Landscape Character and Probable Visual Effect Assessment

Whalers Way Orbital Launch Complex

Prepared for Southern Launch

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1.0 Scope of Assessment

1.1 Introduction

This report has been prepared by Warwick Keates of WAX Design with the assistance of Kieran Power of WAX Design for Southern Launch to assess the potential visual impact of the proposed Whalers Way Orbital Launch Complex (the Project). This report aims to evaluate the existing landscape character, undertake a visual impact assessment of the proposed launch facilities and provide a discussion around the degree of visual change that is likely to result from the introduction of the Project within the landscape of the lower Eyre Peninsula.

The Landscape and Visual Impact Assessment (LVIA) comprises of two separate assessments, a landscape character assessment and a visual impact assessment; these are interrelated processes as described in the Guidelines for Landscape and Visual Impact Assessment[1]. The landscape character assessment considers the existing character of the existing landscape and the localities of the launch facility sites. The site locality is defined by the areas around the Project from which the proposed development and associated infrastructure are likely to be visible. The visual impact assessment considers the possible effect that may result from the development in the landscape, and the development may give rise to changes in the visual character.

The potential visual impact will be assessed using a detailed methodology that involves on-site assessments, GIS analysis and desktop assessments. The detailed visual impact assessment describes the predicted visual effect of the Project within the defined locality.

1.2 Project Description

Southern Launch proposes to develop the Whalers Way Orbital Launch Complex located at the southern tip of the Eyre Peninsula in the area named Sleaford and is commonly known as Whalers Way Peninsula. The subject site is located approximately 25 kilometres southwest of Port Lincoln on the Eyre Peninsula.

The subject allotment has an area of approximately 2,640 hectares. Access to the site from Port Lincoln follows Proper Bay Road, Fishery Bay Road to Right Whale Road before entering the site and private road known as Whalers Way Road.

The proposed orbital launch complex facilities are contained within approximately 1,200 hectares of the allotment, located below the -34.923 degree line of latitude. The site area is subject to a commercial arrangement between Southern Launch and the landowner.

The Whalers Way Orbital Launch Complex will consist of the construction of buildings and infrastructure, including but not limited to:

- Assembly buildings (temporary and permanent);
- Range control facilities;
- Diesel and hydrogen fuel cell-powered generators;
- Helicopter pad(s);
- Water tanks;
- Water towers;
- Water capture and treatment systems;
- Launchpads;
- Lightning rods;
- Anemometer towers;
- Engine test stands
- Methane flare stacks;
- Propellant (liquid, hybrid and solid) storage;
- Secure blockhouses;

1Swanwick, C. (2013). Guidelines for Landscape and Visual Impact Assessment. 3rd ed. United Kingdom: Landscape Institute and Institute of Environmental Management and Assessment.

- Blast walls;
- Bunding (for blast wave deflection);
- Installation of fibre optic and satellite communication systems;
- Installation of high voltage power lines;
- Construction of internal access roads;
- Visitor viewing area and interpretative facilities;

Temporary infrastructure associated with development and construction, including but not limited to:

- Temporary concrete batching plant;
- Temporary site and construction offices and facilities;
- Temporary laydown areas; and
- Temporary access tracks.

1.3 Site Locality

A site locality around the Project has been defined for assessment purposes and is based on research and previous experience in setting thresholds for scale and identification of visual effect. Most notably, the Thomas matrix[2] and Bishop (2002)[3] has guided this matter. Also, the extent of the site locality has been reviewed against the Zone of Theoretical Visual Influence (ZTVI) mapping (figures 18-21). This mapping provides a reference of the extent to which the Project is likely to be visible in the landscape and defines the viewshed that may result from the local topography (excluding vegetation and built form screening).

The landscape character assessment for the site locality comprises of written descriptions and photographic surveys to articulate the character of the existing landscape that surrounds the site. This is followed by a discussion of the probable visual effect that may occur across the locality surrounding the Project.

Figure 1: Locality Plan

2Sinclair, G. (2001). The Potential Visual Impact of Wind Turbines in relation to distance: An approach to the environmental assessment of planning proposals. E.I.Services

3 Bishop, I. (2003). Determination of thresholds of visual impact: the case of the wind turbines: Environment and Planning B: Planning and Design: 707-718

2.0 Introduction

2.1 Visual Assessment Approach

The LVIA methodology aims to provide an objective, reliable analysis of the potential visual impact when considered against the existing landscape character.

The process for the visual assessment is based on the recommendations of John Ginivanand Planning SA (2002)[4]. It considers the visual assessment regarding the Primary Landscape Character Assessment and Detailed Visual Effect Assessment (excluding Qualitative Subjective Assessment).

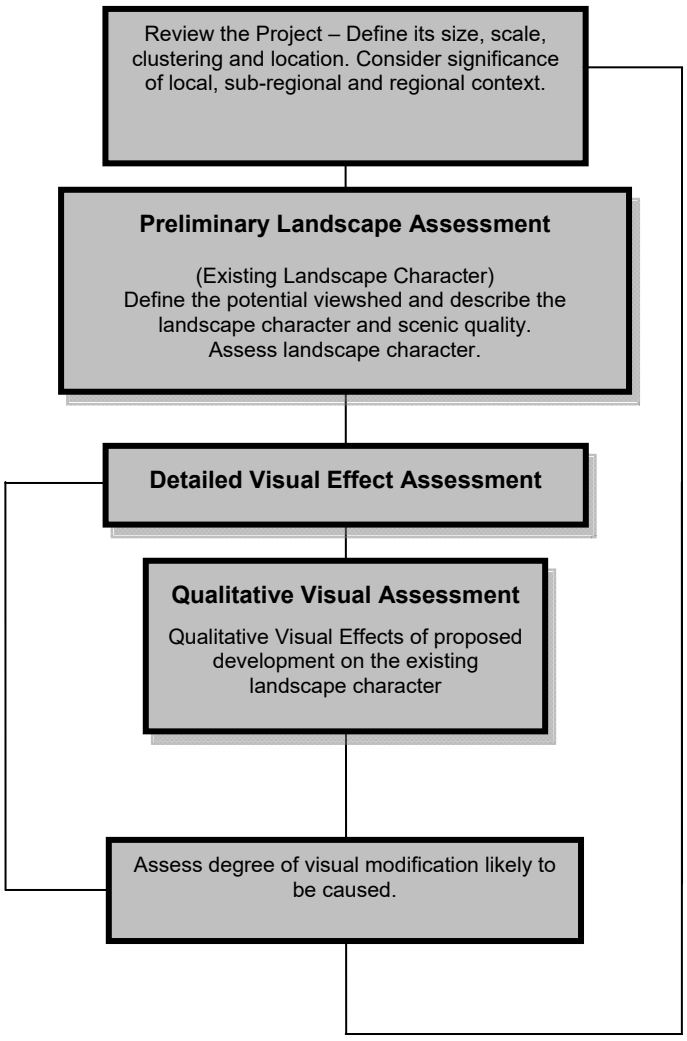


Figure 2: Detailed Visual Assessment Process

[4] *Planning South Australia (2002). Advisory Notice Planning- Draft for Consultation 21 Wind Farms. S.A Adelaide*

2.2 Guidance and Best Practice

Currently, there is no formalised standard visual assessment methodology at local, state or federal government levels. While various guidelines and frameworks have been produced, they do not provide a definitive assessment methodology or technique for the Project. For the visual assessment of the Whalers Way Orbital Launch Complex to follow a 'best practice' approach, it has been defined regarding the following documents and previous experience of the authors:

- Guidance Note for Landscape and Visual Assessment (2018);
- Guidelines for Landscape and Visual Impact Assessment (Third Edition) (2013), Landscape Institute;
- Visual Landscape Planning in Western Australia. (2007). A manual for evaluation, assessment, siting and design, Western Australian Planning Commission;
- Swanwick, C. (2013). Guidelines for Landscape and Visual Impact Assessment. 3rd ed. United Kingdom: Landscape Institute and Institute of Environmental Management and Assessment;
- Lothian, A. (2000). Landscape Quality Assessment of South Australia. PhD Thesis, Adelaide University.

2.3 Methodology

The approach used for the LVIA is based on two assessment stages with reference to the Guidelines for Landscape and Visual Impact Assessment (Third Edition) (2013).

- Landscape character assessment is concerned with identifying and assessing the importance of landscape characteristics and the existing landscape quality.
- The Visual Assessment aims to qualify the extent to which the Project is visible as well as defining the degree of visual change and the associated visual impacts.

The following summarises the stepped approach of the methodology.

2.3.1 Desktop Studies

The Landscape Character Assessment for the Project includes reviews of the project documentation, the Project's location and infrastructure requirements. An analysis of GIS data has been undertaken along with on-site photography and aerial photographs as well as a review of the supporting literature was completed to establish a broad comprehension of the scope of the Project and the existing landscape character.

2.3.2 Landscape Character Assessment

The assessment includes identification and description of landscape character as well as any notable landscape features. Mapping and photographic surveys are undertaken in addition to written commentary to describe the locality and existing landscape character of the site locality.

