

Appendix 4

Landscape Character Assessment

prepared by

Moir Landscape
Architecture Pty Ltd

(Total No. of pages including blank pages = 43)



Albion Park Quarry

Landscape Character Assessment

Albion Park Quarry - Stage 7

Landscape Character Assessment

Prepared for
R.W. Corkery & Co.

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Contents

1.0 Introduction	4	7.0 Visual Landscape Character Assessment	38
1.1 Project Overview	4	7.1 Assessment of Landscape Character Zones	38
1.2 Purpose of the Report	4	8.0 Summary & Recommendations	41
1.3 Relevant Experience	5	8.1 Summary & Recommendations	41
1.4 Report Structure	5		
2.0 Study Method	6		
2.1 Overview of the Study Method	6		
2.2 Existing Landscape Character	6		
2.3 Visual Landscape Character Assessment	7		
2.4 Guidelines and Statutory Framework	9		
3.0 Project Overview	10		
3.1 Regional Context	10		
3.2 Project Area	10		
3.3 The Project	10		
3.4 Study Area	10		
4.0 Existing Landscape Character	12		
4.1 Existing Landscape Character Analysis	12		
4.2 Bioregion Context	12		
4.3 Land Zoning	13		
4.4 Land Use	17		
4.5 Key Landscape Features	20		
5.0 Zone of Visual Influence	25		
5.1 Overview of Zone of Influence	25		
5.2 Summary of Zone of Influence	25		
6.0 Landscape Character Zones	27		
6.1 Overview Landscape Character Zones	27		
6.2 Landscape Character Zones	29		

1.0 Introduction

1.1 Project Overview

Moir Landscape Architecture (MLA) has been commissioned by R.W. Corkery & Co. on behalf of Cleary Bros 'the Applicant' to prepare a Landscape Character Assessment (LCA) for the proposed Albion Park Quarry Extraction Area - Stage 7 (referred to hereafter as 'the Project Area'). The Project Area is located 3.5 km southwest of Shellharbour (refer to **Figure 1**) within the Shellharbour Local Government Area (LGA).

The Project involves:

- a continuation of the existing quarry operation and expansion in extraction area (Stage 7);
- maintenance of the currently approved extraction limit of 900,000 tonnes per annum;
- extraction of quarry Products for up to 30 years; and
- progressive rehabilitation of the site

1.2 Purpose of the Report

Identified under the State Significant Development (SSD) application number SSD-10369, a Request for Information (RFI) has been issued by the DPE for the Project in December 2022, identifying key items to be addressed in the Landscape Character Assessment (LCA) including:

- *sensitivity of each landscape zone as a combination of the scenic quality of each landscape zone and how sensitive the landscape zone is to change. The sensitivity analysis should be based on:*
 - *scenic quality based on the presence/absence of scenic, cultural, or aesthetic values associated with community perceptions of low, moderate, or high scenic quality*
 - *the importance of viewpoints and the value that the community or visitors may place on landscapes viewed from public use areas and infrastructure as well as private viewpoints such as dwellings.*
 - *the types of views and number of viewers for each landscape zone, including consideration of recreational activities and local transportation*
 - *analysis of the sense of place held by those who live or visit the respective landscape zones supported by consultation materials*
- *magnitude of the proposed extension, including the physical scale, how distant it is, and the contrast it presents to the existing viewshed*



Figure 01 - Site Location (Source: Google Earth, 2022)

The purpose of this report is to address deliverables outlined in the request for information (RFI) issued by the Department of Planning and Environment (DPE) relating to the Project and provide a comprehensive analysis of the existing landscape character. The intent is to determine the visual sensitivity and magnitude on the landscape character, landscape values, landscape amenity and scenic vistas. Fieldwork was undertaken in February 2023, to determine the landscape character within the Study Area using CASA registered drone and photography at key locations. The report details results of the use and compilation of consultation documentation along with fieldwork and documents the assessment of the visual impacts to the landscape character and visual setting to assist in the mitigation of any potential visual impacts from the Project.

This LCA has been prepared in accordance with the RFI, the Transport of NSW 'Guideline for Landscape Character and Visual Impact Assessment' (Transport of NSW, 2020) with reference made to the 'Technical Supplement - Landscape and Visual Impact Assessment Large-Scale Solar Energy Guidelines' (DPE, 2022b). This information is to provide an understanding of the likely impacts and how they may be managed to ensure the character of the immediate area and surrounding visual landscape is not overly modified or diminished. The LCA is to inform the Visual Impact Assessment (VIA) to be prepared by R.W. Corkery & Co. Pty Ltd.

1.3 Relevant Experience

Moir Landscape Architecture Pty Ltd is a professional design practice and consultancy specialising in the areas of Landscape Architecture, Landscape Planning and Landscape and Visual Impact Assessments. Our team has extensive experience in undertaking Landscape and Visual Impact Assessments for large scale infrastructure projects, including the mining industry, sustainable energy sector and commercial developments in visually sensitive areas. Our capabilities include digital terrain modelling, viewshed assessment, photomontage development, landscape character assessments and community consultation.

1.4 Report Structure

The following table provides an outline of the report structure and a summary of how these have been addressed in the LCA. Detailed methodologies for each part of the assessment have been included in the relevant chapters of the report.

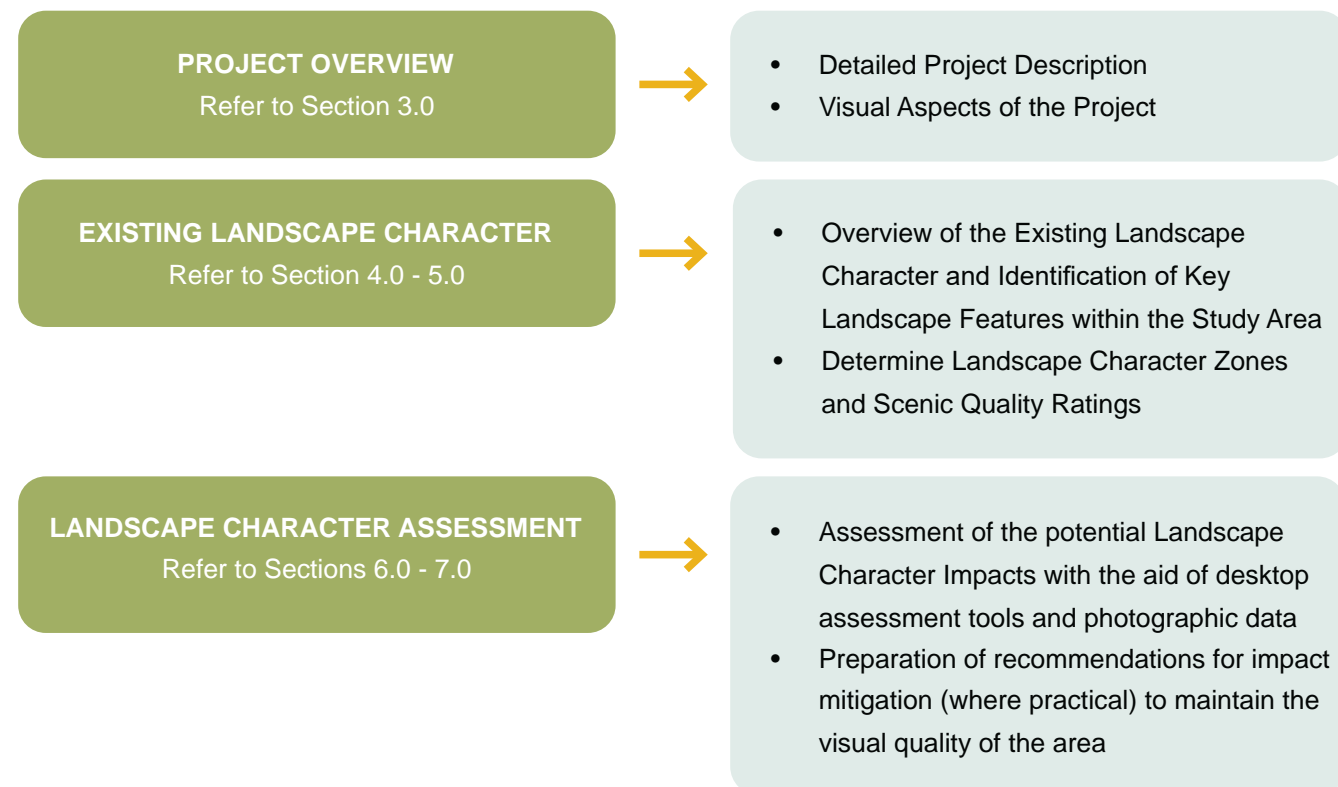
Landscape Character Assessment Report Structure	
2.0 Study Method	Overview of the Study Method utilised for the LCA
3.0 Project Overview	Project Description and Overview of the Project to be assessed within the LCA
4.0 Existing Landscape Character	Establish the Existing Landscape Character of the Study Area by using desktop analysis tools, onsite fieldwork data and information from consultation with the community and Council to identify key landscape features of the region in which the Project is sited
5.0 Landscape Character Zones	Identification of Landscape Characters Zones (LCZ) within the Study Area and determine the Sensitivity and Scenic Quality of each LCZ
6.0 Zone of Visual Influence	Identify regions of the Study Area in which may experience a potential visual modification to inform the Landscape Character Impacts and Assessment
7.0 Landscape Character Assessment	Overview of the Landscape Character Impacts on each LCZ based on the sensitivity and magnitude of change from the Project
8.0 Summary & Recommendations	

Table 01 - Report Structure

2.0 Study Method

2.1 Overview of the Study Method

The following provides an overview of the Study Method utilised for undertaking a Visual Landscape Character Assessment (LCA). This methodology is based on the relevant policies, frameworks and our experience in undertaking Landscape and Visual Impact Assessments (LVIA) and Landscape Character Assessments (LCA) for large infrastructure projects. The methodology outlined has been informed by the Transport for NSW and DPE Technical Supplement guidelines as per the RFI issued by the DPE relating to the Project. The LCA was undertaken in the stages as noted below:



2.2 Existing Landscape Character

Landscape Character refers to the distinct and recognisable pattern of elements that occur consistently in a particular landscape. The Landscape Character of an area is generally defined by the most dominant landscape element or unique combination of elements that occur within that landscape. It reflects how particular combinations of geology, landforms, soils, vegetation, land use and human settlements create a particular sense of place for different areas within the landscape (Landscape Institute, 2013).

The Landscape Character is analysed at a regional, local and site scale. The 'Study Area' for this Project has been defined as 5 km from the Project Area where existing topographic maps, site imagery, land use maps and photographic visual data inform the identification of Landscape Character Zones with the Study Area.

2.2.1 Landscape Character Zones and Scenic Quality

Landscape Character Zones are defined as *'an area of the landscape with similar properties or strongly defined spatial qualities distinct from areas immediately nearby'* (Transport of NSW, 2020).

The Scenic Quality 'Frame of Reference' formulated by the DPE (refer to **Table 02**) utilising the *Technical Supplement - LVIA (DPE, 2022b)* to quantify the sensitivity of the LCZ. Each category of the 'Frame of Reference' has been quantified for each LCZ to determine a 'Scenic Quality' Rating of high, moderate or low.

