VIA

Visual Impact Assessment

Hanson Tweed Sand Plant Expansion

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Visual Impact Assessment

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Final Landform Visualisation Photomontage 02

0.0 Executive Summary

Zone Landscape Architecture (Zone, ZLA) have been engaged by Hanson Construction Materials Pty Ltd (the Proponent) to prepare a Visual Impact Assessment (VIA) assessing the proposed expansion and redevelopment of the Hanson Tweed Sand Plant (TSP) located at Cudgen NSW hereon referred to as 'The Project'. The Project name is Hanson Tweed Sand Plant Expansion Phase 5 to Phase 11.

This VIA has been prepared with reference to the preceding Methodology & Scoping Report (MSR) prepared by Zone Landscape Architecture as part of the scoping report and request for Secretary's Environmental Assessment Requirements (SEAR's).

The objective of this report is to assess the potential visual impact of the proposed changes to the Project Site on private landowners in the established **Visual Catchment Boundary (VCB)** of the development and **Key Vantage Points (KVP)** in the public domain in context with the **scenic amenity** of the local region.

Visual Catchment
The Project Site is located almost entirely within a single Visual Catchment Boundary (VCB). This is due to the Project Site being located within a large expanse of relatively flat land with a similar elevation to that of the Project Site. The catchment is bounded to the north by a minor rise in topography associated with the Pacific Motorway (~3-4m AHD) and the low laying Tweed River to its immediate north. The primary VCB to the north of The Project Site is defined by Terranora Road and associated ridgeline (referenced as Prominent Ridgeline 2). The VCB is bounded to the south by a ridgeline generally associated with Cudgen Rd and McPhail Avenue (Cudgen Plateau).

The operational infrastructure required by the The Project is minor and the expansion of the TSP (Phase 5-11) will require the same type, scale and quantity of infrastructure as the existing approved Phases 1-4. The site buildings and wash plant (extents of which are approximately 50m x 20m located within a cleared area of approximately 60 x 250m) will remain in use during Phases 5 and 6. This existing infrastructure will be relocated to an alternative position on site from Phase 7 onwards. This infrastructure does not present as a significant feature of The Project and was not visible from the assessed KVP.

The existing TSP extraction area is located within a separate VCB due to the decreased elevation of this area relative to the surrounding landform. The expansion of the sand extraction area will reduce the elevation of the Project Site to generally align with the landform and elevation of the existing TSP extraction area. Analysis of Visual Catchment Boundaries indicate that the sand extraction works (that will lower the ground level of the Project Site) will likely further decrease any potential views from locations within the large expanse of flat land that surrounds the Project Site.

Scenic Amenity
An evaluation of the area of interest (AOI) has been undertaken to determine its scenic amenity and landscape character in order to assess the potential impact of The Project and the ability of the landscape to accommodate any changes. This has been determined through site analysis and with reference to the Tweed Shire Council Scenic Landscape Strategy (SLS). The SLS categorises the TSC region into Landscape Character Units (LCU) and defines a landscape's character as the distinctive, recognisable and consistent pattern of physical elements within a landscape, which give a setting its sense of place and makes one landscape different from another.

The existing Project Site over which the expansion is proposed presents as open pasture grazing lands. Prior to 1950 the site was used primarily for cattle grazing with additional uses including sugarcane production until the mid 1980's. At the time of the inspections undertaken (November 2020) the proposed expansion areas supported cattle, had good grass coverage and were well grazed.

The SLS Scenic Quality Assessment notes the physical attributes as of the Project Site (agricultural landuse, formally mapped as LCU: Sugar Cane) as:

> *A **regimented pattern** of the **rectilinear fields** that create a strong yet agreeable contrast to the adjoining and enclosing wooded ridgelines which separate (the agricultural landuse) within adjoining catchments **scattered rural homesteads, farm buildings** and **access roads**.*

The Project will result in a change to the existing landscape character, with the resulting landscape will maintaining many of these key scenic quality attributes:

> A vegetated buffer around the perimeter of the lakes will vary in width and consist of locally occurring native species to provide ecological (and visual) continuity to the existing **regimented pattern** of the **rectilinear fields** and bands of trees that traverse the landscape.
>
> On completion of extraction works and subsequent final rehabilitation phases, the Project Site will present as a **large natural lake** bordered by a **significant vegetation** to its perimeter. The vast horizontal spatial scale of the waterbody will draw the viewers eye to the river, forested hills and **ridgelines** in the background.
>
> The lake will sit within an existing **regimented rectilinear landscape** formed by the surrounding **large scale rural** lots featuring sparsely scattered f**arm buildings, sheds and dwellings**. Lots are defined by drainage and cropping lines and reinforced by trees planted as wind breaks to the surrounding cadastral boundaries.
>
> The varying width of the lake edge and associated perimeter vegetation will create a naturalistic variance to the waterbody whilst remaining visually consistent with the surrounding **rectilinear landscape character** of the region. The perimeter vegetation will soften the lake edge and present as a visual extension to the bands of existing vegetation that frame the large scale rural lots surrounding the Project Site.
>
> During operational phases the primary appearance of The Project will be the gradual expansion of the extraction area which will present as a flat plain within the landscape. Rehabilitation works will be completed on a stage-by-stage basis following completion of sand extraction works within each phase resulting in the gradual extension of the existing bands of trees that traverse the landscape.

Key Vantage Points
Thirteen Key Vantage Points (KVP) have been selected within the defined Area of Interest. Five Key Vantage Points were selected based on Priority Viewing Situations as identified through Tweed Shire Council's Scenic Landscape Strategy mapping. The balance KVP were identified through topographic and photographic studies, and through detailed desktop analysis and viewshed mapping. In selecting and verifying all KVP, emphasis was placed on sensitive receptors such as areas of existing residential development within a proximity to the subject site and areas determined to be located within the visual catchment of The Project. Verification of these KVP's was made through site inspections and photographs recorded for each viewing situation.

The potential visual impact of The Project has been assessed and evaluated against recognized visual assessment principals as described by the Landscape Institute for Environmental Management and Assessment (LIIEMA). This assessment process evaluates predicted impacts according to their significance as a function of the magnitude of the impact and the sensitivity of the receptor, and rates this impact in level of significance from; **Not Significant, Minor Significance, Moderate Significance, High Significance** to **Major Significance.**

Of the 13 KVP investigated as part of this assessment;

6 (40%) were determined to have **nil impact** with no clear line of sight to the Project Site,

2 (14%) were determined as having an impact determined as **Not Significant.**

3 (21%) were determined as having an impact determined to be of **Moderate to Minor Significance.**

2 (14%) were determined as having an impact determined to be of **Moderate to High Significance.**

Vantage Points along Terranora Road were determined as having an impact determined to be of **Moderate to Minor Significance**. The increase of this predicted impact from 'minor' to 'moderate' is a direct result of the perceived sensitivity of the receptor due to its residential nature. It is noted however that these receptors are at a significant distance (approximately 2.0km) from the Project Site with expansive views across the Tweed Shire. This significant field of view would greatly reduce the visual prominence of the Project Site when viewed from this location.

From the Terranora Road KVP the Tweed River presents as a dominant foreground feature with the landscape transitioning to rectilinear fields and scattered dwellings with the developed urban areas of Kingscliff and Cudgen on the horizon. On completion of extraction works, the Project Site will present as a large natural lake and provide a visual connection to the Tweed River and other existing waterbodies (primarily as a result of existing sand extraction projects) dotted within the landscape.

Key Vantage Points determined as having an impact of **Moderate to High Significance** were limited to large rural residential lots located on the elevated Cudgen Plateau. This is a result of the significant elevation of this vantage point and its proximity to the Project Site.

From KVP's located along this plateau the proposed lake will be a dominant feature within the landscape. The lake will provide a visual connection to the Tweed River and other areas of water visible within the landscape. The existing waterbody associated with Cudgen Sands extraction works is also visible from this KVP. Prominent Ridgeline 02 (generally aligned with Terranora Road) provides a vegetated backdrop and encloses views to the north.

Summary of Impact
The predicted visual impacts associated with the proposed expansion of the TSP have generally been found to be of **Minor Significance** with views of the Project Site limited to areas of significant elevation with expansive views across the Tweed Shire.

Whilst The Project will result in a change to the visual amenity, the changes will be gradual over the course of 30 years. The progressive rehabilitation throughout this time frame will ensure the gradual extension of perimeter vegetation (undertaken on a staged basis on the completion of each expansion phase) that will visually connect to the existing bands of trees that traverse the landscape. This vegetated buffer will vary in width and consist of locally occurring native species to provide ecological (and visual) continuity to the existing **regimented pattern** of the landscape.

On completion of extraction works and rehabilitation phases, the Project Site will present as a **large natural lake** bordered by a **significant vegetation** to its perimeter. The varying width of the lake edge and associated perimeter vegetation will create a naturalistic variance to the waterbody whilst remaining visually consistent with the existing **rectilinear landscape character** of the region.

Final Landform Visualisation Photomontage 01

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1.0 Introduction

Zone Landscape Architecture (Zone, ZLA) have been engaged by Hanson Construction Materials Pty Ltd (the Proponent) to prepare a Visual Impact Assessment (VIA) assessing the proposed expansion and redevelopment of the Hanson Tweed Sand Plant (TSP) located at Cudgen NSW hereon referred to as 'The Project'.

This VIA has been prepared with reference to the preceding Methodology & Scoping Report (MSR) prepared by Zone Landscape Architecture as part of the scoping report and request for Secretary's Environmental Assessment Requirements (SEAR's).

1.1 Methodology & Scoping Report (MSR)

1.2 Visual Impact Assessment (VIA)

The SEAR's for the Project were sought and received on the 17/12/2019. This Visual Impact Assessment has been prepared in accord with these requirements.

The general requirements as they pertain to the VIA are summarised in **Table 9: SEAR's Summary** within the **Environmental Impact Statement** proper prepared by Zone Planning Group and are summarised as:

Visual: *including an assessment of the likely visual impacts of the development on* ***private landowners*** *in the vicinity of the development and* ***key vantage points*** *in the* ***public domain****, including any new landforms and potential lighting impacts.*

2.0 Scope & Objectives

2.1 Objectives

The objective of this report is to assess the potential impact of the proposed changes to the Project Site in context with the scenic amenity of the local region. Further, visual amenity has been identified as a 'key issue' requiring consideration of cumulative impact of The Project and focused engagement with stakeholders.

These VIA objectives are summarised as:

- To establish the **key vantage** points;
- To assess the potential impact of The Project in context with the established scenic amenity of the local region;
- To assess **community and stakeholder** input in relation to visual amenity;
- To assess the **cumulative impact** of The Project and other projects or operations in proximity to the Project Site
- To identify appropriate **mitigation measures** (if required).

2.2 Cumulative Impact

Key Projects located in proximity to the Project Site included as part of cumulative impact considerations are noted below:

1) Australian Bay Lobster Producers: Large-scale sheds
   Location: 1//DP1192506
   Proximity to Project Site: 380m

2) Cudgen Sands: Sand Extraction works
   Location: 2//DP216705
   Proximity to Project Site: 100m

2.3 Stakeholder Engagement

Local stakeholder engagement was undertaken by Vaxa Consulting Pty Ltd to inform the Social Impact Assessment (SIA). As this is a local project with limited interface residents, the project team elected to undertake targeted local communications; however considerable effort was undertaken to inform and involve all relevant local stakeholders.

Communication was distributed through a targeted letterbox drop across the project catchment as defined by the 'Area of Social Influence' (ASI) as determined through the Social Impact Assessment.

The SIA details the projects strategy regarding selection of entities to be consulted, why they should be consulted, and the method of consultation undertaken. As part of this VIA, the community and stakeholder feedback received in relation to visual amenity will be discussed and considered.

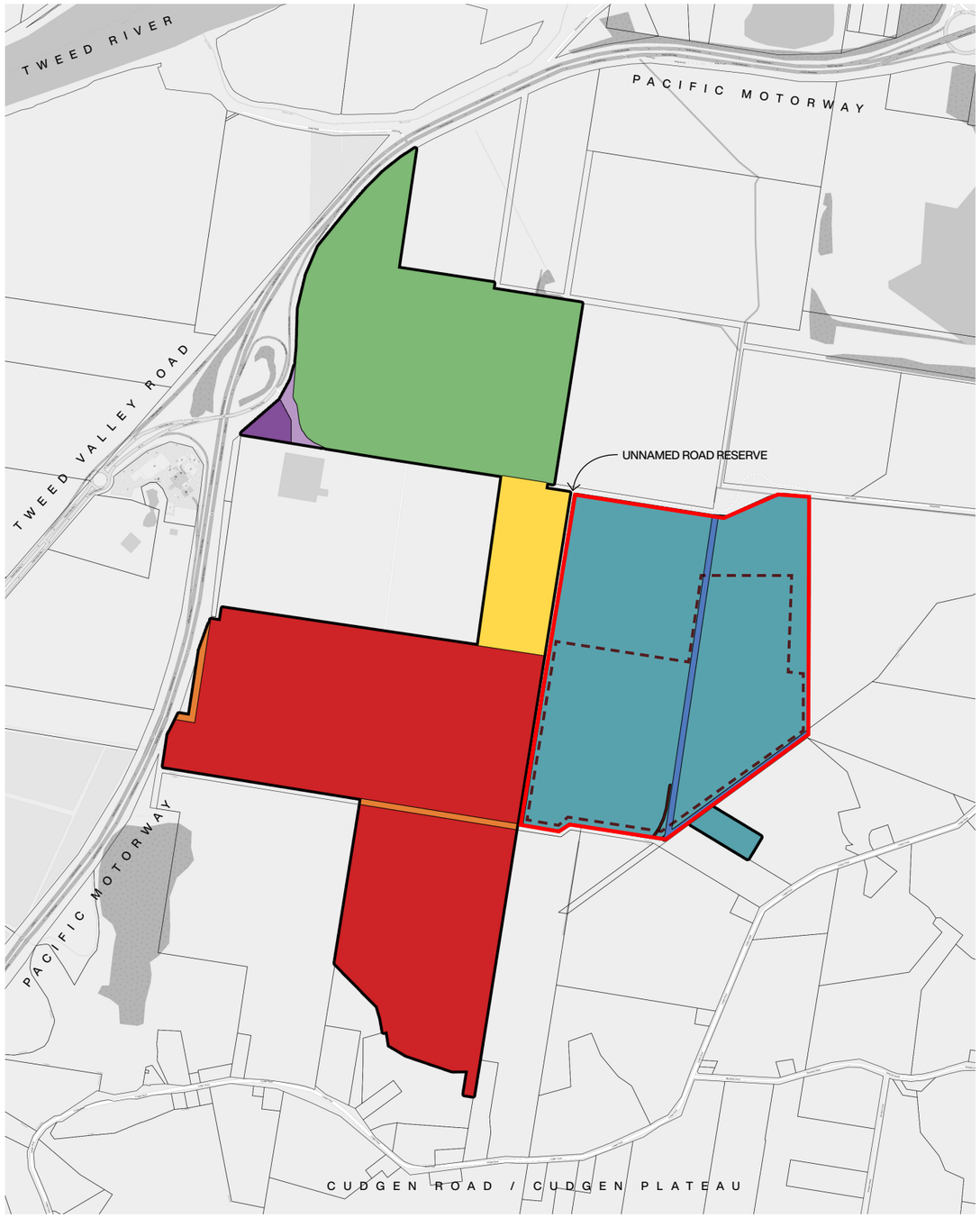

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Fig 1.0 Lot Identification Plan

3.0 The Project Site

The Project Site is located at Cudgen NSW 2487 within the Tweed LGA. Regionally, the Project Site is located 8.5 km south of the New South Wales/Queensland state border; 1.5km west of the coastal suburb of Kingscliff NSW 2487; 14km north east of the rural town of Murwillumbah NSW 2484; and 23km north of the Tweed LGA / Byron LGA boundary.

Locally, the Project Site is positioned between the Pacific Highway (M1) and Tweed Valley Way interchange to the north and west; Tweed Coast Road to the east and Cudgen Road / Cudgen Plateau to the south.

The Project is the expansion of the existing Hanson Tweed Sand Plant (referred also as TSP within this document). The TSP currently has an approval to operate over Lot 22 DP 1082435, Lot 23 DP 1077509 and Lot 494 DP 720450.

The Project name is **Hanson Tweed Sand Plant Expansion Phase 5 to Phase 11.**

The expansion/redevelopment site is proposed over Lot 22 DP1082435, Lot 23 DP1077509, Lot 494 DP720450, Lot 1 DP1250570, Lot 2 DP1192506, Lot 51 DP1166990, Lot 3 DP1243752, Lot 1 DP1242395, Lot 50 DP1056966. The lots comprising the Project are collectively referred to as 'the Project Site'.

Lot		Area (Ha)
Lot 51//DP1056966	|	0.768Ha
Lot 50//DP1056966	|	1.093Ha
Lot 23//DP1077509	|	2.52Ha
Lot 22//DP1082435	|	74.5Ha
Lot 51//DP1166990	|	54.9Ha
Lot 2//DP1192506	|	11.12Ha
Lot 3//DP1243752	|	1.61Ha
Lot 1//DP1250570	|	89.3Ha
Lot 494//DP720450	|	0.104Ha

Existing Hanson Tweed Sand Plant (TSP)
Lots with an existing approval to operate (Lot 22 DP 1082435, Lot 23 DP 1077509 and Lot 494 DP 720450)

Existing Extraction Area
Extents of approved extraction area (current existing dredging extents).

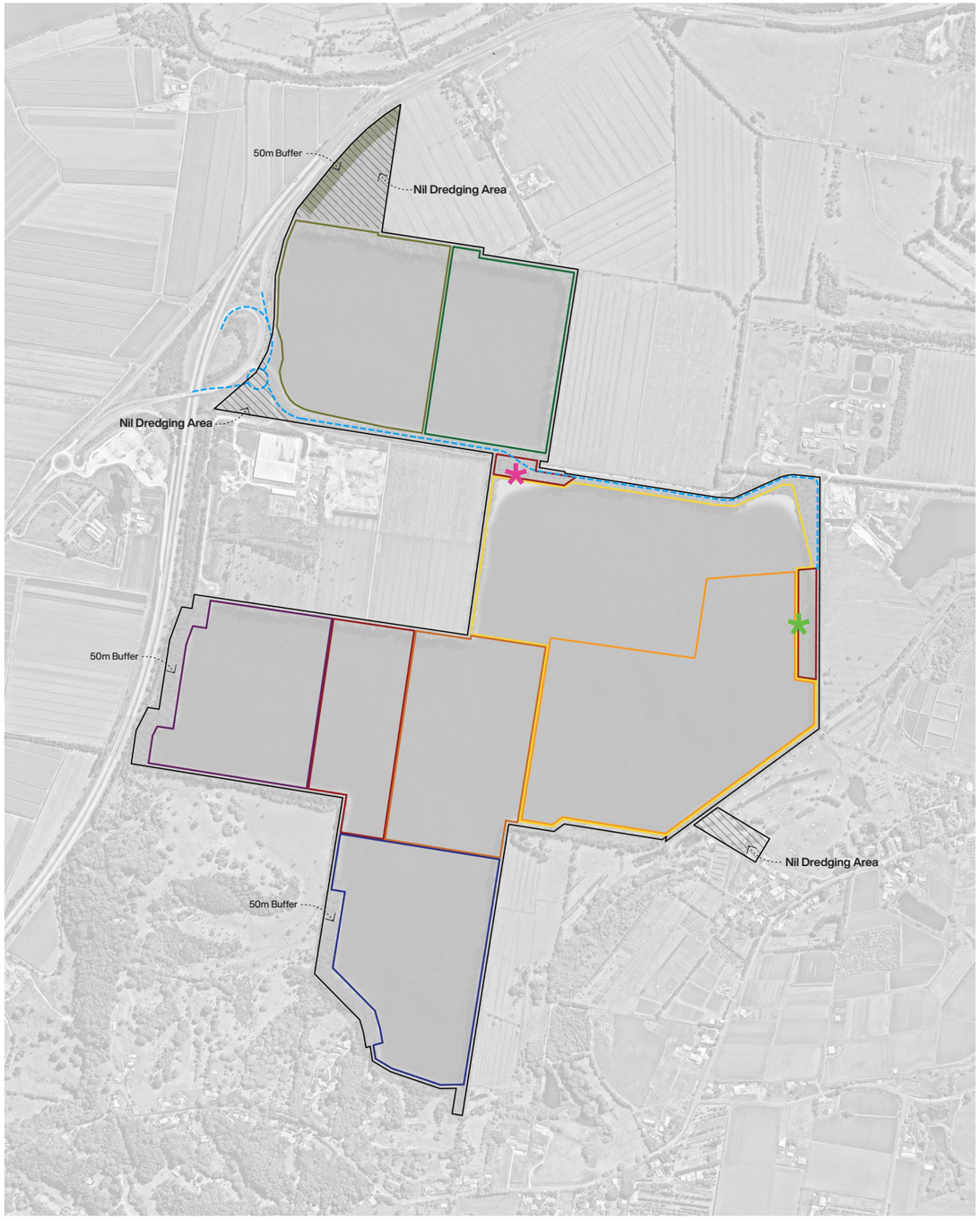

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Fig 2.0 Extraction Phasing

3.1 The Proposal

The Project is the expansion of the existing Hanson Tweed Sand Plant (TSP) and comprises Phase 5 to Phase 11. The existing approved sand extraction extents is comprised of Phases 1 to 4.

The sand plant has operated since 1983, with Hanson acquiring and operating the sand plant since 2007. TSP Phase 4 is currently operational on part of the Project Site and is estimated to have 6 to 10 years of resource remaining (depending on market conditions). The existing TSP extraction footprint is approximately 46ha and production and transport are a maximum of 500,000 tonnes per annum. Material extraction is via dredge with a variable depth (20m below ground level nominal).

The proposed Phase 5 to Phase 11 expansion would access a sand resource of 30-35 million tonnes and provide production and transport of a maximum 950,000 tonnes per annum (market driven). The proposed expansion footprint is approximately 190ha. This would result in a total footprint for TSP of approximately 236ha. The sand resource will continue to be extracted via dredge to a variable depth (20m below ground level nominal). Onsite processing will continue. The Project life is 30 years (market driven) spanning seven extraction phases.

The operational infrastructure required by the The Project is minor and the expansion of the TSP (Phase 5-11) will require the same type, scale and quantity of infrastructure as the existing approved Phases 1-4.

The site buildings and wash plant (extents of which are approximately 50m x 20m located within a cleared area of approximately 60 x 250m) will remain in use during Phases 5 and 6. This existing infrastructure will be relocated to an alternative position on site from Phase 7 onwards. This infrastructure is minor, comprising <0.06% of The Project Site.

The project will provide a new private haulage road with connection to the Tweed Valley Way / M1 Interchange. The existing TSP Phase 1 to 4 haulage route of Altona Road / Crescent Street / Tweed Coast Road will be abandoned, removing all TSP vehicles from local roads. The site would be illuminated to the extent required to facilitate operational requirements. Lighting will be designed in accord with AS4282:2019 - Control of the obtrusive effects of outdoor lighting. Site lighting will be confined to the site buildings and wash plant area.

Project Area
Boundaries of Development Project Area

Phase 1-4
Year 0 - Existing Approved Extraction Area

Phase 5
Year 1-3 Extraction & Rehabilitation Areas

Phase 6
Year 4-8 Extraction & Rehabilitation Areas

Phase 7
Year 9-13 Extraction & Rehabilitation Areas

Phase 8
Year 14-18 Extraction & Rehabilitation Areas

Phase 9
Year 19-22 Extraction & Rehabilitation Areas

Phase 10
Year 23-26 Extraction & Rehabilitation Areas

Phase 11
Year 27-30 Extraction & Rehabilitation Areas

Existing Buildings & Wash Plant
Existing infrastructure to remain during Phase 5-6

Relocated Buildings & Wash Plant
Potential location (TBC) of relocated infrastructure - Phase 7-11

New Haulage Route
Connection to the Tweed Valley Way / M1 Interchange.