The landscape character assessment was undertaken on 26 March 2020 to enable a detailed understanding of the existing landscape character. The weather conditions during the site visit were good with clear skies and no atmospheric conditions to affect the visual assessment.

2.3.3 Zone of Theoretical Visual Influence

Zone of Theoretical Visual Influence (ZTVI) maps are produced to gain an appreciation of where the Project will be visible. The maps qualify the extent to which the Project is likely to be seen using heights of 10-metres to represent the maximum building height on the site, 23 metres to represent the water towers and an infrastructure height of 30-metres to represent the launch gantry and pad equipment. The launch gantry and associated infrastructure represents a temporary visual effect and will only occur during launch operations.

The analysis uses a digital terrain model, and computer-generated models of site facilities to illustrate how the Project would be visible from locations around the proposed Project. It should be noted that

the ZTVI does not take into account the impact of local vegetation or localised landforms, and it is based on a 1-metre contour data set. This means that the theoretical visual impact of the Project is calculated within a landscape devoid of any vegetation or built form screening, as such represents a 'worst case' scenario.

2.3.3 Visual Impact Assessment

An assessment of the visual impact based on-site observations with reference to prepared ZTVI mapping and a detailed assessment of the baseline landscape character, including;

- Topography (the complexity of the land that exists as part of the underlying landscape character);
- Vegetation Cover (the extent to which vegetation is present and the potential to screen and filter views);
- Existing infrastructure (the impact of development on landscape and visual character); and
- Cultural Sensitivity(existing cultural overlays, planning designations and any identified listing of heritage items and or local sensitivities to the landscape such as scenic drives and viewpoints).

The visual impact assessment considers the sensitivity of the existing landscape character and the degree of visual change that is likely to occur as a result of the development of Project within the landscape.

2.3.4 Planning Review

A review of the landscape and visual impacts of the development from a planning context is also undertaken. The planning review included a review of the Lower Eyre Peninsula Council Development Plan consolidated 12 July 2018. The potential visual impact of the development has been reviewed and discussed against the relevant desired character statements with specific reference to landscape and visual considerations resulting from the development of the Project.

2.3.5 Conclusion and Opinion

Based on an assessment of the existing landscape character, the ZVTI and a review of the relevant planning policies, an opinion of the suitability of the Project is developed. The conclusion considers the sensitivity of the landscape to change, the visibility of the development and the potential visual impact.

3.0 Landscape Character Assessment

3.1 The Project Site

The Project site is located to the southern end of the Eyre Peninsula. The landscape character is defined by the coastal topography with an elevated rocky plateau which extends into the Southern Ocean forming a defined coastal edge with vertical cliffs measuring several hundred metres in height.

The underlying topography of the locality creates a defined landscape character to the coast of the peninsula. Local ridgelines, small valleys and broad plateau are formed by the coastal rock plateau, with the progressive erosion of the landscape creating further variation in the local landscape character. Headlands and coves create variations in the cliff line, creating framed views across the landscape and out to sea, as well as providing distinct viewpoints from elevated locations across the coastal peninsula.

Figure 3: View of the coastal topography and land cover in the locality

The land cover consists of low lying coastal scrub with small trees and shrubs that form a densely vegetated carpet across the skeletal soils that exist on the rocky plateau. The height and form of the vegetation provides little screening or visual mitigation across the broader landscape, resulting in an open visual character with view extending over low lying vegetation. Instead, the vegetation cover contributes to the visual amenity of the landscape; contrasting the exposed geology of the coastal cliffs. Generally, the vegetation reinforces the coastal character, rather than providing distinct landmarks, landscape features or vegetated focal points.

Several ridgelines run in a north-south orientation across the peninsula. These landforms vary in height from 30 metres up to 80 metres at the eastern end of the peninsula. Each ridgeline forms a distinct visual envelope within the landscape, either screening or providing an elevated vantage point from which to see the surrounding landscape.

To the north, this landscape character transitions into the agricultural landscape of the Eyre Peninsula. The coastal vegetation and rocky landscape adjacent the coastal line are replaced by open grazed paddocks, isolated tree groups, field boundaries and scattered buildings associated with farms and rural living areas. The transition between the coastal landscape of Whaler's Way and surrounding agricultural landscape is fragmented with large tracts of vegetation breaking up the open visual character of the agricultural land.

Figure 4: View of the agricultural land use to the north of Whalers Way Peninsula

The eastern edge of the peninsula is defined by the headland of Cape Wiles which forms a pronounced ridgeline that runs north. The headland and ridges create two escarpments that face north and east. The northern escarpment forms an interface with the agricultural land uses of the Eyre Peninsula while the eastern escarpment defines the coastal edge to Sleaford Bay. To the west is an undulating coastal plateau with local ridgelines that form the landscape of Red Banks, Theakstone Crevasse and Cape Carnot.

To the centre of the subject land is a broad coastal basin with woodland pockets that form an enclosed landscape character with distinct ridgelines to the east and west that are created by plateaus and escarpments of the surrounding area. The landscape character and extent of vegetation within the basin are more pronounced due to the shelter provided by the local landform, which creates improved growing conditions for the coastal trees and shrubs. Small trees and low shrubs form a dense coastal woodland. The amount of vegetation increases the landscape amenity of the area as well as providing additional screening to the basin.

The combination of topography and vegetation encloses the visibility of the locality. Views within the basin range over tens of metres up to several hundred metres to the adjacent ridgeline.

Located further west is the Cathedral Rocks Wind Farm. The presence of the wind turbines provides a visual contrast to the natural character of the coastal edge of the lower Eyre Peninsula. Given the absence, more generally, of development across the peninsula, the wind turbines appear as large dominant pieces of infrastructure. Local roads, access tracks and small outbuildings are visible appearing as recessive visual elements in the broader landscape context.

The southern edge of the lower Eyre Peninsula is formed by a coastal cliff with local ridges and valleys that create a diverse visual character.

Figure 5: View of the typical landscape character of the coastal cliffs

The location, elevation and orientation of the various proposed launch facilities within this landscape context will directly affect the degree of visual impact produced by each location. The relationship of topography, vegetation and the resulting site works will define the visual effect and the amount to which visual impacts can be mitigated.

3.2 Wider Landscape Character

To the eastern side of Sleaford Bay, the ridgeline associated with the eastern coastal escarpment of the subject landforms a defined topographic backdrop to the area

Several properties are visible within the vegetation of the eastern coastal escarpment. However, these properties, due to their low built form and materiality, provide limited visual impact. The dominant visual effect results from the access road that carves through the coastal scrub forming a contrast in colour and materiality and appearing as a visible line of infrastructure within the coastal landscape.

Along Fisheries Bay Road, the local ridgelines associated with the subject area are visible. The sloping topography and orientation of the ridgelines including the undulating coastal plateau and the coastal headland will result in some of the proposed sites potential being visible from local farms and other buildings located along Fisheries Bay Road.

At distances of 12 kilometres, visibility of the ridgeline and the potential sites becomes significantly diminished.

