operation.

The proponent has undertaken adequate investigations into the types and levels of noise that would be generated during the construction and operational phases of the proposal. In particular, modelling was used to generate noise contour maps for each launch pad site. The modelling was for a worst-case scenario (i.e. noise levels for a much larger rocket than would be launched) and was refined by using recently acquired data from similar rockets to be launched and noise monitoring results from an

engine testing event. Monitoring was undertaken on the site to determine existing background noise levels, which were compared with the modelled levels to determine noise impacts.

Noise criteria were set for the closest 'sensitive receivers' in the locality (i.e. three residences approximately 3.5 km from the launch pads), being categorised as Rural Living in accordance with the EPA Environment Protection (Noise) Policy 2017. It is noted the noise policy does not specifically address rocket launching activities. The modelling indicated that noise at nearby residences would unlikely cause a significant impact (i.e. no greater than a DNL of 65 dB(A) for the largest rocket that could be used). However, due to the nature of a launch noise, during the day it might reach an annoying outdoor level for a brief period (i.e. for one to two minutes), whereas at night it could momentarily disturb sleep.

Noise criteria for 'environmental receivers' (especially threatened bird and marine mammal species) were determined based on relevant scientific literature. Survey records for the Emu Wren and Whipbird were plotted onto noise contour maps to determine the potential extent of behavioural responses to launch noise. The worst-case modelling identified that noise levels that could cause mortality or injury to fauna would be limited to the immediate site of a launch pad, where no birds are likely to be present due to disturbance from launch activities. Non-lethal/injurious noise levels that could have impacts would occur over a much larger area. The majority of recordings are around 1,000 – 1,2500 m away, which is within the 60 – 70 dB(A) noise contour. Within this zone, any birds present could experience temporary hearing loss (impairment) and reduced ability to identify other bird calls (masking). The noise would also elicit a fright-flight behavioural response that could cause stress for birds. Birds may momentarily leave a territory (although their nature is to only fly a short distance away) or they may habituate to the intermittent disturbance. Other terrestrial, coastal and marine species would be buffered from noise impacts due to suitable separation distances.

A Noise Monitoring Programme (including the installation of permanent noise monitoring equipment) would be implemented for the operational phase, which would build on the baseline monitoring undertaken for the EIS and Response Document. It would also be linked with the ecological monitoring programs, primarily for the populations of threatened bird species surrounding the launch sites.

For threatened coastal and marine species, noise from a launch may result in a behavioural response for species using habitat generally within 1 km of the launch site but could extend up to 6 km (including the nearby Liguanea Island) for the largest rockets launched. The island is an important haul out site for threatened Australian Sea-lion, a nesting site for migratory seabirds (such as the Short-tailed Shearwater and Crested Tern) and a nesting site for coastal raptors (such as the White-bellied Sea Eagle). Any launch noise transmitted underwater, is unlikely to affect the hearing of marine mammals, although noise from the largest rockets may have minor, short-term impacts on the behaviour close to shore. Southern Right Whales that congregate at the nearby Sleaford Bay are unlikely to be adversely affected. As a precaution, it is proposed that launches would be delayed until any whales observed within close proximity of the site, have moved on.

Monitoring of seal behaviour and noise on Liguanea Island and underwater noise in the nearshore area near the launch sites would be undertaken before, during and after launches. A review of risks to the marine environment would be undertaken after the first three years of operation. If needed, noise impacts on marine fauna could be minimised by avoiding launches during particular periods in the breeding cycles of affected species.

A rocket explosion (air burst) over the Liguanea Island would be a very rare event that could potentially result in mortalities. However, there would be negligible impact at subpopulation level. Similarly, the

likelihood of discarded rocket debris colliding with individuals of marine species was considered to be remote and would not occur when animals are submerged. If required, the use of a Flight Termination System would enable rockets to be detonated in mid-air, away from any environmentally sensitive areas. Any pollution impacts from rocket debris would be highly localised and the area impacted would be insignificant in comparison to the extent of the marine environment. Thus, population level effects would be negligible. Rocket debris would also pose an insignificant level of toxicity risk.

The establishment of a rocket launching facility would also introduce an additional potential source of fire to the site, that could increase the current fire risk for the area (including from the recreational use of the site, lightning or a fire external to the site). A widespread bushfire would have the potential to cause catastrophic damage to the site, especially the loss of threatened species populations. The implementation of a suitable Bushfire Emergency Management Plan would adequately reduce this risk, especially with a fire response based on the provision of on-site firefighting equipment and back-up emergency response contingencies (including water bombing aircraft). Constant surveillance of the site during operation would enable a rapid respond to any identified fire.

Other issues that were addressed in the AR are outlined below.

- Potential impacts to sites of European and Aboriginal Cultural Heritage have been appropriately identified and considered, and any construction works and operational processes can be appropriately avoided or managed.
- The visual impacts from launch facility infrastructure have been reduced through site selection (and setbacks from the coastline), using temporary infrastructure where possible. In addition, suitable materials and finishes are proposed to visually integrate the structures and complement the existing character of the area.
- Impacts on air quality are considered acceptable and would comply with relevant legislative policies and guidelines.
- No existing or potential contamination source that could impact on the quality of soil and water on site has been identified. The CEMP and SEDMP propose appropriate mitigation measures to minimise potential contamination sources (such as chemical storage, wastewater management, etc.) to land conditions and the coastal environment.
- Temporary waste sources can be appropriately minimised and managed during the construction phase.
- An appropriate level of investigation regarding public safety and security has been undertaken, including the identification of risks and measures to be implemented prior to launch-events and during/after emergency events.

The proposal would need to be constructed and operated in accordance with a comprehensive environmental management framework established by the EIS documentation, with approval requirements, primarily through the implementation of Environmental Management Plans (and associated sub-plans and programs). The plans would address measures to minimize and mitigate all residual and/or short-term impacts that cannot be adequately avoided during construction and operation. The plans would need to prescribe measurable outcome-based objectives and metrics so that impacts and mitigation measures can be quantified and benchmarked. Monitoring and auditing would ensure the measures have been effective or require refinement to avoid any long-term detrimental impacts.

The AR concludes that the EIS site selection process identified the Whalers Way site as the most suitable location based on a range of logistical, social and environmental perspectives. However, the site is problematic as it is within a Conservation Zone under the Planning and Design Code where the

type of development proposed is not envisaged. The site is also within a native vegetation Heritage Agreement Area that supports large tracts of intact vegetation and habitat for threatened species. The main impact would be the effect of operational noise on the nationally endangered Southern Emu-wren (Eyre Peninsula) and Western Whipbird (eastern). Thus, there would be a level of environmental trade-off in order to secure the strategic and economic benefits of the proposal. On balance, and in consideration of the potential environmental, social and economic impacts, it is considered the proposal has sufficient merit and can be supported.

## 16. Recommendations

**PART A: MATTERS RESERVED FOR FURTHER ASSESSMENT AND APPROVAL**

1. **A Works Program** that identifies the stages or phases of construction of the development.

2. **A Stage Details Plan** for each stage that is identified in an approved Works Program, which must include:

   (a) final detailed designs for all components of the orbital launch facility complex (i.e. Sites A, B, C, D and E) and related civil infrastructure, including site plans, building floor plans, elevations, cross-sections, specifications and details of cut and fill; and
   (b) final detailed plans for all temporary construction components (i.e. laydown areas, works compounds, storage areas, concrete batching plants etc.).

   *Reason: Conditions 1-2: Provision of an overall works program for the sequenced construction of each project element, and the final detailed design plans.*

3. **An Environmental Improvement Program**, prepared in consultation with the Department for Environment and Water and the Eyre Peninsula Landscape Board. The Program must detail measures to be undertaken to rehabilitate and restore degraded areas within the entirety of the Heritage Agreement Area (including the removal or restriction of recreational uses).

   *Reason: Provision of the Program for environmental management of the Heritage Agreement Area to address degrading/threatening processes that affect habitat quality and to improve the ecological value, so as to counteract the potential impacts of the launch facility.*

4. **A Construction Environment Management Plan (CEMP)**, prepared in consultation with the Environment Protection Authority; the Department for Environment and Water; the Country Fire Service; the Eyre Peninsula Landscape Board and the District Council of Lower Eyre Peninsula. The CEMP must (at a minimum) detail the predicted impacts of the major development on the following matters, the measures that will be implemented to manage and monitor the predicted impacts on those matters, and the predicted effectiveness of the measures:

   (a) sand drift hazard, soil erosion and drainage
   (b) geomorphology and groundwater
   (c) flora and fauna
   (d) weeds and pests
   (e) air quality
   (f) noise and vibration
   (g) waste and litter
   (h) soil contamination and spill hazards
   (i) traffic
   (j) cultural heritage; and
   (k) local community impacts.

   *Reason: Provision of the CEMP to control for temporary (potential) impacts to the local environment during construction of the development.*

5. **An Operational Environmental Management Plan (OEMP)**, prepared in consultation with the Environment Protection Authority; Department of Environment and Water; the Department of Primary Industry and Regions South Australia; the Country Fire Service; the Eyre Peninsula Landscape Board and the District Council of Lower Eyre Peninsula. The OEMP must include an annual review procedure, including the provision of reporting to the Minister for Planning. The OEMP must (at a minimum) detail the predicted impacts of the major development on the following matters, the measures that will be implemented to manage and monitor the predicted impacts on those matters, and the predicted effectiveness of the measures:

   (a) sand drift hazard, soil erosion and drainage
   (b) geomorphology and groundwater
   (c) flora and fauna
   (d) weeds and pests
   (e) air quality and greenhouse gas emissions
   (f) noise and vibration
   (g) water quality
   (h) waste and litter
   (i) soil contamination and spill hazards
   (j) fuel and chemical storage
   (k) traffic; and
   (l) local community impacts.

   *Reason: Provision of the OEMP to control for temporary (potential) impacts to the local environment during the operation of the development.*

The CEMP and OEMP must incorporate the following sub-plans, where relevant:

6. **A Native Vegetation Management and Monitoring Plan**, prepared in consultation with the Department for Environment and Water and the Eyre Peninsula Landscape Board. The Plan must address:

   (a) vegetation clearance requirements of the Native Vegetation Council
   (b) vegetation clearance practices
   (c) restoration measures, such as site preparation, natural regeneration or direct seeding
   (d) protection and maintenance of remnant vegetation, including and the control of current/future degrading factors (especially erosion)
   (e) vegetation maintenance during operation, especially to maintain access or for safety clearance zones/asset protection zones around facility infrastructure
   (f) pest plant and animal control
   (g) fire management; and
   (h) monitoring requirements.