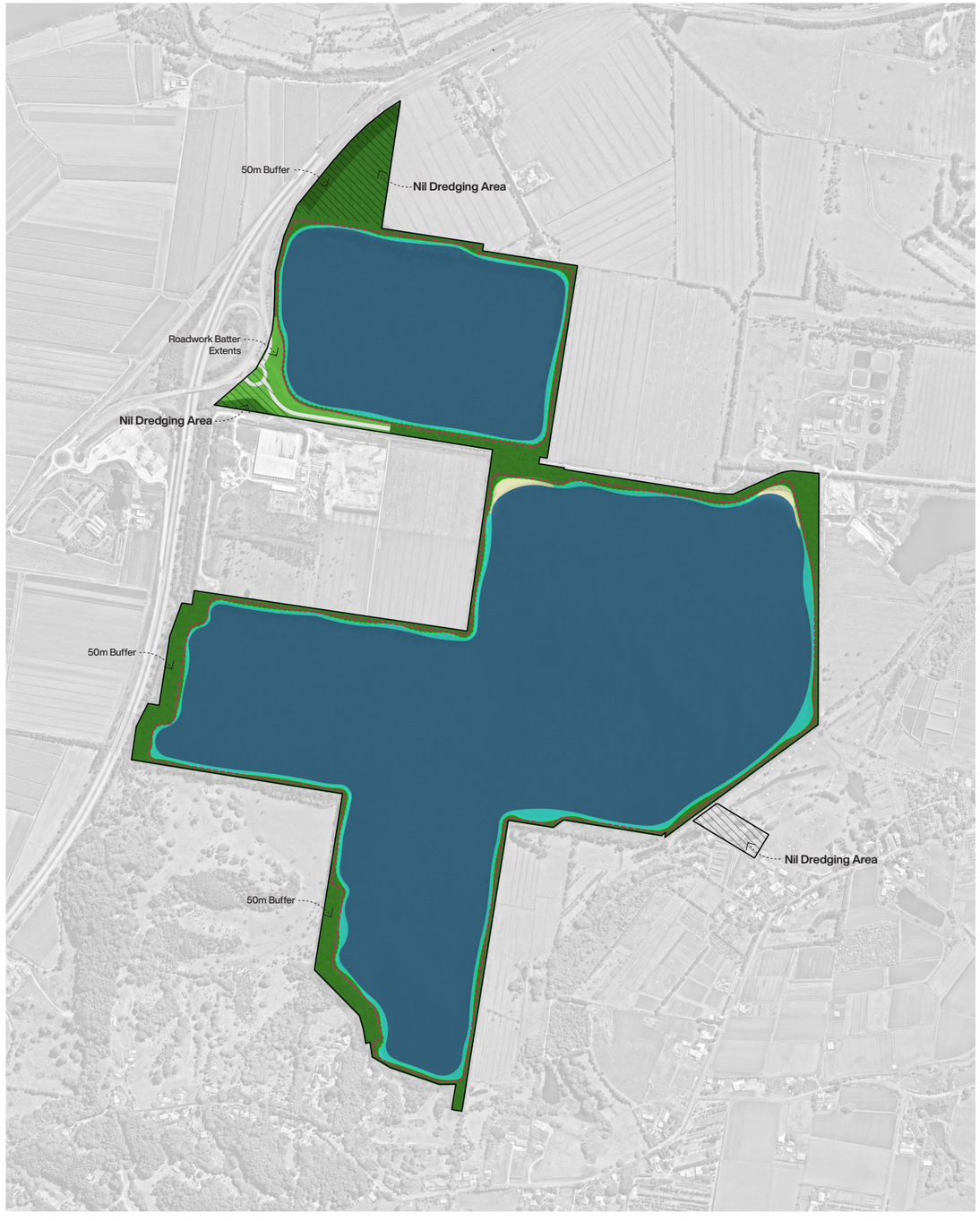

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Fig 3.0 Final Landform Plan

3.2 The Final Landform

A key factor in assessing any potential visual impact of The Project is to determine the physical changes that will occur to the landscape as part of the proposed expansion scope and the capacity of the existing landscape to accommodate the such changes.

How the Project Site will present upon project completion is primarily determined by the final proposed landform (refer **Figure 3.0 Final Landform Plan**) in combination with the rehabilitation works proposed (refer **Figure 4.0 Rehabilitation Plan**).

On completion of extraction works and subsequent final rehabilitation phases, the Project Site will present as a natural lake bordered by a significant vegetation buffer or varied width to its perimeter (refer **Figure 6.0 End Use Plan**).

Maximum Dredging Extents
The maximum extents of dredging is to be to a minimum offset from the Project Site property boundaries of 10m.

Final Landform Line
The final landform line will vary in width from 10m (being the maximum dredging extents) to an average maximum width of 20m. The final landform line extend to minimum 50m in key areas as illustrated this plan. Progressive rehabilitation works to be undertaken on completion of each extraction phase.

Wetland Rehabilitation
Wetland rehabilitation is proposed consisting primarily of natural regeneration of water plants / macrophytes around the fringes of the lake.

Final Lake Extents
The extents of the waterbody as defined by the Final Landform Line.

Open Space & Riparian Rehabilitation Areas
A vegetated buffer around the perimeter of the lakes will vary from a minimum 10m to 20m and consist of locally occurring native species to provide ecological (and visual) continuity to the existing landscape character. This buffer will also include open grassed areas.

Sandy Beach
The lake edge will include areas of gently inclined sandy 'beach' as typically illustrated.

**Refer to Section 6.2 VIA Methodology*
Layout Infographic provides reference regarding the relevant stage of the four-stage VIA Methodology process (as described within Tweed Shire Council VIA Assessment Guide). ***Stage 4 Mitigation*** *relates to the final landform of the Project Site and associated rehabilitation works that will be progressively undertaken to improve the Project Site and provide a high-value scenic amenity outcome. This stage has been included out of sequence within this document as part of the proposal description to provide a basis to inform the analysis of impact.*

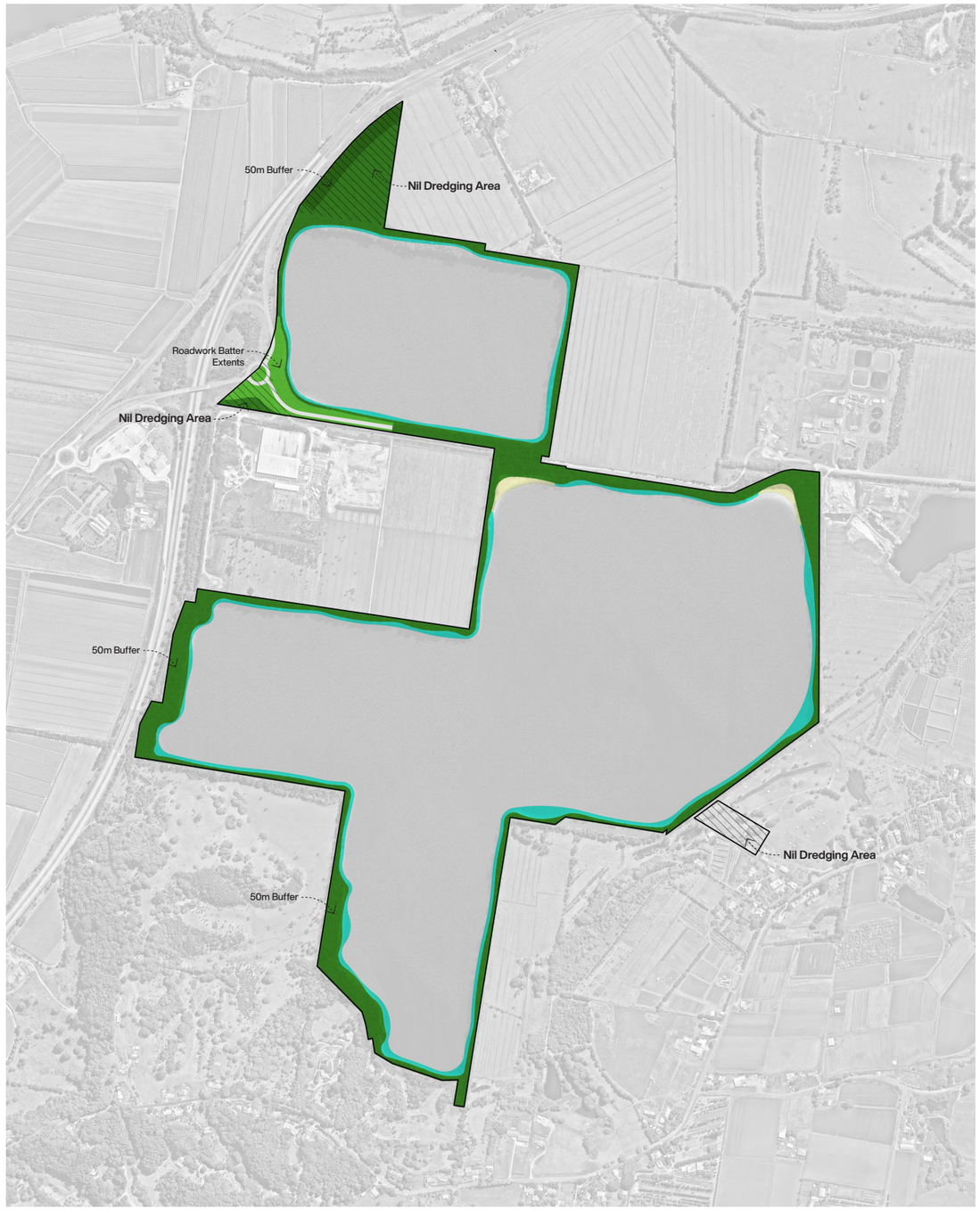

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Fig 4.0 Concept Rehabilitation Plan

4.0 Rehabilitation

A Concept Rehabilitation and Landscape Management Plan (CRLMP) has been prepared by JWA Pty Ltd. This CRLMP follows on from rehabilitation work completed as part of the site's existing RLMP.

As detailed within the CRLMP, rehabilitation works on the site will cover approximately 20 ha (almost 10% of the site area) and will be completed on a stage-by-stage basis following completion of sand extraction works within each phase. Refer to **Fig 5.0 Rehabilitation Phasing.**

Following the completion of sand extraction works in each phase, the banks of the extraction lake will be graded and stabilised where necessary. The banks and batters within and adjacent to the extraction lakes will be augmented to be non-uniform and exhibit an undulating surface (including areas of deep water) to maximise habitat diversity and mimic natural landform variance. Rehabilitation works will establish a vegetated buffer around the perimeter of the lakes consisting of locally occurring native species to provide ecological (and visual) continuity to the surrounding landscape.

The aim of rehabilitation works on the site is to restore the ecological values of the site following the completion of sand extraction works with targeted planting of locally occurring native species.

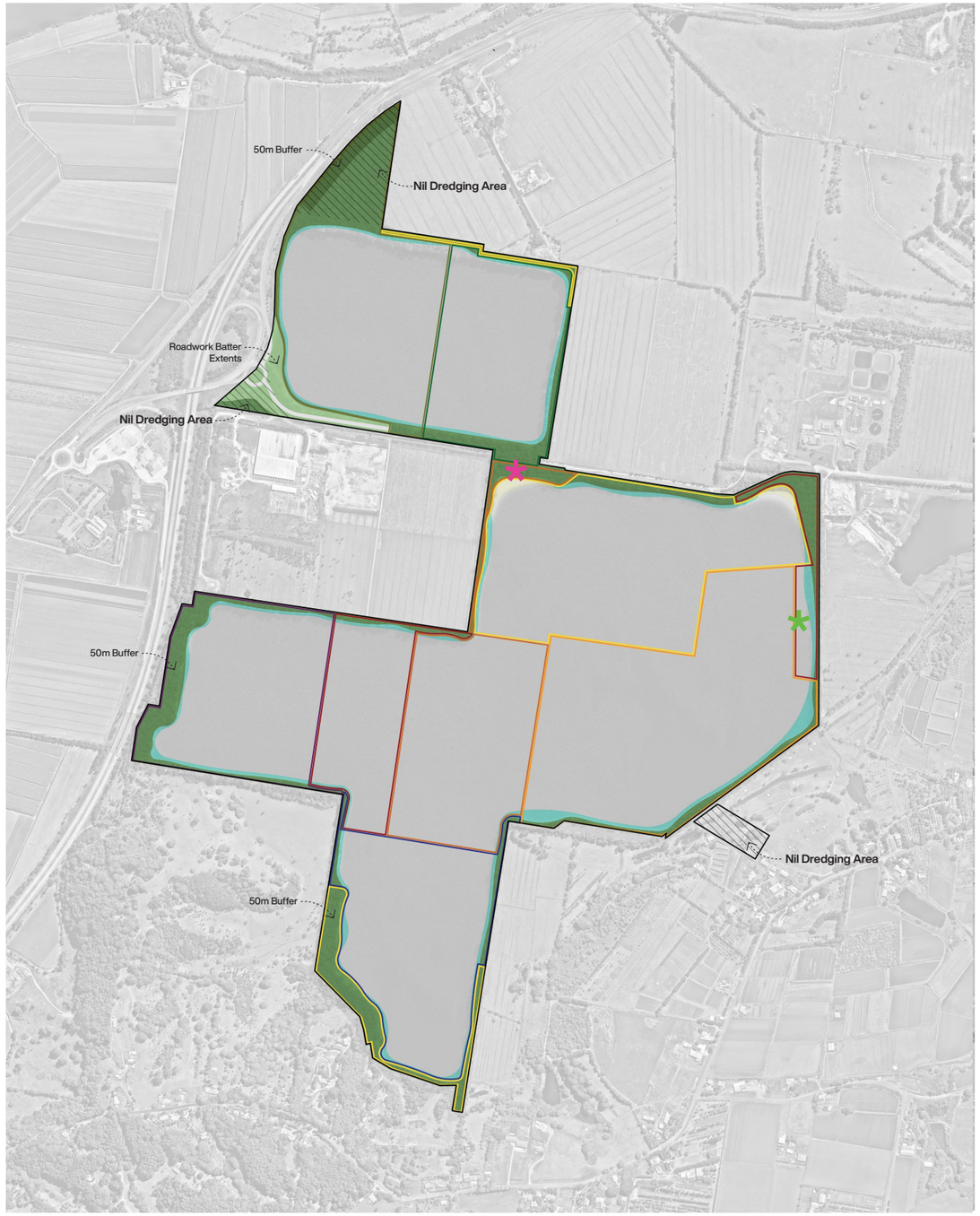
The rehabilitation works will deliver three types of rehabilitation areas as follows:

Wetland Rehabilitation
Wetland rehabilitation is proposed consisting primarily of natural regeneration of water plants/macrophytes around the fringes of the lake.

Riparian Rehabilitation Areas (RRA)
A vegetated buffer around the perimeter of the lakes will vary from a minimum 10m to an average maximum of 20m, this extends to minimum 50m to an average maximum of 60m in key areas as illustrated this plan. Progressive rehabilitation works to be undertaken on completion of each extraction phase. consist of locally occurring native species to provide ecological (and visual) continuity to the existing landscape character.

Open Space
Includes landscaped and grassed areas (contained within the RRA perimeter buffer).

The Project Site



4.1 Rehabilitation Phasing

As detailed within the Concept Rehabilitation and Landscape Management Plan (CRLMP) prepared by JWA Pty Ltd, Rehabilitation works will be completed on a stage-by-stage basis following completion of sand extraction works within each phase.

The plan this sheet illustrates the Extraction Phasing and associated Rehabilitation Phasing sequence.

Wetland Rehabilitation
Wetland rehabilitation is proposed consisting primarily of natural regeneration of water plants/macrophytes around the fringes of the lake.

Open Space & Riparian Rehabilitation Areas
A vegetated buffer around the perimeter of the lakes will vary from a minimum 10m to 60m and consist of locally occurring native species to provide ecological (and visual) continuity to the existing landscape character. Refer to Fig 4.0 Rehabilitation. This buffer will also include open grassed areas.

Project Area
Boundaries of Development Project Area

Phase 1-4
Year 0 - Existing Approved Extraction Area

Phase 5
Year 1-3 Extraction & Rehabilitation Areas

Phase 6
Year 4-8 Extraction & Rehabilitation Areas

Phase 7
Year 9-13 Extraction & Rehabilitation Areas

Phase 8
Year 14-18 Extraction & Rehabilitation Areas

Phase 9
Year 19-22 Extraction & Rehabilitation Areas

Phase 10
Year 23-26 Extraction & Rehabilitation Areas

Phase 11
Year 27-30 Extraction & Rehabilitation Areas

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Fig 5.0 Rehabilitation Phasing

Visual Impact Assessment

Fig 6.0 End Use Plan

5.0 End Use

The final form of lake banks will vary from gently inclined sandy 'beach' areas and wetlands to steeper banks reinforced with vegetation, floating wetlands and/or placed rock (or similar). A vegetated buffer around the perimeter of the lakes will vary from a minimum 10m to 20m and consist of locally occurring native species to provide ecological (and visual) continuity to the existing regimented pattern of the rectilinear fields and bands of trees that traverse the greater regional landscape.

On completion of extraction works and subsequent final rehabilitation phases, the Project Site will present as a large natural lake bordered by a significant vegetation to its perimeter. The vast horizontal spatial scale of the waterbody will draw the viewers eye to the river, forested hills and ridgelines in the background.

The lake will sit within an existing regimented rectilinear landscape formed by the surrounding large scale rural lots defined by drainage and cropping lines and reinforced by trees planted as wind breaks / land parcel delineation to the surrounding cadastral boundaries.

The varying width of the lake edge and associated perimeter vegetation will create a naturalistic variance to the waterbody whilst remaining visually consistent with the surrounding rectilinear and segmented landscape character of the region. The perimeter vegetation will soften the lake edge and present as a visual extension to the bands of existing vegetation that frame the large scale rural lots surrounding the Project Site.

Hanson would retain ownership of the site following completion of sand extraction and any proposed subsequent use of the site would be decided via the appropriate consultative, application and regulatory processes in place at that time.

5.1 End Use Photomontages

A series of photomontages of the Project Site Final Landform / End Use have been prepared to accurately illustrate the proposed landform changes and final outcome for the Project Site. The methodology used to prepare these images is outlined below:

Photomontages consist of a range of panoramic images. Panoramic imagery has been stitched together using PTGui software. Panoramic imagery was stitched together using rectilinear mapping process. Rectilinear processing ensures the least amount of curved distortion within the panoramic imagery.

3D components of the photomontages have been prepared using 3D Studio Max 2021 to model and render the proposed final landform for the development. Within 3d Studio Max, camera matching tools were utilised to align the 3D model to the site photography using the sites boundary features as reference.

Vray 5 rendering software was utilised to render the 3D components of the composite. All rendered components and panoramic backplates were bought into Photoshop v22, for editing. 3D components are then edited with filters to match the colour tone etc of the backplate imagery for further accuracy.

A **Australian Bay Lobster Producers:** Large-scale sheds
Location: 1//DP1192506
Proximity to Project Site: 380m

B **Cudgen Sands:** Sand Extraction works
Location: 2//DP216705
Proximity to Project Site: 100m

The Project Site

CAMERA 1
Location: Vantage Point C
Elevation: RL 120m (Approx.)
Bearing: North West

Australian Bay Lobster Producers: Large-scale sheds
Location: 1//DP1192506
Proximity to Project Site: 380m

Cudgen Sands: Sand Extraction works
Location: 2//DP216705
Proximity to Project Site: 100m

Prominent Ridgeline 1
Ridgeline (raised topography) generally associated with Cudgen Rd and McPhail Avenue (Cudgen Plateau) . This Ridgeline has an average elevation of: 30-45m AHD (compared to The Project Site ~1-2m AHD).

Open Space & Riparian Rehabilitation Areas
A vegetated buffer around the perimeter of the lakes will vary from a minimum 10m to 60m and consist of locally occurring native species to provide ecological (and visual) continuity to the existing landscape character. This buffer will also include open grassed areas.

The varying width of the lake edge and associated perimeter vegetation will create a naturalistic variance to the waterbody whilst remaining visually consistent with the surrounding rectilinear and segmented landscape character of the region. The perimeter vegetation will soften the lake edge and present as a visual extension to the bands of existing vegetation that frame the large scale rural lots surrounding the Project Site.

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Fig 6.1 End Use Photomontage 01

CAMERA 2
Location: Vantage Point D
Elevation: RL 142m (Approx.)
Bearing: North East

Australian Bay Lobster Producers: Large-scale sheds
Location: 1//DP1192506
Proximity to Project Site: 380m

Cudgen Sands: Sand Extraction works
Location: 2//DP216705
Proximity to Project Site: 100m

Prominent Ridgeline 2
Ridgeline (raised topography) generally associated with Terranora Rd. This Ridgeline has an average elevation of: 60-90m AHD (compared to The Project Site ~1-2m AHD).

Open Space & Riparian Rehabilitation Areas
A vegetated buffer around the perimeter of the lakes will vary from a minimum 10m to 60m and consist of locally occurring native species to provide ecological (and visual) continuity to the existing landscape character. This buffer will also include open grassed areas.

The varying width of the lake edge and associated perimeter vegetation will create a naturalistic variance to the waterbody whilst remaining visually consistent with the surrounding rectilinear and segmented landscape character of the region. The perimeter vegetation will soften the lake edge and present as a visual extension to the bands of existing vegetation that frame the large scale rural lots surrounding the Project Site.

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Fig 6.2 End Use Photomontage 02

CAMERA 3
Location: Terranora
Elevation: RL 150m (Approx.)
Bearing: South East

Australian Bay Lobster Producers: Large-scale sheds
Location: 1//DP1192506
Proximity to Project Site: 380m

Cudgen Sands: Sand Extraction works
Location: 2//DP216705
Proximity to Project Site: 100m

Prominent Ridgeline 1
Ridgeline (raised topography) generally associated with Cudgen Rd and McPhail Avenue (Cudgen Plateau) . This Ridgeline has an average elevation of: 30-45m AHD (compared to The Project Site ~1-2m AHD).

Prominent Ridgeline 2
Ridgeline (raised topography) generally associated with Terranora Rd. This Ridgeline has an average elevation of: 60-90m AHD (compared to Subject Site ¬4.1 AHD).

Open Space & Riparian Rehabilitation Areas
A vegetated buffer around the perimeter of the lakes will vary from a minimum 10m to 60m and consist of locally occurring native species to provide ecological (and visual) continuity to the existing landscape character. This buffer will also include open grassed areas.

The varying width of the lake edge and associated perimeter vegetation will create a naturalistic variance to the waterbody whilst remaining visually consistent with the surrounding rectilinear and segmented landscape character of the region. The perimeter vegetation will soften the lake edge and present as a visual extension to the bands of existing vegetation that frame the large scale rural lots surrounding the Project Site.

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Fig 6.3 End Use Photomontage 03

6.0

Visual Analysis.

6.1 TSC Scenic Landscape Strategy

Tweed Shire Council has been actively developing the Scenic Landscape Strategy (SLS) since 2016. The initial exercise undertaken was the mapping and assessment of the prominent landscape character types and significant public viewing locations in the region. This exercise lead to the development of the draft Scenic Landscape Strategy.

Council endorsed the public exhibition of the draft SLS and supporting policies, including draft amendments to the Tweed Development Control Plan 2008 and draft Council Policy Statement. Industry consultation and public exhibition feedback submissions closed on Wednesday 19 June 2019. This strategy is under review with Implementation pending as of date of this report.

This Visual Impact Assessment acknowledges the relevance of the SLS and reference to this strategy is made throughout this report where applicable to ensure that the methodology, terminology and overall intent of the strategy is applied to the assessment where applicable.

6.2 VIA Methodology

Key visual catchment zones have been identified through both topographic and photographic studies and with reference to the Tweed Shire Council's Scenic Landscape Strategy (SLS) interactive mapping. This mapping tool prototype has been developed by Tweed Shire Council for the purposes of exhibiting the spatial data and mapping associated with the draft Scenic Landscape Strategy.

The potential visual impact of The Project on the identified visual catchments will be assessed and evaluated against recognized visual assessment principals as determined by the Institute of Environmental Management & Assessment and described by the Landscape Institute for Environmental Management and Assessment (LIIEMA).

Reference: *Guidelines for Landscape and Visual Impact assessment, Second Edition*, published by the Landscape Institute for Environmental Management and Assessment.

A four-stage process is proposed in line with the methodology as described within Tweed Shire Council VIA Assessment Guide is to be applied. These stages and associated proposed methodology are summarised as:

Stage 1 Define the Area of Investigation

Stage 2 Evaluation of Site Scenic Amenity

Stage 3 Visual Impact Analysis

Stage 4 Proposed Mitigation

Mitigation works including land profiling and rehabilitation works are detailed in the below:

3.2 The Final Landform	Fig 3.0 Final Landform Plan
4.0 Rehabilitation	Fig 4.0 Concept Rehabilitation Plan
4.1 Rehabilitation Phasing	Fig 5.0 Rehabilitation Phasing
5.0 End Use	Fig 6.0 End Use Plan (Including photomontages)

6.3 Stage 1: Define the Area of investigation

This Section of the Report will include the below phases:

A. Determine Visual Catchment of The Project
B. Determine Key Vantage Points for Analysis

A. Determine Area of Investigation

The Area of Investigation represents the area over which the visual impacts of The Project will be investigated. The Area of Investigation (AOI) has been determined through desktop analysis . Site Analysis Plans prepared to determine the AOI and provide base data to inform the selection of Key Vantage Point and subsequent impact analysis are summarised below and are included within the following section of this report.