Viewpoint Type	Low Scenic Quality	Moderate Scenic Quality	High Scenic Quality
Landform	<ul style="list-style-type: none"> Large expanses of flat or gently undulating terrain. Indistinct, dissected or unbroken landforms that provide little illusion of spatial definition or landmarks with which to orient 	<ul style="list-style-type: none"> Steep, hilly and undulating ranges that are not visually dominant Broad shallow valleys Moderately deep gorges or moderately steep valley walls Minor rock outcrops 	<ul style="list-style-type: none"> Isolated peaks, steep rocky ridges, cones or escarpments with distinctive form and/or colour contrast that become focal points Large areas of distinctive rock outcrops or boulders Well defined, steep sided valley gorges
Vegetation	<ul style="list-style-type: none"> Extensively cleared and cropped areas with very limited variation in colour and texture Pastoral areas, human created paddocks, pastures or grasslands and associated buildings typical of grazing lands 	<ul style="list-style-type: none"> Predominantly open forest or woodland combined with some natural openings in patterns that offer some visual relief Vegetative stands that exhibit a range of size, form, colour, texture and spacing including human influenced vegetation such as vineyards, and orchards 	<ul style="list-style-type: none"> Strongly defined patterns with combinations of native forest, naturally appearing openings, streamside vegetation and/or scattered exotics Distinctive stands of vegetation that may create unusual forms, colours or textures in comparison to surrounding vegetation
Waterbodies	<ul style="list-style-type: none"> Absence of natural waterbody Farm dams, irrigation canals or stormwater infrastructure 	<ul style="list-style-type: none"> Intermittent streams, lakes, rivers, swamps and reservoirs 	<ul style="list-style-type: none"> Visually prominent lakes, reservoirs, rivers, streams, wetlands and swamps Presence of harbour, inlet, bay or open ocean
Social & Cultural	<ul style="list-style-type: none"> Places of worship, cemeteries/memorial parks, private open spaces 	<ul style="list-style-type: none"> Local heritage sites Distinguishable entry ways to a regional city identified in the Transport and Infrastructure SEPP 	<ul style="list-style-type: none"> Culturally important sites, world heritage areas, national parks/reserves, Commonwealth and state heritage sites
Human Presence	<ul style="list-style-type: none"> Dominating presence of infrastructure, human settlements, highly modified landscapes and higher density populations such as regional cities, industrial areas, agricultural transport or electricity infrastructure 	<ul style="list-style-type: none"> Dispersed yet evident presence of human settlement such as villages, small towns, isolated pockets of production and industry, lower scale and trafficked transport infrastructure 	<ul style="list-style-type: none"> Natural/undisturbed landscape Minimal evidence of human presence and production

Table 02 - Scenic Quality Frame of Reference (Adapted from the DPE Technical Supplement - LVIA)

2.2.2 Receptor Sensitivity Rating

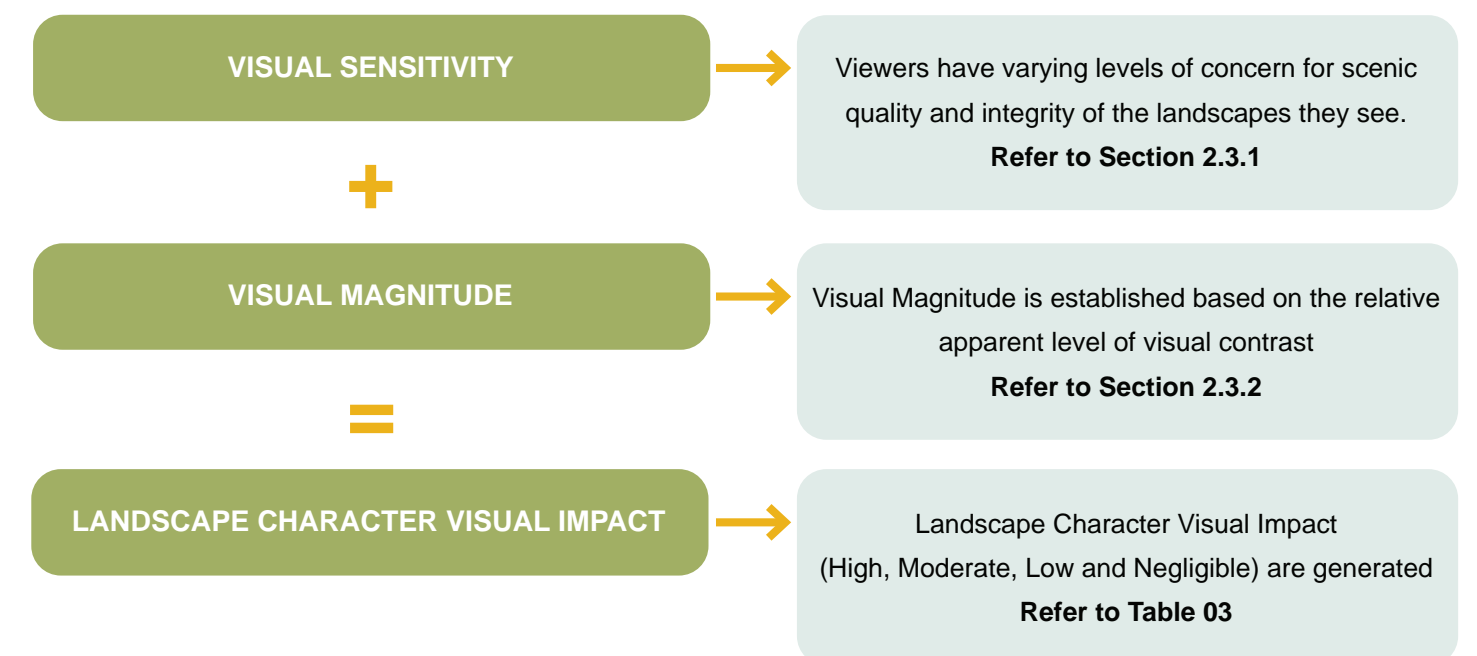
Receptor sensitivity relates to the relative importance of receptors (refer to Table 3) and the value that the community or visitors may place on landscapes viewed from public use areas, public travel ways and private receptors such as dwellings. The sensitivity of each viewpoint into one of four (4) sensitivity ratings (very low, low, moderate, high). The intent is to classify the viewer sensitivity on the LCZ in which the Project is being viewed and assessed based on the Landscape Character Assessment.

Receptor Sensitivity Rating	
Very Low	<ul style="list-style-type: none"> Local sealed and unsealed roads Passenger rail lines with daily daylight services State highways, freeways and classified main roads Walking tracks and navigable waterways
Low	<ul style="list-style-type: none"> Secondary view from dwellings in rural areas (zoned RU1, RU2, RU3, RU4 and RU6), large lot residential areas (zoned R5) and in environmental or conservation areas (zoned C2, C3 and C4) Tourist roads and scenic drives Walking tracks and navigable waterways Cemeteries, memorial parks
Moderate	<ul style="list-style-type: none"> Primary view from dwellings in rural areas (zoned RU1, RU2, RU3, RU4 and RU6), large lot residential areas (zoned R5) and in environmental or conservation areas (zoned C2, C3 and C4) Tourist and visitor accommodation and places of worship (such as bed and breakfasts, motels, hotels) Tourist uses in tourist areas (zoned SP3) Publicly accessible green and open spaces including picnic areas, parks, public recreation areas Town centres and central business districts
High	<ul style="list-style-type: none"> Dwellings in residential areas and rural villages (land zoned R1, R2, R3, R4 and RU5) Historic rural homesteads/residences on the national, state or local heritage list

Table 03 - Receptor Sensitivity Rating (Adapted from the DPE Technical Supplement - LVIA)

2.3 Visual Landscape Character Assessment

The process of a Visual Landscape Character Assessment is to ‘determine the overall impact of a project on an area’s character and sense of place (what people think and feel about a place and how society values it, whether or not they are physically present at it)’ (Transport of NSW, 2020). The potential visual impacts of the Project is then assessed based on the relationship between the visual sensitivity (refer to Section 2.3.1) and visual magnitude (refer to Section 2.3.2).



2.3.1 Visual Sensitivity

Sensitivity refers to the qualities of an area, the number and type of receivers and how sensitive the existing character of the setting is to the proposed nature of change (as noted in Sections 2.2.1). The *'design quality of the proposed development does not make the area less sensitive to change but instead affects the magnitude of the impact as described following'* (Transport for NSW, 2020).

For example, a significant change that is not frequently seen may result in a low visual sensitivity although its impact on a landscape may be high. Generally the following principles apply:

- Visual sensitivity decreases as the viewing time decreases
- Visual sensitivity decreases as the number of potential viewers decreases
- Visual sensitivity can also be related to viewer activity (e.g. A person viewing an affected Site whilst engaged in recreational activities will be more strongly affected by change than someone passing a scene in a car travelling to a desired destination)

Visual Sensitivity ratings are defined as high, moderate or low based on the Scenic Quality of the LCZ.

VISUAL SENSITIVITY RATING				
		SCENIC QUALITY LANDSCAPE CHARACTER ZONE		
		HIGH	MODERATE	LOW
RECEPTOR SENSITIVITY	HIGH	HIGH	HIGH	MODERATE
	MODERATE	HIGH	MODERATE	MODERATE
	LOW	MODERATE	LOW	LOW
	VERY LOW	LOW	VERY LOW	VERY LOW

Table 04 - Visual Sensitivity Rating Table (Adapted from Technical Supplement - LVIA Large-Scale Solar Energy Guidelines)

2.3.2 Visual Magnitude

Visual magnitude refers to the extent of change that will be experienced by receptors. Factors that are considered when assessing the magnitude of change include (AILA, 2018):

- the proportion of the view / landscape affected;
- extent of the area over which the change occurs;
- the size and scale of the change;
- the rate and duration of the change; and
- the level of contrast and compatibility.

2.3.3 Landscape Character Visual Impact

Landscape Character Visual Impact is the combined effect of visual sensitivity and visual magnitude. Various combinations of visual sensitivity and visual magnitude will result in high, moderate, low and negligible overall visual impacts as shown in **Table 05** below (Transport for NSW, 2020). This process involves a qualitative assessment of the conclusions of impact ratings for each LCZ. The analysis takes into consideration other relevant influencing factors not easily addressed through the process of quantitative analysis.

LANDSCAPE CHARACTER VISUAL IMPACT RATING					
		VISUAL MAGNITUDE			
		HIGH	MODERATE	LOW	NEGLIGIBLE
VISUAL SENSITIVITY	HIGH	HIGH	HIGH-MODERATE	MODERATE	NEGLIGIBLE
	MODERATE	HIGH-MODERATE	MODERATE	MODERATE-LOW	NEGLIGIBLE
	LOW	MODERATE	MODERATE-LOW	LOW	NEGLIGIBLE

Table 05 - Visual Impact Rating Table (Adapted from Transport of NSW, 2020)

2.4 Guidelines and Statutory Framework

An overview of the guidelines, relevant frameworks and considerations of authorities utilised to form the methodology for this visual impact assessment is provided in the following section.

2.4.1 Shellharbour Local Environmental Plans (LEP) 2013

The Project Area is located within Shellharbour LGA. The Project Area is zoned as RU1 - Primary Production and C2 - Environmental Conservation under the Shellharbour LEP 2013.

The objectives of RU1 - Primary Production are as follows:

- *to encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *to encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *to minimise the fragmentation and alienation of resource lands.*
- *to minimise conflict between land uses within this zone and land uses within adjoining zones.*

The objectives of C2 - Environmental Conservation are as follows:

- *to protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.*
- *to prevent development that could destroy, damage or otherwise have an adverse effect on those values.*

3.0 Project Overview

3.1 Regional Context

The Project Area is located within the Wollongong-Illawarra Region in New South Wales, 3.5 km southwest of Shellharbour and 4.8 km west of Albion Park (refer to **Figure 01**). Shellharbour Local Government Area (LGA) is adjoining Wollongong City Council to the north, Kiama Municipal Council to the south, Wingecarribee Shire to the west and the South Pacific Ocean to the east. Shellharbour LGA encompasses a total area of 147 sq km, with key urban areas within the region include Albion Park, Shellharbour Village, Warilla and Oak Flats.