   *Reason: Provision of the Plan to ensure that vegetation clearance controls and rehabilitation protocols both minimise clearance and allow for the expeditious rehabilitation of coastal species to control erosion and to restore and improve local habitat.*

7. **A Threatened Species Management and Monitoring Plan**, prepared in consultation with the Department for Environment and Water and the Eyre Peninsula Landscape Board (and

possibly the Australian Government Department of Climate Change, Energy, the Environment and Water). The Plan must address the measures to be implemented to avoid, minimise and off-set impacts on each threatened species that could be affected by the proposal (including consideration of any Recovery Plans that relate to each species). Species of State and Regional conservation significance listed under the South Australian *National Parks and Wildlife Act 1972* and species listed under Commonwealth the *Environment Protection and Biodiversity Conservation Act 1999* must be addressed in the Plan. The Plan must also include the following items.

(a) A Coastal Raptor Monitoring Program, with an annual Eastern Osprey and White-bellied Sea Eagle nest survey to be implemented for the 2024 breeding season (including May/June and September/October surveys). The Program must be designed in general accordance with the Whalers Way Coastal Raptor Memorandum, prepared by EBS Ecology and dated 24/02/2022, that was included in the Response Document (Appendix F). Surveys must be undertaken by a suitably qualified coastal raptor expert (including the identification of appropriate mitigation and monitoring measures to be incorporated into the Plan).

(b) A Southern Emu-wren (Eyre Peninsula) and Western Whipbird (eastern) Monitoring Program, with an annual survey to be implemented for the 2024 breeding season. The Program must be designed in general accordance with the methodology adopted for the rocket test launch campaign that was included in the Response Document (Appendix D). Surveys must be undertaken by a suitably qualified avifauna expert.

(c) Monitoring of seal behaviour and noise on Liguanea Island and underwater noise in the nearshore area near the launch sites to be undertaken before, during and after launches. A review of risks to the marine environment would need to be undertaken after the first three years of operation. If needed, noise impacts on marine fauna could be minimised by avoiding launches during particular periods in the breeding cycles of affected species.

*Reason: Requires the preparation and implementation of the Plan for the life of the development, which seeks to ensure the on-going monitoring of threatened species is undertaken in accordance with recognised scientific methods by qualified environmental practitioners at regular intervals. Such research findings must be published online, and subject to peer review if required by the Minister for Environment and Water.*

8. **A Noise Monitoring Program** for the construction and operational phases, prepared in consultation with the Environment Protection Authority. The Program must be designed in general accordance with the methodology adopted for the rocket test launch campaign that was included in the Response Document. An annual reporting framework must be submitted that details the results of the noise monitoring and verification of the noise modelling undertaken for the Environmental Impact Statement and Response Document, including independent peer review.

9. **A Pest Plant and Animal Management and Monitoring Plan**, prepared in consultation with the Department for Environment and Water and the Eyre Peninsula Landscape Board.

*Reason: To ensure that weeds are controlled and feral animals within the project area are permanently eradicated, to assist in the further rehabilitation of the land.*

10. **A Sand Drift Hazard, Soil Erosion and Drainage Management Plan**, prepared in consultation with the Environment Protection Authority and the Department for Environment and Water.

    *Reason: To ensure that construction and operational activities do not result in coastal erosion, through the provision of a management plan that avoids, mitigates, manages or rehabilitates such impacts to the natural environment.*

11. **A Fire and Emergency Management Plan**, prepared in consultation with the South Australian Country Fire Service and Safework SA.

    *Reason: To ensure the risk of fire events associated with operational activities are minimised, consistent with SA Country Fire Service requirements.*

12. **A Road and Traffic Management Plan**, prepared in consultation with, and to the satisfaction of, the relevant road authority (District Council of Lower Eyre Peninsula and/or the Department for Infrastructure and Transport) under the *Local Government Act 1999* and the *Highways Act 1926*. The Plan must address the following matters:

    (a) the type of vehicles to be used, their distributions and frequency

    (b) safety impacts associated with transport of rocket componentry, propellants and other materials used in both the assembly and launch process during operational use

    (c) traffic management strategies (where required):

    - speed limits along the length of the route (having regard to safety considerations, the impact on the road surface, the protection of native fauna and any other relevant matters)

    (d) required road infrastructure upgrades and road maintenance requirements. A risk-based approach must be used to determine all road infrastructure upgrades, including school bus routes, tourism operators and visitors and local residents and businesses.

    The Plan must include all roads and intersections proposed for the transport of construction materials and operational components of the development and a Pavement Monitoring & Management Sub-plan.

13. **A Road Infrastructure Agreement**, outlining the financial arrangements and/or contributions associated with any required road infrastructure upgrades and ongoing maintenance arrangements, where relevant, entered into between the proponent and the relevant road authority (District Council of Lower Eyre Peninsula and the Department for Infrastructure and Transport) under the *Local Government Act 1999* and the *Highways Act 1926*.

    *Reason: Conditions 12-13 are to ensure that the development provides safe, efficient and appropriate access for the types of vehicles and number of movements during the construction and operational phases of the development, including initial upgrade works to local and state roads, and to maintain an agreed service level over the life of the orbital launch facility.*

14. **A Waste Management and Minimisation Plan**, prepared in consultation with the Environment Protection Authority and District Council of Lower Eyre Peninsula (to the extent relevant to their respective legislative authority).

    *Reason: To ensure that waste materials generated from the site are appropriately managed, from initial identification, separation, temporary storage, re-use and off-site disposal. The Plan must develop and implement source reduction strategies to minimise the generation of waste and to maximise re-use and recycling of waste streams.*

15. **A Cultural Heritage Management Plan**, prepared in consultation with the Traditional Owner groups and the relevant Aboriginal heritage representatives, that establishes protocols to apply to the discovery of any Aboriginal sites, objects and/or remains during construction.

    *Reason: To ensure the Plan identifies, protects and maintains Aboriginal cultural heritage sites, artefacts and objects during the construction and operation of the development, including on-going cultural awareness training for employees and visitors to the site.*

16. **A Communication Protocol** for launch events and the associated implementation of exclusion zones and temporary restricted areas, prepared in consultation with Seafood Industry South Australia.

    *Reason: To ensure launch events (and the approved launch window and expected exclusion zone areas) are made known to the commercial fishing sector, with the means and method of notice prepared in conjunction with industry representatives, including the establishment of an information line by Southern Launch. The protocol must cover the overall period of exclusion, potential delays, and the notification to resume operations.*

17. **A Launch Event Management Plan**, prepared in consultation with the District Council of Lower Eyre Peninsula. The Plan must address the likely increased visitation to the location to observe a launch event, including public communication, signage, traffic management and measures to enhance the visitor experience (such as providing suitable viewing opportunities).

18. **Complaints Management Procedure and Community/Stakeholder Engagement Plan**, prepared in consultation with the District Council of Lower Eyre Peninsula.

    *Reason: Conditions 17-18 are to establish, maintain and publish management procedures for each launch event, and provide a complaints management procedure and engagement plan to ensure such events are undertaken in a safe and efficient manner for both local residents, visitors and the public more generally.*

19. **Building Rules compliance** must be assessed and certified for each stage or component of the development by an accredited professional (or by a person determined by the Minister) and a copy of all relevant certification documentation must be provided to the Minister.

    *Reason: To ensure the safety and stability of construction in accordance with the National Construction Code, and relevant state building policies, being certified by an accredited building professional.*

**PART B: GENERAL CONDITIONS**

20. In regard to the satisfaction of the reserved matters and general conditions (as outlined in Parts A and B of the Decision Notice), documentation submitted by the proponent shall be considered by an across government Working Group, chaired by the Department for Trade and Investment – Planning and Land Use Services. The Working Group shall comprise relevant state agency and local government representatives (plus the proponent - Southern Launch), from which advice to the Department and/or Minister for Planning will be provided to determine whether each reserved matter or condition has been satisfactorily addressed, or whether further information is required.

    *Reason: To ensure that final plans and documentation is reviewed by relevant state agencies and the local council before construction and/or implementation. This may also result in the imposition of additional conditions related to their satisfaction.*

21. Except where minor amendments may be required by other legislation or by conditions imposed herein, the construction, operation, use and maintenance of the development must be undertaken in accordance with the approved plans and details, drawings, designs and specifications:

    (a) Set out in the application:
        (i) Whalers Way Orbital Launch Complex – Environmental Impact Statement – June 2021 (including Appendices A to AE)
        (ii) Whalers Way Orbital Launch Complex – Response Document – August 2022
        (iii) Southern Emu-wren Management Plan - 19 July 2023;
        (iv) Mallee Whipbird Management Plan - 19 July 2023;
        (v) EPBC Offset Strategy – Sothern Emu-wren and Mallee Whipbird - 19 July 2023;
        (vi) Request for further information – Launch Exclusion Zones - Undated;
        (vii) Additional Information Addendum – Undated; and
        (viii) Summary document (update to the EIS and Response Document) – Undated

    (b) Set out in the final and approved:
        (i) Works Program;
        (ii) Stage Details Plan for each stage identified in an approved Works Program;
        (iii) Environmental Improvement Program;
        (iv) Construction Environment Management Plan (CEMP);
        (v) Operational Environmental Management Plan (OEMP);
        (vi) Native Vegetation Management and Monitoring Plan;
        (vii) Threatened Species Management Plan;
        (viii) Noise Monitoring Program;
        (ix) Pest Plant and Animal Management and Monitoring Plan;
        (x) Sand drift Hazard, Soil Erosion and Drainage Management Plan;
        (xi) Fire and Emergency Management Plan;
        (xii) Road and Traffic Management Plan;
        (xiii) Waste Management and Minimisation Plan;
        (xiv) Cultural Heritage Management Plan;
        (xv) Communication Protocol;
        (xvi) Launch Event Management Plan; and
        (xvii) Complaints Management Procedure and Community/Stakeholder Engagement Plan.

To the extent of any inconsistency, and subject to any contrary intention, a later document will prevail over an earlier one.

*Reason: To ensure the proponent undertakes the development in accordance with an approved and final set of plans and documentation.*

22. The major development (including all stages and components) must be substantially completed within five years of the date of this authorisation, failing which an extension of time may be sought from the Minister for Planning (the Minister) prior to the expiry of that period or the authorisation may be cancelled.

23. Should the development not be substantially completed within five years of the date of this authorisation, and no extension of time sought before such expiry and subsequently approved, the state and condition of the land and buildings must be reinstated, so far as is reasonably practicable, to the state and condition that the land and buildings were in immediately before the commencement of the major development.

*Reason: Conditions 22-23 are to ensure that all stages of the development are commenced and/or completed within the approved timeframe; or where the development is not commenced or remains incomplete (without further extension or authorisation), the risk of cancellation and/or remediation.*

24. No building works on any part of the site of the development (the site) may commence until a favourable decision has been notified to the proponent by the Minister in respect of the reserved matters (PART A) and until a development authorisation under section 48(2) of the *Development Act 1993* and/or section 115(2) of the *Planning, Development and Infrastructure Act 2016* is granted for the relevant stage or component as is approved in the Works Program.

*Reason: Prior to the commencement of construction, all building works must be certified in accordance with the building rules.*

25. The implementation of the CEMP and OEMP must be continuously monitored and reviewed to ensure compliance with the measures to manage and monitor relevant impacts and the effectiveness of those measures and updated (with approval of the Minister) as necessary. Each review must be made publicly available and a copy provided to the Minister until all construction stages or components are complete.