Fig 7.0 Visual Catchment Boundaries 01

Fig 7.1 Visual Catchment Boundary Plan 02

Fig 8.0 Viewshed Map 01

Fig 9.0 TSC Scenic Landscape Strategy: Visibility Map

B. Determine Key Vantage Points for Analysis

Viewing Situations are defined as Locations from which people experience and enjoy views. The identification of viewing situations as 'Key Vantage Points' (KVP) for assessment in the VIA has been determined via a two step process:

Step 01: A review of the Tweed Shire Council Scenic Landscape Strategy (SLS) and associated interactive mapping has been undertaken to establish potential viewing situations applicable to the allotments which form the site.

Step 02: Topographic and photographic studies to 'vet' the potential viewing situations identified by the SLS. This 'vet' applied a set of criteria to identify which of the viewing situations are Key Vantage Points for assessment, whether they are possible Key Vantage Points that will require further site investigation to rule in or out as Key Vantage Points and those which are not considered Key Vantage Points and which will not be considered by the VIA.

Plans prepared to determine Key Vantage Point and inform the above referenced process are summarised below and are included within the following section of this report.

Fig 10.0 TSC Scenic Landscape Strategy: Static & Linear Viewpoints

Fig 11.0 Viewing Situations 01

Fig 12.0 Key Vantage Points: Area of Investigation Confirmation

6.4 Key Vantage Points TSC Scenic Landscape Strategy

The Viewing Situations as identified through TSC SLS mapping have been investigated to determine Key Vantage Points (KVP's) for further analysis based on the following criteria;

a) Proximity to subject site,

b) Location along primary vehicular or pedestrian networks and;

c) Areas of elevated topography.

Emphasis was placed on sensitive receptors such as areas of existing residential development within a proximity to the subject site and areas determined to be located within the visual catchment of The Project.

Verification of these KVP's has been made through site inspections and photographs have been recorded for each viewing situation to investigate any potential visual impact of The Project.

TSC SLS Viewing Situations determined as Key Vantage Points for further investigation are listed below:. Refer to **Fig 10.0 TSC Scenic Landscape Strategy: Static & Linear Viewpoints** for locations relative to The Project Site.

1. **Fingal Headland**
   Distance from Site: 6.6km
   Elevation: AHD 0.00m (Approx.)

2. **Oxley Park**
   Distance from Site: 2.6km
   Elevation: AHD 1.283m (Approx.)

3. **Chinerah Jetty & Chinderah Bay Drive**
   Distance from Site: 1.8km
   Elevation: AHD 0.25m (Approx.)

4. **Terranora Road**
   Distance from Site: 1.85km
   Elevation: AHD 125m (Approx.)

5. **Bruce Chick Reserve**
   Distance from Site: 2.8km
   Elevation: AHD 1.27m (Approx.)

Plans prepared to illustrate SLS Viewing Situations identified as Key Vantage Points are summarised below and are included within the following section of this report.

Fig 10.0 TSC Scenic Landscape Strategy: Static & Linear Viewpoints

6.5 Key Vantage Points Additional Vantage Points

The Key Vantage Points identified in section 6.4 do not represent the KVP's in their entirety and represent viewing situations identified through application of the TSC SLS mapping tools only. Additional KVP have be identified through topographic and photographic studies and through desktop analysis (refer Figures 11.0 -12.0). This has been undertaken to identify additional Viewing Situations within the AOI. The selection criteria and principals as identified in this report have been applied to identify the below listed locations as additional KVP.

6. **Key Vantage Point A**
   Distance from Site: 750m
   Elevation: AHD 30.879m (Approx.)

7. **Key Vantage Point B**
   Distance from Site: 1.25km
   Elevation: AHD 2.227m (Approx.)

8. **Key Vantage Point C**
   Distance from Site: 450m
   Elevation: AHD 39.305m (Approx.)

9. **Key Vantage Point D**
   Distance from Site: 300m
   Elevation: AHD 78.784m (Approx.)

10. **Key Vantage Point E**
    Distance from Site: 825m
    Elevation: AHD 1.666m (Approx.)

11. **Key Vantage Point F**
    Distance from Site: 1km
    Elevation: AHD 2.083m (Approx.)

12. **Key Vantage Point G**
    Distance from Site: 50m
    Elevation: AHD 1.338m (Approx.)

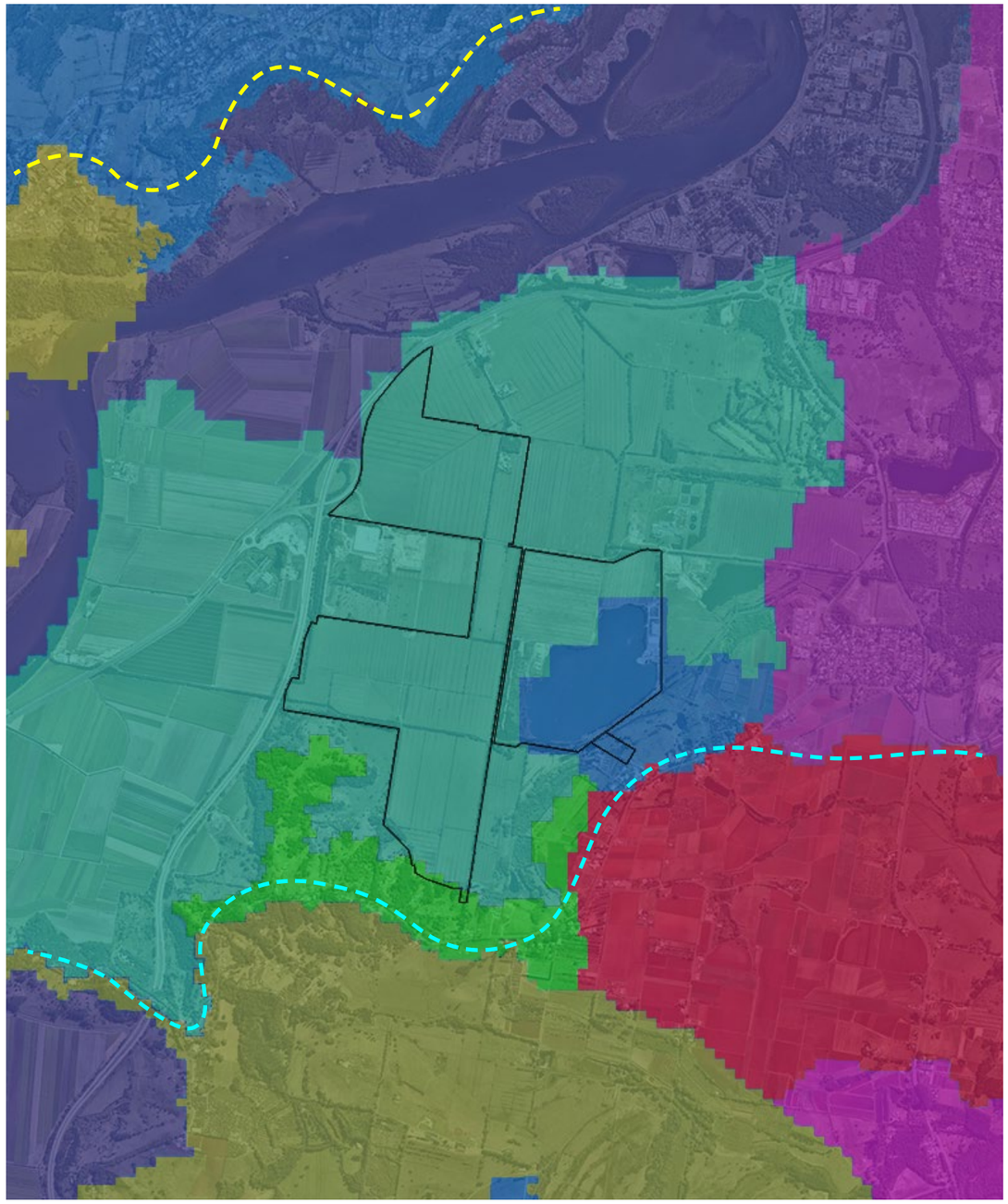
13. **Key Vantage Point H**
    Distance from Site: 270m
    Elevation: AHD 41.963m (Approx.)

Plans prepared to illustrate additional Viewing Situations identified as Key Vantage Plans are summarised below and are included within the following section of this report.

Fig 10.0 TSC Scenic Landscape Strategy: Static & Linear Viewpoints

Fig 11.0 Viewing Situations 01

Fig 12.0 Key Vantage Points: Area of Investigation Confirmation



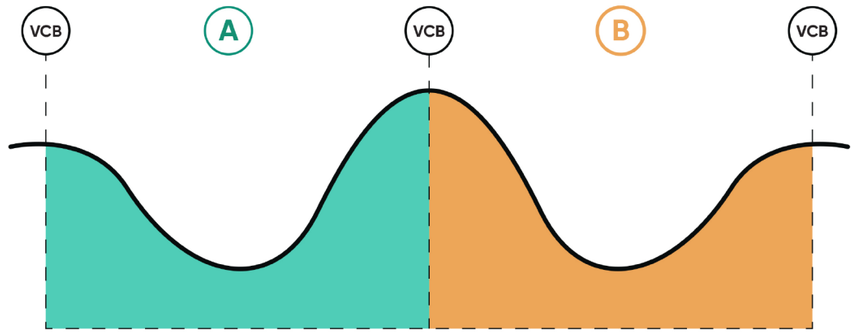
Visual Impact Assessment

Fig 7.0 Visual Catchment Boundary Plan 01

6.3.1 Visual Catchment Boundaries

The Area of Investigation (AOI) represents the area over which the visual impacts of The Project will be investigated. The identification of Visual Catchment Boundaries to determine the area over which The Project Site may be visible has been undertaken to assist in defining the AOI and identifying and / or confirming potential Key Vantage Points for assessment.

Visual catchments are areas bound by a shared viewing exposure from a particular vantage point or location on the ground plane. Visual catchment areas are defined by topography, the height of a particular point on the ground plane, relative to the surrounding area.



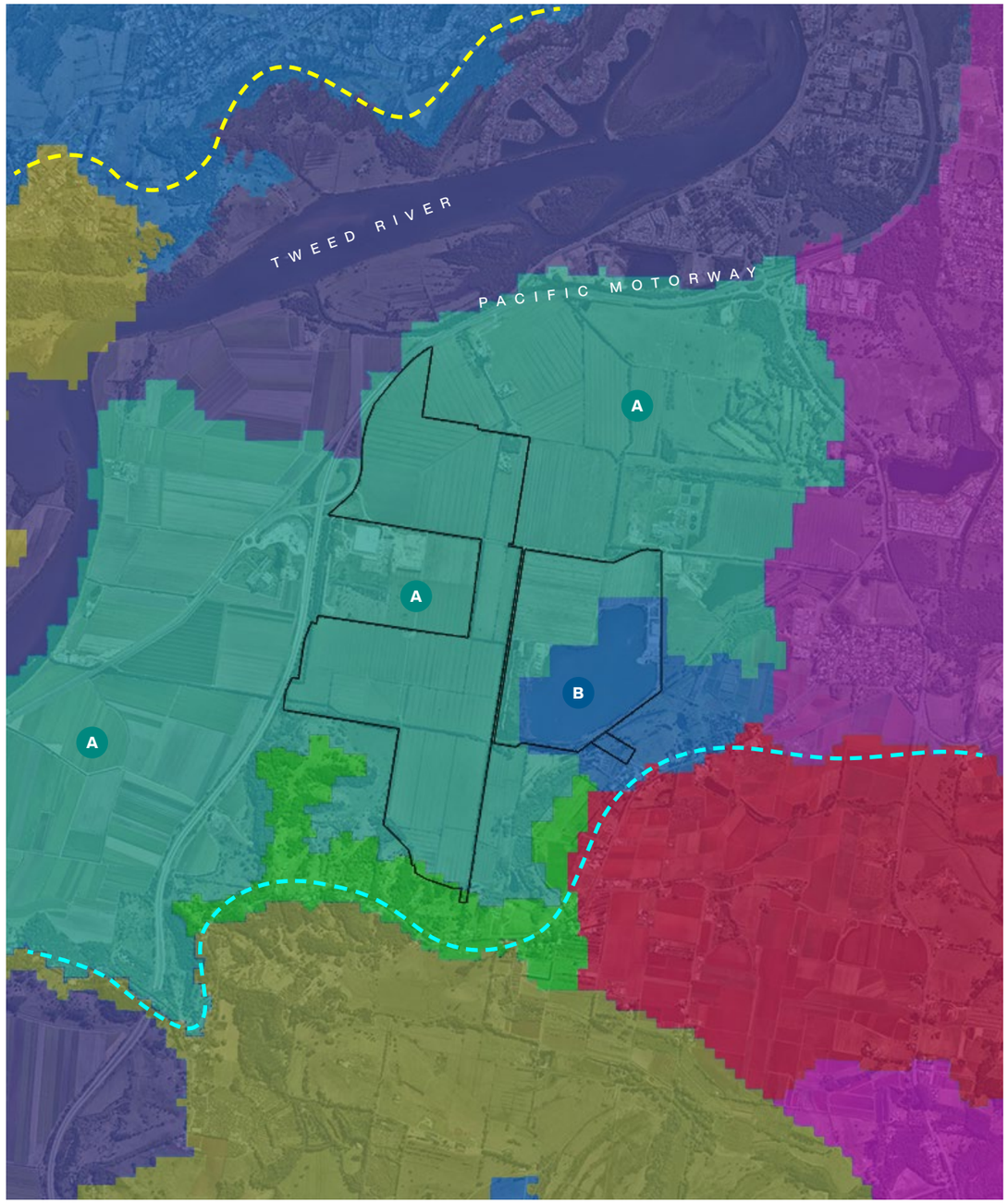
The cross-sectional diagram above illustrates two distinct Visual Catchments 'A' and 'B'. A particular land-use or structure that exist within Visual Catchment Area A is likely to be contained within the confines of Visual Catchment Zone A. Further, its impact may be visually obscured (or its impact lessened) from Visual Catchment B by the central rise in topography. These Visual Catchment Boundaries are associated with prominent ridglines or rises in topography that act to contain or restrict views.

This methodology for establishing visual catchment boundaries has been applied over The project Site and surrounding area and is included this page. The various visual catchments determined through topographic analysis are illustrated by the contrasting coloured catchment zones over and surrounding the The Project Site.

The Primary Ridgelines responsible for defining the Visual Catchments are referenced throughout this document as Prominent Ridgeline 1 and Prominent Ridgeline 2 and are defined below:

Prominent Ridgeline 1
Ridgeline (raised topography) generally associated with Cudgen Rd and McPhail Avenue (Cudgen Plateau) . This Ridgeline has an average elevation of: 30-45m AHD (compared to Subject Site ¬4.1 AHD).

Prominent Ridgeline 2
Ridgeline (raised topography) generally associated with Terranora Rd. This Ridgeline has an average elevation of: 60-90m AHD (compared to Subject Site ¬4.1 AHD).



6.3.2 Visual Catchment Boundaries 02

A **Visual Catchment A (VCB A)**
The Project Site is located almost entirely within Visual Catchment A due to its location within a large expanse of relatively flat land extending to the north-east and west and south-west (Tweed Valley Floodplain). This large expanse shares an average elevation of ~1-2m AHD. The catchment is bounded to the north by a minor rise in topography associated with the Pacific Motorway (~3-4m AHD) and the low laying Tweed River (~0-1m AHD) to its immediate north. The primary VCB to the north of The Project Site is defined by Prominent Ridgeline 2. VCB A is bounded to the south by a ridgeline generally associated with Cudgen Rd and McPhail Avenue (Cudgen Plateau). This Ridgeline has an average elevation of: 30-45m AHD (compared to The Project Site ~1-2m AHD).

B **Visual Catchment B (VCB B)**
The Project Site is also located over Visual Catchment B. This is a minor catchment defined by the existing TSP extraction lake located over lots with an existing approval to operate (Lot 22 DP 1082435, Lot 23 DP 1077509 and Lot 494 DP 720450). The catchment is bounded to the south by Prominent Ridgeline 1 which is generally associated with Cudgen Rd and McPhail Avenue (Cudgen Plateau) . This Ridgeline has an average elevation of: 30-45m AHD (compared to The Project Site ~1-2m AHD).

Prominent Ridgeline 1
Ridgeline (raised topography) generally associated with Cudgen Rd and McPhail Avenue (Cudgen Plateau) . This Ridgeline has an average elevation of: 30-45m AHD (compared to The Project Site ~1-2m AHD).

Prominent Ridgeline 2
Ridgeline (raised topography) generally associated with Terranora Rd. This Ridgeline has an average elevation of: 60-90m AHD (compared to The Project Site ~1-2m AHD).

Plan Analysis Summary

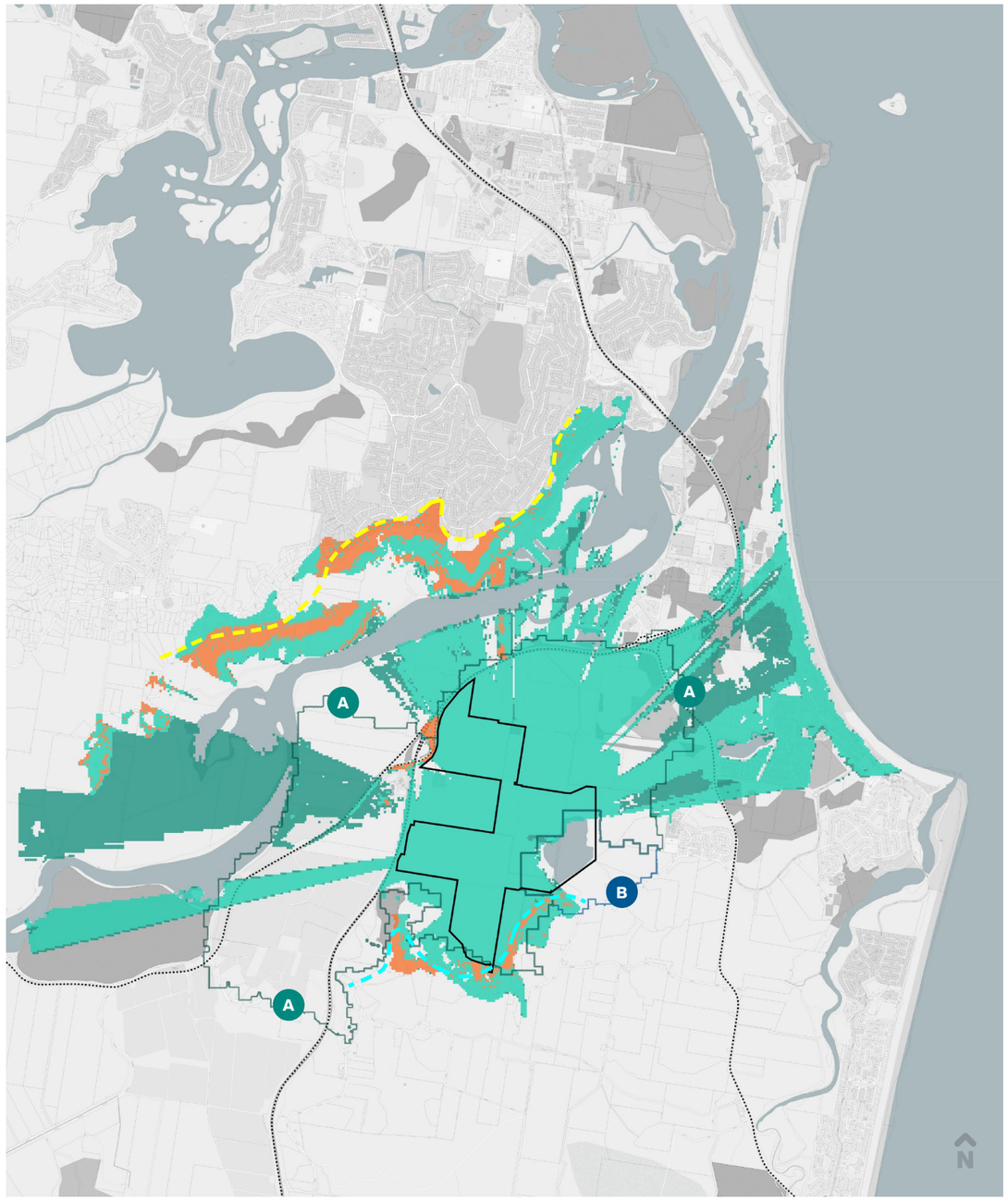
The Project Site is located almost entirely within a single VCB (Visual Catchment A). This is due to the Project Site being located within a large expanse of relatively flat land with a similar elevation to that of the Project Site.

The existing TSP extraction area is located within a separate VCB due to the decreased elevation of this area relative to the surrounding landform.

The expansion of the sand extraction area will reduce the elevation of the Project Site to generally align with the landform and elevation of the existing TSP extraction area. As illustrated, this existing extraction area is located within a separate Visual Catchment (VCB B). Visual Catchment B would likely increase as a result of the expanded extraction area and in doing so reduce (act to contain) the visual catchment of the Project Site. In simple terms, lowering the ground level of the Project Site will likely further decrease any potential views from locations within the large expanse of flat land that surrounds the Project Site.

The role that prominent Ridgelines 1 & 2 (and the landform generally) has in defining Visual Catchment Boundaries is clearly evident in this plan with these ridgelines located along the boundary of the visual catchments identified.

Visual Impact Assessment
Fig 7.1 Visual Catchment Boundary Plan 02



Visual Impact Assessment

Fig 8.0 Viewshed Map 01

6.3.3 Viewshed Mapping

A viewshed is the area that is visible from a particular viewing location or 'vantage point' within the landscape . It is the combination of all available lines of sight along which an observer has an unobstructed view, and is directly related to terrain only. **The role of existing and or proposed vegetation within the AOI is not considered by Viewshed Mapping.**

The viewshed analysis uses loaded elevation grid data with a user-specified transmitter location, height, and radius. All areas within the selected radius that have a clear line of sight to the transmitter are colored with a user-specified color.

