Bayswater Water and Other Associated Operational Works Project

Appendix K – Landscape and Visual Assessment

Bayswater Water and Other Associated Works Project

AGL Macquarie Pty Ltd

Landscape and Visual Assessment

Final | 02

18 November 2019

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Bayswater Water and Other Associated Works Project

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02	18/11/2019	Final (non-technical updates)	KF	KF	TM	TM

Contents

Executive Summary

The Project comprises works within Bayswater Power Station to ensure its continued safe, efficient and reliable operation, based on post-installation advances in water and wastewater management. Works would comprise additional infrastructure and facilities, most notably the increase in height by 11.5m of an ash dam using earth embankments.

The Project would impact upon a low-quality rural landscape that has been heavily influenced by activity relating to mining and power station related operations. Two Landscape Character Units have been identified as receptors to the Project. Impacts would be consistent with previous development within the area which would be considered to have minimal effect upon the existing landscape character.

Land ownership local to the Project is entirely private and not accessible to the general public. Potential views of the Project may become available from the New England Highway which has been identified as the only potential visual receptor from publicly accessible land. Views from this linear receptor have potential to be glimpsed from moving traffic and would likely be filtered by intervening landform and vegetation. No residential visual receptors have been identified and a full visual assessment would not be required.

It is considered that the Project would have a **negligible** overall effect from both landscape receptors.

1. Introduction

AGL Macquarie own and operate the Bayswater Power Station (**Bayswater**), located approximately 15 km south-east of Muswellbrook, NSW. Bayswater was commissioned in 1985 to utility standards of the time and has a current technical life up to 2035. Prior to its retirement, water and wastewater infrastructure and site improvements are required to ensure its continued operational and environmental performance.

The proposed Water and Other Associated Operational Works Project (**Project**) at Bayswater would ensure the continued safe, efficient and reliable operation of Bayswater t until its retirement. This Project provides the opportunity for improvements based on post-installation advances in water and wastewater management.

Jacobs, on behalf of AGL Macquarie has been commissioned to prepare an Environmental Impact Statement (**EIS**) for the assessment of infrastructure and water upgrade works, in accordance with Division 4.7 of the *Environmental Planning and Assessment Act* 1979 (NSW).

1.1 Description of works

The purpose of the Project is to improve the management of these ancillary processes over the remaining operating life of Bayswater. The Project would include:

- Augmentation of the existing Bayswater ash dam to provide additional ash storage capacity;
- Improvements to water management structures and systems to ensure continued collection and reuse of process water and return waters from the Bayswater ash dam;
- Improvements to the management of water and waste materials within the coal handling plant sediment basin and associated drainage system;
- Increasing coal ash recycling activities to produce up to 1,000,000 tonnes per annum of ash derived product material and reuse of coal ash;
- Upgrades to existing fly ash harvesting infrastructure including the installation of weighbridges, construction of a new 240 tonne silo, tanker wash facility and additional truck parking;
- Construction and operation of a new coal ash pipeline to Ravensworth Void No. 3 for ash emplacement;
- Construction and operation of a salt cake landfill facility to dispose of salt cake waste; and
- Construction and operation of up to four borrow pits to facilitate the improvements proposed for the Project and other works on AGL Macquarie land.

In addition, the Project would include routine clearing of vegetation along the alignments of the Lime Softening Plant (LSP) Sludge Line and High Pressure (HP) Pipeline to provide ongoing access for maintenance and management within the disturbance footprint. The Project elements are presented in Figure 1-2.

During construction, typical plant and machinery would be present within Bayswater. However, it is assumed that works would not be visible to any sensitive receivers and activities. Earthworks, truck movements and installation works would be consistent with the existing functioning of Bayswater, as an operational power station.

For the purposes of this assessment, it is assumed that once operational the majority of the Project would be located at or close to ground level. However, the augmentation of the ash dam would involve the construction of an 11.5-metre-high levee embankment on the western perimeter. This is assumed to be the most visually prominent element of the Project.

1.2 Location and context

Bayswater is located on the New England Highway, approximately six kilometres west of the locality of Liddell and approximately 15 kilometres south east of the township of Muswellbrook in the Upper Hunter Valley of New South Wales (see Figure 1-1). Bayswater lies within the Local Government Areas of Muswellbrook and Singleton. The study area comprises water and other works infrastructure related to Bayswater.

Bayswater's immediate operational area occupies approximately 300 hectares. The Project is predominately located on land owned by AGL Macquarie, although some Project infrastructure also crosses road reserves owned by Roads and Maritime Service, Singleton Council, and small area/s of Crown land.

1.3 Assumptions and limitations

This report has been based on information received from AGL Macquarie and observations made via desk top study.

1.4 Authorship and acknowledgements

This report has been prepared by Jacobs Landscape Architect, Mark Lawton with the assistance of Jacobs Urban Planner, Elaine Yong. A technical review was undertaken by Jacobs Principal Landscape Architect, Carlo Missio. Mapping/GIS was prepared by Lisa Weber, Jacobs Spatial Consultant.

1.5 Scope and purpose of this report

This report presents the results of an assessment of landscape and visual impacts within the study area.

The purpose of this report is to advise of the potential landscape and visual impact of the proposed works at Bayswater , and the effects of the proposed development upon the receiving landscape. The proposed development that is the subject of this assessment, as outlined in Section 1.1, will be referred to as "the Project" within this report.

The Project is to be built mainly within the boundary of Bayswater, which will be referred to as "the site" within this report. The term "study area" will be used to define the area from which the change would be identifiable. The term "impact" will be used to describe the introduction of each element of the Project to the landscape setting and the term "effect" will be used to describe the change resulting from that action.

This assessment forms part of the EIS for the Project and responds to the Secretary's Environmental Assessment Requirements (**SEARs**) issued on 30th November 2018 (see Section 1.6). Further details of the Project are provided in the EIS. The full assessment methodology used for this assessment is described in Appendix A.

1.6 Secretary's Environmental Assessment Requirements (SEARs)

The SEARs for the Project were issued on 30th November 2018. This report has been prepared in part to address the SEARs. The Table below summarises the SEARs and outlines the relevant sections of this report where they have been addressed.

Compliance with the visual components of the SEARs

SEARs	Addressed in this report
The EIS must address the following specific matters:	

Visual – including:
• a detailed assessment of the:
  ○ changing landforms on site during the various stages of the development;
  ○ potential visual impacts of the development on private landowners in the surrounding area as well as from key vantage points in the public domain; and
	A description of the Project, including the visual prominence of each Project element is presented in Section 5.1
	
	Figure 2-2 shows the visual catchment of the Project, noting that this has been based on a bare earth analysis, not taking into account any built environment or vegetation heights.

• a detailed description of the measures that would be implemented to minimise the visual impacts of the development;	Mitigation measures are outlined in Section 6.

Data sources

Jacobs 2019,
AGL 2019,
NSW Spatial Services 2019

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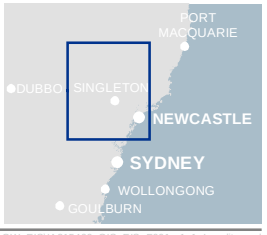