*Reason: The CEMP and OEMP are 'living documents' that must be periodically updated to ensure that their effectiveness over time is maintained, including the adoption of new measures and the deletion of measures that are no longer effective or required.*

26. The total number of launches permitted from the launch facility must not exceed 36orbital launches per annum and six sub-orbital launches per annum (and up to 10 engine tests). The size of the largest rocket launched must not exceed 30m in height, with a thrust no greater than 2,300 kN (kilonewtons). The launch of the largest rockets must be restricted to Launch Pad B.

*Reason: The facility must not exceed the approved number of launches per annum, including a maximum threshold on rocket capability/performance. The launching of the largest rockets from Pad B only would reduce noise impacts on a cluster of known Southern Emu-wren locations.*

27. Council, utility or state agency maintained infrastructure that is demolished, altered, removed or damaged without lawful authority in the implementation of the development, must be reinstated to council, utility or state agency specifications as applicable. All costs associated with these works must be met by the proponent.

    *Reason: Utility, state and local government infrastructure must be reinstated if damaged or altered without lawful authority during construction or operation of the development.*

28. All road infrastructure upgrades must be completed to the standard required to enable use of the identified vehicle type (as specified in the Road and Traffic Management Plan), to the satisfaction of the relevant road authority.

29. All road infrastructure upgrades, unless otherwise identified, are to be funded by the proponent.

*Reason: Conditions 28-29 are to ensure the proponent is responsible for the design, delivery, installation and maintenance of required road infrastructure improvements, and meets the overall cost of such works.*

30. Should the proponent or any subsequent owner or operator of the launch facility intend that the operation of the orbital launch facility or portion of it will cease, the Minister must be advised as soon as is reasonably practicable. Furthermore, a Decommissioning and Rehabilitation Plan (DRP) must be prepared in consultation with relevant government agencies and the local council and must be submitted to the reasonable satisfaction of the Minister.

The DRP must be prepared nine months prior to the time that the operation (or relevant portion of it) is scheduled to cease, and include information related to:

(a) identifying assets to be rehabilitated, remediated, decommissioned and/or removed, along with those that are proposed to be retained and the proposed tenure and management arrangements
(b) confirming responsibility for costs associated with rehabilitation, remediating, decommissioning and/or removing and retaining assets
(c) handover arrangements for useable assets
(d) responsibility for future management and maintenance of useable assets; and
(e) measures, if required, to remove fuel and chemical storage and wastewater treatment facilities in accordance with relevant legislation and standards.

31. Decommissioning of the development and rehabilitation of the site must be undertaken in accordance with the approved DRP.

    *Reason: Conditions 30-31 are to ensure that the operator of the development makes good the condition of the land at the cessation of operations.*

32. All external lighting, including for car parking areas and buildings within the launch complex must be designed and constructed to conform with *Australian/New Zealand Standard AS/NZS 4282:2023 – Control of Obtrusive Effects of Outdoor Lighting* and the *National Light Pollution Guidelines for Wildlife* (Commonwealth Department of Climate Change, Energy, the Environment and Water, 2023). Lighting must be located, directed and shielded, and

of such limited intensity, as far as reasonably practicable, that no unreasonable nuisance is caused to any person beyond the boundary of the site.

33. All vehicle car parks, driveways and vehicle entry and maneuvering areas at or providing access to and from the launch facility complex must be designed and constructed in accordance with the relevant Australian Standards and appropriately line marked, and must be constructed, drained and paved with bitumen, concrete or compacted gravel (or other such material as agreed to by the Minister for Planning), in accordance with sound engineering practice.

34. All loading and unloading, parking and maneuvering areas at or providing access to and from the launch facility complex must be designed and constructed to ensure that all vehicles can safely traffic the site and enter and exit the subject land in a forward direction.

35. All stormwater design and construction must be in accordance with Australian Standards and recognised engineering best practice to ensure that stormwater does not adversely affect any adjoining property or public road.

36. All liquids or chemical substances that are to be stored at the launch facility complex and that have the ability to cause environmental harm must be located within a bunded compound that has a capacity of at least 120% of the volume of the largest container, in accordance with the EPA *Bunding and Spill Management Guidelines* (2016).

    *Reason Conditions 32-36 are to ensure that various infrastructure works (including the storage of liquids and chemical substances) are undertaken, consistent with the relevant final design specifications, Australian Standards or environmental guidelines.*

37. Unless otherwise specifically provided for in these conditions, or otherwise agreed to in writing with the Minister, all costs necessary for compliance with these conditions must be met solely by the proponent.

    *Reason: The proponent is responsible for the implementation of the development in accordance with its approved plans and documentation, with all costs met by the proponent.*

**ADVISORY NOTES**

a. The proponent is advised that all conditions must be met including monitoring, mitigation and reporting requirements as detailed in relevant management plans. Failure to comply with a condition is a breach of the *Development Act 1993* or the *Planning, Development and Infrastructure Act 2016* (as applicable), under which this authorisation is given.

b. An accredited professional undertaking Building Rules assessments for each stage or component must ensure that the assessment and certification for any stage or component is consistent with this provisional development authorisation and the approved Works Program (including any conditions or advisory notes that apply in relation to this provisional development authorisation).

c. Construction of each stage or component of the development may commence only after a Building Rules assessment and certification has been undertaken in relation to that stage or component and has been issued by an accredited professional undertaking Building Rules assessments, and the Minister for Planning has received a copy of the relevant certification documentation.

d. In accordance with the *National Heavy Vehicle Law (South Australia) Act 2013*, the proponent must apply to the National Heavy Vehicle regulator to obtain permits for use of Restricted Access Vehicles and/or High Productivity Vehicles on public roads, where access for such vehicles is currently not available. This might include such things as construction equipment and vehicles carrying large indivisible construction materials. This might also include access for vehicles such as Road Trains or Performance Based Standards (PBS) vehicles to transport commodities.

e. Prior to the use of any High Productivity Vehicles, the Department for Infrastructure and Transport requires that any additional road infrastructure upgrades required to facilitate this use, must be completed to the satisfaction of the relevant road authority.

f. An important initial step, as outlined in the Heavy Vehicle Access Framework, is to have an assessment of the route undertaken by an Authorised Route Assessor, at the proponent's cost. This process will identify any upgrades required to make the route safe and suitable for the type of vehicle access requested. As part of the approval/s, the proponent will be required to prepare a list of final transport infrastructure improvement needs upon completion of a full route assessment. If this is necessary, the list should identify the scope, timing and estimated cost of the required improvements.

g. The proponent is reminded of its obligations under the *Aboriginal Heritage Act 1988* that excavation, damage, disturbance of, or interference with, any Aboriginal site, object or ancestral remains is unlawful without ministerial authorisation under sections 21 and 23 of the Act.

h. The proponent, and all agents, employees and contractors, such as construction crew, are reminded of requirements under the *Aboriginal Heritage Act 1988*, particularly the requirement to immediately contact the Department of Aboriginal Affairs and Reconciliation in the event that archaeological items (especially skeletal material) are uncovered during earthmoving.

i. The proponent is reminded of requirements under the *Native Title Act 1993* particularly those requiring consultation with appropriate representatives of any relevant Aboriginal Groups in relation to any known sites of significance in the area and any Native Title Claims over the sea bed and subjacent lands.

j. The proponent is reminded of requirements under the *Native Vegetation Act 1991* and the *Native Vegetation Regulations 2017,* particularly where native vegetation clearance must be undertaken in accordance with a management plan that has been approved by the Native Vegetation Council that results in a significant environmental benefit on the property where the development is being undertaken, or a payment is made into the Native Vegetation Fund of an amount considered by the Native Vegetation Council to be sufficient to achieve a significant environmental benefit in the manner contemplated by section 21(6) of the *Native Vegetation Act 1991*, prior to any clearance occurring. To vary the Heritage Agreement, the proponent must secure the agreement of the Native Vegetation Council and the Minister for Climate, Environment and Water under section 23(5) of the *Native Vegetation Act 1991*

k. The proponent is reminded of requirements under the *National Parks and Wildlife Act 1972*, particularly as permits are required for the 'taking of protected animals', such for the capture

and relocation of animals during construction and the destruction or relocation of animals during operation.

l. The proponent is reminded that an environmental authorisation (license) may be required for components of this development. Before commencing operations, the applicant/operator should contact the Environment Protection Authority on EPALicensing@sa.gov.au for information about the licensing application process and requirements.

m. The proponent/owner/operator is reminded of their general environmental duty, as required by section 25 of the *Environment Protection Act 1993*, to take all reasonable and practicable measures to ensure that activities on the site and associated with the site (including during construction) to not pollute the environment in a way which causes or may cause environmental harm.

n. The proponent is reminded of requirements under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* not to undertake any activity that could have a significant effect on any matter of National Environmental Significance without the approval of the Commonwealth Minister for the Environment and Water.

o. Should the proponent wish to vary the major development or any portion of it, an application to the Minister must be submitted, provided that the development application variation remains within the ambit of the Environmental Impact Statement and Assessment Report referred to in this development authorisation. If an application variation involves substantial changes to the proposal, pursuant to section 47 of the *Development Act 1993* or section 114 of the *Planning, Development and Infrastructure Act 2016* (as applicable), the proponent may be required to prepare an amended Environmental Impact Statement for public consultation. An amended Assessment Report may also be required to assess any new issues not covered by the original Assessment Report and the decision made pursuant to section 48 of the *Development Act 1993* or section 115 of the *Planning, Development and Infrastructure Act 2016* (as applicable).

p. The Minister has a specific power to require testing, monitoring and auditing under section 48C of the *Development Act 1993* or section 117 of the *Planning, Development and Infrastructure Act 2016* (as applicable).

q. In regards to Conditions 4-5, the CEMP and OEMP must be prepared taking into consideration, and with explicit reference to, relevant *Environment Protection Act 1993* policies and guidance documents, including but not limited to:

- the Environment Protection (Air Quality) Policy 2016
- the Environment Protection (Commercial and Industrial Noise) Policy 2023
- the Environment Protection (Water Quality) Policy 2015
- the Environment Protection (Waste to Resources) Policy 2010
- the Environment Protection (Used Packaging Materials) Policy 2012
- the Environment Protection Authority Bunding and Spill Management Guideline 2016
- Environment Protection Authority Handbooks for Pollution Avoidance
- the Environment Protection Authority Stormwater Pollution Prevention Code of Practice for the Building and Construction Industry 1999
- the Environment Protection Authority guideline 'Construction environmental management plan (CEMP) 2019'
- any other relevant legislative requirements, Guidelines and Australian Standards.

