STRATFORDCOAL
Part of the Yancoal Australia Group

Stratford Extension Project
Environmental Impact Statement






APPENDIX O

VISUAL ASSESSMENT

STRATFORD EXTENSION PROJECT

VISUAL ASSESSMENT

PREPARED BY
RESOURCE STRATEGIES PTY LTD

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1 INTRODUCTION

The Stratford Mining Complex comprises the Stratford Coal Mine (SCM) and Bowens Road North Open Cut (BRNOC), two open cut mining operations located some 10 kilometres (km) south of Gloucester and approximately 100 km north of Newcastle in New South Wales (NSW) (Figure 1).

Stratford Coal Pty Ltd (SCPL), a wholly owned subsidiary of Yancoal Australia Limited (Yancoal), owns and operates the Stratford Mining Complex. The nearby Duralie Coal Mine (DCM) is also owned by Yancoal and is located approximately 20 km south of the Stratford Mining Complex.

SCPL proposes to increase the extent and operational life of the Stratford Mining Complex via the Stratford Extension Project (the Project). The proposed life of the Project is approximately 11 years and incorporates:

- run-of-mine (ROM) coal production up to 2.6 million tonnes per annum for an additional 11 years (commencing approximately 1 July 2013 or upon the grant of all required approvals), including mining operations associated with:
  - completion of the BRNOC;
  - extension of the existing Roseville West Pit; and
  - development of the new Avon North and Stratford East Open Cuts;
- exploration activities;
- progressive backfilling of mine voids with waste rock behind the advancing open cut mining operations;
- continued and expanded placement of waste rock in the Stratford Waste Emplacement and Northern Waste Emplacement;
- progressive development of new haul roads and internal roads;
- coal processing at the existing Coal Handling and Preparation Plant (CHPP) including Project ROM coal, sized ROM coal received and unloaded from the DCM and material recovered periodically from the western co-disposal area;
- stockpiling and loading of product coal to trains for transport on the North Coast Railway to Newcastle;
- disposal of CHPP rejects via pipeline to the existing co-disposal area in the Stratford Main Pit and, later in the Project life, the Avon North Open Cut void;
- realignments of Wheatleys Lane, Bowens Road, and Wenham Cox/Bowens Road;
- realignment of a 132 kilovolt (kV) power line for the Stratford East Open Cut;
- continued use of existing contained water storages/dams and progressive development of additional sediment dams, pumps, pipelines, irrigation infrastructure and other water management equipment and structures;
- development of soil stockpiles, laydown areas and gravel/borrow areas, including minor modifications and alterations to existing infrastructure as required;
- monitoring and rehabilitation;
- all activities approved under DA 23-98/99 and DA 39-02-01; and
- other associated minor infrastructure, plant, equipment and activities, including minor modifications and alterations to existing infrastructure as required.

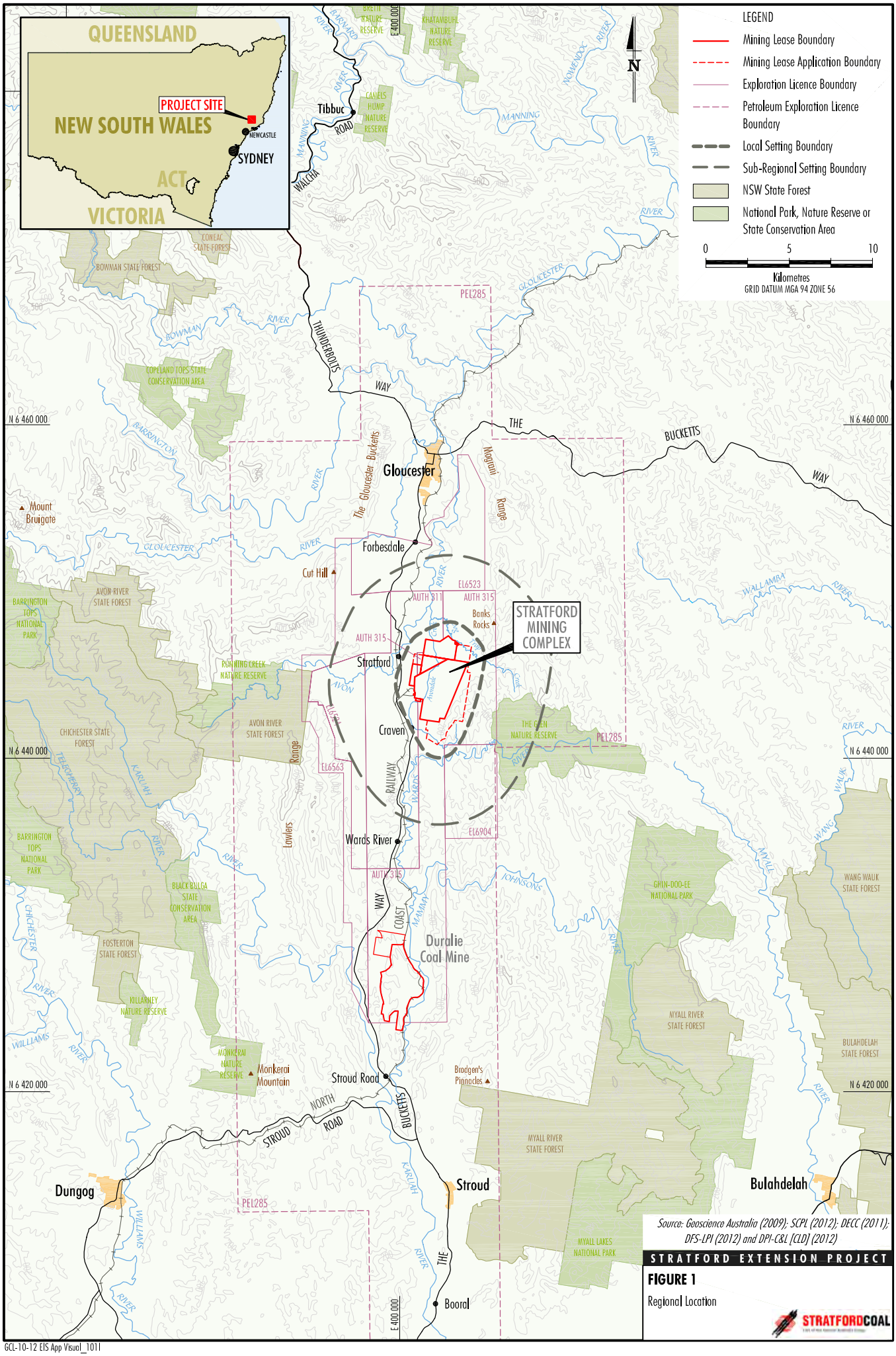

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Figure 2 shows the proposed layout of the existing and proposed open cuts and waste rock emplacement extensions associated with the Project. Further description of the Project is provided in Section 2 in the Main Report of the Environmental Impact Statement (EIS).

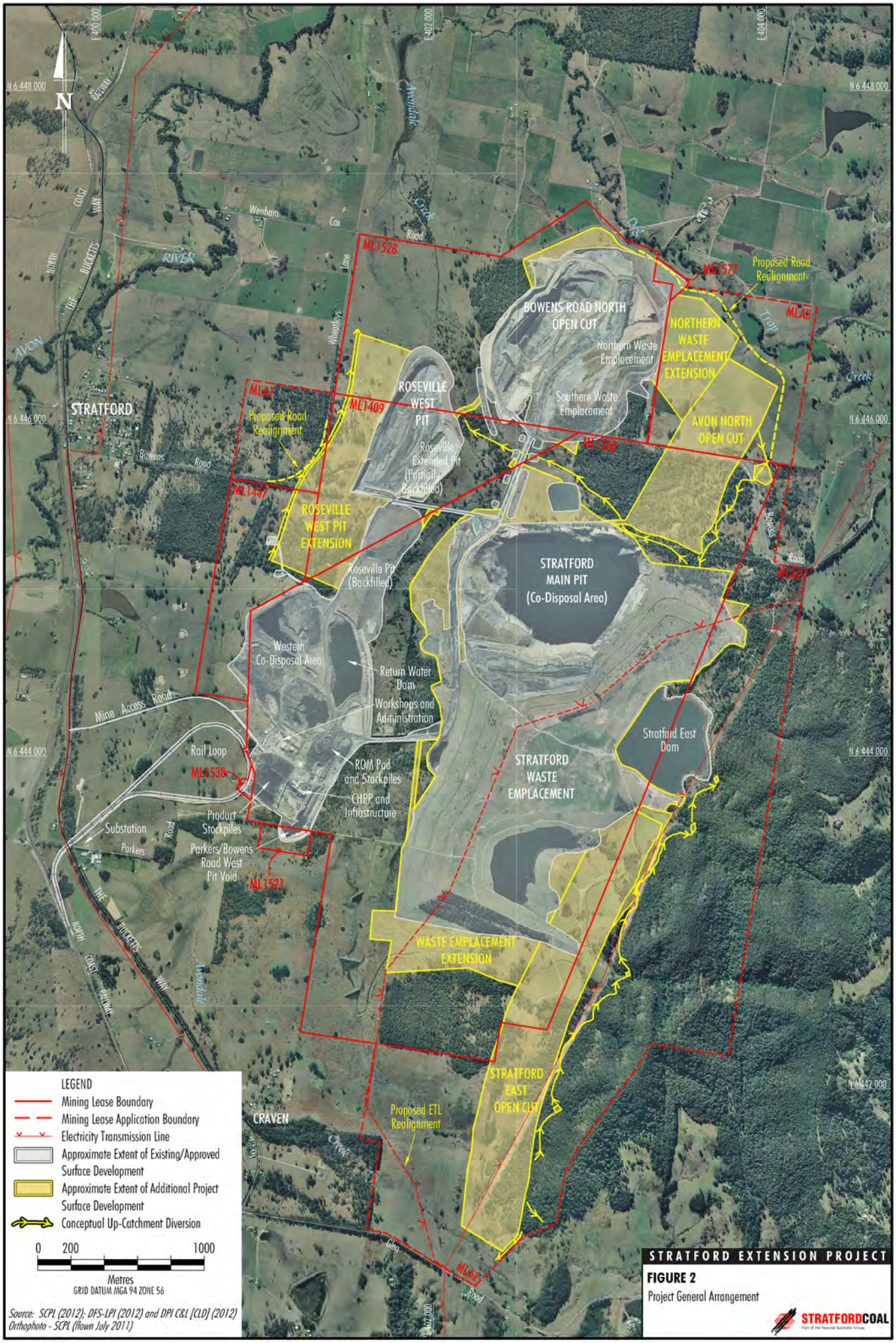
In accordance with the Director-General's Requirements (DGRs) issued by the NSW Department of Planning and Infrastructure on 14 December 2011, the preparation of a visual assessment is required for the Project EIS. Table 1 identifies each of the relevant DGRs and where they are addressed within this visual assessment.

Table 1
Director-General's Requirements – Reference Table

Director-General's Requirements	Visual Assessment Section
Visual *– including:*	
- *a detailed assessment of the:*	
o *changing landforms on the site during the various stages of the project; and*	Section 5.3
o *potential visual impacts of the project on private landowners in the surrounding area as well as key vantage points in the public domain, including lighting impacts; and*	Sections 5.3 and 5.4
- *a detailed description of the measures that would be implemented to minimise the visual impacts of the project.*	Section 6

The following components are included as part of this visual assessment:

- Review of previous visual assessments undertaken for the Stratford Mining Complex, *viz*. *Stratford Coal Project Environmental Impact Statement* (SCPL, 1994); *Bowens Road North Project Environmental Impact Statement* (SCPL, 2001); *Stratford Coal Mine Modification Statement of Environmental Effects* (SCPL, 2003) and *Stratford Coal Mine Roseville West Pit Modification Statement of Environmental Effects* (SCPL, 2006) (Section 2).
- Characterisation of the existing landscape and visual setting (Section 3).
- Description of the changing landforms during the various stages of the Project that could have potential visual impacts (Section 4).
- Assessment of (Section 5):
  - Visual modification at key viewpoints – *How would the Project contrast with the landscape character of the surrounding setting?*
  - Visual sensitivity at key viewpoints – *How sensitive would viewers be to the Project?*
  - Potential night-lighting impacts.
  - Potential cumulative visual impacts.
- Proposed visual impact mitigation and management measures (Section 6).



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2 REVIEW OF PREVIOUS VISUAL ASSESSMENTS

2.1 PREVIOUS PROJECTS AND MODIFICATIONS

Visual assessments have been conducted for a number of previous projects and modifications sought and approved at the Stratford Mining Complex. A summary of the conclusions made in the visual assessments is provided below.

Stratford Coal Project Environmental Impact Statement (1994)

The potential environmental impacts associated with the development of the SCM were assessed in the *Stratford Coal Project Environmental Impact Statement* (SCPL, 1994). The main components of the Stratford Coal Project included open-cut mining based on the Stratford Main Deposit (Stratford Main Pit) and a small amount of coal from the Bowens Road West deposit, a coal preparation plant and associated raw and product coal handling infrastructure and rail loading facilities, out-of-pit mine waste rock emplacement (Stratford Waste Emplacement), the Stratford East Dam and co-disposal areas (western co-disposal area and Stratford Main Pit) (Figure 2).

Potential visual impacts at a number of viewpoints surrounding the SCM were assessed (Dewsnap Landscape Design, 1994). The assessment concluded:

- The Project would present very limited potential for adverse visual impact. The overall impact of the mining operations would generally be low, providing remedial measures (e.g. tree planting) were implemented.
- The need for lighting mitigation on the Project was expected to be very minor given the natural shielding effect of the surrounding topography. The use of uni-directional lighting fixtures throughout the coal preparation plant and industrial area was proposed.
- Visual mitigation measures proposed included forward tree planting, massed tree planting, earthworks and bunding and amenity and specimen planting.

Bowens Road North Project Environmental Impact Statement (2001)

The potential environmental impacts associated with the development of the BRNOC were assessed in the *Bowens Road North Project Environmental Impact Statement* (SCPL, 2001). The main components of the Bowens Road North Project included open-cut mining (i.e. BRNOC), two out-of-pit mine waste rock emplacements (Northern Waste Emplacement and Southern Waste Emplacement) and diversion of Wenham Cox Road to the north of the BRNOC (Figure 2).

Potential visual impacts at four viewpoints (i.e. The Bucketts Way, “Atkins” dwelling, “Ellis” dwelling and “Wadland” dwelling) surrounding the BRNOC were assessed (Resource Strategies, 2001). The assessment concluded:

- The visual impact of the open cut would be limited in duration, following which views would then be largely be screened by the development of the mine waste rock emplacements, perimeter bunds and subsequent revegetation.
- Only two residences would have significant potential views of the new landform, however, the progressive rehabilitation programme would significantly reduce the level of visual impact at public viewpoints by Year 5 of the Bowens Road North Project.

- At nearby residences with views of the Bowens Road North Project (e.g. the "Ellis" dwelling located approximately 400 metres (m) north of the Bowens Road North Project), SCPL would undertake tree screen planting to progressively limit views of the Bowens Road North Project if requested by the landholder.
- The construction of a 6 m high bund on the northern and western limits of the BRNOC operations, tree plantings along Wenham Cox Road and the implementation of a specific Landscape Enhancement Plan for the "Ellis" dwelling were identified as mitigative measures to limit the level of visual impact from the operations.
- Visual effects of lighting during night-time operations would be similar to the light level generated by a rural homestead.

Stratford Coal Mine Modification Statement of Environmental Effects (2003)

In 2003, a modification of DA 23-98/99 that included the extension of the approved Roseville Pit (the Roseville Extended Pit) was assessed via the *Stratford Coal Mine Modification Statement of Environmental Effects* (SCPL, 2003).

A review of potential visual impacts undertaken as part of the assessment concluded that existing visual amenity would not change significantly as a result of the Roseville Extended Pit (Figure 2).

Stratford Coal Mine Roseville West Pit Modification Statement of Environmental Effects (2006)

In 2006, a modification of DA 23-98/99 to develop a small pit adjacent to and contiguous with the approved Roseville Extended Pit (the Roseville West Pit) was assessed via the *Stratford Coal Mine Roseville West Pit Modification Statement of Environmental Effects* (SCPL, 2006a).

The visual assessment for the modification concluded that for privately owned residences which had views of the modification area (including the Roseville Extended Pit – refer Figure 2), the potential visual impact of the proposed modification would be substantially the same, due to the distances involved and screening effects of existing vegetation and local topography.

2.2 HISTORIC VISUAL MITIGATION MEASURES

SCPL has implemented a number of landscaping and visual screening measures over the life of the Stratford Mining Complex including:

- tree plantings parallel to The Bucketts Way and Wenham Cox Road;
- bunding and tree planting at the CHPP and infrastructure areas; and
- construction and revegetation of bunding surrounding the BRNOC operations.

Lighting mitigation measures undertaken have included (where practicable) use of directional lighting throughout the CHPP and infrastructure areas, use of low brightness lights in selected areas and switching off lighting associated with the rail loading conveyor and bin adjacent to the rail loop when not required.

3 EXISTING LANDSCAPE AND VISUAL SETTING

3.1 LOCAL LANDSCAPE CHARACTER AND SCENIC QUALITY

It has been established through previous studies that scenic quality increases as topographic ruggedness and relative relief increase (Leonard and Hammond, 1984; Burns and Rundell, 1969; Anderson *et al*, 1976). Scenic quality, particularly in modified landscapes, can also increase as the patterning of vegetation increases (EDAW Gillespies, 2005).