Project Area Boundary
Boundary of lots included within the Project Area

Viewshed Analysis A <1m Height
Viewshed cast from center of Project Area at <1m to 1.7m receiver height

Viewshed Analysis B 1.5m Height
Viewshed cast from center of Project Area at 1.5m to 1.7m receiver height

Viewshed Analysis C 3.0m Height
Viewshed cast from center of Project Area at 3m to 1.7m receiver height

Prominent Ridgeline 1

Prominent Ridgeline 2

A **Visual Catchment A (VCB A)**

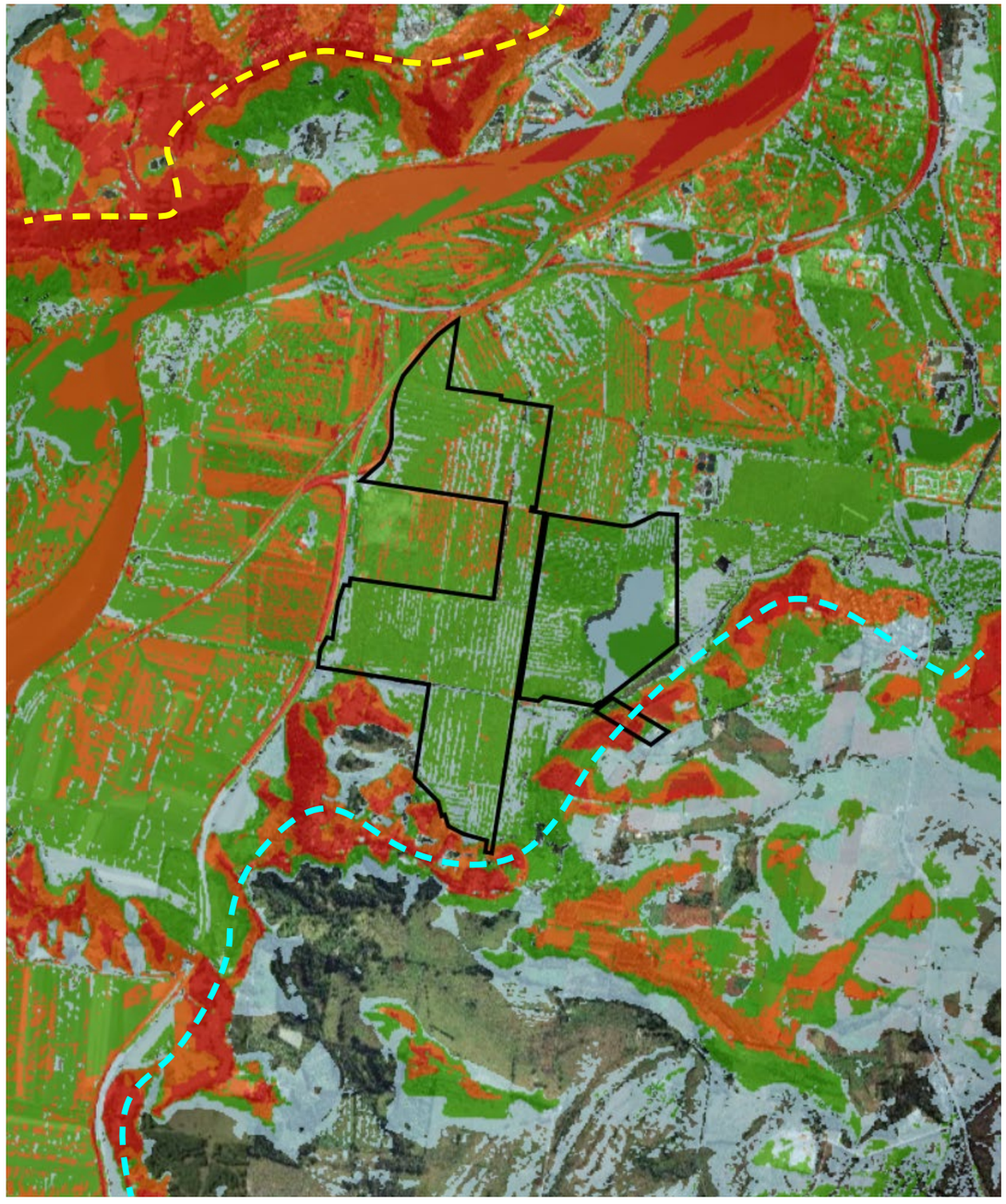
B **Visual Catchment B (VCB B)**

Plan Analysis Summary

Viewshed A is cast from a transmitter at the height representing the Project Site. This Viewshed is primarily limited to the elevated areas associated with Prominent Ridgelines 1 & 2 only. This is due to the Project Site being located within a large expanse of relatively flat land with a similar elevation to that of the Project Site. Viewsheds only become visible within VCA & VCB B when the transmitter height is raised to ~1.5m to ~3.0m above the existing ground level (Viewshed Analysis B & C) equating to ~2.5 ~4.0m AHD.

As described within **Section 3.1 The Proposal**, the operational infrastructure required by The Project is minor. The existing site buildings and wash plant (extents of which are approximately 50m x 20m located within a cleared site pad of approximately 60 x 250m) will remain in use during Phases 5 and 6. The site buildings and wash plant will be relocated to an alternative position onsite from Phase 7 onwards. This infrastructure is minor and comprises <0.06% of the Project Site.

The primary feature of The Project will be the gradual expansion of the extraction area which will present as a flat plain within the landscape at an AHD <1m. Viewshed Mapping indicates that views of the extraction areas will be limited to elevated areas associated with Prominent Ridgeline 1 & 2 only.



6.3.4 TSC SLS Viewshed Mapping

The TSC Scenic Landscape Strategy includes detailed Viewshed Mapping for each identified Viewing Situation. A viewshed is the area that is visible from a particular viewing situation. It is the combination of all available lines of sight between a transmitter and receptor, and is directly related to terrain. This data is collated under the SLS to create a 'heat map', (Scenic Landscape Strategy: Visibility Map) that identifies areas over which varying cumulative viewsheds are located. The greater the number of viewsheds located over a specific area, the more likely it is that a change or impact that occurs within that area will be visible to a greater number of Viewing Situations.

Tweed Shire Boundary
Tweed Shire Local Government Boundary

The Project Site

1-2
Visible by 1-2 Static / Linear Viewing Situations

3-5
Visible by 3-5 Static / Linear Viewing Situations

6-9
Visible by 6-9 Static / Linear Viewing Situations

10 or Greater
Visible by 10 or Greater Static / Linear Viewing Situations

Prominent Ridgeline 1
Ridgeline (raised topography) generally associated with Cudgen Rd and McPhail Avenue (Cudgen Plateau) . This Ridgeline has an average elevation of: 30-45m AHD (compared to The Project Site ~1-2m AHD).

Prominent Ridgeline 2
Ridgeline (raised topography) generally associated with Terranora Rd. This Ridgeline has an average elevation of: 60-90m AHD (compared to The Project Site ~1-2m AHD).

Plan Analysis Summary

The SLS Visibility Map indicates the Project Site has between 1-5 Viewing Situations with a clear line of sight. This low viewshed count can be attributed to the low average elevation of the Project Site and the role that Prominent Ridgelines 1 & 2 play in containing the field of view from many of the Viewing Situations identified under the SLS.

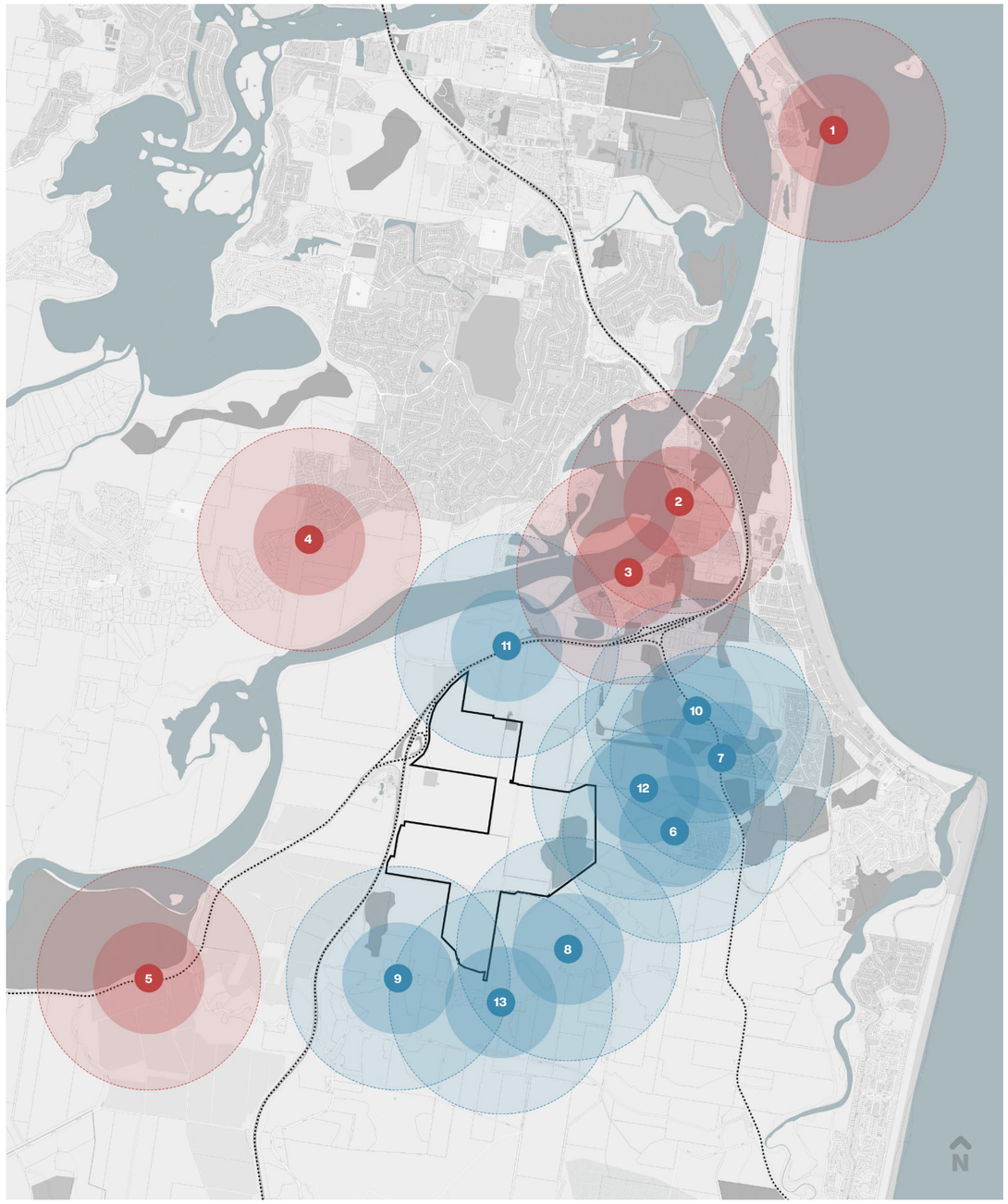
The number of Viewing Situations over the existing TSP extraction area is reduced to between 1-2 only (represented by the light blue colour). The expansion of the sand extraction area will reduce the elevation of the Project Site to generally align with the landform and elevation of the existing TSP extraction area. This would suggest that the number of locations within the AOI with a clear line of sight to The Project Area will decrease as the sand extraction phases progress.

These findings reaffirm the Visual Catchment analysis (**Fig 7.1 Visual Catchment Boundary Plan** 02) which illustrated that the Visual Catchment B would likely increase as a result of the expanded extraction area and in doing so reduce (act to contain) the visual catchment of the Project Site.

Visual Impact Assessment

Fig 9.0 TSC Scenic Landscape Strategy: Visibility Map

Source: This plan is a recreation of the Draft Scenic Landscape Strategy: Visibility Map. This plan illustrates the number of viewsheds located over a specific region to identify areas where changes within the landscape will likely have a higher impact.



Project Area Boundary
Boundary of lots included within the Project Area

SLS Identified Viewpoints
Vantage Points identified by 'TSC Scenic Landscape Strategy'
1000m | 500m Radius Illustrated

Identified Key Vantage Points
Vantage Points identified for further investigation
1000m | 5000m Radius Illustrated

Major Roads Surrounding Project Area

1 **Fingal Headland**
Distance from Site: 6.6km
Elevation: AHD 0.00m (Approx.)

2 **Oxley Park**
Distance from Site: 2.6km
Elevation: AHD 1.283m (Approx.)

3 **Chinerah Jetty & Chinderah Bay Drive**
Distance from Site: 1.8km
Elevation: AHD 0.25m (Approx.)

4 **Terranora Road**
Distance from Site: 1.85km
Elevation: AHD 125m (Approx.)

5 **Bruce Chick Reserve**
Distance from Site: 2.8km
Elevation: AHD 1.27m (Approx.)

6 **Key Vantage Point A**
Distance from Site: 750m
Elevation: AHD 30.879m (Approx.)

7 **Key Vantage Point B**
Distance from Site: 1.25km
Elevation: AHD 2.227m (Approx.)

8 **Key Vantage Point C**
Distance from Site: 450m
Elevation: AHD 39.305m (Approx.)

9 **Key Vantage Point D**
Distance from Site: 300m
Elevation: AHD 78.784m (Approx.)

10 **Key Vantage Point E**
Distance from Site: 825m
Elevation: AHD 1.666m (Approx.)

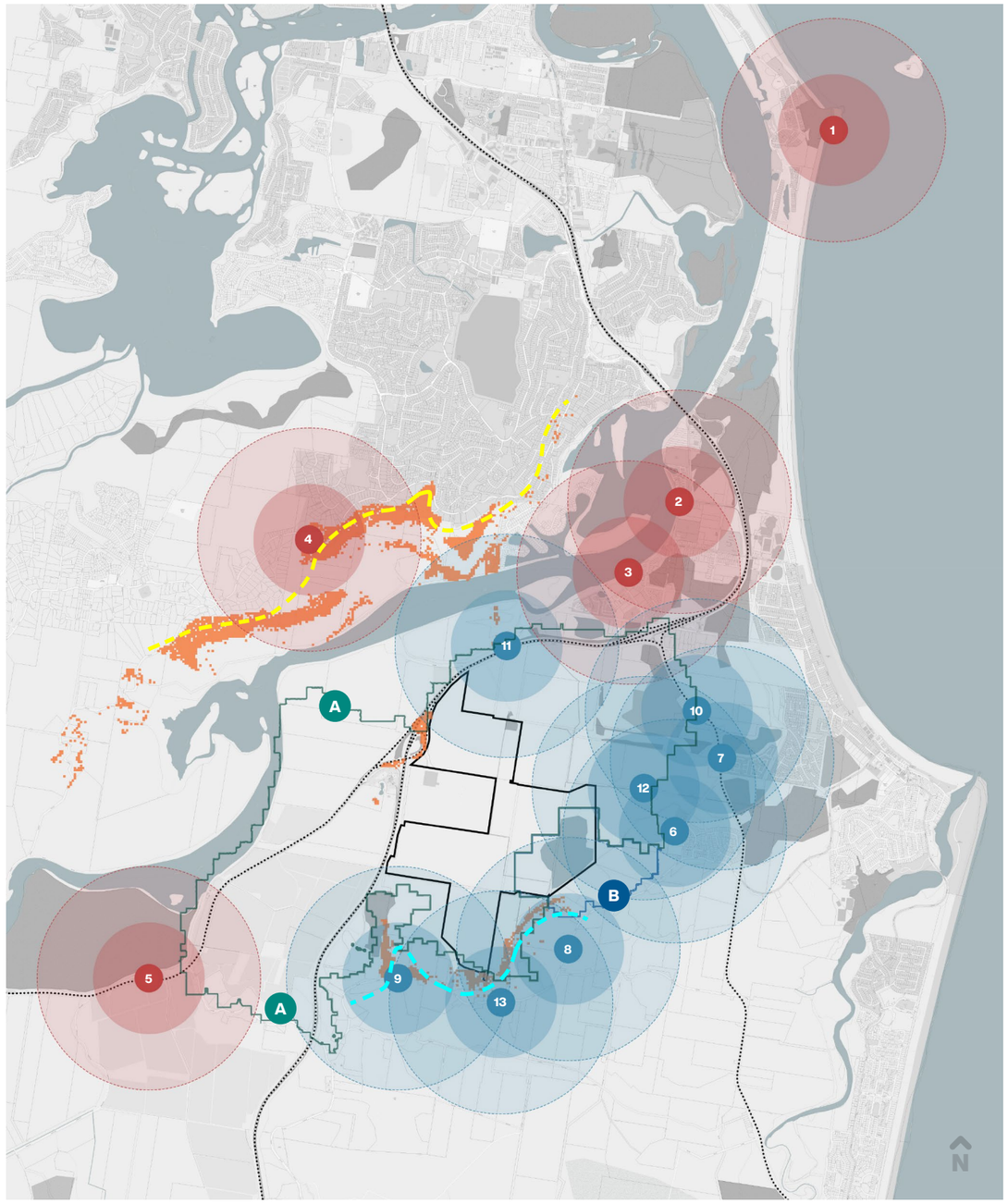
11 **Key Vantage Point F**
Distance from Site: 1km
Elevation: AHD 2.083m (Approx.)

12 **Key Vantage Point G**
Distance from Site: 50m
Elevation: AHD 1.338m (Approx.)

13 **Key Vantage Point H**
Distance from Site: 270m
Elevation: AHD 41.963m (Approx.)

Visual Impact Assessment

Fig 10.0 Key Vantage Points: Area of Investigation



Visual Impact Assessment

Fig 10.1 Key Vantage Points: Area of Investigation

6.5 Key Vantage Points

The Area of Investigation (AOI) has been determined through desktop analysis and is comprised of the Project Site and the Visual Catchments over which the Project Site is located with this extending to encompass all identified KVP.

Figure 12.0 illustrates all KVP identified for further analysis and overlays the Visual Catchment Boundaries and Viewshed A for reference.

Project Area Boundary
Boundary of lots included within the Project Area

SLS Identified Viewpoints
Vantage Points identified by 'TSC Scenic Landscape Strategy'
1000m | 500m Radius Illustrated

Identified Key Vantage Points
Vantage Points identified for further investigation
1000m | 5000m Radius Illustrated

Major Roads Surrounding Project Area

1 **Fingal Headland**
Distance from Site: 6.6km
Elevation: AHD 0.00m (Approx.)

2 **Oxley Park**
Distance from Site: 2.6km
Elevation: AHD 1.283m (Approx.)

3 **Chinerah Jetty & Chinderah Bay Drive**
Distance from Site: 1.8km
Elevation: AHD 0.25m (Approx.)

4 **Terranora Road**
Distance from Site: 1.85km
Elevation: AHD 125m (Approx.)

5 **Bruce Chick Reserve**
Distance from Site: 2.8km
Elevation: AHD 1.27m (Approx.)

6 **Key Vantage Point A**
Distance from Site: 750m
Elevation: AHD 30.879m (Approx.)

7 **Key Vantage Point B**
Distance from Site: 1.25km
Elevation: AHD 2.227m (Approx.)

8 **Key Vantage Point C**
Distance from Site: 450m
Elevation: AHD 39.305m (Approx.)

9 **Key Vantage Point D**
Distance from Site: 300m
Elevation: AHD 78.784m (Approx.)

10 **Key Vantage Point E**
Distance from Site: 825m
Elevation: AHD 1.666m (Approx.)

11 **Key Vantage Point F**
Distance from Site: 1km
Elevation: AHD 2.083m (Approx.)

12 **Key Vantage Point G**
Distance from Site: 50m
Elevation: AHD 1.338m (Approx.)

13 **Key Vantage Point H**
Distance from Site: 270m
Elevation: AHD 41.963m (Approx.)

Viewshed Analysis A <1m Height
Viewshed cast from center of Project Area at <1m to 1.7m receiver height

A **Visual Catchment A (VCB A)**

B **Visual Catchment B (VCB B)**

Prominent Ridgeline 1

Prominent Ridgeline 2

7.0 Stage 2: Evaluation of Site Scenic Amenity

An evaluation of the AOI has been undertaken to determine its scenic quality and assist in determining the potential impact of The Project. Evaluation of the natural and cultural scenic amenity of the AOI has been undertaken with reference to TSC Landscape Character Unit Map layer and SLS Part 2 landscape character assessment and narratives.

As noted within the SLS, there are numerous visual features that give the Tweed landscape its scenic quality and create the Shire's identity and image. These were summarised within the Tweed Scenic Landscape Evaluation (November 1995) by Catherine Brouwer:

High diversity of landscape form and vegetation patterns;

Predominately natural character and frequent views of water or mountains;

Openness of the Tweed River valley with the distinctive, steeply rising Wollumbin/Mt Warning in the centre and the dramatic enclosing backdrop of the caldera rim;

Frequent access to long, wide, highly legible views;

Uniformity of the cane fields and forested hillsides that accentuates any visual intrusion or clearing;

Steepness and closeness to view of the hillsides that form the natural setting for views from villages and roads;

Location of scenic historic villages and townships along main or tourist roads, with development occurring in the foreground of views of the village setting or broader landscape;

Predominantly natural and pristine landscapes as distinct and contrasting from monoculture and high-density suburban communities.

The SLS defines scenic quality as the combination of multiple elements within the landscape and their potential to create different levels of satisfaction or appreciation.

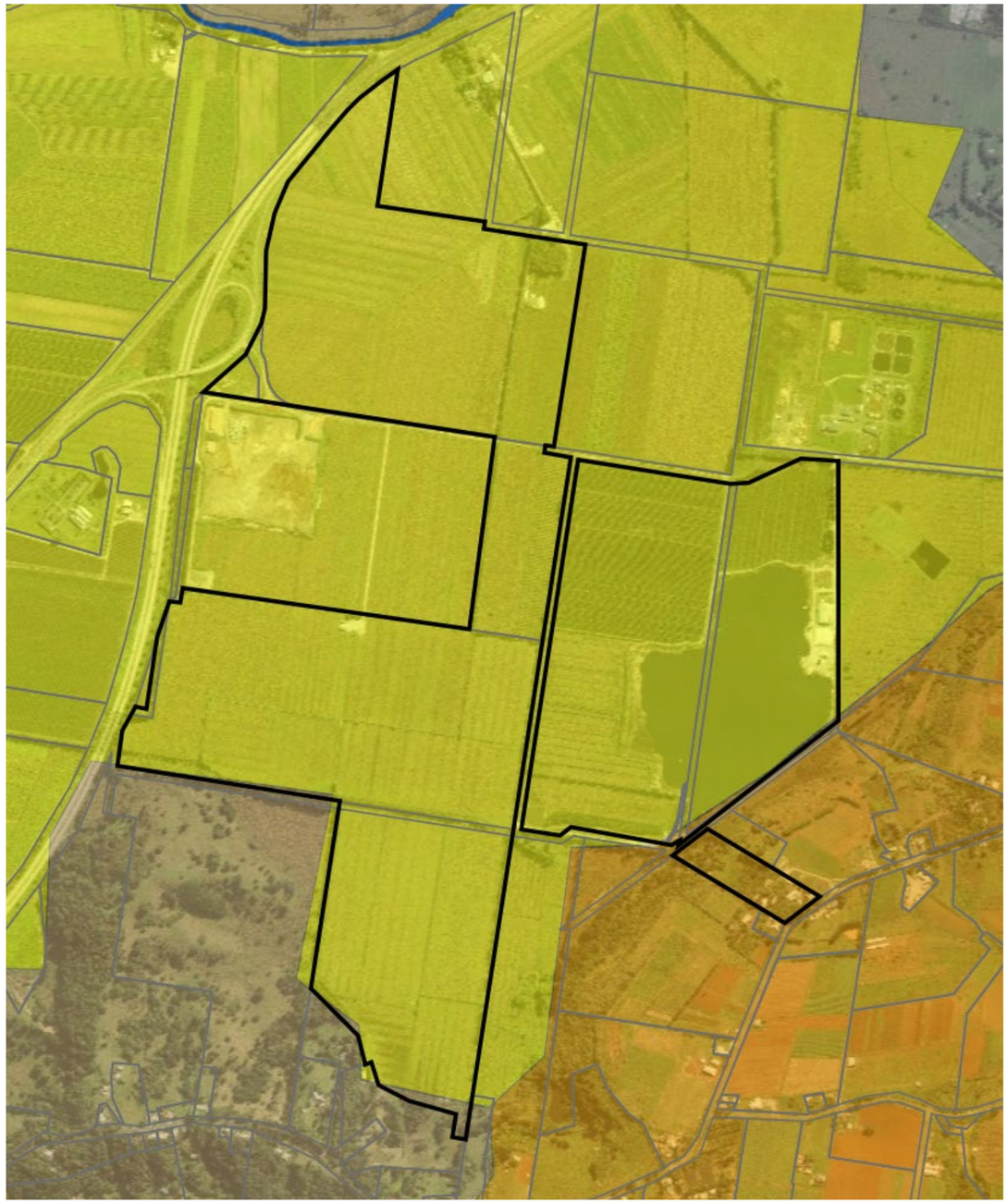
These elements include:

the natural and cultural features that provide the basic pattern of landscape, noting these are fluid and reflect social and land use changes over time;

the observer's position within the landscape;

the degree of personal enjoyment someone feels from what they are seeing.

The scenic amenity and character of the site and its regional context will be further described and evaluated through the analysis of the potential visual impact of The Project. This is included within the Analysis section of all KVP where applicable.



7.1 SLS Landscape Character

The Draft Scenic Landscape Strategy (SLS) defines a landscape's character as the distinctive, recognisable and consistent pattern of physical elements within a landscape, which when combined, give a setting its sense of place and make one landscape different from another. The SLS categorises the TSC region into ten primary Landscape Character Units based on a number of parameters including the below:

Landform including natural topography and artificial landforms such as cut and fill, subdivision land forming, leveling, canals and reclaimed land;

Vegetation characteristics such as cover, height, density and colouration;

Bodies of water;

Cultural modifications and built structures including buildings, water tanks, transmission lines, generation plants and recreation facilities; and

Temporal and atmospheric components for example seasons, time of day, weather phenomena, seasonal humpback whale migration.

The Project Site is located within the below listed Landscape Character Units (with percentage of each noted). Reference to these Landscape Character Units is made within the Analysis section of all KVP where applicable.

Tweed Shire Boundary
Tweed Shire Local Government Boundary

The Project Site

Sugar Cane
98.84% of Project Area

Coastal Agriculture
0.82% of Project Area

Rural Hills & Valleys
0.34% of Project Area

Visual Impact Assessment

Fig 12.1 Key Vantage Points: Area of Investigation

7.1.1 SLS Landscape Character Unit Narrative: Sugarcane

Sugarcane
98.84% of Project Area

The Sugarcane Character Unit is described within the SLS to identify and describe the physical landscape elements and scenic quality associated with those elements. An extract of the Character Unit Narrative is included hereunder. Assessment of the associated Management principles is made the Analysis section of all Veiwshed Analysis plans where applicable.