Figure 1 - 1 Project location

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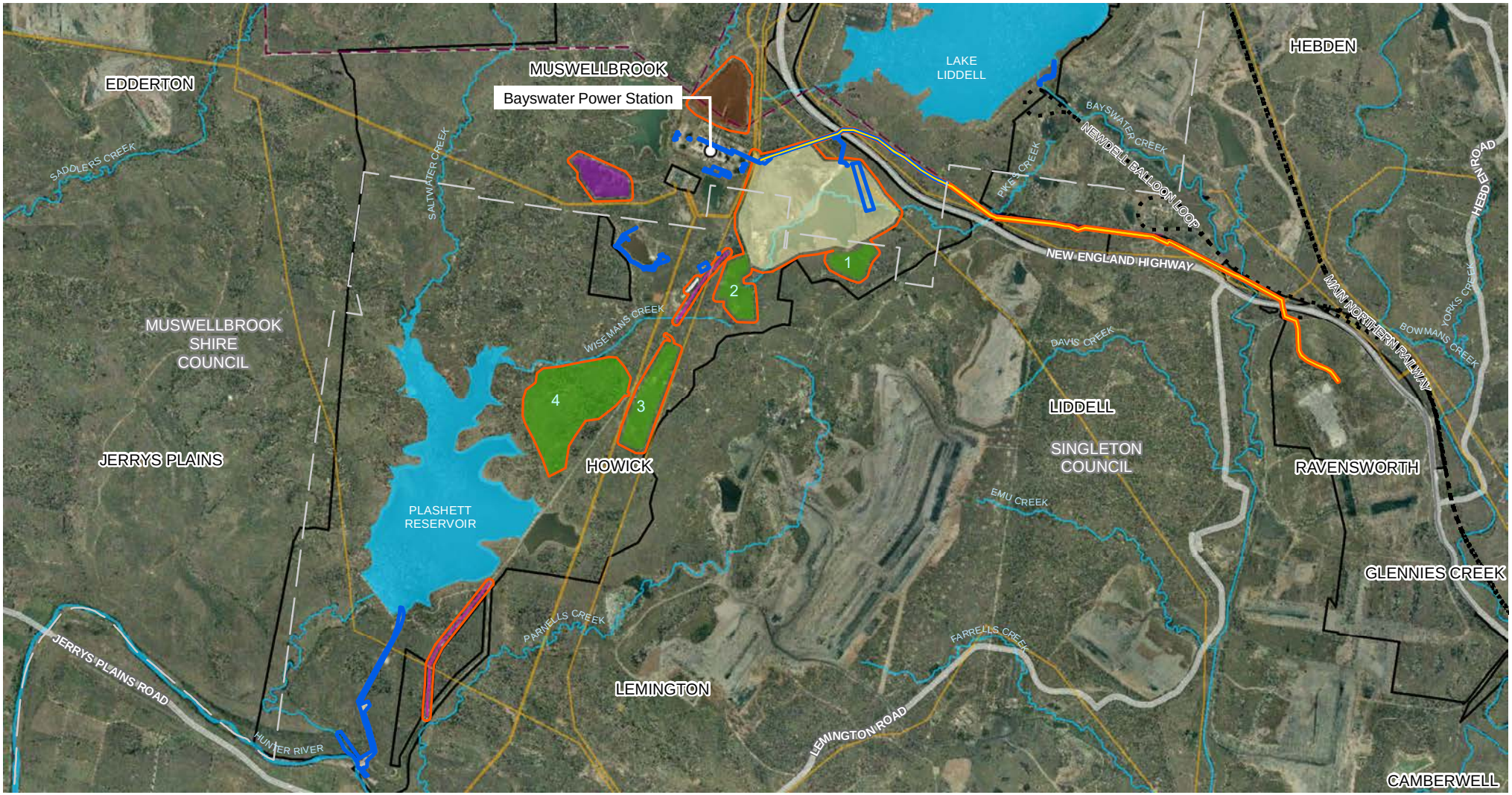

- Study area
- Local Government Area boundary
- Footprints of approvals to be surrendered
- AGL owned land
- Railway
- Electricity transmission line
- Coal supply conveyor

Project elements:

- Ash Dam Augmentation, Ash Harvesting and Water Management Works
- Ravensworth Ash Line
- Coal Handling Plant Water and Wastewater Infrastructure Upgrades
- HP Pipe Clearing
- LSP Sludge Line Clearing
- Clay Borrow Pits
- Salt Cake Landfill

0 2 4 km

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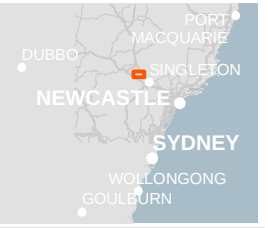

Data sources
Jacobs 2019
AGL 2019
NSW Spatial Services 2019

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Figure 1 - 2 AGL Site Plan and Project Elements

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2. Viewshed

A viewshed can be defined by the distance at which the proposed works are either a miniscule element or indiscernible within a viewer's field of view. A viewshed is not defined by the limit of visibility, but rather a distance from which the proposed alteration forms such a small component of the view that the visual impact would be indiscernible. Calculating a viewshed can be dependent on the topography, viewing angle, changes to the use and intervening vegetation. The viewshed is the area from within which the development could create a recognisable visual impact for a viewer. Anthropometric data determines the limit of visual recognition to be 0.5% of the vertical field of vision of the average person. This can be used to calculate the distance from which a development can be viewed within the landscape and determine potential visual receptors.

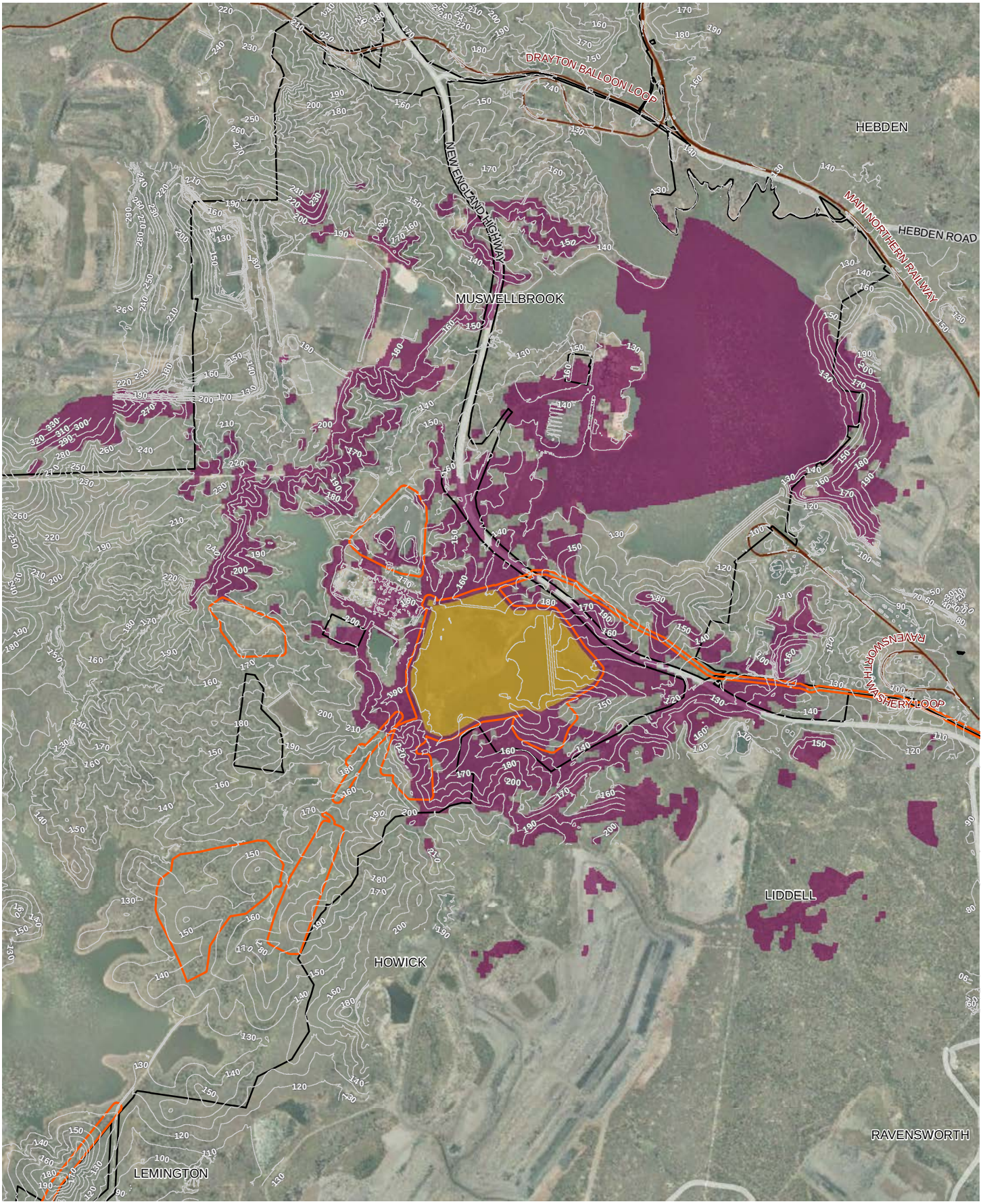
At Bayswater, the proposed increase in height of the ash dam by 11.5m is the most visually prominent element of the Project. The ash dam has therefore been used to define the viewshed for this Project, as it is the only potentially visible element of the Project. The augmented ash dam is also located adjacent to the New England Highway road corridor. The distance over which the proposed, additional 11.5m height change of the ash dam wall could be viewed by the 0.5% vertical field of vision is 1260m or 1.26km. This distance is used to define the viewshed for the purposes of this report. Visibility from the 1.26km offset from the ash dam would be limited by the receiving landscape for the scheme which comprises gently rolling hills, and areas of modified landform associated with development relating to Bayswater and surrounding mining operations. Further filtering and obstruction of views would be provided by both scattered, individual trees and small areas of woodland distributed across the landscape.