The area surrounding the Project comprises a number of distinct land use types and landscape units of varying levels of landscape quality. These have been defined as follows:

- Existing mining operations – including the existing Stratford Mining Complex and the DCM (located approximately 20 km south of the Project).
- Residential dwellings – detached dwellings located mostly to the north, west and south of the Project.
- Agricultural areas – the Project is located in a rural area characterised by cattle grazing on native and improved pastures, along with some poultry farming and other agricultural production.
- The Gloucester Bucketts (546 m Australian Height Datum [AHD]) – located approximately 11 km north-northwest of the Project (Figure 1). The Gloucester Bucketts, whilst not being particularly high, provide picturesque views from a large area of the Gloucester Valley due to the rugged nature of the escarpments and irregular profile of the ridgeline.
- Mograni Range (480 m AHD) – located approximately 11 km north-northeast of the Project (Figure 1).
- The Glen Nature Reserve – located approximately 2 km to the south-east of the Project.
- Avon River State Forest – located approximately 5 km to the south-west of the Project.
- Ridgeline immediately to the east of the Project – runs north to south and reaches a maximum elevation of approximately 470 m AHD.
- Dog Trap Creek – located approximately 100 m north of the nearest Project landform.
- Avondale Creek – drains through the Stratford Mining Complex to join Dog Trap Creek approximately 1 km north (and downstream) of the Project.
- Avon River – located approximately 1 km to the north-west of the Project.

Regional, sub-regional and local visual settings are based on distance from the nearest Project landform and have been defined as follows:

- regional setting – greater than 5 km from the nearest Project landform;
- sub-regional setting – 1 to 5 km from the nearest Project landform; and
- local setting – less than 1 km from the nearest Project landform.

Major topographic features in the vicinity of the Project are provided on Figure 1. A description of landscape character and scenic quality for each of these settings is provided below.

Views of the Stratford Mining Complex from the surrounding area are generally limited due to the flat to slightly undulating topography of the Gloucester Valley floor and the presence of scattered vegetation along roadsides, creeklines and around dwellings that partially or wholly screen potential views.

3.1.1 Regional Setting (> 5 km)

The regional setting of the Project has attributes of moderate to high scenic quality due to the presence of geographical features within the region such as Monkerai Mountain (350 m AHD), Brogden's Pinnacles (200 m AHD) and Lawlers Range (626 m AHD) (Figure 1), as well as the Gloucester Basin. The Gloucester Basin is a linear valley which extends approximately 40 km in length and 13 km in width (SCPL, 1998). The Gloucester Bucketts (546 m AHD) and Mograni Range (480 m AHD) flank the western and eastern sides, respectively, of Gloucester (Figure 1). Other elevated topographic features are located some 7 km north-west of the Project at Cut Hill (359 m AHD) (Figure 1). The majority of the valley is rural in nature and has been cleared as a result of historic land use practices. The valley is a strongly defined landform that is visually enclosed (Figure 3) and comprises a combination of natural features and rural land uses. Remnant vegetation generally occurs along ridgelines that define the valley, along watercourses and in isolated patches within the cleared landscape.

A number of reserved areas are also located in the regional setting of the Project including the Barrington Tops National Park (located approximately 23 km to the south-west) and the Avon River State Forest (located approximately 6 km to the west) (Figure 1).

The DCM, located approximately 20 km south of the Stratford Mining Complex, also comprises part of the regional setting (Figure 1).

Towns and small villages within the Project regional setting include Stroud, Gloucester, Dungog, Forbesdale, Stroud Road and Wards River (Figure 1).

3.1.2 Sub-regional Setting (1 to 5 km)

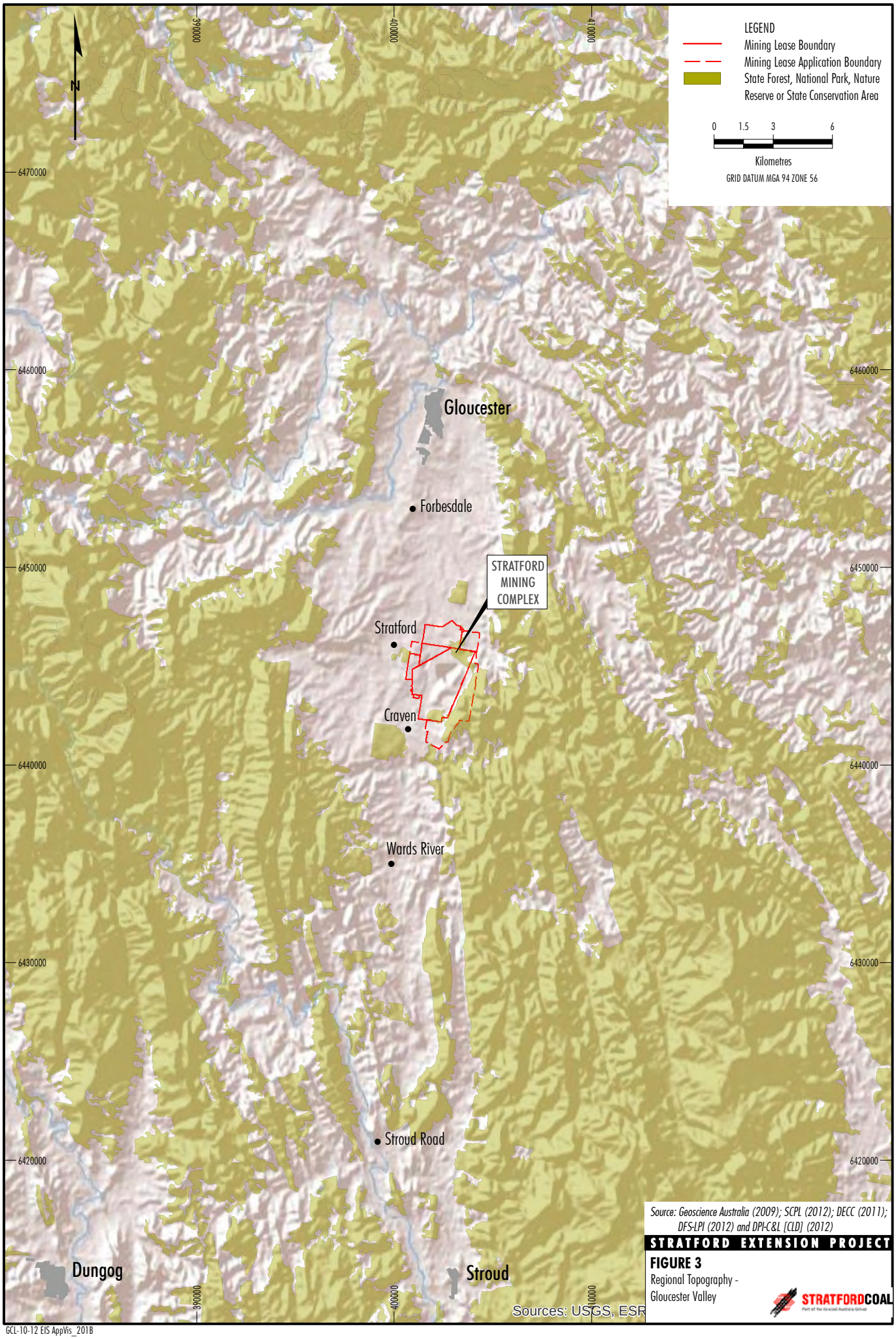
The sub-regional setting comprises similar features to those found within the regional and local settings. These features include elements of low to high scenic quality such as cleared pastoral land, undulating topography and scattered remnant vegetation. Banks Rocks (located some 3 km north-east of the Project) occupies an elevated topographic position (460 m AHD) (Figure 1). The Glen Nature Reserve is situated approximately 2 km to the south-east of the Project (Figure 1).

3.1.3 Local Setting (< 1 km)

The ridgeline to the east of the Project area rises to approximately 470 m AHD and is moderately to steeply sloping. It predominantly comprises of native woodland and forest vegetation and is of moderate scenic quality. The elevation of the valley floor within the Project area ranges from approximately 140 m AHD to approximately 115 m AHD.

The existing Stratford Mining Complex is located within the Avondale Creek and Dog Trap Creek sub-catchments which ultimately flow into the Avon River (Figure 1). Avondale Creek appears to exhibit less flow persistence than the Avon River, with some extended periods of no or negligible flow (Appendix B of the EIS). Anecdotal evidence suggests Dog Trap Creek has similar flow patterns to Avondale Creek, but may be regarded as ephemeral with less flow persistence (Appendix B of the EIS). Dog Trap Creek is located approximately 100 m north of the nearest Project landform (Figure 2).

Villages located within the local setting include Stratford and Craven (Figure 1).



Source: Geoscience Australia (2009); SCPL (2012); DECC (2011); DFS-LPI (2012) and DPI-C&L [CLD] (2012)

STRATFORD EXTENSION PROJECT

FIGURE 3

Regional Topography - Gloucester Valley

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3.2 SITE TOPOGRAPHY, SURFACE WATER RESOURCES AND VEGETATION

The topography of the area within and immediately surrounding the Project is characterised by a north-south oriented linear ridgeline to the east (Figure 1), transitioning to undulating lowlands and valley floor floodplains towards the west, which form part of the Gloucester Valley. The ridgeline effectively screens the majority of views from private dwellings situated to the east of the Project.

The development of the Stratford Mining Complex and associated open cut mining and waste rock emplacements has resulted in alteration to the site's pre-mining topography. Modified landforms from mining operations at the Stratford Mining Complex include the Northern, Southern and Stratford Waste Emplacements (Figure 2).

Some of the Project area has been cleared as part of past rural land use practices. The remnant vegetation communities that exist within the Project area include *Tallowwood – Turpentine – White Mahogany Shrub/Grass Forest, Forest Red Gum – Box Grassy Woodland, Smooth-barked Apple – White Stringybark Shrubby Forest* and derived Native Grassland/Shrubland (Appendix E of the EIS).

In general, views of the Stratford Mining Complex from the surrounding area are effectively screened by topography and vegetation, except for some areas to the north and west (potential views of the Project landforms from these areas are discussed in Section 5.2.1). As described in Section 2.2, SCPL has also planted vegetation screens at strategic locations to assist with the screening of mine landforms and infrastructure.

3.3 LANDSCAPE CHARACTER SIGNIFICANCE

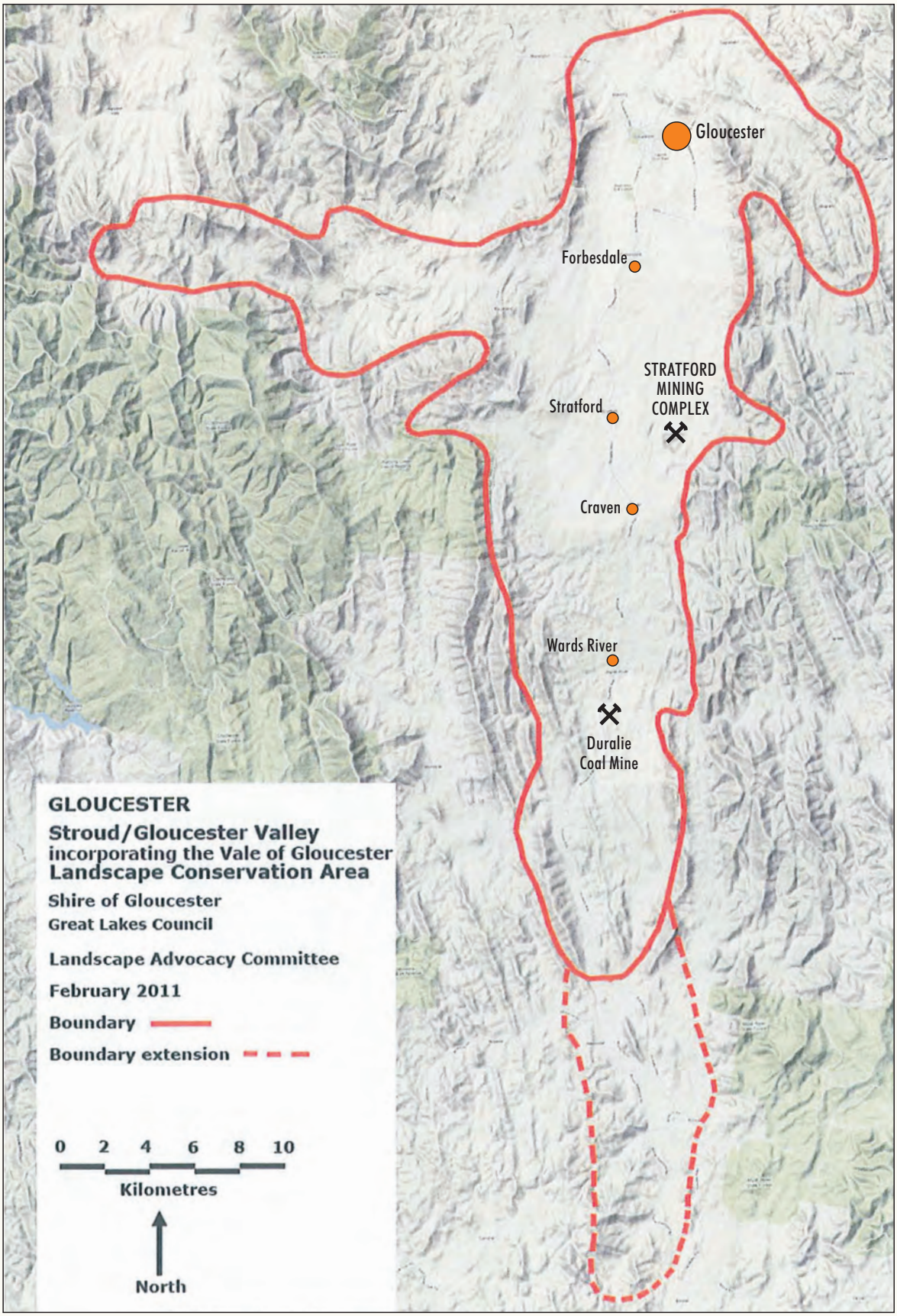
A review of the significance of the landscape character proximal to the Project is provided in the Non-Aboriginal Heritage Assessment (Appendix J of the EIS). Five places (i.e. the Stratford timber railway – cutting and route [two sites], the Glen Railway, Stratford Cemetery and Craven) were assessed as having local significance (Appendix J of the EIS). One of these (the Glen Railway) is in part entered in Schedule 5 of the *Gloucester Local Environmental Plan, 2010* (Gloucester LEP) (Appendix J of the EIS).

The Project is located within the Vale of Gloucester Landscape Conservation Area which was registered by the National Trust of Australia (NSW) in 1976 for its historical and scenic values (National Trust of Australia [NSW], 1976). The listing was revised and extended by the Landscape Conservation Committee of the National Trust of Australia (NSW) in 1981. The original listing proposal recommended that the Vale of Gloucester *be the subject of a detailed Rural Lands Environmental Study, with a view to protection under a Regional or local Environmental Plan*. Despite the recommendation, the Vale of Gloucester Landscape Conservation Area has not been listed in the Gloucester LEP or any other regional plan.

The listing for the Vale of Gloucester Landscape Conservation Area was revised and extended again by the Landscape Conservation Committee of the National Trust of Australia (NSW) as the 'Stroud Gloucester Valley Incorporating the Vale of Gloucester' in March 2011. The revised and retitled register citation now extends the area further to the south and includes some additional information, photographs and the registration (National Trust of Australia [NSW], 2011). The Stroud Gloucester Valley Incorporating the Vale of Gloucester covers an area of approximately 53,000 hectares (ha) and is shown on Figure 4.

Further detail regarding the above listing is provided in the Non-Aboriginal Heritage Assessment for the Project (Appendix J of the EIS).

This visual assessment has included consideration of the potential visual impacts of the Project on the Stroud Gloucester Valley Incorporating the Vale of Gloucester (Section 5.5).



Source: Adapted from National Trust of Australia (2011)

STRATFORD EXTENSION PROJECT

FIGURE 4

Stroud Gloucester Valley Incorporating the Vale of Gloucester

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4 PROJECT DESCRIPTION – VISUAL CHARACTER

The Project has a number of components that would have varying impacts on the existing landscape. These impacts range from a modification of drainage lines and the generally undulating topography to major earthworks that have a greater impact on the landscape character. A description of the visual character of the Project follows.

4.1 OVERVIEW

A detailed description of the Project is provided in Section 2 in the Main Report of the EIS. The general arrangement of the Project during Year 1, Year 2, Year 6, Year 7 and Year 10 of the Project and at the end of the Project life is shown on Figures 5 to 10.

The major aspects of the Project considered to have the potential to impact on the visual landscape include:

- additional clearance or disturbance of vegetation within the Project area;
- modification of topographic features including expanded placement of waste rock in the Stratford Waste Emplacement (including backfilling of the Stratford Main Pit) and Northern Waste Emplacement;
- an extension of the existing Roseville West Pit and development of the new Avon North and Stratford East Open Cuts;
- progressive rehabilitation of completed landforms; and
- lighting associated with night-time mining operations.

In addition, noise attenuation infrastructure required for the Project (i.e. an acoustic barrier adjacent and on the southern [inbound] side of the rail loop, a 6 m high permanent acoustic/visual bund adjacent to the Roseville West Pit Extension and construction of a 10 m high temporary noise mitigation bund on the top surface of the Stratford Waste Emplacement during Year 7 of the Project) would also have the potential to impact on the visual landscape.