Location
The majority of sugar cane is located on the flat valley floors and floodplains of the Tweed River and Rous River, extending in a north-westerly direction from Murwillumbah Chinderah with a smaller area within coastal valleys to the north west of Pottsville and in the south of the Shire at Wooyung.
This landscape unit covers approximately 8706 hectares or 6.6% of the Shire.

Description of Landscape Features
Large wide flat fields of lower Tweed River floodplain as well as smaller more visually contained valleys of the coastal creeks contained by forested spurs at Cudgera Creek, Wooyung and Chinderah.

Landscape attributes are generally characterised by:

• Regimented rectilinear patterns formed by drainage and cropping lines on large scale lot sizes

• Scattered homesteads and rural buildings and work sheds

• Colours are predominantly vibrant yellows and lush greens, with carpeting grassy textures across landscape occasionally intersected by lines of loamy brown earth

• Ever changing heights, patterns and colours of the sugar cane, caused by farming and seasonal cycles, can both restrict and broaden viewing fields, and creates visual interest across the landscape character for both views seen from static elevated positions, and dynamic views seen whilst traveling through the landscape unit.

• Occasional dust and smoke caused by burning and harvesting techniques, which affect visibility within and of adjacent Landscape Character Units.

Tweed and Rous Rivers bisects the Tweed Valley and Sugar Cane Landscape Character Unit. The visual contrast of the meandering organic lines, colour and reflectivity of the Rivers against the highly homogeneous and expansive fields creates visual interest.

The Condong Sugar Mill sits at the centre of the Landscape Character Unit on the bank of the Tweed River at Condong. It straddles the boundary between "Sugar Cane" and "Rivers and creeks" Landscape Character Units with "Rural Hills and Valleys" and "Forested Hills" in the background. The Mill serves as a highly significant landscape feature and visual focal point for many panoramic vistas, created by its positioning within the landscape, great height and vertical structure of the steam stack contrasting against predominantly horizontal spatial scales of the sugar cane field and Tweed River, as well as the constant white and luminous 'plume' of vapour escaping the stack which is very attractive to the viewer eye.

Anticipated Future Changes and Pressures
• Acid Sulfate soils are identified as a key pressure on the soil landscape, with potential change in land uses if soils become unproductive.

• Encroaching urban development, affecting the viability of sugar cane farming

• Sugar cane fields are identified under Significant Farmland Protection Project as Regionally Significant Farmland, which offers some level of protection. The land is also Zoned RU1, which permits limited land uses

• Extractive industry, such sand mining, is a potential land use that will remove the key attributes of the sugar cane Landscape Character Unit, and sterilise any future agricultural uses.

Scenic Quality Analysis
One of the defining characteristics of the Sugar Cane Landscape Unit is the dynamic transformation the fields undergo each year, from the lush green of mature cane plants, through the burning process and harvesting, to bare brown earth, then the peppering of new season growth slowly transforming the bare brown earth back to green again as it matures.

The consistency of colour and texture and the regimented pattern of the rectilinear fields create a strong yet agreeable contrast to the adjoining and enclosing wooded ridgelines and spurs which separate the coastal cane fields within adjoining catchments, scattered rural homesteads, farm buildings and access roads.

The vast horizontal spatial scale of the landscape unit tends to draw the viewers eye from the foreground of the sugar cane to the River, forested hills and Caldera ridgelines in the background, with occasional and largely heritage cultural features creating interest. The sporadic placement of structures in the foreground enables viewers traveling through the unit to experience a visual journey generally free of obstructions and fast-moving stimuli, adding to perceptions of slowness despite moving at rapid speeds, at times.

The Condong Sugar Mill is a defining feature of the sugar cane landscape unit that helps to orient viewers whilst traveling through the landscape unit. However, some observers may not appreciate the cultural significance of the mill and therefore perceive it as visual detractor, particular when in close proximity and scale of the ancillary structures of Mill dominates their view field in full.

Similar reaction may occur to the sugar cane haulage trailers that can be seen scattered along the roadside during harvesting season.

The farming practice of burning sugar cane typically generates smoke and dust which reduces landscape visibility or disrupts focus from other key landscape features.

Management Principles
• Retain sugar cane uses to ensure character is preserved.

• Maintain sense of entry to the Tweed Shire along the Pacific Highway, Tweed Valley Way and other key roads that move into and traverse the Landscape Unit, by retaining visible cane fields and vegetated hills visible from key intersections and through the valley.

• Maintain long distant sight lines across the unit by avoiding or minimising the placement of structures and signage in the foreground that would result in division or obstruction of views across the sugar cane unit toward key features such as Condong Mill, Wollumbin/Mt Warming, or of adjacent landscape units, such as Rivers and Creeks, Rural Hills and Forested Hills of the Caldera volcanic shield.

7.1.2 SLS Landscape Character Unit Narrative: Coastal Agriculture

Coastal Agriculture
0.82% of Project Area

An extract of the Character Unit Narrative is included hereunder. Assessment of the associated Management principles is made the Analysis section of all Veiwshed Analysis plans where applicable.

Location
This landscape unit occupies approximately 691 hectares or 0.5% of the Shire, and is spatially restricted to the low hills and rolling rises of the Cudgen / Duranbah plateau.

Description of Landscape Features
Formed from the breakdown of basalt lava flows from the Tweed Shield Volcano, this immediately recognisable agricultural landscape is characterised by rolling rises and low hills with fertile red soils that enable intensive horticulture production. The rich red soils and rectangular pattern of agricultural fields are distinctly visible, scattered with contrasting colour yet rectangular form of rural residences and farm buildings.

The coastal agricultural landscape unit generally comprises smaller rural landholdings of intensive horticulture crop production rather than inland rural Landscape Character Units, which creates a visual patchwork of contrasting lines, colours and textures, resulting from the tilling of soils, crop growth and harvesting activities that expose or cover the red soils at various times. Occasional built structures including large lot rural homes and storage sheds or climate control structures dot the landscape.

Anticipated Future Change and Pressures
• Population pressures resulting in residential / urban encroachment into farmland
• Increasing land use conflict between farming and non-farming neighbours.
• Increasing land prices caused by development pressure making it difficult for farmers to purchase and secure additional land.
• Climate change poses challenges for sectors reliant on the healthy functioning of ecosystems
• Encroaching residential and other forms of urban development.
• Unfarmed / unmanaged land being left untended and becoming dominated by environmental weeds, farm/rural waste

Scenic Quality Analysis
Inherent social and economic values are associated with the economic productivity of this landscape unit, as being the most fertile soil in the Shire for intensive horticulture. Additionally there are cultural heritage values associated with the kanacka walls, as a connection to the historic settlement of the Tweed.
Intangible values and linkages to the bucolic rural and agricultural history.

Management Principles
Retain agricultural uses to ensure character is preserved.
Ensure kanacka rock walls at intersection of Cudgen Road and Tweed Coast Road are not obscured from views.

7.1.3 SLS Landscape Character Unit Narrative: Rural Hills & Valleys

Rural Hills & Valleys
0.34% of Project Area

An extract of the Character Unit Narrative is included hereunder. Assessment of the associated Management principles is made the Analysis section of all Veiwshed Analysis plans where applicable.

Location
Rural Hills and Valleys occupy approximately 51,505 hectares or 39% of the Shire. The unit generally covers land where the terrain gradient rises above the Tweed floodplain and ends where elevation rises into the steeper forested slopes of the Caldera rim and ranges.

Description of Landscape Features
Elevated basalt slopes and marginal lands support a mix of rural pursuits, ranging from cattle grazing, banana growing, dairy grazing, intensive horticulture production, large lot residential, extractive and industrial land uses. Visual character is created by interplay between vegetation and topographic patterns at all scales that can create an indented or transitional edge between two or more interlocking or connecting areas.

Management of vegetation is a defining landscape attribute in this unit, where a high diversity of vegetation patterns can be found. For example, distinguishing mature trees in cleared grassed areas can create random or graduation of textures and colour mixing, whilst productive horticultural farms with uniform rows of fruiting trees may dominate large lots to create more dense and ordered spatial arrangement of colours and textures.

Extensive stands of camphor laurel have also regenerated in previously cleared areas, creating distinctive form, texture and colour that are often perceived as characteristic of the NSW North Coast identity.

Structural elements such as farmhouses, shed, fences and yards, climate control structures and machinery are often screened by vegetation in fore and mid ground views, but readily visible from higher viewing points or long distance views. Roads, powerlines, fences and edges of vegetation stands create lines throughout the landscape.

Colours are often dominated by shades of green attributed to a variety of vegetation or disturbed soils, and interspersed with generally white, greys, browns and silvers of houses, sheds and other structures. General low density development and associated artificial lighting creates viewing opportunities of dark skies and star gazing activities.

Anticipated Future Change and Pressures
• Directions in the North Coast Regional Plan and Council's Rural Lands Strategy aim to encourage niche commercial, tourist and recreational activities that complement and promote a stronger agricultural sector, and build the sector's capacity to adapt to changing circumstances.
• Changing patterns of land use seeking subdivision of rural lots can impact the ratio and arrangement of natural elements.
• Poor soil management resulting in land scarring or land slips are perceived as visual detractors. Extractive industries or high density urbanised areas are also perceived as being unsympathetic to rural uses and agricultural production.

Scenic Quality Analysis
For many views in the western portion of the Shire, Rural Hills and Valleys are the dominant landscape unit. The cultural heritage and bucolic values associated with this landscape unit may be considered as significant as those for biodiversity and natural heritage associated with coastal and wilderness areas. The high diversity of landscape attributes including undulating terrain, native and exotic vegetation, variable lot sizes and cultural structures supporting productive agricultural lands creates views of high scenic diversity and interest in terms of colour, spatial qualities and textures for many views.

Revegetation of some areas is not necessarily desired by some community members or viewer groups. For example, the rolling hills of Tyalgum contribute to the rural vistas around Tyalgum village including the cleared grazing fields and hills populated with the invasive plant species Camphor Laurel (Cinnamomum camphora). Whilst camphor laurel is considered a noxious weed, it forms extensive stands of tree coverage in areas that have been historically cleared of native vegetation and the aesthetic qualities formed by their form, foliage and colouration are considered by some community members to contribute to a distinctive visual characteristic of the rural hills and valleys of the Tweed. For example, the dispersed canopy allowing dappled light over routes and creeks that are appreciated by residents and visitors. Therefore, consideration of compensatory impacts management measures ifs recommended in the control and removal of camphor laurel species.

Management Principles
Maintain sense of entry to the Tweed Valley and foothills of the Caldera by retaining rural land uses in the hills and valleys visible from key viewing situations including the Pacific Highway, Tweed Valley Way and other key roads. Preserve the existing proportions, patterns and visual relationships between forested and cleared areas.
Maintain existing character, density and distribution of structural elements such as roads, powerlines, dams, buildings etc. Avoid or minimise the cumulative impact of urban development in the rural hills and valleys, by maintaining vegetated screens and edge buffers against highly urbanised or industrialised land uses or development Consolidate new development within existing urban centres and existing footprints of rural villages to maintain existing widespread nature of rural uses and development. Where extensive camphor laurel (or other exotic weed species) stands exist, encourage removal at a rate that can be balanced with compensatory planting.

7.2 SLS Landscape Character: Analysis Summary

The Draft Scenic Landscape Strategy (SLS) defines a landscape's character as the distinctive, recognisable and consistent pattern of physical elements within a landscape, which when combined, give a setting its sense of place and makes one landscape different from another. In describing the various Landscape Character Units The SLS does not assign any hierarchy regarding the perceived value of one landscape type over another. Instead, these narratives identify and describe the physical landscape elements, scenic quality associated with those elements, known risks and pressures, and specific management principles that are distinctive to each Landscape Character Unit.

The Project Site is mapped almost entirely (98.84%) as being part of the landscape character unit 'Sugar Cane' (LCU: Sugar Cane). Refer to Section 7.1.1 SLS Landscape Character Unit Narrative: Sugarcane for a full description of this Character Unit. In reality, the Project Site presents as open pasture grazing lands. The Preliminary Site Investigation Report prepared by Gilbert + Sutherland January 2021 notes that prior to 1950 the site was used primarily for cattle grazing with additional uses including sugarcane production until the mid 1980's. At the time of the inspections undertaken (November 2020) the proposed expansion areas supported cattle, had good grass coverage and were well grazed.

Whilst this would suggest some disconnect between the SLS LCU mapping and the current site conditions, the LCU Sugar Cane description recognises the scenic amenity of agricultural landuses generally and in this way serves as a basis for the assessment of the sites scenic amenity prior and post works associated with The Project.

The Project will result in a change to the existing landscape character and on completion of extraction works and subsequent final rehabilitation phases, the Project Site will present as a natural lake bordered by a significant vegetation to its perimeter.

Although this will result in a landscape that does not align with the **existing mapped character unit**, the resulting landscape will maintain many of the key scenic quality attributes prescribed to the character unit 'Sugar Cane'. Further, this change in landscape character would not adversely impact key significant landscape features of this landscape unit.

Scale & Location

The Sugar Cane LCU covers approximately 8706 hectares or 6.6% of the Shire. The Project would result in a loss of <3% of this landscape unit.

The Project Site is located at the eastern-most end of this LCU which extends approximately 19km to the west of the Project Site to Murwillumbah and Condong. The loss of the LCU at the eastern-most end would not cause fragmentation of the balance LCU area.

The SLS notes the Condong Sugar Mill as a significant feature of this Landscape Character Unit. The Project will have no adverse impact on this significant feature and is located at a considerable distance to the east (located at a distance from the Project Site of approximately 12.5km).

The Condong Sugar Mill sits at the centre of the Landscape Character Unit on the bank of the Tweed River at Condong. The Mill serves as a highly significant landscape feature and visual focal point for many panoramic vistas, created by its positioning within the landscape, great height and vertical structure of the steam stack contrasting against predominantly horizontal spatial scales of the sugar cane field and Tweed River, as well as the constant white and luminous 'plume' of vapour escaping the stack which is very attractive to the viewer eye.

Key Scenic Quality Attributes

The Scenic Quality description of this Character Unit notes the dynamic nature of the landuse being:

> *... the dynamic transformation the fields ... from the lush green of mature cane plants, through the burning process and harvesting, to bare brown earth, then the peppering of new season growth slowly transforming the bare brown earth back to green again as it matures.*
>
> This is a quality that is specific to an agricultural landuse. The Project Site will be subject to progressive rehabilitation phases over an extended period of operations transforming the site into a natural lake bordered by a significant vegetation to its perimeter.

The Scenic Quality description of this LCU notes the physical attributes as;

> *A **regimented pattern** of the **rectilinear fields** that create a strong yet agreeable contrast to the adjoining and enclosing **wooded ridgelines** which separate the coastal cane fields within adjoining catchments **scattered rural homesteads, farm buildings and access roads.***
>
> *The **vast horizontal spatial scale** of the landscape unit tends to draw the viewers eye from the foreground of the sugar cane to the **River, forested hills and ridgelines in the background.***

The Project will result in a change to the landscape character, the resulting landscape will maintain many of these key scenic quality attributes :

> A vegetated buffer around the perimeter of the lakes will vary from a minimum 10m to 20m to consist of locally occurring native species to provide ecological (and visual) continuity to the existing **regimented pattern of the rectilinear fields** and bands of trees that traverse the landscape.
>
> On completion of extraction works and subsequent final rehabilitation phases, the Project Site will present as a large natural lake bordered by a significant vegetation to its perimeter. The **vast horizontal spatial scale of the waterbody** will draw the viewers eye to the **River, forested hills and ridgelines** in the background.
>
> The lake will sit within an **existing regimented rectilinear landscape** formed by the surrounding large scale rural lots defined by drainage and cropping lines and reinforced by trees planted as wind breaks to the surrounding cadastral boundaries.
>
> The varying width of the lake edge and associated perimeter vegetation will create a naturalistic variance to the waterbody whilst remaining visually consistent with the surrounding **rectilinear landscape** character of the region. The perimeter vegetation will soften the lake edge and present as a visual extension to the **bands of existing vegetation** that frame the large scale rural lots surrounding the Project Site.

Refer also **5.1 End Use Photomontages**

A series of photomontages of the Project Site Final Landform / End Use have been prepared to accurately illustrate to proposed landform changes and final outcome for The Project Site. These image further illustrate the above reference scenic quality attributes.

Methodology

8.0 Stage 3: Visual Impact Assessment and Analysis

A qualitative assessment of visual impacts on all identified Vantage Points has been undertaken. The significance of impacts have been evaluated through the analysis of landscape impacts and visual impacts, as defined below.

8.1 Landscape Impact

Landscape impacts refer to the relative capacity of the landscape to accommodate changes to the physical landscape of the type and scale proposed that would occur as a direct result of the proposed development, through the introduction of new features or loss/ modification of existing features.

Impacts have been assessed within the 20km Investigation Area and consider (through professional judgment) the scale of change to determine the potential Landscape Impact (between Negligible to Large as defined below).

Landscape impact	Definition
Large	A substantial / obvious change to the landscape due to total loss of, or change to, elements, features or characteristics of the landscape. Would cause a landscape to be permanently changed and its quality diminished.
Moderate	Discernible changes in the landscape due to partial loss of, or change to the elements, features or characteristics of the landscape. May be partly mitigated. The change would be out of scale with the landscape, and at odds with the local pattern and landform and will leave an adverse impact on a landscape of recognised quality.
Small	Minor loss or alteration to one or more key landscape elements, features, or characteristics, or the introduction of elements that may be visible but may not be uncharacteristic within the existing landscape.
Negligible	Almost imperceptible or no change in the view as there is little or no loss of / or change to the elements, features or characteristics of the landscape. The existing landscape quality is maintained but be slightly at odds to the scale, landform and pattern of the landscape.

Table 1.0 Assessment of Landscape Impact
Reference: *Guidelines for Landscape and Visual Impact assessment, Second Edition*, published by the Landscape Institute for Environmental Management and Assessment (2002).

8.2 Visual Impact

Visual impacts arise from changes in available views of the landscape that occur as a result of the development. Visual impact is determined through the subjective assessment of sensitivity of the visual receptors (i.e. residents, outdoor recreational users) and the magnitude (scale) of the change in view. Sensitivity is dependent upon receptors' location; the importance of their view; their activity (i.e. working, recreational, or traveling through); expectations; available view; and the extent of screening of this view.

Factors that have been considered in assessing the response of receptors to changes in the visual amenity include:

- Interest in the visual environment and their distance/angle of view to the source of the impact;
- The extent of screening/filtering of the view;
- Magnitude of change in the view (i.e. loss/addition of features that change the view's composition);
- Integration of changes within the existing view (form, mass, height, colour and texture);
- Duration of the effect (temporary/permanent, intermittent/continuous)

Sensitivity	Definition
High	Occupiers of residential properties with long viewing periods, within close proximity to The Proposal Users of outdoor recreational area including nature reserves, and nature based recreation (walking, horse riding trails, water based activities such as swimming and fishing) where their attention is focused, in part, on the landscape and its amenity Communities that place value upon the landscape and enjoyment of views of their landscape setting
Medium	Outdoor workers who have a key focus on their work who may also have intermittent views of The Proposal Outdoor recreation users (i.e. sporting activities) where their attention is focused predominately on the activity being undertaken Occupiers of residential properties with long viewing periods, at a distance from or screened from The Proposal
Low	Road users in motor vehicles, trains or on transport routes that are passing through or adjacent to the study area and therefore have short term views Viewers indoor at their place of work
Negligible	Viewers from locations where there is screening by vegetation or structures where only occasional screened views are available and viewing times are short Road users in motor vehicles, trains or on transport routes that are passing through/adjacent to the study area and have partially screened views and short viewing times

Table 2.0 Assessment of Receptor Sensitivity
Reference: *Guidelines for Landscape and Visual Impact assessment, Second Edition*, published by the Landscape Institute for Environmental Management and Assessment (2002).

8.3 Significance of Impact

For the purposes of this assessment, predicted impacts as a direct result of the project will be described according to their significance which is a function of the magnitude of the impact and the sensitivity of the receptor (Table 3.0). In the example below, with a Visual Sensitivity rating of 'Low' and a Landscape Impact of 'Small', the Significance of Impact would be considered to be 'Not Significant'.

		Landscape Impact			
		Large	Moderate	Small	Negligible
Visual Sensitivity	High	Major Significance	High Significance	Moderate Significance	Minor Significance
	Medium	High Significance	Moderate Significance	Minor Significance	Not Significant
	Low	Moderate Significance	Minor Significance	Not Significant	Not Significant
	Negligible	Minor Significance	Not Significant	Not Significant	Not Significant

Table 3.0 Significance of Impact
Reference: *Guidelines for Landscape and Visual Impact assessment, Second Edition*, published by the Landscape Institute for Environmental Management and Assessment (2002).

8.4 Community Engagement

Local stakeholder engagement was undertaken by Vaxa Consulting Pty Ltd to inform the Social Impact Assessment (SIA). Communication was distributed through a targeted letterbox drop across the project catchment as defined by the 'Area of Social Influence' (ASI) as determined through the Social Impact Assessment.

Stakeholder feedback responses that noted a 'negative sentiment' in relation to the 'potential impacts to visual amenity' was limited to 4.3% of respondents. Respondents were primarily wary of over-development, including greater densities and building heights. The SIA made note that the community value and are protective of their rural and village lifestyle and have close connection with Tweed's natural environment and scenery.

Community consultation reveals some people would prefer there is no change, some do not have a view and others support the change to provide a mix of land and water in local amenity along with greater recreational opportunities.

In reference to the baseline social findings within the SIA, there are no material changes arising from the proposed use that would impact residents' lifestyle or the enjoyment of their environment.

As noted in this VIA, The predicted visual impacts associated with the proposed expansion of the TSP have generally been found to be of **Minor Significance** with views of the Project Site limited to areas of significant elevation with expansive views across the Tweed Shire.

Whilst The Project will result in a change to the visual amenity, the changes will be gradual over the course of 30 years. The progressive rehabilitation throughout this time frame will ensure the gradual extension of perimeter vegetation (undertaken on a staged basis on the completion of each expansion phase) that will visually connect to the existing bands of trees that traverse the landscape. This vegetated buffer will vary in width and consist of locally occurring native species to provide ecological (and visual) continuity to the existing **regimented pattern** of the landscape.

On completion of extraction works and rehabilitation phases, the Project Site will present as a **large natural lake** bordered by a **significant vegetation** to its perimeter. The varying width of the lake edge and associated perimeter vegetation will create a naturalistic variance to the waterbody whilst remaining visually consistent with the existing **rectilinear landscape character** of the region.

8.5 Cumulative Impact

This assessment is undertaken to determine how other near projects may add to and/or exacerbate impacts generated by the TSP expansion proposal. The two (2) relevant projects include:

1) Australian Bay Lobster Producers: Large-scale sheds (ABLP)
Location: 1//DP1192506
Proximity to Project Site: 380m

The ABLP is an aquaculture operation, with the first of three (3) approved stages delivered and operating. The site receives seawater to sustain operations, with spent seawater piped to the nearby wastewater treatment plant. The development footprint is planned to expand over time. This is an approved use and there will be visual change to the generally rural landscape.

2) Cudgen Lakes Sand Operation (CSLO)
Location: 2//DP216705
Proximity to Project Site: 100m

The CLSO operates directly to the east of the TSP site. The operation is comparable to the existing TSP activities, involving the extraction of sand by dredge and pump, along with the progressive creation of a water body.

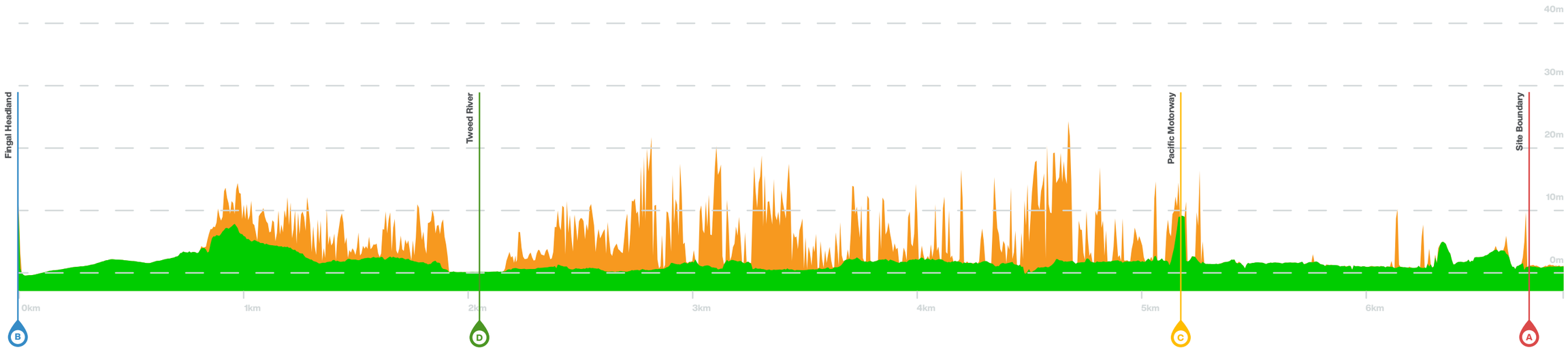
The greenfield features of the combined project areas will change over time, although they are already highly modified from vegetation clearing and historic agricultural use. The Increased operational footprints of the ABLP (additional large scale sheds) and CLSO will result in a cumulative visual change from the gradual transition from rural lands to new uses. Hanson's rehabilitation and vegetation program will ensure the lakes have natural appearance.