There are no residential properties within 1.26 km of Bayswater and the only potential visual receptor would be users of the New England Highway (A15). The New England Highway forms part of the inland road network that links Sydney to Brisbane as part of Australia's National Highway system. The New England Highway traverses the study area on a broadly northwest to southeast alignment and passes between the Bayswater and Liddell power stations whose access is served by a complex highway junction. It is understood that 30% of New England Highway road users are heavy vehicles (Jacobs Traffic and Transport Assessment, 2019), and it is likely that many road users would be associated with the power stations and surrounding mining operations. Near the site, the New England Highway is dual carriageway, with two lanes in each direction and a central median. No public transport services operate on the road network near the Project. Public appreciation and visual exposure to the local area are largely restricted to views from the road network where visibility beyond the New England Highway corridor is frequently filtered by sections of highway cutting and embankment and extensive belts of mature woodland vegetation. Views are typically of expansive skyscapes with long views available ahead, down the highway. Occasional, elevated, open stretches of highway offer broad views across the landscape towards far ridgelines, however much of the route in the vicinity of Bayswater is visually contained on both sides of the road by mature woodland vegetation or landform. Occasional glimpse views beyond the highway corridor may be available where gaps between landform and vegetation align. Furthermore, the tall chimneys of both Liddell and Bayswater power stations are frequently visible above the treeline as well as spoil dumps associated with mining operations.

A Visual Envelope (**VE**) has been prepared for the site within the study area and this is illustrated in Figure 2.1. This is an approximation of the extent of potential visibility of the Project, calculated from a 1.6m height viewer standing in the centre of the site. The VE is computer generated as a "bare-earth" representation and does not consider intervening vegetation. Figure 2.2 illustrates the area from which the modified landform would potentially be visible (Zone of Visual Influence (**ZVI**)). The 1.26km viewshed has been overlaid over the ZVI for reference to demonstrate the areas in which the Project, once operational, would be visible. It should be noted that there is little difference in the areas of visibility on the VE and ZVI which illustrates both the visual containment of the area and the limited change that would occur within the view. Visibility would be further restricted within these areas of visibility by landform, vegetation and the extensive private ownership of land that restricts public access.

There are no New England Highway stopping points or lay-bys that would be afforded views of the proposed changes, therefore potential views would be limited to oblique, glimpse views from moving vehicles travelling at speed in either direction within the road corridor. Potential views towards the new landform would be filtered by landform and vegetation and would likely visually merge with the existing, modified landscape associated with Bayswater, mining operations and the highway. It is unlikely that the change would be discernible within any potential glimpse, filtered, oblique views from the highway.

Based on the limited visibility of the Project from potential visual receptors and the lack of sensitive viewpoints or receivers within the VE a detailed visual impact assessment is not being considered further within this report.

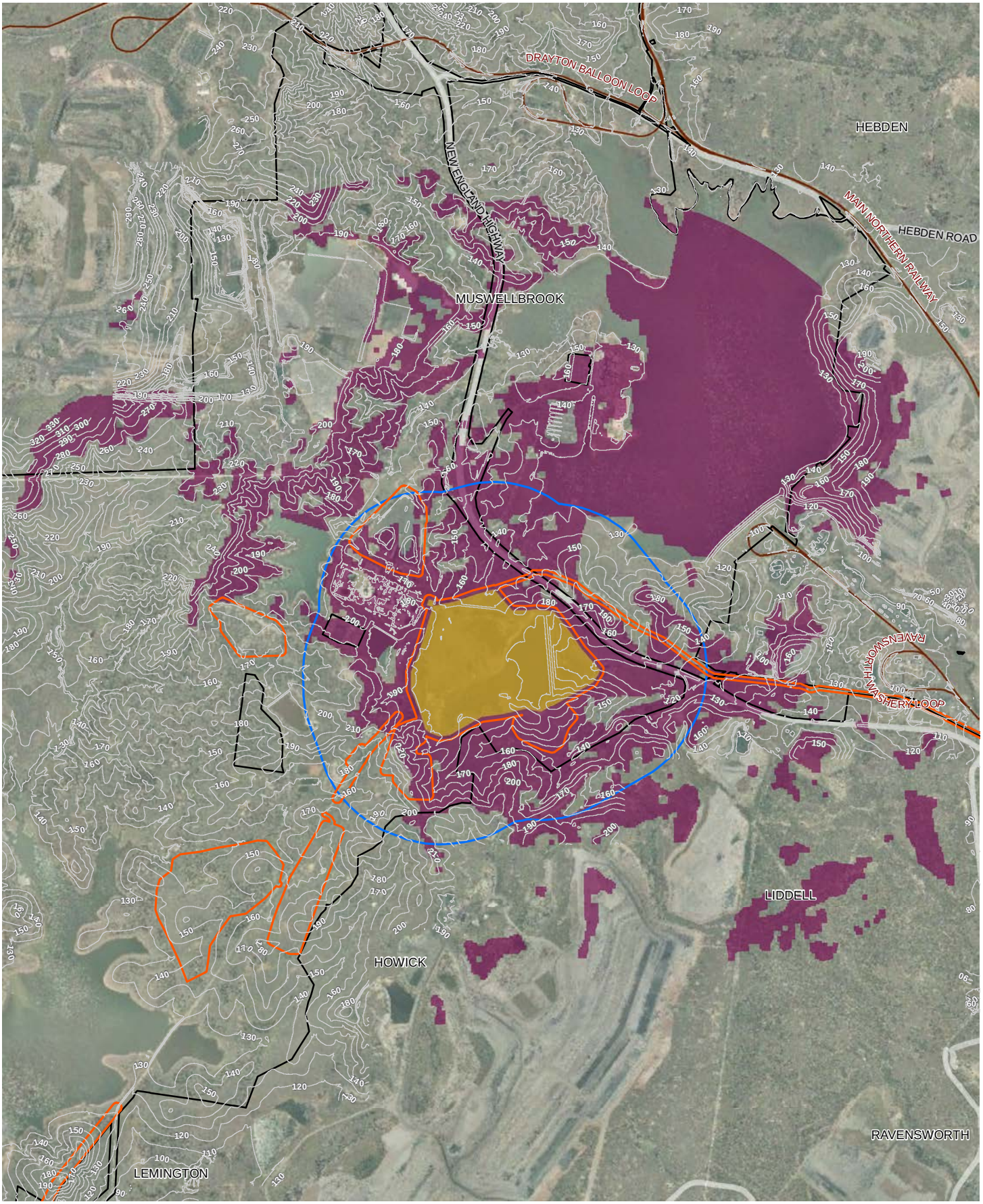


Data sources

Jacobs 2019, AGL 2019, OEH 2019
NSW Spatial Services 2019

GDA94 MGA56

Figure 2-1 **Bayswater - Existing visual envelope**



Data sources

Jacobs 2019, AGL 2019, OEH 2019
NSW Spatial Services 2019

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Figure 2-2 **Bayswater - Theoretical zone of visual influence**

3. Statutory and Planning Context

3.1 Zoning

The Project is located partially within the Muswellbrook Local Government Area and is subject to the Muswellbrook Local Environmental Plan 2009 (**Muswellbrook LEP**). The Muswellbrook LEP locates the Project within land zoned SP2 – Infrastructure (Power Station).

The objectives of the SP2 Infrastructure zone are:

- To provide for infrastructure and related uses;
- To prevent development that is not compatible with or that may detract from the provision of infrastructure;
- To recognise existing railway land and to enable future development for railway and associated purposes;
- To prohibit advertising hoardings on railway land;
- To recognise major roads and to enable future development and expansion of major road networks and associated purposes; and
- To recognise existing land and to enable future development for utility undertakings and associated purposes.

The only development types permitted within the zone are roads and the purpose shown on the Land Zoning Map, in this case 'Power Generation', including any development that is ordinarily incidental or ancillary to development for that purpose.

The Project meets the definition of Power Generation and as such is permissible with development consent under the Muswellbrook LEP.