3.2 Project Area

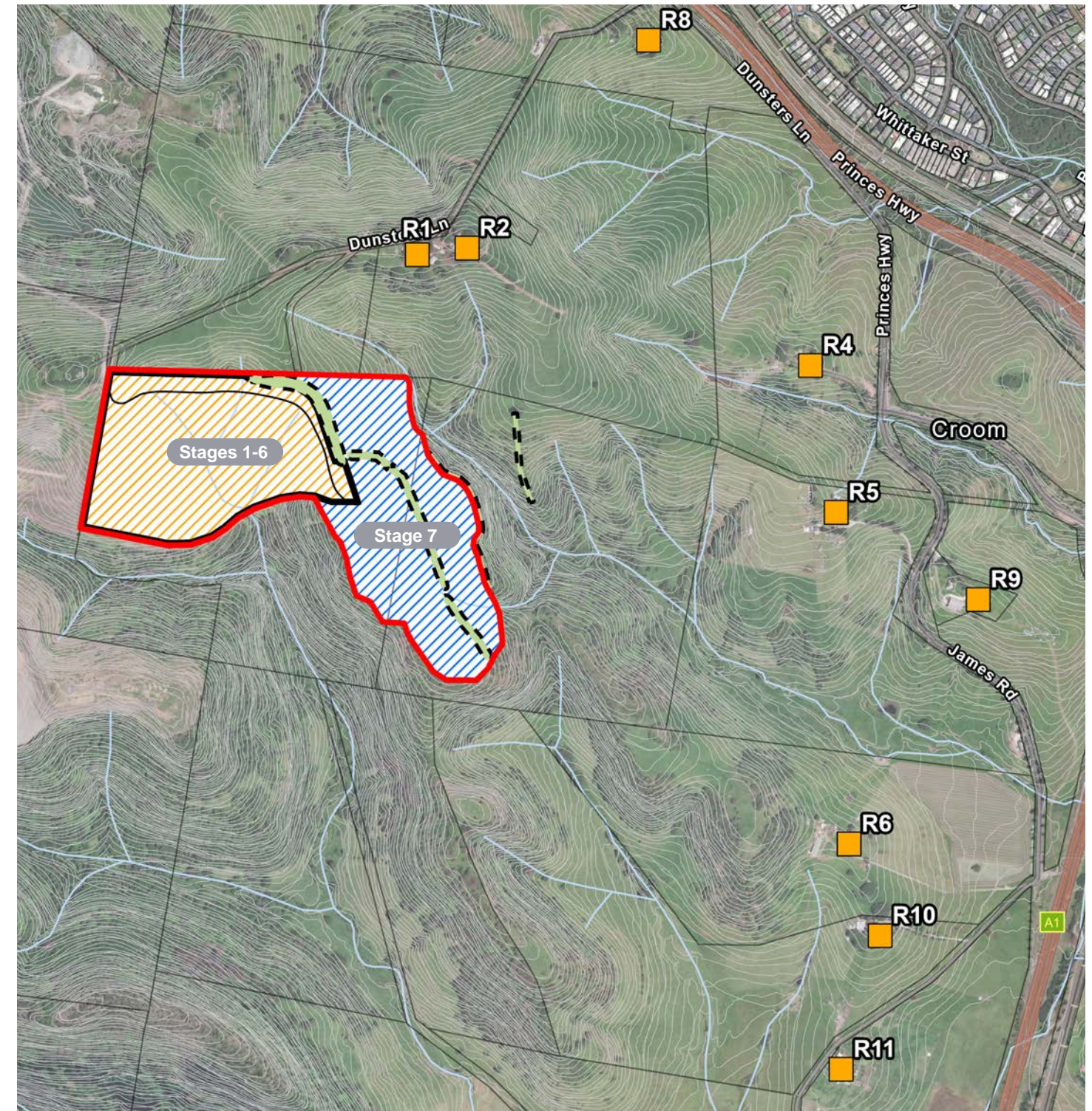
The Project Area is located to the south of Dunsters Lane within the Wentworth Hills within two lots identified as Lot 1 DP 858245 and Lot 7 DP3709 (refer to **Figure 02**). The Project Area currently consists of quarrying activities and undulating hills surrounding by established vegetation within the undulations. The Project Area is located along the ridge in the immediate area ranging from approximately 125m AHD in the north to 65m AHD in the south.

3.3 The Project

The Applicant proposes to extend the operational life of the Albion Park Quarry, which consists of the extension of the current extraction area, comprising of Stages 1-6 (approximately 18 ha). The extension, identified as Stage 7 'the Project' Lot 7 DP3709 covers an area of 15.6 ha to the east and southeast of the current extraction area. For the purposes of the report, all stages combined are referred to as the 'Project Area' for assessment purposes. The extraction process within Stage 7 will occur in five (5) substages, which involves the removal of hard rock materials as per Stages 1-6, with the rock removed by blasting. Operationally, the blasted rock would be crushed and screened within the Project Area and then either transported to fixed processing plant to further processing, stockpiling and/or delivery.

3.4 Study Area

The 'Study Area' referred to in this report is defined as land within 5 km from the Project Area which is deemed suitable for the scale of the development, as per DPE Technical Supplement. This defined area will form the visual baseline assessment (refer to **Figure 03**), where LCZs are identified once the landscape character is established.





Study Area

Refer to Section 3.4

LEGEND





-  Project Area
-  Study Area
-  Lot Boundary
-  Stream & Creeks

Figure 03 - Study Area (Source: ESRI ArcGIS, 2022)



4.0 Existing Landscape Character

4.1 Existing Landscape Character Analysis

The purpose is to establish the landscape and visual conditions through descriptions, mapping and photographic representation to capture the sense of place in which the Project is sited to provide a baseline against which the potential visual impacts of the Project can be assessed. The Study Method for undertaking the landscape character analysis has been established in the 'Guideline for Landscape Character and Visual Impact Assessment' (Transport of NSW, 2020) in conjunction the DPE Technical Supplement prepared for Landscape & Visual Impact Assessments for Large Scale Solar Projects.

4.2 Bioregion Context

The Project Area is located in the 'Sydney Basin' bioregion (NPWS, 2003) between the Tasman Ocean to the east and South East Highlands to the west. (refer to **Figure 04**). In addition to Sydney, the bioregion includes the cities of Wollongong, Newcastle, Katoomba and Nowra. Small water catchments located in the area include Lake Illawarra to the north of Project. Within the subregion of the 'Illawarra', the bioregion features are defined as -

- **Geology** - Permian siltstone, shale, sandstones and interbedded volcanics on and below the coastal escarpment. Quaternary alluvium and coastal sands.
- **Characteristic Landforms** - vegetated cliff faces on coastal escarpment with waterfalls and steep streams. Boulderly debris slopes with sandy clay matrix and low hills and alluvial valleys on coastal ramps. Barrier System at Lake Illawarra.
- **Vegetation** - mixed warm temperate and subtropical rainforest complexes on rich shale soils and alluvium under the escarpment. Coachwood, native tamarind, cabbage tree palm, port jackson fig, cheese tree, with soft tree fern and rough tree fern understorey. Adjacent tall forests; Sydney peppermint, brown barrel, yellow stringbark coastal white box. Coastal dunes; coast wattle, tea-tree, banksia, and blackbutt. Common reed in fresh swamps and lakes, mangroves and limited saltmarsh in estuaries.

(Source: Bioregions of New South Wales, NPWS, 2003)



Figure 04 - Bioregion (New South Wales) (Source: DPE, 2021 & NPWS 2003)





Image 01 - Typical Vegetation Character in the Study Area (outside urban developments). Views over Wentworth Hills. (MLA - 02/2023)



Image 02 - Typical Residential and Urban Development in the Study Area. Views of Barrack Point towards the Illawarra Escarpment. (MLA - 02/2023)

4.3 Land Zoning

The Project Area is located within the Shellharbour LGA where the Shellharbour Local Environment Plan 2013 (LEP) applies. The following provides an overview of the land zoning within the immediate surrounds of the Project Area as shown in **Figure 05**.

4.3.1 RU1 Primary Production

The Project Area is primarily zoned as RU1 Primary Production where extractive industries or quarrying activities are permissible with consent. There are no objectives related to visual requirements that need to be addressed for the landscape character assessment.

4.3.2 RU2 Rural Landscape

The rural land surrounding the Project Area outside the Wentworth Hills is primarily zoned as RU2 Rural Landscape. One of the objectives relating to visual includes the requirement *'to maintain the rural landscape character of the land'*. The majority of dwellings within close proximity of the Project Area is located on land zoned as RU2 Rural Landscape.

4.3.3 C2 Environmental Conservation

The Project Area is primarily zoned as RU1 Primary Production along with portions of the Project Area zoned as C2 Environmental Conservation, specifically the east and south of the Project. It is noted that the area of land zoned C2 within the Project Area is predominantly cleared land. Objectives includes the requirements *'to protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values'* and *'to prevent development that could destroy, damage or otherwise have adverse effect on those values'*.

4.3.4 C3 Environmental Management and C4 Environmental Living

The land immediately surrounding the Project Area to the north, west and south are primarily zoned as C3 Environmental Management. One of the objectives related to visual requirements includes *'to retain and enhance the visual and scenic qualities of the Illawarra Escarpment'*. Land zoned C4 Environmental Living to the far west of the Project Area is located near R2 Low Density Residential where the objective is *'to provide for low-impact residential development in areas with special ecological, scientific or aesthetic values'*.

4.3.5 SP2 Infrastructure

To the north and east of the Project Area, there is presence of large-scale motorways, highways and railway infrastructure zoned as SP2 Infrastructure, which transverses between rural zoning (RU2) and residential zoning (R2 & R3) as shown in **Figure 05**. There are no visual requirements outlined under the LEP, however, the overall objective of SP2 is *'to provide for key transport corridors'*, which forms part of the urban fabric of the area.

4.3.6 R2 Low Density Residential and R3 Medium Density Residential

Land beyond SP2 to the northeast and northwest are primarily zoned as R2 Low Density Residential and R3 Medium Density Residential outside recreation (RE1 and RE2) and urban (B1, B2, B3, B4, B5, B7) zoning. These suburbs include Albion Park, Albion Park Rail, Oak Flats, Blackbutt, Flinders, Shellharbour, Shell Cove and Barrack Heights as shown in **Figure 06**. There are no visual requirements outlined under the LEP for R2 or R3 zoning. This expansive typology forms part of the urban fabric within the Study Area.

4.3.7 RE1 Public Recreation and RE2 Private Recreation

To the northeast and northwest of the Project Area beyond SP2, there are dotted areas zoned as RE1 Public Recreation and RE2 Private Recreation. One of the objectives relating to the visual character for both these typologies includes the requirement *'to protect and enhance the natural environment for recreational purposes'*.

4.3.8 W1 Natural Waterways and W2 Recreational Waterways

The objective relating to the visual character for both W1 Natural Waterways and W2 Recreational Waterways includes the requirement *'to protect the ecological and scenic values of natural waterways'* and *'to protect the ecological, scenic and recreation values of recreational waterways'*.