Figure 6: View of the landscape character looking north

Figure 7: View looking south towards Whaler's Way Peninsula

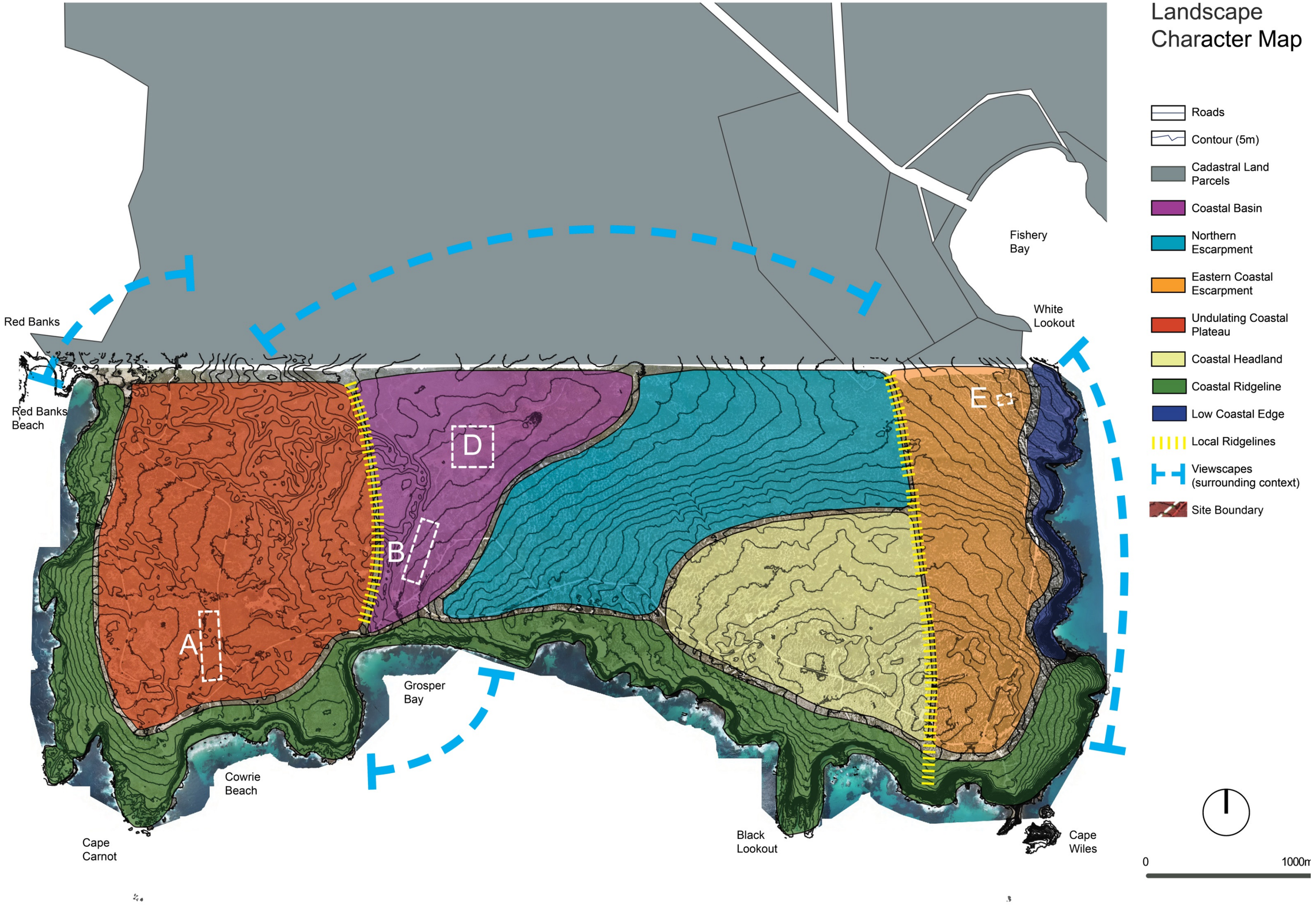


Figure 8: Landscape character

3.3 Site A

Site A is located to the western edge of the peninsula. The largest of the three proposed sites that will be used as part of the entire Project. Site A is positioned on an elevated plateau that is orientated and slopes gently to the north. The western edge of Site A is contained by a local ridgeline that is elevated to the southeast creating a visual screen to the broader locality around Site A. The ridgeline limits the visibility of the site, particularly to the west and south and rises to an elevation of 71m.

The potential visibility of Site A extends to the north, due to the inclination of the plateau and the lower-lying landscape character to the northern agricultural landscape. Distant views from Site A will be apparent and focus on the distant ridgelines associated with Marble Hill, Strawberry Hill and Mount Gawler located 45 kilometres to the north. This visibility is illustrated in the ZTVI mapping in Section 4.

The variations in the topography across the plateau on which Site A is located create visual corridors that extend south towards the coastal edge with glimpsed views over the coastal cliffs and towards the agricultural land further north.

Figure 9: Panoramic view from Site A looking north

3.4 Site B

Site B is located within the coastal basin that forms the central landscape character of the locality. At the southern end of Site B, the coastal basin narrows with local ridgelines forming a small valley that connects the coastal basin with the coastal cliffs. The low lying valley and adjacent ridgelines create an enclosed visual character with narrow views to the south.

To the southwest, the ridgeline is more pronounced forming a steep escarpment of several metres in height. This elevated topography encloses the visual character of the area. To the east is the inclined topography of the northern escarpment of the peninsula. The presence of the local ridgelines creates a distinct visual envelope to the locality. This visibility is illustrated in the ZTVI mapping in Section 4.

The land cover and vegetation associated with Site B reinforces the localised screening of the area, and the coastal scrub increases the landscape amenity of the area.

Views south to the coastline are screened by small ridgelines that provide a degree of visual separation to the scenic coastal edge beyond. To the north, views to the surrounding landscape are mostly absent with occasional glimpsed views to distant ridgelines.

The location of Site B, the surrounding ridgelines and low lying topography of the coastal basin limit the visual impact that may result from the development of this site.

Figure 10: Panoramic view from Site B looking north

3.5 Site D

Site D is located at the northern edge of the coastal basin. The site is enclosed by the surrounding vegetated ridgelines to the north, south, east and west. These ridgelines rise 5 to 6 metres above the floor of the basin.

The presence of coastal scrub and pockets of trees increase the screening provided by the ridgelines and enhance the visual amenity across the floor of the basin.

While the development of Site D includes dam walls up to 5m, the surrounding ridgelines form distinct visual envelopes and views to the proposed site from surrounding areas do not extend beyond a few hundred metres. Views to the coastline or further inland are screened, reinforcing the defined visual enclosure to Site D. This visibility is illustrated in the ZTVI mapping in Section 4.

Views across the basin range over tens of metres up to several hundred metres to the local ridgeline to the east. However, the local visual character will be modified by the introduction of the dam on the floor of the existing basin.

The low lying character of the site and underlying geology does result in stormwater impacts and possible lenses of water below ground that are reflective of the increased vegetation character within the area.

Figure 11: Panoramic view from Site D looking north

3.6 Site E

Site E is located to the base of the eastern coastal escarpment that faces Sleaford Bay. The vegetation cover, orientation and the underlying topography are defined by the low-lying coastal scrub and variations in the local landforms. The rising elevation of the coastal edge provides a distinct backdrop to the site. To the east are panoramic views across Sleaford Bay to Jussieu Peninsula and the vegetated coastal character of Lincoln National Park.

Further to the east of the Site E, on the coastal edge associated with White Lookout and Cape Wiles, are several viewing platforms and coastal access points. These areas provide viewpoints which are predominantly orientated east across Sleaford Bay and Sleaford Mere Conservation Park.

Figure 12: Panoramic view from Whites Lookout looking northwest over the eastern coastal escarpment

The location of Site E on the lower coastal edge and eastern facing escarpment is likely to be visible from locations along the coastal and the Investigator Trail to the east. However, the scale of development proposed for Site E is similar to several buildings and small scale developments that already exist in the landscape.

Figure 13: View from Whites Lookout looking east across Sleaford Bay

Figure 14: View from Wanna Road looking west to eastern coastal escarpment

Figure 15: View from Pioneer Lookout looking east

4.0 State Wide Landscape Scenic Quality Values

4.1 Review of StateWide Landscape Scenic Quality Values

To present a broader understanding of the landscape value associated with the existing landscape and visual impact of the Project a review has been undertaken of a research study conducted by Dr Andrew Lothian. This research focuses on landscape character, landscape value and the potential visual change created by development.

4.2 State Wide Landscape Scenic Quality Values

Referring to Lothians studies from 2000)[5] and (2005) [6], the biophysical landscape character of the Eyre Peninsula has been classified as a coastal region with plains and low ranges/hills, refer to figure 16.

The assessment process conducted by Lothian measured public scenic beauty perception values of South Australian Landscapes. Scenes were rated out of 10.

The mean ratings for coastal landforms within the Eyre Peninsula were;

- Cliffs 8.56
- Beaches and cliffs 8.03
- Beachs and flat hinterlands 6.66
- Plain (Coastal) 4.69

In addition, scenes were assessed with regards to land use and physical characteristics such as vegetation type and coverage, topographic variance, the presence of water. Cliffs, rocks, beaches and flat hinterland occupy the majority of the Eyre Peninsula. The mean of flat terrain recorded a mean 3.97 and coastal areas had a median range of 6-6.99.

The landscape of the Eyre Peninsula, including the Whalers Way Peninsula, received a moderate to high ranking in terms of the scenic quality. Figure 17illustrates the landscape quality variance of Eyre Peninsula and the proposed location of the Project and represents landscape quality values of 7 to 8.

In the case of the Project, the existing landscape quality has a moderate to high scenic value due to the coastal location and cliffs. Consequently, development of the proposed sites within this scenic landscape character may potentially impact on the visual amenity of the area.

[5] *Lothian, A. (2000) Landscape Quality Assessment of South Australia. Department of Geographical & Environmental Studies. University of Adelaide. PhD*

[6] *Lothian, A. (2005)Coastal Landscape Values of South Australia. Report for the Coast Protection Branch South Australian Department for Environment and Heritage*