## Appendix A: Definitions and Acronyms

| ACRONYM | DEFINITION |
|---|---|
| AGD-PLUS | Attorney-General's Department – Planning and Land Use Services (now DTI-PLUS) |
| AR | Assessment Report |
| ASA | Australian Space Agency |
| BAM | Bushland Assessment Method |
| CEMP | Construction Environment Management Plan |
| CFS | Country Fire Services |
| CO | Carbon monoxide |
| CSIRO | Commonwealth Scientific and Industrial Research Organisation |
| dB | Decibel |
| DCLEP | District Council of the Lower Eyre Peninsula |
| DEM | Department for Energy and Mining |
| DEW | Department for Environment and Water |
| DIT | Department for Infrastructure and Transport |
| DNL | Day Night Levels |
| DPC-AAR | Aboriginal Affairs and Reconciliation |
| DTI-PLUS | Department for Trade & Investment – Planning and Land Use Services |
| EIS | Environmental Impact Statement |
| EPA | Environment Protection Authority |
| EPBC | Environment Protection and Biodiversity Conservation Act 1999 |
| EPLB | Eyre Peninsula Landscape Board |
| FAA | United States Federal Aviation Administration |
| FTS | Flight Termination System |
| GSP | Gross State Product |
| HCl | Hydrogen chloride |
| IBRA | The Interim Biogeographic Regionalisation for Australia |
| IO | Input-output |
| LAE | A-weighted Sound Exposure Level |
| LAmax | Maximum A-weighted Sound Level |
| LE | Unweighted Sound Exposure Level |
| $L_{max}$ | Maximum unweighted Sound Level |
| LSA | The Landscape South Australia Act 2019 |
| MFS | Metropolitan Fire Services |
| NCSSA | The Nature Conservation Society of SA |
| $NO_2$ | Nitrogen oxides as nitrogen dioxide |
| NOISE EPP | Environment Protection (Noise) Policy 2007 |
| NOTAM | Notice to Airmen |
| NOTMAR | Notice to Mariners |
| NPW | National Parks and Wildlife Act 1972 |
| NVC | Native Vegetation Council |
| OEMP | Operational Environmental Management Plan |
| PIRSA | Primary Industries and Regions SA |
| PM | Particulate matter |
| $PM_{2.5}$ | Fine Particulate matter |
| PTS | Permanent Threshold Shift |
| RD | Response Document |
| RUMBLE | Rumble Modelling Software |
| SAAS | South Australian Ambulance Services |
| SACES | SA Centre for Economic Studies |
| SAPOL | SA Police |
| SARDI | South Australian Research and Development Institute |

| | |
|---|---|
| SEB | Significant Environmental Benefit |
| SEDMP | Soil Erosion and Drainage Management Plan |
| SLR | SLR Consulting Australia |
| SPC | State Planning Commission |
| SPP | State Planning Policies |
| SRV | Small Rigid Vehicles |
| TIA | Transport and Access Impact Assessment |
| TTS | Temporary Threshold Shift |
| UBS | Unit Biodiversity Score |
| UNCLOS | United Nations Convention on the Law of the Sea |
| VIA | Visual Impact Assessment |
| WMMP | Waste Management and Minimisation Plan |
| WONS | Weed of National Significance |

## Appendix B: Assessment Guidelines

| | | | Risk | | Scale | | Level of assessment |
|---|---|---|---|---|---|---|---|
| No | Issue/Impact | Description | Issue/Impact | Response | Duration | Extent | |
| 1. | Effect on Conservation Values | The proposed development is located within the Coastal Conservation Zone, in an area which contains sensitive coastal features and a significant and an extensive tract of remnant native vegetation. The area has high conservation values, being within part of the Jussieu Peninsula to Coffin Bay Peninsula and adjoining the Thorny Passage Marine Park. It is also within close proximity of the Lincoln National Park. | Based on the information provided by the proponent, clearing of native vegetation and some earthworks are proposed, with the potential for operational activities to impact on the conservation values of the surrounding area. | The current plan does not provide a detailed description of the various effects on conservation values. | During construction and ongoing. | Regional and state (possibly national) | The receiving environment is potentially negatively impacted by the development. Need for further assessment and offset opportunities.<br>**= CRITICAL** |
| 2. | Effect on Native Vegetation | The proposed development is located on a significant tract of remnant native vegetation including possibly threatened species and ecological communities. | Based on the information provided by the proponent, there is potential for significant impacts on native vegetation, including threatened species through the clearance of vegetation. The interaction of the development in relation to the Native Vegetation Heritage Agreement is not detailed. There is also potential to impact native vegetation within the marine environment from spent (discarded) launch vehicles. | The current plan does not provide a detailed description of the quantity of native vegetation proposed to be cleared, the effect on native vegetation (including in the marine environment) and any changes proposed to the Native Vegetation Heritage Agreement. | Primarily during construction. | Regional and state (possibly national) | The receiving environment is potentially negatively impacted by the development. Need for further assessment on the location, extent, condition and impact on native vegetation and threatened species. Need for investigation of offset opportunities.<br>= **CRITICAL** |
| 3. | Effect on Native Fauna | The proposed development is located on land which supports native fauna habitat. The proposed operations also involve the airspace surrounding the subject site, introducing the potential for bird and bat strike. The adjoining cliffs and marine waters also support fauna. | Based on the information provided by the proponent, there is potential for impacts on terrestrial and marine fauna and their habitat. | The current plan does not provide a detailed description of the effect on native fauna. | During construction and ongoing. | Regional and state (possibly national) | The receiving environment is sensitive to change. Need for further assessment on the location, extent, condition and impact on native fauna and any opportunity for offsetting.<br>= **CRITICAL** |
| 4. | Hazard Risks | The operation of an orbital launch complex and associated supportive infrastructure and facilities involves a range of general and specific risks. | Associated risks include:<br>• fire and explosion<br>• fuel spills and site contamination<br>• public safety<br>• aircraft and maritime safety<br>• wind recirculation and<br>• marine debris. | The current document provides limited detail of risk assessment and mitigation strategies. | Primarily during operations. | Local | Issue is not well understood, more specific information is required.<br>= **CRITICAL** |

| | | | Risk | | Scale | | Level of assessment |
|---|---|---|---|---|---|---|---|
| No | Issue/Impact | Description | Issue/Impact | Response | Duration | Extent | |
| 5. | Economic Effects | The proposal will have an impact on the local and state economy during construction and operations and may result in immediate and long-terms effects on residents, businesses and surrounding uses. | The development has potential to have an economic effect on existing tourism, commercial fishing and recreation activities and businesses.<br><br>The development is anticipated to contribute investment to the local community and state, research and development, have educational effects, employment generation and flow-on impacts on business | There is limited information on the proposed economic effects of the proposal. | During construction and ongoing. | Local, regional and state | More information is required by way of an economic impact assessment.<br>= **CRITICAL** |
| 6. | Noise and Vibration Impacts | The proposed launch operations will involve the creation of significant noise and vibration. | Potential to disturb fauna (including marine organisms), nearby residents and visitors through the creation of noise and vibration impacts. | The documentation does not detail any noise or vibration impacts, nor identify any sensitive receivers or environments. | Primarily during operations. | Local | Further information and details are required to quantify the impacts.<br>= **MEDIUM** |
| 7. | Visual Amenity and Tourism Impacts | Located on a visually prominent peninsula, the proposed operations introduce a change in the landscape. | The effect of launches and an altered prominent coastal landscape will introduce a visual impact and have an impact on existing ecotourism activities. | The current document does not provide an analysis of the visual impact (near and distant views) or quantify the impacts on the existing tourism sector. | Ongoing | Local and regional | Further information required. The environment is potentially negatively impacted by the development, impacting on amenity and tourism.<br>= **MEDIUM** |
| 8. | Effect on the physical environment, water and air quality | The proposed development has the potential to alter the natural landform, introduce air quality impacts and affect water quality. Broader impacts can be expected from greenhouse emissions produced during construction and operation of the facility. | Operational activities have the potential to adversely change the surrounding physical environment, air and water quality and contribute to global warming through release of greenhouse emissions. Construction of the facility will contribute to greenhouse emissions through the use of materials, products, energy and fuels. | The current plan does not provide a detailed baseline of the existing environment and potential for the development to disturb the physical environment. | Construction and during operations. | Local | More information is required to quantify the impacts.<br>=**MEDIUM** |
| 9. | Effect on Communities | The proposed development has the potential to affect the local community during construction and through the operation of the launch complex. | The introduction of a launch complex may affect local communities, especially access to the coast for recreation and tourism. | The current plan provides limited detail on the effects on communities. | During construction and ongoing. | Local | More information is required to quantify the impacts on communities.<br>= **MEDIUM** |
| 10. | Introduction/spread of exotic plant and animal species | The proposed development has the potential for the spread of introduced or nuisance plants and animals. | Construction activities could increase the abundance of pest plants or animals (especially weeds). | The proponent will need to provide a detailed description of the risk and effect of introduced or nuisance plant and animal species to terrestrial and coastal environments. | During construction and ongoing. | Local | More information is required to quantify the impacts.<br>**= MEDIUM** |

| | | | Risk | | Scale | | Level of assessment |
|---|---|---|---|---|---|---|---|
| No | Issue/Impact | Description | Issue/Impact | Response | Duration | Extent | |
| 11. | Security and Safety | The proposed development requires a level of security which complies with National requirements and extends across land, water and airspace. Discreet public accessibility is envisaged. | The nature of the operations requires the site and facilities to be specifically secure to ensure sensitive information is not divulged. | The documentation does not provide details on security and safety measures. | During construction and ongoing. | Local, Rregional and national. | Further information is required on the security and safety of the proposal. = **MEDIUM** |
| 12. | Effect on Cultural Heritage Values | The proposed development has the potential to impact on sites and places of Indigenous or non-aboriginal heritage through disturbance during construction and operation. Native Title implications associated with Claim Nauo No. 2. | The proposed development may have impacts on Aboriginal heritage sites, objects and remains, as well as state heritage listed places, which may be located on the site. | The current document does not provide a detailed description on existing Aboriginal and other heritage matters, or management of such heritage matters that may arise during the construction phase. Documentation has not identified Native Title Claim Nauo No. 2. | Construction and operation | State | Investigations are required to be undertaken and more information to be provided. = **MEDIUM** |
| 13. | Spent (discarded) launch vehicle management | The proposed development has the potential to cause spent (discarded) launch vehicles and associated debris to accumulate on the seafloor and coastlines. | Spent (discarded) launch vehicles will fall into the ocean and are not proposed to be recovered. Such vehicles are likely to sink to the sea floor but could wash up on coastlines. | The current document provides limited information about management of spent launch vehicles. | During construction and ongoing | Local and regional | More information is required to quantify the impacts on the adjoining marine environment. **= MEDIUM** |
| 14. | Transport and Access | The proposal requires access for the transportation of infrastructure and construction materials to site and ongoing access for materials transport, workforce attendance and public viewing purposes. Vehicular, airfreight and shipping access requires consideration. | Traffic may introduce impacts to the arterial and local road network, especially for the delivery of materials and infrastructure. | The current documentation does not provide a detailed description of the existing and proposed arrangements. | During construction and ongoing. | Local and regional | More information is required, but impacts would be manageable. **= STANDARD** |
| 15. | Construction and Operational Environmental Management | The proposed development would require a range of impacts to be minimised, mitigated and monitored through an environmental management plan framework across the construction and operational phases. | A range of standard and specific impacts would need to be adequately addressed to mitigate adverse impacts. Specifically, general, contaminated and spent rocket waste will be generated. | The current document provides limited information on the proposed construction and operational management techniques and measures. | During construction and ongoing. | Local and regional | More information is required, but impacts would be manageable. = **STANDARD** |
| 16. | Land Use Effects | The proposal will have an impact on surrounding land owners and uses, including Cathedral Rocks windfarm, in the immediate and long term, due to the change in land uses proposed. | The proposal introduces land uses which alter the Coastal Conservation Zone and have broader effects. | The current plan does not provide an analysis of the change in land uses, the associated impacts and mitigation strategies. | Ongoing. | Regional and state | More information is required, but impacts would be manageable. **= STANDARD** |
| 17. | Legislation and Policies | A range of planning, environmental and space related statutory requirements would need to be met for the construction and operation of the proposed development | The proposal will need to comply with relevant state, national and international obligations, policy directions and strategic objectives. | The current plan does not provide a detailed description of all relevant requirements. | During construction and ongoing. | State, national and international | Issue is understood, but more specific information is required. **= STANDARD** |