4.3.9 Other Land Zones Identified within the Study Area

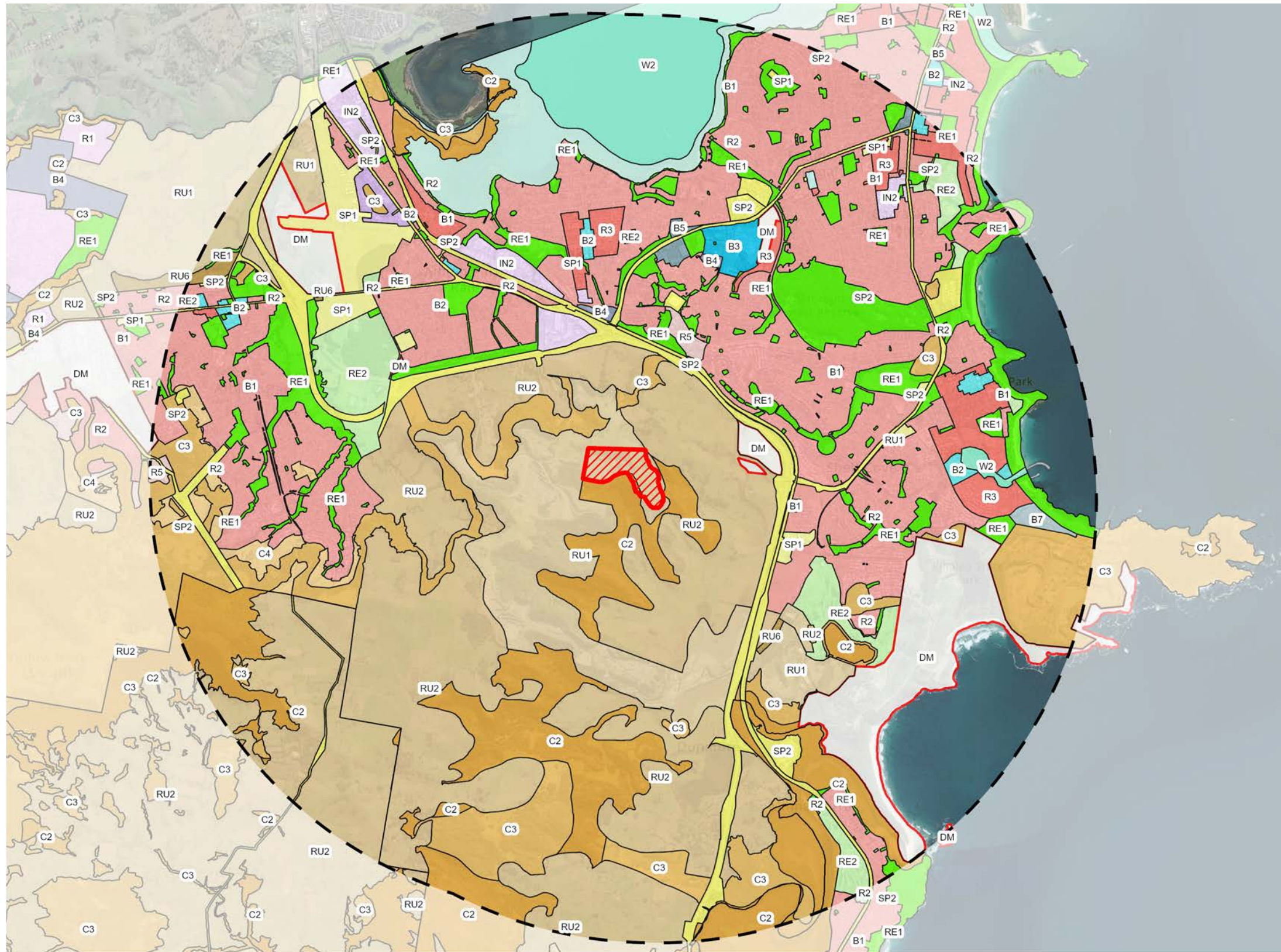
As the Project Area is located within the urban region of Shellharbour, there is a large mix of land zoning within the Study Area identified in the Shellharbour LEP. Additional land zones not listed above located on the outer extent of the Study Area where there are no visual requirements listed in the LEP include -

- RU6 Transition, B1 Neighbourhood Centre, B2 Local Centre, B3 Commercial Use, B4 Mixed Use, B5 Business Development, B7 Business Park, IN1 General Industrial, IN2 Light Industrial, SP1 Special Activities and DM Deferred Matter

It is to be noted that there is no land zoned as C1 National Parks and Nature Reserves within the Study Area, however, Killalea Reserve to the east is zoned Deferred Matters (DM).

4.3.10 Land Zoning Summary

Land zoning surrounding the Project Area is predominantly classed as RU1, RU2, C2 and C3. The land zoning classification will assist in informing the visual sensitivity of select LCZs. As the Project Area is located within the City of Shellharbour, there is high presence of human activity, including urban centres and expansive residential suburbs zoned as R2 and R3, which form part of landscape character of the area as an urban centre along the coastline. Due to the high presence of human activity, large-scale infrastructure is present within the Study Area which is a key feature of the landscape which includes motorways, highways and rail infrastructure zoned as SP2 that traverses to the east of the Project between rural (RU2) and residential zoning (R2 & R3).



Land Zoning

Refer to Section 4.3

LEGEND

- Project Area
- Study Area
- B1
- B2
- B3
- B4
- B5
- B7
- C2
- C3
- C4
- DM
- IN1
- IN2
- R1
- R2
- R3
- R5
- RE1
- RE2
- RU1
- RU2
- RU6
- SP1
- SP2
- W1
- W2

Figure 05 - Land Zoning (Source: NSW Spatial Data, 2022, ESRI ArcGIS, 2022)





Suburb Boundaries

Refer to Section 4.3

LEGEND





-  Project Area
-  Study Area
-  Suburb (Shellharbour LGA)
-  Suburb (Kiama LGA)

Figure 06 - Suburb Boundaries (Source: NSW Spatial Data, 2022, ESRI ArcGIS, 2022)



4.4 Land Use

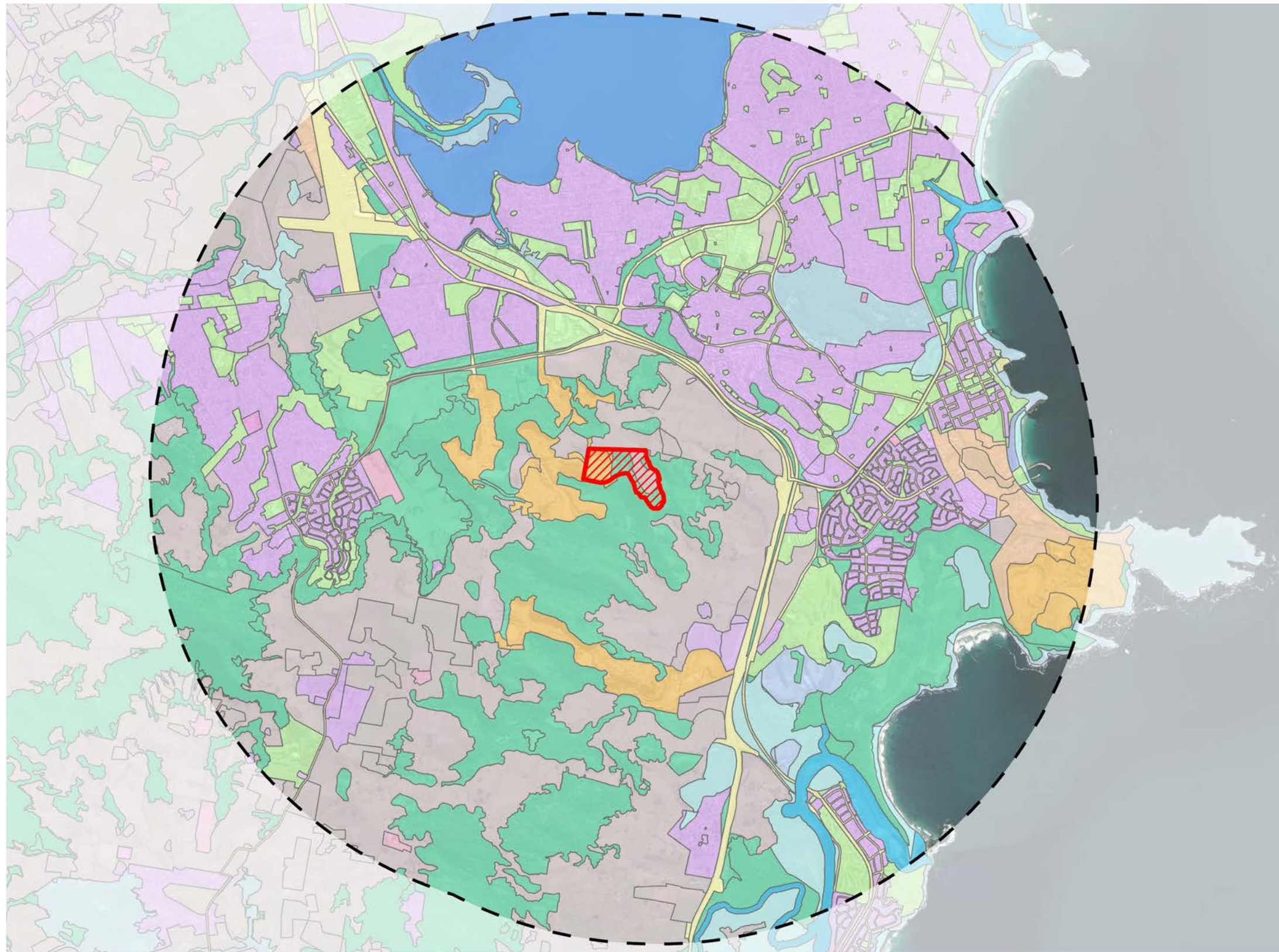
Land use within and surrounding the Project Area predominantly comprises of the following land uses as shown in **Figure 07** -

- 2.1 Grazing Native Vegetation
- 3.2 Grazing Modified Pastures
- 5.4 Residential and Farm Infrastructure
- 5.5 Services
- 5.7 Transport and Communication
- 5.8 Quarrying and related activities

The Project Area and immediate surrounds comprise currently of quarrying, grazing native vegetation and modified pastures as per land use mapping of NSW (SEED, 2019). The topography of the grazing areas are undulating with scattered vegetation present within the undulations. There is a large presence of quarrying activities within the Study Area, which includes Holcim Albion Park Quarry, Boral Dunmore Quarry and Hanson Bass Point Quarry. To the east of the Project Area, transportation infrastructure is present, specifically motorways, highways and railway infrastructure that transverses between the grazing lands and residential suburbs. The classification of these land uses forms part of the landscape character within the Study Area. In combination with the Land Zoning, the sensitivity of the LCZs can be determined.

Land Use

Refer to Section 4.4



LEGEND

- Project Area
- Study Area
- 1_1_0_Nature_conservation
- 1_2_0_Managed_resource_protection
- 1_3_0_Other_minimal_use
- 2_1_0_Grazing_native_vegetation
- 2_2_0_Production_native_forestry
- 3_1_0_Plantation_forests
- 3_2_0_Grazing_modified_pastures
- 3_3_0_Cropping
- 3_4_0_Perennial_horticulture
- 3_5_0_Seasonal_horticulture
- 3_6_0_Land_in_transition
- 4_1_0_Irrigated_plantation_forests
- 4_2_0_Grazing_irrigated_modified_pastures
- 4_3_0_Irrigated_cropping
- 4_4_0_Irrigated_perennial_horticulture
- 4_5_0_Irrigated_seasonal_horticulture
- 4_6_0_Irrigated_land_in_transition
- 5_1_0_Intensive_horticulture
- 5_2_0_Intensive_animal_production
- 5_3_0_Manufacturing_and_industrial
- 5_4_0_Residential_and_farm_infrastructure
- 5_5_0_Services
- 5_6_0_Utilities
- 5_7_0_Transport_and_communication
- 5_8_0_Mining
- 5_9_0_Waste_treatment_and_disposal
- 6_1_0_Lake
- 6_2_0_Reservoir_dam
- 6_3_0_River
- 6_4_0_Channel_aqueduct
- 6_5_0_Marsh_wetland
- 6_6_0_Estuary_coastal_waters

Figure 07 - Land Zoning (Source: NSW Spatial Data, 2022, ESRI ArcGIS, 2022)



Landscape Features

Refer to Section 4.5



LEGEND

- Project Area
- Study Area
- Stream & Creeks
- Lot Boundary
- Nature Reserves
- Parks & Recreation
- City Centres
- Roads & Transport Infrastructure
- Mining Activities & Quarries
- Hydrological

Figure 08 - Landscape Features (Source: ESRI ArcGIS, 2022)



4.5 Key Landscape Features

4.5.1 Topographic Character

The Study Area is located within a gently undulating basin near the City of Shellharbour. In the regional context of the Illawarra, the topography rises from 0 AHD at the South Pacific Ocean to 778 m AHD at Knights Hill (Budderoo National Park) 12 km southwest of the Project Area (refer to **Image 03**). Knights Hill forms part of the Illawarra Range, where the escarpment dominates the landscape character of the region, viewed as a key geological feature. The Shellharbour LEP nominates the Illawarra escarpment as having a high scenic quality, and the quality of this landscape feature needs to be maintained. This feature is located outside the Study Area, however, is viewed as a backdrop when viewing the Project Area from the east.