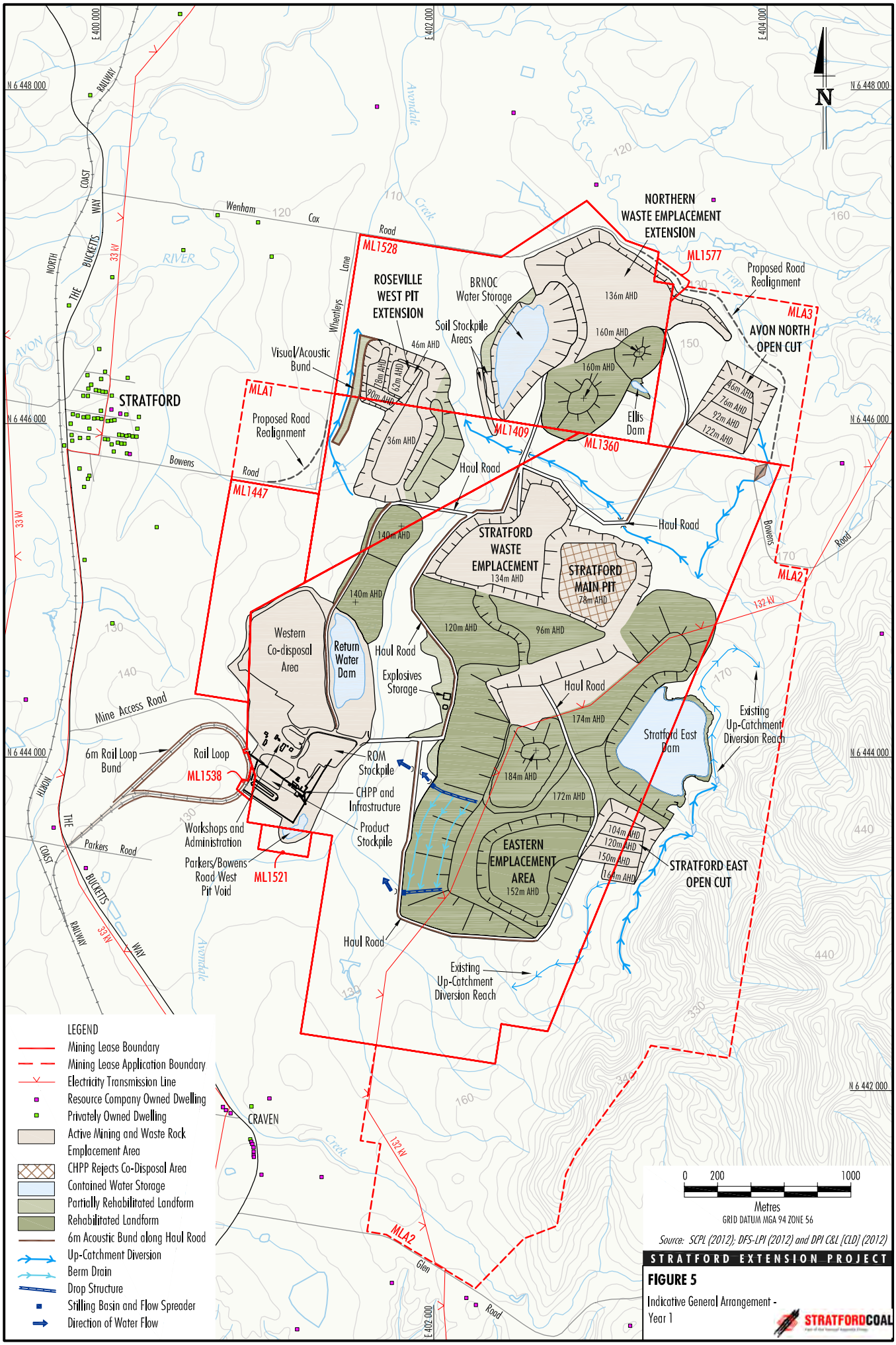
4.2 PROJECT LANDFORMS

The extent of the existing open cut mining areas (i.e. Roseville West Pit Extension) and waste rock emplacements would be increased by the Project. The Project would also include development of the new Avon North and Stratford East Open Cuts.

Waste rock (including overburden and interburden) mined during the development of the Project would continue to be used to in-fill the mine void behind the advancing open cut, as well as being placed in the out-of-pit mine waste rock emplacements (i.e. the extensions to the Northern Waste Emplacement and Stratford Waste Emplacement).

The Stratford Waste Emplacement would be lifted to a maximum height of 196 m AHD. This would involve removing existing rehabilitated areas (e.g. agricultural areas) that are located on the Stratford Waste Emplacement. The Northern Waste Emplacement would be extended to a maximum height of 165 m AHD during Year 4 of the Project.

The rehabilitation of mine waste rock emplacements would be undertaken on a progressive basis in order to improve integration of the Project landforms with the surrounding environment and mitigate potential visual impacts. Areas of the rehabilitated Stratford Waste Emplacement and Northern Waste Emplacement would be retained from commencement of the Project (Figure 2).



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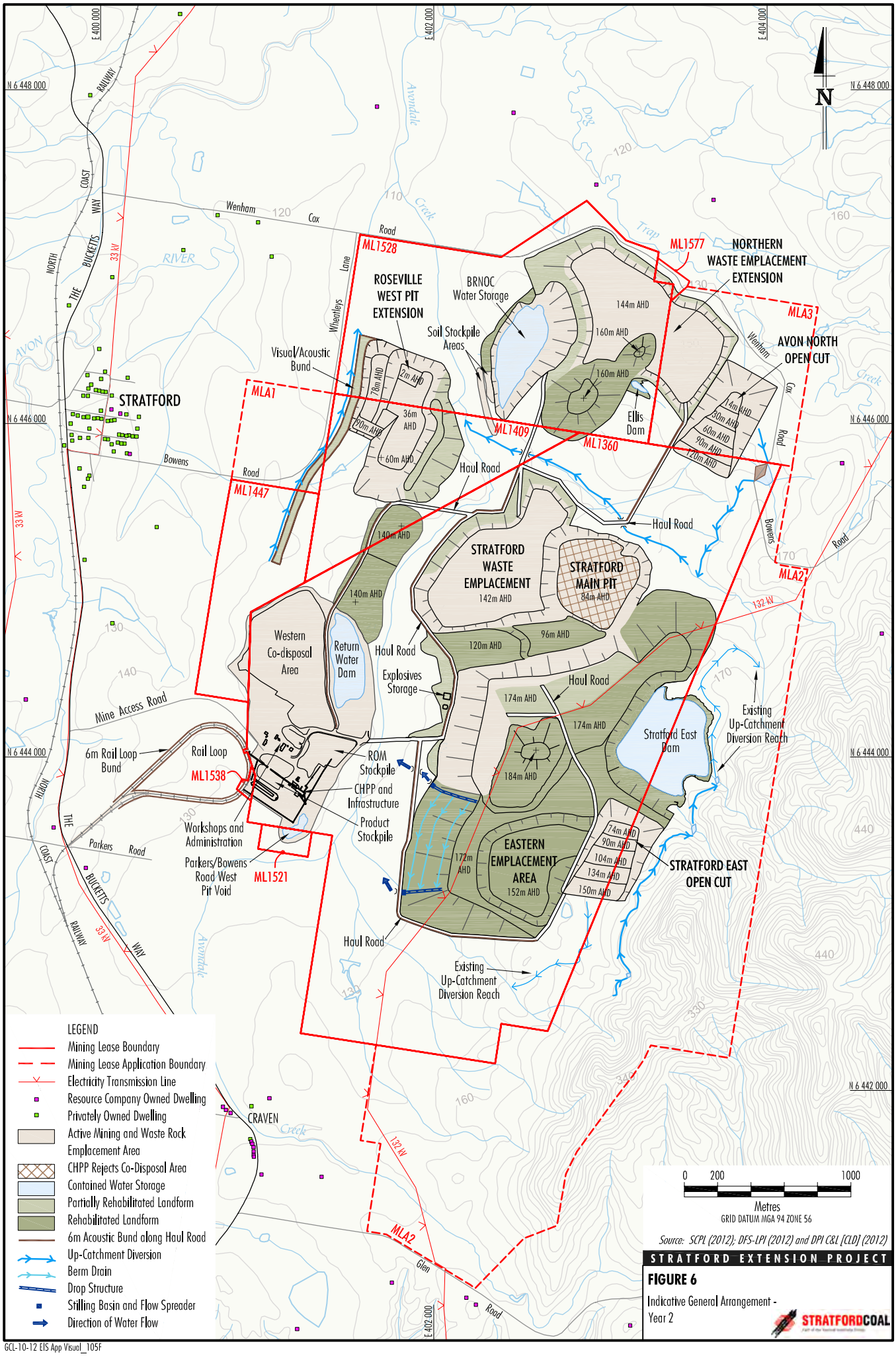

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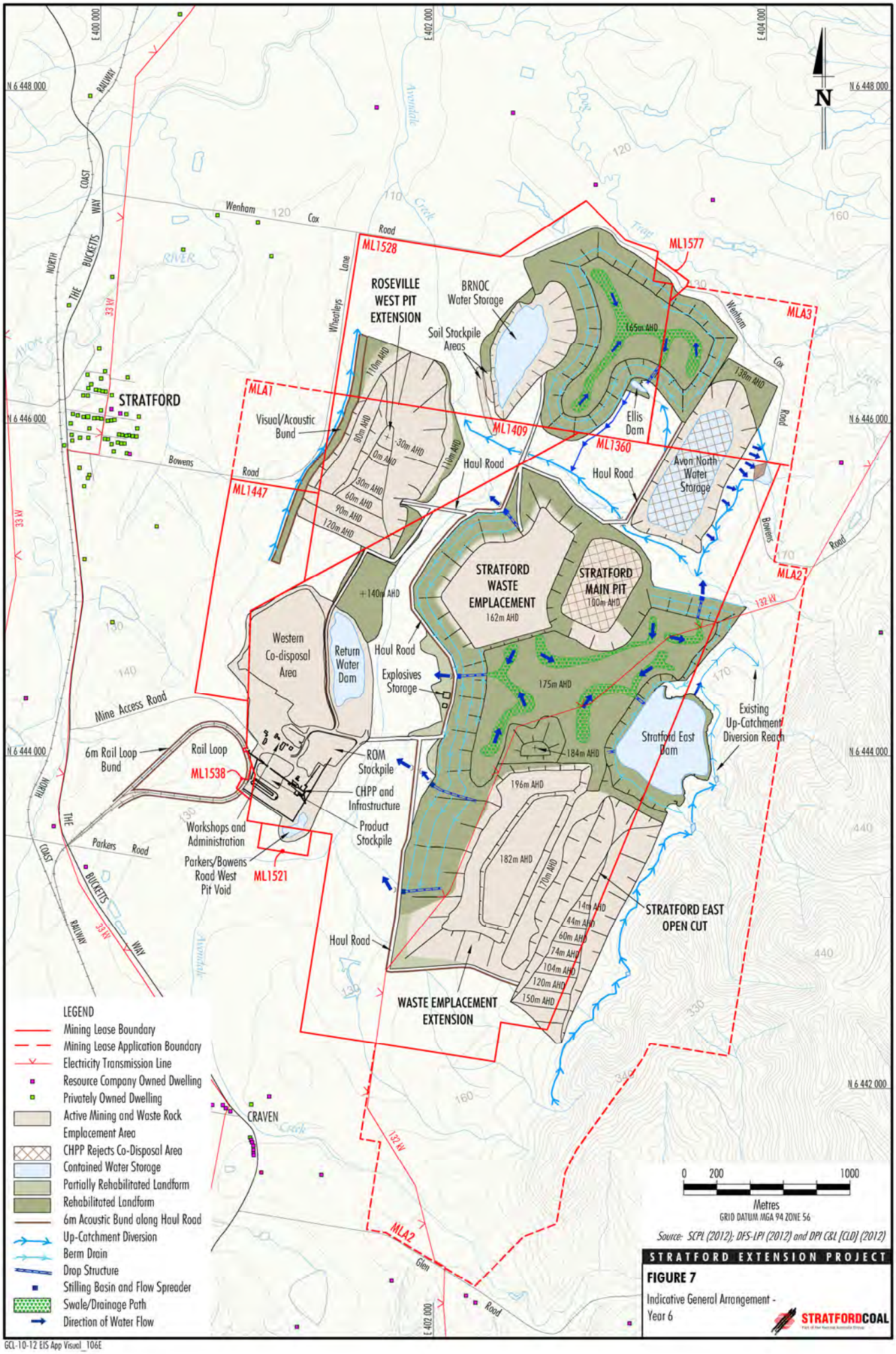

Source: SCPL (2012); DFS-LPI (2012) and DPI C&L [CLD] (2012)

STRATFORD EXTENSION PROJECT

FIGURE 7

Indicative General Arrangement - Year 6

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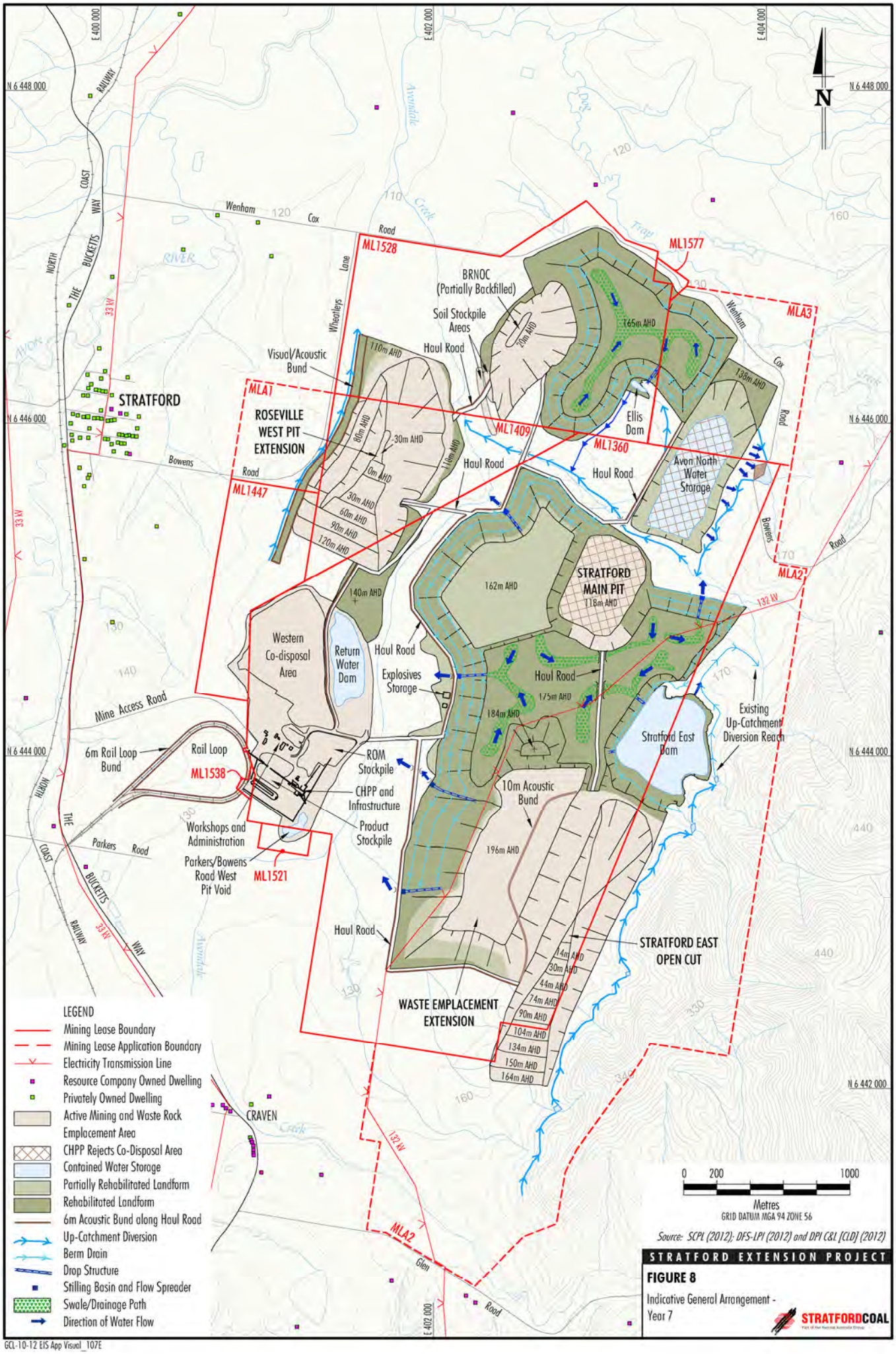