Based on the known scale of the existing projects and the type of activities and change, the TSP proposal is not expected to create noticeable cumulative impacts. All three (3) uses are relatively discreet and passive, with limited interface with 'sensitive receivers'.

9.0

KVP Analysis.

130º Panoramic Vantage Point Site Image



Supplementary Plans

9.0 TSC Scenic Landscape Strategy: Fingal Headland

Digital Elevation Model Section
DEM model has been created using LiDAR survey and exclusively generated using the classified ground lidar filter.

Digital Surface Model Section
DSM model has been created using LiDAR survey and exclusively generated using the classified ground, low vegetation, medium vegetation, and high vegetation lidar filters.

Vantage Point Drone Image @ 25m

Vantage Point Drone Image @ 70m

SLS Viewing Situation: Fingal Headland

Coordinates (Lat/Lon): -28.20084348772497, 153.57050726521945
Distance from Site: 6.39km
Elevation: AHD 11.40m (Approx.)

- **Site Boundary Extents**
- **Location of Vantage Point**
- **Major Road Reserve Location**
- **Tweed River Location**
- **Digital Elevation Model Section**
- **Digital Surface Model Section**
- **Area of Site Visible within Drone Imagery**

Key Vantage Point: SLS Viewing Situation: Fingal Headland
This KVP is located **6.39km** to the north-east of the subject site at Fingal Headland.

This KVP has an elevation of **11.40 AHD** and was selected based on the TSC Scenic Landscape Strategy Visibility Mapping which nominates this location as a **Priority 1 Viewing Situation.**

This KVP was identified as a potential sensitive receptor due to its natural setting, high community value as a nature walk and elevated viewing location of approximately **18.0m** above that of the Project Site.

The SLS has determined this location as a **Priority 1 Viewing Situation**: being locations of national or regional significance, that attract a significant number of visitors, is easily accessed, highly trafficked and as having high scenic value, quality or preference.

Site Photographs
The Project Site is located within 16º of the 130º Panoramic Vantage Point Site Image. This represents ~ 12% of the 130º field of view illustrated.

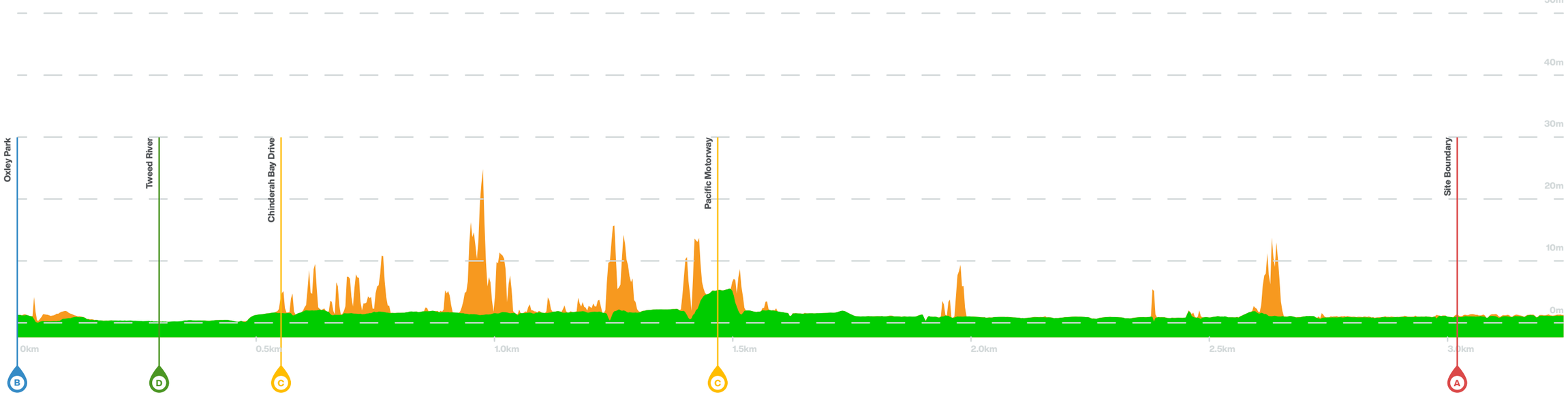
Project Site visibility from KVP :	None
Project Site visibility at Drone Height 25m:	None
Project Site visibility at Drone Height 70m:	None

Cross Section
Existing vegetation (represented by the DSM) screens any potential views of the Project Site from this KVP.

Ridgelines and rises in landform primarily associated with primary road networks also play a role in screening any potential views of the Project Site from this KVP.

Analysis Summary | Significance of Impact: **Nil Impact**

130º Panoramic Vantage Point Site Image



Supplementary Plans

9.2 TSC Scenic Landscape Strategy: Oxley Park

Digital Elevation Model Section
DEM model has been created using LiDAR survey and exclusively generated using the classified ground lidar filter.

Digital Surface Model Section
DSM model has been created using LiDAR survey and exclusively generated using the classified ground, low vegetation, medium vegetation, and high vegetation lidar filters.

Vantage Point Drone Image @ 25m

Vantage Point Drone Image @ 70m

SLS Viewing Situation: Oxley Park

Coordinates (Lat/Lon): -28.233341285269972, 153.5554686505252
Distance from Site: 2.64km
Elevation: AHD 1.283m (Approx.)

- **Site Boundary Extents**
- **Location of Vantage Point**
- **Major Road Reserve Location**
- **Tweed River Location**
- **Digital Elevation Model Section**
- **Digital Surface Model Section**
- **Area of Site Visible within Drone Imagery**

Key Vantage Point: SLS Viewing Situation: Oxley Park
This KVP is located **2.64km** to the north-east of the subject site at Oxley Park.

This KVP has an elevation of **~1.28m AHD** and was selected based on the TSC Scenic Landscape Strategy Visibility Mapping which nominates this location as a **Priority 2 Viewing Situation.**

This KVP was identified as a potential sensitive receptor due to its natural setting and accessibility to the public.

The SLS has determined this location as a **Priority 2 Viewing Situation:** being locations of regional significance, promoted at a regional or local level, moderately trafficked and easily accessed or those identified as having high scenic value quality.

Site Photographs
The Project Site is located within 38º of the 130º Panoramic Vantage Point Site Image. This represents ~29% of the 130º field of view illustrated.

Project Site visibility from KVP :	None
Project Site visibility at Drone Height 25m:	None
Project Site visibility at Drone Height 70m:	Partial Visibility

The Project Site becomes visible from this KVP at raised elevation of ~70m. Views from a human viewing perspective are not possible from this KVP.

Cross Section
Existing vegetation (represented by the DSM) screens any potential views of the Project Site from this KVP.

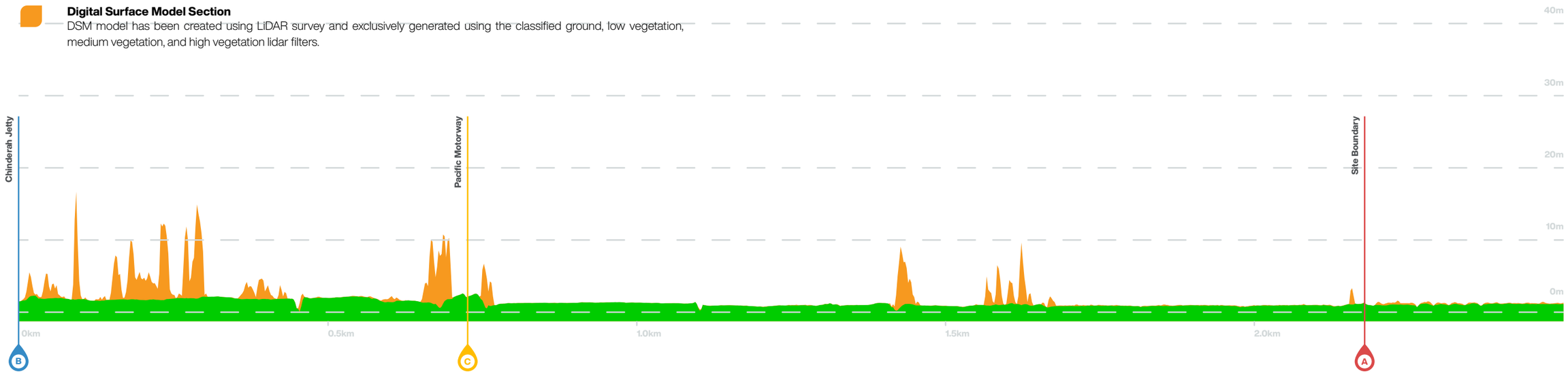
Ridgelines and rises in landform primarily associated with primary road networks also play a role in screening any potential views of the Project Site from this KVP.

Analysis Summary | Significance of Impact: **Nil Impact**

130º Panoramic Vantage Point Site Image

Digital Elevation Model Section
DEM model has been created using LiDAR survey and exclusively generated using the classified ground lidar filter.

Digital Surface Model Section
DSM model has been created using LiDAR survey and exclusively generated using the classified ground, low vegetation, medium vegetation, and high vegetation lidar filters.



Supplementary Plans

9.3 TSC Scenic Landscape Strategy: Chinderah Jetty & Chinderah Bay Drive

Vantage Point Drone Image @ 25m

Vantage Point Drone Image @ 70m

SLS Viewing Situation: Chinderah Jetty

Coordinates (Lat/Lon): -28.239094866954712, 153.55064981930843
Distance from Site: 1.85km
Elevation: AHD 0.25m (Approx.)

- **Site Boundary Extents**
- **Location of Vantage Point**
- **Major Road Reserve Location**
- **Tweed River Location**
- **Digital Elevation Model Section**
- **Digital Surface Model Section**
- **Area of Site Visible within Drone Imagery**

Key Vantage Point: SLS Viewing Situation: Chinderah Jetty

This KVP is located **1.85km** to the north-east of the subject site at Chinderah Jetty.

This KVP has an elevation of **~1.28m AHD** and was selected based on the TSC Scenic Landscape Strategy Visibility Mapping which nominates this location as a **Priority 2 Viewing Situation.**

This KVP was identified as a potential sensitive receptor due to its natural setting and accessibility to the public.

The SLS has determined this location as a **Priority 2 Viewing Situation:** being locations of regional significance, promoted at a regional or local level, moderately trafficked and easily accessed or those identified as having high scenic value quality.

Site Photographs
The Project Site is located within 41º of the 130º Panoramic Vantage Point Site Image. This represents ~31% of the 130º field of view illustrated.

Project Site visibility from KVP :	None
Project Site visibility at Drone Height 25m:	None
Project Site visibility at Drone Height 70m:	Partial Visibility

The Project Site becomes visible from this KVP at raised elevation of ~70m. Views from a human viewing perspective are not possible from this KVP.

Cross Section
Existing vegetation (represented by the DSM) screens any potential views of the Project Site from this KVP.

Ridgelines and rises in landform primarily associated with primary road networks also play a role in screening any potential views of the Project Site from this KVP.

Analysis Summary | Significance of Impact: **Nil Impact**

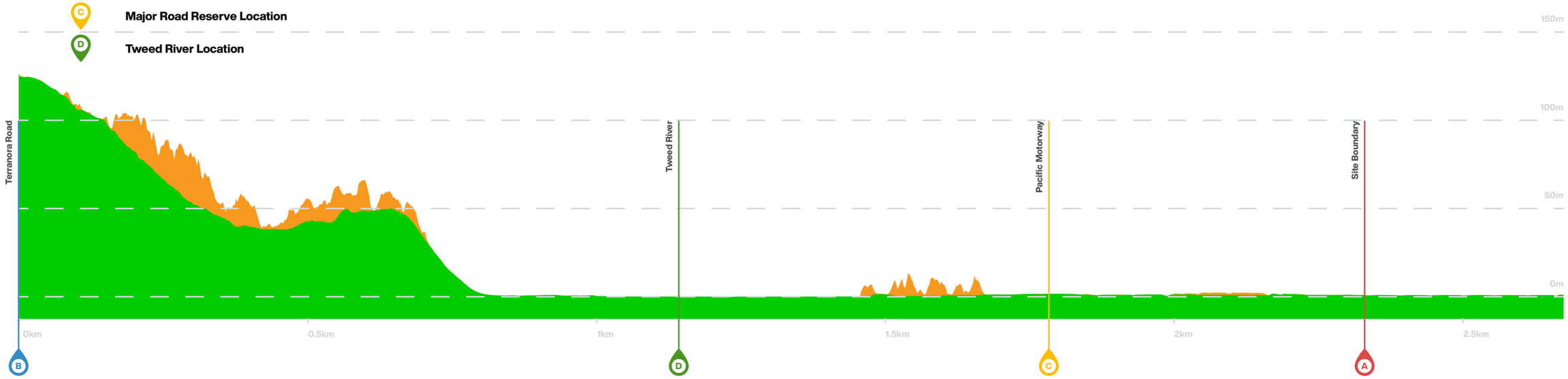
130º Panoramic Vantage Point Site Image

A Site Boundary Extents

B Location of Vantage Point

C Major Road Reserve Location

D Tweed River Location



Supplementary Plans

9.4 TSC Scenic Landscape Strategy: Terranora Road

Digital Elevation Model Section
DEM model has been created using LiDAR survey and exclusively generated using the classified ground lidar filter.

Digital Surface Model Section
DSM model has been created using LiDAR survey and exclusively generated using the classified ground, low vegetation, medium vegetation, and high vegetation lidar filters.

Vantage Point Drone Image @ 25m

Vantage Point Drone Image @ 70m

SLS Viewing Situation: Terranora Road

Coordinates (Lat/Lon): -28.236312144078664, 153.51954546151455
Distance from Site: 2.0km
Elevation: AHD 125m (Approx.)

Area of Site Visible within Drone Imagery

Key Vantage Point: SLS Viewing Situation: Terranora Road
This KVP is located **2.0km** to the north of the subject site along the elevated ridgeline generally aligned with Terranora Road.

This KVP has an elevation of **~125m AHD** and is located along Prominent Ridgeline 2 as referenced within the Section 6.0 VIA Analysis Mapping.

This KVP was identified as a potential sensitive receptor due to the residential nature of the landuse and the significant elevation above that of the Project Site.

The SLS has determined this location as a **Priority 2 Viewing Situation:** being locations of regional significance, promoted at a regional or local level, moderately trafficked and easily accessed or those identified as having high scenic value quality.

Site Photographs
The Project Site is located within 32º of the 130º Panoramic Vantage Point Site Image. This represents ~24% of the 130º field of view illustrated.

Project Site visibility from KVP :	Potential Visibility
Project Site visibility at Drone Height 25m:	Highly Visible
Project Site visibility at Drone Height 70m:	Highly Visible

Whilst the Vantage Point Site Image does not indicate that the Project Site is visible from this specific location, the significant elevation of Terranora Road will likely provide instances from which a clear line of sight to the Project Site will be possible. The Project Site becomes highly visible at raised elevation of both 25m and ~70m.

Cross Section
As illustrated in cross sectional analysis (and visible in site photographs) Terranora Road is located along a prominent ridgline (Prominent Ridgeline 2) at significantly higher elevation that the Project Site. The Project Site is located within the large expanse of the Tweed Valley Flood Plain with an average elevation of ~1-2m AHD.

Existing vegetation (represented by the DSM) is located to the sloping south face of the ridgeline. From a human viewing perspective, this vegetation will act to screen / partially screen views of the Project Site. Existing vegetation to the Tweed valley Floodplain creates a regimented rectilinear landscape and define the large scale rural lots and provides some softening and screening of the Project Site.

Analysis Notes
Figure 8.0 Viewshed Mapping indicates that a clear line of sight to the elevated areas of Terranora Road / prominent Ridgeline 2. This is a direct result of the elevated viewing position which provides sweeping views across the Tweed Valley Floodplain in which the Project Site is located. This is confirmed by site investigation.

As noted in Section 5.0 End Use, on completion of extraction works and subsequent final rehabilitation phases, the Project Site will present as a large natural lake bordered by a significant vegetation to its perimeter. The lake will sit within the existing regimented rectilinear landscape formed by the surrounding large scale rural lots defined by drainage and cropping lines and reinforced by trees planted as wind breaks / land parcel delineation to the surrounding cadastral boundaries.

From this KVP the propose lake of The project will provide a visual connection to the Tweed River and other areas of water (primarily as a result of similar sand extraction landuses) visible within the landscape.

Significance of Impact: Moderate to Minor
With reference to Section 8.1 Visual Impact Table 1.0 Assessment of Landscape Impact, the impact of The Project would be considered **Small** being a minor loss or alteration to the landscape, or the introduction of elements that may be visible but may not be uncharacteristic within the existing landscape.

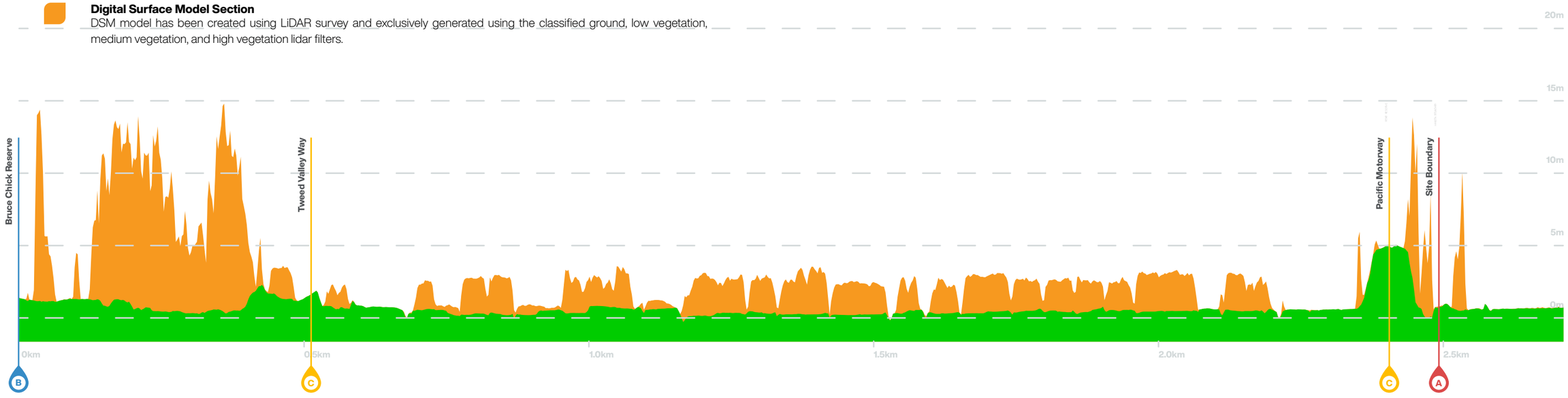
With reference to Section 8.2 Visual Impact Table 2.0 Assessment of Receptor Sensitivity, the Sensitivity of the KVP would be considered **Medium to High** being residential properties with long viewing periods with minor screening located at a distance from the Project Site, .

With a Visual Sensitivity rating of **Medium to High** and a Landscape Impact of **Small** the Significance of Impact would be considered to be of **Moderate to Minor Significance.**

130º Panoramic Vantage Point Site Image

Digital Elevation Model Section
DEM model has been created using LiDAR survey and exclusively generated using the classified ground lidar filter.

Digital Surface Model Section
DSM model has been created using LiDAR survey and exclusively generated using the classified ground, low vegetation, medium vegetation, and high vegetation lidar filters.



Supplementary Plans

9.5 TSC Scenic Landscape Strategy: Bruce Chick Reserve

Vantage Point Drone Image @ 25m

Vantage Point Drone Image @ 70m

SLS Viewing Situation: Bruce Chick Reserve

Coordinates (Lat/Lon): -28.2745146925609, 153.50406620041502
Distance from Site: 2.49km
Elevation: AHD 1.27m (Approx.)

- **Site Boundary Extents**
- **Location of Vantage Point**
- **Major Road Reserve Location**
- **Tweed River Location**
- **Digital Elevation Model Section**
- **Digital Surface Model Section**
- **Area of Site Visible within Drone Imagery**

Key Vantage Point: SLS Viewing Situation: Bruce Chick Reserve
This KVP is located **2.49km** to the south-west of the subject site at Bruce Chick Reserve. The reserve consists of a large unsealed area of carparking with an area of open turf and several picnic tables and shelters . The reserve is adjacent to Tweed Valley Way located to its immediate south that provides vehicular access to the reserve.

This KVP has an elevation of **~1.27m AHD** and was selected based on the TSC Scenic Landscape Strategy Visibility Mapping which nominates this location as a **Priority 2 Viewing Situation.**

This KVP was identified as a potential sensitive receptor due to its natural setting and accessibility to the public.

The SLS has determined this location as a **Priority 2 Viewing Situation:** being locations of regional significance, promoted at a regional or local level, moderately trafficked and easily accessed or those identified as having high scenic value quality.

Site Photographs
The Project Site is located within 44º of the 130º Panoramic Vantage Point Site Image. This represents ~34% of the 130º field of view illustrated.

Project Site visibility from KVP :	None
Project Site visibility at Drone Height 25m:	None
Project Site visibility at Drone Height 70m:	Partial Visibility

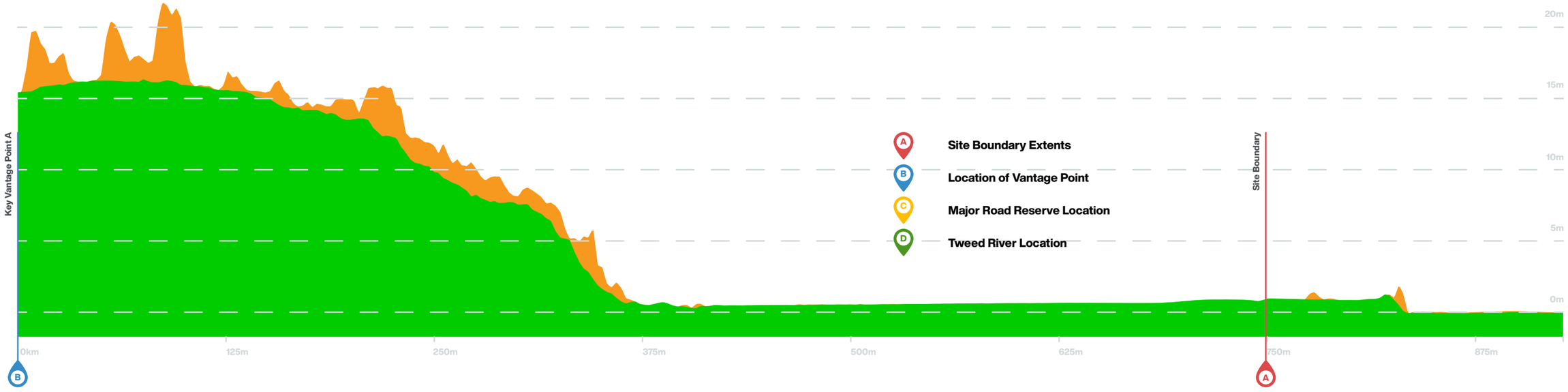
The Project Site becomes visible from this KVP at raised elevation of ~70m. Views from a human viewing perspective are not possible from this KVP.

Cross Section
Existing vegetation (represented by the DSM) screens any potential views of the Project Site from this KVP.

Ridgelines and rises in landform primarily associated with primary road networks also play a role in screening any potential views of the Project Site from this KVP.

Analysis Summary | Significance of Impact: **Nil Impact**

130º Panoramic Vantage Point Site Image



Supplementary Plans

9.6 Key Vantage Points: Vantage Point A

Digital Elevation Model Section
DEM model has been created using LiDAR survey and exclusively generated using the classified ground lidar filter.