Within the Study Area, the Project Area is located in the Wentworth Hills, a localised rural landscape feature, consisting of undulating hills and dense vegetation (refer to **Image 04**). Within the Wentworth Hills, quarrying activities are present, however, contained by the undulations of the land which limits the visibility. This results in existing quarrying operations varying in visibility within the Study Area. In some areas the quarrying operations are seen as a prominent feature, and in other locations contained by intervening topography. Within this localised area, the topography ranges from approximately 20 AHD in the east to 120 AHD at the top of the ridge where the Project Area is located.

Outside the Wentworth Hills, the topography undulates to the southwest rising towards Knights Hill and the Illawarra Range. To the north and east of the Project Area, the topography is gently undulating down to the South Pacific Ocean and Lake Illawarra across Shell Cove, Shellharbour and Oak Flats. High points within the Study Area include Blackbutt Nature Reserve, Vista Park and Mount Warrigal.

This landscape has a high human presence, where majority of the Study Area has been modified. As shown in **Figure 07**, the topography in all directions of the Project Area has been modified to allow for transport infrastructure, railway infrastructure, quarrying practices and residential uses.



Image 03 - (Drone Image) Views over Barrack Heights and Blackbutt Nature Reserve towards the Illawarra Range. (MLA - 02/2023)



Image 04 - (Public Viewpoint) Views from James Road towards the Wentworth Hills to the northwest. (MLA - 02/2023)

4.5.2 Hydrological Character

Key hydrological features with the Study Area include the South Pacific Ocean to the east of Shellharbour and Lake Illawarra to the north of Oak Flats. A number of watercourses feed into these catchments, including Rocklow Creek to the south, Frazer Creek to the west, Horsley Inlet to the north and Bensons Creek to the northeast. Rocklow Creek flows into the Minnamurra River southeast of the Project Area (refer to **Image 05**).

The Project Area is surrounded by five (5) first order streams and one (1) second order stream, all feeding into Rocklow Creek to the south. The Project Area is located in the Rocklow Creek Catchment (SCC, 2019). Within the Study Area, there are a number of estuaries and waterways, including Lake Illawarra, zoned as W1 or W2, with inherit scenic quality values as per the Shellharbour LEP.

4.5.3 Vegetation Character & Nature Reserves

Within the Study Area, there a number of Nature Reserves including Blackbutt Nature Reserve to the northeast, Killaela Reserve to the east and James Holt Reserve to the southeast. The vegetation within these reserves are typical of the bioregion defined in **Section 4.2**. As the majority of the Study Area has a high human presence, vegetation is limited to private dwellings, local parks and watercourses.

Within the Project Area, the land is generally cleared and scattered native vegetation is visible to the east of the existing quarry. Surrounding the Project Area to the east and south, dense native vegetation is visible across the Wentworth Hills (refer to **Image 06**), typical of the Illawarra bioregion defined in **Section 4.2**. Beyond the undulations of the Wentworth Hills, the modified grazing land between the Project Area and the Princes Highway is generally clear of vegetation. In close proximity to the Project along James Road, Norfolk Pines line the roadside which form part of a memorial that is a heritage item listed under the Shellharbour LEP (refer to **Image 19**).



Image 05 - (Drone Image) Views over the Minnamurra River in the southeast towards the Project. (MLA - 02/2023)



Image 06 - (Drone Image) Views over the Wentworth Hills to the south towards Boral Quarry. Dense Vegetation surrounding Albion Park Quarry with the cleared zone to the right establish as a rehabilitation area. (MLA - 02/2023)

4.5.4 Roads & Transport Infrastructure

Key road transport infrastructure includes the Princes Highway and Motorway to the east and north of the Project, and the East West Link Road to the north of the Project Area (refer to **Image 07**). These arterial road corridors are major thoroughfares connecting Kiama, Shellharbour and Wollongong. This is a key landscape feature, along with the railway corridor adjoining the Princes Highway traversing between the rural zoning and residential zoning. Shellharbour Junction Station is located to the east of the Project Area, below the new low density residential subdivision in the suburb of Shell Cove. Shellharbour Road connects to the Princes Highway to the east of the Project Area.

In addition to the major commuter routes, four (4) low use roads were identified in close proximity to the Project Area, identified as Dunsters Lane, Lindsays Lane, James Road and Croome Road (refer to **Image 08**).

4.5.5 Quarrying Infrastructure

There is a high presence of quarrying activity dotted within the Study Area (refer to **Image 09**). The quarries are predominantly located in the Wentworth Hills. In addition to the existing Cleary Bros Albion Park Quarry, there are three (3) large-scale quarries including Holcim Albion Park Quarry to the west, Boral Dunmore Quarry to the south and Hanson Bass Point Quarry to the southeast. Infrastructure associated with the quarries and the topographic modification is visible from receptors within the Study Area, forming part of the existing landscape character.

4.5.6 Residential and Urban Centres

The Project Area is located within the rural suburb of Croom, consisting of quarrying activities and rural dwellings. Outside the immediate surrounds of the Project Area, there is a large human presence within the Study Area, consisting of a number of urban centres and residential suburbs (refer to **Image 10**). Twelve (12) residential suburbs with urban centres are located to the north, east and west of the Project Area as shown in **Figure 05** and **Figure 06**. Immediate residential suburbs to the Project Area include Shell Cove, Albion Park, Flinders, Blackbutt, Oak Flats and Albion Park Rail, consisting of low to medium residential developments. Major urban centres with the Study Area include Shellharbour City Centre and Albion Park Centre.



Image 07 - (Drone Image) Views from Shellharbour Road towards the Princes Highway, Princes Motorway, Railway Infrastructure and a new subdivision in Shell Cove. Motorway network transversing between rural zoning and residential zoning. (MLA - 02/2023)

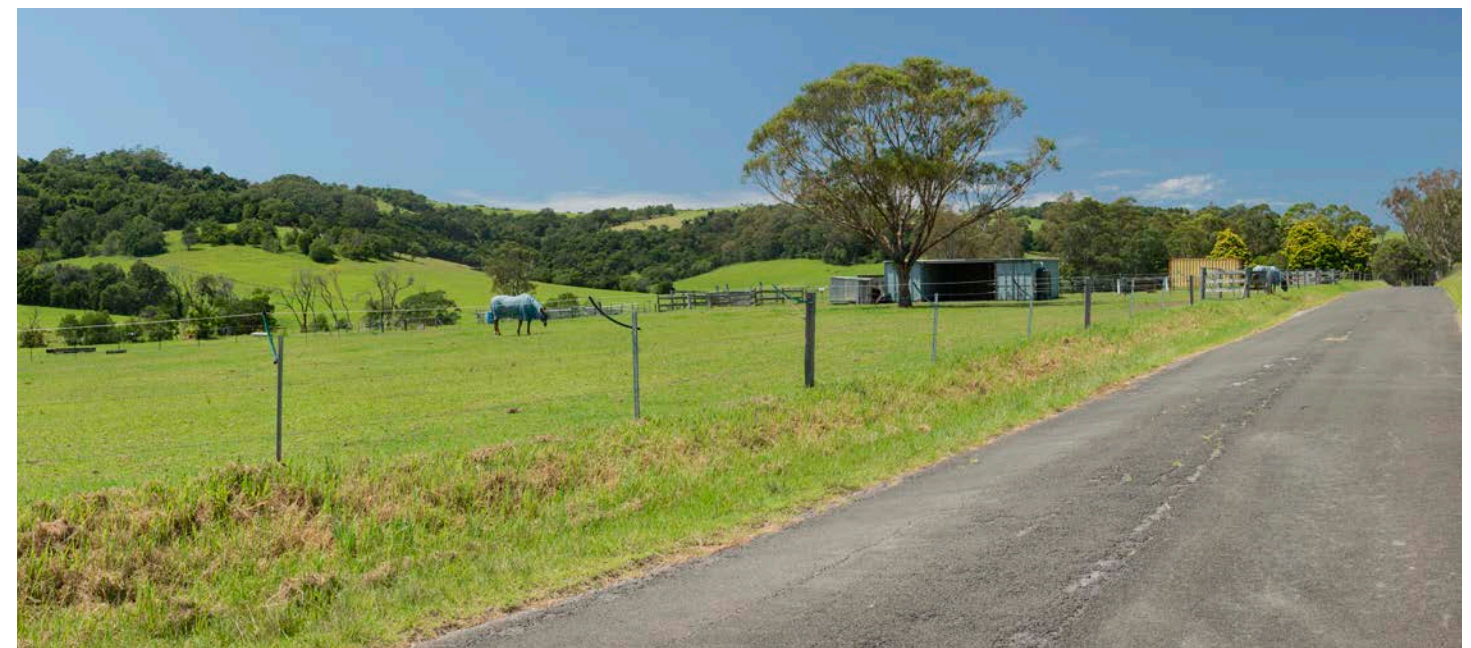


Image 08 - (Public Viewpoint) View along Croome Road towards the Wentworth Hills to the west of the Project. Typical character of rural properties and topography surrounding the existing quarries. (MLA - 02/2023)

4.5.7 Point of Interests

Within the Study Area, there a number of beaches and recreation areas along the Shellharbour coastline, including key lookout locations, including Bass Point and Barrack Point that allows for open views along the coastline. Closer to the Project Area, in addition to nature reserves, key recreation areas include Pioneer Park and Village Green to the northeast, Killalea Regional Park to the southeast and Jamberoo Action Park to the southwest.