The Project is also located within land zoned as RU1 – Primary Production under the *Singleton Local Environmental Plan 2013* (**Singleton LEP**). The objectives of this zone are:

- 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; and
- To minimise conflict between land uses within this zone and land uses within adjoining zones.

While electricity generation, and associated infrastructure for the purposes of electricity generation, are not listed as permissible with or without consent under this zone, under clause 34 of *State Environmental Planning Policy (Infrastructure) 2007* (**ISEPP**) development for the purpose of electricity generating works may be carried out by any person with consent on any land in a prescribed rural, industrial or special use zone.

Therefore, the Project is permissible, and aligns with the objectives of the land zoning it is within.

The Project is also relevant to the operation of Bayswater and is in line with the current landscape and existing land uses of the area as a working and productive rural landscape.

3.2 Surrounding land uses

The land use zones in the areas surrounding the site largely comprise land which is zoned RU1 – Primary Production. Other land use zones in the locality include RE1 – Public Recreation to the east and E3 – Environmental Management land to the north (see Figure 3-1).

The surrounding area is characterised by mining operations, rolling hills, grazing land and bushland. The existing surrounding land uses have a low number of sensitive receivers.

3.3 Strategic land use

The “Muswellbrook Residential and Rural Residential Strategy” (SGC; 2014) identifies future residential development areas close to the existing Muswellbrook town centre and Denman. The Draft Muswellbrook Local Strategic Planning

Statement (**LSPS**) identifies the surrounding area for coal mines and agribusiness. The visual landscape is not expected to significantly change to include more sensitive receivers.

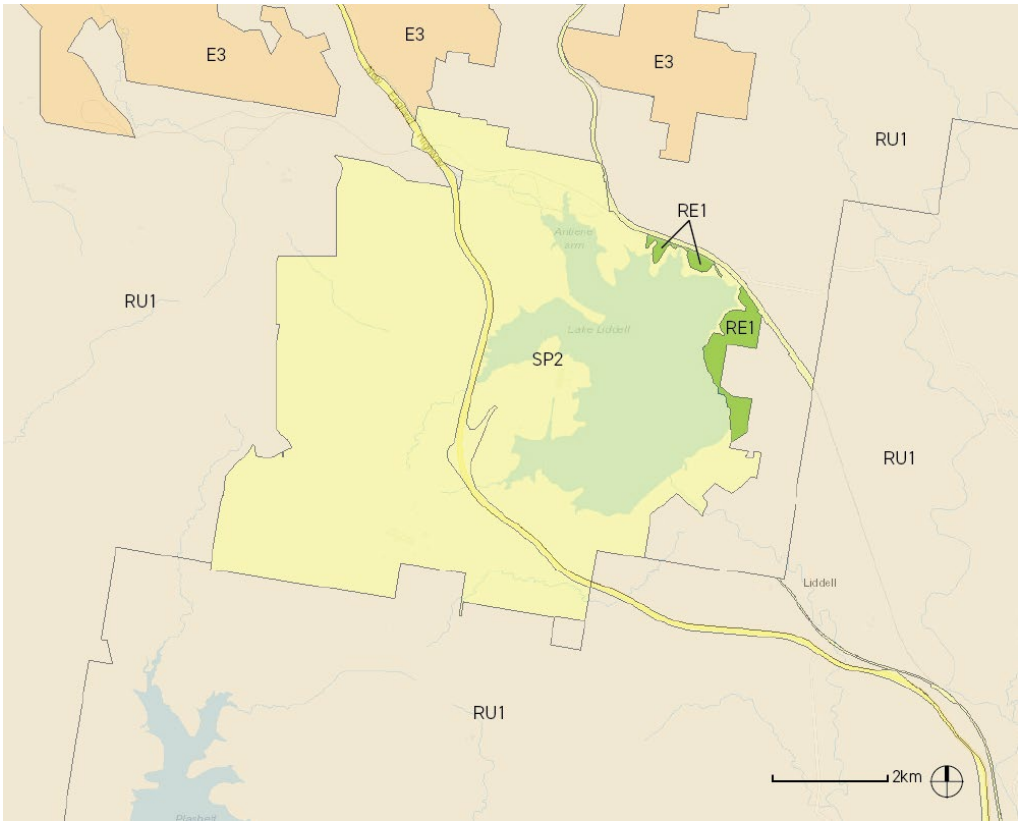


Figure 3-1 Land Use Zones (Source: Muswellbrook LEP 2009)

3.4 Heritage Items

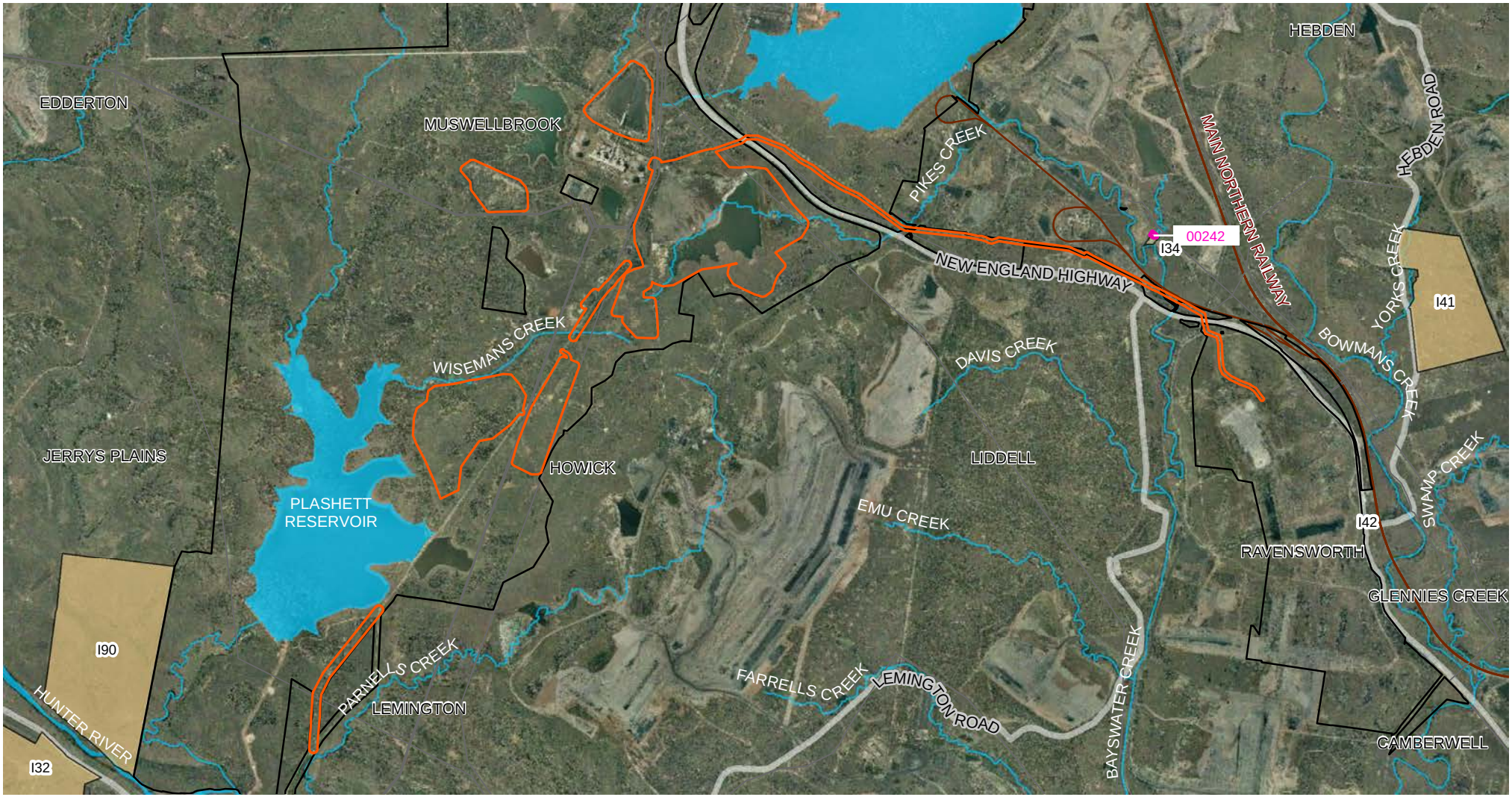
Clause 5.10 of both the Muswellbrook LEP and Singleton LEP requires that Councils consider the effect of the Project on the heritage significance of a listed item, including visual landscape impacts.