Digital Surface Model Section
DSM model has been created using LiDAR survey and exclusively generated using the classified ground, low vegetation, medium vegetation, and high vegetation lidar filters.

Vantage Point Drone Image @ 25m

Vantage Point Drone Image @ 70m

Cudgen Sands: Sand Extraction works
Location: 2//DP216705
Proximity to Project Site: 100m

Key Vantage Point: A

Address: 26 Denman Drive, Cudgen
Coordinates (Lat/Lon): -28.261802221620492, 153.55502146395182
Distance from Site: 750m
Elevation: AHD 30.879m (Approx.)

Area of Site Visible within Drone Imagery

Key Vantage Point: SLS Viewing Situation: 26 Denman Drive, Cudgen
This KVP is located **750m** to the east of the subject site along the eastern-most portion of the elevated ridgeline generally aligned with Cudgen Road. The KVP is located within the western-most area of a small pocket of residential dwellings and consists of a new extension of residential dwellings over a former Asphalt Mixing Plant site.

This KVP has an elevation of **~31m AHD** and is located along the eastern-most portion of Prominent Ridgeline 1 as referenced within the Section 6.0 VIA Analysis Mapping.

This KVP was identified as a potential sensitive receptor due to the residential nature of the landuse, its significant elevation and its proximity to the Project Site.

Site Photographs
The Project Site is located within 76º of the 130º Panoramic Vantage Point Site Image. This represents ~58% of the 130º field of view illustrated. This large field of view is due to the proximity of the KVP to the Project Site.

Project Site visibility from KVP :	Potential Visibility
Project Site visibility at Drone Height 25m:	Highly Visible
Project Site visibility at Drone Height 70m:	Highly Visible

Whilst the Vantage Point Site Image does not indicate that the Project Site is visible from this specific location, the significant elevation of the KVP combined with its proximity to the Project Site will result in the western-most residential dwellings with views over the Project Site.. The Project Site becomes highly visible at raised elevation of both 25m and ~70m.

Cross Section
As illustrated in cross sectional analysis (and visible in site photographs) the KVP is located along a prominent ridgline (Prominent Ridgeline 1) at significantly higher elevation that the Project Site. The Project Site is located within the large expanse of the Tweed Valley Flood Plain with an average elevation of ~1-2m AHD.

Existing vegetation (represented by the DSM) is located to the sloping western face of the ridgeline. Vegetation is also located along the crest of the ridgeline to the western side of residential dwellings. This vegetation will act to screen / partially screen views of the Project Site from the KVP and residential dwellings along Denham Drive generally.

Significant existing vegetation to the eastern perimeter of the Project Site provides screening of the existing sand extraction phases. The role this existing vegetation plays in screening the existing extraction site is visible in Drone Imagery this sheet. This vegetation will be retained and additional rehabilitation works to the perimeter of the Project Site will provide further screening from this KVP.

Analysis Notes
Figure 8.0 Viewshed Mapping indicates that a clear line of sight to the elevated areas of this KVP and prominent Ridgeline 1 generally. This is a direct result of the elevated viewing position which provides views across the Tweed Valley Floodplain in which the Project Site is located. This is confirmed by site investigation.

As noted in Section 5.0 End Use, on completion of extraction works and subsequent final rehabilitation phases, the Project Site will present as a large natural lake bordered by a significant vegetation to its perimeter. The lake will sit within the existing regimented rectilinear landscape formed by the surrounding large scale rural lots defined by drainage and cropping lines and reinforced by trees planted as wind breaks / land parcel delineation to the surrounding cadastral boundaries.

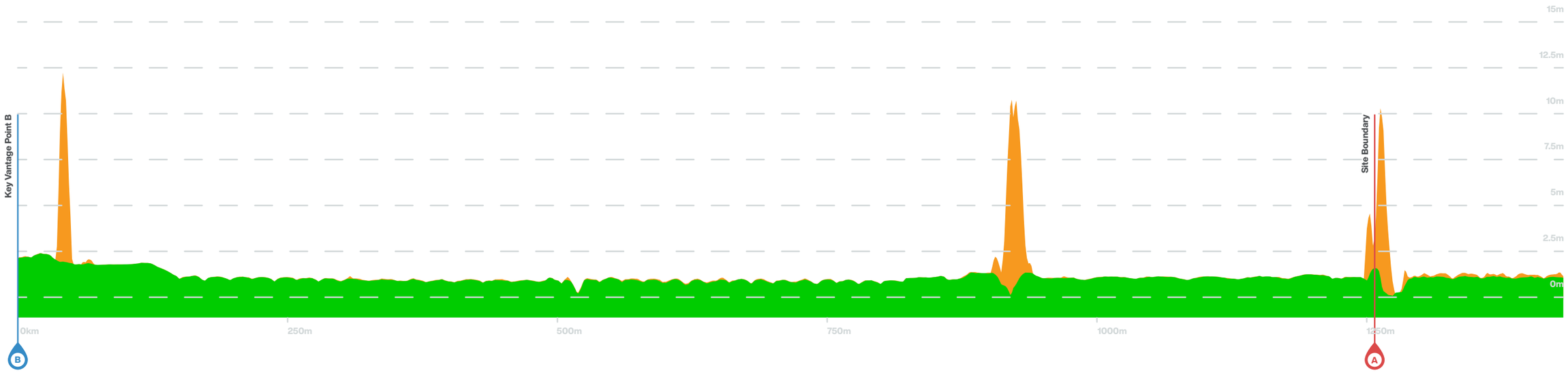
From this KVP the propose lake of The Project will provide a visual connection to the Tweed River and other areas of water visible within the landscape. The existing waterbody associated with Cudgen Sands extraction works is a dominant feature within the landscape from this KVP.

Significance of Impact: Moderate to Minor
With reference to Section 8.1 Visual Impact Table 1.0 Assessment of Landscape Impact, the impact of The Project would be considered **Small** being a minor loss or alteration to the landscape, or the introduction of elements that may be visible but may not be uncharacteristic within the existing landscape.

With reference to Section 8.2 Visual Impact Table 2.0 Assessment of Receptor Sensitivity, the Sensitivity of the KVP would be considered **Medium to High** being residential properties with long viewing periods with minor screening from the Project Site.

With a Visual Sensitivity rating of **Medium to High** and a Landscape Impact of **Small** the Significance of Impact would be considered to be of **Moderate to Minor Significance.**

130º Panoramic Vantage Point Site Image



Supplementary Plans

9.7 Key Vantage Points: Vantage Point B

Digital Elevation Model Section
DEM model has been created using LiDAR survey and exclusively generated using the classified ground lidar filter.

Digital Surface Model Section
DSM model has been created using LiDAR survey and exclusively generated using the classified ground, low vegetation, medium vegetation, and high vegetation lidar filters.

Vantage Point Drone Image @ 25m

Vantage Point Drone Image @ 70m

E **Cudgen Sands:** Sand Extraction works
Location: 2//DP216705
Proximity to Project Site: 100m

F **Prominent Ridgeline 2**
Ridgeline (raised topography) generally associated with Terranora Rd. This Ridgeline has an average elevation of: 60-90m AHD (compared to The Project Site ~1-2m AHD).

Key Vantage Point: B

Address: 214 Tweed Coast Road, Chinderah
Coordinates (Lat/Lon): -28.25550764235626, 153.55978726045163
Distance from Site: 1250m
Elevation: AHD 2.227m (Approx.)

A **Site Boundary Extents**
B **Location of Vantage Point**
C **Major Road Reserve Location**
D **Tweed River Location**
Digital Elevation Model Section
Digital Surface Model Section
Area of Site Visible within Drone Imagery

Key Vantage Point B

This KVP is located **1.25km** to the east of the subject site at 214 Tweed Coast Road, Chinderah.

This KVP has an elevation of **~2.23m AHD** and is the primary north-south connection road to the east of the Project Site.

Site Photographs

The Project Site is located within 51º of the 130º Panoramic Vantage Point Site Image. This represents ~40% of the 130º field of view illustrated.

Project Site visibility from KVP :	None
Project Site visibility at Drone Height 25m:	Potential Visibility
Project Site visibility at Drone Height 70m:	Partial Visibility

The Project Site becomes visible from this KVP at raised elevation of ~70m. Views from a human viewing perspective are not possible from this KVP.

Cross Section

Existing vegetation (represented by the DSM) screens any potential views of the Project Site from this KVP.

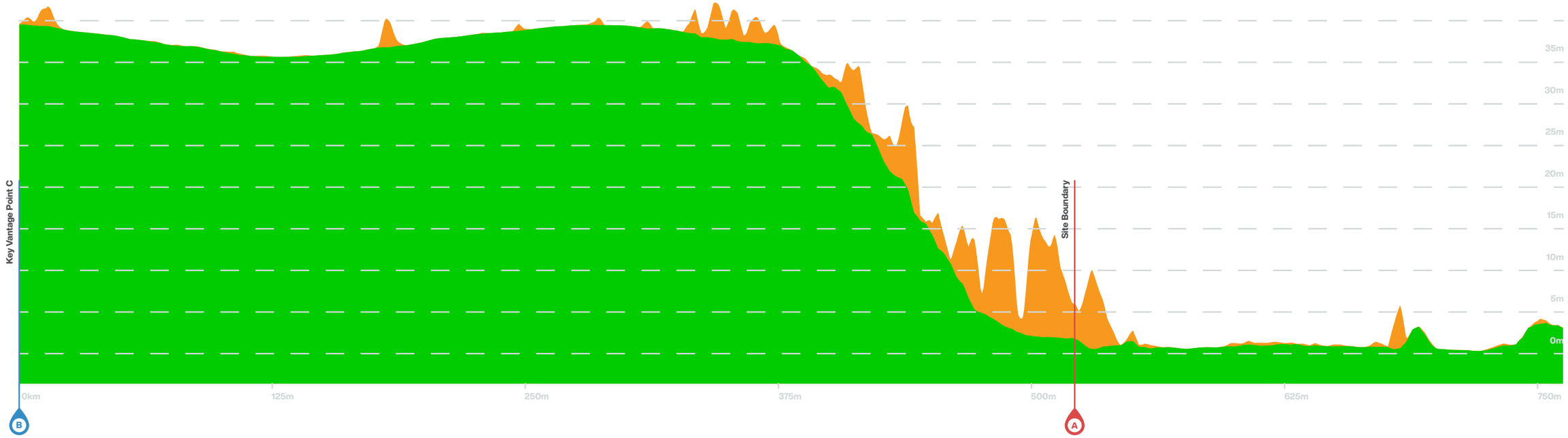
The low elevation of the KVP increases the role of the existing vegetation in preventing any potential views of the Project Site from this KVP.

Analysis Summary

Site Photographs and Cross Sectional Analysis confirm the findings of the Viewshed & Visual Catchment Boundary Mapping. There is no clear line of sight from this KVP to the Project Site. Views from a human viewing perspective would not be possible from this KVP.

Significance of Impact: Nil Impact

130º Panoramic Vantage Point Site Image



Supplementary Plans

9.8 Key Vantage Points: Vantage Point C

Digital Elevation Model Section
DEM model has been created using LiDAR survey and exclusively generated using the classified ground lidar filter.

Digital Surface Model Section
DSM model has been created using LiDAR survey and exclusively generated using the classified ground, low vegetation, medium vegetation, and high vegetation lidar filters.

Vantage Point Drone Image @ 25m

Vantage Point Drone Image @ 70m

Cudgen Sands: Sand Extraction works
Location: 2//DP216705
Proximity to Project Site: 100m

Prominent Ridgeline 2
Ridgeline (raised topography) generally associated with Terranora Rd. This Ridgeline has an average elevation of: 60-90m AHD (compared to The Project Site ~1-2m AHD).

Key Vantage Point: C

Address: 529 Cudgen Road, Cudgen
Coordinates (Lat/Lon): -28.271727898773385, 153.5449668177518
Distance from Site: 450m
Elevation: AHD 39.305m (Approx.)

Area of Site Visible within Drone Imagery

Key Vantage Point: SLS Viewing Situation: 529 Cudgen Road, Cudgen
This KVP is located **450m** to the south of the subject site along the elevated ridgeline generally aligned with Cudgen Road. The KVP is located adjacent to 'Farm & Co' restaurant and small-scale organic farm. The area in which this KVP is located is characterised by large scale rural lots and agricultural landuses.

This KVP has an elevation of **~39m AHD** and is located along Prominent Ridgeline 1 as referenced within the Section 6.0 VIA Analysis Mapping.

This KVP was identified as a potential sensitive receptor due to its significant elevation and its proximity to the Project Site.

Site Photographs
The Project Site is located within 106º of the 130º Panoramic Vantage Point Site Image. This represents ~81% of the 130º field of view illustrated. This large field of view is due to the proximity of the KVP to the Project Site.

Project Site visibility from KVP :	Potential Visibility
Project Site visibility at Drone Height 25m:	Highly Visible
Project Site visibility at Drone Height 70m:	Highly Visible

Whilst the Vantage Point Site Image does not indicate that the Project Site is visible from this specific location, the significant elevation of the KVP combined with its proximity to the Project Site will result in views over the Project Site for residential dwellings located on the northern side of Cudgen Road. The Project Site becomes highly visible at raised elevation of both 25m and ~70m.

Cross Section
As illustrated in cross sectional analysis (and visible in site photographs) the KVP is located along a prominent ridgline (Prominent Ridgeline 1) at significantly higher elevation that the Project Site. The Project Site is located within the large expanse of the Tweed Valley Flood Plain with an average elevation of ~1-2m AHD.

Existing vegetation (represented by the DSM) is located to the sloping northern face of the ridgeline. Vegetation is also located along the crest of the ridgeline to the northern side of the large rural residential dwellings. This vegetation will act to screen / partially screen views of the Project Site from the KVP and residential dwellings along Cudgen Drive generally.

Significant existing vegetation to the southern and eastern perimeter of the Project Site provides screening of the existing sand extraction phases. The role this existing vegetation plays in screening the existing extraction site is visible in Drone Imagery this sheet. This vegetation will be retained and additional rehabilitation works to the perimeter of the Project Site will provide further screening from this KVP.

Analysis Notes
Figure 8.0 Viewshed Mapping indicates that a clear line of sight to the elevated areas of this KVP and prominent Ridgeline 1 generally. This is a direct result of the elevated viewing position which provides views across the Tweed Valley Floodplain in which the Project Site is located. This is confirmed by site investigation.

As noted in Section 5.0 End Use, on completion of extraction works and subsequent final rehabilitation phases, the Project Site will present as a large natural lake bordered by a significant vegetation to its perimeter. The lake will sit within the existing regimented rectilinear landscape formed by the surrounding large scale rural lots defined by drainage and cropping lines and reinforced by trees planted as wind breaks / land parcel delineation to the surrounding cadastral boundaries.

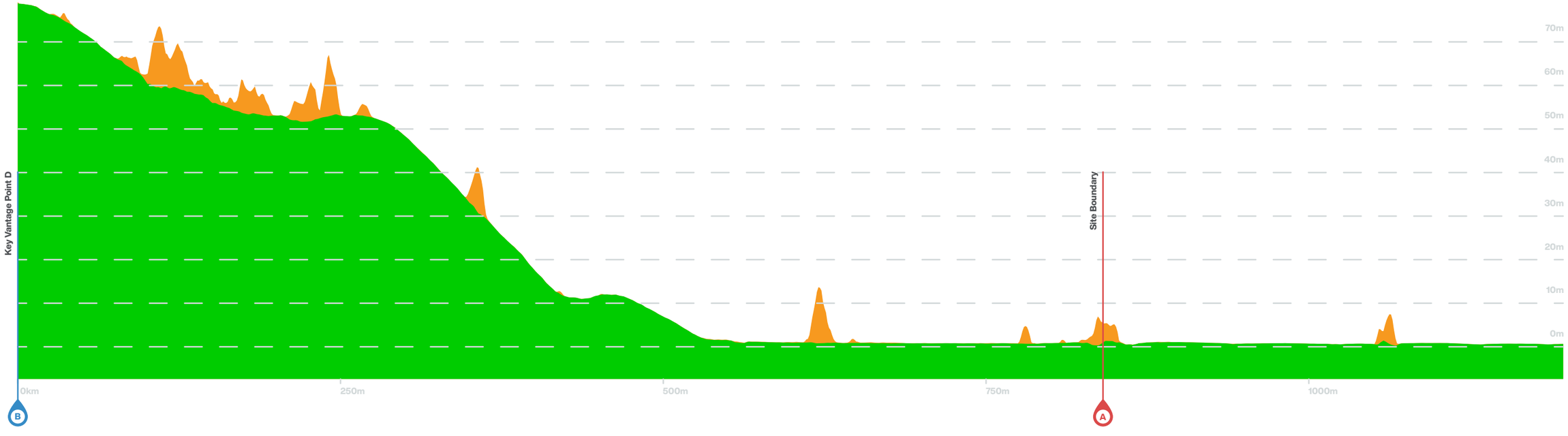
From this KVP the proposed lake of The Project will provide a visual connection to the Tweed River and other areas of water visible within the landscape. The existing waterbody associated with Cudgen Sands extraction works is also visible from this KVP. Prominent Ridgeline 02 provides a vegetated backdrop and encloses views to the north.

Significance of Impact: Moderate to Minor
With reference to Section 8.1 Visual Impact Table 1.0 Assessment of Landscape Impact, the impact of The Project would be considered **Small** being a minor loss or alteration to the landscape, or the introduction of elements that may be visible but may not be uncharacteristic within the existing landscape.

With reference to Section 8.2 Visual Impact Table 2.0 Assessment of Receptor Sensitivity, the Sensitivity of the KVP would be considered **Medium to High** being residential properties with long viewing periods with minor screening from the Project Site.

With a Visual Sensitivity rating of **Medium to High** and a Landscape Impact of **Small** the Significance of Impact would be considered to be of **Moderate to Minor Significance.**

130º Panoramic Vantage Point Site Image



Supplementary Plans

9.9 Key Vantage Points: Vantage Point D

Digital Elevation Model Section
DEM model has been created using LiDAR survey and exclusively generated using the classified ground lidar filter.

Digital Surface Model Section
DSM model has been created using LiDAR survey and exclusively generated using the classified ground, low vegetation, medium vegetation, and high vegetation lidar filters.

Vantage Point Drone Image @ 25m

Vantage Point Drone Image @ 70m

Cudgen Sands: Sand Extraction works
Location: 2//DP216705
Proximity to Project Site: 100m

Prominent Ridgeline 2
Ridgeline (raised topography) generally associated with Terranora Rd. This Ridgeline has an average elevation of: 60-90m AHD (compared to The Project Site ~1-2m AHD).

Key Vantage Point: D

Address: 307 Cudgen Road, Cudgen
Coordinates (Lat/Lon): -28.27435498063066, 153.52863171896865
Distance from Site: 300m
Elevation: AHD 78.784m (Approx.)

Area of Site Visible within Drone Imagery

Key Vantage Point: SLS Viewing Situation: 307 Cudgen Road, Cudgen
This KVP is located **300m** to the south of the subject site along the elevated ridgeline generally aligned with Cudgen Road. The area in which this KVP is located is characterised by large scale rural residential lots set within significant stands of retained trees.

This KVP has an elevation of **~79m AHD** and is located along Prominent Ridgeline 1 as referenced within the Section 6.0 VIA Analysis Mapping.

This KVP was identified as a potential sensitive receptor due to its significant elevation and its proximity to the Project Site.

Site Photographs
The Project Site is located within 97º of the 130º Panoramic Vantage Point Site Image. This represents ~74% of the 130º field of view illustrated. This large field of view is due to the proximity of the KVP to the Project Site.

Project Site visibility from KVP : Potential Visibility
Project Site visibility at Drone Height 25m: Highly Visible
Project Site visibility at Drone Height 70m: Highly Visible

Views of the Project Site will be visible to motorists traveling along this section of Cudgen Road. These views will be limited to viewing opportunities between residential dwellings and existing vegetation. The significant elevation of the KVP combined with its proximity to the Project Site will result in views over the Project Site for residential dwellings located on the northern and southern side of Cudgen Road. The Project Site becomes highly visible at raised elevation of both 25m and ~70m.

Cross Section
As illustrated in cross sectional analysis (and visible in site photographs) the KVP is located along a prominent ridgline (Prominent Ridgeline 1) at significantly higher elevation that the Project Site. The Project Site is located within the large expanse of the Tweed Valley Flood Plain with an average elevation of ~1-2m AHD.

Existing vegetation (represented by the DSM) is located to the sloping northern face of the ridgeline. Significant existing vegetation is also located along the crest of the ridgeline within the private open space of the large rural residential dwelling lots. This vegetation will act to screen / partially screen views of the Project Site from this vantage point and residential dwellings along Cudgen Drive generally.

Significant existing vegetation to the southern and eastern perimeter of the Project Site provides screening of the existing sand extraction phases. The role this existing vegetation plays in screening the existing extraction site is visible in Drone Imagery this sheet. This vegetation will be retained and additional rehabilitation works to the perimeter of the Project Site will provide further screening from this KVP.

Analysis Notes
Figure 8.0 Viewshed Mapping indicates that a clear line of sight to the elevated areas of this KVP and prominent Ridgeline 1 generally. This is a direct result of the elevated viewing position which provides views across the Tweed Valley Floodplain in which the Project Site is located. This is confirmed by site investigation.

As noted in Section 5.0 End Use, on completion of extraction works and subsequent final rehabilitation phases, the Project Site will present as a large natural lake bordered by a significant vegetation to its perimeter. The lake will sit within the existing regimented rectilinear landscape formed by the surrounding large scale rural lots defined by drainage and cropping lines and reinforced by trees planted as wind breaks / land parcel delineation to the surrounding cadastral boundaries.

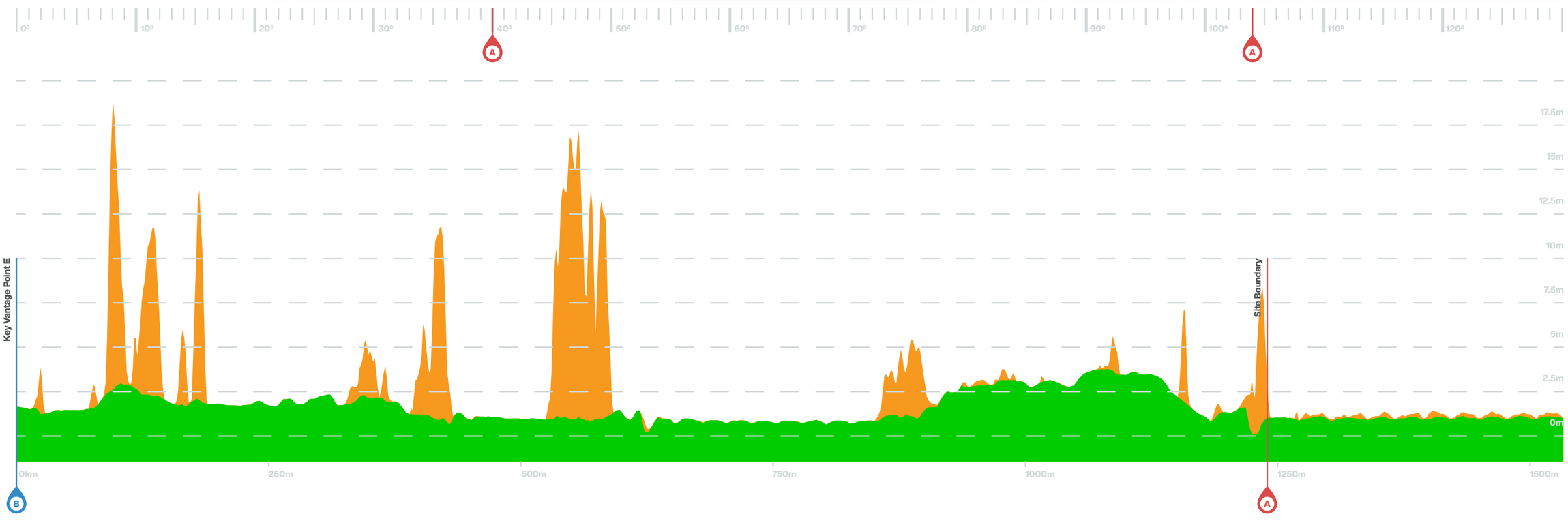
From this KVP the proposed lake will be a dominant feature within the landscape. The lake will provide a visual connection to the Tweed River and other areas of water visible within the landscape. The existing waterbody associated with Cudgen Sands extraction works is also visible from this KVP. Prominent Ridgeline 02 provides a vegetated backdrop and encloses views to the north.