4.5.8 Heritage Items

Within close proximity of the Project Area within the suburb of Croom, there a number of heritage items listed under the Shellharbour LEP (refer to **Figure 09**). These items include -

HERITAGE ITEMS		
ITEM No	NAME	ADDRESS
I022	The Hill Farm Complex	195 Dunsters Lane, Croom
I024	'Kurrawong' trees, stone walls and silo	126 James Road, Croom
I025	'St Ives' and fig trees	2 James Road, Croom
I026	'Rosemont Complex' tress and setting	35 James Road, Croom
I177	'Bravella' fig trees	144 James Road, Croom
I281	Kyawana	265 Dunsters Lane, Croom
I179	Memorial, Norfolk Island Pines	James Road, Croom
I209	'Belmont' stone walls, figs and coral tree avenue	207 Dunsters Lane, Croom

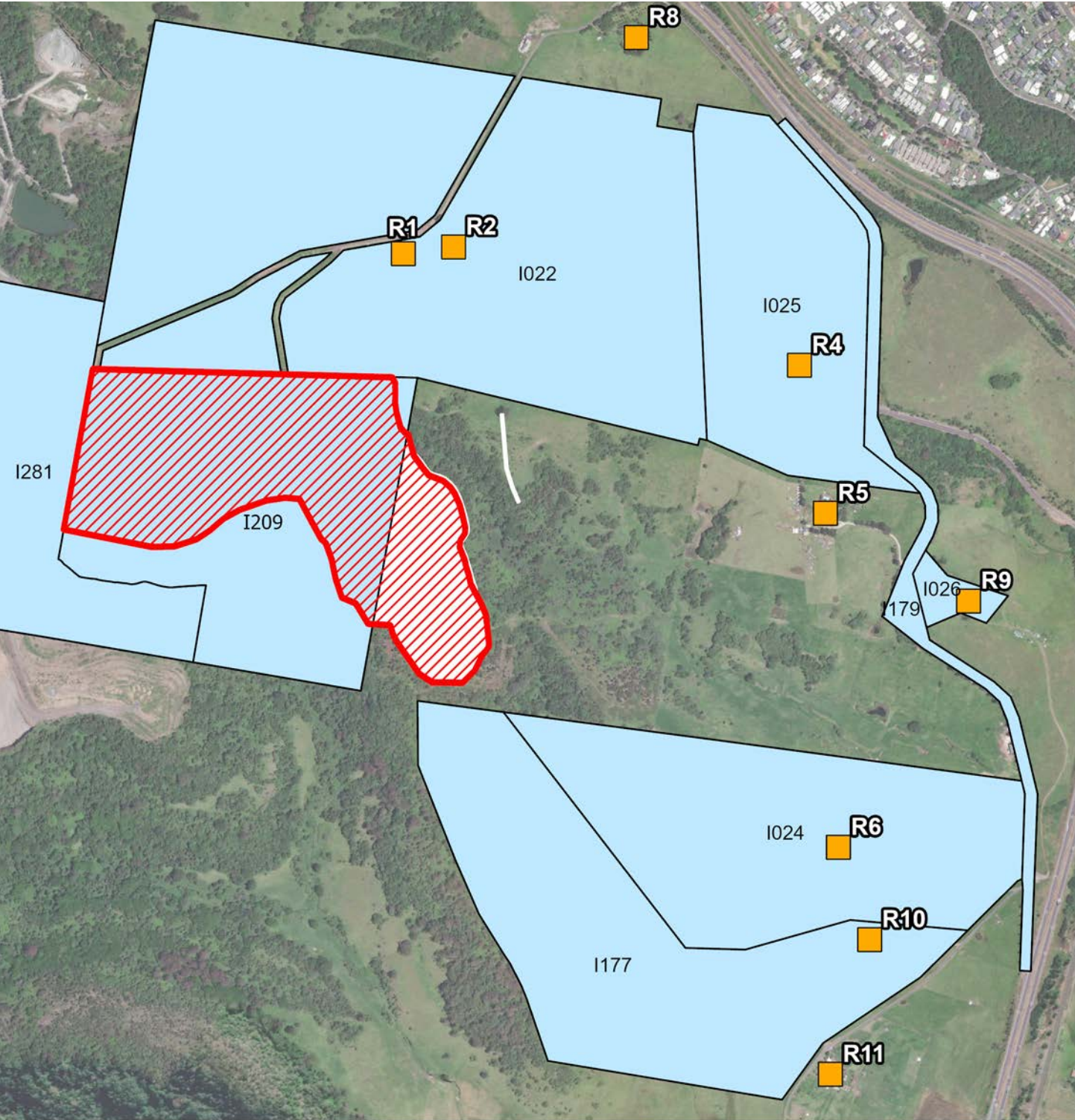
For further information on these items, refer to the Statement of Heritage Impact (Biosis 2021) and associated Archival Report, which form part 6 of the Specialist Consultant Studies Compendium of the Environmental Impact Statement, as well as the supplementary heritage assessment included within this Response to Submissions. Within the LCA, these items will only be assessed in relation to potential visual impacts on the landscape character defined by the LCZ in which the item is located.



Image 09 - (Drone Image) Views over Albion Park Quarry from the Project Area. (MLA - 02/2023)



Image 10 - (Drone Image) Views from Shellharbour Road over Flinders towards Village Green, Pioneers Park, Blackbutt Reserve and Lake Illawarra. (MLA - 02/2023)



LEGEND
Heritage Items
Project Area
Dwelling

Figure 09 - Heritage Items (source: NSW Spatial Data, 2022, ESRI, 2022) 0 0.13 0.25 0.5 Kilometres



5.0 Zone of Visual Influence

5.1 Overview of Zone of Visual Influence

An initial visibility assessment was undertaken utilising Zone of Visual Influence (ZVI) mapping. This tool assists defining the theoretical areas from which the Project would have potential visibility and assist in determining the 'Visual Catchment'.

The ZVI represents the area over which a development can theoretically be seen, and is based on a Digital Terrain Model (DTM). The ZVI is a desktop tool intended to make the fieldwork and assessment more efficient by clearly excluding areas that are screened by topography. Fieldwork assessments are then undertaken predominantly within the areas with the potential for visual impacts.

The ZVI usually presents a bare ground scenario - ie. a landscape without screening, structures or vegetation, and is usually presented on a base map. It is also referred to as a zone of theoretical visibility (LIEMA, 2002). It is important to note the ZVI is based solely on topographic information. Therefore this form of mapping should be acknowledged providing a worst case scenario and is used purely as a desktop assessment tool to determine areas for further investigation.

5.2 Summary of Zone of Visual Influence

The ZVI was prepared based on the existing topographic condition of the Project Area extent, representing the worst case scenario. The ZVI identifies that within the Study Area, no area will have greater than 50% potential visibility of the Project. The majority of the areas identified on the ZVI have a potential of 1%-25% visibility, with some areas identified as having 26%-50% potential visibility due to an elevated position.

The ZVI indicates the potential to view the Project from the northeast to the south. Of the ten (10) nearby dwellings to the east of the Project, five (5) non-associated dwellings (R5, R6, R9, R8 & R11) will have the potential to view the Project. It is to be noted that R1 and R2 are Project related, as they have entered into an agreement with the Applicant to compensate for the visual impacts of the Project.

Outside the immediate extent of the Project Area and the suburbs of Croom - Shell Cove, Flinders, Shellharbour, Blackbutt and Minnamurra have the potential to view the Project Area. It is anticipated some views to the Project Areas would be obscured from these areas by built form and existing vegetation (that is not taken into account in the ZVI).

Zone of Visual Influence

Refer to Section 5.1

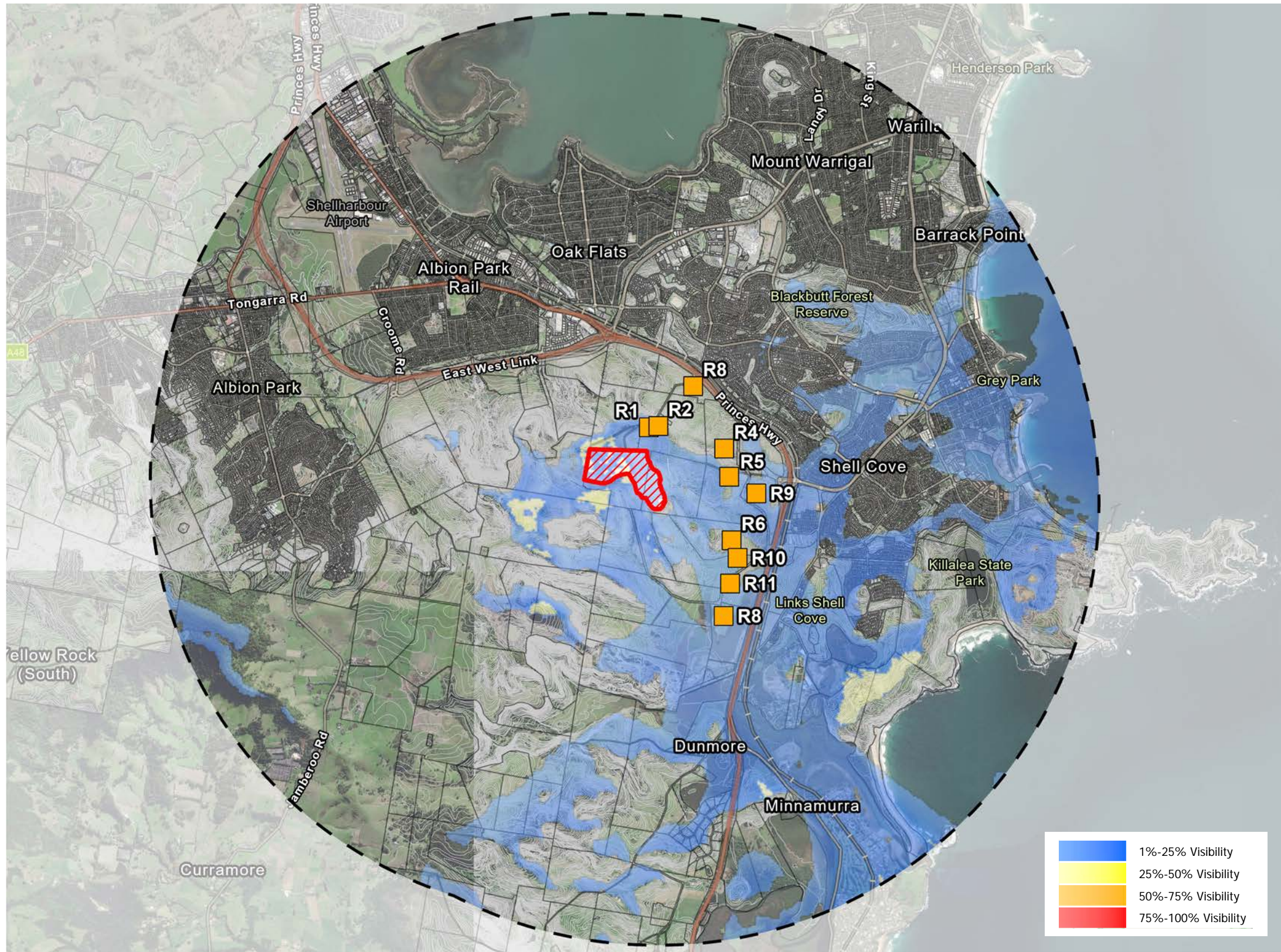


Figure 10 - Zone of Visual Influence (Source: ESRI ArcGIS, 2022)

0 0.5 1 2 3 4 Kilometres



6.0 Landscape Character Zones

6.1 Overview of Landscape Character Zones

As assessment of existing land zoning, land use and landscape features suggests the Study Area and surrounds consist of a number of landscape typologies which include undulating hills, quarrying, grazing, urban precincts, estuary environments and infrastructure corridors. Landscape Character Zones (LCZs) within the Study Area are shown in **Figure 10**, with nine (9) key landscape typologies being identified, highlighting the dominant landscape features that forms the overall character of that zone.

Table 06 provides an overview of each LCZs and Scenic Quality Ratings that have been applied using the 'Frame of Reference' outlined in the Study Method. These ratings have been developed to form part of the assessment in determining the Visual Sensitivity and Scenic Quality.