## State Assessment Requirements

## CRITICAL ASSESSMENT

**Effect on Conservation Values**

**Assessment Requirement 1:** The subject site adjoins the Thorny Passage Marine Park which is a significant flora and fauna marine environment. The Jussieu Peninsula to Coffin Bay Peninsula is a significant Biodiversity Area which encompasses the subject site and contains a large tract of remnant native vegetation. The site is also located approximately 3.6 km from the offshore island Liguanea Island, which contains an Australian Sealion colony and Short-Tailed Shearwater colony. Liguanea Island is located within the Lincoln National Park. The conservation values of these areas are to be quantified and protected.

***1.1*** *Identify the existing terrestrial and marine environments and species that are known and likely to occur on the subject site and surrounds. Detail the conservation values for the Thorny Passage Marine Park, Jussieu Peninsula to Coffin Bay Peninsula Biodiversity Area and Lincoln National Park (including species listed in the* SA National Parks and Wildlife Act 1972.

***1.2*** *Detail the potential impacts on terrestrial and marine habitat for each potential launching site and associated impact area, including runoff from storm and wastewater into the marine environment due to the increase in impervious surfaces, impacts from noise and vibration during launches and impacts of the exhaust from rockets. Both terrestrial and marine ecosystems must be considered for all operational activities. Provide adequate mitigation and management measures for each area in turn.*

***1.3*** *Identify the potential trajectory of launched vehicles and likely location, extent, composition and amount of debris and spent componentry anticipated to impact on the surrounding area, including the adjoining Marine Park. Propose operational management strategies to limit the impacts on the quantified conservation values.*

***1.4*** *Describe the rationale for the major design elements of the proposed development and measures to mitigate the impact.*

***1.5*** *Describe the effect of the proposed development on coastal clifftop dunes, cliffs, limestone and calcrete formations of the site, and associated heathland shrubland communities, and outline management and rehabilitation measures for these areas.*

***1.6*** *Describe any alterations to the physical landforms by the construction (e.g. levelling of sand dunes, filling of low lying areas) and describe management and rehabilitation measures for these areas.*

**Effect on Native Vegetation**

**Assessment Requirement 2:** The proposed development is located on land which currently holds significant stands of native vegetation within the Coastal Conservation zone.

*2.1 Describe the location, condition and significance of native vegetation on the subject site, including individual species and communities. Include reference to areas that have Heritage Agreements under the Native Vegetation Act 1991 and any proposed alterations to or implications for the Heritage Agreement.*

*2.2 Describe the location, condition and significance of native vegetation species and communities that may need to be cleared or disturbed during both the construction and maintenance phases. This should include clearing for all buildings, structures, exclusion zones and access arrangements.*

*2.3 Describe the potential impacts on native vegetation fragmentation and the ability of communities or individual species to recover, regenerate or be rehabilitated during all phases of development.*

***2.4** Identify the habitat value of native vegetation and the potential for habitat fragmentation during both construction and maintenance (and decommissioning). Include a description of the effects of any fragmentation that may occur over the life of the project.*

***2.5** Detail any likely changes in remaining vegetation surrounding the launch pads, which may be impacted by the proposed operations. Mitigation measures should be documented to minimise the impact on remaining species and communities in the immediate vicinity of the launch pads.*

***2.6** Outline any compensatory activities proposed, making reference to guidelines produced by the Native Vegetation Council.*

***2.7** Identify the potential impact of fire on native vegetation, and the effects of fire risk management processes during both construction and operation.*

***2.8** Describe the location, extent, condition and significance of native vegetation species and communities in the marine environment within the impact area of spent (discarded) launch vehicles.*

**Effect on Native Fauna**

**Assessment Requirement 3:** The proposed development will be constructed on land, but will also operate in the airspace and over adjoining waters with potential impacts on terrestrial and marine habitats which support significant populations of native fauna.

***3.1** Describe the location, extent, condition and significance of native terrestrial and marine fauna populations, including individual species and communities in the surrounding area, including on land, cliffs and in adjoining waters, including Liguanea Island.*

***3.2** Describe the nature and extent of the impacts likely to affect native terrestrial and marine fauna species and populations during both construction and operation. Describe the ability of communities and individual species to recover, especially threatened or significant species (including those listed under the* National Parks and Wildlife Act 1972*). Specifically consider the impact of marine debris.*

***3.3** Identify the effect of the proposal on terrestrial habitat fragmentation including the ability of populations or individuals to recover during both construction and operation.*

***3.4*** *Identify the potential impact of fire and explosion on native fauna, and the effects of fire risk management processes during both construction, operation and maintenance.*

***3.5*** *Identify the potential impact of noise and vibrations on terrestrial, coastal and marine native fauna, and the mitigation and monitoring strategies during both construction and operational phases.*

***3.6*** *Detail appropriate buffer distances that would be required between proposed development (including coastal access points) and threatened terrestrial and marine species, including feeding areas, nesting sites and roosting sites.*

***3.7*** *Outline measures to avoid, minimise, mitigate and monitor the effects on native fauna, including any compensatory activities.*

**Hazard Risks**

**Assessment Requirement 4:** The construction and operation of a launch complex involves a range of general and specific risks.

***4.1*** *Undertake a risk assessment to quantify hazards and potential eventualities involved with operating the orbital launch complex.*

***4.2*** *Articulate the measures taken to mitigate the risks involved in launch operations. Detail the site emergency response strategies, specifically in the event of an explosion or incomplete launch. Quantify the impact of launch vehicle failure on the pad and throughout the trajectory.*

***4.3*** *Evaluate the fire risk and danger zone for the proposed launching complex and high voltage power lines. Document measures to minimise fire risk, resources, and training required and firefighting water sources.*

***4.4*** *Identify the publicly restricted buffer and exclusion zones for each launch pad. Describe the methodology to establish the various buffers and zones and the corresponding distances, including airspace and marine waters. Articulate the anticipated security measures to ensure public safety.*

***4.5*** *Outline any risks for workplace safety procedures which mitigate and manage the operational phase of the development ensuring all activities on site are described.*

***4.6*** *Describe any hazardous materials, including propellants, with reference to storage, use, handling and disposal of these materials during construction and operation. Document the physical and operational mitigation strategies to contain propellants and eliminate spills.*

***4.7*** *Identify any potential effects on airfields and aircraft movements, and consult with the Civil Aviation Safety Authority Australia and the District Council of Lower Eyre Peninsula (Port Lincoln Airport) about the requirements for development within the vicinity of airfields and on flightpaths.*

***4.8*** *Consider and quantify the impacts of the development on commercial shipping and aircraft routes during operations.*

***4.9*** *Consider and quantify the impacts of the development on commercial and recreational fishing areas during operations i.e. safety of commercial fishermen from falling debris and the need for temporary exclusion zones.*

***4.10*** *Describe the potential impacts on the Cathedral Rocks wind farm.*

***4.11*** *Describe the likelihood of bird and bat strike and the management of such a hazard.*

***4.12*** *Evaluate the wind recirculation zones and the corresponding potential impacts on operations.*

***4.13*** *Describe risk minimisation, management and response requirements.*

***4.14*** *Identify the impact of coastal erosion due to expected sea level rise of 0.3 m to 2050 and 1 metres to 2100.*

**Economic Effects**

**Assessment Requirement 5:** The proposal will have an impact on the local and state economy during construction and operations and may result in immediate and long terms effects on residents, businesses and surrounding uses.

***5.1*** *Describe the proposal's anticipated effect on state and local investment, research and development, educational effects, employment generation and flow-on impacts on business.*

***5.2*** *Describe potential employment opportunities and the expected impacts on the local workforce during construction and operational stages.*

***5.3*** *Identify any potential economic effects on tourism, recreation, mining and petroleum related activities.*

***5.4*** *Identify any secondary economic effects, including the potential to attract new industries and commercial ventures. Describe the positive and negative effects of this, including the current situation.*

***5.5*** *Identify any economic implications for the state and the region if the proposal does not proceed.*

***5.6*** *Consider and quantify the impacts of the development on commercial fishing areas during operations i.e. impacts on business if there is a need for temporary exclusion zones.*

***5.7*** *Document the consultation undertaken with mining and petroleum tenement holders (onshore and offshore). Describe how the development is anticipated to interact with mining and petroleum interests and operations, during the construction and operational phase.*

## MEDIUM ASSESSMENT

**Noise and Vibration Impacts**

**Assessment Requirement 6:** The proposed development has the potential to disturb fauna, nearby residents and visitors through the creation of noise and vibration impacts.

***6.1*** *Detail the predicted levels of environmental noise and vibration associated with construction and operation of the proposed development, identifying all potential noise and vibration sources and assessing the impact upon sensitive receivers in the immediate and wider locality (including residents, visitors, marine fauna, terrestrial native animals and livestock, and avifauna including migratory species).*

***6.2*** *Provide information on the anticipated frequency of launch events, initially and into the future. Include information regarding individual launch events and predicted noise and vibration impacts to be generated.*

***6.3*** *The location of noise and vibration sensitive receivers should be identified on an appropriately scaled plan.*

***6.4*** *Information, including noise contours from a suitable acoustic model, should be provided for all significant noise generating activities when operating under worst case meteorological conditions.*

***6.5*** *Describe current background noise and vibration levels at sensitive receivers and changes to these levels as a result of the project (during both the construction, maintenance and operational phases). Sufficient data should be gathered to provide baseline information for comparison with any future monitoring undertaken during the construction and operational phases. Details of any noise or vibration monitoring undertaken should be incorporated.*

***6.6*** *Detail the predicted noise levels against the* Environment Protection (Noise) Policy 2007 *and section 25 of the* Environment Protection Act 1993 *at the nearest noise sensitive receivers when operating under worst case meteorological conditions.*

***6.7*** *Identify what reasonable and practicable measures will be used to minimise impacts from noise and vibration and assess their effectiveness. Details of how any such measures will be monitored, audited and managed should be included.*

***6.8*** *Identify the potential impact of noise and vibrations on native fauna (terrestrial and marine), and the mitigation and monitoring strategies during both construction and maintenance.*

## Visual Amenity and Tourism Impacts

**Assessment Requirement 7:** The impact of permanent structures and visually prominent operations on a highly visible peninsula with substantial landscape value. There will be significant changes from the existing natural landform and conservation use, currently utilised for ecotourism purposes. Ongoing coastal tourism access is proposed along the eastern coastal boundary. Cape Wills Radio Station in the lower south-east is excluded from the lease area.