Significance of Impact: Moderate to High
With reference to Section 8.1 Visual Impact Table 1.0 Assessment of Landscape Impact, the impact of The Project would be considered **Small to Moderate** with discernible changes in the landscape due to partial loss of, or change to the elements, features or characteristics of the landscape that may be partly mitigated and the introduction of elements that may be visible but may not be uncharacteristic within the existing landscape.

With reference to Section 8.2 Visual Impact Table 2.0 Assessment of Receptor Sensitivity, the Sensitivity of the KVP would be considered **Medium to High** being residential properties with long viewing periods with minor screening from the Project Site.

With a Visual Sensitivity rating of **Medium to High** and a Landscape Impact of **Small to Moderate** the Significance of Impact would be considered to be of **Moderate to High Significance.**

130º Panoramic Vantage Point Site Image



Supplementary Plans

9.10 Key Vantage Points: Vantage Point E

Digital Elevation Model Section
DEM model has been created using LiDAR survey and exclusively generated using the classified ground lidar filter.

Digital Surface Model Section
DSM model has been created using LiDAR survey and exclusively generated using the classified ground, low vegetation, medium vegetation, and high vegetation lidar filters.

Vantage Point Drone Image @ 25m

Vantage Point Drone Image @ 70m

Key Vantage Point: E

Address: 140 Tweed Coast Road, Chinderah
Coordinates (Lat/Lon): -28.251383494851773, 153.55756241845864
Distance from Site: 825m
Elevation: AHD 1.666m (Approx.)

Site Boundary Extents

Location of Vantage Point

Major Road Reserve Location

Tweed River Location

Digital Elevation Model Section

Digital Surface Model Section

Area of Site Visible within Drone Imagery

Key Vantage Point E
This KVP is located 825m to the east of the subject site at 140 Tweed Coast Road, Chinderah.

This KVP has an elevation of ~1.65m AHD and is the primary connection road to the east of the Project Site.

Site Photographs
The Project Site is located within 64º of the 130º Panoramic Vantage Point Site Image. This represents ~49% of the 130º field of view illustrated.

Project Site visibility from KVP :	None
Project Site visibility at Drone Height 25m:	Potential Visibility
Project Site visibility at Drone Height 70m:	Partial Visibility

The Project Site becomes visible from this KVP at raised elevation of ~70m. Views from a human viewing perspective are not possible from this KVP.

Cross Section
Existing vegetation (represented by the DSM) screens any potential views of the Project Site from this KVP.

The low elevation of the KVP increases the role of the existing vegetation in preventing any potential views of the Project Site from this KVP.

Analysis Summary
Site Photographs and Cross Sectional Analysis confirm the findings of the Viewshed & Visual Catchment Boundary Mapping. There is no clear line of sight from this KVP to the Project Site. Views from a human viewing perspective would not be possible from this KVP.

Significance of Impact: Nil Impact

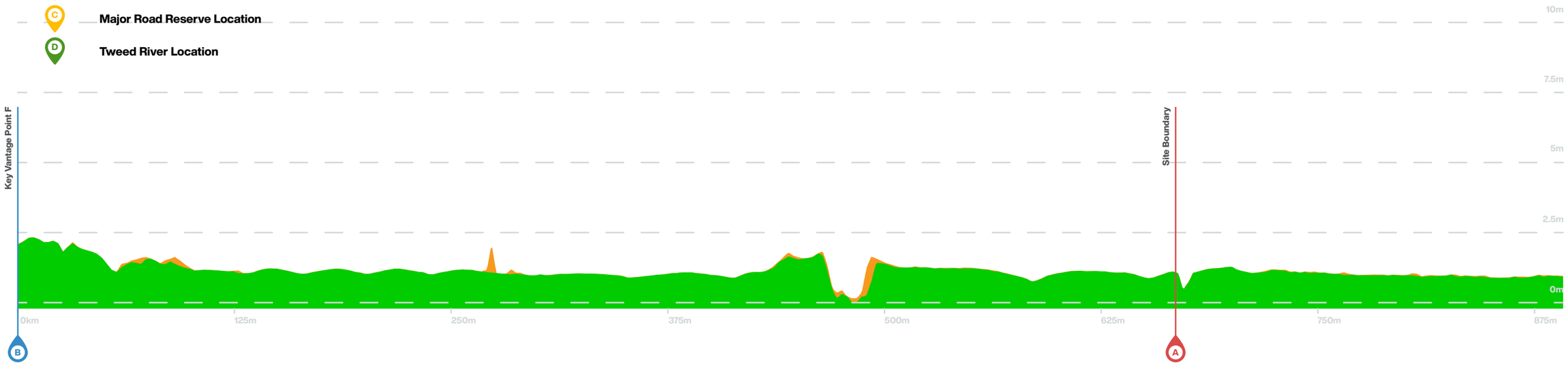
130º Panoramic Vantage Point Site Image

A **Site Boundary Extents**

B **Location of Vantage Point**

C **Major Road Reserve Location**

D **Tweed River Location**



Supplementary Plans

9.11 Key Vantage Points: Vantage Point F

Digital Elevation Model Section
DEM model has been created using LiDAR survey and exclusively generated using the classified ground lidar filter.

Digital Surface Model Section
DSM model has been created using LiDAR survey and exclusively generated using the classified ground, low vegetation, medium vegetation, and high vegetation lidar filters.

Vantage Point Drone Image @ 25m

Vantage Point Drone Image @ 70m

Key Vantage Point: F

Address: 139 Pacific Motorway, Chinderah
Coordinates (Lat/Lon): -28.245795220861076, 153.53876377386493
Distance from Site: 1000m
Elevation: AHD 2.083m (Approx.)

Area of Site Visible within Drone Imagery

Key Vantage Point F
This KVP is located ~1km directly north of the subject site along the Pacific Motorway. This KVP has an elevation of ~2.1m AHD and is the primary connection road to the north of the Project Site.

Site Photographs
The Project Site is located within 88º of the 130º Panoramic Vantage Point Site Image. This represents ~68% of the 130º field of view illustrated.

Project Site visibility from KVP :	None
Project Site visibility at Drone Height 25m:	Partial Visibility
Project Site visibility at Drone Height 70m:	Highly Visible

The Project Site can only be viewed from this KVP at raised elevation of ~25m. Views from a human viewing perspective would not be possible from this KVP.

Cross Section
As illustrated in cross sectional analysis (and visible in site photographs) there is scattered and fragmented screening vegetation located between the KVP and the Project Site. The low elevation of the KVP increases the role of the slight landform variation has in limiting any potential views of the Project Site.

Analysis Notes
Although no clear line of sight to the Project Site exists from this KVP, the sparse existing vegetation present within land parcels to the immediate north of the Project Site combined with the raised elevation of the Pacific Motorway may result in views from other locations along the Pacific Motorway in proximity to this KVP.

Figure 8.0 Viewshed Mapping indicates minor instances along the Pacific Motorway with a clear line of sight to the Project Site. It is noted however that these instances are sparse and fragmented. The applicable viewshed was cast at a transmitter height of ~1.0m to represent the existing landform of the Project Site. The sand extraction works will reduce the existing elevation of the Project Site and rehabilitation works to the Project Site will considerably screen any potential views from locations along the Pacific Motorway in proximity to this KVP.

Significance of Impact
With reference to Section 8.1 Visual Impact Table 1.0 Assessment of Landscape Impact, the impact of The Project would be considered **Small** being a minor loss or alteration to the landscape, or the introduction of elements that may be visible but may not be uncharacteristic within the existing landscape.

With reference to Section 8.2 Visual Impact Table 2.0 Assessment of Receptor Sensitivity, the Sensitivity of the KVP would be considered **Negligible** being limited to Road users with partially screened views and short viewing times of the Project Site.

With a Visual Sensitivity rating of **Negligible** and a Landscape Impact of **Small** the Significance of Impact would be considered to be **Not Significant.**

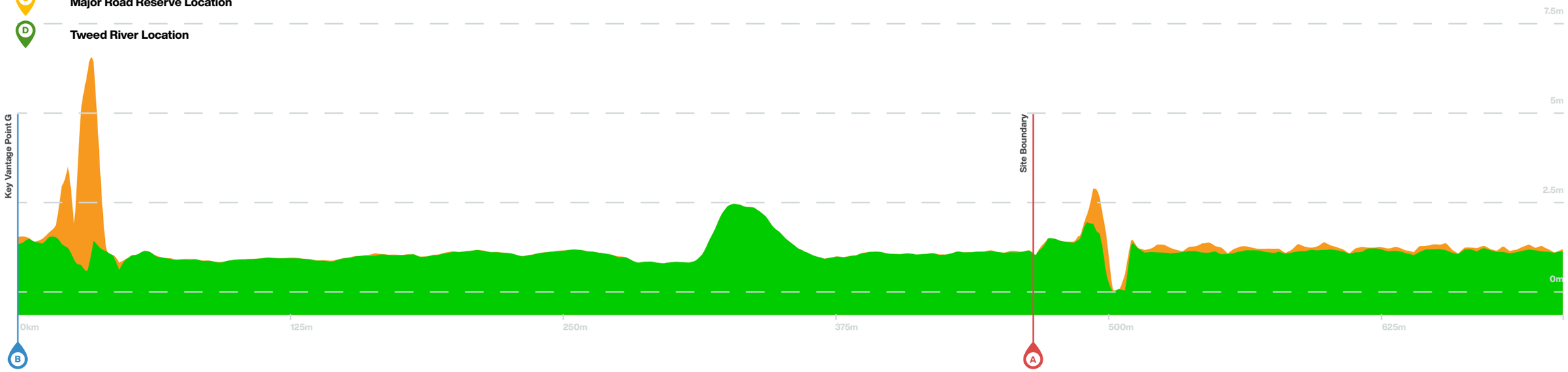
130º Panoramic Vantage Point Site Image

A Site Boundary Extents

B Location of Vantage Point

C Major Road Reserve Location

D Tweed River Location



Supplementary Plans

9.12 Key Vantage Points: Vantage Point G

Digital Elevation Model Section
DEM model has been created using LiDAR survey and exclusively generated using the classified ground lidar filter.

Digital Surface Model Section
DSM model has been created using LiDAR survey and exclusively generated using the classified ground, low vegetation, medium vegetation, and high vegetation lidar filters.

Vantage Point Drone Image @ 25m

Vantage Point Drone Image @ 70m

Key Vantage Point: G

Address: 103 Altona Road, Chinderah
Coordinates (Lat/Lon): -28.25786210992857, 153.55080726707277
Distance from Site: 50m
Elevation: AHD 1.338m (Approx.)

Area of Site Visible within Drone Imagery

Key Vantage Point G
This KVP is located ~50m east of the subject site along Altona Road. This KVP has an elevation of ~1.34m AHD and serves as the TSP Phase 1 to 4 haulage route.

Site Photographs
The Project Site is located within 108º of the 130º Panoramic Vantage Point Site Image. This represents ~83% of the 130º field of view illustrated due to the proximity of the KVP to the Project Site.

Project Site visibility from KVP :	None
Project Site visibility at Drone Height 25m:	Highly Visible
Project Site visibility at Drone Height 70m:	Highly Visible

The Project Site becomes visible from this KVP at raised elevation of ~25m. Views from a human viewing perspective are not possible from this KVP.

Cross Section
As illustrated in cross sectional analysis (and visible in site photographs) there is significant screening vegetation located along the western side of Altona Road. Additional screening vegetation is located to the immediate east of the Project Site. The low elevation of the KVP increases the role of this screening vegetation in limiting any potential views of the Project Site from this KVP.

Analysis Notes
Although no clear line of sight to the Project Site exists from this KVP, the close proximity of Altona Road to the Project Site will likely result in filtered views from locations along Altona Road in proximity to this KVP. Altona Road has an elevation similar to the existing Project Site resulting in a low viewing angle that would further reduce the extent of the Project Site visible from this location.

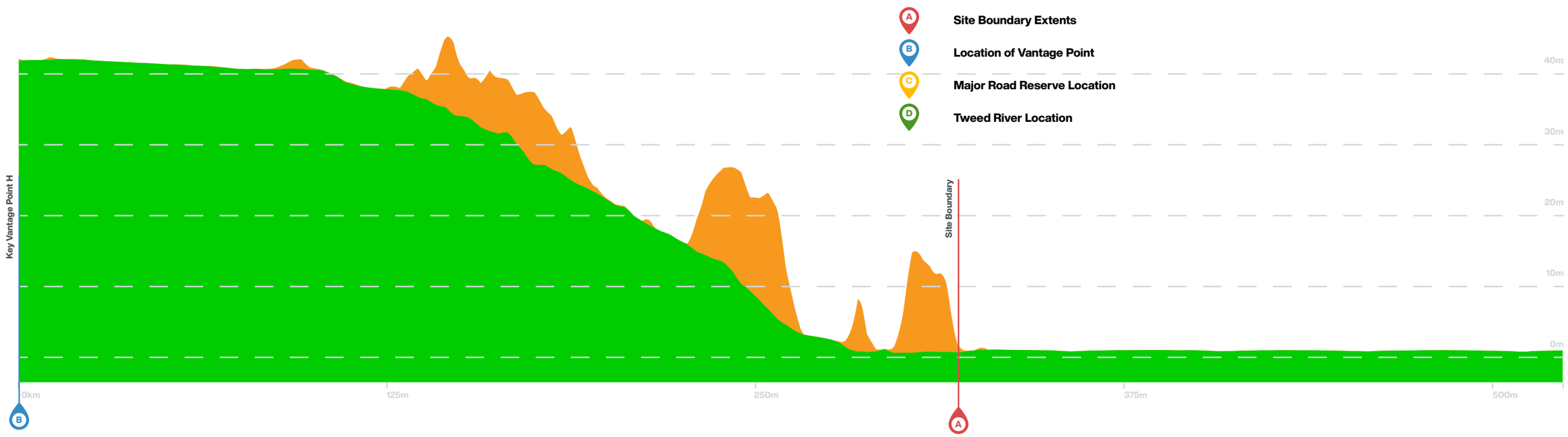
The sand extraction works will reduce the existing elevation of the Project Site and rehabilitation works to the Project Site will considerably screen any potential views from locations along Altona Road in proximity to this KVP.

Significance of Impact
With reference to Section 8.1 Visual Impact Table 1.0 Assessment of Landscape Impact, the impact of The Project would be considered **Small** being a minor loss or alteration to the landscape, or the introduction of elements that may be visible but may not be uncharacteristic within the existing landscape.

With reference to Section 8.2 Visual Impact Table 2.0 Assessment of Receptor Sensitivity, the Sensitivity of the KVP would be considered **Negligible** being limited to Road users with partially screened views and short viewing times of the Project Site.

With a Visual Sensitivity rating of **Negligible** and a Landscape Impact of **Small** the Significance of Impact would be considered to be **Not Significant.**

130º Panoramic Vantage Point Site Image



Supplementary Plans

9.13 Key Vantage Points: Vantage Point H

Digital Elevation Model Section
DEM model has been created using LiDAR survey and exclusively generated using the classified ground lidar filter.

Digital Surface Model Section
DSM model has been created using LiDAR survey and exclusively generated using the classified ground, low vegetation, medium vegetation, and high vegetation lidar filters.

Vantage Point Drone Image @ 25m

Vantage Point Drone Image @ 70m

Cudgen Sands: Sand Extraction works
Location: 2//DP216705
Proximity to Project Site: 100m

Prominent Ridgeline 2
Ridgeline (raised topography) generally associated with Terranora Rd. This Ridgeline has an average elevation of: 60-90m AHD (compared to The Project Site ~1-2m AHD).

Key Vantage Point: H

Address: 413A Cudgen Road, Cudgen
Coordinates (Lat/Lon): -28.27642319488104, 153.53857545290327
Distance from Site: 270m
Elevation: AHD 41.963m (Approx.)

Area of Site Visible within Drone Imagery

Key Vantage Point: SLS Viewing Situation: 413A Cudgen Road, Cudgen
This KVP is located **270m** to the south of the subject site along the elevated ridgeline generally aligned with Cudgen Road. The area in which this KVP is located is characterised by large scale rural residential lots set within significant stands of retained trees. This KVP is located approximately 800m to the east of KVP D.

This KVP has an elevation of **~42m AHD** and is located along Prominent Ridgeline 1 as referenced within the Section 6.0 VIA Analysis Mapping.

This KVP was identified as a potential sensitive receptor due to its significant elevation and its proximity to the Project Site.

Site Photographs
The Project Site is located within 83º of the 130º Panoramic Vantage Point Site Image. This represents ~64% of the 130º field of view illustrated. This large field of view is due to the proximity of the KVP to the Project Site.

Project Site visibility from KVP :	Potential Visibility
Project Site visibility at Drone Height 25m:	Highly Visible
Project Site visibility at Drone Height 70m:	Highly Visible

Views of the Project Site may be visible to motorists traveling along this section of Cudgen Road. Any potential views will be limited to viewing opportunities between residential dwellings and existing vegetation. The significant elevation of the KVP combined with its proximity to the Project Site will result in views over the Project Site for residential dwellings located on the northern side of Cudgen Road in this location. The Project Site becomes highly visible at raised elevation of both 25m and ~70m.

Cross Section
As illustrated in cross sectional analysis (and visible in site photographs) the KVP is located along a prominent ridgline (Prominent Ridgeline 1) at significantly higher elevation that the Project Site. The Project Site is located within the large expanse of the Tweed Valley Flood Plain with an average elevation of ~1-2m AHD.

Existing vegetation (represented by the DSM) is located to the sloping northern face of the ridgeline. Significant existing vegetation is also located along the crest of the ridgeline within the private open space of the large rural residential dwelling lots. This vegetation will act to screen / partially screen views of the Project Site from this vantage point and residential dwellings along Cudgen Drive generally.

Significant existing vegetation to the southern and eastern perimeter of the Project Site provides screening of the existing sand extraction phases. The role this existing vegetation plays in screening the existing extraction site is visible in Drone Imagery this sheet. This vegetation will be retained and additional rehabilitation works to the perimeter of the Project Site will provide further screening from this KVP.

Analysis Notes
Figure 8.0 Viewshed Mapping indicates that a clear line of sight to the elevated areas of this KVP and prominent Ridgeline 1 generally. This is a direct result of the elevated viewing position which provides views across the Tweed Valley Floodplain in which the Project Site is located. This is confirmed by site investigation.

As noted in Section 5.0 End Use, on completion of extraction works and subsequent final rehabilitation phases, the Project Site will present as a large natural lake bordered by a significant vegetation to its perimeter. The lake will sit within the existing regimented rectilinear landscape formed by the surrounding large scale rural lots defined by drainage and cropping lines and reinforced by trees planted as wind breaks / land parcel delineation to the surrounding cadastral boundaries.

From this KVP the proposed lake will be a dominant feature within the landscape. The lake will provide a visual connection to the Tweed River and other areas of water visible within the landscape. The existing waterbody associated with Cudgen Sands extraction works is also visible from this KVP. Prominent Ridgeline 02 provides a vegetated backdrop and encloses views to the north.

Significance of Impact: Moderate to High
With reference to Section 8.1 Visual Impact Table 1.0 Assessment of Landscape Impact, the impact of The Project would be considered **Small to Moderate** with discernible changes in the landscape due to partial loss of, or change to the elements, features or characteristics of the landscape that may be partly mitigated and the introduction of elements that may be visible but may not be uncharacteristic within the existing landscape.

With reference to Section 8.2 Visual Impact Table 2.0 Assessment of Receptor Sensitivity, the Sensitivity of the KVP would be considered **Medium to High** being residential properties with long viewing periods with minor screening from the Project Site.

With a Visual Sensitivity rating of **Medium to High** and a Landscape Impact of **Small to Moderate** the Significance of Impact would be considered to be of **Moderate to High Significance.**

10.0 Significance of Impact Summary

10.1 Significance of Impact

As detailed within Section 8.0 Stage 3: Visual Impact Assessment and Analysis, the, predicted impacts as a direct result of the project will be described according to their significance which is a function of the magnitude of the impact and the sensitivity of the receptor.

The Below Key Vantage Points were determined as having **Nil Impact** with no clear line of site to the Project Site:

1. **Fingal Headland**
   Distance from Site: 6.6km
   Elevation: AHD 0.00m (Approx.)
2. **Oxley Park**
   Distance from Site: 2.6km
   Elevation: AHD 1.283m (Approx.)
3. **Chinerah Jetty & Chinderah Bay Drive**
   Distance from Site: 1.8km
   Elevation: AHD 0.25m (Approx.)
5. **Bruce Chick Reserve**
   Distance from Site: 2.8km
   Elevation: AHD 1.27m (Approx.)
7. **Key Vantage Point B**
   Distance from Site: 1.25km
   Elevation: AHD 2.227m (Approx.)
10. **Key Vantage Point E**
    Distance from Site: 825m
    Elevation: AHD 1.666m (Approx.)

The Below Key Vantage Points were determined as having an impact determined as **Not Significant.**
The impact of The Project is considered **Small** being a minor loss or alteration to the landscape, or the introduction of elements that may be visible but may not be uncharacteristic within the existing landscape. The Sensitivity of the KVP is considered **Negligible** being limited to Road users with partially screened views and short viewing times of the Project Site.

11. **Key Vantage Point F**
    Distance from Site: 1km
    Elevation: AHD 2.083m (Approx.)
12. **Key Vantage Point G**
    Distance from Site: 50m
    Elevation: AHD 1.338m (Approx.)

The Below Key Vantage Points were determined as having an impact determined to be of **Moderate to Minor Significance**.
The impact of The Project would be considered **Small** being a minor loss or alteration to the landscape, or the introduction of elements that may be visible but may not be uncharacteristic within the existing landscape. The sensitivity of the KVP would be considered **Medium to High** being residential properties with long viewing periods with minor screening from the Project Site.

6. **Key Vantage Point A**
   Distance from Site: 750m
   Elevation: AHD 30.879m (Approx.)
8. **Key Vantage Point C**
   Distance from Site: 450m
   Elevation: AHD 39.305m (Approx.)
4. **Terranora Road**
   Distance from Site: 1.85km
   Elevation: AHD 125m (Approx.)

The Below Key Vantage Points were determined as having an impact determined to be of **Moderate to High Significance**.
The impact of The Project would be considered **Small to Moderate** with discernible changes in the landscape due to partial loss of, or change to the elements, features or characteristics of the landscape that may be partly mitigated and the introduction of elements that may be visible but may not be uncharacteristic within the existing landscape. The sensitivity of the KVP would be considered **Medium to High** being residential properties with long viewing periods with minor screening from the Project Site.

9. **Key Vantage Point D**
   Distance from Site: 300m
   Elevation: AHD 78.784m (Approx.)
13. **Key Vantage Point H**
    Distance from Site: 270m
    Elevation: AHD 41.963m (Approx.)

Significance of Impact Assessment Table included below for ease of reference. This has been completed based on KVP D & H with an impact determined to be of **Moderate to High Significance**.

		Landscape Impact			
		Large	Moderate	Small	Negligible
Visual Sensitivity	High	Major Significance	High Significance	Moderate Significance	Minor Significance
	Medium	High Significance	Moderate Significance	Minor Significance	Not Significant
	Low	Moderate Significance	Minor Significance	Not Significant	Not Significant
	Negligible	Minor Significance	Not Significant	Not Significant	Not Significant

Significance of Impact
Reference: *Guidelines for Landscape and Visual Impact assessment, Second Edition*, published by the Landscape Institute for Environmental Management and Assessment.

11.0

Data Sources.

11.0 Limitations and Data Sources

This report examines the current landscape and visual amenity of the study area through site inspections and relies on the use of third-party data sources to generate topographic analysis and assessment.

Whilst various data and information sources have been utilized to ensure accuracy, various data limitations are present in such documents. As such, these limitations would also be transferable to the information within this report.

In this way, although Zone Landscape Architecture (ZLA) has taken every precaution in the report preparation process to ensure data accuracy, ZLA makes no representations or warranties about report suitability, accuracy or completeness for any particular purpose and disclaim all responsibility and all liability for all expenses, losses, damages and costs which may be incurred as a result of data being inaccurate or incomplete in any way and for any reason.

Data Sources

Aerial Imagery
Nearmap Aerials – 15.07.2019 (nearmap.com.au)

Base Imagery
Open Street Map (openstreetmaps.org)

Cadastre
SIXMAPS Click & Ship

Digital Elevation Models and LiDAR
LiDAR (Captured 2013)- Foundation Spatial Data (elevation.fsdf.org.au)

TSC Static & Linear Viewsheds

Issued by TSC by request.

References

Guidelines for Landscape and Visual Impact assessment, Second Edition
Published by the Landscape Institute for Environmental Management and Assessment (2002).