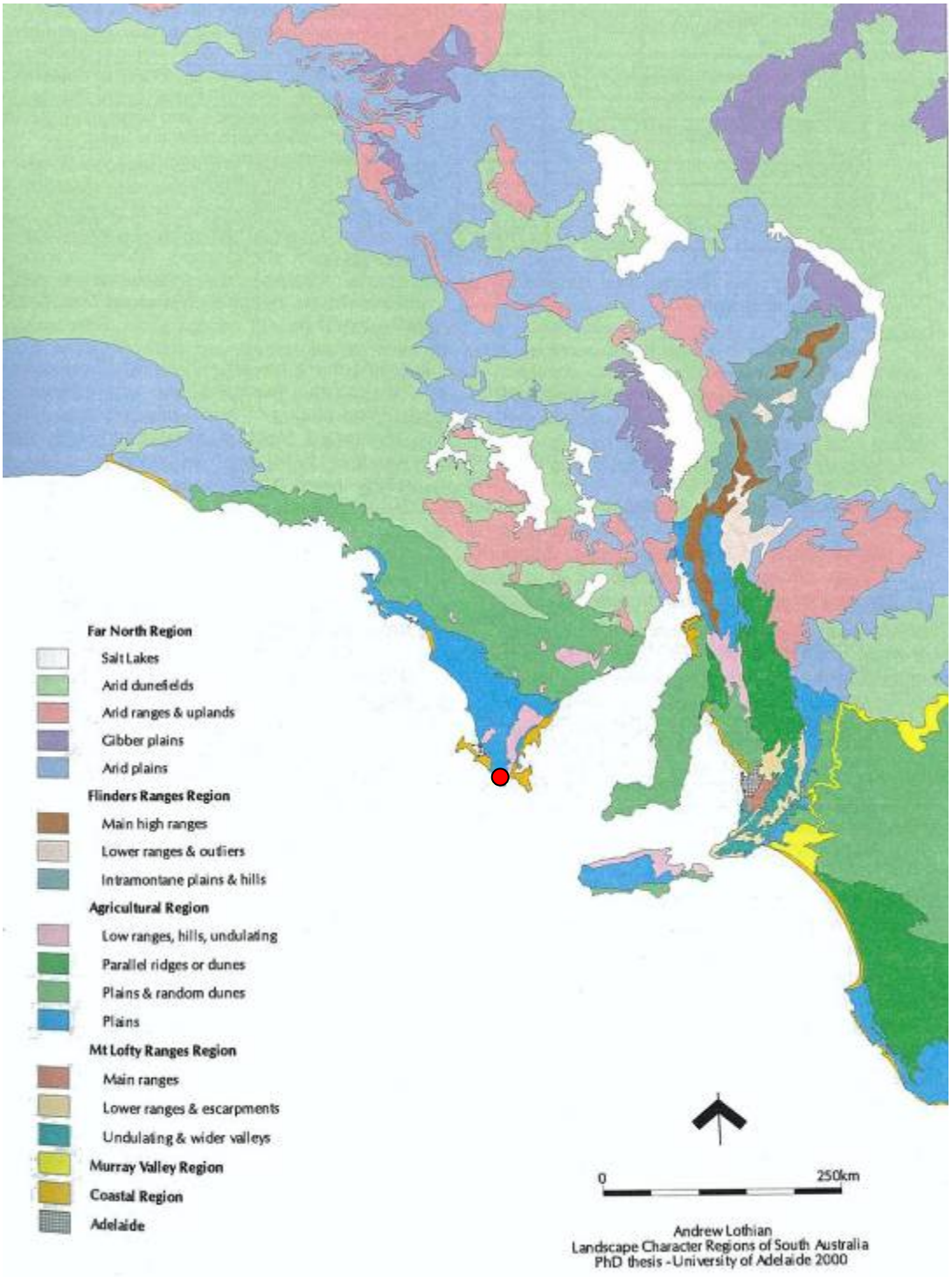


Figure 16: Landscape Character Regions of South Australia (Lothian, 2000 with red dot indicating the project location)

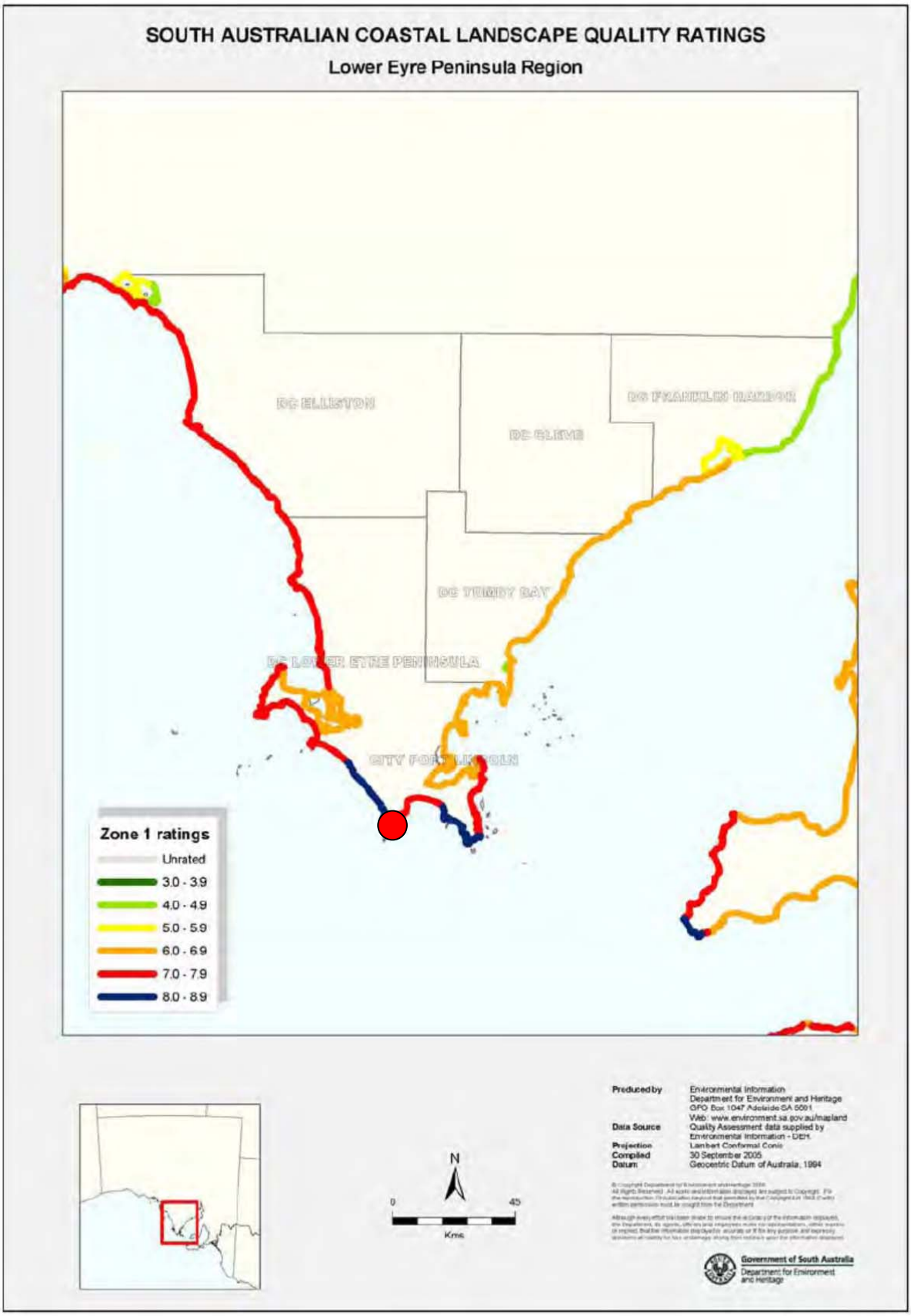


Figure 17: Coastal Viewscapes of South Australia (Lothian, 2005 with red dot indicating the project location)

5.0 Zone of Theoretical Visual Influence

5.1 Zone of Theoretical Visual Influence (ZTVI)

The Zone of Theoretical Visual Influence (ZTVI) mapping illustrates the potential visual impact associated with the Project within the landscape. The mapping quantifies the extent to which the Project is likely to be seen in the broader landscape.

The ZTVI mapping is developed in GIS using 1-metre contour data. The ZTVI represents a 'worst case' scenario as it does not incorporate vegetation or localised screening effects, which are described as part of the on-site assessment.

The ZTVI has used several assessments to understand the potential visual effects associated with the permanent launch facility infrastructure which has a maximum height of 10-metres (buildings) and 23-metres (elevated water tanks) and the launch gantries which reach a height of 30-metre during a launch operation. Sites A and B both contain a 40-metre lightening tower; however, this is a slender piece of infrastructure and is unlikely to cause a visual effect in the locality. Consequently, this piece of infrastructure has not been included in the ZTVI assessment. Assessment of each of the launch sites has been undertaken in order to understand the visual effect associated with each site and the potential mitigation that is offered by the specific location of each land site.These maps demonstrate the variations that will occur and the modification of the visual impact that occurs as a result of the proposed developments in the landscape and the screening provided by the existing landscape features.

Due to the enclosed topography of Site D, there is no additional visual effect represented in the ZTVI mapping.

Due to the small scale development of Site E, specific ZTVI mapping has not been undertaken. Instead, a description of the potential visual impacts has been prepared.

5.2 Combined Visual Impact of Launch Facilities (non-launch days)

The combined ZTVI mapping for the launch facilities (figure 18) demonstrates the visual containment that is provided by the local topography of the area, particularly the rising landform of the western plateau and the ridgelines of the eastern coastal escarpment.

The heights associated with the proposed built form facilities (10-metre assembly building) (non- launch days) ensures that local ridges that surround the central basin and the coastal vegetation limit the visual impact of the sites. Visual impacts on Sleaford Bay and Red Banks are screened.

Site A and B will also contain an elevated water tank structure which will sit 23 metres above the surrounding ground levels. The proposed tanks will sit atop a 20-metre tall lattice tower, while the tanks have dimensions of 3 metres height and 9.3-metre diameter. The lattice tower provides a degree of transparency and will be hard to discern from the sky and surrounding landscape when viewed from distances outside the subject land. However, the water tanks will be viewed as a solid object against the sky and surrounding landscape from locations to the north, east and southern waters. To ensure the visibility and visual impact of the tanks is limited, the water tanks will need to incorporate an applied paint finish that will assist in reducing the visual contrast of the structures.