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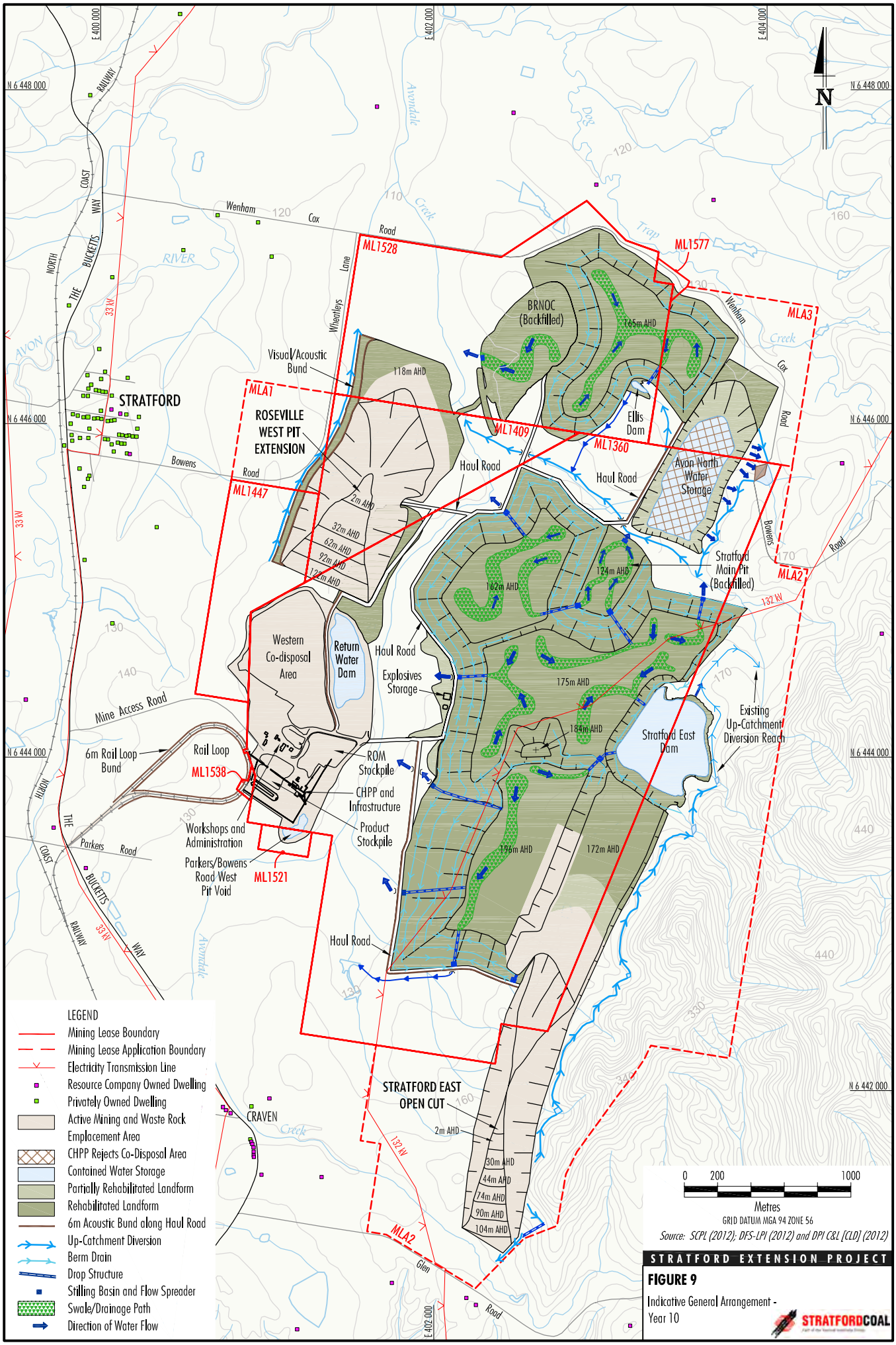

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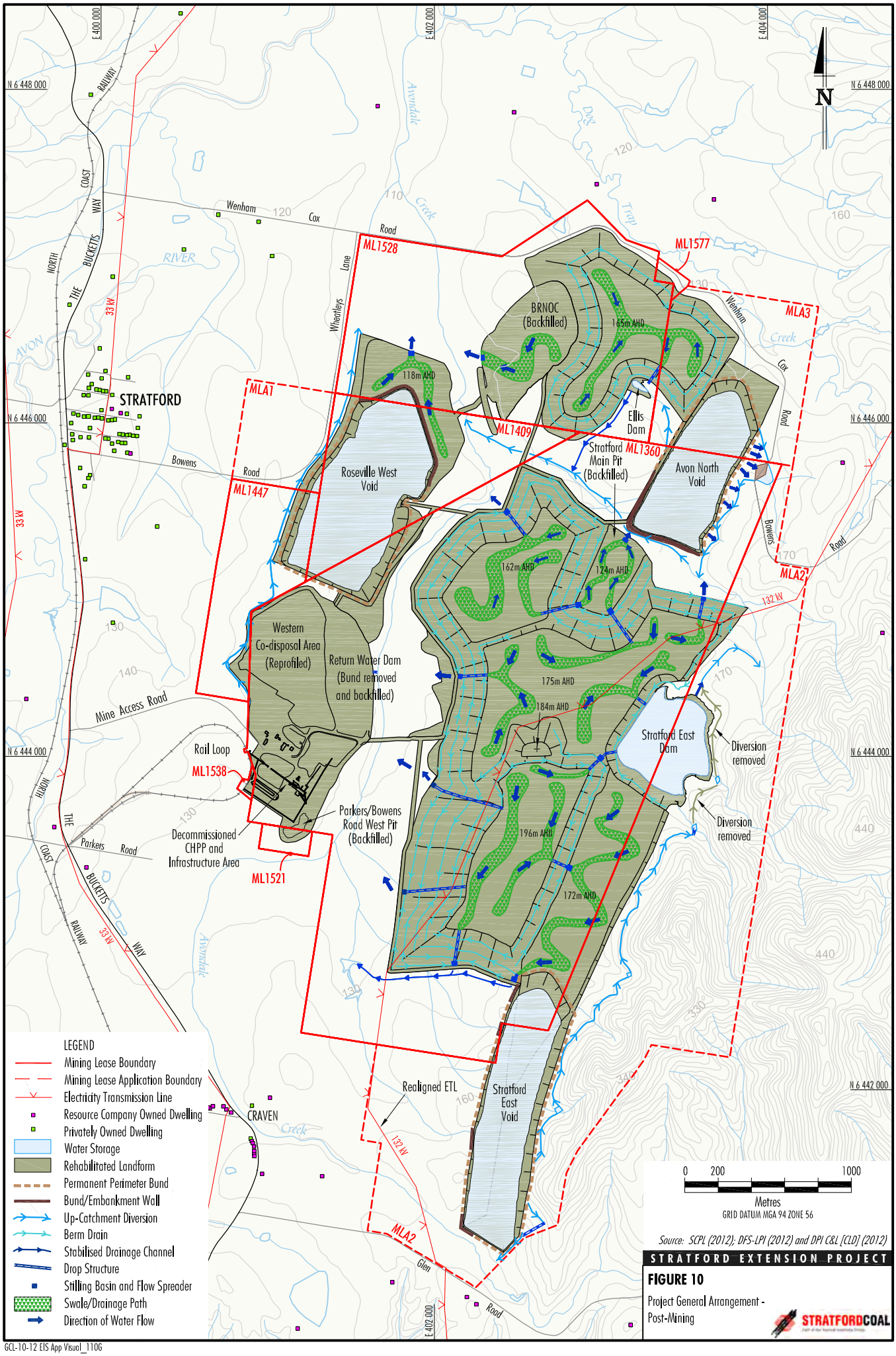
E 400 000
E 402 000
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N 6 448 000
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N
STRATFORD
Wenham Cox Road
Bowens Road
Parkers Road
Mine Access Road
Rail Loop
Wheatleys Lane
NORTH COAST WAY
BUCKETTS WAY
RAILWAY
RIVER
Avondale Creek
Dog Trap Creek
Wenham Creek
CRAVEN Creek
Glen Road
33 kV
132 kV
ML1528
ML1577
ML1409
ML1360
ML1447
ML1538
ML1521
MLA1
MLA2
MLA3
BRNOC (Backfilled)
165m AHD
118m AHD
Ellis Dam
Stratford Main Pit (Backfilled)
Roseville West Void
Avon North Void
162m AHD
124m AHD
Western Co-disposal Area (Reprofiled)
Return Water Dam (Bund removed and backfilled)
175m AHD
184m AHD
Stratford East Dam
Diversion removed
Diversion removed
Parkers/Bowens Road West Pit (Backfilled)
196m AHD
172m AHD
Decommissioned CHPP and Infrastructure Area
Realigned ETL
Stratford East Void
LEGEND
Mining Lease Boundary
Mining Lease Application Boundary
Electricity Transmission Line
Resource Company Owned Dwelling
Privately Owned Dwelling
Water Storage
Rehabilitated Landform
Permanent Perimeter Bund
Bund/Embankment Wall
Up-Catchment Diversion
Berm Drain
Stabilised Drainage Channel
Drop Structure
Stilling Basin and Flow Spreader
Swale/Drainage Path
Direction of Water Flow
0 200 1000
Metres
GRID DATUM MGA 94 ZONE 56
Source: SCPL (2012); DFS-LPI (2012) and DPI C&L [CLD] (2012)
STRATFORD EXTENSION PROJECT
FIGURE 10
Project General Arrangement - Post-Mining
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The extensions to the waste rock emplacements would, over time, vary in appearance from freshly placed rock and soil material to rehabilitated landforms. As such, the level of visual modification created by these landforms would change, reducing as vegetation becomes established and matures.

A temporary noise mitigation bund (comprised of waste rock) would be constructed on the top surface of the Stratford Waste Emplacement during Year 7 of the Project (Figure 8). The bund would be removed prior to rehabilitation of the final landform. An earthen bund along the perimeter of the Roseville West Pit Extension would also be constructed to attenuate noise propagation and screen views of the active open cut mining areas from Bowens Road and Wheatleys Lane. The bund would vary in appearance from freshly placed soil material to a rehabilitated landform

At the end of the Project life, the Avon North Open Cut, Roseville West Pit Extension and Stratford East Open Cut would remain as final voids and would be surrounded by permanent perimeter bunds (Figure 10).

The Project landforms would be rehabilitated in accordance with the Rehabilitation Strategy presented in Section 5 in the Main Report of the EIS.

4.3 REALIGNMENT OF WHEATLEYS LANE, BOWENS ROAD AND WENHAM COX/BOWENS ROAD

The Project would include realignments of Wheatleys Lane, Bowens Road and Wenham Cox/Bowens Road (Figure 2). These realignments may modify existing views from private dwellings and roads to the north-east and west of the Project.

4.4 REALIGNMENT OF A 132 KV ELECTRICITY TRANSMISSION LINE

Due to mining of the Stratford East Open Cut, realignment of a 132 kV electricity transmission line would also be required (Figure 2). The realignment may modify existing views from private dwellings and Glen Road located to the south of the Project.

4.5 VEGETATION CLEARANCE

The Project would involve the progressive clearance of approximately 105 ha of native vegetation. As a result, the Project may modify existing views available from nearby public roads (e.g. Glen Road) and dwellings to the north-east, west and south of the Project.

4.6 NIGHT-LIGHTING

Light sources at the Stratford Mining Complex currently include:

- overhead lighting associated with the CHPP and infrastructure area;
- lighting associated with the rail loading conveyor and bin adjacent to the rail loop;
- mobile lighting plants (floodlights) used for mining operations at the Roseville West Pit and BRNOC; and
- mobile vehicle-mounted lights (e.g. haul trucks and other heavy and light vehicles used at the Stratford Mining Complex).

Lighting from the Project may be visible at additional locations due to the increased elevation of light sources on the Stratford Waste Emplacement. Mobile lighting plants may also be visible due to the development of the additional Avon North and Stratford East Open Cuts and extension of operational hours.

The Project would include an increase in the number of mine fleet and operational hours. Mining operations would be conducted up to 24 hours per day, 7 days per week for the Avon North Open Cut and Stratford East Open Cut. Consequently, there would be an increase in light generated by existing sources (i.e. mobile lighting plants and vehicle-mounted lights). No additional light would be generated by mining operations at the Roseville West Pit Extension (i.e. mining operations would only occur between the hours of 7.00 am to 6.00 pm).

5 ASSESSMENT OF POTENTIAL VISUAL IMPACTS

The following sub-sections present a visual assessment of the potential impacts associated with the Project.

5.1 METHODOLOGY

The potential visual impact was assessed by evaluating the level of visual modification of the development in the context of the visual sensitivity of relevant surrounding land use areas (i.e. those areas from which the proposed development may be visible) (EDAW Australia, 2006). Levels of visual impact resulting from visual modification and sensitivity are illustrated in Table 2.

Table 2
Visual Impact Matrix

Visual Modification \ Viewer Sensitivity	H	M	L
H	H	H	M
M	H	M	L
L	M	L	L
VL	L	VL	VL

VL = Very Low
L = Low
M = Moderate
H = High

Source: EDAW Australia (2006).

5.1.1 Visual Modification

The degree of visual modification of a proposed development can be measured as a function of the contrast between the development and the existing visual landscape (including the approved mine landforms of the Stratford Mining Complex). Throughout the visual catchment, the level of visual modification generally decreases as the distance from the development to various viewpoint locations increases, and is categorised as follows (EDAW Australia, 2006):

- Negligible (or very low) level of visual modification – where the development is distant and/or relates to a small proportion of the overall viewscape.
- Low level of visual modification - where there is minimal visual contrast and a high level of integration of form, line, shape, pattern, colour or texture values between the development and the landscape. In this situation the development may be noticeable, but does not markedly contrast with the existing modified landscape.
- Moderate level of visual modification - where a component of the development is visible and contrasts with the landscape, while at the same time achieving a level of integration. This occurs where surrounding topography, vegetation or existing modified landscape provide some measure of visual integration or screening.
- High level of visual modification - where the major components of the development contrast strongly with the existing landscape.

5.1.2 Visual Sensitivity

Visual (viewer) sensitivity is a measure of how critically a change to the existing landscape would be viewed from various use areas, where different activities are considered to have different sensitivity levels. Visual sensitivity can therefore be described as a function of both land use and duration of exposure (EDAW Australia, 2006). For example, individuals would generally view changes to the visual setting of their residence more critically than changes to the visual setting of the broader setting in which they travel or work (EDAW Australia, 2006). Another factor to consider is the extent to which the viewer has become accustomed to significant modifications to the landscape and existing industrialisation in the region (EDAW Australia, 2006).

The visual sensitivity of the development depends on a range of viewer characteristics. The primary characteristics used in this visual assessment are land use, the distance to the Project and the Project landforms. These characteristics were assessed from the perspective of the viewer and visibility from critical viewpoints.

The extent to which the viewer has become accustomed to the Stratford Mining Complex which is an existing modification to the landscape has also been considered.

Typical visual (viewer) sensitivity levels are defined in Table 3.

Table 3
Typical Visual (Viewer) Sensitivity Levels

Use Area	Foreground (Local Setting)		Middleground (Sub-Regional Setting)		Background (Regional Setting)
	0 - 0.5 km	0.5 - 1 km	1 - 2.5 km	2.5 - 5 km	> 5 km
Natural Area - Recreation	H	H	H	M	L
Residential – Rural	H	H	H	M	L
Residential – Township	H	H	H	M	L
Tourist Roads	H	M	M	L	L
Other Main Roads	M	L	L	L	L
Local Roads	L	L	L	L	L
Industrial Areas	L	L	L	L	L

Source: EDAW Australia (2006).

H - High, M – Moderate, L – Low.

For the purposes of this visual assessment, visual sensitivity was classified using the relevant land use and distance from the nearest Project landform in accordance with Table 3.

5.2 IDENTIFICATION OF SENSITIVE VISUAL SETTINGS

The main issues to consider in the assessment of potential visual impacts are:

- the number of sensitive viewing locations; and
- the level to which the proposed works are visible from the viewpoint – if they are not seen, then there is no impact.

5.2.1 Sensitive Visual Settings

Locations with potential views of the Project landforms primarily include those that already have views of the Stratford Mining Complex. Potential views of the Project landforms would be available from the following locations:

- rural residences to the north-east, north, west and south of the Project (Figures 11a and 11b [relevant land ownership list is provided on Figure 11c]);
- local roads; and
- other areas such as private roads and paddocks.

These locations are discussed further below.

Limited views of the Project would be available from surrounding viewpoints due to the undulating topography and presence of scattered vegetation along roadsides and around dwellings that partially or wholly screen some potential views. To the north and south of the Project, a large proportion of dwellings are also resource company-owned. Whilst it is acknowledged that the ridgeline located to the east of the Stratford Mining Complex overlooks the Project, potential views from this location are considered to be negligible given the ridgeline is:

- heavily wooded with potential views restricted by vegetation; and
- not readily accessible to the public and not routinely accessed by the public.

As such, no further assessment for this location has been undertaken.