***7.1*** *Describe how the visual landscape and amenity will be altered by the development, for residents and visitors, for both near and distant views.*

***7.2*** *Describe and illustrate the development when viewed from the publicly accessible coastal reserve (Crown Land Allotment 102 – CR5993/375) or from the adjoining waters, on launch and non-launch days.*

***7.3*** *Outline the methodology adopted for classifying landscapes and assessing visual and landscape impacts.*

***7.4*** *Describe the impacts (amenity and economic) on the region's ecotourism sector and the existing caravan park in the north-east portion of the site.*

***7.5*** *Describe alternative measures for minimising potential loss of visual amenity.*

***7.6*** *Identify lookout/viewing locations and anticipated delivery timing of these facilities.*

***7.7*** *Identify any potential impacts on Cape Wills Radio Station.*

## Effect on the Physical Environment, Water and Air Quality

**Assessment Requirement 8:** The proposed development has the potential to alter the natural landform, introduce air quality impacts, release greenhouse emissions and affect water quality in the vicinity.

***8.1*** *Describe the nature and condition of the existing physical environment in the proposal's environs, including reference to geology, geomorphology, soils, hydrology and atmosphere. Include any baseline data or monitoring established prior to development on the site.*

***8.2*** *Identify the potential for pollution (e.g. fuel spills and launch debris) of watercourses, coastal drainage and groundwater, and what design, construction and management measures will be adopted to minimise such impacts. Document mitigation and monitoring strategies to limit any adverse impacts.*

***8.3*** *Evaluate the potential for air quality to be impacted as a result of the proposal (e.g. fuel emissions, combustion products and generators, gases, steam etc.) and describe any sensitive receivers (including residents, land uses or environments) and the extent to which they may be impacted. Air quality impacts need to be assessed against the* Environment Protection (Air Quality) Policy 2016 *in accordance with the EPA Ambient Air Quality Assessment 2016 publication. Document mitigation and monitoring strategies to limit any adverse impacts.*

***8.4*** *Identify the potential for soil/surface erosion and sand drift hazard, including the implications of these processes. Describe measures for the remediation of erosion or sand drift should it occur within the clifftop dune system as a result of the development.*

***9.5*** *Describe stormwater and wastewater management and the potential impact on groundwater resources, surface water resources and the marine and coastal environment, in particular with regard to fuel and chemicals used in the operation of the development. Include measures proposed to manage stormwater and wastewater.*

***8.6*** *Undertake a high level estimate of whole of life greenhouse gas emissions associated with the construction and operation of the facility and outline measures to minimise emissions through material selection including recycled products, operating methods and offsets. Estimates shall cover Scope 1, 2 and 3 emissions and as a minimum include:*

- *embodied emissions of construction materials used in construction of the facility and consumables during operation (e.g. quarry products, concrete, asphalt, metals, fuels)*
- *extraction, production, transportation of fuels*
- *transportation of purchased materials and waste*
- *disposal of waste; and*
- *electricity.*

## Effect on Communities

**Assessment Requirement 9:** The proposed development has the potential to affect the local community through the establishment and ongoing launch complex operations.

***9.1*** *Describe and illustrate the proximity of the proposed development to local communities and individual dwellings.*

***9.2*** *Describe the impacts which may impact on nearby communities and residents (e.g. businesses, employment, visual amenity, ecotourism).*

***9.3*** *Outline potential impacts on the use of the land by Aboriginal people, or on cultural values held by Aboriginal people that relate to the areas affected by the project (land and water).*

***9.4*** *Detail the impacts of the increased workforce on the communities and evaluate the necessary accommodation, and other local infrastructure such as schooling and health facilities, for peak periods of construction and operation.*

***9.5*** *Describe any community consultation processes conducted by the proponent, specifically detailing the support and / or any concerns raised about the proposed development.*

***9.6*** *Identify any potential effects on education and skills, or opportunities to retrain and upskill workers, in the state and local area.*

***9.7*** *Identify any impacts on recreational use of coastal land on and around the site, including recreational fishing and access to coastal crown land.*

**Introduced Plant and Animal Species**

**Assessment Requirement 10:** The proposed development has the potential for the spread of introduced or nuisance plants and animals and soil pathogens such as Phytophthora.

***10.1*** *Identify the potential for the introduction or dispersal of new pest or nuisance plant and animal species, and soil pathogens and the associated implications for native species and habitat.*

***10.2*** *Identify the potential for increased distribution and abundance of existing pest or nuisance plants, and soil pathogens and the associated implications for terrestrial and coastal environments.*

***10.3*** *Outline mitigation measures and their effectiveness in reducing or avoiding the introduction or spread of pest or nuisance plant and animal species.*

**Security and Safety**

**Assessment Requirement 11:** The proposed development requires a level of security which complies with national requirements and extends across land, water and airspace.

***11.1*** *Where appropriate, provide information on the proposed physical equipment and structures, personnel and procedural security measures for the launch complex for construction and operational phases.*

***11.2*** *Identify the safety and security measures anticipated to be developed for the publicly accessible areas, including any roads or viewing locations. Articulate the anticipated security measures to ensure public safety.*

**Effect on Cultural Heritage Values**

**Assessment Requirement 12:** The proposed development has the potential to impact on sites/locations of Aboriginal or non-aboriginal heritage through disturbance during construction and operation.

***12.1*** *Quantify any Aboriginal sites of archaeological or anthropological significance, including but not limited to those listed in the SA Register of Aboriginal Sites and Objects.*

***12.2*** *Identify any effects on Aboriginal sites of archaeological or anthropological significance. Indicate any consultation with local Aboriginal organisations that have an in interest in the area, specifically addressing Native Title Claim Nauo No. 2.*

***12.3*** *Quantify any non-aboriginal settlement heritage places or elements on or adjoining the subject site, including but not limited to those listed in the SA Heritage Places Database (state and local heritage value).*

***12.4*** *Identify any impacts on non-aboriginal settlement heritage places or elements on or adjoining the subject site.*

***12.5*** *Outline measures adopted to avoid or minimise impacts on Aboriginal and non-aboriginal sites of archaeological or anthropological significance.*

**Spent (discarded) launch vehicle management**

**Assessment Requirement 13:** The proposed development has the potential to cause spent (discarded) launch vehicles to accumulate on the seafloor and coastlines.

***13.1*** *Detail how spent (discarded) launch vehicles and associated debris will be managed, including any retrieval of spent vehicles. Document the likely impacts on the adjacent Marine Park. Take account of state, national and international legal requirements, agreements and conventions (e.g. Commonwealth* Environment Protection (Sea Dumping) Act 1981*, London protocol etc.).*

***13.2*** *Identify how the movement and accumulation of spent (discarded) launch vehicles and associated debris will be monitored, including any tracking.*

***13.3*** *Outline how potential environmental impacts will be monitored, associated with spent (discarded) launch vehicles (including any impacts at the species and ecosystem level) and associated debris.*

***13.3*** *Propose operational management strategies to minimise potential environmental impacts of spent (discarded) launch vehicles and associated debris, including any retrieval of spent launch vehicles/debris that may wash up onto coastlines.*

## STANDARD ASSESSMENT

**Transport and Access**

**Assessment Requirement 14:** The proposal requires access for the transportation of infrastructure and construction material to site and ongoing access for materials transport, workforce attendance and public viewing purposes.

***14.1*** *Undertake a Transport Assessment that involves end-to-end supply chain (input and output) to determine transport impacts (including traffic impacts on the local and arterial road network) and measures to manage and/or mitigate the impacts during the construction and operational phases. The impacts on the arterial and local road networks are to be considered to an extent which encompasses Port Lincoln.*

***14.2*** *Describe the existing transport and access arrangements to and around the site, including access from the arterial and local road network, private roads and gated areas. Detail the road surface treatments and minimum vehicle types for each road and track (e.g. 4WD).*

***14.3*** *Describe and identify on plans, all primary and alternate access roads (including arterial and local roads), tracks and parking proposed for the construction and operational phases.*

***14.4*** *Identify all vehicle types required to utilise the existing and any proposed access routes, specifically the heavy vehicles anticipated. Identify any road surface upgrades required as a result of the development and any heavy vehicle movements (including over-size/over-mass) that require approval through the National Heavy Vehicle Regulator.*

***14.5*** *Identify the anticipated construction and operational vehicle movements per day, making provision for any increases in either phase of development. Include the likely transportation of large-scale materials or componentry and method of transport (e.g. heavy vehicles, airfreight, and shipping).*

***14.6*** *Document the anticipated publicly accessible areas, including roads to be utilised, parking and turnaround facilities.*

***14.7*** *Describe the right of way access easements required to facilitate public access to the site for public viewing purposes.*

***14.8*** *Identify any potential effects of construction traffic including noise and dust and associated mitigation measures.*

***14.9*** *Describe the location, extent, number and purpose (e.g. commercial or otherwise) of helicopter pads. Identify the potential impacts of helicopter operations with regard to the intended flight paths, downdraft below cruising height, wildlife (e.g. bird and bat strike) and noise implications.*

***14.10*** *Describe the risk involved in transporting materials to the site, including any specific safety and security requirements to be implemented when travelling on roads, including the dangerous goods code requirements.*

**Construction and Operational Environmental Management**

**Assessment Requirement 15:** The proposed development would require a range of impacts to be minimised, mitigated and monitored through an environmental management plan framework across the construction and operational phases.