An interpolation of the visual impact to the north indicates that glimpsed and partial views of the sites might occur. Given the scale of the proposed developments, the existing landscape character and the distance over which the visual effects are likely to occur, the visual impact would be described as slight with the impacts resulting primarily from development on Sites B and D.

Visual impacts from the water looking back at the proposed development sites typically occur at distances over a kilometre offshore. The height of the coastal cliffs creates a defined viewshed that screens the coastal edge from any potential visual impacts.

Typically the visual impacts associated with the Project will be limited to rooflines of the assembly buildings, and the tops of bunding and blast walls, tanks and other ancillary infrastructure. The visual prominence of these elements will be slight, and there are opportunities to further mitigate the visual

impact through landscape treatments to the sites and applied paint finish that will assist in reducing the visual contrast of the structures with the surrounding landscape.

5.3 Combined and Individual Impacts of Launch Towers (launch days)

The combined ZTVI mapping for the Sites A and B (figure 19) uses a 30-metre vertical height to calculate the potential impacts associated with the sites during launch days. This visual effect represents a temporary impact that will occur for a day or two during a launch, up to three times a month. This also encompasses the impact associated with the 20-metre tall methane flare stacks which are utilised on launch days to burn off excess fuel.

The topography and vegetation cover to the east and west of the sites ensure that visual impacts on the sensitive landscape character of Red Banks, Sleaford Bay and Cape Wiles are screened. This screening also extends to the Pioneer Lookout, which is recognised as a site of cultural value.

Visual impacts occur to the south over the coastal waters of the peninsula and across the agricultural land to the north. While the coastal water to the south will be impacted and the launch towers will be visible from a few hundred metres offshore, the temporary nature of the tower and frequency of people viewing the tower from the water will be limited. This combination is likely to result in very slight visual impacts.

The visual impacts to the north will occur in a modified agricultural landscape character. Given the extent of existing infrastructure in the landscape and low levels of landscape amenity, the potential visual impacts associated with the launch tower on launch days will be limited and viewed over several kilometres.

The visual impact of Site A on launch days (figure 20) illustrates the specific areas from which the launch tower will be visible. The undulating topography of the coastal plateau and the orientation of the northern escarpment result in distinct areas of visibility across the subject land. This visibility extends south over the coastal waters and east along the coastline to Black Lookout. At this point, the north-south ridgeline of the eastern escarpment forms a defined visual envelope.

As previously discussed, the visually sensitive landscape character to the east of Site A is screened with more visual effects occurring to the north across the agricultural land uses of the peninsula.

The location of Site B within the central coastal basin will have an increased visual containment (figure 21). During launches, the visual impact is contained in the centre of the peninsula. The undulating coastal plateau and the northern escarpment contain the visibility of the site to the east and west.

A narrow valley entrance to the south of Site B will limit the visibility from the coastal waters, creating a defined angle of visibility due south, creating a negligible to slight degree of visual impact.

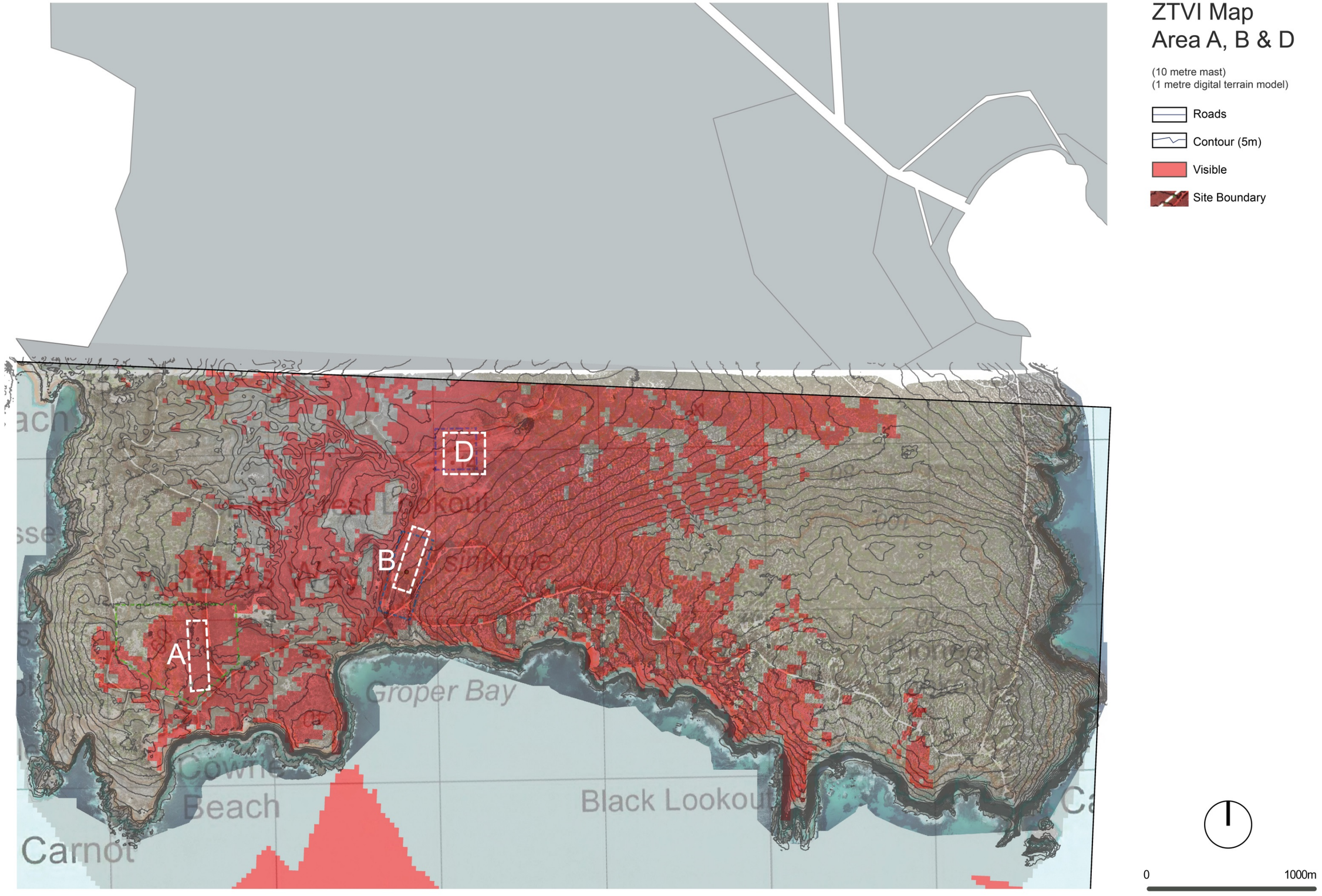


Figure 18: ZTVI of Sites A, B and D showing visual impact of 10-metre high infrastructure