Both Non-Aboriginal and Cultural heritage assessment reports have been prepared to support the EIS for this Project.

Searches of National, State and Local heritage databases were undertaken as part of the Bayswater Non-Aboriginal heritage assessment (Jacobs, 2019), which identified only one heritage item within the vicinity of the Project. This item is the former Chain of Ponds Inn, located approximately 500 metres from the proposed Ravensworth ash line, on the north eastern side of Bayswater Creek. This item is registered on the State heritage register (SHR00242) and the Singleton LEP (Item I34). A further three items of local heritage significance are listed in the surrounding area:

- Item I41 – Ravensworth homestead (Singleton LEP);
- Item I32 - Weatherboard hall (Muswellbrook LEP); and
- Item I90 - Plashett Homestead (Muswellbrook LEP).

Each of these items are subject to the provisions of Clause 5.10 of the Muswellbrook and Singleton LEPs. The location of these listed heritage items are presented on Figure 3-2. These items are located beyond the theoretical ZVI presented in Figure 2-2, and would therefore not be visually impacted by the Project.



Study area
AGL owned land
State Heritage Register item
Heritage (EPI):
Item - General

0 1 2 km

1:75,000 at A4

N

Data sources

Jacobs 2019, AGL 2019,
DPE 2019, OEH 2019
NSW Spatial Services 2019

GDA94 MGA56

Figure 3.2 Heritage items in proximity to the project area

4. Landscape Units and Sensitivity

Landscape character typically results from the combination and interaction of landscape components such as land use, vegetation, topographic features, settlement pattern, cultural heritage, scale and visual amenity. This stage of the assessment establishes the existing landscape conditions and provides an understanding of the character and quality of the receiving landscape within which the Project would be located. It includes a description of the defining features and characteristics of the locale. Landscape units are described, defined and evaluated to identify the most valued areas and those displaying high quality characteristics

The study area for this section has been defined as extending for a 3 km radius from the site. This relatively contained area is in recognition of the visual containment of the site afforded by the undulating landform, tracts of mature vegetation and the lack of publicly accessible land within proximity to the site.

4.1.1 Landscape Features, Character & Quality

The study area displays characteristics typical of a rural landscape within the upper Hunter Valley of NSW. The local landscape broadly comprises rolling, open landform vegetated by rough grassland with scattered trees, drifts of mature woodland and areas of maturing plantation. A number of creeks wind through the landscape and link to occasional waterbodies of varying scale. Roads cut across the landscape to serve the sparsely located residences, provide access to Bayswater and Liddell Power Stations and mining operations, and loosely connect the farmsteads along the Hunter Valley and the New England Highway. The undulating landform offers both visual containment and occasional, extensive views across the surrounding landscape towards far ridgelines.

The landscape local to Bayswater is heavily influenced by industrial activity. Local land use is dominated by large-scale infrastructure associated with the Bayswater and Liddell Power Stations and opencast mining activities at Ravensworth Mine Complex, Mount Arthur Coal, Hunter Valley Operations, Liddell Coal Mine and the former Drayton Mine. Further associated land uses include the large-scale waterbodies of Lake Liddell and Plashett Reservoir which supply cooling water to Bayswater and Liddell Power Stations.

Views of large-scale infrastructure are frequent and characteristic within this landscape and comprise; mining activities, reservoirs, the built form and chimneys of Bayswater and Liddell Power Stations, pylons, overland pipelines and the highway infrastructure connecting to the New England Highway. Extensive planting and sections of cutting along the New England Highway provide some visual screening. Occasional long views are available towards both Liddell and Bayswater Power Stations and the extensive lines of pylons, typically seen on the skyline beyond the rolling landscape.

4.1.2 Landscape Character Units and Evaluation

Through desktop study and photographs provided from site walkovers undertaken by the project team, areas of distinct, recognisable and consistent common character were grouped together taking account of characteristics including landform, land-cover, vegetation type and extent, geology, built forms, historic features, hydrology, communications, features of local significance, general components of the landscape and perceptual factors. These elements were recorded and collated and used as a basis to identify and define two separate, local landscape character areas to inform the Landscape Visual Assessment (**LVA**):

Local Landscape Character Unit 1 (LCU 1): Mining and Industrial Activities

The broad characteristics of this character unit can be identified as:

- typically restricted public access;
- land use of power station associated operations comprising;
    - large-scale built form, industrial architecture and chimneys;
    - associated infrastructure; access roads and tracks, electricity pylons, above-ground pipelines;
    - associated waterbodies – Lake Liddell, Plashett Reservoir;
- land use of open cast mining associated operations comprising;
    - deep and extensive excavations;
    - modified landform in restored areas/ excavated material storage bunds; and
    - access roads and regular, large vehicle movements.

The baseline condition of LCU 1 has been identified as being of **Poor quality** – the landscape has been compromised by long term, large-scale industrial operations. Whilst remnants of the agricultural landscape remain, the immediate environs of Bayswater and the surrounding mining areas have been degraded and feature detracting features such as industrial buildings and associated infrastructure comprising above ground pipelines and electricity pylons. Management of these landscapes appears to be based on function, with few concessions made to address potential aesthetics or screening.

Further to the establishment of the quality/ value of the receiving landscape, judgement must be made as to the sensitivity of each receptor to the change/ impact resulting from the proposed development. LCU 1 has been determined as being of **Negligible sensitivity** as the landscape does not display inherent, unique features and is generally of low quality and has been damaged by industrial development/ activity and infrequent/ uncoordinated management.

Local Landscape Character Unit 2 (LCU 2): Rural Agricultural Lands

The broad characteristics of this character type can be identified as;

- landcover of rough grassland, scrub woodland and scattered trees;
- land use typically cattle grazing;
- gently undulating landform – rounded hills and flat-floored valleys;
- frequent creeks;
- scattered farmsteads; and
- panoramic, broad views across the landscape.

The baseline condition of LCU 2 has been identified as being of **Ordinary quality** – the landscape appears to have had infrequent management which has resulted in degradation of its quality over time. The frequent panoramic views, tracts of vegetation and rolling landform offer a distinguishable landscape structure with some noteworthy features.

LCU 2 has been determined as being of **Negligible sensitivity** as whilst the landscape does display attractive characteristics, they are not unique. The Unit is typically of ordinary quality, with land use being dominated by cattle grazing and with broad, undulating landform of a scale tolerant to change, featuring frequent views of industrial development/ activity and its related infrastructure.

5. Impacts

The purpose of this section is to systematically identify and assess the potential landscape impacts of the proposed development. The following text establishes further the baseline landscape in the locality of each of the proposed works as well as the nature and extent of the proposed changes. This section should be read in conjunction with Figure 1-2.

5.1 Description of the Impact of the Project

5.1.1 Ravensworth coal ash pipeline

The existing coal ash pipeline is aligned through a landform of low rolling hills with low-gradient slopes, rounded tops, and flat-floored valleys. Existing above-ground pipelines, conveyors and vehicular tracks run along the entire length of the ash line corridor (Figure 5-1). Disturbed ground lies either side of the corridor and is assumed to result from construction works comprising track grading, drain excavation, capping, and other related earthworks. Further areas of disturbance occur where the corridor is crossed by road bridges and conveyors; and where graded and gravel-capped laydown yards have been constructed. As a result, few remnant, intact areas of landscape remain along the corridor.

Figure 5-1: Vehicle track and working coal conveyor (ash line out of frame to right) (Source: Jacobs 2019)

Proposed Works

The proposed works would comprise installation of an additional coal ash pipe alongside the existing pipeline connecting Bayswater to the Ravensworth Ash Disposal Area. Additional ground disturbance is anticipated as a result of the proposed works and would likely include some loss of existing vegetation to clear a route for the pipe construction/ alignment and grade excavated material. The above ground alignment of the pipeline and presence of an existing track along the length of the proposed route should limit disturbance and any potential direct landscape impacts.

5.1.2 Ash dam augmentation

The ash dam augmentation area consists of a landform of low, rolling hills. Pike's Creek runs through the area from the southwest to southeast. The existing ash dam is extensive and is located centrally within the augmentation area. The dam wall runs north-south to the eastern and areas inundated by water and ash slurry cover much of the west of the dam. The Ravenswood ash-line runs along the northern periphery of this area. Adjacent to the ash dam itself, existing modern buildings, vehicle parking, laydown yards, vehicle tracks, and a pipeline have been constructed and a high-voltage powerline and associated pylons are aligned northwest-southeast. Most of this area has been subject to disturbance from construction activities during the operational life of the ash dam and Bayswater and little remains of the pre-existing landscape.