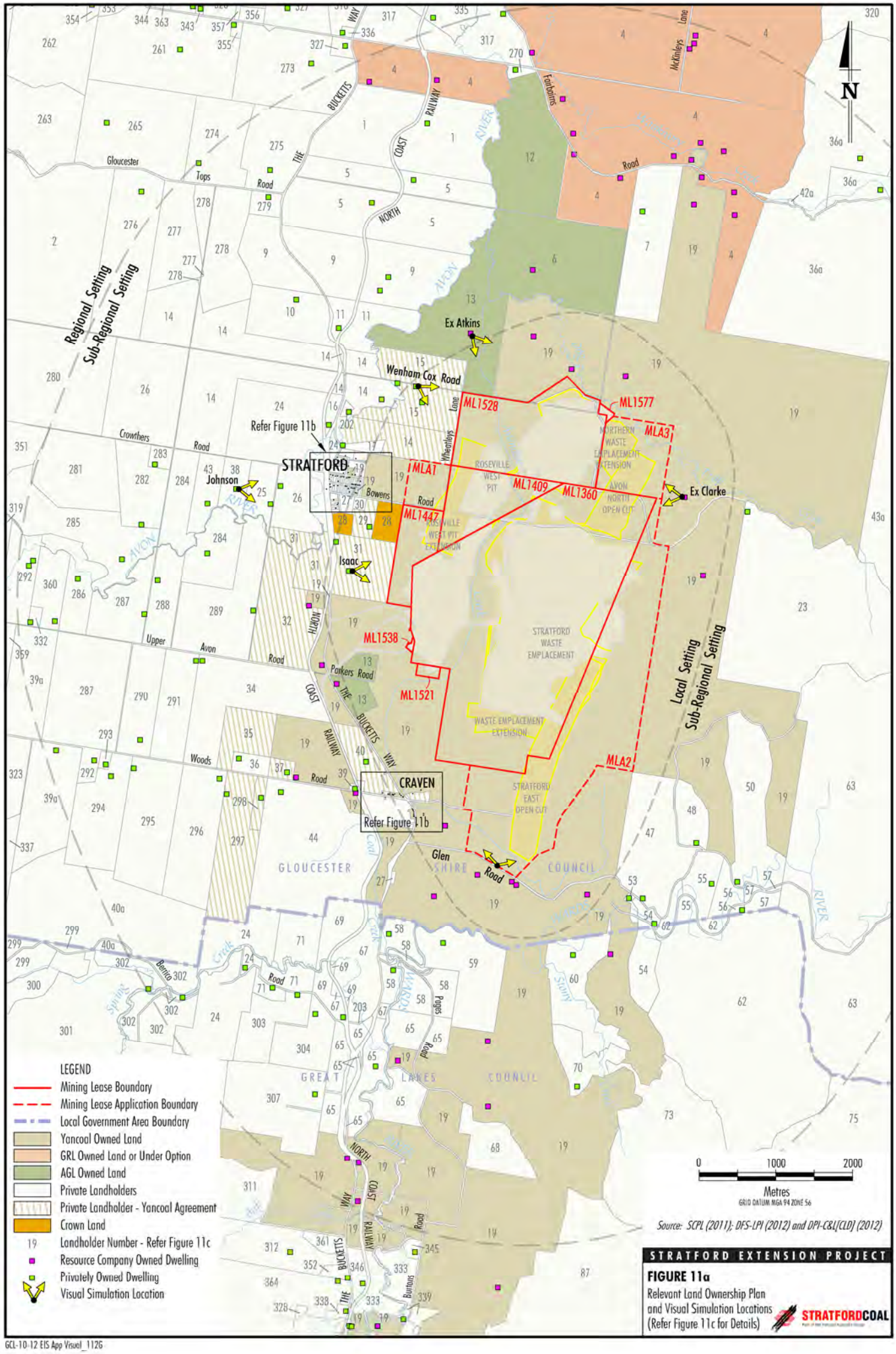
Views of the Project from Stratford would be obscured by intervening vegetation and topography, and as such, no further assessment for this location was undertaken.

In the local setting, limited views of the Stratford Mining Complex are currently available from The Bucketts Way, mostly in areas where tree plantings (established by SCPL) have yet to fully establish. However, given the tree plantings would continue to establish prior to commencement of the Project, it is anticipated that views towards the Project from The Bucketts Way would be almost entirely screened and hence, no further assessment for this location was undertaken.

Views available from intermittent locations along The Bucketts Way (looking south) and locations to the west of the Project would either be distant (i.e. the Project would comprise a very low proportion of the viewscape) or screened by intervening vegetation. The typical visual (viewer) sensitivity levels in these locations would be low (Table 3) and hence, visual simulations have not been prepared for these locations. Notwithstanding, potential distant views from elevated locations to the west of the Project towards the Stratford East Open Cut were considered in the development of mitigation measures for the Project (Section 6).

Although views towards the Project along the Wenham Cox/Bowens Road realignment would be available (due to its close proximity to the Avon North Open Cut and the absence of screening vegetation), the level of potential visual impact associated with the Project is expected to be less than the impacts predicted for the “Ex Clarke” dwelling, particularly given that users of the road would already be accustomed to the existing modified landscape that includes views of the Stratford Mining Complex. Hence no further assessment for this location was undertaken.

Visual simulations (based on a computer generated 3D model) have subsequently been created for the locations identified in Table 4 and shown on Figure 11a.



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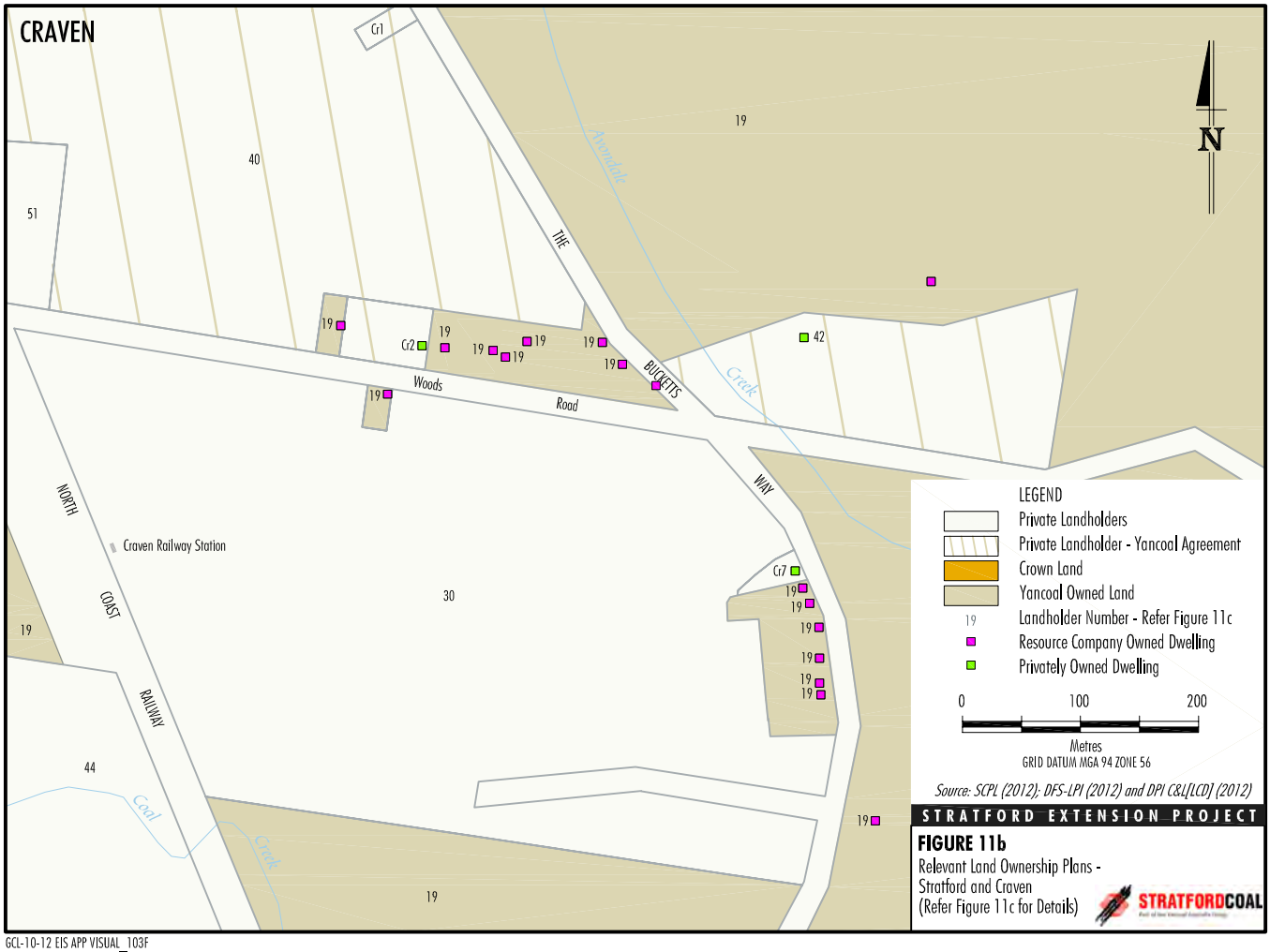

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1 Wendy Jane Fraser
2 Farley (Gloucester) Pty. Limited
4 Gloucester Resources Limited
5 Norman Edward Bignell
6 AGL Gloucester Le Pty Ltd in 70/100 Share & AGL Gloucester MG Pty Ltd in 30/100 Share as Tenants in Common
7 Mary Blanche Burrell
9 Norman John Williams
10 Kenneth James Whatmore & Anne Grace Whatmore
11 Brian Keith Walker, Lesley Jane Walker, Tyson Brian Walker & Lacey Maree Walker
12 AGL Upstream Investments Pty Limited
13 AGL Energy Limited
14 Allen James Wenham & Pamela Diane Wenham
15 GS & GL Falla Superannuation Pty Limited
16 Judith Helen Pickett
17 Darren James Fisher & Claire Louise Smith
19 Yancoal Australia Limited
23 Ross Lewis Bagnall
24 Geoffrey Lawrence Harris
25 Marisa Thompson
26 Kevin John Lowrey & Robyn Lowrey
27 The Council of the Shire of Gloucester
28 Crown Land
29 Edwin Dennis Ward & Rhonda Fay Ward
30 The State of New South Wales
31 Allan Stanley Isaac
32 Eliza Ann Ruth Mcintosh & Ronald Keith Mcintosh
34 Graham Wesley Hall & Kim Lorraine Hall
35 Leo John Dillon & Isobel Robyn Dillon
36 Graham Lindsay Wallace & Marion Frances Wallace
36a Anthony Stanford Berecry
37 Timothy James Worth
38 Paul Michael Johnson & Judith Anne Johnson
39 Paula Anne Standen
39a Woods Road Pty Ltd
40 Leslie Allenby Blanch
40a Howard Kerr Williams & Margaret Russell Williams
42 Douglas John Blanch
42a William Rainsford Ribbons
43 Vicki Colleen Moseley
43a Lymarn Holdings Pty Limited
44 Peter Michael Cross & Kylie Jane
47 David Charles Digges, Carolyn Denise Digges, Timothy Charles Hart & Elizabeth Mary Hart
48 Marion Iris Rounsley
50 Neil James Porter
51 Gloucester Printing Services Pty Ltd
53 William Charles Barnes & Cheryl Freda Barnes
54 Kenneth John Hughes & Carrysong Pty Limited
55 Allan James Hancock & Lynda Margret Hancock
56 Gerald McCalden & Patricia Brawdley McCalden
57 Pamela Brawdley Harrison
58 Douglas William Blanch & Evelyn Fay Blanch
59 Guy William Cassar & Cecile Elizabeth Cassar
60 Graeme Healy & Philip Weston Greenwood
62 Dorothy May Beeston
63 National Parks and Wildlife Service
65 Noeline Elizabeth Weismantle
67 Ian Robert Bowen
68 Julie Dawn Lyford
69 Ralph Hooper & Bronwyn Ann Bartholmew
70 Robert George Knight
71 Anthony Douglas Burnet & Robyn Annette Burnet
73 Rodney John Pearce & Anne Jeanette Pearce
75 Geoffrey Ashton Wilson
87 Pacific Property Investments Ltd
202 Paul Phillip Wenham
203 Samuel Taylor
261 Frank Murray Hooke & Susan Elizabeth Hooke
262 Noel Albert Davis & Elizabeth Therese O'Sullivan
263 Patrick Michael Ryan
265 Hans Joran Stenstrom & Janete Stenhouse Stenstrom
270 Jason David Collins & Michelle Isobel Barrett
273 Baker Place Investments Pty Limited & Dr PW Brady Pty Limited as Tenants in Common in Equal Shares
274 Warren Neil Wilson & Colleen Therese Wilson
275 Pace Farm Pty Limited
276 Alan Luscombe & Carol Luscombe
277 John William Farley
278 Mark Anthony Campbell & Roseleen Linette Campbell
279 John Donald Cullum & Rachel Anne Cullum
280 Clifford John Bramley & Terri Louise Bramley
281 Colin William Lewis & Lesley Ann Lewis
282 Peter Stephen Ross
283 Janet Nolan
284 Alec Gregory Perrin & Noreen Nita Jean Perrin
285 Marshall Leon Carter & Theresa Kathleen Carter
286 Gerard Roland Burley
287 Dorothy Kay Sinderberry & Carole Martha Rinkin
288 Alec Gregory Perrin
289 Eliza Ann Ruth Mcintosh
290 Anne Frances Ryan & Darcy Tordoff
291 Trevor Allan Crawley & Coleen Dawn Crawley
292 James Reginald Fisher & Rhonda Patricia Fisher
293 Kerry Elizabeth Braunton
294 Gregory Vincent Morcom & Karen Morcom
295 William John Bush & Danielle Elizabeth Bush
296 Peter Geoffrey Watson & Heather Irene Watson
297 William Marten Bosma
298 Eric Allan Yates
299 Malcolm Ronald Lee
300 Bevan Douglas Hokin & Di Hokin
301 Folio Identifier Pty Limited
302 Edwin John Walton & Wendy Walton
303 JSTC Newcastle Pty Limited
304 Ernie Danzil Abeysekera & Sharee Ann Abeysekera
306 Gregory Hunt & Catherine Hunt
307 Graham John Wolfenden & Rosalind Mary Wolfenden
311 Paul Berthold & Carolyn Berthold
312 Allen James Harrison & Darlene Marie Harrison
316 Country Rail Infrastructure Authority
317 Adrian Kenneth Boorer/ Beverley Ruth Boorer
318 Albert Malcolm Timothy Sopher/ Gloria June Sopher
319 Allan John Maslen
320 Andrew Charles Vintner/ Kevin Thomas Vintner
323 Burmah Pastoral Co Pty Limited
325 Charles Robert Norman
326 Charnich Pty Limited
327 Dallas Reginald Andrews
328 Daphne May Chapman
331 Delese Ellen May Buckton
332 Erol William Hastings/ Lorraine Hastings
333 Gary Bruce Grant
334 Gary Douglas Randall/ Gai Lorraine Randall
335 Graeme Harold Harris
336 Gregory James Channon/ Tonia Alice Edwards
337 Gregory Thomas Price/ Dianne Elizabeth Price
338 Jason Bruce Steward/ Maria Eliana Steward
339 John Andersen
340 John Robert Higgins
343 Kerrie Banks
344 Kerry Anne Hartigan/ Antonino Virzi
345 Lliam Woolfrey
346 Lorraine Bruce
350 Raymond Keith Saunders/ Barbara Jayne Saunders
351 Roger Speaight/ Elisabeth Aili Maria Speaight
352 Ross Sidney Edwards
353 Ryan Garth Harris
354 Scott Ernest Hoy/ Leanne Margaret Barrett
355 Sue-Ellen Margaret Kingston/ Anthony Gerard Kingston
356 Thelma Elaine Mott
357 Victor Steven Pham/ Katherine Dawn Pham
359 William Kilpatrick Hunter/ Kay Edith Hunter
360 Ter Geoffrey Mason/ Sandra Joy Mason/ Valda Doreen
361 Helen Teresa Whelan
363 Linda Trudgeon
364 Heatscape Pty Limited
Cr.1 William Deane Wood
Cr.2 Rodger Malcolm Boorer
Cr.7 David Robert Pryce-Jones
S1 Gary Owen Rees
S3 Irene Myrtle Yeatman
S4 Belinda Maree Grady & Terry Raymond Grady
S5 Christopher James Britnell
S6 Gary Wayne Threadgate & Julie Frances Threadgate
S7 Raymond James Cawley & Lucinda Cawley
S8 Neville Charles Forbes
S9 Peter John Greenham & Beverley May Greenham
S10 Louise Frances Germon
S11 Adam John Glew
S12 Grant James Mitchell & Cecily Maree Mitchell
S13 Ian Mark Wells & Jody Ann Wells
S14 Kathleen Edith Bignell
S15 Minister for Education
S18 Keith Matthew John Whittall & Janelle Fiona Whittall
S19 Rodney Lawrence Carroll
S20 Sandra Ellen McGrath
S21 Marie Anne Adams
S22 Telstra Corporation Limited
S23 Marie Fay Bartlett
S24 David Carl John Mavay
S25 The Trustees of Church Property for the Diocese of Newcastle
S26 Margaret Elaine Young
S27 Terry Leonard Brown & Elizabeth Florence Brown
S28 David Charles Morris & Yvette Marie Morris
S29 Robert Charles Bagnall & Lyndell Joy Bagnall
S30 Kam Daryl Baker
S31 Tracey Louise Richards
S32 Peter Kelly
S33 Greta Alexandra Langtry, Jennifer Gilbert & Neville Bertram Gilbert
S34 Edward George Ashby
S35 Mark Rodgers & Korinna Yvette Bekker
S36 Kenneth George Platt & Ruth Lynne Platt
S37 Malcolm Neville Pryor & Helen Leone Pryor
S38 Stephen Russell Kirkman
S39 Lizabeth Joye Nicholls & Raymond John Husband
S40 Peter John Curtis
S41 Desmond Brice McClure & Coral Ann Aplin
S42 Stephen Ronald Murray & Wilma Joy Murray
S43 Deanne Donna Squire
S44 Ann Elizabeth Flack
S45 Daniel John Keywood, Dale Martin Keywood, Kelly Hazel Keywood & Amanda Margaret Hawkins
S46 Stephen Thomas Parker & Jean Maree Parker
S47 John Victor Potts
S48 James Bryson Farley & Glenda Laurel Farley
S49 Lindy Jayne Blanch
S50 Sheryl Fay Vanderdrift & Lindy Jane Blanch
S51 Gregory John Trenholme
S52 Ronald John Farley & Theresa Jane Barry
S53 Trevor Arthur
S54 Scott Anthony Adams
S55 Beryl Veronica Mostyn & Tony James Mostyn
S56 Graham John Collins & Elizabeth Collins
S57 Mavis Jean Gam
S58 Marilyn Dorothy Harrigan
S59 Terry Raymond Grady & Belinda Maree Grady
S60 Deanne Donna Squires

Source: SCPL (2012); DFS-LPI (2012) and DPI-C&L [CLD] (2012)

STRATFORD EXTENSION PROJECT

FIGURE 11c

Relevant Land Ownership List

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Table 4
Locations of Visual Simulations

Visual Simulation Location	Potential View of Project Landforms	Visual Simulation Figure
Adjacent to the "Johnson" Dwelling (privately-owned)	View towards Stratford Waste Emplacement and Roseville West Pit Extension.	Figure 12
Adjacent to the "Ex Atkins" Dwelling (AGL-owned)	View towards Stratford Waste Emplacement, Northern Waste Emplacement Extension and Roseville West Pit Extension.	Figure 13
Adjacent to the "Ex Clarke" Dwelling (SCPL-owned)	View towards Northern Waste Emplacement Extension, Avon North Open Cut and Wenham Cox/Bowens Road realignment.	Figure 14
Wenham Cox Road	View towards Stratford Waste Emplacement, Northern Waste Emplacement Extension and Roseville West Pit Extension.	Figure 15
Adjacent to the "Isaac" Dwelling (privately-owned)	View towards Stratford Waste Emplacement.	Figure 16
Glen Road	View towards Stratford East Open Cut and Stratford Waste Emplacement.	Figure 17

AGL = AGL Gloucester LE Pty Ltd

As the simulation locations are proximal to differing components of the Project, different years are most relevant to evaluating potential visual impacts. The Project development simulations therefore vary between Years 2, 4, 7 and 10 to illustrate the period when the landforms would be at their maximum heights and not yet fully rehabilitated and/or when development would be closest to the respective viewpoint, therefore representing the greatest potential for visual impact. The post-mining simulations illustrate the conceptual landform following completion of mining and rehabilitation activities.