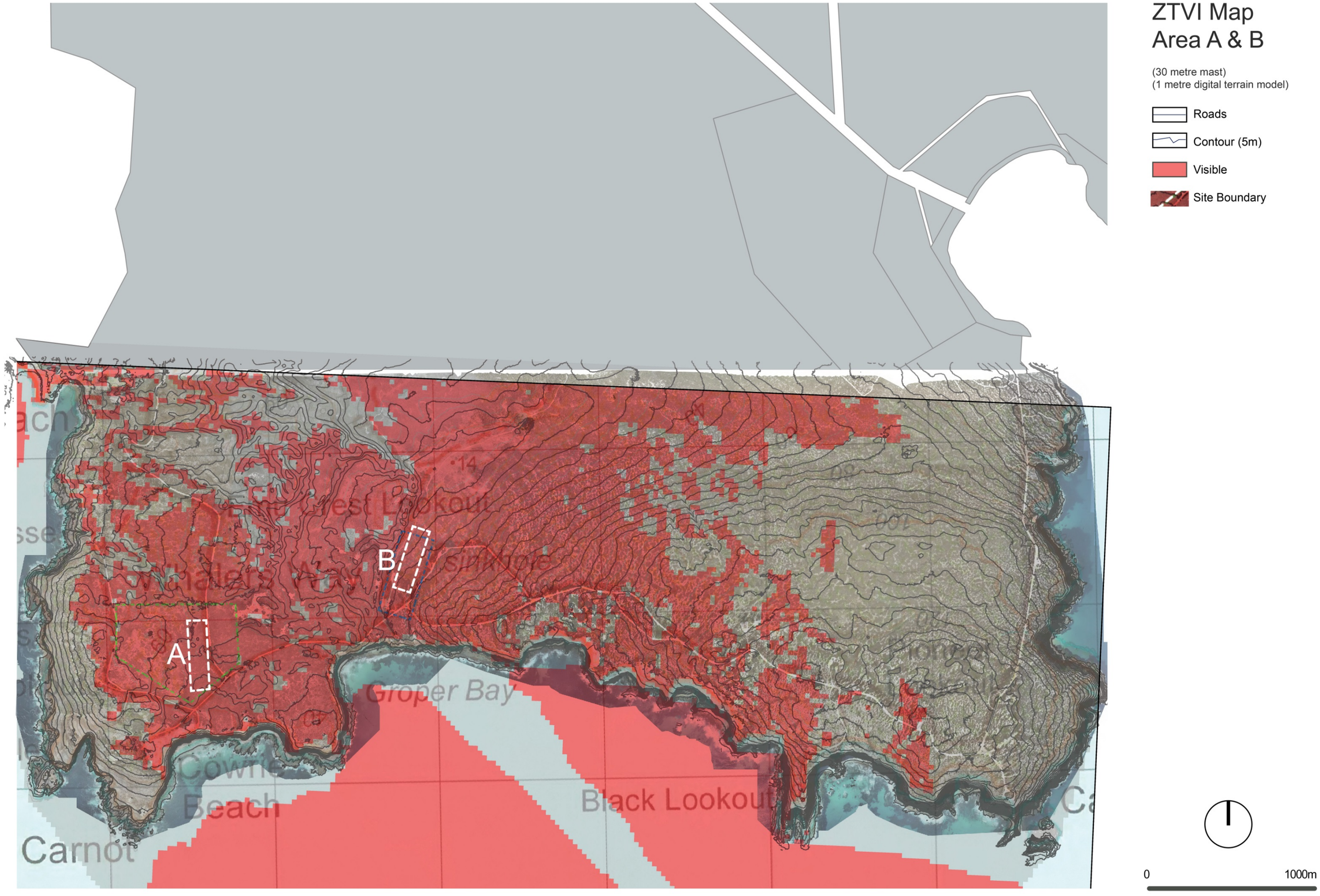


Figure 19: ZTVI of Sites A and B showing visual impact of 30-metre high launch gantry

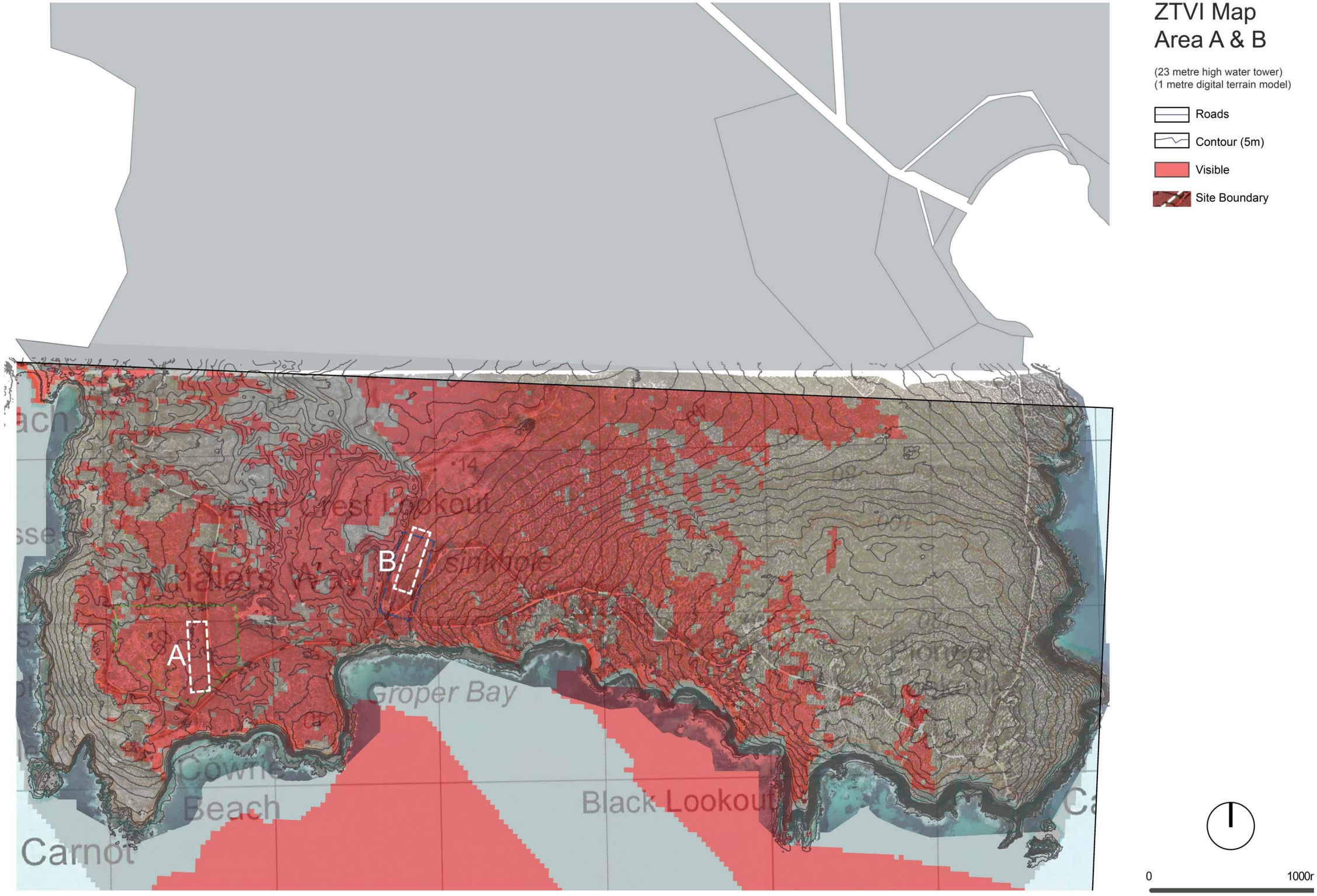


Figure 20: ZTVI of Site A & B showing visual impact of 23-metre high water tower

6.0 Visual Impact Assessment

6.1 Visual Impact Scope

The visual impact assessment is based on a proposed development of four sites across the subject land located within the lower Eyre Peninsula. The sites contain a variety of facilities and infrastructure to support the launching of orbital satellites. For the purposes of the visual assessment, a maximum height of 10-metres has been proposed for the assembly buildings as well as the 22.5-metre tall water towers. These buildings and infrastructure elements represent the permanent visual impact that will occur in Sites A, B and D. Further visual assessments have been undertaken for the launch tower, which will create a 30-metre high visual effect on launch days and represents a temporary visual impact. Site E will contain several low-rise buildings and represents a small scale development in the landscape. Consequently, a ZTVI has not been produced for this site.

The visual impact assessment considers the character and sensitivity of the existing landscape such as topography, vegetation, existing infrastructure (or lack of); as well as the scenic landscape values. Section 3 describes the existing landscape and outlines the visual character and potential sensitivity to change in relation to Sites A, B and D.

Using a series of ZTVI maps, a detailed visual assessment has been undertaken for each of the launch pad sites (Sites A and B) and support area (Site D). The visual impact for each site has been assessed by considering the existing landscape character and the degree of visual impact that the proposed development will produce with reference to the Summary Table of Visual Impacts (see Section 5.3).

6.2 Visual Impact Assessment

The visual assessment of Sites A, B and D and the review of Site E has identified that a variety of visual impacts will be experienced across the locality.

The existing landscape is defined by the underlying topography of the peninsula. The local ridgelines, small valleys and broad plateau form a distinct coastal edge. Headlands and coves create a varied coastline with framed views across the landscape and out to sea.

The vegetation cover consists of a dense coastal scrub with small trees and shrubs that form a defined landscape character and amenity. While the height and form of the vegetation do not provide significant belts of screening vegetation, the landscape character appears natural with development impacts limited to the access tracks and small clearance for informal camping or parking.

The combination of extensive vegetation cover, local landforms and coastal cliffs create a natural landscape character with a high level of visual amenity. The existing landscape will be sensitive to change, and the degree of sensitivity increases to the eastern edge of the peninsula as the scenic quality of Sleaford Bay becomes more apparent.

The landscape and visual amenity vary to the north. The modified agricultural landscape has reduced scenic qualities, and the sensitivity to change is reduced. In addition, the visibility of the Cathedral Rock Wind Farm increases to the north reinforcing the productive and modified character of the land, further reducing the sensitivity of the landscape to change.

The development of the Project within the existing landscape will cause a variety of visual changes. To the north, during launch and non-launch days, the visual impact is described as slight with the visibility of the Project occurring across a modified rural landscape. The sensitivity to change is low as the landscape character contains existing visual impacts such as the Cathedral Rocks Wind Farm, farm buildings and access roads. Due to the undulating topography of the locality, the visibility of the Project will be confined to glimpsed views of building rooflines and the launch tower on launch days.

To the south, visual impacts on the coastal edge are removed due to the screening provided by the cliffs that form the south edge of the peninsula. Glimpsed views of the Project will be seen from coastal water at a distance of several hundred metres. The visual impact of the development will be set in the landscape partially screened by local ridgelines and vegetation. During launch days, the

visual impact will increase slightly and focus on the launch tower with the potential visual impact described as slight increasing to moderate.

To the west, the visual impact is negligible to slight and is limited to launch days only. The existing wind farm reduces the sensitivity of the landscape character, and the comparative scale of the Project to the wind farm reduces significantly the degree of visual changes produced.