Land to the south of the ash dam comprises low, rolling hills, with some areas of exposed bedrock caused by erosion. The majority of the area appears otherwise largely undisturbed.

To the west the landscape features vehicular tracks, artificial ponds, high voltage powerlines and associated pylons. Furthermore, the ground is patterned with linear plough lines and furrows, indicating that the entire area has probably been subject to the low-level disturbance of ground ploughing and perhaps contour bank formation in the recent past.

Figure 5-2: Open fields to the south of the ash dam, looking north-west (Source: Jacobs 2019)

Proposed Works

The proposed works at this location comprise increasing the capacity of the ash dam by raising the height of the dam retaining structure by 11.5m. It is understood that locally excavated material will be used to form earth mounding around the dam and that the during operation, the landform groundcover will comprise bare earth. Physical changes resulting from the proposed works will comprise the increased elevation of the dam wall earth embankments. It is likely that the profile of the extended embankments would be integrated to merge with that of the existing dam wall and surrounding natural, undulating landform.

5.1.3 Salt cake landfill

The salt cake landfill area is located within a landscape of low, rolling hills (Figure 5-3and Figure 5-4) and is currently subdivided into parcels of land used for gypsum handling, stockpiling of construction materials, storage sheds, vehicle parking, laydown areas and other ancillary power plant works. Most of this area has been subject to disturbance from construction activities during the operational life of Bayswater.

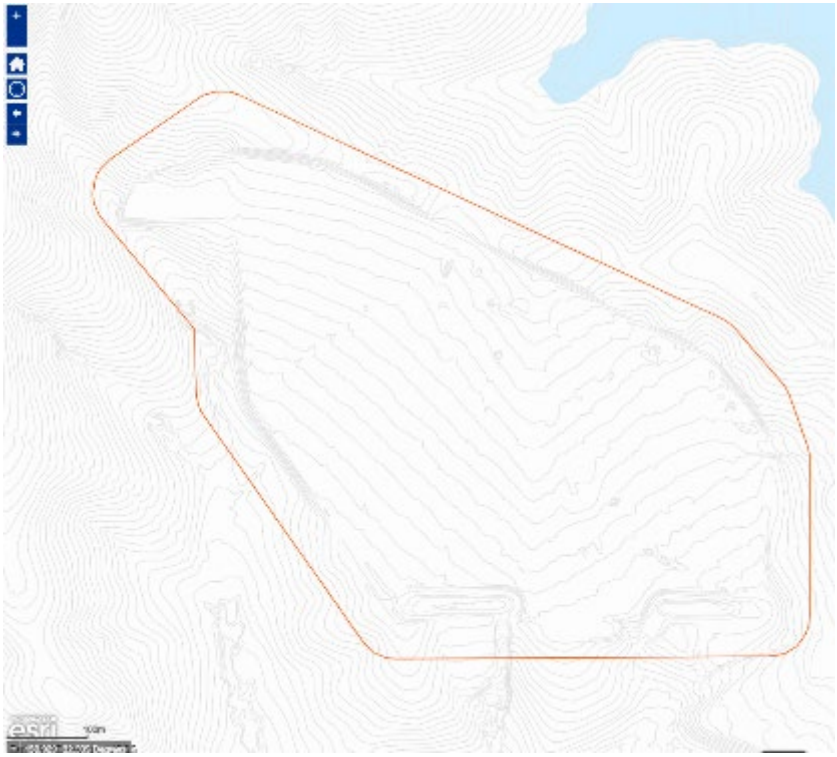


Figure 5-3: Mapping of salt cake landfill area overlaid with 1 m contour lines (Source: Jacobs 2019)

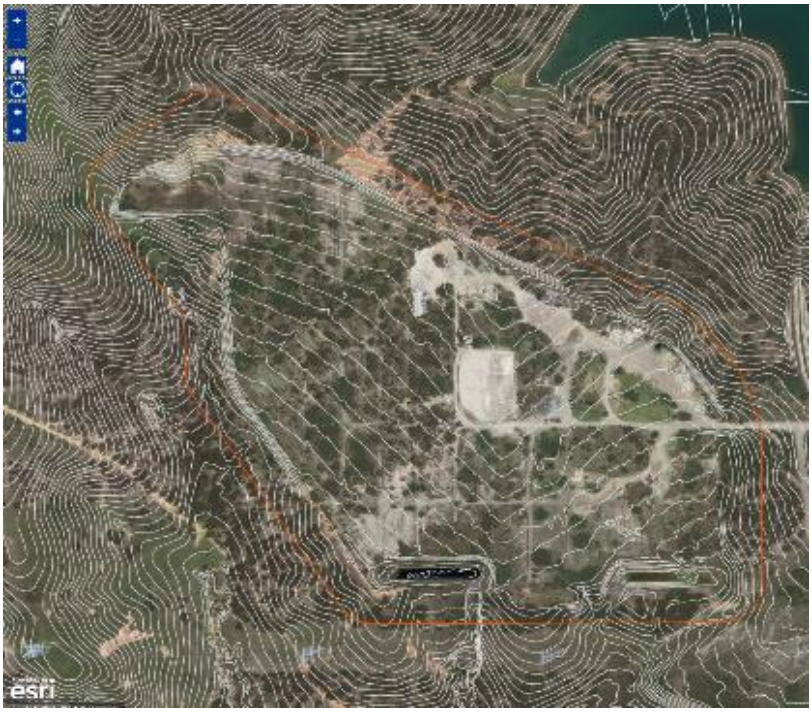


Figure 5-4: Salt cake landfill area with aerial base map (Source: Jacobs 2019)

Figure 5-5: View towards the proposed entrance to the salt cake landfill area, looking south-west (Source: Jacobs 2019)

Proposed Works

The proposed works at this location comprise construction and operation of a salt cake landfill facility to dispose of salt cake waste. Physical changes resulting from the proposed works will comprise the loss of extensive scrub vegetation and trees and changes to landform.

5.1.4 Coal Handling Plant (CHP)

The CHP area is almost entirely covered by the extant, operational CHP, with the majority of the area currently buried underneath a coal stockpile within an area of ground that has been artificially lowered several metres by prior earthworks. The coal stockpile is surrounded by chain-link fencing, a drainage trench, a vertical excavation face rising up to the surrounding ground surface and vegetation with Eucalypt saplings and casuarinas (Figure 5-6). To the south, the CHP area is immediately adjacent to Bayswater itself. A dense array of buildings, conveyors, vehicle tracks, carparks and other infrastructure cover all the ground between the coal stockpile and Bayswater.

Figure 5-6: Rehabilitation vegetation on the outer margin of the CHP (Source: Jacobs 2019)

Proposed Works

Upgrades are proposed as part of an Environmental Improvement Program at Bayswater and comprise a range of small improvements to ultimately reduce the quantity of water discharges to Tinkers Creek. Physical changes are likely to be minimal.

5.1.5 Borrow Pit 1

This area consists of low rolling hills, and flat-floored valleys used for grazing. The ground surface rises upward to the north, toward the hilltops bordering the ash dam. To the south the ground surface slopes downward into a flat-floored valley running east-west along the area's southern border. Some small farm dams have been constructed along drainage lines within the area.

Figure 5-7: Borrow Pit 1 - View down into the valley, looking south-east (Source: Jacobs 2019)

Proposed Works

Excavation is required to generate clay material to construct the ash dam. Quantities of excavation may vary as required and the landform is understood to be reinstated to blend into the existing landform. Whilst construction impacts would likely be considerable, the proposed reinstatement would result in long term physical changes being minimal.

5.1.6 Borrow Pit 2

This area consists primarily of a large round-topped hills with a crest in the centre of the area, dropping away to the north, east and west. The slopes running eastward drain into the headwaters of Pike's Creek. The slopes in the west and south of the area drain into Wiseman's Creek, which runs past the southern boundary of the area. Land use is typically grazing. Erosion has stripped away the soil from several of the steepest slopes, and in some areas has exposed the underlying bedrock. In most areas, erosion, which is understood to likely be associated with rabbit infestations, has stripped away all topsoil and exposed the underlying yellow-orange subsoil.