***15.1*** *Provide information on any baseline data or monitoring established prior to development on the site. Document the anticipated monitoring on site throughout the construction and operational phases.*

***15.2*** *Document the development's construction techniques, methodology, including site preparation works, activities, timeframes and staging (if proposed). Detail the proposed management arrangements to mitigate the negative environmental, public health and amenity impacts and subsequent implementation of these procedures.*

***15.3*** *Outline the timing of construction and the time of year it is likely to occur.*

***15.4*** *Describe the soil erosion and drainage management plan to be implemented, including the proposed stormwater management solution. Document any storage, detention and treatment proposed for the development. Surface water and groundwater quality is to be addressed with specific regard to spill containment. Detail the dust management mitigation measures for the construction phase, in particular for the concrete batching plant and site access.*

***15.5*** *Identify the water sources for construction and operations, in particular for the site amenities, firefighting and concrete batching plant.*

***15.6*** *Identify the location, extent and details of all infrastructure and site services required on site to support the launch operations including, but not limited, to solar arrays, water tanks, propellant storage, generators, lighting rods, anemometer towers, fibre optic and satellite communication systems and high voltage powerlines (including alignment). Detail all utilities to be provided or connecting, including water, gas, electricity, wastewater treatment and disposal, drainage, trenches or conduits.*

***15.7*** *Describe the volume and source of cut and fill required for all proposed built form and associated works, including access tracks, launch pads, permanent and temporary structures, and the effect on the natural topography of the site.*

***15.8*** *Identify the location, extent and details of any temporary buildings, structures and activities proposed, including but not limited to the concrete batching plant, offices, assembly buildings, laydown areas, fuel and chemical storage locations and access tracks.*

***15.9*** *Identify the anticipated launches and activities carried out on site and the operational management regimes for each. The OEMP is to demonstrate mitigation of negative environmental, public health and amenity impacts. The plan is to collate the key operational information for the project, including hazard and risk documentation, waste and debris procedures, fire and explosion response strategy, noise and vibration monitoring and transport and access.*

***15.10*** *Prepare a waste management and minimisation plan which documents all waste streams during construction and operation, identifies the location of waste storage areas and disposal facilities. Identify the opportunities for recycling and reuse of equipment and componentry.*

***15.11*** *Document the site rehabilitation and decommissioning strategy for all temporary and permanent elements.*

**Land Use Effects**

**Assessment Requirement 16:** The proposal will have an impact on land owners and surrounding uses, in the immediate and long term.

***16.1*** *Identify the existing land uses of the subject site and surrounds (e.g. coastal conservation, tourism, mining and petroleum related activities).*

***16.2*** *Describe the new land uses proposed for the subject site (e.g. launch complex, helicopter landing pads, electricity generation etc.).*

***16.3*** *Identify the types and extent of land tenure in broad terms, including reference to Crown Land. Outline any implications for Native Title and Native Vegetation Heritage Agreements.*

***16.4*** *Identify the level of interference to landowners, land uses and activities in the immediate and surrounding environs.*

***16.5*** *Evaluate the change in land use, resulting in a loss of coastal conservation area, visual and amenity impacts being introduced and impact on mining and petroleum related activities.*

***16.6*** *Outline any mitigation measures to alleviate or avoid impacts on land owners and land uses.*

**Planning and Environmental Legislation and Policies**

**Assessment Requirement 17:** A range of planning, environmental and space related statutory requirements would need to be met for the construction and operation of the proposed development.

***17.1*** *Describe the launch complex and site activities in terms of the consistency with the relevant Development Plans, Planning and Design Code, the Planning Strategy and the State Planning Policies.*

***17.2*** *Describe the development in terms of its consistency with relevant state and Commonwealth legislation and initiatives.*

***17.3*** *Provide information on the operational requirements to be met with regard to the authorised space activities under the* Space (Launches and Returns) Act 2018 *and compliance with any relevant national and international obligations.*

***17.4*** *Identify any potential implications of the proposed launch complex for International Conventions and Agreements to which the Commonwealth of Australia is a party.*

***17.5*** *Provide information on activities which will require a licence pursuant to the* Environment Protection Act 1993.

***17.6*** *Provide information on the operational requirements to ensure compliance with the* Environment Protection Act 1993 *and associated Air Quality and Water Quality policies.*

## Appendix C: Assessment against Planning and Design Code

| **CONSERVATION ZONE** | | | |
|---|---|---|---|
| **Policy** | **Description** | **Consistency** | **Assessment** |
| DO 1 | Conservation and enhancement of the natural environment | ☐YES ☐NO ☒PARTIAL | The zone seeks the conservation and enhancement of the natural environment and natural ecological processes for their ability to reduce the effects of climate change, for their historic, scientific, landscape, habitat, biodiversity, carbon storage and cultural values and provision of opportunities for the public to experience these through low-impact recreational and tourism development.<br><br>It is noted, the key policies of the Conservation Zone do not envisage the development of a rocket-launch facility or supporting ancillary development proposed. The proposal does not include any elements listed within DTS/DPF 1.1 of the Conservation Zone. The proposed development is not specifically envisaged within the Conservation Zone and is an undefined land use when considered against the Code and would be considered as a performance assessed development (not listed as restricted). |
| PO 1.1, 1.3 | Small-scale, low-impact land uses that provide for the conservation and protection of the area, while allowing the public to experience these important environmental assets. | ☐YES ☐NO ☒PARTIAL | The development is not specifically envisaged within the zone, with generally smaller scale structures for public purposes sought within designated areas. The zone policies allow for low intensity recreation uses and to maintain farming outside of areas of native vegetation, coastal dunes, and wetlands of national importance. The proposal is an undefined use and not specifically envisaged within the zone.<br><br>The proposal does not directly impact on the natural features or landscape of the coast, any conservation park or area, wetland, samphire flats, beaches, sand dunes, or cliff tops. |
| PO 3.1 | Development avoids important habitat, nesting or breeding areas or areas that are important for the movement/migration patterns of fauna. | ☐YES ☐NO ☒PARTIAL | The proposal will have both direct and indirect effect on specialist habitat in the region. Fauna species have specific requirements for breeding and foraging on site. The two key threatened bird species recorded during field surveys (Southern Emu-wren (Eyre Peninsula) and Western Whipbird (eastern)) build nests out of twigs, barks and grass that is placed closed to the ground in dense vegetation. The proposal requires the clearance of 23.76 ha of suitable breeding and foraging habitat for fauna species while indirect impacts such as noise during construction |

| | | | |
|---|---|---|---|
| | | | works and rocket launch operations may affect where these species choose to nest and feed.<br><br>In addition, Southern Launch proposes to initiate a Significant Environmental Benefit (SEB) offset under the Native Vegetation Act 1993. It will be applied to ensure that a positive impact on the environment occurs that is over and above the negative impact presented by all proposed vegetation clearance. The overall SEB requirement for this project calculated by Southern Launch currently stands at $965,407.77. Southern Launch will either provide a SEB in the form of an inground offset provided by SEB credit providers within the region or pay the required fee into the fund.<br><br>There is a risk that some of the proposed clearing may pose a direct threat to the individual threatened species. Direct impacts to state and EPBC Act listed species are to be offset through a biodiversity offset program developed in accordance with NVC. Indirect impacts will be managed through the implementation of a CEMP and OEMP to ensure that all impacts are reduced as far as practicable utilising management measures. |
| PO 4.1 4.2, 4.4 | Development is sited and designed unobtrusively to minimise the visual impact on the natural environment and does not obscure existing public views to landscape, river or seascape features and is not visibly prominent from key public vantage points, including public roads or car parking areas. | ☐YES ☐NO ☒PARTIAL | The development, whilst occurring within an area of ecological value and importance, has been designed and sited to minimise its impact on the biodiversity and ecology of the area as far as is practical.<br><br>The location of the key elements has been strategically selected by Southern Launch to minimise disruption to the natural environment by proposing access routes that follow existing cleared vehicle tracks and siting project infrastructure in areas of lower native vegetation condition.<br><br>In regard to noise from launches, the proposal would temporarily alter the quiet setting of the natural environment for one to two minutes during launches. The EIS notes, the maximum instantaneous sound pressure level during a launch would be 125 dBA at the closest shoreline to either launch site, less than 95 and 100 dBA at Cape Wiles for launches from Site A and Site B, respectively, and about 95 dBA at the northern end of Liguanea Island (slightly higher for Site A launches). |

| | | | |
|---|---|---|---|
| | | | The separation of each of the development launch areas are sited to ensure the visual effect of the proposal is fragmented, and the underlying coastal landscape is maintained.<br><br>Southern Launch has provided a range of technical assessment reports to quantify the impacts of the proposed development on the natural environment. |
| PO 5.1, 5.2, 5.6 | Vehicle access points are limited to minimise impact on the natural environment.<br><br>Car parking areas are designed to minimise impact on the natural environment. | ☒YES ☐NO ☐PARTIAL | Access to the individual launch-sites will be connected by an internal access track network. Internal site access will be developed utilising the existing access track network where possible, with minor extensions as required.<br><br>Roads for commercial vehicles within the launch sites are to be designed to cater for vehicle sizes up to a 19 m semi-trailer. Road widths and swept paths will meet relevant Australian Standards.<br><br>The staff parking area is to be of asphalt construction to meet the relevant Australian Standards in respect of parking dimensions and number of disabled carparks. Further, it is noted that a minimum of 25 parking spaces will be provided at each launch site.<br><br>The proposed car-parking areas and access to the launch-site E are designed in a matter that can be utilised as a staging area in the event of an emergency at the facility. |
| PO 7.1 | Screening and planting are provided to buildings and structures and comprise locally indigenous species to enhance the natural environment. | ☒YES ☐NO ☐PARTIAL | Southern Launch propose to implement and manage groundcover landscaping over the unsealed areas of each launch site inside the access road which runs adjacent the fenced perimeter. This landscaping will be a mixture of appropriate native species with low water demand and stabilise the site. The unsealed areas between the access roads and the fenced perimeter of the site will have a gravel surface which will function as a fire break between the facility and the surrounding vegetated environment. The proposal is consistent with PO 7.1 |

| **CONSERVATION ZONE (VISITOR EXPERIENCE SUBZONE)** | | | |
|---|---|---|---|
| **Policy** | **Description** | **Consistency** | **Assessment** |
| DO 1<br>PO 1.1, 2.1 | Tourist accommodation within a conservation area complements visitor experiences, and is located, sited and designed to minimise detrimental impacts on the natural environment. | ☐YES ☐NO ☒PARTIAL | The proposed development does not include a land use listed in the Conservation Zone or any elements listed within DTS/DPF 1.1 of the Visitor Experience Subzone.<br><br>It is noted the proposal may introduce future tourism experiences in the region and South Australia. Space-related infrastructure and events can become significant |

| | | | |
|---|---|---|---|
| | | | tourist attractions for the region. In addition, the proposal would enable the public to observe launches and visit the facilities.<br><br>Any tourism opportunities would avoid delicate or environmentally sensitive areas such as sand dunes, cliff tops, estuaries, wetlands or substantially intact strata of native vegetation. |

| **CARAVAN AND TOURIST PARK ZONE** | | | |
|---|---|---|---|
| **Policy** | **Description** | **Consistency** | **Assessment** |
| DO 1 | Tourist accommodation and associated services and facilities enhance visitor experiences and enjoyment. | ☒YES ☐NO ☐PARTIAL | The subject land adjoins the Caravan and Tourist Park Zone (towards the north-east) and is approximately 17ha of land. The zone is situated on private land owned by the lessor of the development site. There are no current tourist facilities established at this location.<br><br>It is considered the proposal will not prejudice the intent of the Caravan and Tourist Zone nor would a tourist facility on the land prejudice the operation of the Whalers Way Orbital Launch Complex. |