The landscape character assessment has highlighted the visual and landscape sensitivity of the eastern coastal escarpment. The scenic value and broader landscape amenity of Sleaford Bay and Lincoln National Park increase the sensitivity of the landscape to change.

While, there are several publically accessible roads, walking tracks and lookout along the eastern coastal line of the locality, particularly While Point and Fishery Bay, the north-south ridgeline of the eastern coastal escarpment creates a defined visual envelope, screening the development and preventing visual impacts to the east. The screening provided by the north-south ridgeline extends to other areas to the east including Lincoln National Park and Investigator Trail.

Over the subject land, as defined by land south of the -34.923 degree line of latitude, the visual impact will vary in response to the underlying topography and the natural landscape character of Whaler's Way. The combination of topography, land cover and landscape sensitivity, create a gradient of visual effects across the peninsula.

The visual impact across the coastal basin, undulating coastal plateau and the northern escarpment is described as moderate with the Project visible in the landscape. The visual change will be distinguishable from the surroundings in terms of form, scale and materiality, although the composition and underlying landscape visual character will be retained. The development will not block views, and the open visual character of the coastal landscape will remain. However, the existing landscape has limited sensitivity to change.

Areas to the east and west will have a potential visual impact describe as slight. The coastal ridgeline, coastal headland, eastern escarpment and the low coastal edge while sensitivity to visual change, are screened from the Project by local ridgelines and orientation of the escarpments with glimpsed views from specific locations when the launch tower is raised.

6.3 Summary Table of Visual Impacts

The following Table 1 is a summary of the classifications as recommended by the Guidelines for Landscape and Visual Impact Assessment (2nd Edition) (with reference the base criteria of Terance O'Rourke plc.), which describes the degree of effect on the visual amenity of the locality.

Descriptive of Visual Impact	Descriptors – appearance in the central vision field	Comments
Severe	*Standing out, striking, sharp and unmistakable.*	*Severe change in the view involving the obstruction of existing views or alteration to underlying landscape visual character through the introduction of new elements. Change may be different in scale and character from the surroundings and the wider setting or a severe change in the context of the existing landscape character. Resulting in a perceived adverse visual effect and an increase in a proportional change to the underlying landscape visual character.*

Descriptive of Visual Impact	Descriptors – appearance in the central vision field	Comments
Substantial	*Noticeable, distinct, catching the eye or attention, clearly visible, well defined and easily seen.*	*A substantial change in the view: which may involve partial obstruction of existing view or alteration of underlying landscape visual character and composition through the introduction of new elements. The composition of the view will alter the sensitivity of the underlying landscape character. The visuall character may be changed through the introduction of features.*
Moderate	*Visible, evident, obvious.*	*A moderate change in the view: visual change will be distinguishable from the surroundings while the composition and underlying landscape visual character will be retained. The existing landscape has limited sensitivity change.*
Slight	*Not obvious, indistinct, not clear, obscure, blurred, indefinite.*	*A very slight change in the view: change barely distinguishable from the surroundings. Composition and character of view substantially unaltered.*
None	*Not visible*	*No part of the development is discernable*

Table 1: Classification of Visual Impacts

7.0 Review of Development Plan

7.1 Introduction

The following section details the various development plan provisions, zones and policy areas that have been considered in relation to the potential visual effect of the Project and associated infrastructure.

The intent of the review is to provide clarity as to the relevance and consistency with particular provisions of the Lower Eyre Peninsula Council Development Plan (consolidated 12 July 2018) in relation to the development of the launch facility and associated infrastructure, visual impacts (as described in Section 4 and 5), and the effects on the landscape character and amenity.

A review of the PDI act planning policies which relate to the land have also been incorporated.

7.2 Coastal Conservation Zone (Lower Eyre Peninsula Council Development Plan)

Having reviewed the Development Plan, consideration has been given to the following provisions as they deal directly with visual impact and the protection of natural features.;

- Coastal Conversation Zone Objectives 1, 4
- Coastal Conservation Zone Desired Character Statement
- Coastal Conservation Zone PDC 7, 8, 9, 11, 14

OBJECTIVES

1 To enhance and conserve the natural features of the coast, including visual amenity, landforms and fauna.

4 Development that contributes to the desired character of the zone.

DESIRED CHARACTER

The desired character statement places a value on the protection of scenic qualities and the conservation of coastal features and scenic quality.

- *Development within the zone should be subservient to the conservation of the coastal environment in order to ensure that the fragile coastal environment is protected and biodiversity maintained*
- *The zone continues to be a predominately natural landscape containing coastal features and habitats such as wetlands, samphire flats, beaches, sand dunes, and cliff tops.*
- *Development borrows from, and complements the natural landscape in form and scale, and in building materials, textures, colours and tones, to ensure that the natural elements of the site/locality remain dominant to any introduced elements, and the scenic quality of the coast is protected.*

PRINCIPLES OF DEVELOPMENT CONTROL

Land Use

7 Development should not be undertaken unless it is consistent with the desired character for the zone.

8 Development should be designed and sited to be compatible with conservation and enhancement of the coastal environment and scenic beauty of the zone.

9 Development should:

(a) not adversely impact on the ability to maintain the coastal frontage in a stable and natural condition

(b) minimise vehicle access points to the area that is the subject of the development

(c) be landscaped with locally indigenous plant species to enhance the amenity of the area and to screen buildings from public view

(d) utilise external low reflective materials and finishes that will minimise glare and blend in with the features of the landscape.

11 Development should:

(b) minimise impacts on the natural surrounding environment by containing construction within a tightly defined site boundary

(c) not obscure existing views to coastal features or be visibly prominent from key public vantage points, including public roads or car parking areas

14 Car parking and access points to development should, wherever practicable, be:

(a) constructed of a permeable surface

(b) located on cleared land or along property boundaries to avoid the unnecessary removal of native vegetation.

7.3 Conservation Zone (PDI Act)

Having reviewed the Development Plan, consideration has been given to the following provisions as they deal directly with visual impact and the protection of natural features.;

Development Plan

- Coastal Conversation Zone Objectives 1, 4
- Coastal Conservation Zone Desired Character Statement
- Coastal Conservation Zone PDC 7, 8, 9, 11, 14

PDI Act

- Desired Outcome D01
- Performance Outcome PO1.1, PO1.2, PO4.1, PO4.2, PO4.4, PO7.1

DESIRED OUTCOME

D01 The conservation and enhancement of the natural environment and natural ecological processes for their historic, scientific, landscape, faunal habitat, biodiversity, carbon storage and cultural values and provision of opportunities for the public to experience these through low-impact recreational and tourism development.

PERFORMANCE OUTCOME

Land Use

PO1.1 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.

PO1.2 Development is primarily in the form of:

(a) directional, identification and/or interpretative advertisements and/or advertising hoarding for conservation management and tourist information purposes

(b) scientific monitoring structures or facilities

(c) a small-scale facility associated with the interpretation and appreciation of natural cultural heritage such as public amenities, camping grounds, remote shelters or huts

(d) structures for conservation management purposes

Built form and character

PO4.1 Development is sited and designed unobtrusively to minimise the visual impact on the natural environment by:

(a) using low-reflective materials and finishes that blend with, and colours that complement, the surrounding landscape

(b) being located below hilltops and ridgelines

(c) being screened by existing vegetation

PO4.2 Development is sited and designed to minimise impacts on the natural environment by:

(a) containing construction and built form within a tightly defined site boundary

(b) minimising the extent of earthworks

PO4.4 Development 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.

Landscaping

PO7.1 Screening and planting are provided to buildings and structures and comprise locally indigenous species to enhance the natural environment.

7.4 Discussion of Zone requirements (Development Plan and PDI Act)

The objectives for the zone aim to facilitate development that contributes to the desired character of the zone while enhancing and conserving the natural features of the coast, including visual amenity and landforms.

The desired character statement places a value on the protection of scenic qualities of the coastal landscape within the zone. The desired character statement also acknowledges certain development may take place within the zone but must be in a way which does not dominate the natural elements of the area.While the Conservation Zone envisages scientific monitoring, and the proposed development is aligned with these performance outcomes, the operation of the facility does not directly relate to the monitoring and testing of the locality.

Sites A and B contain assembly buildings which will have a maximum height of 10-metres and water towers with lattice towers up to 22.5-metres above the surrounding ground level. These buildings and objects will be constructed with colours and materials which help to mitigate the visual impact on the surrounding landscape. The development of bunding and the potential revegetation across the sites will assist in further reducing the potential impacts of the building. The retention of existing vegetation where possible will provide additional screening to these buildings and mitigate the visual impact of the water towers over more distant views.

These sites also contain launch pads which will accommodate launch towers of up to 30-metres in height. These structures are only required on launch days, as they are used to raise the launch vehicle into a specific launch position. It is expected that in the days leading up to a launch, there will be tests of these systems. It is proposed once fully completed; the two sites could accommodate up to three launches per month. Taking into account the anticipated launch frequency, the 30-metre tall structures will only be visible within the landscape for a limited time, reducing the visual prominence within the locality and from public vantage points.