Development simulations for the northern viewpoint locations (i.e. "Ex Clarke" dwelling and Wenham Cox Road – refer Figure 11a) were prepared using the Project landforms during Year 2 of operations when development of the northern Project components (i.e. extension of the Northern Waste Emplacement and Avon North Open Cut) would be closest (therefore representing the greatest potential for visual impact). The "Ex Clarke" dwelling is expected to have greater visual impacts than the views from the Wenham Cox/Bowens Road realignment.

The development simulation for the "Ex Atkins" dwelling (refer Figure 11a) was prepared using the Project landforms during Year 4 of operations when the extension of the Northern Waste Emplacement would be at its approximate maximum height and not yet fully rehabilitated (therefore representing the greatest potential for visual impact).

Development simulations for the western viewpoint locations (i.e. "Johnson" and "Isaac" dwelling – refer Figure 11a) were prepared using the Project landforms during Year 7 of operations when the Stratford Waste Emplacement would be at its approximate maximum height and not yet fully rehabilitated (therefore representing the greatest potential for visual impact).

The development simulation for the southern viewpoint location (i.e. Glen Road – refer Figure 11a) was prepared using the Project landforms during Year 10 of operations when development of the southern Project components (i.e. the Stratford East Open Cut) would be closest (therefore representing the greatest potential for visual impact).

5.3 IMPACT ASSESSMENT

This section assesses potential visual impacts that are expected to arise as a result of the Project based on the methodology described in Section 5.1. The level of potential visual impact is assessed assuming the status of rehabilitation as shown in the general arrangements of the Project as well as implementation of specific visual impact mitigation measures (Section 6).

A summary of the potential visual impact at the viewpoint locations analysed in the following subsections is provided in Table 5.

Table 5
Summary of Potential Visual Impact at Sensitive Locations

Location	Visual Sensitivity	Visual Modification Level	Potential Impact*	Potential Impact After Final Amelioration
Sub-Regional Setting (1 to 5 km)				
"Johnson" Dwelling	H	L	M	L
"Ex Atkins" Dwelling (AGL-owned)	H	L	M	L
Local Setting (<1 km)				
"Ex Clarke" Dwelling	H	H	H	M
Wenham Cox Road	L	L	L	VL
"Isaac" Dwelling	H	L	M	VL
Glen Road	L	M	L	L

* Methodology described in Section 5.1.

H – High, M – Moderate, L – Low, VL – Very Low.

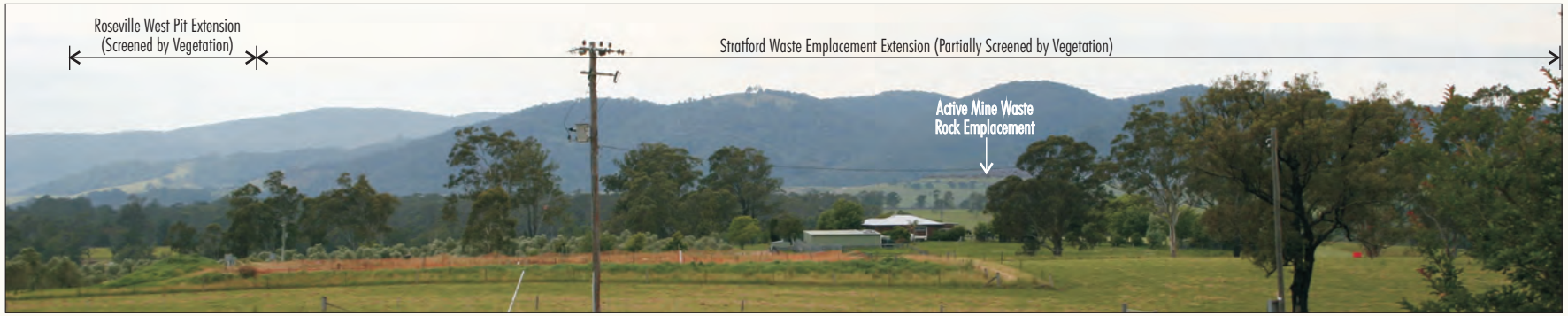
5.3.1 Visual Impacts – Regional Setting

Whilst some isolated viewing locations are located within the regional setting, the intervening topography and distance to the Project means that any potential views would represent only a small proportion of the overall viewscape. Typically, other dwellings within the regional setting are set within a "house paddock" with a surrounding perimeter of vegetation, that when combined with intervening scattered vegetation and undulating topography, results in heavily screened, distant views to the Project. The level of potential visual impact at other dwellings with views of the Project in the regional setting would generally be expected to be less than the impacts predicted at dwellings in the sub-regional setting.

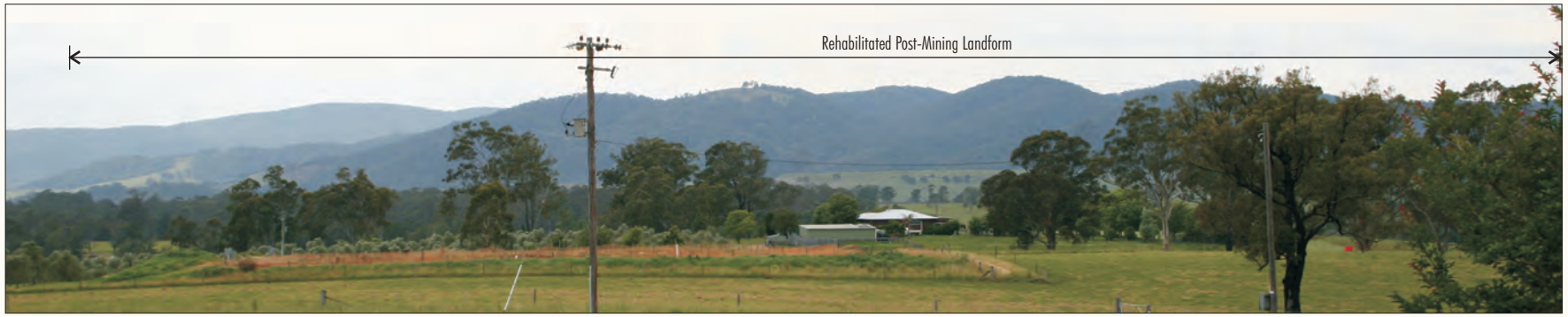
5.3.2 Visual Impacts – Sub-regional Setting

A number of isolated viewing locations are located within the sub-regional setting (Figure 11a). The potential visual impacts of the Project from the privately-owned "Johnson" dwelling and the AGL-owned "Ex Atkins" dwelling are described below and visual simulations are shown on Figures 12 and 13.

Existing View



Development Simulation (Year 7)



Post-Mining Simulation

Source: Marc & Co (2012)

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FIGURE 12

Existing View and Visual Simulations - "Johnson" Dwelling

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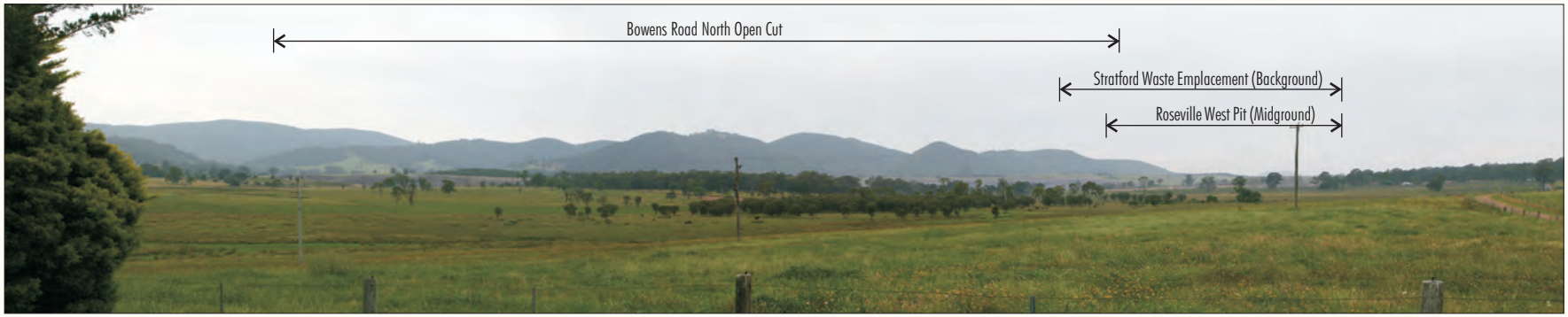
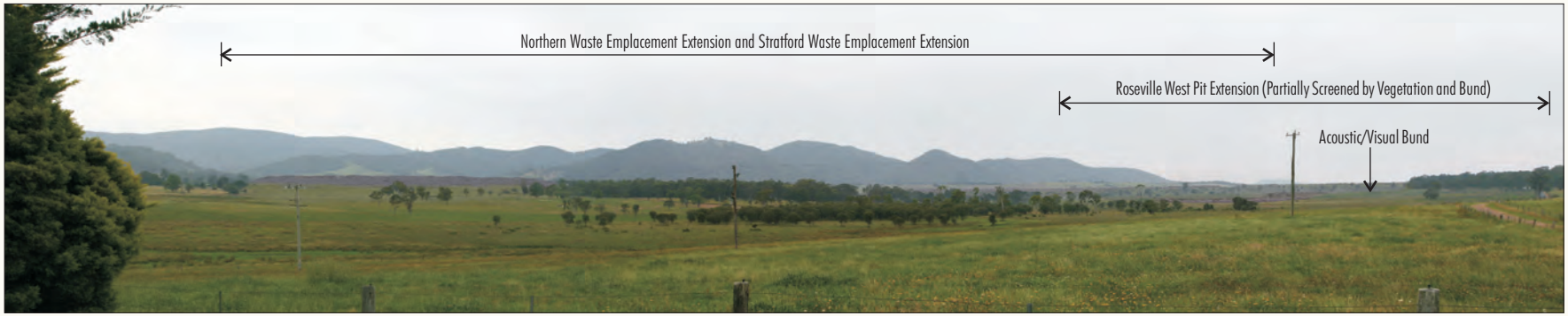
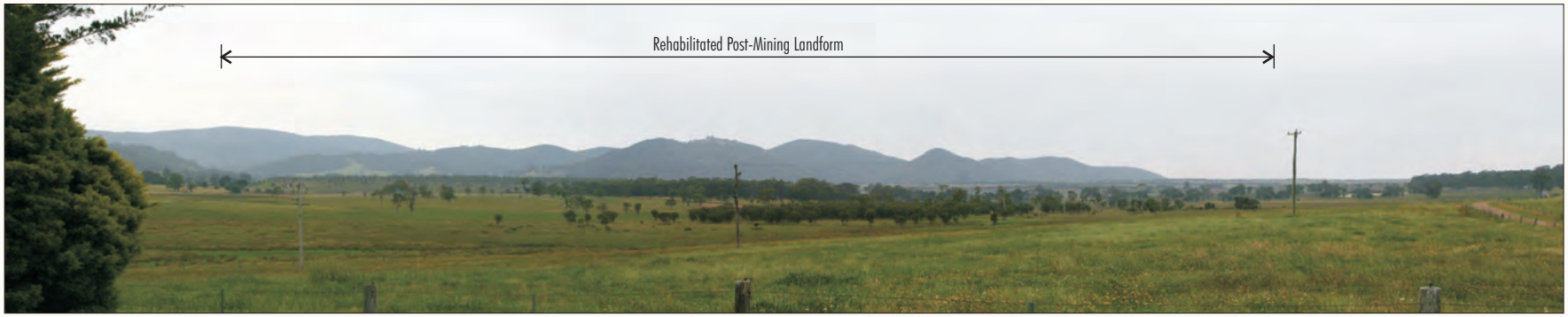


Existing View



Development Simulation (Year 4)



Post-Mining Simulation

Source: Marc & Co (2012)

STRATFORD EXTENSION PROJECT

FIGURE 13

Existing View and Visual Simulations - "Ex Atkins" Dwelling

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GCL-10-02 EIS App Visual_004E

"Johnson" Dwelling

Level of Visual Modification

The privately-owned "Johnson" dwelling is located approximately 2 km west of the nearest Project landform (Figure 11a). Views from this residence towards the Stratford Mining Complex are mostly obscured by intervening vegetation and comprise a small proportion of the overall viewscape (Figure 12). The existing view shows the elevated north-south trending ridgeline visible on the horizon with the rehabilitated Stratford Waste Emplacement in the middle ground and cleared pastoral land and scattered vegetation in the foreground.

Views from this residence would have previously been modified during construction of the approved Stratford Waste Emplacement (Section 2). However, the existing view demonstrates that the rehabilitated Stratford Waste Emplacement landform (Figure 2) now represents a low level of visual modification given its integration with the surrounding landscape (i.e. it has been revegetated and rehabilitated to date).

Similar to the previously identified potential visual impacts associated with the development of the SCM (and specifically, the Stratford Waste Emplacement), the greatest potential visual impact at the "Johnson" dwelling would occur mid-way through the Project when the extensions to the Stratford Waste Emplacement are active. During this period, a low level of visual modification would result from the contrasting colour and texture of the existing landscape and the newly placed and unvegetated material on the upper batters of the Stratford Waste Emplacement before a cover is established as part of the rehabilitation process. This potential impact would be confined to the upper batters of the Stratford Waste Emplacement during progressive construction and rehabilitation.

The simulation on Figure 12 shows that the Project landforms would only comprise a small proportion of the overall viewscape. The level of visual modification associated with the Project would be low due to the screening effects of existing vegetation and the low level of contrast between the partially revegetated emplacement and the landscape of the setting.

Viewer Sensitivity

Within the sub-regional setting, visual sensitivity at the "Johnson" dwelling (residential – rural) is considered high given the distance to the Project (i.e. approximately 2 km) (Table 3).

Visual Impact

Given the low level of visual modification associated with the Project coupled with the high visual sensitivity at the "Johnson" dwelling, a moderate level of potential visual impact is expected (Table 5).

Duration of Impact

Similar to previous development works associated with the Stratford Waste Emplacement (and the achieved level of integration of the rehabilitated landform with the surrounding landscape), the level of potential visual impact is expected to progressively reduce as vegetation cover is established on the rehabilitated Stratford Waste Emplacement. Further, the final landform heights would remain below the vegetated north-south trending ridgeline visible on the horizon from this location and would therefore be compatible with the surrounding landscape. The simulation on Figure 12 shows that following progressive and final rehabilitation, the level of potential visual impact associated with the Project would reduce to low (Table 5).

"Ex Atkins" Dwelling

Level of Visual Modification

The AGL-owned "Ex Atkins" dwelling is located approximately 1.2 km north-west of the nearest Project landform (Figure 11a). The existing view shows the north-south trending ridgeline visible on the horizon together with a small area of the rehabilitated Stratford Waste Emplacement (Figure 13). The existing view also shows some active areas of the BRNOC and Roseville West Pit visible in the middle ground and cleared pastoral land and remnant vegetation in the foreground.

The greatest potential visual impact at the "Ex Atkins" dwelling would occur during the initial years of the Project when the Northern Waste Emplacement, Stratford Waste Emplacement and Roseville West Pit Extension areas are active. By Year 4 of the Project, the extension of the Northern Waste Emplacement would be at its approximate maximum height and not yet fully rehabilitated (therefore representing the greatest potential for visual impact). The main source of visual modification associated with the Project would be the contrasting colour and texture of the existing landscape and the newly placed and unvegetated material on the Project mine waste rock emplacements before a cover is established as part of the rehabilitation process.

The simulation on Figure 13 shows that the Project landforms would only comprise a small proportion of the overall viewscape. The level of visual modification associated with the Project would be low due to the screening effects of existing vegetation and the acoustic/visual bund to be established adjacent to the Roseville West Pit Extension (Section 4.2).

Viewer Sensitivity

Within the sub-regional setting, visual sensitivity at the "Ex Atkins" dwelling (residential – rural) is considered high given the distance to the nearest Project landform (i.e. approximately 1.2 km) (Table 3).

Visual Impact

Given the low level of visual modification associated with the Project coupled with the high visual sensitivity at the "Ex Atkins" dwelling, a moderate level of potential visual impact is expected (Table 5). It should be noted that the "Ex Atkins" dwelling is AGL-owned.

Duration of Impact

The level of potential visual impact would progressively reduce as vegetation cover is established on the rehabilitated Project landforms. Further, the final landform heights would remain below the vegetated north-south trending ridgeline visible on the horizon from this location and would be compatible with the surrounding landscape. The simulation on Figure 13 shows that following progressive and final rehabilitation, the level of potential visual impact associated with the Project would reduce to low (Table 5).