LANDSCAPE CHARACTER ZONES		
CODE	NAME	SCENIC QUALITY
LCZ01	Princes Highway & Motorway	LOW
LCZ02	Quarries & Related Activities	LOW
LCZ03	Nature Reserves & Recreation	MODERATE
LCZ04	Undulating Hills	MODERATE
LCZ05	Pastures & Grazing	LOW
LCZ06	Low Density Residential	LOW
LCZ07	Mix Use Urban Precinct	LOW
LCZ08	Estuary Environment	MODERATE
LCZ09	Lake Illawarra	MODERATE

Table 06 - Landscape Character Zones Overview

Landscape Character Zones

Refer to Section 6.1



LEGEND

-  Project Area
-  Study Area
-  LCZ01 Princes Highway & Motorway
-  LCZ02 Quarries & Related Activities
-  LCZ03 Nature Reserves & Recreation
-  LCZ04 Undulating Hills
-  LCZ05 Patures & Grazing
-  LCZ06 Low Density Residential
-  LCZ07 Mix Use Urban Precinct
-  LCZ08 Estuary Environment
-  LCZ09 Lake Illawarra

Figure 11 - Landscape Character Zones (Source: ESRI ArcGIS, 2022)



6.2 Landscape Character Zones

6.2.1 LCZ01 Princes Highway & Motorway

To the east and north of the Project Area, the Princes Highway and Motorway transverse between the rural properties and residential dwelling. The urban infrastructure associated with this vehicular network becomes a visual landscape feature within the Study Area including the junction points due to the scale and position. Scattered vegetation is visible along sections of the corridor. Shellharbour Junction Station is located within this zone, with the railway corridor aligning the Princes Highway to the east.



Image 11 - (Drone Image) Views of Princes Highway, Railway Corridor and Shellharbour Road. (MLA - 02/2023)



Image 12 - Typical Landscape Character. Views along Shellharbour Road towards junction to the Princes Highway. (MLA - 02/2023)

LANDSCAPE CHARACTER ZONE	KEY LANDSCAPE FEATURES (dominate features within this zone)	KEY VIEWPOINTS	Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING
			Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes	
LCZ01 - Princes Highway & Motorway	Urban Infrastructure	Shellharbour Junction Station Princes Highway Princes Motorway	H							LOW
			M	●						
			L	●	●	●	●	●	●	

6.2.2 LCZ02 Quarries & Related Activities

Within the Study Area, there are a number of active quarries within the Wentworth Hills (LCZ04) and near Bass Point (LCZ03). This includes the Applicant, Holcim Albion Park Quarry, Boral Dunmore Quarry and Hanson Hanson Bass Point Quarry and Dunmore Sand and Soil extraction. The predominant landscape character within these areas is heavily modified which is generally opencut quarries and dams associated with quarrying activities screened to varying extents by topography and vegetation. LCZ02 is characterised by industrial infrastructure, modified terrain and ridgelines which form part of the existing landscape character.



Image 13 - (Drone Image) Views of Boral Dunmore Quarry. (MLA - 02/2023)



Image 14 - Typical Landscape Character. Views along Rocklow Road towards Boral Dunmore Quarry and Wentworth Hills. (MLA - 02/2023)

LANDSCAPE CHARACTER ZONE	KEY LANDSCAPE FEATURES (dominate features within this zone)	KEY VIEWPOINTS	Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING
			Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes	
LCZ02 - Quarries & Related Activities	Existing Quarry Infrastructure Vegetated Hills	Rocklow Road	H							LOW
			M	●	●				●	
			L	●		●	●	●	●	

6.2.3 LCZ03 Nature Reserves & Recreation

To the northeast and southeast of the Project Area are a number of dotted nature reserves and recreation parks within the urban suburbs of Shell Cove, Shellharbour and Blackbutt. Reserves include Blackbutt Reserve and Killalea Reserve. The terrain within this area is gently undulating with dense native vegetation, typical of the Illawarra bioregion. Waterbodies are located within this zone, including Rocklow Creek and Killalea Lagoon. Key recreation areas within this zone include Pioneer Park, Village Green, Vista Park and Killalea Regional Park.



Image 15 - (Drone Image) Views towards the Wentworth Hills and the Illawarra Escarpment from Pioneer Park. (MLA - 02/2023)

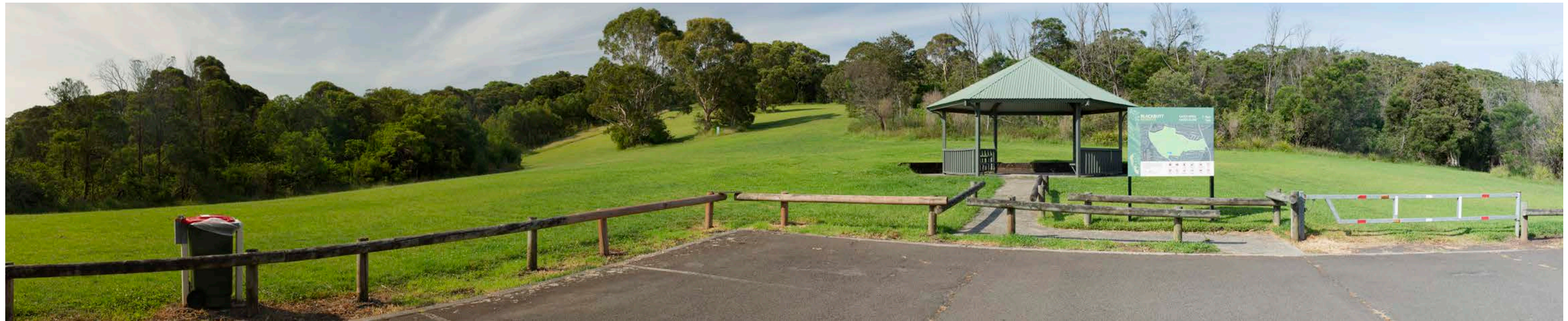


Image 16 - Typical Landscape Character. Views from Blackbutt Nature Reserve. (MLA - 02/2023)

LANDSCAPE CHARACTER ZONE	KEY LANDSCAPE FEATURES (dominate features within this zone)	KEY VIEWPOINTS	Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING	
			Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes		
LCZ03 - Nature Reserves & Recreation	Vegetated Undulations Waterbodies	Blackbutt Nature Reserve Killalea Reserve Pioneers Park Village Green Vista Park	H			●				●	MODERATE
			M	●			●	●			
			L		●				●		

6.2.4 LCZ04 Undulating Hills

The Project Area is located within the vegetated undulating hills associated with Wentworth Hills. Dotted within this zone are active quarries that are visible along select ridgelines. The terrain is characterised as undulating with scattered to dense native vegetation surrounding the undulations, typical of the Illawarra bioregion. Rural properties are dotted at the base of the undulations. The undulating ridgelines form a backdrop to the suburbs of Shell Cove, Shellharbour, Flinders and Blackbutt with the Illawarra Escarpment featuring beyond.



Image 17 - (Drone Image) Views over the undulating hills from the Project Area. (MLA - 02/2023)



Image 18 - Typical Landscape Character. Views from James Road towards the Undulating Hills, identified as the Wentworth Hills. (MLA - 02/2023)

LANDSCAPE CHARACTER ZONE	KEY LANDSCAPE FEATURES (dominate features within this zone)	KEY VIEWPOINTS	Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING	
			Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes		
LCZ04 - Undulating Hills	Vegetated Undulations Ridgelines	James Road Dunsters Lane Lindsay Lane Croome Road	H	●						●	MODERATE
			M		●	●	●	●			
			L		●		●	●	●		

6.2.5 LCZ05 Pastures & Grazing

This LCZ surrounds the undulating hills (LCZ04) in close proximity to the Project Area. The terrain is gently undulating with minimal vegetation within pastures. The landscape is classified as modified grazing lands. A number of rural properties and heritage items, are located within this LCZ, including ten (10) non-associated dwellings to the east of the Project Area. One of the heritage item (I179) listed includes the Norfolk Island Pines Memorial along James Road.



Image 19 - (Drone Image) Views over James Road and the Norfolk Pines Memorial. (MLA - 02/2023)



Image 20 - Typical Landscape Character. Views along James Road towards Shell Cove. (MLA - 02/2023)

LANDSCAPE CHARACTER ZONE	KEY LANDSCAPE FEATURES (dominate features within this zone)	KEY VIEWPOINTS	Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING
			Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes	
LCZ05 - Pastures & Grazing	Pastures Farm Buildings (Heritage Items) Norfolk Island Pines	James Road	H							LOW
			M							
			L	●	●	●	●	●	●	

6.2.6 LCZ06 Low Density Residential

The Study Area consists of predominantly low density residential suburbs, including Shell Cove, Shellharbour, Flinders and Blackbutt, located to the east of the Project Area and Minnamurra to the southeast. The terrain within these suburbs is gently undulating, with scattered vegetation associated with private dwellings or streetscape. This LCZ is an urban landscape, with single and two storey residential developments in which the landscape has been modified to allow for these housing typologies to exist. A new subdivision has been constructed to the east of the Shellharbour Junction Station in the suburb of Shell Cove (refer to **Image 07**) which will increase the density over time. Views toward the undulating hills form a visual backdrop from some areas within this LCZ, with the Illawarra Escarpment featuring beyond.



Image 21 - (Drone Image) Views over the suburb of Flinders. (MLA - 02/2023)



Image 22 - Typical Landscape Character. Residential Dwellings in the suburb of Flinders. (MLA - 02/2023)

LANDSCAPE CHARACTER ZONE	KEY LANDSCAPE FEATURES (dominate features within this zone)	KEY VIEWPOINTS	Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING
			Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes	
LCZ06 - Low Density Residential	Low Density Residential Developments	Shell Cove Shellharbour Flinders	H							LOW
			M							
			L	●	●	●	●	●	●	

6.2.7 LCZ07 Mix Use Urban Precinct

As the Study Area incorporates an urban centre, there is a range of mix uses within this LCZ including low and medium residential dwellings, industrial developments, shopping centres and central business districts (CBD). These suburbs include Shellharbour City Centre, Oak Flats, Albion Park Rail and Albion Park. The terrain within these suburbs is gently undulating, with scattered vegetation associated with private lots or street trees. This LCZ is an urban landscape, consists of a range of architectural typologies, ranging in density in which the landscape has been modified to allow for the urban built form.



Image 23 - (Drone Image) Views over Shellharbour. (MLA - 02/2023)

LANDSCAPE CHARACTER ZONE	KEY LANDSCAPE FEATURES (dominate features within this zone)	KEY VIEWPOINTS	Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING
			Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes	
LCZ07 - Mix Use Urban Precinct	Commercial Developments Industrial Buildings Low-Medium Residential Buildings		H							LOW
			M							
			L	●	●	●	●	●	●	

6.2.8 LCZ08 Estuary Environment

The Study Area encompasses an area characterised by the coastal estuary environment. This LCZ consists of areas where waterways lined by dense vegetation typical of the Illawara bioregion converge to meet the ocean. A key landscape feature includes the Minnamurra River, located approx. four (4) km to the southeast of the Project Area where Rocklow Creek feeds into the river from tributaries flowing from the Project Area.



Image 24 - (Drone Image) Views over the Minnamurra River. (MLA - 02/2023)



Image 25 - Typical Landscape Character along the Minnamurra River. View from Riverside Drive, Minnamurra. (MLA - 02/2023)

LANDSCAPE CHARACTER ZONE	KEY LANDSCAPE FEATURES (dominate features within this zone)	KEY VIEWPOINTS	Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING	
			Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes		
LCZ08 - Estuary Environment	Waterways Dense Native Vegetation Minnamurra River Rocklow Creek	Minnamurra River Minnamurra Beach	H		●						MODERATE
			M	●		●		●		●	
			L				●	●	●		

6.2.9 LCZ09 Lake Illawarra

Lake Illawarra, a large tidal lake, is a key landscape feature within the Illawarra region. The lake is surrounded by urban suburbs including Albion Park Rail, Oak Flats, Shellharbour City Centre and Mount Warrigal. Low lying vegetation including saltmarsh and floodplain forests surround the lake.