The ZTVI mapping for both launch sites A and B indicates the extent to which each 30-metre launch tower will be visible from surrounding areas. When these structures are raised for launches, they will be visible within two defined view corridors; from offshore waters to the south and north towards the agricultural land of the peninsula. In addition, there will be some visibility from areas towards the centre of the subject land.

Local ridgelines and coastal ridgelines will help to mitigate any views from coastal areas to the east and west. Views from the Lincoln National Park to the east are mitigated by the distance across

Sleaford Bay to the closest launch site (approximately 20 kilometres) as well as the topography of the subject land to the eastern extent.

Site D will contain a workshop which may have a maximum height of 10-metres. Site E will contain the range operations centre of approximately 300 square metres. It is anticipated that this building will low scale and designed in a manner which incorporates materials and building heights which blend into the surrounding landscape, utilising indigenous vegetation for screening from public vantage points, particularly from lookout and viewpoints along the eastern edge of Sleaford Bay.

Given the scale of the development and visibility demonstrated by the ZTVI mapping, the potential visual and landscape impacts in the coastal landscape will be contained and minimised with significant areas of the Whaler's Way Peninsula experiencing minimal impacts.

7.5 Council Wide Provisions (Development Plan) and Overlays (PDI Act)(General Section)

Several Council Wide Objectives and PDC's relate to impacts on the existing landscape character, the design and form of development and associated visual effects. Coastal Areas, Siting and Visibility and Natural Resources consider the impacts of the development on the existing landscape. Of the objectives and PDCs contained within these sections, this assessment has considered those that are relevant and realistic to the proposed development.

Development Plan

- Coastal Areas Objectives 1, 3, 8 and PDC 1, 31
- Landscaping, Fences and Walls Objective 1
- Natural Resources Objective 1, 13
- Siting and Visibility Objective 1 and PDC 1, 2, 3, 4, 5, 7

PDI Act

- Coastal Areas Overlay

7.6 Coastal Areas (Development Plan)

OBJECTIVES

1 The protection and enhancement of the natural coastal environment, including environmentally important features of coastal areas such as mangroves, wetlands, sand dunes, cliff tops, native vegetation, wildlife habitat shore and estuarine areas.

3 Preservation of areas of high landscape and amenity value including stands of vegetation, shores, exposed cliffs, headlands, islands and hilltops, and areas which form an attractive background to urban and tourist areas.

8 Management of development in coastal areas to sustain or enhance the remaining natural coastal environment.

PRINCIPLES OF DEVELOPMENT CONTROL

1 Development should be compatible with the coastal environment in terms of built form, appearance and landscaping, including the use of low pitched roofs of non-reflective texture and natural earth colours.

31 Development along the coast should be in the form of infill in existing developed areas or concentrated into appropriately chosen nodes and not be in a scattered or linear form.

7.7 Coastal Areas Overlay (PDI Act)

DESIRED OUTCOME

D01 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; provision is made for natural coastal

processes; and recognition is given to current and future coastal hazards including sea level rise, flooding erosion and dune drift to avoid the need, now and in the future, for public expenditure on protection of the environment and development.

7.8 Discussion of Coastal Areas

In relation to maintaining the coastal character of the landscape, the Project will produce a defined development footprint within the existing coastal landscape. Four development sites will be utilised, with three located centrally and to the western portion of the subject land. The permanent structures located within each development site have a maximum height of 10-metres, with visibility contained to the coastal basin in the centre of the subject land and the northern escarpment. There are small areas of visibility associated with the Project towards the southern coastal ridgeline and offshore. In this regard, the physical impact of the development on the coastal landscape is limited.

The temporary launch towers associated with the launch sites A and B will have a maximum height of 30-metres. When in use, these structures will have a greater zone of visibility (refer to figures 20 and 21), focusing on the surrounding near-coast waters and the north-western portion of the subject land. The frequency of use of these structures (approximately three times per month) enables the protection of the coastal amenity when not in use. The temporary nature of the development helps to minimise the potential visual effects.

The separation of each of the development sites ensures that the visual effect of the proposed development is fragmented and the underlying coastal landscape is maintained. The coastal landscape is retained while the visual character is changed to a moderate degree, decreasing to slight to the north within the defined locality of the proposed development.

7.9 Landscaping, Fences and Walls

OBJECTIVES

1 The amenity of land and development enhanced with appropriate planting and other landscaping works, using locally indigenous plant species where possible.

7.10 Natural Resources

OBJECTIVES

1 Retention, protection and restoration of the natural resources and environment.

13 Protection of the scenic qualities of natural and rural landscapes.

7.11 Siting and Visibility

OBJECTIVES

1 Protection of scenically attractive areas, particularly natural, rural and coastal landscapes.

PRINCIPLES OF DEVELOPMENT CONTROL

1 Development should be sited and designed to minimise its visual impact on:

(a) the natural, rural or heritage character of the area

(b) areas of high visual or scenic value, particularly rural and coastal areas

(c) views from the coast, near-shore waters, public reserves, tourist routes and walking trails

(d) the amenity of public beaches

2 Buildings should be sited in unobtrusive locations and, in particular, should:

(a) be grouped together

(b) where possible be located in such a way as to be screened by existing vegetation when viewed from public roads

3 Buildings outside urban areas and in undulating landscapes should be sited in unobtrusive locations and in particular should be:

(a) sited below the ridgeline

(b) sited within valleys or behind spurs

(c) sited in such a way as to not be visible against the skyline when viewed from public roads

(d) set well back from public roads, particularly when the allotment is on the high side of the road

4 Buildings and structures should be designed to minimise their visual impact in the landscape, in particular:

(a) the profile of building should be low and the roof lines should complement the natural form of the land

(b) the mass of buildings should be minimised in wall and roof lines and by floor plans which complement the contours of the land

(c) large eaves, verandas and pergolas should be incorporated into designs so as to create shadowed areas that reduce the bulky appearance of buildings.

5 The nature of external surface materials of buildings should not detract from the visual character and amenity of the landscape.

7 Development should be screened through the establishment of landscaping using locally indigenous plant species:

(a) around buildings and earthworks to provide a visual screen as well as shade in summer, and protection from prevailing winds

(b) along allotment boundaries to provide permanent screening of buildings and structures when views from adjoining properties and public roads

(c) along the verges of new roads and access tracks to provide screening and minimise erosion.

7.12 Discussion

The proposed development seeks to protect the scenically attractive coastal location through the use of low building forms and associated infrastructure. Taller elements within the proposal will only be utilised during specific launch days, limiting the visual impact these elements will have on the surrounding area. The development site is located a substantial distance from surrounding towns and dwellings, which further helps to limit the impact on the visual character. The ZTVI mapping indicates that some views of the development will be visible across the coastal basin when approaching from Fishery Bay Road (north). There are also small sections of open waters from which development will be seen. However, it is noted that the visibility of these elements is associated with the launch infrastructure and will only be present on specific days, reducing the potential visual effect.

08 Conclusion

8.0 Conclusion

The landscape character assessment demonstrates that the underlying topography of the subject land creates a defined coastal landscape character with framed and screened views across the landscape and out to sea. The land cover consists of low lying coastal scrub with small trees and shrubs that form a dense landscape character. The combination of coastal topography and natural qualities of the vegetation result in a scenic landscape character.

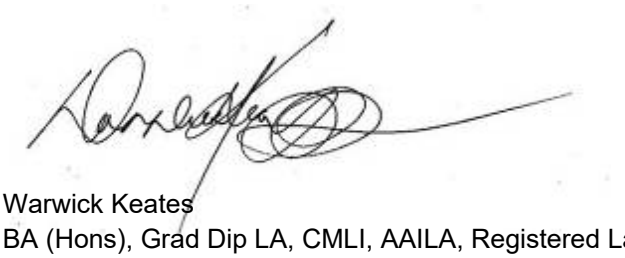
Several ridgelines run in a north-south orientation across the peninsula. The topography forms distinct visual envelopes within the landscape screening views to the east and west. To the north, the Whaler's Way Peninsula transitions into the agricultural landscape of the Eyre Peninsula. The coastal vegetation is replaced by open grazed paddocks, isolated tree groups, field boundaries and scattered buildings.

The Project will produce distinct areas of visibility that vary during launch days. The visual impacts associated with the Project are contained to the central sections of the subject land and area described as moderate. To the east and west, the coastal ridgelines create defined edges which limit the potential visual impacts on the sensitive landscape character of Sleaford Bay and Red Banks.

To the north, the visibility of the Project increases. However, the modified rural character of the landscape reduces the potential visual impacts, which are described as slight.

While the coastal landscape of the subject land is sensitive to visual and landscape change, the scale and separated locations of the development sites help to limit and fragment the potential effect. Given the contained visibility of the sites, particularly Site B and D, the potential impacts are mitigated by the surrounding topography to the east and west. The use of low-reflective material applied colour schemes that mimic the existing landscape, and the revegetation of the sites will further assist in limiting the visual impacts of the Project.

On balance, the slight to moderate visual impacts and contained visibility, as well as the potential to deliver a range of mitigation measures ensure that the degree of visual effect on the existing landscape of the subject land will be minimised.



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