Other Dwellings

There are a number of dwellings in the sub-regional setting (Figure 11a) and some of these dwellings may also have partial views of the Project. The level of potential visual impact at other dwellings with views of the Project in the sub-regional setting would generally be expected to be equivalent to or less than the impacts predicted at the "Johnson" and "Ex Atkins" dwellings.

5.3.3 Visual Impacts – Local Setting

A number of isolated viewing locations are located within the local setting (Figure 11a). The potential visual impacts of the Project from the privately-owned "Isaac" dwelling and mine-owned "Ex Clarke", as well as Wenham Cox Road and Glen Road are described below and visual simulations are shown on Figures 14 to 17.

"Ex Clarke" Dwelling

Level of Visual Modification

The mine-owned "Ex Clarke" dwelling is located approximately 500 m east of the nearest Project landform (Figure 11a). Westerly views of the Project would be available from this residence, due to its elevation and the absence of screening vegetation and topography (Figure 14). The existing view shows the wooded hills of the Gloucester Valley visible on the horizon with the rehabilitated areas of the Northern Waste Emplacement visible in the middle ground and cleared pastoral land in the foreground.

Views from this residence would have previously been modified during construction of the approved BRNOC (Section 2). However, the existing view demonstrates that the rehabilitated Northern and Southern Waste Emplacement landforms (Figure 2) now represent a low level of visual modification given their integration with the surrounding landscape (i.e. these landforms have been revegetated and rehabilitated to date).

Similar to the previously identified potential visual impacts associated with the development of the BRNOC (and specifically, the associated Northern and Southern Waste Emplacements), the greatest potential visual impact at the "Ex Clarke" dwelling would occur during the initial years of the Project, when development of the Northern Waste Emplacement and Avon North Open Cut progress towards the dwelling. The main source of visual modification associated with the Project would be the removal of vegetation from a section of the viewscape and partial views into the Avon North Open Cut. Some visual modification would also arise from the contrasting colour and texture of the undisturbed natural areas and the newly placed and unvegetated material on the Northern Waste Emplacement, before a grass cover is established as part of the rehabilitation process.

The potential visual impact of the Wenham Cox/Bowens Road realignment would result from the realignment of the road closer to the dwelling.

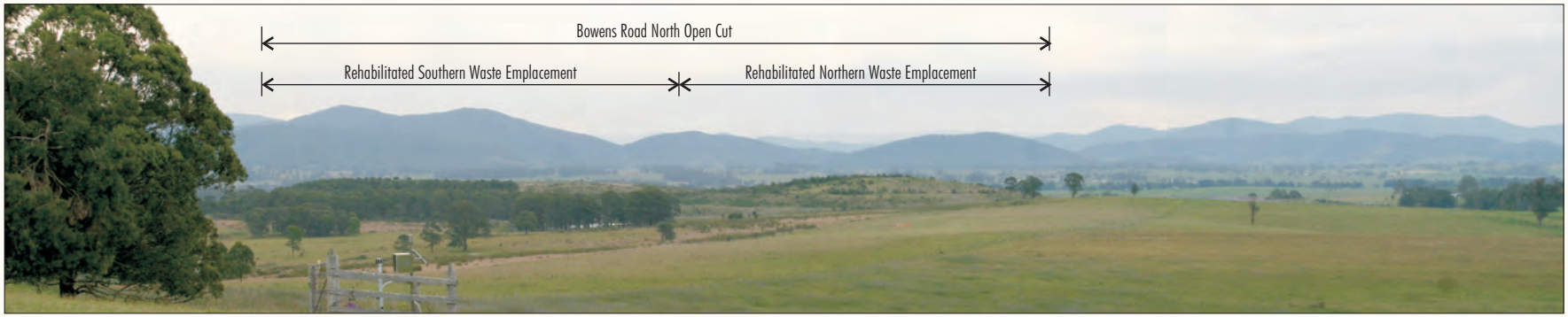
The simulation on Figure 14 shows the level of visual modification associated with the Project would be high.

Viewer Sensitivity

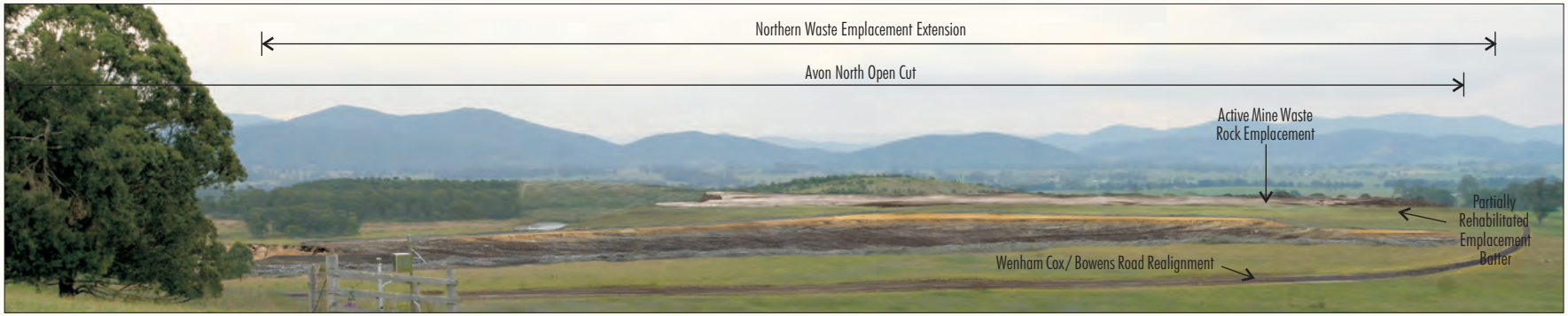
Within the local setting, visual sensitivity at the "Ex Clarke" dwelling (residential – rural) is considered high given the distance to the nearest Project landform (i.e. approximately 500 m) (Table 3).

Visual Impact

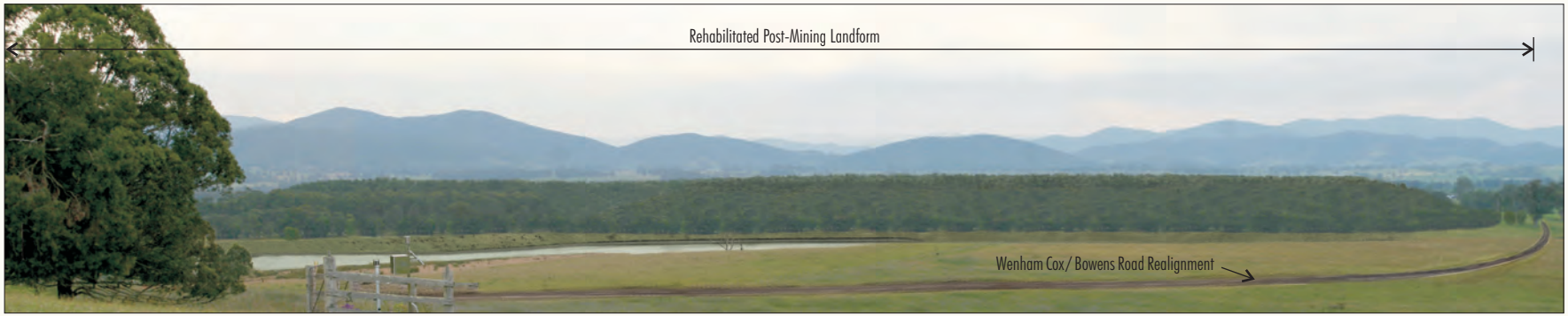
Given the high level of visual modification associated with the Project coupled with the high visual sensitivity at the "Ex Clarke" dwelling, a high level of potential visual impact is expected (Table 5).



Existing View



Development Simulation (Year 2)



Post-Mining Simulation

Source: Marc & Co (2012)

STRATFORD EXTENSION PROJECT

FIGURE 14

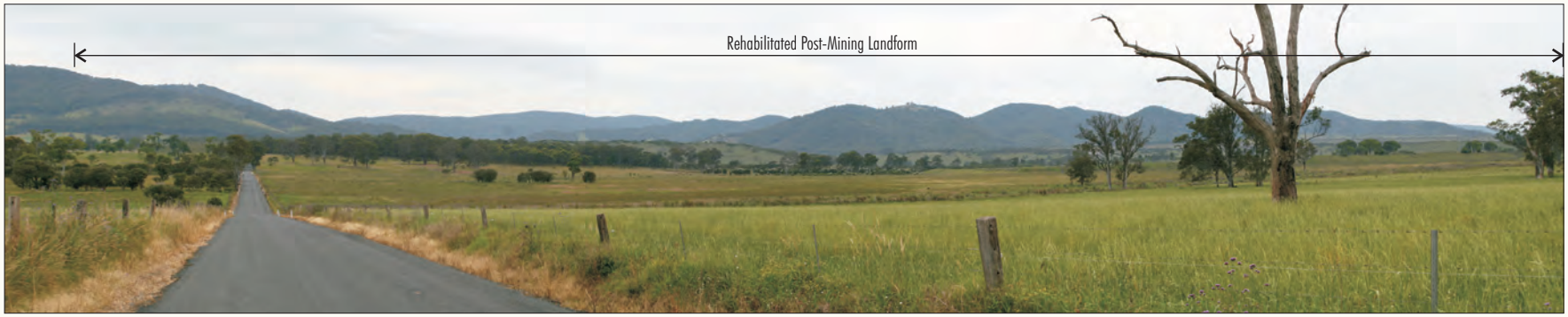
Existing View and Visual Simulations - "Ex Clarke" Dwelling

STRATFORDCOAL

GCL-10-02 EIS App Visual_005H

Existing View

Development Simulation (Year 2)



Post-Mining Simulation

Source: Marc & Co (2012)

STRATFORD EXTENSION PROJECT

FIGURE 15

Existing View and Visual Simulations - Wenham Cox Road

STRATFORDCOAL

GCL-10-02 EIS App Visual_006D

Existing View

Development Simulation (Year 7)

Post-Mining Simulation

Source: Marc & Co (2012)

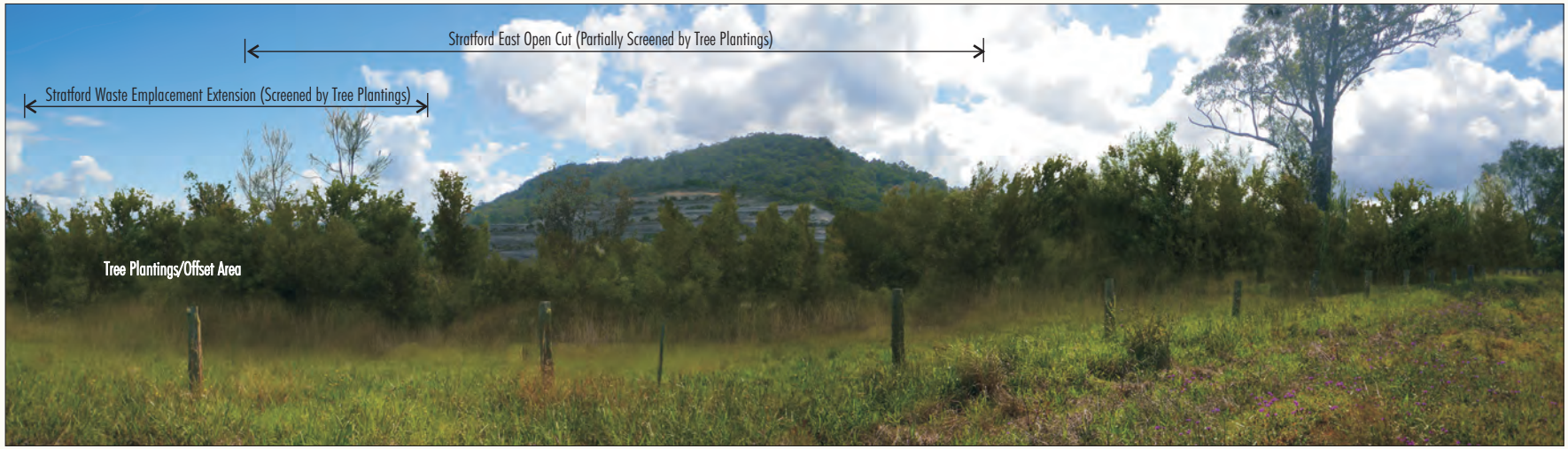
STRATFORD EXTENSION PROJECT

FIGURE 16

Existing View and Visual Simulations -" Isaac" Dwelling

STRATFORDCOAL

Existing View



Development Simulation (Year 10)

Source: Marc & Co (2012)

STRATFORD EXTENSION PROJECT

FIGURE 17

Existing View and Visual Simulation - Glen Road

STRATFORDCOAL

GCL-10-02 EIS App Visual_007F

Duration of Impact

Similar to previous development works associated with the BRNOC (and the achieved level of integration of the associated rehabilitated landforms with the surrounding landscape), the level of potential visual impact would progressively reduce as vegetation cover is established on the rehabilitated Project landforms and as the Avon North Open Cut is partially backfilled and rehabilitated. Further, the final landform heights would remain below the wooded hills of the Gloucester Valley visible on the horizon from this location and would therefore be compatible with the surrounding landscape.

The simulation on Figure 14 shows that following progressive and final rehabilitation, the level of potential visual impact associated with the Project would reduce to moderate (Table 5).

Wenham Cox Road

Level of Visual Modification

The greatest potential visual impact for users of Wenham Cox Road would occur during the initial years of the Project when development of the northern Project components (i.e. extension of the Northern Waste Emplacement and Stratford Waste Emplacement) would be active and the extension of the Roseville West Pit would progress towards the road.

Potential visual impacts would result from the contrasting colour and texture of the existing landscape and the newly placed rock/soil material on the Project landforms before a vegetation cover is established as part of the rehabilitation process. There is also likely to be some contrast between the colour of newly established vegetation and the existing landscape that would reduce with time.

The simulation on Figure 15 shows that the Project landforms would only comprise a small proportion of the overall viewscape. The level of visual modification associated with the Project would be low.

Viewer Sensitivity

Although the Project landforms would be visible from Wenham Cox Road, there are relatively few users of this local road. In addition, most users of this local road would be accustomed to the existing modified landscape that includes views of the Stratford Mining Complex (Figure 15). Within the local setting, the visual sensitivity of users on Wenham Cox Road is therefore considered to be low (Table 3).

Visual Impact

Given the low level of visual modification associated with the Project coupled with the low level of visual sensitivity of users of Wenham Cox Road, a low level of potential visual impact is expected (Table 5).

Duration of Impact

The simulation on Figure 15 shows that following progressive and final rehabilitation, the level of potential visual impact associated with the Project would reduce to very low (Table 5).

"Isaac" Dwelling

Level of Visual Modification

The privately-owned "Isaac" dwelling is located approximately 1 km west of the nearest Project landform (Figure 11a). The existing view shows the north-south trending ridgeline visible on the horizon and cleared pastoral land in the middle and foreground (Figure 16). The nature of the local topography (which rises between the dwelling and the existing Stratford Mining Complex) currently screens views of the Stratford Mining Complex from this dwelling.

The greatest potential visual impact at the "Isaac" dwelling would occur mid-way through the Project when the extensions to the Stratford Waste Emplacement are active. The main source of visual modification associated with the Project would be the contrasting colour and texture of the existing landscape and the newly placed and unvegetated material on the upper batters of the Stratford Waste Emplacement before a cover is established as part of the rehabilitation process. This potential impact would be confined to the upper batters of the Stratford Waste Emplacement during progressive construction and rehabilitation.

The simulation on Figure 16 shows that the Project landforms would only comprise a small proportion of the overall viewscape. The level of visual modification associated with the Project would be low due to the presence of intervening topography and screening vegetation and the low level of contrast between the partially rehabilitated waste emplacement and the landscape of the setting.

Viewer Sensitivity

Within the local setting, visual sensitivity at the "Isaac" dwelling (residential – rural) is considered high given the distance to the nearest Project landform (i.e. approximately 1 km) (Table 3).

Visual Impact

Given the low level of visual modification associated with the Project coupled with the high visual sensitivity at the "Isaac" dwelling, a moderate level of potential visual impact is expected (Table 5).

Duration of Impact

The level of potential visual impact would progressively reduce as vegetation cover is established on the rehabilitated Stratford Waste Emplacement. The simulation on Figure 16 shows that following progressive and final rehabilitation, the level of potential visual impact associated with the Project would reduce to very low (Table 5).

Glen Road

Level of Visual Modification

Visual simulations were prepared for the Glen Road viewpoint, located approximately 250 m from the nearest Project landform (Figure 11a).

The greatest potential visual impact along Glen Road would occur during the latter years of the Project when development of the southern Project components (i.e. extension of the Stratford Waste Emplacement and Stratford East Open Cut) would progress towards the road. The realigned 132 kV electricity transmission line would also potentially alter the viewscape.

The potential impact of the Stratford East Open Cut would result from the removal of vegetation and topography from a section of the viewscape and partial views of the open cut mine workings.

Tree plantings would be established adjacent to Glen Road commencing in Year 1 of the Project (Section 6.2). The simulation on Figure 17 shows that the level of visual modification associated with the Project would be moderate.

Viewer Sensitivity

There would be relatively few users of Glen Road, given it is a local, unsealed road. Exposure to views of the Project from this location would therefore be limited in the public domain. These users would also be accustomed to the existing partially modified landscape that includes views of a 132 kV electricity transmission line and cleared agricultural land. Within the local setting, the visual sensitivity of users on Glen Road is therefore considered to be low (Table 3).