Proposed Works

Excavation is required to generate clay material to construct the ash dam. Quantities of excavation may vary as required and the landform is understood to be reinstated to blend into the existing landform. Whilst construction impacts would likely be considerable, the proposed reinstatement would result in long term physical changes being minimal.

5.1.7 Borrow Pit 3

This area also consists of rolling hills and flat-floored valleys. The ground slopes downward toward the west of the area and am unnamed creek runs from east to west through the centre of the area to join Wisemans Creek to the west. Two farm dams have been constructed on the ephemeral creek running through the area. To the south of the creek line, a circle of trees with a central clearing showed signs of past camp activity, with a metal tub likely used as a hearth or small stock-feeding tub (Figure 5-8**),** and a wooden structure of indeterminate purpose (Figure 5-9).

Figure 5-8: Metal tub, likely either a hearth or feeding tub, looking north-east (Source: Jacobs 2019)

Figure 5-9: Indeterminate wooden feature, likely livestock related, looking south-west (Source: Jacobs 2019)

Proposed Works

Excavation is required to generate clay material to construct the ash dam. Quantities of excavation may vary as required and the landform is understood to be reinstated to blend into the existing landform. Whilst construction impacts would likely be considerable, the proposed reinstatement would result in long term physical changes being minimal.

5.1.8 Borrow Pit 4

This area consists of rolling hills, with rounded tops, low gradient slopes and flat-floored valleys. The ground falls away to the northwest and south of the area. The southern extents of the area drain southward into a small ephemeral creek that runs southwest into Plashett Reservoir. The northern half of the area drains to the northwest into Wisemans Creek, which flows in a south westerly direction to Plashett Reservoir. Land use is typically grazing.

Some farm dams have been constructed on the ephemeral creek running through the area. Contour banks have been cut into the side of the hillslope toward the northern edge of the area to control water runoff into Wisemans Creek.

A series of cattle yards and modern metal run fencing have been installed at the entrance to this borrow pit area (Figure 5-10). The fencing material, gates and shipping container present all appear to be relatively recent.

Figure 5-10: Fences, gate and stock run at the entrance to Borrow Pit 4, looking south-east (Source: Jacobs 2019)

Proposed Works

Excavation is required to generate clay material to construct the ash dam. Quantities of excavation may vary as required and the landform is understood to be reinstated to blend into the existing landform. Whilst construction impacts would likely be considerable, the proposed reinstatement would result in long term physical changes being minimal.

5.2 Landscape Character Effects

Following identification of the landscape impacts of the Project identified in the previous section, the effect of the proposed changes upon landscape receptors is explored in this section. When considering the predicted effect on landscape receptors, the magnitude of change resulting from the Project is determined by combining judgements about the predicted size and scale of the change, the extent of the area over which it occurs, its reversibility and whether it is short or long term in duration. Two Landscape Character Units have been identified as landscape receptors and the Project would result in the following effects upon them;

LCU 1: Mining and Industrial Activities

The receiving landscape is associated with long term, large-scale industrial operations. Whilst remnants of the pre-existing agricultural landscape remain, the surrounding area has been degraded and feature detracting elements comprising industrial buildings and associated infrastructure such as above ground pipelines and electricity pylons. The landscape does not display inherent, unique features and has been damaged by industrial development/ activity and infrequent/ uncoordinated management.

The Project would result in very minor loss or alteration to key elements/features of the remnant agricultural landscape and the changes would be characteristic within the environs of the power stations and mining operations within the LCU. It is unlikely that the changes would be remarkable within the context of Bayswater and the magnitude of change upon LCU 1 is therefore **negligible**.

LCU 2: Rural Agricultural Lands

The receiving landscape presents as cleared agricultural and pastoral land typical of the surrounding region. Stock grazing (currently cattle) is prevalent with fenced boundaries as typically found throughout the Hunter Valley. Outside of the major operational elements of Bayswater, large swathes of land still exist as cleared grassland. Previously pastoral, these areas operate as grazing land for cattle under a schedule of grazing licenses to local farmers. As part of these operations, there is remnant infrastructure (e.g. cattle yards of varying age), fencing (both modern barbed wire and older post and rail), and other small-scale agricultural elements (such as contour banks and farm dams) throughout the landscape.

The Project would result in minor alteration to key elements/features/characteristics of the receiving landscape. Views of infrastructure associated with the power stations and mining operations are characteristic within the LCU therefore the proposed changes would not be considered to be totally uncharacteristic when set within the receiving landscape. The Unit has been assessed as typically being of ordinary quality, with land use being dominated by cattle grazing and with a broad, undulating landform of a scale tolerant to change. It is unlikely that the changes would be remarkable within the context of Bayswater and the magnitude of change upon LCU 2 is therefore **negligible**.

Table 5-1: Summary of Landscape Character Assessment

Character Unit	Sensitivity	Magnitude	Overall Effect
LCU 1	Low	Negligible	Negligible
LCU 2	Low	Negligible	Negligible

Overall Effect

Overall it is considered that the Project would have a **negligible effect** on both LCU 1: Mining and Industrial Activities and LCU 2: Rural Agricultural Lands.

6. Mitigation

It is understood that AGL Macquarie will seek to minimise disturbance associated with the Project, for example by retaining existing mature vegetation and limiting areas of disturbance where possible in order to limit the overall environmental impact of the Project. This would have the effect of also mitigating the visual impacts of the Project.

However, the following mitigation strategies are proposed for further consideration, as presented in Table 6-1.

Table 6-1 Mitigation strategies

Category	Mitigation Measures	Description
Design	Retention of elements contributing to the existing character	Sensitive alignment/ location of works where possible to retain existing landscape features of merit such as mature, individual trees / vegetation or landform. Replanting where appropriate following works to vegetate disturbed ground to integrate with surrounding landscape. Sensitive restoration of disturbed ground to merge with surrounding levels.
Construction Management	Minimise areas of disturbance	Limiting areas for storage of materials and construction. Monitoring and management of works to react to issues as they arise.
Operational Management	Retain and enhance the existing semi-natural elements that contribute to the local character	Maintain a mosaic of grassland types and vegetative cover to provide visual interest and biodiversity.

Appendix A. Additional Information

A.1 Report Structure and Methodology

This section sets out the report structure and methodology for this report:

A.1.1 Guideline for landscape character and visual impact assessment

This report has been prepared with reference to the *Guideline for landscape character and visual impact assessment: Environmental impact assessment practice note EIA-NO4* (Roads and Maritime Services, December 2018) and tailored to suit the requirements of this project.

The guidelines for landscape character and visual impact assessment require the changes that are to be brought about by a project to an area to consider the sensitivity of the area in which the project is to be constructed and the magnitude of the impacts (visual) in the context of the site and the surrounding area.

Landscape sensitivity considers the visual features of areas such as topography, land-use, existing modifications, vegetation and recognition or protections of the landscape afforded by the planning scheme. i.e: modifications to an existing road in an area that is currently zoned a road reserve is less sensitive than a new road or road reserve that might be contemplated in a national park or pristine natural environment such as a coastal tourist road.

The magnitude of a visual impact assessment is in part the ranking of four visual criteria, of which one is sensitivity. This is not a numerical weighting or assessment, rather it is part of the overall assessment that includes quantitative measures such as scale of the project, distance, viewer numbers and sensitivity and qualitative discussion which includes a description of the existing modifications to the surrounding landscape and the overall change that the project will attribute to these views. The overall magnitude of the visual change is discussed within each viewpoint and based upon the scale of effects which considers distance, visibility and viewer numbers and sensitivity.

A.2 Methodology

A.2.1 Visibility Appraisal (Viewshed)

The aim of establishing the visual baseline is to establish the area in which the development may be visible, the different groups of people who may experience views of the development, the places where they will be affected and the nature of the views and visual amenity at those points. The methodology for undertaking baseline visibility studies will involve the following process:

i. Data collection and mapping of a Visual Envelope for the proposed scheme through computer generated imagery, desk study and verification in the field;

ii. Desk and field studies to determine the location of relevant footpaths and areas of open access from which a view of the proposed scheme may become available; and

iii. Desk and field studies to determine the location of residential property within the visual envelope from which a view of the proposed scheme may become available.

A Visual Envelope is computer generated and accompanied by a description determined by a desk study and/ or site visits to determine the visibility of the existing site.