| **GENERAL DEVELOPMENT POLICIES: Infrastructure and Renewable Energy Facilities** | | | |
|---|---|---|---|
| **Policy** | **Description** | **Consistency** | **Assessment** |
| PO 1.1 | Development is located and designed to minimise hazard or nuisance to adjacent development and land uses.<br>. | ☒YES ☐NO ☐PARTIAL | It is acknowledged there will be some noise associated with the launch events associated with the proposal. This will be limited to the period the rocket is within 10 km of the launch site (60 seconds from lift off). Due to the short duration of the launch, the noise generated will not create an ongoing a hazard or nuisance to adjacent development and land uses.<br><br>The proposal anticipates approximately 36 launch-events per year (once every three weeks). This high-level noise would be brief, but similar to the noise of a large airplane.<br><br>The proposal is sited approximately 3.5 km from any sensitive receivers and is considered to be generally consistent with PO 1.1 |

| **GENERAL DEVELOPMENT POLICIES: Design** | | | |
|---|---|---|---|
| **Policy** | **Description** | **Consistency** | **Assessment** |
| DO 1, PO 3.1, 9.1 | Development that is fit for purpose and carefully responds to its natural surroundings or built environment | ☐YES ☐NO ☒PARTIAL | The proposal is designed and sited to protect the scenically attractive coastal location through the use of low building forms (across multiple launch sites) and includes ancillary infrastructure. The most prominent visual elements within the proposal will only be utilised during specific launch days, limiting the visual impact these elements will have on the surrounding area.<br><br>Appropriate landscaping is proposed and selected to support the development.<br><br>In addition, Southern Launch confirms that when selecting fencing required to secure the launch sites, Australian Standard 1725.1 - 2010 chain link fabric security fences and gates will be utilised as a baseline. |

| **GENERAL DEVELOPMENT POLICIES: Interface between Land Uses** | | | |
|---|---|---|---|
| **Policy** | **Description** | **Consistency** | **Assessment** |
| DO 1, PO 1.2, 2.1, 4.1, 4.2 | Development is located and designed to mitigate adverse effects on or from neighbouring and proximate land uses. | ☒YES ☐NO ☐PARTIAL | *Code* provisions primarily relate to the impact of a proposal on sensitive receivers and provide guidance to ensure development is located and designed to mitigate adverse effects on or from neighbouring and proximate land uses.<br><br>The proposed test launch vehicles will have a trajectory in a southerly direction, over the ocean and away from the nearest sensitive receiver in the region. The nearest habitable building is located approximately 3.5km to the east of the subject site which is considered a suitable distance. The range control site is located approximately 300 m from the nearest dwelling – no adverse impacts are envisaged.<br><br>The applicant asserts that modelling undertaken has indicated that expected vibration impacts from launches will be located in the area immediately surrounding the launch sites and are highly unlikely to have any perceivable ongoing impact at the nearest sensitive receivers which are located several kilometres from the location where the launch is to take place.<br><br>In addition, Southern Launch propose to implement the following measures to minimise noise and vibration during launch-events: |

| | | | |
|---|---|---|---|
| | | | • blast walls and water deluge systems<br>• construction and operation of the project to be managed in accordance with applicable CEMP and OEMP<br>• notifying residents of launch-events<br>noise monitoring and reporting program to verify impacts of noise events on sensitive receivers. |

| **GENERAL DEVELOPMENT POLICIES: Land Division** | | | |
|---|---|---|---|
| **Policy** | **Description** | **Consistency** | **Assessment** |
| DO 1<br>PO 1.2, 3.1 | Land division creates allotments with the appropriate dimensions and shape for their intended use | ☒YES ☐NO ☐PARTIAL | As part of the proposal, Southern Launch proposes to lease the allotment for a period of more than six years, therefore is classified as a form of development. The proposed lease does not result in the creation or issue of a separate title of land in the zone. The proposal is considered to comply with the land division policies for the zone as it does not create an allotment for an existing tourist facility, nor does it create an additional allotment with access to the coast. Further, appropriate access to the site is available.<br><br>As noted within the Response Document, Southern Launch and the owner of the property have resulted in a revised proposal for land division by lease, which relocates the lease boundary northwards, and includes more land within the proposed lease to Southern Launch. This relocation of the lease boundary locates more of the safety buffers required for individual launches within the extent of the lease. |

| **GENERAL DEVELOPMENT POLICIES: Transport, Access and Parking** | | | |
|---|---|---|---|
| **Policy** | **Description** | **Consistency** | **Assessment** |
| DO 1, PO 1.1 | Development is integrated with the existing transport system and designed to minimise its potential impact on the | ☒YES ☐NO ☐PARTIAL | *Code* policies seek development that is integrated with the existing transport system and designed to minimise its potential impact on the functional performance of the |

| | | | |
|---|---|---|---|
| | functional performance of the transport system. | | transport system. In addition, safe and convenient access should be provided to minimise impact or interruption on the operation of public roads.<br><br>A Transport and Access Impact Assessment (TAIA) has been undertaken by traffic engineers Wallbridge Gilbert Aztec and is included within the EIS supplied by the applicant. WGA consider the existing public road network has the capacity to accommodate the additional movements.<br><br>The report concludes the external road network will cater for the 19 m Semi Trailer design vehicle – the largest vehicle required to access the site. In addition, geometric realignment and road upgrades to the internal access network will be required to enable the safe passage of all vehicles to the proposed launch sites. Realignment of some of the internal intersections may be required to achieve safe sight distances.<br><br>Once the launch pad is operational, total traffic (excluding tourist traffic) is expected to be approximately 56 vehicles per day with 8 per cent of that volume being commercial vehicles.<br><br>DCLEP has provided feedback relating to Fishery Bay Road and advised it would require resheeting and possibly may require sealing, rather than more frequent grading. DCLEP has also requested dilapidation reports be developed, so that road condition can be monitored during the construction period (of the launch facility) and are returned to their pre-construction condition. Southern Launch has committed to providing a traffic management plan during the "construction" phase of the launch facility, which would also provide a level of consultation with relevant stakeholders to increase their awareness of increased construction activity and associated traffic impacts, for the duration of works.<br><br>The proposal is generally consistent with the key performance outcomes and performance features listed in the General Development Policy – Transport, Access and Parking. |

| | | | |
|---|---|---|---|
| PO 1.2 | Development is designed to discourage commercial and industrial vehicle movements through residential streets and adjacent other sensitive receivers. | ☒YES ☐NO ☐PARTIAL | Heavy vehicle routes during construction will be specified in a Traffic Management Plan.<br><br>Based on these geotechnical conditions and a set-back distance of typically 6 m to 10 m from the existing road to the top of the cliff at the closest points, the loads imposed by the 10 to 12 heavy vehicles per day, on average, are not expected to materially affect the stability of the coastal cliffs. Further, the vehicle speeds are anticipated to be relatively slow with no further adverse effects anticipated.<br><br>Southern Launch advise the heavy vehicles will cause deterioration of the road surface, and will require maintenance, and are accepting of an infrastructure agreement with council to address the issue of ongoing road maintenance. |
| PO 1.3 | Industrial, commercial and service vehicle movements, loading areas and designated parking spaces are separated from passenger vehicle car parking areas to ensure efficient and safe movement and minimise potential conflict. | ☒YES ☐NO ☐PARTIAL | Heavy vehicle routes and movements during construction will be specified in a Traffic Management Plan. |
| PO 1.4 | Loading, unloading and turning of traffic avoids the interruption of and queuing on public roads. | ☒YES ☐NO ☐PARTIAL | Heavy vehicle routes during construction will be specified in a Traffic Management Plan and Construction Traffic Management Plan. Impacts can be appropriately managed through a combination of minor upgrades and safety improvements, traffic management controls, dust monitoring, avoidance of peak periods, permitting conditions and maintenance requirements. |
| PO 3.1 | Safe and convenient access minimises impact or interruption on the operation of public roads. | ☒YES ☐NO ☐PARTIAL | Refer above. |
| PO 3.3, 3.4, 3.5, 3.7, 3.8, 3.9 | Access points sited and designed to accommodate the type and volume of traffic; minimise adverse impacts to neighbouring properties, and not interfere with existing street trees, furniture or infrastructure. Appropriate separation from level crossings. | ☒YES ☐NO ☐PARTIAL | Refer above.<br>Existing access tracks will be upgraded as required to provide appropriate, all-weather access to each of the sites. New access connections will be provided to connect the sites to the existing and upgraded access tracks. |
| PO 6.1, 6.2, 6.6 | Vehicle parking areas are sited and designed to minimise impact on the operation of public roads by avoiding the | ☒YES ☐NO ☐PARTIAL | Refer above. |

| | | | |
|---|---|---|---|
| | use of public roads when moving from one part of a parking area to another; Vehicle parking areas are appropriately located, designed and constructed to minimise impacts on adjacent sensitive receivers. | | |

# Appendix D: Repealed Policy under the *Development Act 1993*

**DEVELOPMENT PLANS**

1. Lower Eyre Peninsula (DC) Development Plan – consolidated 12 July 2018
2. Land Not Within a Council Area (Coastal Waters) – consolidated 12 December 2017

**COASTAL CONSERVATION ZONE**

The majority of the allotment is situated within the Coastal Conservation Zone of the Lower Eyre Peninsula (DC) Development Plan. The role of this zone is to ensure the conservation of coastal features and scenic quality, enable appropriate public access and ensure that development is not subject to coastal hazards. Development within the zone should be subservient to the conservation of the coastal environment to ensure that the fragile coastal environment is protected, and biodiversity maintained. Development is limited to conservation work, signage and nature-based tourist accommodation. In addition, development should be designed and sited to be compatible with conservation and enhancement of the coastal environment and scenic beauty of the zone. The non-complying list for the Zone is extensive.

**PRIMARY PRODUCTION ZONE**

Land further to the north of the allotment containing the site is located in the Primary Production Zone. The zone is used for agricultural production and the grazing of stock on relatively large holdings. The pattern of occupation with homesteads, ancillary buildings and paddocks enclosing crops and livestock dominate the environment and firmly establish an open, rural appearance. The climate, soil and landform characteristics of this zone favour the continuance of agricultural production and livestock grazing and it is desirable not only that these activities continue, but also that good land management techniques be encouraged to control proclaimed pest plants, vermin, and soil erosion.

**WATER PROTECTION ZONE**

Land further to the north of the allotment containing the site is located in the Water Protection Zone. The zone seeks the protection of surface and underground water resources from pollution, contamination or unsustainable use. Development including broadacre cropping, farm buildings and grazing is envisaged within the zone.

**COASTAL WATERS ZONE (LNWCA)**

The proposed development is situated adjacent to the Coastal Waters Zone Land Not Within a Council Area (Coastal Waters) Development Plan. It is noted the policies of the Coastal Waters Zone were never applicable to assessment of the application, however a summary is provided below. The role of the zone is to protect and conserve terrestrial and marine flora, fauna and scenery, and the creation of recreation areas by establishing parks and reserves. In addition, the coast should be protected from development that could affect the marine and onshore coastal environment whether by pollution, erosion, damage or depletion of physical or biological resources, interference with natural coastal processes or any other means.

www.plan.sa.gov.au

Department for Trade and Investment
Planning and Land Use Services

GPO Box 1815
Adelaide South Australia 5001