Visual Impact

Given the moderate level of visual modification associated with the Project coupled with the low level of visual sensitivity of users of Glen Road, a low level of potential visual impact is expected (Table 5).

Duration of Impact

As described above, tree plantings would be established adjacent to Glen Road as part of the Project offset strategy, commencing in Year 1 of the Project (Section 6.1). The tree plantings/revegetation to be undertaken as part of the Project offset strategy would progressively limit potential views of the Project from this location (Section 6.1). The upper benches of the Stratford East Open Cut would be progressively revegetated with scattered trees and shrubs to reduce the level of contrast between the open cut and surrounding vegetation, which may also be visible from elevated locations to the west of the Project. The level of potential visual impact associated with the Project is therefore expected to remain low (Table 5). Following the completion of mining and rehabilitation, views towards the Project would be expected to be screened by tree plantings and revegetation and, hence, a post-mining simulation was not prepared.

Other Dwellings

Other dwellings in the local setting (Figure 11a) are not expected to have views of the Project, with the exception of those that are subject to an existing landholder agreement with SCPL.

5.4 NIGHT-LIGHTING

The glow produced by night-lighting at the Stratford Mining Complex is visible at nearby residences and along transport routes (i.e. rail and road), while direct views of mobile machinery lights and operational lighting are potentially available from some exposed positions and nearby residences. The night-glow is similar to that associated with existing towns and villages in the Gloucester Valley.

The intensity of the glow produced by night-lighting is likely to increase at various stages over the life of the Project as a result of night-time mining operations. There may also be an increase in night-lighting from mobile equipment and vehicle-mounted lights. Visual effects of lighting associated with the CHPP and infrastructure areas would be similar to existing levels.

Measures that would be employed to mitigate potential impacts from night-lighting are described in Section 6.3.

5.5 STROUD GLOUCESTER VALLEY INCORPORATING THE VALE OF GLOUCESTER

As described in Section 3.3, the Stroud Gloucester Valley Incorporating the Vale of Gloucester covers an area of approximately 53,000 ha. Including the existing mining lease and proposed mining lease application areas, the Project has conservatively been estimated to cover an area of approximately 1,800 ha (i.e. approximately 3 percent of the Stroud Gloucester Valley Incorporating the Vale of Gloucester area [Figure 4]).

It is noted in the Non-Aboriginal Heritage Assessment for the Project that the "*existing rehabilitated mine landforms at Stratford are generally well integrated and once revegetated look very similar to the surrounding un-mined lands"* (Appendix J of the EIS). Similarly, the Project landforms, once revegetated, would also look similar to the surrounding un-mined lands and therefore the Project is not considered likely to significantly impact the scenic values described in the National Heritage Trust of Australia (NSW) listing.

As described in the Agricultural Assessment for the Project (Appendix K of the EIS), areas of the rehabilitated Project site would also be established for agricultural purposes and as a result, the Project would not detract from the essentially rural nature of the Stroud Gloucester Valley Incorporating the Vale of Gloucester.

5.6 CUMULATIVE IMPACTS

The assessment of cumulative visual impacts has considered the combined effects of the Project with the effects of existing and proposed operations in the Gloucester Valley, *viz*.:

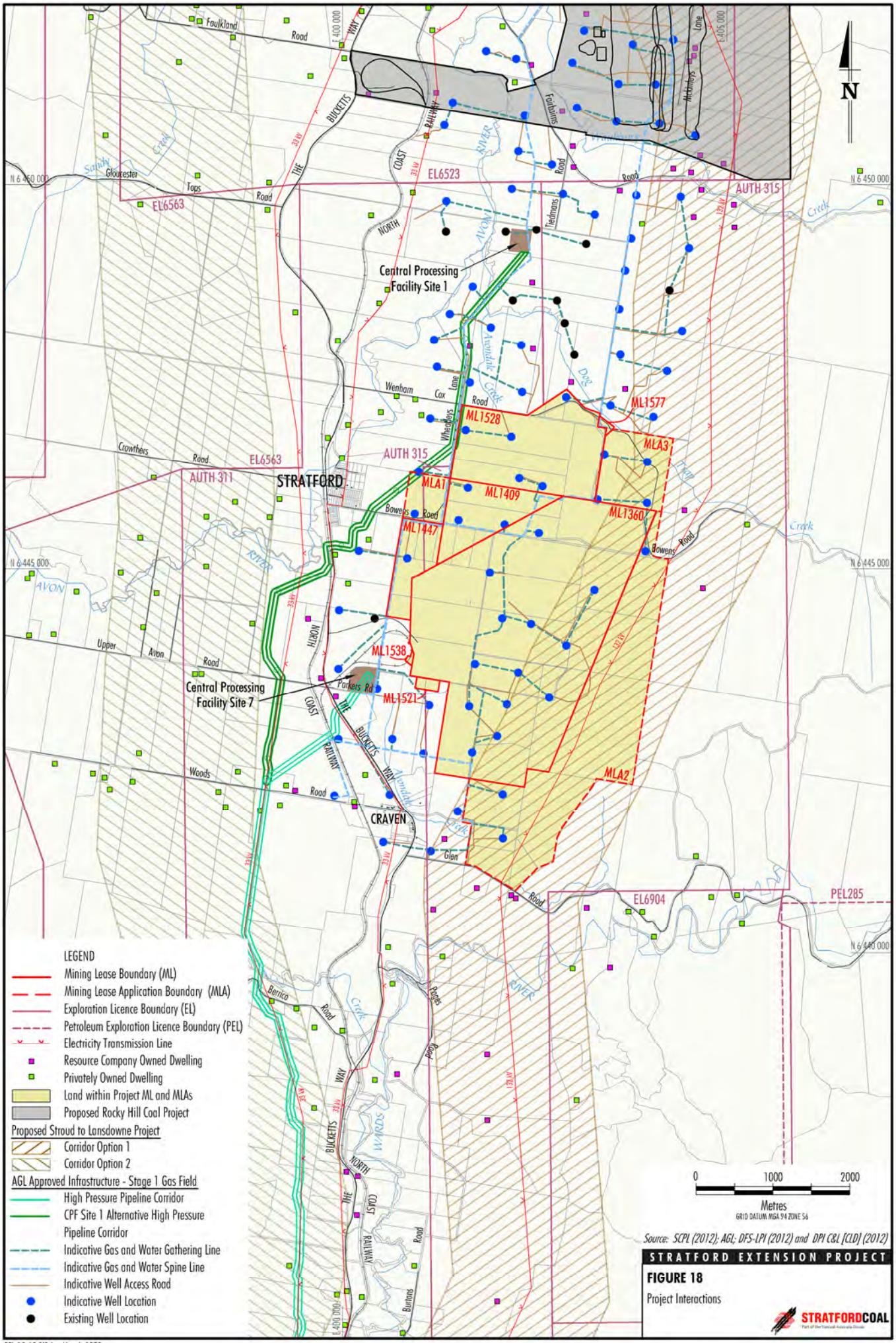
- the existing DCM (owned by Yancoal);
- AGL's Gloucester Gas Project;
- exploration activities undertaken by Gloucester Resources Limited (GRL) and Yancoal;
- GRL's proposed Rocky Hill Coal Project; and
- Stroud to Lansdowne Project.

As described in Section 3, the visual setting for the Project includes the existing Stratford Mining Complex and the DCM, located approximately 20 km south of the Stratford Mining Complex.

Stage 1 of the Gloucester Gas Project was granted Project Approval (08_0154) under Part 3A of the NSW *Environmental Planning and Assessment Act, 1979* in February 2011. AGL is the proponent of the Gloucester Gas Project. Infrastructure associated with Stage 1 of the Gloucester Gas Project overlays and is adjacent to the existing mining and exploration tenements at the Stratford Mining Complex (Figure 18).

The *Gloucester Gas Project Environmental Assessment* (AECOM Australia, 2009) indicates the following for the Stage 1 gas field development area with respect to potential visual impacts (Figure 18):

- the Central Processing Facility locations have been selected with regard to the visual characteristics of the surrounding area, and are proposed to be located proximate to existing industrial land uses;
- visibility of the well sites and pipeline during construction would be of a limited, transient nature;
- the pipeline would be buried and rehabilitated upon completion of construction; and
- night-lighting would be similar to that of a rural dwelling.



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GRL is undertaking exploration activities within Exploration Licence (EL) 6523, EL 6524 and EL6563, north and west of the Stratford Mining Complex (Figure 1). Yancoal is also approved to undertake exploration activities within surrounding authorisations (AUTH) (AUTH 311 and AUTH 315), and EL 6904 to the south-east of the Stratford Mining Complex. It is considered unlikely that any significant or sustained cumulative impacts would arise from the exploration activities being undertaken by GRL or Yancoal in the region as exploration activities are generally short-term, of a limited extent and will be closely regulated by the NSW Department of Resources and Energy.

The proposed GRL Rocky Hill Coal Project is located approximately 5 km to the north of the Project (Figure 18) and would disturb an area of approximately 560 ha of land (R.W. Corkery and Co. Pty Limited, 2012). *Documentation Supporting an Application for Director-General's Requirements for the Rocky Hill Coal Project* (R.W. Corkery and Co. Pty Limited, 2012) indicates the following with respect to that project's potential visual impacts:

- tree planting and construction of visibility barriers are proposed;
- placement of overburden would be located away from both the public and private domain viewing locations and would be progressively revegetated; and
- emphasis would be placed upon ensuring the final landforms trend in a similar manner to the existing surrounding topography.

TransGrid is the proponent of the Stroud to Lansdowne Project (Figure 18). The Stroud to Lansdowne transmission line alignment may potentially traverse a similar alignment to the existing 132 kV transmission line east of the Project (i.e. corridor option 1). As described in Section 4.4, a section of the existing 132 kV electricity transmission line is proposed to be realigned as part of the Project. Views towards both the realigned 132 kV electricity transmission line and the potential Stroud to Lansdowne Project transmission line would be limited to viewpoints along Glen Road. As described in Section 5.3.3, the visual sensitivity of users on Glen Road (local road) is considered to be low given that there would be relatively few users of Glen Road and therefore exposure to views of the Project from this location would be limited in the public domain.

Based on review of the above and the existing area of the Stroud Gloucester Valley Incorporating the Vale of Gloucester (Section 3.3), no significant cumulative visual impacts are anticipated to arise from the coincident development of the Project, approved DCM and Gloucester Gas Project, proposed Rocky Hill Coal Project, or proposed Stroud to Lansdowne Project should these be approved.

As described in Section 4.6, the scale and intensity of night-lighting for the Project is expected to increase when compared to the existing night-lighting at the Stratford Mining Complex. If approved, the Rocky Hill Coal Project would also involve evening and (potentially) night-time mining operations and as such, would result in night-lighting impacts (i.e. night-time lighting effects similar to the existing Stratford Mining Complex) that may result in cumulative impacts. For example, there may be increased night-time lighting effects at dwellings situated between the Project and the proposed Rocky Hill Coal Project (Figure 18) or at elevated locations where views are currently available across the wider Gloucester Valley landscape.

6 MITIGATION MEASURES AND MANAGEMENT

The limited number of residences in the vicinity of the Project and the ownership of a number of nearby properties by SCPL assist in limiting the potential visual impacts of the Project. Notwithstanding, proposed visual impact mitigation and management measures are described below.

6.1 PROGRESSIVE REHABILITATION AND REVEGETATION

Progressive rehabilitation of the Northern Waste Emplacement, Stratford Waste Emplacement, open cuts and other mine infrastructure areas would be undertaken in order to reduce the contrast between the Project landforms and the surrounding environment. The Avon North and Stratford East Open Cuts together with the Roseville West Pit Extension would be progressively backfilled with waste rock followed by the application of topsoil to facilitate revegetation. Upon completion of backfilling of the BRNOC and Stratford Main Pit, topsoil application would also occur as part of progressive rehabilitation activities. At the end of the Project life, the Avon North Open Cut void, Stratford East Open Cut void and Roseville West Pit Extension void would remain, as described in Section 5 in the Main Report of the EIS. Rehabilitation would be conducted in accordance with the Rehabilitation Strategy presented in Section 5 in the Main Report of the EIS. The offset strategy for the Project is described in the Flora Assessment (Appendix E of the EIS) and includes measures such as revegetation of cleared areas (e.g. between Glen Road and the Stratford East Open Cut void). The tree plantings/revegetation to be undertaken as part of the Project offset strategy would progressively limit potential views of the Project from the southern viewpoint locations (specifically Glen Road). The proposed offset areas are shown on Figure 19.

6.2 VISUAL SCREENING

Visual screening (e.g. a vegetation screen consisting of endemic plants that are compatible with the existing surrounding vegetation) is considered to mitigate potential visual impacts from sensitive viewpoints. Upon receiving a request from an owner of any privately-owned dwelling which has significant direct views of the Project, SCPL would implement visual mitigation measures (e.g. vegetation screening) in consultation with the owner to minimise the visibility of the Project from the dwelling.

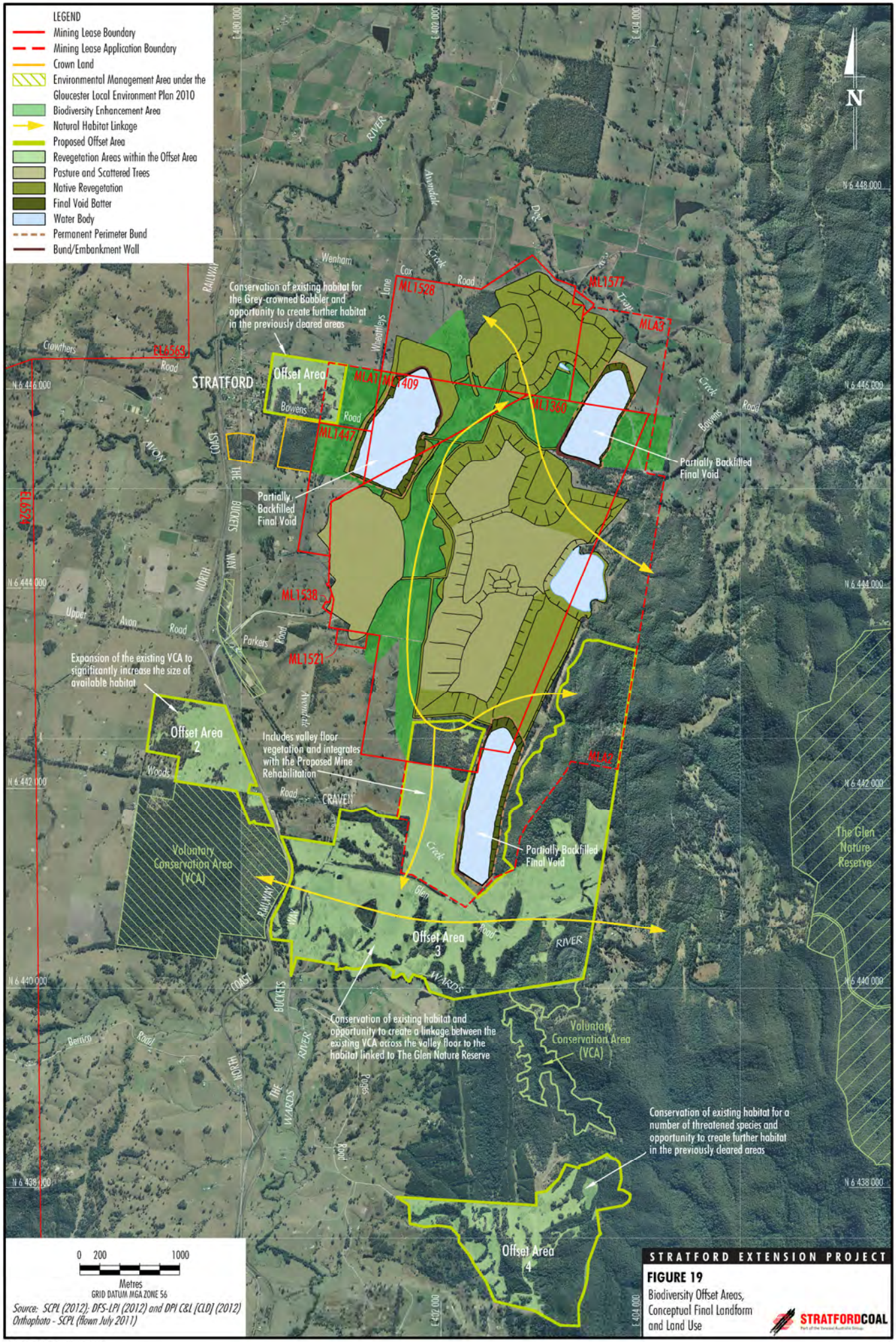
As described above, tree planting parallel to Glen Road would also be undertaken during Year 1 of the Project as part of the Project offset strategy to progressively limit potential views of the Project from Glen Road.

6.3 NIGHT-LIGHTING CONTROLS

Whilst ensuring that operational safety is not compromised, SCPL would minimise light emissions from the Project by select placement, configuration and direction of lighting so as to reduce off-site nuisance effects where practicable. Establishment of the permanent visual barrier adjacent to the Roseville West Pit Extension and use of temporary bunding on top of the Stratford Waste Emplacement during Year 7 of the Project would also minimise direct views of light sources during night-time mining operations.

Measures that would be employed to mitigate potential impacts from night-lighting would include:

- Compliance with Australian Standard 4282: 1997 - *Control of the Obtrusive Effects of Outdoor Lighting* for all external lighting associated with the Project.
- Restriction of night-lighting to the minimum required for operational and safety requirements.



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- Use of directional lighting techniques to direct light away from sensitive viewpoints.
- Planting of trees at nearby dwellings to help screen any potential night-time lighting impacts, in consultation with the landholder (Section 6.2).

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