A selection of views from publicly accessible locations are prepared to provide an impression of the existing visibility of the site and inform the likely impact of the proposed development.

The study area/ viewshed is determined at an appropriate radius from the site, to determine effects upon visibility and the presence of landscape designations and character areas. In addition, a detailed appraisal is

carried out within an agreed radius to capture visual receptors that would likely experience more noticeable effects as a result of the development to be considered, without resulting in excessive levels of study detail that could detract from the key findings.

Analysis of the study area includes landscape and visual receptors such as designated areas, local residents, users of public rights of way and visitors to open spaces and areas of countryside. The landscape character and actual visibility of the site is then reviewed in the field.

A.2.2 Landscape Character Units and Condition

The key characteristics of each character area are described and evaluated in this section. The landscape quality of each is evaluated using the criteria set out in Table A.1 below;

Table A.1: Landscape Quality Assessment

Category	Criteria
Highest Quality	Strong landscape structure, characteristics, patterns, balanced combination of landform and land cover; Appropriate management for land use and land cover; Distinct features worthy of conservation; Sense of place; No detracting features; Areas are likely to be, but not necessarily, within a National Park, Area of Outstanding Natural Beauty, Registered Park and Garden or within a World Heritage Site
Very Attractive	Strong landscape structure, characteristic patterns and balanced combination of landform and land cover; Appropriate management for land use and land cover but potentially scope to improve; Distinct features worthy of conservation; Sense of place; Occasional detracting features; Areas are of regional or local importance and are likely to be, but not necessarily, designated by the planning authority as being of landscape value
Good	Recognisable landscape structure, characteristic patterns and combinations of landform and land cover are still evident; Scope to improve management for land use and land cover; Some features worthy of conservation; Sense of place; Some detracting features. Areas are unlikely to be designated for their landscape value
Ordinary	Distinguishable landscape structure, characteristic patterns of landform and land cover often masked by land use; Scope to improve management of vegetation; Some features worthy of conservation; Some detracting features
Poor	Weak landscape structure, characteristic patterns of landform and land cover often masked by land use; Mixed land use evident; Lack of management and intervention has resulted in degradation; Frequent detracting features

6.1.1 Sensitivity/ Nature of the Receptor – Landscape

Further to the establishment of the quality/ value of the receiving landscape, judgement must be made as to the sensitivity of each receptor to the change/ impact resulting from the proposed development. The criteria for assessing sensitivity of landscape receptors are described in Table A.2.

Table A.2: Landscape Sensitivity Assessment

Landscape Receptor	Sensitivity
Highest Quality Landscapes with distinctive elements/ features that are integral to the appreciation of its over-all character and quality Landscape with important elements/ features or of particularly distinctive or diverse character susceptible to relatively small changes Landscape elements/ features generally not substitutable	**High**
Very Attractive Quality Landscapes with distinctive elements/ features that are integral to the appreciation of its over-all character and quality Landscape with important elements/ features or of particularly distinctive or diverse character susceptible to change Landscape elements/ features not easily substituted	**Moderate**
Areas of Good/ Ordinary Quality Landscapes Landscape with some features/ elements of importance or of a character that is reasonably tolerant of change Landscape elements/ features generally substitutable/ similar to other areas	**Low**
Areas of Ordinary/ Poor Quality Landscapes Landscape with features similar to other areas/ of low quality Damaged/ derelict landscape features	**Negligible**

A.2.3 Impacts – Assessment of Effects

Landscape and Visual Impact Assessment (**LVIA**) guidance requires that projects must be assessed to determine the significance of their effects. Significance is determined by linking judgements on the sensitivity to change of the receptor likely to be affected and the magnitude/ nature of the change/effects likely to occur. Conclusions on significance and magnitude are made through collection and analysis of evidence and professional judgement.

The LVIA assessment of effects is divided into two distinct, but closely related parts and takes into account the potential direct, indirect, cumulative, permanent and temporary impacts of the scheme and its effects as follows:

The potential impact upon the landscape character areas within the receiving landscape. This assessment considers the potential effects on the defining characteristics of the local landscape character areas and takes into account the sensitivity of the receiving landscape

The potential impact upon the view, utilising the key viewpoints as a basis for reference. This assessment takes into account the nature and extent of visibility, the degree of change / effect to the view and the sensitivity of the visual receptor

The visual impact assessment describes the visual effects of the proposed development upon:

- Viewpoints from footpaths and publicly accessible land; and
- Views from residential properties within the visual envelope.

A map is included to illustrate the position and location of these views. Each view is shown as their unaltered baseline condition, followed by a photomontage showing the proposed development within the view with an accompanying description.

A Zone of Visual Influence (**ZV**I) will be generated digitally using GIS topographical mapping to illustrate where the highest point of the building will be visible from. The ZVI will be used to identify any viewpoints for photomontages

In all cases visibility is defined by whether a person standing in the middle of a grid of 10 x 10m squares which covers the whole of study area, could see either the existing ground surface (VE) or the proposed scheme

(ZVI). The eye level of the person assumed to be standing in the middle of each square is taken as 1.6m above ground level. This height represents a 95% percentile eye level for a western man and provides the maximum realistic extent of visibility.

The overall landscape and visual impact of the scheme is assessed using a number of significance criteria which take into account the potential effects of the proposed mitigation measures proposed later in this chapter.

A.2.4 Magnitude

When considering the predicted effect on landscape receptors the magnitude of change should be determined by combining judgements about the predicted size and scale of the change, the extent of the area over which it occurs, its reversibility and whether it is short term or long term in duration.

The magnitude of landscape effects upon each receptor is evaluated using the criteria set out below:

Table A.3: Magnitude of Change: Landscape Receptors

Magnitude of Change Criteria	Magnitude
Total loss or major alteration to key elements/features/characteristics of the baseline, i.e. pre-development landscape and/or introduction of elements considered to be totally uncharacteristic when set within the attributes of the receiving landscape. The nature of the proposal has an adverse effect upon the landscape character of the area. The nature of the impact will be permanent or long-term in the context of landscape change	**High**
Partial loss or alteration to key elements/features/characteristics of the baseline, i.e. pre-development landscape and/or introduction of elements considered to be totally uncharacteristic when set within the attributes of the receiving landscape. The nature of the proposal has an adverse effect upon the landscape character of the area. The nature of the impact will be permanent or long-term in the context of landscape change	**Moderate**
Minor loss or alteration to key elements/features/characteristics of the baseline, i.e. pre-development landscape and/or introduction of elements considered to be totally uncharacteristic when set within the attributes of the receiving landscape. The nature of the proposal has an adverse effect upon the landscape character of the area. The nature of the impact will be permanent or long-term in the context of landscape change	**Low**
Very minor loss or alteration to key elements/features/characteristics of the baseline, i.e. predevelopment landscape and/or introduction of elements considered to be totally uncharacteristic when set within the attributes of the receiving landscape	**Negligible**

A.2.5 Overall Effect

Sensitivity of the receiving landscape and the magnitude of the proposed change are used to determine the overall effect of the development.

Table A.4: Overall Effect: Landscape Receptors

Sensitivity	Magnitude				
		High	Moderate	Low	Negligible
	High	High	Moderate / High	Moderate	Negligible
	Moderate	Moderate / High	Moderate	Moderate / Low	Negligible
	Low	Moderate	Moderate / Low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

A.2.6 Mitigation Proposals

Mitigation measures compensate for losses or adverse effects resulting from proposed development. Where possible mitigation and enhancement should be considered within the design process with the aim of avoiding the need for extensive screening measures. Mitigation strategies should apply the following hierarchy:

- Avoid;
- Reduce; and
- Remedy.

These measures will be recorded and defined as:

- Primary measures – developed through an iterative design process and which are integrated into the project design;
- Standard construction and operational management practices for avoiding and reducing environmental effects; and
- Secondary measures – designed to address any residual adverse effects remaining after primary measures and standard construction practices have been incorporated into the scheme.

A description of the development is given in the Introduction. The main features of the proposals are described within the body of this report as they pertain to the potential landscape and visual impact of the scheme.

The assessment process aims to be objective and to describe the changes factually. However, the assessment of landscape and visual impacts inevitably requires a degree of subjective analysis. Whilst the potential changes arising from proposals can be factually defined, the significance of these changes does require qualitative judgements to be made. The conclusions to this assessment therefore combine objective measurement and subjective professional interpretation.