Image 26 - (Drone Image) Views over Warilla Beach towards Lake Illawarra and the Illawarra Escarpment. (MLA - 02/2023)



Image 27 - View from Albion Park towards the floodplains and Lake Illawarra. (MLA - 02/2023)

LANDSCAPE CHARACTER ZONE	KEY LANDSCAPE FEATURES (dominate features within this zone)	KEY VIEWPOINTS	Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING	
			Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes		
LCZ09 - Lake Illawarra	Lakes Floodplains	Lake Illawarra	H		●						MODERATE
			M	●		●	●		●	●	
			L					●			

7.0 Landscape Character Assessment

7.1 Summary of Landscape Character Assessment

Of the nine (9) LCZs identified within the Study Area, when assessed using the Study Method outlined in this report:

- two (2) LCZs were identified as having a 'MODERATE' visual impact;
- two (2) LCZs were identified as having a 'MODERATE-LOW' visual impact; and
- two (2) were identified as having a 'LOW' visual impact on the landscape character.

The remaining three (3) LCZs were identified as having a NEGLIGIBLE visual impact on the landscape character.

Landscape Character Assessment					
Landscape Character Zone	Scenic Quality Rating	Receptor Rating	Visual Sensitivity	Visual Magnitude	Landscape Character Visual Impact
LCZ01 - Princes Highway & Motorway	LOW	LOW	<p>LOW</p> <p>This LCZ has been highly modified to allow for an arterial transportation corridor, including vehicular and rail within this urbanised area, where the receptors duration of visibility is limited by speed and intervening elements.</p>	<p>LOW</p> <p>As shown in the ZVI, areas of this LCZ to the east and southeast of the Project Area will have a 1 to 25% potential visibility (based on topography alone). The elevation of the Princes Highway within the potential visibility zone ranges between 3m AHD and 30m AHD. The duration of change from vehicular and rail transport is low, as the field of view traversing through is not focused on the Project Area due to intervening infrastructure, topography and vegetation, making it discernible to motorists.</p>	LOW
LCZ02 - Quarries & Related Activities	LOW	LOW	<p>LOW</p> <p>This LCZ has a strong relationship to LCZ04, where the undulating hills and vegetation screen the majority of views into the operating quarry pits within the Wentworth Hills, forming part of the landscape character surrounding the existing quarries. Select ridgelines within LCZ04 are seen to be modified from quarrying activities, which form part of the existing landscape character.</p>	<p>LOW</p> <p>As shown in the ZVI, areas of this LCZ will have 1 to 50% potential visibility of the Project Area (based on topography alone). Quarrying and related activities are visible within the Study Area and form part of the existing landscape character within the undulating hills area (LCZ04). The Project is compatible with the existing quarry and associated infrastructure present, with the size of the Project comparable to existing footprint of existing quarries in close proximity to the Project Area.</p>	LOW
LCZ03 - Natures Reserves & Recreation	MODERATE	MODERATE	<p>MODERATE</p> <p>This LCZ is located in close proximity to residential developments, which comprises dense native vegetation, a landscape feature of this LCZ which is typical of the Illawarra bioregion. In addition to native reserves, the area includes recreation spaces and parks.</p>	<p>LOW</p> <p>As shown in the ZVI, areas of this LCZ will have 1 to 50% potential visibility of the Project Area (based on topography alone). Views within this LCZ are contained by vegetation and terrain. Key nature reserves within this LCZ include Blackbutt and Killalea Reserve, where it's likely the Project Area will be screened by intervening vegetation, residential buildings and topography. It is unlikely that the Project will disturb key landscape features within this LCZ .</p>	<p>MODERATE-LOW</p> <p><i>Areas of detailed investigation in the Visual Impact Assessment (VIA), prepared by R.W. Corkery & Co, includes key viewpoints within this LCZ as noted in Section 6.</i></p>

Table 09 - Landscape Character Assessment

Landscape Character Assessment					
Landscape Character Zone	Scenic Quality Rating	Receptor Rating	Sensitivity	Magnitude	Landscape Character Visual Impact
LCZ04 - Undulating Hills	MODERATE	MODERATE	MODERATE This LCZ consists of undulating hills that are densely vegetated. This LCZ is viewed with LCZ02 & LCZ05, forming part of the overall rural landscape character between Albion Park and Shell Cove. Some areas within and surrounding the undulating hills are modified as per the land use mapping, consist of quarrying activities and grazing pastures.	LOW As shown in the ZVI, areas of this LCZ will have 1 to 50% potential visibility of the Project Area (based on topography alone). There are minimal public access points into this LCZ, with majority of traffic within this area associated with quarrying activities. The Project will include some modification of the ridgelines within this LCZ, which is a landscape feature when viewing from LCZ05 and LCZ06. The modification may be visible from some locations, however, modified ridgelines from existing quarrying activities are part of the existing landscape character from these LCZs.	MODERATE-LOW <i>Areas of detailed investigation in the Visual Impact Assessment (VIA), prepared by R.W. Corkery & Co, includes key viewpoints within this LCZ as noted in Section 6.</i>
LCZ05 - Pastures & Grazing	LOW	HIGH	MODERATE This LCZ has been modified to allow for agricultural grazing and rural properties. Within this area, a number of heritage items exist, including rural dwellings and established planting including the memorial planting of Norfolk Pines along James Road. Key landscape features include the pastures and heritage Norfolk Pines.	MODERATE As shown in the ZVI, areas of this LCZ to the east and southeast of the Project Area will have a 1 to 25% potential visibility (based on topography alone). Quarrying activities are present within the undulating hills (LCZ04), forming part of the existing landscape character when viewed from within the LCZ. There is a visual connection between this LCZ and LCZ04, where a portion of the ridgeline will be modified to allow for the Project. However, the visual magnitude is considered as moderate, as the Project is compatible with the quarrying activities that are already an existing landscape character element from views within this LCZ.	MODERATE <i>Areas of detailed investigation in the Visual Impact Assessment (VIA), prepared by R.W. Corkery & Co, include an assessment of the key dwellings and heritage items to the east of the Project Area within this LCZ as noted in Section 6.</i>
LCZ06 - Low Density Residential	LOW	HIGH	MODERATE This LCZ consists of low density residential developments in suburbs including Shell Cove, Flinders, Shellharbour and Blackbutt. The landscape within this LCZ has been modified to allow for urban development. This also includes parcels of land aligning the railway corridor to the east zoned for new development, including the proposed Shellharbour Hospital.	MODERATE As shown in the ZVI, areas of this LCZ to the east and southeast of the Project Area will have a 1 to 25% potential visibility (based on topography alone). The Project include some modification of the ridgelines within LCZ04, which is a landscape feature when viewed from the edge of Shell Cove and areas within Flinders. However, modified ridgelines from existing quarrying activities when viewed from this LCZ are part of the existing landscape character. The Project is not likely to disrupt distant views toward the Illawarra Escarpment which are a key feature of views from areas within this LCZ.	MODERATE <i>Areas of detailed investigation in the Visual Impact Assessment (VIA), prepared by R.W. Corkery & Co, includes key viewpoints within this LCZ as noted in Section 6.</i>

Table 09 - Landscape Character Assessment

Landscape Character Assessment					
Landscape Character Zone	Scenic Quality Rating	Receptor Rating	Sensitivity	Magnitude	Landscape Character Impact
LCZ07 - Mix Use Urban Precinct	LOW	HIGH	MODERATE	NEGLIGIBLE As shown in the ZVI, the Project Area is not visible from this LCZ, and will not alter the existing character of this LCZ, resulting in a negligible visual modification.	NEGLIGIBLE
LCZ08 - Estuary Environment	MODERATE	LOW	LOW	NEGLIGIBLE As shown in the ZVI, areas of this LCZ will have 1 to 25% potential visibility of the Project Area (based on topography alone). From desktop and fieldwork assessment, the undulating hills (LCZ04) are screened by vegetation surrounding the Minnamurra River, and it is likely the Project Area will not visually affect the existing landscape character from this LCZ.	NEGLIGIBLE
LCZ09 - Lake Illawarra	MODERATE	LOW	MODERATE	NEGLIGIBLE As shown in the ZVI, the Project Area is not visible from this LCZ, resulting in a negligible visual modification to the landscape character within this area.	NEGLIGIBLE

Table 09 - Landscape Character Assessment

8.0 Summary & Mitigation Measures

8.1 Summary

The intent of this report is to define the landscape character, scenic quality and sensitivity of areas within 5km to the amended Project Area. These areas, identified as Landscape Characters Zones (LCZs) were assessed using the Study Method to determine the overall visual impact rating on each LCZ located with the Study Area. A total of nine (9) LCZs were identified, with the following impact to landscape character as a result of the amended Project :

- two (2) LCZs were identified as having a 'MODERATE' visual impact;
- two (2) LCZs were identified as having a 'MODERATE-LOW' visual impact; and
- two (2) were identified as a having 'LOW' visual impact on the landscape character.

The two (2) LCZs identified as having a 'MODERATE' visual impact on the landscape character includes LCZ05 Pastures & Grazing and LCZ06 Low Density Residential. This rating was derived from the scenic quality and receptor sensitivity of the LCZs in combination with the visual magnitude of the Project on the existing landscape character. These areas are further assessed in the Visual Impact Assessment (VIA). The implementation of mitigation measures outlined in **Section 8.2** will reduce the visual impact ratings defined in **Section 7.1**.

This report has been prepared to address the request of information (RFI), issued by the Department of Planning and Environment (DPE) in December 2022, in relation to the documentation of landscape character. This LCA defines the scenic quality and sensitivity of the LCZs within the Study Area, which contributes to the understanding of the baseline landscape character analysis for the Visual Impact Assessment (VIA), prepared by R.W. Corkery & Co. The LCA assisted in the selection and assessment of the potential visual impacts of key specific viewpoints, dwellings and heritage items for the VIA.

8.2 Mitigation Methods

The following section outlines records the mitigation methods to be adopted by the Applicant to reduce potential visual modifications to the landscape character from the Project.

8.2.1 Design Considerations

Good design principles employed throughout the Project design phase can significantly reduce visual impacts. These include the siting principles, access, layout and other aspects of the design which directly influence the appearance of the Project Area. The detailed mitigation measures relating to key locations, dwellings and heritage items are present in the VIA prepared by R.W. Corkery & Co.

The following design considerations need to be considered to assist in maintaining the landscape character in which the Project is proposed:

- Retain existing vegetation surrounding the proposed extraction area within LCZ04 (Undulating Hills).
- Implementation and retention of amenity barriers of tree planting and vegetation screens to the upper extraction areas, and along the eastern and south eastern boundaries.
- Stage extraction to visually shield the majority of the extraction until vegetation screening is established along the eastern and south eastern boundaries.

8.2.2 Landscape Principles

To ensure that the proposed screen planting integrates into the existing landscape character, the vegetation screens should be planted with fast growing small trees and bushes, and low lying vegetation to ensure a naturalistic effect. Plant species are to be selected in keeping with existing plant communities generally present around the Project Area.

The existing character of the landscape allows for a variety of methods of landscaping and visual screening which will remain in keeping with the landscape character. General guidelines to adhere to when planning for landscaping and visual screening include:

- Planting should remain in keeping with existing landscape character
- Species selection is to be typical of the Illawarra bioregion
- Planting layout should avoid screening views of the broader landscape
- Avoid the clearing of existing vegetation beyond the proposed extraction area
- Applicant proposes a planting regime and not rely on regrowth

Locally native plant species are preferred, as they help to preserve the landscape character and scenic quality of the area as well as building habitat for local fauna. Native species are also well-suited to local conditions (ie. soil, climate, etc.) and will build on the existing vegetation assemblages in the area.

